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D1.5. Case Study Anthology V2

Governance innovation and implementation in the Cities Mission.

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Abbreviations and acronyms

Acronym	Description
CCC	Climate City Contract, the main governance instrument of the EU's 100 Climate Neutral and Smart Cities Mission including a city's action plans, investment plans and stakeholder commitments
ESG	Environment, social and governance; a framework used by investors and companies to measure a business's long-term sustainability
EU	European Union
KU Leuven	*Katholieke Universiteit* Leuven (catholic university)
MoU	Memorandum of Understanding
NECP	National Energy and Climate Plan
OLO	Odvoz a likvidácia odpadu (Bratislava Waste Management Company)
RES	Renewable Energy Source
SECAP	Sustainable Energy and Climate Action Plan
SIEA	Slovenská inovačná a energetická agenúra(Slovak Innovation and Energy Agency-)
SMEs	Small and medium enterprises
SUMP	It is a strategic planning framework used by cities and municipalities
TSB	Technické siete Bratislava (Bratislava Public Lighting and Networks Company)
UZ	*Universiteitsziekenhuis* (university hospital)
WTE	Waste To Energy

Keywords

Mission Governance; Private Sector Engagement; Monitoring, Evaluation, and Learning (MEL), Multi-Actor Collaboration.

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Introduction

This deliverable presents the second case study anthology on governance innovation and implementation in the Cities Mission, developed under Task 1.1 of SGA1. In accordance with the grant agreement, the work is submitted as one combined deliverable file. For public dissemination, however, the material will be released as three separate thematic reports. The deliverable has therefore been structured into three distinct chapters, each of which can function as a standalone report while also contributing to the overall anthology, which makes the findings more accessible and usable for different audiences across the NetZeroCities consortium, Mission cities, national platforms and wider communities of practice.

The report builds directly on the 2025 case study anthology (Deliverable D1.4), which examined governance innovation in Mission cities during an earlier phase of Climate City Contract development and implementation. While the first anthology focused on identifying and describing emerging governance practices across selected cities, this second anthology places stronger emphasis on implementation. It examines how cities are moving from strategy, commitment and experimentation toward more structured governance arrangements, operational tools, stakeholder engagement processes, monitoring systems and institutional learning mechanisms. In this sense, the report contributes to an evolving evidence base on how Mission cities are organising the transition from planning to implementation, and how the Climate City Contract can function as a governance framework for mobilising actors, aligning capacities and supporting iterative learning.

The combined anthology covers three thematic areas: **multi-actor collaboration and private sector engagement**; **city-driven monitoring, evaluation and learning**; and **mission governance**. Together, these themes address central city governance challenges for the EU Mission “100 Climate-Neutral and Smart Cities”:

- how cities mobilise actors beyond the municipality;
- how they develop learning-oriented systems to assess and steer implementation; and
- how they organise internally to sustain cross-departmental, mission-oriented work.

The three chapters follow a broadly comparable structure. Each begins with a thematic introduction, presents key analytical themes, discusses cross-case findings, and then presents individual city cases that provide more detailed empirical accounts.

The first chapter “**multi-actor collaboration and private sector engagement in the Cities Mission**” analyses how **Lund**, **Leuven**, **Mannheim**, **Milan** and **Bratislava** are engaging companies, intermediaries, utilities, knowledge institutions and other non-state actors in the implementation of climate-neutrality commitments. The chapter examines how private sector engagement is framed, how companies are onboarded, what governance structures and collaboration mechanisms are used, and how voluntary commitments are translated into concrete action. The cases show a range of engagement models, including system demonstrators, independent intermediaries, Local Green Deals, territorial “molecules” and mayor-led climate challenges. The chapter therefore explores the governance conditions to help make private sector collaboration more credible, accountable and useful for climate-neutrality delivery.

The second chapter focuses on “**city-driven monitoring, evaluation and learning (MEL) in mission-oriented urban climate governance**”. It examines how **Stockholm**, **Zaragoza**, **Cork**, **Münster**, **Bergamo** and **Turin** are developing MEL practices to support climate-neutrality implementation. The chapter moves beyond monitoring as a technical reporting function and considers MEL as a governance mechanism: **a way to connect data**, **indicators**, **decision-making**, **adaptive management**, **stakeholder engagement** and **institutional learning**. It addresses questions of governance architecture, measurement systems, data infrastructures, co-benefits, distributional

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indicators, learning loops and the use of evidence in decision-making. Across the cases, the chapter considers how cities are building the capacities needed to understand progress, adjust implementation pathways and make early signs of change visible before long-term emissions outcomes are fully measurable.

The third chapter focuses on "**mission governance**". It analyses how **Umeå**, **Oslo**, **Turku** and **Aachen** are organising the internal and cross-institutional governance arrangements needed to implement climate-neutrality missions. The chapter examines the role of **shared visions**, **transition teams**, **political leadership**, **mandates**, **cross-departmental coordination**, **internal rules and norms**, **operational routines**, **KPIs** and **multi-level governance conditions**. Its central concern is how mission-oriented climate work becomes embedded in the everyday functioning of city administrations, rather than remaining a parallel project or temporary initiative. The cases provide insight into how cities are experimenting with new coordination structures, strengthening political and administrative anchoring, and adapting institutional arrangements to support implementation across departments and sectors.

Across the three thematic chapters, **the anthology includes 15 city cases**. The cases were selected to provide variation across geography, institutional context, city size, administrative capacity, governance maturity and thematic relevance. They include cities operating in different national systems and with different starting points in relation to Climate City Contract development, stakeholder mobilisation and implementation capacity. This variation is important because the report does not seek to identify a single model of effective Mission governance. Instead, it examines how different cities are adapting mission-oriented approaches to their own institutional, political, economic and territorial contexts.

The methodology combines qualitative case study research, desk-based document review, semi-structured interviews, workshops and cross-case synthesis. The empirical basis differs slightly across the three chapters, reflecting the thematic focus and available materials for each set of cases, but the overall approach is consistent. The case studies draw on Climate City Contracts, Climate Action Plans, Investment Plans, municipal strategies, city presentations, governance documents, programme materials, workshop outputs and interview data. The analysis is primarily qualitative, but it is grounded in triangulation across multiple sources. Documentary material provided the basis for understanding formal commitments, institutional arrangements, policy frameworks and stated targets. Interviews and workshops added insight into implementation practices, operational challenges, governance dynamics and the experience of actors involved in the work. Where relevant, interview findings were reported in anonymised or aggregated form to protect participants and to focus attention on cross-cutting governance lessons rather than individual attribution.

The remainder of the report is structured as follows. Chapter 1 presents the analysis of multi-actor collaboration and private sector engagement, beginning with a synthesis of key themes and followed by the five city cases of Lund, Leuven, Mannheim, Milan and Bratislava. Chapter 2 presents the analysis of city-driven monitoring, evaluation and learning, with comparative findings followed by the six city cases of Stockholm, Zaragoza, Cork, Münster, Bergamo and Turin. Chapter 3 presents the analysis of mission governance, with comparative findings followed by the four city cases of Umeå, Oslo, Turku and Aachen. The report concludes through the thematic conclusions embedded in each chapter, rather than through a single overarching conclusion, because each chapter is intended to stand as a separate dissemination product.

Taken together, the three chapters provide a structured account of how Mission cities are developing governance capacities for implementation. The report shows how cities are working to mobilise actors beyond the municipality, create learning systems that support adaptive management, and reorganise internal governance around mission-oriented objectives. By building on the 2025 D1.4 case study anthology, this second anthology contributes to a cumulative understanding of governance innovation in the Cities Mission and provides a basis for continued learning, replication and refinement across Mission cities and the broader NetZeroCities ecosystem.

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D1.5.1. Case study anthology V2

1 Theme 1: Multi-Actor Collaboration and Private Sector Engagement in the Cities Mission

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1.1 Introduction

This synthesis report analyses how five European Mission cities are using multi-actor collaboration and private sector engagement as core governance mechanisms for delivering climate-neutrality commitments: **Lund**, **Leuven**, **Mannheim**, **Milan** and **Bratislava**. It builds on the first 2025 NetZeroCities Theme 1 report on multi-actor collaboration and private sector engagement, extending the comparative lens to a new set of city cases and deepening the focus on implementation practices, instruments and governance architectures.

The cases were selected to reflect a balance of geographical, institutional and economic contexts within the EU Mission "100 Climate-Neutral and Smart Cities". Lund (Sweden) and Leuven (Belgium) represent medium-sized, knowledge-intensive university cities; Mannheim (Germany) is a mid-sized industrial and logistics hub; Milan (Italy) is a large metropolitan centre with strong financial and innovation sectors; and Bratislava (Slovakia) is a capital city operating in a highly centralised governance context. All five cities have made formal net-zero or deep decarbonisation commitments and have developed Climate City Contracts (CCC) and strategic frameworks, but they differ markedly in institutional capacity, economic structure and the maturity of their collaboration infrastructures.

Cities experiment with different institutional configurations to structure relationships with firms, knowledge institutions and civil society: system demonstrators (CoAction Lund), intermediaries (Lund and Leuven), local green deals (Mannheim), territorial "molecules" (Milan), and mayor-led climate challenges (Bratislava). The comparative analysis focuses on how these configurations enable or constrain implementation, how they distribute roles and risks, and how they interact with wider multi-level governance regimes and emerging EU competitiveness and industrial-policy agendas.

This chapter starts by synthesising five in-depth case studies, city presentation materials and a cross-city workshop transcript. The analysis is based on documents and interview material using a shared analytical framework further developed from the initial Theme 1 report. Key themes include: strategic framing, engagement processes, governance structures, instruments, onboarding and inclusion, municipal enabling roles, commitments and outcomes, monitoring and accountability, and motivations and value propositions. Evidence has been triangulated across documents, interviews and workshop reflections to support cross-case comparison while retaining sensitivity to local context.

The five cities exemplify different institutional responses to the Mission's demand for whole-of-society governance. Lund and Leuven leverage long-standing innovation ecosystems and intermediary organisations to convene diverse actors; Mannheim has built a dense architecture of municipal and arm's-length entities; Milan is experimenting with territorial "molecules" as an organising principle for cross-sector investment; and Bratislava is piloting a tightly scoped, mayor-led climate challenge that operates with limited formal powers but high relational intensity.

Each case study follows a shared outline, with Section 1 providing city profile and Mission context, Section 2 detailing the approach to private sector engagement, and Section 3 offering outlook and lessons learned. This common structure enables systematic cross-case comparison while allowing for context-specific elaboration.

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Table 1 - Overview of the five Mission cities

City	Country/ region	Population and urban form	Economic profile	Climate target / CCC focus	Core private sector engagement focal point
Lund	Sweden, Skåne County; part of the Öresund region	≈131,000 inhabitants in 2024; medium-sized municipality combining dense urban neighbourhoods with surrounding villages and agricultural hinterland.	Knowledge-intensive economy anchored by Lund University, science parks and major research infrastructures, with global corporations and innovation-oriented SMEs.	Climate City Contract with 2030 climate-neutrality target and long-term ambition to become climate-positive; strong focus on mobility and energy transitions.	CoAction Lund system demonstrator as a mission-oriented collaboration hub with thematic arenas and project-based "CoActs".
Leuven	Belgium, Flanders	Just over 100,000 inhabitants in a compact historic core embedded in a wider metropolitan constellation, with strong regional mobility connections.	Diversified, knowledge-intensive economy built around KU Leuven, the university hospital, Interuniversity microelectronics centre (imec), and a dense ecosystem of services, research and high-tech firms.	Aims for at least 80% emissions reduction by 2030 and climate neutrality thereafter, with buildings and heat as dominant emission sources.	Leuven2030, an independent multi-actor intermediary that convenes around 400 members and co-governs the CCC implementation portfolio.
Mannheim	Germany, Baden-Württemberg; Rhine-Neckar Metropolitan Region	≈330,000 inhabitants; mid-sized city at the core of a 2.4 million-inhabitant metropolitan region, with strong industrial and logistics footprint.	Highly diversified industrial base including machinery and automotive manufacturing, chemicals, port logistics and a large trades and services sector.	Climate Action Plan / CCC targeting a 93% reduction from 2020 baseline, with industry accounting for nearly half of emissions.	"Local Green Deal" Team and Climate Action Agency supporting bilaterally, combined with multi-actor platforms like KLIMAnetz, the Climate Protection Alliance and I2M industrial consortia.
Milan	Italy, Lombardy; metropolitan region of over 3 million inhabitants	Large metropolitan centre with dense core and pronounced spatial inequalities across districts in income, housing and access to services.	Financial, design and innovation hub with significant real-estate and service sectors and ongoing large-scale urban regeneration projects.	Climate City Contract with long-term decarbonisation pathways to 2035 and 2050, focusing on buildings, energy systems, mobility and nature-based solutions.	Climate City Contract and "molecular" territorial model (CLIMB project) that anchor collaboration with utilities, developers, financial institutions and housing actors in specific urban molecules.
Bratislava	Slovakia, capital city on the Austrian and Hungarian borders	≈477,000 inhabitants (2022) in 17 urban districts; ageing population and strong in-migration in a prosperous metropolitan region.	Service-led economy with strong roles for trade, retail, education, healthcare and public administration; limited manufacturing base.	Targets 63% per-capita emissions reduction by 2030 from 2005 levels, with buildings and transport as major sources; city directly controls about 11% of emissions.	Mayor's Climate Challenge, a voluntary, two-year commitments-based programme with selected "first-mover" companies focused on energy efficiency and renewables.

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The individual case studies drew on semi-structured interviews with municipal officials, intermediary organisations and private-sector actors: Lund (CoAction Lund and municipal transition team representatives plus company partners), Leuven (Leuven2030 and business partners), Mannheim (municipal entities and three companies), and Bratislava (Climate Office and participating companies). The Milan case integrates interviews with CLIMB project and Urban Resilience Department representatives, plus participating companies with documentary material and workshop-based exchanges. In line with good practice for anonymised qualitative reporting, this synthesis references interview insights in aggregated form, without identifying individual respondents.

A cross-city workshop was convened in April 2026. The workshop involved municipal officials and intermediary representatives from Lund, Leuven, Mannheim, Milan and Bratislava and focused on reflecting across cases on emerging practices, challenges and opportunities. Insights from the workshop were incorporated as an additional comparative lens, particularly in the discussion of shared challenges and opportunities in **Section 1.3.**

The remainder of this chapter introduces the five cities and provides a comparative overview of their demographic, economic and governance profiles, alongside their climate targets and primary private-sector engagement mechanisms. Subsequent sections: draw comparative findings across the five cities structured around the main themes of private sector engagement (**Section 1.2**), present a cross-case comparison (**Section 1.3**), and draw out conclusions and implications for Mission governance and the broader net-zero delivery framework (**Section 1.4**), before presenting the full individual city cases (**Section 1.5**).

1.2 Key themes for private sector engagement

The thematic framework used for this synthesis builds on the research conducted in the first iteration of this report: **Multi-Actor Collaboration in Mission City Climate Action: Private Sector Engagement**. This section briefly defines the core themes used in the cross-case analysis, before Section 4 expands on these themes to discuss across the five cities. The themes are:

- (i) strategic framing and evolution;
- (ii) engagement processes and practices;
- (iii) governance structures and roles;
- (iv) governance tools and collaboration mechanisms;
- (v) onboarding, inclusion and representation;
- (vi) municipal powers, enabling roles and support;
- (vii) private sector commitments, collaboration and outcomes;
- (viii) monitoring, reporting and accountability; and
- (ix) motivations, incentives and value propositions.

1.2.1 Strategic framing and evolution

Across the cases, private sector engagement is framed in explicitly mission-oriented or whole-of-society terms.

Lund positions companies as co-owners of a concrete mission to achieve climate-neutral transport and energy in a defined innovation district by 2030, embedded in a broader Climate City Contract roadmap.

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Leuven centres shared stewardship around climate neutrality, with Leuven2030 serving as the intermediary through which companies, knowledge institutions and civil society co-produce a portfolio of breakthrough projects aligned with the CCC.

Mannheim articulates an “every deal counts” philosophy that treats each voluntary commitment as a visible step in a cumulative transition, while

Milan’s molecular model situates private actors within specific urban territories where integrated decarbonisation scenarios are co-developed.

Bratislava’s Mayor’s Climate Challenge frames collaboration as a long-term partnership for concrete, site-specific investments that simultaneously cut emissions and reduce operating costs.

The evolution trajectories show a common pattern: cities move from ad hoc, project-based collaboration and informal networks toward more structured, mission-anchored frameworks. In Leuven and Mannheim, earlier experiments with broad coalitions (Leuven2030’s early volunteer network, Mannheim’s Climate Protection Alliance) gradually gave way to more targeted engagement tools and portfolios once Climate City Contracts and Local Green Deals were established. Lund’s CoAction Lund emerged from Sweden’s Viable Cities “system demonstrator” programme and now functions as a flagship arena for mobilising firms around mobility and energy transitions. Milan and Bratislava, both working under stronger multi-level constraints, have used the Mission as a lever to reframe earlier, more fragmented approaches into more coherent, long-term frameworks (the molecular model and the Climate Challenge, respectively).

1.2.2 Engagement processes and practices

Engagement modalities across the cases blend bilateral relationship-building, multi-actor forums and project-based collaboration.

Lund’s CoAction hub convenes general assemblies for all members, thematic arenas for mobility, energy and construction, and more operational “CoActs” in which small coalitions of firms and municipal units design and implement specific interventions.

Leuven2030 combines bilateral meetings, thematic working groups, and governance participation through its multi-stakeholder board, while Mannheim’s Local Green Deal Managers, Climate Action Agency and business networks like KLIMAnetz orchestrate a dense ecology of bilateral advisory relationships, peer-learning networks and public recognition events.

Milan’s engagement practices are strongly tied to the molecular model, with study visits, co-design workshops, World Café sessions and finance-focused focus groups structured around specific territories. These gatherings use visual mapping, scenario exercises and actor-mapping to align perspectives and identify cross-sectoral interventions within molecules.

Bratislava’s Climate Challenge relies on intensive, high-touch engagement: a dedicated municipal programme manager conducts repeated bilateral calls with each company, organises joint training sessions and peer meetings, and maintains ongoing contact to troubleshoot implementation challenges.

In several cases, engagement practices deliberately cultivate soft peer pressure - for example by grouping competitors in Bratislava or by publicising deals on Mannheim’s iDEAL platform to trigger a “fear of missing out” effect.

1.2.3 Governance structures and roles

Governance architectures differ substantially across the cases, but all attempt to embed private-sector engagement within broader climate governance rather than treating it as an add-on.

Leuven’s model is distinguished by an independent intermediary, **Leuven2030**, with a multi-stakeholder board representing six stakeholder groups, operating alongside municipal governance but structurally embedded in Climate City Contract processes. Mannheim’s climate governance is unusually well-resourced, with a Transition Team led from the First Deputy Mayor’s office, a Local Green Deal team

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situated between the Mayor and First Deputy Mayor, a Climate Action Agency, the Environment and Economic Development Departments, and several business networks focused on climate.

Lund's governance is organised around a municipal transition team and the CoAction hub, which coordinates CoAction arenas and projects while linking them to the broader CCC roadmap. Milan's Urban Resilience Department leads the molecular model and CCC processes, supported by technical agencies and university partners, while Bratislava's Climate Office - embedded in the Mayor's Office - serves as the central node for both city-wide climate strategy and the Mayor's Climate Challenge. In all cases, specific individuals - project managers, intermediaries and technical advisors - play outsized roles as relational linchpins, translating political mandates into operational collaboration and providing continuity across political cycles.

1.2.4 Governance tools and collaboration mechanisms

A wide repertoire of instruments is used to structure collaboration. Leuven's CCC and associated portfolio templates provide a shared framework for voluntary commitments, while Leuven2030's project templates and analytic tools help partners translate indicative commitments into concrete actions. Mannheim's Local Green Deal uses an online platform to publicise "deals" - voluntary, above-baseline commitments - supported by 7 Local Green Deal managers that work with companies to develop deals and accessing funding information; the Climate Action Agency provides standardised energy audits and technical support, and KLIMAnetz structures a 2.5-year peer-learning and target-setting cycle for ten participating firms.

Lund has developed green travel plans as a central instrument to operationalise collaboration on mobility, complemented by project contracts for CoActs and developing collaboration agreements for CoAction membership. Milan uses decarbonisation scenarios at molecule level, visual maps and case-study repertoires to support shared understanding and investment planning. Bratislava's Climate Challenge relies on memoranda of understanding specifying concrete measures and targets for each building or site, complemented by standardised progress reviews and public recognition at a mayor-hosted closing event. Across all cases, these tools remain formally non-binding, but they make expectations explicit, create reference points for monitoring, and signal seriousness of intent.

1.2.5 Onboarding, inclusion and representation

Onboarding strategies differ according to institutional capacity and the maturity of local ecosystems.

Leuven2030 maintains an open membership model but has strategically shifted from broad coalition-building to working more intensively with a smaller group of high-leverage actors. Mannheim's Local Green Deals are open to any organisation willing to make a qualifying commitment, but more intensive formats such as KLIMAnetz and the Climate Protection Alliance are deliberately limited-cohort or closed-membership to preserve trust and depth of engagement. Lund's CoAction started with a formation group of ten key companies and gradually expanded membership to around 37 organisations, prioritising actors with strong leverage over mobility and energy in the target district.

Milan's onboarding is closely tied to existing regeneration initiatives and CCC signatories, using the molecular approach to bring in actors with assets or projects in the selected molecules. Bratislava has deliberately targeted "first-mover" companies with strong internal ESG capacity and significant building footprints. Bratislava seeks for scale by inviting partners (ESG lead) with high capacity for implementation and to inspire others to do the same.

Across all cases, SMEs and less-resourced organisations remain harder to engage, with capacity constraints, knowledge gaps and weaker incentives limiting their participation; initiatives such as Leuven2030's support for smaller cooperatives, Mannheim's Heat Transition Academy and Lund's outreach to additional employers show emerging responses but also underline enduring inclusion gaps.

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1.2.6 Municipal powers, enabling roles and support

Municipal powers are structurally constrained in all cases, but cities leverage a mix of convening authority, technical expertise, financial support and regulatory navigation. Leuven's municipal administration provides strategic framing, data, planning instruments and some project funding, while relying on Leuven2030 to broker relationships and maintain momentum. Mannheim offers one of the most comprehensive support packages, including free technical advisory services via the Climate Action Agency, assistance accessing funding, targeted subsidies, recognition awards and training programmes such as the Heat Transition Academy for tradespeople.

Lund's municipality plays multiple roles through its CoAction hub: convener, technical advisor, funder and broker. It provides coaching for green travel plans, small project grants and administrative support. Milan's Urban Resilience Department coordinates technical analysis, scenario work and stakeholder engagement, but faces gaps in sustainable finance expertise, highlighting the need to complement urban planning skills with financial engineering capacities. Bratislava's Climate Office emphasises pragmatic support: helping companies interpret regulations, facilitating access to municipal land where needed, and providing tailored advice even when it cannot directly change national rules. In all cases, cities act as problem-solvers and enablers more than as classical regulators.

1.2.7 Private sector commitments, collaboration and outcomes

Private-sector commitments across the cases range from city-wide climate pacts and CCC signatory roles to highly concrete, site-specific measures. In Leuven, companies commit to participating in breakthrough projects on green heat, building renovation, circular construction and logistics, with the CCC and Leuven2030's portfolio governance cycle providing structure and follow-up. In Mannheim, companies formalise Local Green Deals, join KLIMAnetz with quantified energy and emissions targets, and participate in industrial consortia on hydrogen, circular economy and other transformation themes. Lund's CoAction members sign statements of intent linked to the CCC, develop green travel plans with minimum action requirements, and participate in CoActs on shared mobility and local energy networks.

Milan's private actors make portfolio commitments through the CCC and co-develop decarbonisation scenarios and investment concepts within molecules, while Bratislava's Climate Challenge participants sign MoUs specifying percentage energy reductions and concrete measures for each site. Quantified outcomes are still emerging, but there is evidence of energy savings, new photovoltaic capacity, behavioural changes in commuting, and strengthened project pipelines in all cities. Equally important are relational and institutional outcomes: stronger networks, improved internal legitimacy for sustainability teams, and more structured channels for city-business dialogue.

1.2.8 Monitoring, reporting and accountability

Monitoring and accountability remain predominantly soft and process-oriented, but several cases have begun to strengthen data practices. Leuven2030 systematically follows up on CCC commitments and is developing tools to estimate the emissions impact of measures, even as systematic monitoring of individual companies is still emerging. Mannheim's KLIMAnetz publishes collective targets and progress, while the city is developing methods to estimate the CO_2 impact of Local Green Deals more systematically. Lund integrates commuter surveys, project reporting and CCC monitoring pathways, and uses external coaching to support firms in interpreting data and adjusting measures.

Milan's monitoring is tied to scenario modelling and molecule-level data layers, with municipal staff and technical partners jointly validating assumptions and outputs. Bratislava's Climate Challenge requires baseline and follow-up energy data for participating buildings, but in practice much monitoring is internal to companies, with the city focusing on implementation progress and visibility rather than enforcing strict performance obligations. In all cases, accountability relies heavily on transparency, peer visibility, reputational incentives and ongoing dialogue, reflecting both legal constraints and the voluntary nature of most instruments.

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1.2.9 Motivations, incentives and value proposition

Companies participate for a mix of normative, strategic and pragmatic reasons. Across the cases, large firms emphasise alignment with corporate climate targets and ESG expectations, reputational benefits, and a desire for stable local policy environments. SMEs, cooperatives and social-economy actors value access to networks, practical support and visibility that they could not easily secure individually. In Mannheim and Bratislava, regulatory pressure (for example from EU sustainability reporting) and energy costs are strong underlying drivers, while the value proposition is framed in very pragmatic terms: cost savings, risk reduction and business opportunities as a result of public recognition/greater visibility.

In Leuven and Lund, relational and learning benefits stand out: companies stress the importance of peer examples, trusted municipal counterparts and opportunities to experiment with new solutions. Milan's stakeholders emphasise the chance to influence strategic decarbonisation scenarios, align investments with urban plans and participate in high-visibility Mission-labelled initiatives. Across all cities, there are tensions between high expectations and finite municipal capacity, making honest communication about what cities can and cannot offer an important part of maintaining trust.

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1.3 Discussion: emerging themes of multi-actor collaboration and private sector engagement

This section discusses three common themes emerging from the cases, along with shared challenges and opportunities. For each theme, we highlight convergences and divergences in governance choices and implementation practices, supported by comparative tables where appropriate. The analysis emphasises how different institutional designs respond to similar underlying challenges, and how they variously balance ambition, inclusiveness, feasibility and scalability.

1.3.1 Strategic framing and political anchoring

All five cities explicitly frame climate neutrality as a shared societal mission that cannot be delivered by municipal action alone, but the way this narrative is operationalised differs.

Lund's CCC and the CoAction Lund system demonstrator presents climate neutrality as an innovation-driven transformation, using concrete goals (such as a 90% reduction in transport emissions and a modal split target) to make the mission tangible.

Leuven's CCC and Leuven2030 governance model frame climate neutrality as a city-wide project anchored in co-ownership by six stakeholder groups, with an emphasis on just transition and social equity alongside technical decarbonisation.

Mannheim situates its Local Green Deal and broader climate architecture in a narrative that explicitly links decarbonisation to industrial competitiveness and innovation, echoing the EU's Clean Industrial Deal logic that the green transition is a route to renewed prosperity.

Milan's molecular model gives the mission a territorial and spatial dimension, treating specific urban "molecules" as living test beds where decarbonisation, regeneration and innovative finance are integrated.

Bratislava's framing is more explicitly pragmatic and relational: the Mayor's Climate Challenge is presented as a movement for change built on long-term partnerships with responsible companies, with a strong emphasis on cost savings and resilience as entry points.

A common feature is political anchoring. In Mannheim, the First Deputy Mayor holds the environmental portfolio and chairs the Transition Team; in Leuven and Lund, climate neutrality is elevated in city strategies and backed by visible mayoral support; in Bratislava, the Mayor and Vice Mayor for Climate actively endorse the Climate Challenge; and in Milan, the Urban Resilience Department works closely with political leadership around the CCC and CLIMB project.

1.3.2 Engagement architectures and relational infrastructures

The cases illustrate three broad types of engagement architectures.

- First, intermediary-centred models (Leuven and Lund) use a dedicated organisation or hub to convene and sustain relationships with businesses and other actors.
- Second, municipal-ecosystem models (Mannheim) embed engagement capacity directly in city administration and municipally co-owned agencies, combining advisory, networking and recognition functions.
- Third, programme-centred models (Bratislava, and to some extent Milan's CLIMB) focus on a specific, tightly defined programme with intensive bilateral support and relatively small cohorts of companies.

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In Leuven, the presence of Leuven2030 as a neutral intermediary with its own governance and staff is repeatedly cited as the key enabler of sustained collaboration: it can bridge municipal silos, maintain continuity across political cycles and provide a trusted platform where businesses feel they are co-owners rather than mere consultees.

Lund's CoAction hub, although located within the municipality, functions in a similar way as a focal point for engagement around a system demonstrator.

Mannheim invests heavily in municipal capacity: Local Green Deal Managers, who provide assistance to companies developing "deals", are embedded in departments across the administration, and the Climate Action Agency offers free technical support - companies describe these individuals as genuine "sparring partners", underlining the importance of relational quality.

Bratislava demonstrates that high-intensity engagement with a small group of companies can be achieved even with limited formal powers, provided there is a dedicated and trusted programme manager who can leverage prior corporate-sector experience.

Milan's molecular engagement shows the value of anchoring relationships in concrete territories and projects, where stakeholders jointly walk the streets, examine sites and co-design actions.

Across all cases, relational infrastructure - trust, continuity of contact persons, and the ability to mediate between municipal procedures and business logics - emerges as at least as important as formal governance diagrams.

1.3.3 Instruments, incentives and accountability

The menu of instruments used to engage and incentivise companies is broad but can be grouped into four clusters: strategic frameworks and charters (CCC, Local Green Deals, Climate Challenges); project and portfolio tools (green travel plans, breakthrough projects, molecule scenarios, CoActs); advisory and capacity-building services (energy audits, coaching, training academies); and recognition and visibility mechanisms (awards, public events, online platforms).

In Leuven, the CCC and its 86-project portfolio serve as a central reference, while Leuven2030's assessment tools and follow-up procedures give it practical bite.

In Mannheim, the Local Green Deal and KLIMAnetz formats combine voluntary commitments with structured peer learning, technical assistance and public recognition via the iDEAL platform and environment awards.

Lund's combination of green travel plans, CoActs and system-demonstrator funding lowers the barrier for firms to move from intent to action, while Milan's decarbonisation scenarios and financial-instrument work seek to make complex, cross-sector investment opportunities legible and investable.

Bratislava's Climate Challenge sharpens the instrument mix further: participation is contingent on companies being able to specify concrete measures upfront, with MoUs turning corporate ambitions into time-bound, site-specific commitments. The city offers non-financial incentives - tailored training, persistent municipal support and high-profile recognition - while emphasising the cost-saving logic of many measures.

Across all cases, the absence of hard legal enforcement shifts the centre of gravity toward soft accountability: visibility, peer pressure, and the reputational and relational benefits of being part of an ambitious climate coalition.

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Table 2 - Selected thematic configurations across the five cases.

City	**Primary engagement vehicle**	**Dominant narrative**	**Key instruments**	**SME inclusion approach**
Lund	CoAction Lund system demonstrator and CCC roadmap	Mission-oriented implementation in a defined innovation district, with companies as co-owners of climate-neutral mobility and energy.	CoAction membership, thematic arenas, green travel plans, CoActs, project funding, commuter surveys.	Focus initially on large employers and utilities; gradual outreach to additional employers and solution providers; smaller local firms remain under-represented.
Leuven	Leuven2030 intermediary and Climate City Contract	Shared stewardship of climate neutrality through a multi-actor network spanning six stakeholder groups.	CCC commitments, breakthrough projects, Leuven2030 membership structure, bilateral engagement, portfolio management cycle.	Strong engagement of large institutions and cooperatives; SMEs often reached via clusters; recent shift toward working more deeply with a smaller set of high-leverage actors.
Mannheim	Local Green Deal ecosystem (iDEAL), Climate Action Agency, KLIMAnetz, industrial consortia	"Every deal counts": cumulative impact of many voluntary commitments, linking decarbonisation and industrial competitiveness.	Local Green Deals, Deal Box, KLIMAnetz peer network, Climate Protection Alliance, Heat Transition Academy, Green Industry Cluster.	Strong offer for SMEs via advisory services, LGD Managers and KLIMAnetz, but engagement remains more consolidated among larger firms and trades with clear market opportunities.
Milan	Climate City Contract and CLIMB molecular model	Territorially grounded decarbonisation, linking regeneration, mobility, energy and finance in specific urban "molecules".	Stakeholder workshops and study visits in molecules, decarbonisation scenarios, finance-focused World Cafés and focus groups, visual mapping.	Focus on actors with assets and projects in pilot molecules (utilities, developers, housing providers, universities); challenges in sustaining engagement of some associations and in reaching broader SME base.
Bratislava	Mayor's Climate Challenge	Small-scale, high-intensity partnership programme showcasing pragmatic, cost-saving climate action within tight governance constraints.	MoUs with concrete measures, bilateral consultations, joint training sessions, public recognition events.	Deliberate prioritisation of large, sustainability-leading companies with strong internal capacity; targeting large building owners provided a feasible and high-impact entry point for a programme of this scope; SMEs not yet a primary focus in the pilot phase.

1.3.4 Shared challenges and emerging opportunities

The cross-case analysis confirms many of the shared challenges identified in the 2025 Theme 1 report and adds new nuances. Four clusters of challenges recur across the five cities: (i) capacity and resourcing constraints within municipalities and intermediaries; (ii) difficulties in engaging SMEs and less-resourced organisations; (iii) regulatory and multi-level governance misalignments; and (iv) sustaining momentum and managing expectations in volatile economic and political contexts.

Capacity constraints are visible even in relatively well-resourced Mannheim and Leuven, where maintaining intensive engagement, monitoring and portfolio management strains staff time and budgets. In Lund and Bratislava, small teams shoulder complex facilitation roles; Milan struggles to complement strong planning and engagement skills with specialised sustainable-finance expertise. Turnover in key positions threatens relational continuity, underlining the need to treat engagement capacity as a strategic investment rather than a short-term project cost.

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Engaging SMEs and less-resourced actors remains a structural challenge. Across cases, smaller firms face time, knowledge and financing constraints, and tend to prioritise core business over collaborative climate action unless a clear and immediate business case is evident. Initiatives such as Leuven2030's attention to smaller cooperatives, Mannheim's Heat Transition Academy for trades, and Lund's efforts to broaden CoAction membership beyond large institutions show promising directions but have not yet reached the "long tail" of companies that collectively shape urban emissions trajectories.

Regulatory and multi-level dynamics effect what cities can achieve through collaboration alone. Lund cannot resolve tax rules that penalise ride-sharing benefits or grid regulations that make local flexibility solutions difficult; Bratislava operates in a highly centralised system where building codes, energy regulation and permitting are largely national competences; Milan's partners experience long and unpredictable authorisation processes that can delay projects for years; and Mannheim grapples with shifting EU reporting requirements that affect SME engagement in KLIMAnetz. These constraints confirm the need for Mission governance to intentionally connect city-level experiments to national and EU-level regulatory and financing reforms.

At the same time, the cases reveal several shared opportunities and breakthroughs:

- There is growing experimentation with governance architectures that move beyond single-project partnerships to more systemic ecosystems: Leuven's intermediary model, Mannheim's layered engagement system, Milan's molecular approach and Lund's system demonstrator illustrate different pathways.
- New forms of capacity-building and knowledge infrastructures are beginning to tackle practical bottlenecks in implementation, not just awareness. These include: Mannheim's Heat Transition Academy, Leuven2030's impact assessment tools and Milan's data-rich decarbonisation scenarios.
- There is increasing recognition that climate collaboration must be connected to economic and competitiveness agendas. Mannheim's Green Industry Cluster, Leuven's climate fund work and Bratislava's cost-savings narrative all speak to a convergence between climate policy and industrial / investment strategies.
- Relational and reputational dynamics can be powerful levers for action. The challenge for the next phase of Mission implementation is to scale these relational successes, extend them to harder-to-reach actors, and connect them to structural reforms in finance, regulation and skills.

1.4 Conclusions and outlook

The five cases in this anthology highlight both the indispensability and the complexity of multi-actor collaboration and private sector engagement in city-level climate governance. They confirm that without sustained, structured engagement with businesses and other non-state actors, municipal climate plans and Climate City Contracts risk remaining aspirational. At the same time, they show that meaningful collaboration is not a simple matter of convening workshops or collecting signatures: it requires carefully designed governance architectures, long-term relational work, targeted instruments, and honest navigation of regulatory and economic constraints.

Several overarching conclusions emerge:

- **There is no single ideal model for private sector engagement**: intermediary-led networks, municipal ecosystems, territorial programmes and high-intensity challenges can all be useful mechanisms when aligned with local institutional realities and capacities. What matters is clarity of roles, credible political anchoring, and the presence of dedicated people and structures that can translate strategic missions into everyday collaboration.

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- **Voluntary commitments can drive substantial action**, provided they are embedded in supportive instruments (advisory services, funding access, technical tools) and anchored in soft but meaningful accountability mechanisms (visibility, peer pressure, portfolio follow-up).
- **Multi-actor collaboration is itself a site of learning and institutional innovation**. Cities and intermediaries are continually adjusting their engagement portfolios - shifting focus from breadth to depth, redesigning tools such as alliances and networks, and developing new capacities in areas such as sustainable finance and skills development. These adaptive processes are not peripheral but central to Mission governance, and should be explicitly recognised and supported in EU and national frameworks (for example through long-term funding for engagement capacity and knowledge infrastructures).
- **Structural challenges cannot be solved at city level alone**. Mission governance will need to connect city experiments more deliberately to national reforms on taxation, building codes, energy regulation and procurement, and to EU-level instruments under the Clean Industrial Deal, cohesion policy and green finance agenda.

Cities like Mannheim, Leuven and Milan, already engaging with industrial and financial actors at scale, can serve as laboratories for aligning climate and competitiveness agendas; cities like Bratislava show how relational, trust-based programmes can operate effectively.

Looking ahead, three strategic priorities stand out for advancing multi-actor collaboration and private sector engagement in Mission cities.

- **Invest in people and intermediaries:** without stable teams and trusted conveners, even well-designed instruments will underperform.
- **Deepen work on scaling and inclusion** by designing tailored approaches for SMEs, social-economy actors and neighbourhood-based initiatives, building on emerging practices such as energy-transition academies, climate funds and territorial programmes.
- **Strengthen the connective tissue between local collaboration ecosystems and higher-level policy and finance systems**, so that lessons from cities inform regulatory change and large-scale investments, and vice versa.

If these priorities are pursued, the kinds of governance innovations illustrated in Lund, Leuven, Mannheim, Milan and Bratislava can become not isolated exemplars but core components of a net-zero delivery framework across Europe.

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1.5 City Cases: Multi-Actor Collaboration and Private Sector Engagement in the Cities Mission

1.5.1 Lund (CoAction Lund)

1.5.1.1 City Profile and Mission Context

Lund is a medium-sized municipality in southern Sweden, located in Skåne County and forming part of the wider Öresund region together with the city of Malmö and the metropolitan area of Copenhagen. The municipality comprises the historic city of Lund and eight surrounding villages, embedded within a predominantly agricultural hinterland, and thus combines dense urban neighbourhoods with smaller settlements and rural land (Lund Municipality, 2024). This spatial configuration shapes both emission profiles and the governance challenges of orchestrating climate action across different territorial and sectoral contexts.

Lund had around 131,000 inhabitants in 2024 and is projected to grow to roughly 140,000 residents by 2030, driven mainly by in-migration and the continued expansion of research and knowledge-intensive industries (Lund Municipality, 2024). The age structure is characterised by a relatively large share of young adults linked to Lund University, but also by demographic ageing in the oldest cohorts, which reinforces concerns about long term welfare and fiscal pressures. Socio-economic statistics indicate that most residents live in areas classified as having good or very good socio-economic conditions, although a non-trivial share live in more disadvantaged or mixed neighbourhoods, which matters for distributional dimensions of the climate transition.

Economically, Lund is a knowledge-intensive city anchored by Lund University, Ideon Science Park and Medicon Village, with major research infrastructures such as the European Spallation Source (ESS) and MAX IV cementing its position as a European research hub (Lund Municipality, 2024). Global corporations such as Tetra Pak, Alfa Laval and Axis, along with a dense field of high-tech and life-science SMEs, provide a strong base of private-sector actors with significant innovation capacity. This economic structure both facilitates and complicates climate governance: it provides a pool of potential frontrunner firms and solution providers, but also creates complex interdependencies across global value chains and local infrastructures.

Lund has been engaged in climate and environmental policy since at least the 1990s and has progressively tightened its targets. The current CCC commits the city to achieving climate neutrality by 2030, with an 80 percent reduction in territorial greenhouse gas emissions from 2010 levels and a long-term ambition of becoming climate-positive around 2045 (Lund Municipality, 2024). The territorial emissions inventory shows that emissions have declined substantially since 2010, largely due to decarbonisation of the district heating system, while transport and agriculture/land-use now constitute the main emitting sectors. The city has adopted a specific goal of reducing transport emissions by at least 90 percent between 2010 and 2030, alongside a consumption-based target of one tonne of emissions per capita by 2050.

Lund is deeply embedded in multi-level climate-governance frameworks. It is a founding member of the Swedish Viable Cities programme, participates in the EU-funded NetZeroCities project and is part of the Urban Transition Mission (Lund Municipality, 2024). At the local level, the governance landscape includes Climate Alliance Lund, Future by Lund as an innovation platform, and a Climate Policy Council composed of researchers from Lund University and the Swedish University of Agricultural Sciences who provide independent assessments of local climate progress. Within this architecture, CoAction Lund is positioned as one of the municipality's key "system demonstrators" for climate-neutral mobility and energy, and as a focal arena for collaboration with private-sector actors (Lund Municipality, 2024; NetZeroCities, 2025).

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1.5.1.2 CoAction Lund as mission-oriented system demonstrator

Lund's overall approach to engaging private-sector actors is framed in explicitly mission-oriented terms. The CCC states that achieving the 2030 climate-neutrality target requires mobilisation of actors well beyond the municipal organisation, including businesses, research institutions and civil society, and highlights the importance of system demonstrators such as CoAction Lund as implementation vehicles (Lund Municipality, 2024). Rather than treating companies solely as objects of regulation or beneficiaries of municipal programmes, the city positions them as co-owners of the mission who are expected to contribute both through their own internal transitions and through participation in collaborative projects.

Officials describe an evolution from earlier, more fragmented forms of engagement (including one-off projects, ad hoc consultations and voluntary business networks) towards a more coherent, mission-anchored approach tied to the CCC and the EU Cities Mission. In this narrative, CoAction Lund functions as a flagship initiative that concentrates and structures engagement around the intertwined systems of mobility and energy in a geographically bounded innovation district. The mission for CoAction is defined as achieving climate-neutral transport and energy in the area by 2030, with concrete targets such as a 90 percent reduction in transport emissions and a "one third" modal split between cars, public transport and active modes (Lund Municipality, 2024; Interview 2, 2026).

CoAction Lund emerged from a call issued by Viable Cities for "system demonstrators for climate-neutral cities", with the explicit aim of creating large-scale, real-world pilots that pioneer new ways of working and can be scaled to other cities (Lund Municipality, 2024a). Lund's proposal focused on the highly workplace-dense district encompassing Brunnshög, Ideon Science Park and Medicon Village in the north-eastern part of the city, where infrastructure investments, research facilities and major employers intersect. The initiative was designed as a system demonstrator for the intertwined systems of mobility and energy, with a mission to achieve climate-neutral transport and energy in the area by 2030 (CoAction Lund, 2025). The mission framing is unusually concrete: CoAction aims to contribute to a 90% reduction in transport-related emissions from 2010 levels and to a modal split where no more than one-third of trips are made by car, with the remaining two-thirds split between active modes and public transport, supported by flexible, locally produced and digitally coordinated energy systems (CoAction Lund, 2025; Lund Municipality, 2024).

Mission-oriented approaches require a clear narrative about why private-sector engagement is central, how it is expected to contribute to emissions reduction, and how it is linked to broader economic and social objectives (NetZeroCities, 2025). Lund's strategy is broadly consistent with this guidance. Private-sector engagement is framed as necessary not only for mobilising emissions reductions in sectors outside direct municipal control, but also for leveraging local innovation ecosystems, attracting investment and experimenting with new business models and governance arrangements. The CoAction system demonstrator embodies this logic by linking company participation to both climate impact and innovation opportunities.

In terms of evolution, city actors distinguish an exploratory phase of engagement prior to the CCC, a co-creation phase during CCC preparation, a launch phase for CoAction as a Viable Cities system demonstrator, and a current early implementation and scaling phase marked by the development of CoActs and testbeds (Interview 2, 2026). Major milestones include joining Viable Cities, adopting the CCC, securing funding for CoAction as one of two Swedish system demonstrators, and moving from an initial statement of intent signed by 37 members towards a more formal collaboration agreement.

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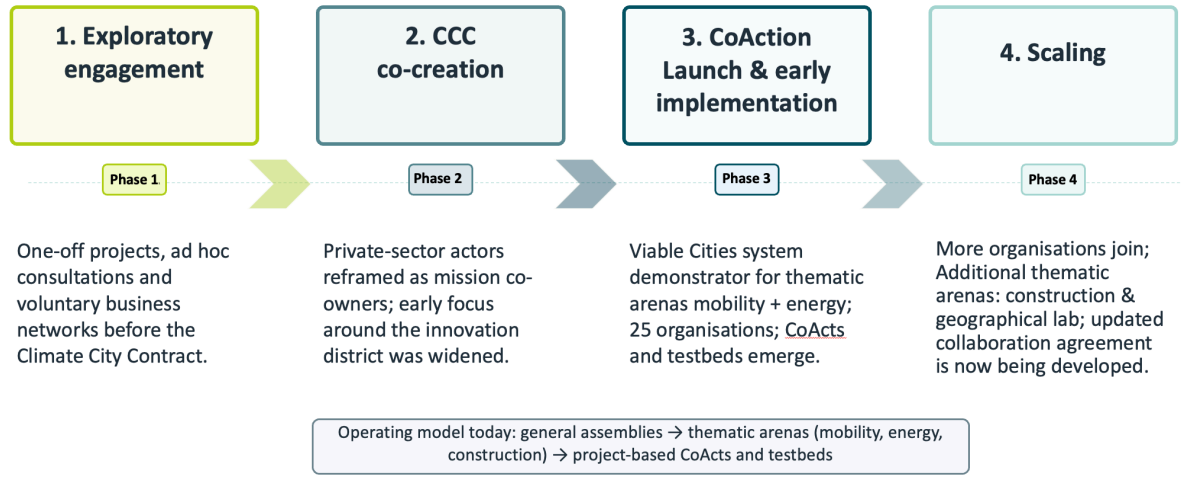


Figure 1 - Evolution of CoAction Lund.

Target groups have been explicitly prioritised. The city's initial outreach for CoAction focused on large employers, property owners, municipal companies and key infrastructure and utility actors in the innovation district, on the basis that their decisions around commuting, parking, building energy use and infrastructure investments would have the largest leverage on local emissions (Interview 2, 2026). Solution providers and start-ups with relevant mobility and energy services were subsequently brought in to provide technical and digital capabilities. While the CCC and CoAction materials refer to SMEs more broadly, the current engagement is still strongly weighted towards larger organisations and innovation-oriented SMEs, which has implications for inclusion and representation analysed in later sections.



Figure 2 - Active stakeholder members in CoAction Lund.

Engagement Processes and Practices

Engagement with companies in Lund occurs through a layered set of modalities. At the broadest level, CoAction Lund organises general assemblies that bring together all members and associated "CoAction friends" for networking, high level updates and horizon-scanning. These meetings are

typically used to present overall progress, spotlight specific CoActs, and share information about funding opportunities and regulatory developments (Interview 2, 2026). Stakeholders describe these assemblies as important for maintaining a sense of shared purpose and for enabling contacts across sectoral and organisational boundaries (Interview 3, 2026; Interview 4, 2026).

Below this level, thematic arenas for mobility, energy and construction convene smaller groups of actors with relevant expertise around more focused agendas. Mobility-arena meetings bring together employers, property owners, mobility service providers and municipal mobility planners to discuss commuting, business travel, freight and shared mobility, often working directly with the data and insights generated through commuter surveys and green travel plans. Energy arena meetings involve Kraftringen, ViaEuropa, Energy Opticon, property owners and other stakeholders in examining issues including local energy networks, flexibility services and the integration of new research infrastructures into the energy system (Interview 3, 2026; Interview 4, 2026).

At the most operational level, CoActs function as project-based collaboration units. Initial idea-generation workshops in each arena produced a long list of potential interventions, which were then clustered and refined into a smaller number of CoActs with defined objectives, partners, budgets and timeframes. Examples include green travel plan programmes and ride-sharing portals in mobility, and EnergyNet pilots and flexibility services in energy (Interview 2, 2026; Interview 3, 2026; Interview 4, 2026). Stakeholders characterise CoActs as “chaotic in a positive way”: they allow for bottom-up initiative and flexibility, but also depend heavily on the time, motivation and informal leadership of participants.

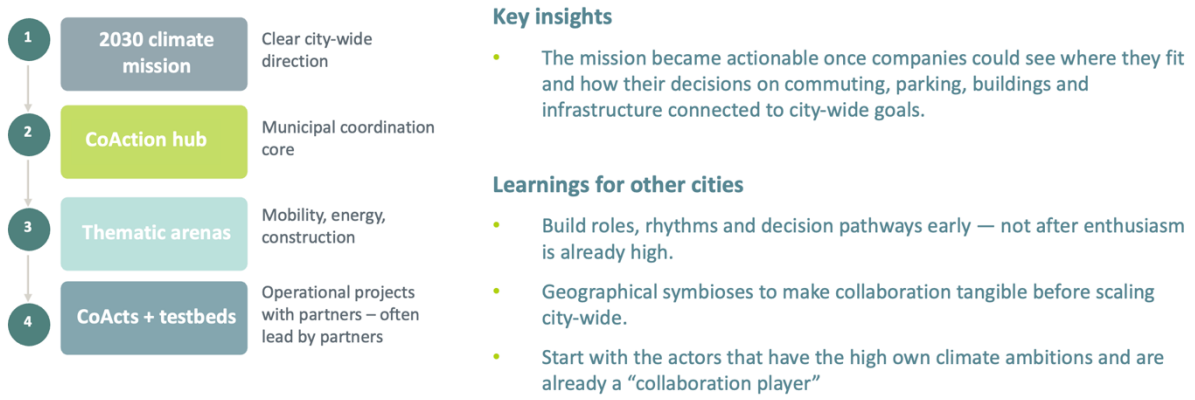


Figure 3 - Distributed implementation through "CoActs".

Trust-building is a central feature of these engagement processes. Companies repeatedly emphasise the accessibility of municipal coordinators, the perceived sincerity of the city’s commitment, and the fact that reporting and administrative requirements are kept proportionate to the size of projects (Interview 2, 2026; Interview 3, 2026; Interview 4, 2026). Joint workshops and team-building exercises, particularly in the early phases of CoAction, are reported to have built relational capital that later facilitated more sensitive discussions around data sharing, competitive boundaries and risk-sharing. This aligns with findings from the Theme 1 2025 report that trust and perceived fairness of process are crucial enablers of durable multi-actor collaboration (NetZeroCities, 2025).

Engagement practices are differentiated across company types. Large firms and municipal companies tend to engage through strategic dialogues, participation in steering or leadership groups, and involvement in larger work packages. Innovation-oriented SMEs and start-ups including CoRide or ViaEuropa participate through smaller, more agile projects, often with limited direct financial compensation but significant test-bed access and relational benefits (Interview 2, 2026; Interview 3, 2026). Routine communication is maintained through email lists, regular arena meetings, bilateral conversations and surveys; there is no dedicated digital collaboration platform, which may limit visibility across projects and actors but keeps transaction costs relatively low.

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Governance Structures and Roles

The organisational architecture for private-sector collaboration in Lund revolves around a municipal transition team and the CoAction hub. The CCC describes a climate-governance setup in which a central transition team coordinates climate-neutrality efforts across municipal departments and companies, overseen by political leadership and supported by thematic roadmaps (Lund Municipality, 2024). Within this framework, the CoAction hub is located in the municipal organisation and staffed by project managers with expertise in environmental strategy, mobility, business development and finance (Interview 2, 2026). The hub manages stakeholder engagement, project-portfolios, communication and monitoring related to CoAction.

Internally, the transition team links CoAction to other elements of the CCC implementation, including sectoral programmes for buildings, waste, circular economy and agriculture, and to cross-cutting governance innovations (Lund Municipality, 2024). This reduces the risk that CoAction becomes an isolated experiment disconnected from municipal planning and investment cycles. The hub team has evolved from a focus on CCC preparation and project application writing to a more complex role that involves coordinating dozens of actors, managing EU and national funding streams, and integrating learning from CoAction into broader policy frameworks (Interview 2, 2026).

Formal multi-actor structures include the thematic arenas for mobility, energy and construction, the Urban Transition Lab area, and, in some cases, leadership and steering groups that bring together senior representatives from key organisations. These structures are not legal entities but are nonetheless institutionalised through recurring meetings, shared agendas and joint documentation (Lund Municipality, 2024; Interview 2, 2026). Companies play central roles in these arenas: for example, Kraftringen, ViaEuropa and major property owners are key actors in the energy arena, and large employers, parking companies and mobility-service providers are central in the mobility arena (Interview 3, 2026; Interview 4, 2026).

Decision-making within CoAction is largely based on consensus. While the municipality retains formal authority over budget allocations and project-selection decisions, the choice of which CoActs to pursue and how they are designed is strongly influenced by stakeholder input during workshops and arena meetings (Interview 2, 2026; Interview 2, 2026). Companies do not co-chair the overall hub, but they do co-lead specific CoActs and are sometimes involved in setting meeting agendas and initiating new work packages. This hybrid governance model, combining a municipal lead organisation with networked thematic arenas and project-based coalitions, is consistent with collaborative governance patterns identified in other Mission cities (NetZeroCities, 2025).

Governance Tools and Collaboration Mechanisms

A range of tools is used to formalise and operationalise collaboration between the municipality and private-sector actors. At the highest level, the CCC provides a framework for commitments by the municipality, municipal companies and external stakeholders, including businesses, utilities and research institutions (Lund Municipality, 2024). CoAction Lund adds a more specific layer: all 37 CoAction members have signed a statement of intent in support of Lund's 2030 climate-neutrality goal, and the city is in the process of upgrading this to a more formal collaboration agreement that clarifies roles and expectations (Interview 2, 2026).

Green travel plans are a central instrument for operationalising collaboration in the mobility domain. Participating employers commit to undertaking commuting surveys, receiving external coaching and developing plans that contain at least five concrete measures to reduce emissions from commuting and business travel (Interview 5, 2026). These plans translate system-level goals into organisation-specific actions and are supported by technical assistance provided through CoAction. While the plans are not legally binding, the expectations are clear enough to structure behaviour and provide a basis for monitoring.

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CoActs and work packages constitute another key tool. They function as modular collaboration units through which specific interventions are designed, funded and implemented, often involving small coalitions of public and private actors. Examples include the development of a ride-sharing portal and mobility wallets for CoAction members, parking campaigns that provide incentives for carpooling, EnergyNet pilots that test local energy networks and energy-sharing arrangements, and flexibility projects that optimise energy demand and supply (Interview 2, 2026; Interview 3, 2026; Interview 4, 2026). These tools are co-created through workshops and bilateral discussions and are formalised through project contracts linked to funding agreements.

From the perspective of effectiveness, interviewees generally see these tools as enabling experimentation and learning, but also note some limitations. The voluntary nature of CoAction membership and green travel plans means that there are no hard sanctions for non-compliance, and companies facing internal capacity constraints can slow down or deprioritise actions without formal consequences. Work-package funding is appreciated but is not always sufficient to compensate for the full opportunity costs of participation, especially for smaller firms and start-ups (Interview 2, 2026; Interview 3, 2026).

Onboarding, Inclusion and Representation

The onboarding of companies into Lund's Mission-related collaboration followed a targeted and relational strategy. During CCC preparation and the design phase of CoAction Lund, municipal staff identified key stakeholders based on emissions relevance, strategic influence and existing relationships, and 10 companies were part of the formation group. This number quickly expanded to 25 companies; property owners, municipal companies, major employers and key utilities in the innovation district were prioritised for early outreach, including direct contact and by leveraging existing arenas such as Climate Alliance Lund and Future by Lund (Interview 2, 2026; Lund Municipality, 2024). This reflects the logic of focusing first on actors with high leverage over emissions and infrastructure.

Ongoing onboarding into CoAction has expanded the membership to 37 organisations, with the expectation that an additional 10 companies will join throughout 2026 (Interview 1, 2026). New firms can join by expressing interest to the hub, being identified through existing networks or being recommended by current members (Interview 2, 2026). There is some evidence of learning and adaptation: the city has sought to increase diversity by reaching out to additional employers and solution providers, and by using success stories from early CoActs to attract new participants.

The current membership focusses more on large organisations and innovation-oriented SMEs, while smaller local firms, cooperatives and minority-owned businesses are less visible. Stakeholders point out that many SMEs lack the staff time and institutional capacity to participate in time-consuming meetings and projects unless the direct business case is very clear (Interview 2, 2026).

Municipal Powers, Enabling Roles and Support

Lund municipality deploys a variety of powers and roles to mobilise private-sector action. As a convener, it uses its political legitimacy and central position in local governance to bring together actors that might not otherwise collaborate, creating safe spaces for dialogue and experimentation. The CoAction hub, housed within the municipal organisation, is a key expression of this convening power, providing a recognisable contact point for companies and coordinating activities across arenas and projects (Interview 2, 2026).

The city also provides technical support. It supplies data on emissions and mobility patterns, facilitates commuter surveys and data analysis for green travel plans, and offers external coaching to help companies interpret results and design effective measures (Interview 5, 2026). In the energy domain, municipal actors help facilitate access to testbed sites, align planning processes with experimental

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initiatives such as EnergyNet, and connect local projects to national funding opportunities through agencies including the Swedish Energy Agency (Interview 3, 2026; Lund Municipality, 2024).

Financially, the coordinating city officials channel funding into CoActs and work packages. Most participating organisations have their staff time reimbursed for project work, and start-ups receive small direct fees to compensate for part of the opportunity costs of participating in non-commercial pilot activities (Interview 2, 2026; Interview 3, 2026). Administrative and financial coordination for these funds is largely handled by the hub, reducing transaction costs for firms and allowing them to concentrate on technical and organisational contributions.

Stakeholders specifically highlighted several forms of support.

- **CoRide highlighted the role of the project management office in maintaining the overall process**, helping when activities became stuck, and managing administration and finance. The interviewee stated that the project team was "really fantastic help" and described frequent contact with them (Interview 2). This highlights how central coordination and facilitation were important forms of support.
- **SAAB identified support in the form of structured mobility tools and coaching**. Participation in CoAction included the requirement to develop a green travel plan and undertake a commuter survey, but this was accompanied by "three coaching sessions with the external consultant company" (Interview 5). The interviewee explained that these sessions helped participating companies work through their baseline, consider actions, and learn alongside other firms facing similar tasks. This demonstrates that the city-supported programme did not only convene actors, but also provided targeted implementation support.
- **Opticon described support more in relational and collaborative terms**. The interviewee emphasised the unusual level of willingness from participants to cooperate in the project and said that, from the beginning, "it has felt like we are working on this together" and that "this is more like a cooperation" than in many other projects (Interview 4). The same interview also linked this to trust and explicitly praised the role played by Lund's energy strategist in creating that feeling of shared endeavour (Interview 4).
- **ViaEuropa referred both to practical and enabling support**. The interview indicated that approved work packages received partial financial compensation, but also highlighted the value of the city's support in creating legitimacy, awareness, and room for innovation. The interviewee suggested that the city's role had made it easier to raise issues and move innovation forward, describing this as enabling the actors to "do more innovation with less time" (Interview 3).

At the same time, both city officials and companies emphasise significant constraints. Lund cannot unilaterally change national tax rules that make ride-sharing benefits taxable, nor can it reform taxi regulations that create legal ambiguity for ride-sharing platforms, nor can it easily alter grid-regulation frameworks that disincentivise local flexibility solutions (Interview 2, 2026; Interview 3, 2026; Lund Municipality, 2024). Internal municipal capacity is also limited: staffing levels and budgetary cycles constrain the extent to which new support instruments (for example, systematic ESG/CSRD guidance or innovative procurement mechanisms) can be developed. These constraints mirror those identified in the Theme 1 report, which highlights the importance of multi-level governance reforms in enabling city-led collaboration with the private sector (NetZeroCities, 2025).

Private-Sector Commitments, Collaboration and Outcomes

Private-sector commitments in Lund are multi-layered. At the broadest level, some companies have signed the CCC or are part of city-wide climate pacts, signalling support for the 2030 climate-neutrality goal (Lund Municipality, 2024). Within CoAction, all members have signed a statement of intent endorsing the city's climate targets, and a more formal collaboration agreement is under development

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(Interview 2, 2026). These commitments are primarily normative and symbolic, but they create a shared reference point for subsequent project-level collaboration.

Green travel plans represent a more concrete form of commitment. Participating employers pledge to undertake commuter surveys, work with external coaches and adopt a set of measures to support sustainable commuting and business travel (Interview 5, 2026). While there are no legal sanctions for non-compliance, the existence of agreed-upon action plans, combined with follow-up coaching and peer visibility, exerts a degree of soft pressure on organisations to act. For some firms, these plans complement internal commitments made as part of science-based targets or corporate sustainability strategies.

Commitments translate into concrete projects most visibly in the mobility and energy domains. In mobility, green travel plans and CoActs have led to the introduction of ride-sharing portals for CoAction members, integration of mobility wallets that allow employees to allocate mobility benefits across sustainable modes, and parking campaigns that incentivise carpooling (Interview 2, 2026; Interview 5, 2026). In energy, EnergyNet pilots demonstrate shared investments and experiments in local energy networks linking municipal housing and parking companies, while flexibility projects develop services that optimise energy demand and supply at neighbourhood scale (Interview 3, 2026; Interview 4, 2026).

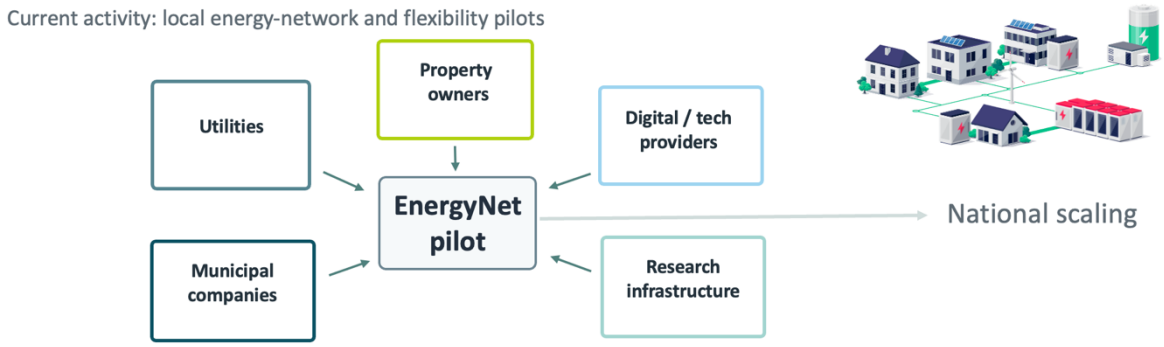


Figure 4 - Scaling of flexible energy solutions through EnergyNet.

Inter-company collaboration is evident within CoActs and in national-scale projects. Locally, companies cooperate on shared mobility services, joint campaigns and energy-flexibility solutions, often facilitated by the municipality but also driven by shared interests and mutual gains (Interview 2, 2026; Interview 3, 2026; Interview 4, 2026). Nationally, the scaling of EnergyNet into a multi-city, multi-actor project funded by the Swedish Energy Agency illustrates how local system demonstrators can generate coalitions that extend beyond the initial set of actors and sites (Interview 3, 2026). Outcomes in terms of quantified emissions reductions are still emerging, but there is evidence of behavioural change around commuting, development of new technical solutions, and strengthening of relationships and capacities.

Monitoring, Reporting and Accountability

Monitoring and reporting arrangements in Lund combine project-level data collection with integration into the broader CCC monitoring, evaluation and learning (MEL) framework. For mobility, commuter surveys conducted among employees of participating firms provide baseline and follow-up data on travel behaviour, enabling both the municipality and employers to track modal shifts and identify barriers and opportunities (Interview 5, 2026). External coaching helps translate survey results into actionable measures and supports internal monitoring of progress within firms.

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For CoActs and work packages, partners are required to report regularly on hours worked, progress against milestones, deviations from plans and key lessons learned. Stakeholders describe these templates as clear and proportionate, neither overwhelming nor superficial (Interview 4, 2026). In the energy domain, monitoring includes technical data on energy flows, flexibility services and system performance, though many pilots are still in early stages and long-term impact metrics are not yet fully established (Interview 3, 2026; Interview 4, 2026).

At the strategic level, the CCC defines impact pathways and indicators for each roadmap, and CoAction activities feed into this framework conceptually, even if attribution of specific emissions reductions to individual CoActs remains methodologically challenging (Lund Municipality, 2024). The emphasis to date has been on learning and adaptive governance rather than on strict performance management. City officials emphasise the importance of creating feedback loops between project experiences and policy and planning decisions, consistent with the reflexive approach advocated in the Theme 1 report (NetZeroCities, 2025).

Accountability for private-sector commitments is primarily 'soft' rather than formal/legal. Beyond the reporting required for funded work packages and participation in surveys, there are no binding legal obligations for companies to meet specific emissions targets under CoAction. Instead, accountability is exercised through visibility within the network, peer expectations, ongoing dialogue and, in some cases, reputational considerations associated with being part of a high-profile system demonstrator (Interview 2, 2026; Interview 2, 2026). This reliance on soft accountability mirrors patterns in other Mission cities and reflects both legal constraints and the voluntary nature of most collaboration mechanisms (NetZeroCities, 2025).

Motivations, Incentives and Value Proposition

From the municipality's perspective, companies engage in climate collaboration for a mixture of normative, strategic and pragmatic reasons. Officials highlight reputational benefits, innovation opportunities, access to funding and alignment with corporate sustainability strategies as key motivators, and frame CoAction as a way for companies to be at the forefront of the transition and to shape future markets and regulatory environments (Interview 2, 2026; Lund Municipality, 2024). The narrative emphasises mutual benefit: companies contribute to city-wide climate goals while gaining from networking, learning and experimentation.

Stakeholder interviews confirm some of these motivations but also reveal distinct emphases across actor types. SAAB, a large industrial employer with science-based climate targets, participates in CoAction to complement its internal decarbonisation efforts, strengthen its image as a sustainable and attractive employer and gain support in addressing commuting emissions that are not central to its formal scope 3 targets but are visible locally (Interview 5, 2026).

Energy Opticon and ViaEuropa are motivated by the opportunity to develop and test advanced energy-optimisation and digital-infrastructure solutions in partnership with utilities and property owners, and see CoAction as a pathway to national and international recognition and markets (Interview 3, 2026; Interview 4, 2026). CoRide, as a ride-sharing start-up, engages to access a dense network of employers, refine its service in a real-world testbed and advance its mission of reducing car use (Interview 2, 2026).

A clear theme across the interviews was alignment between the objectives of CoAction Lund and the participating organisations' own activities or priorities.

- For CoRide, the motivation was strongly linked to the fit between the programme's mobility agenda and the company's core service. The interviewee described CoAction as "a perfect opportunity" because "their goals are so much aligned with ours, which is to reduce the number of cars on the streets" (Interview 2). Participation therefore appears to have been motivated by direct alignment between the programme's target and the company's business model.

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- For SAAB, participation was linked to the city's climate neutrality goal and the company's interest in supporting lower-carbon commuting among employees. The interview framed the baseline challenge in practical terms: how companies could contribute by reducing commuting by private car and instead encourage cycling or public transport. The interviewee presented CoAction as useful because it addressed this challenge in a practical and action-oriented way, rather than at the level of broad discussion (Interview 5).
- For Opticon, the motivation combined business relevance with a wider commitment to sustainability. The interviewee explained that the company works with energy companies and that its goals align with the green transition, while also describing a "burning passion for … the environment" within the company (Interview 4). Participation was therefore connected both to the relevance of the topic to the company's field and to a broader normative commitment.
- For ViaEuropa, motivation centred on involvement in the design and development of a concrete innovation process. The company had been approached by Lund and was involved in writing the first application. Participation therefore appears to have been motivated by the opportunity to shape and test new technical solutions in a real city context rather than simply to observe or advise from a distance (Interview 3).

Across companies, networking and relational benefits stand out as central value elements. Interviewees emphasise the "short distance to decision-makers", the ability to meet actors from different sectors, and the trust that develops through repeated interaction (Interview 2, 2026; Interview 3, 2026; Interview 4, 2026). Access to technical support and external coaching is also valued, particularly by firms that do not have extensive internal capacity for mobility or energy analysis. For solution providers, visibility within a nationally recognised system demonstrator and through Viable Cities is an important reputational asset.

In particular, the value of networking was one of the strongest and most consistent themes across the four interviews.

- **CoRide described the network created through CoAction as a major advantage**. The interviewee stated that "the network that we have established within the projects" was highly valuable because it was "very easy to get hold of the right persons" and because "the distance to people is very short" (Interview 2). He also noted that, because the participants wanted the same thing, there was less need to persuade others of the value of an idea.
- **SAAB also attached strong value to interaction with other organisations, particularly in the form of peer learning**. The interviewee stated that one of the most useful elements of CoAction was having "very practical examples from other companies" on how to work with sustainable commuting in "a cost efficient and an easy way" (Interview 5). This highlights the value of networking beyond simply for relationship-building, but because it allowed companies to learn from others already working on similar issues and this was considered valuable for advancing conversations within internal steering groups.
- **Opticon described the larger meetings as important**, because "it's important for all the actors to get to know each other, because it creates engagement from everybody" (Interview 4). Even when not every topic was directly relevant to the company's own work, the meetings were seen as useful for providing the bigger picture and enabling participation across perspectives. In this sense, networking was associated both with engagement and with system-level understanding.
- **ViaEuropa also attached clear value to the different meeting levels within CoAction**. The interviewee explained that the General Assembly had been useful as a networking environment bringing together "the movers and shakers inside Lund," including academia, large firms, startups, scale-ups, and non-profits (Interview 3). The interview also showed that networking across groups led to new work tasks, new connections to other projects outside

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CoAction, and identification of additional stakeholders that should be brought into the process (Interview 3).

Recognition and expectation management are more ambivalent. Companies appreciate the visibility and opportunities provided, but some also report mismatches between expectations - for example, hopes for easier access to external funding, rapid regulatory change or strong municipal procurement shifts - and the actual constraints under which the city operates (Interview 2, 2026; Interview 3, 2026). The Theme 1 report similarly cautions that cities must carefully calibrate their value propositions and be transparent about what they can realistically offer to avoid disillusionment and loss of trust (NetZeroCities, 2025).

1.5.1.3 Outlook

Challenges, Barriers and Enablers

The Lund case highlights some challenges and barriers on both the municipal and company sides. Internally, the city faces some capacity considerations: coordinating a complex system demonstrator, managing multiple funding streams and maintaining engagement across dozens of actors is resource-intensive (Interview 2, 2026). There are also tensions between different municipal departments and companies, for example between mobility and energy actors around the setting and prioritisation of charging infrastructure, which may require mediation.

The stakeholder interviews were generally very positive, but did also identify several areas where potential improvements could be made.

- **CoRide highlighted the self-organised and flexible nature of the co-acts**. While the interviewee valued this flexibility, he also noted that progress depended heavily on the time, energy, and continuity of the individuals involved. Some sub-projects moved too slowly because they required “someone holding the flag and running forward” (Interview 2). This indicates that flexibility could also lead to uneven momentum when participant capacity changed. CoRide also raised a more specific point about follow-up. Referring to the use of green travel plans, the interview suggested that planning alone was not enough and that participating organisations should also “measure” and have “internal follow up procedures and measurements” after actions had been identified (Interview 2).
- **Opticon pointed to uneven engagement and access as a potential challenge**. Although the overall experience was very positive, the interviewee suggested that some actors had been more active than others and that access had not been uniform across all participants. The interview nevertheless implied that workshop processes and repeated interaction had helped to build stronger cooperation over time (Interview 4).
- **SAAB identified fewer direct problems, but did indicate that internal buy-in can be a practical issue**. The interviewee noted that joining CoAction does not require companies to pay a fee, which lowers the entry barrier, but that it still requires someone in a senior position to sign off and someone internally to drive the initiative (Interview 5). The interview also suggested that collective activities such as a city-wide cycling initiative could help strengthen visibility and momentum across participating employers.
- **ViaEuropa’s interview implied that wider awareness remained an challenge**. The participant highlighted that there was already considerable potential within existing tools and arrangements, but that more actors needed to understand the opportunities available. This highlights that broader communication and diffusion of the lessons from the programme could further strengthen impact (Interview 3).

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Companies face their own constraints. Time and resource limitations mean that participation in CoActs must compete with core-business activities, and the benefits of engagement are sometimes uncertain or long term (Interview 2, 2026; Interview 4, 2026). The failure of the planned physical mobility hub, despite considerable preparatory work, illustrates how large, capital-intensive interventions can stall when no actor is willing or able to assume long-term operational responsibility and when permitting and regulatory requirements are complex (Interview 2, 2026).

Regulatory misalignments present a structural barrier. Tax rules that treat ride-sharing benefits as taxable income for employees, ambiguous taxi legislation that can be used to challenge ride-sharing, and grid-regulation frameworks that assume centralised upgrades rather than local flexibility all constrain the feasibility and scalability of innovative solutions piloted in CoAction (Interview 2, 2026; Interview 3, 2026; NetZeroCities, 2025). The CCC itself acknowledges that many key levers for agriculture, land use and circular economy lie at national or regional levels, highlighting the importance of multi-level advocacy (Lund Municipality, 2024).

Several enabling conditions stand out. Strong municipal leadership and a clear mission framework provide direction and legitimacy. Existing networks such as Climate Alliance Lund, Future by Lund and university partnerships supply relational infrastructure and trust that can be mobilised for CoAction (Lund Municipality, 2024; Interview 3, 2026). Anchor institutions, including the university, municipal utilities and major employers, play key roles in stabilising collaboration and providing critical mass. External programme support from Viable Cities and national agencies provides funding, knowledge exchange and political leverage. Most importantly, stakeholders emphasise the importance of trust, proximity and the perceived fairness and pragmatism of municipal processes for sustaining engagement (Interview 2, 2026; Interview 3, 2026; Interview 4, 2026). These enabling conditions echo those identified across other Mission cities in the Theme 1 report (NetZeroCities, 2025).

Lessons Learned and Transferable Insights

Lund's experience with CoAction Lund offers several lessons for Mission governance and for other cities seeking to develop multi-actor collaboration with the private sector.

- **First, the case illustrates the value of concrete, mission-framed collaboration structures.** The combination of a municipal hub, thematic arenas and project-based CoActs provides a clear architecture within which companies can situate their engagement and understand how their actions contribute to city-wide goals (Lund Municipality, 2024; Interview 2, 2026). The use of system demonstrators to concentrate experimentation in a specific district, while linking it to city-wide roadmaps, is particularly noteworthy.
- **Second, the CoAction case underscores the importance of pairing voluntary commitments with support instruments**. Green travel plans and CoAction membership would likely have limited impact in the absence of technical support, coaching, financial contributions and administrative assistance. By lowering transaction costs and providing tangible help, Lund increases the likelihood that companies will move from abstract commitments to concrete action (Interview 5, 2026; Interview 2, 2026). This aligns with the Theme 1 report's argument that effective private-sector engagement typically requires a combination of normative, informational, financial and procedural instruments (NetZeroCities, 2025).
- **Third, the case highlights the need to balance experimentation with clarity of leadership and responsibility within co-created projects**. The reliance on self-organisation in CoActs has enabled creativity and bottom-up initiative, but has also led to some situations in which promising ideas stalled due to unclear leadership or insufficient capacity. City actors report that they are adjusting project-selection and governance arrangements to ensure that each CoAct has a clearly designated lead and a realistic resource base (Interview 2, 2026; Interview 2, 2026).

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- **Fourth, Lund's experience demonstrates both the potential and the limits of local experimentation in the face of multi-level regulatory constraints**. CoAction Lund has been able to pilot innovative solutions in mobility and energy, generate evidence and build coalitions that are now influencing national-level projects, as in the case of EnergyNet (Interview 3, 2026). However, fundamental barriers in tax law, taxi regulation and grid rules cannot be resolved at the municipal level. This underscores the importance of Mission governance structures that deliberately connect local experiments to national and EU policy processes, a point emphasised in the NetZeroCities reference report (NetZeroCities, 2025).
- **The case offers insights into transferability and context-specificity**. Stakeholders note that CoAction's success depends partly on context factors including a strong innovation ecosystem, proactive municipal leadership and existing networks, which may not be present in all cities (Interview 2, 2026). Nonetheless, several elements appear transferable: systematic green travel plan programmes anchored in coaching and surveys; hub-based governance models that integrate multiple arenas; use of system demonstrators and testbeds; and a deliberate focus on trust-building and proportionate reporting requirements.

The Lund case thus contributes to a growing body of evidence on how Mission cities can design and manage multi-actor collaboration with the private sector as a core governance mechanism for the climate transition (NetZeroCities, 2025).

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1.5.2 Leuven

Leuven2030 is an experienced multi-actor network in support of climate action in the city of Leuven, Belgium. It provides a best practice example of collaboration between government, private sector, knowledge parties and civil society representatives, and plays a key role in establishing and implementing the city's Climate City Contract (CCC) as part of the EU's 100 Climate Neutral and Smart Cities Mission (the 'Cities Mission'). In this case study, we elaborate on its key features, success factors and challenges for future development, to provide other European cities inspiration for their trajectories towards climate neutrality through collaboration.

1.5.2.1 City profile and Mission context

Leuven is a compact city in Flanders, Belgium, characterized by a dense historical core with surrounding residential neighbourhoods, embedded within a broader metropolitan constellation that includes Brussels. The city sits at the intersection of major mobility and ecological corridors, notably the Dijle river valley and the ring road dividing inner and outer districts. Leuven's regional connectivity is significant; commuting patterns, logistics flows, and shared water systems link the city structurally to neighbouring municipalities, making the urban-regional interface a key dimension of its climate governance.

Leuven has a little over 100,000 inhabitants, with an internationally oriented population linked to the presence of KU Leuven (the university) and associated research institutions. As in many European medium-sized cities, demographic change is intertwined with housing pressure, mobility demands, and social vulnerability, all of which shape its Mission's emphasis on wellbeing and a just and inclusive transition.

Economically, Leuven hosts a diversified knowledge-intensive economy anchored by KU Leuven, UZ Leuven (the university hospital), imec (a major global semiconductor R&D institute) and headquarters or major sites of large firms such as AB InBev, BENEO-Remy, and a wide network of SMEs and service providers. Leuven's economic profile is thus dominated by research, education, healthcare, professional services, and innovation-driven manufacturing. The broader employment structure reflects this: the service sector accounts for the largest share of energy consumption and emissions within buildings, while industry - though smaller in aggregate - includes high-tech players with significant decarbonisation potential (heat integration, circularity, process emissions). Private-sector actors are repeatedly recognised as essential in delivering climate neutrality, not only because of their energy use but also because of their role as innovators, employers, and infrastructure owners.

Leuven has a highly multimodal mobility system, yet private car use - particularly through-traffic from neighbouring municipalities - remains a major contributor to emissions. The city has already introduced strong mobility interventions, including circulation plans and robust cycling infrastructure. Mobility is both an opportunity and a challenge: Leuven's compact form supports low-carbon choices, but its regional centrality generates high commuter inflows.

Local governance setup

Leuven's governance structure centres on the municipal administration led by the mayor and supported by key departments covering climate, mobility, spatial development, energy, social affairs, and public works. The governance model is distinctly collaborative, characterised by partnerships with Leuven 2030, and numerous knowledge, industry and civil society organisations. Municipal companies such as AG Stadsontwikkeling Leuven (project development) and public actors like EcoWerf (waste) and ECoOB (energy cooperative) play operational roles.

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The city's governance is also strongly shaped by multilevel policy dependencies. Many enabling levers for energy, mobility, and buildings lie with the Flemish government or federal fiscal frameworks; Leuven therefore positions the Cities Mission as a bridge to strengthen vertical governance alignment.

For the Cities Mission, Leuven has built a distinctive governance model centred on collaboration between the city administration and the non-profit Leuven2030. Mission governance features three nested bodies: Mission Control (political-strategic guidance), the Mission Cockpit (administrative steering), and operational subteams, including Portfolio, Data & Monitoring, Investment Plan, Commitments, and Communication. This structure is intended to function interdepartmentally and ecosystem-oriented.

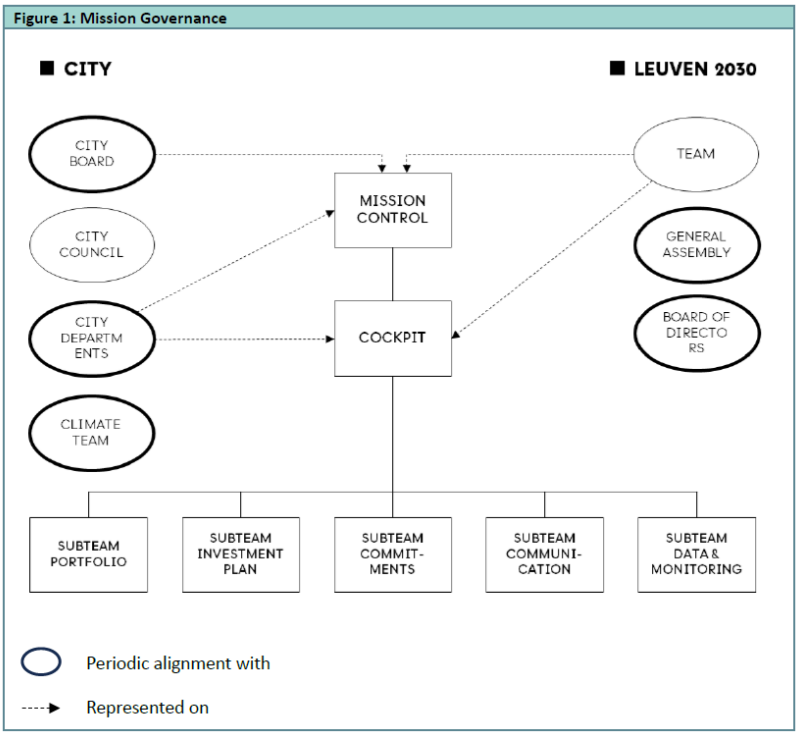


Figure 5 - Roles of the City of Leuven and Leuven2030 in Cities Mission governance (source: CCC action plan, City of Leuven, 2023).

Leuven 2030 is an independent, membership-based non-profit organisation that facilitates collaboration between companies, the municipality, knowledge institutions, and citizens to accelerate climate action in Leuven. Although it works closely with the municipality, the city is only one member among roughly 400, which allows Leuven 2030 to act as a neutral intermediary that connects actors across sectors. In addition to its role as convenor, it monitors commitments related to the CCC, which includes climate actions and breakthrough projects across several emission domains.

"The city of Leuven is a lot of silos working next to each other, and Leuven 2030 can go over those silos." (Interview #4)

Emissions profile and decarbonisation strategy

"From 457,000 tonnes down to 79,000 tonnes of CO2 emissions a year by 2030. An 80% reduction. That is the ambition of the Leuven Climate City Contract."* (City of Leuven, 2024)

Leuven's 2019 baseline emissions amount to 457,000 tCO_2-eq, with buildings dominating at nearly 314,000 tCO_2-eq (69% of total emissions), followed by transport (14%) and waste (10%). The challenge is stark: energy use in buildings - residential, tertiary, and public - is the primary source of

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emissions, compounded by the dominance of gas and fuel oil. The impact of transport remains significant, even excluding highway emissions outside local control. Scope 3 emissions from materials and food are substantial and expected to be more fully integrated in later iterations of Leuven's climate action planning. Emissions are still increasing due to population and business growth, despite efficiency improvements. The municipality directly controls <2% of emissions.

The city aims for at least 80% reduction by 2030, focusing on: accelerated renovation of buildings and fossil-free heating, rapid expansion of local renewable energy decarbonizing industry, modal shift and logistics reform, development of circular material flows, and climate resilience of the built environment. Social justice is a core principle in the city's climate transition, with explicit attention to vulnerable groups.

CCC commitments and governance processes

Leuven's CCC brings together over 30 key actors and 86 breakthrough projects. Leuven2030, businesses, knowledge institutions, civil society, and municipal entities all contribute commitments linked to action portfolio items. Commitment areas typically include: renewable energy deployment, renovation and circular construction, mobility policy alignment, nature-based solutions, social justice in the transition, and financial innovation. Importantly, commitments are not static: Leuven employs a portfolio management cycle that updates actions, monitors indicators, and revises strategies every two years. Private sector engagement is primarily structured around collective green heat, large-scale building renovation, circular construction, and sustainable mobility.

1.5.2.2 Leuven's approach to private sector engagement

The city and Leuven2030 approach climate neutrality as a shared societal project requiring joint action across six stakeholder groups; companies, ranging from large anchor institutions to SMEs and social-economy organisations, are therefore woven structurally into the governance, co-creation processes, and project portfolio.

Private-sector actors are engaged through a dual narrative: as major emitters and system-shapers who must reduce their direct and indirect emissions, and as innovation partners, capable of piloting new energy, mobility, circularity, and heat-system solutions. Strategic documents emphasise collaboration not only for decarbonisation but also for building resilient local ecosystems, stimulating technological experimentation, mobilising investment, and strengthening local employment - particularly through social-economy partners.

Anchor firms such as imec, KU Leuven/UZ Leuven, AB InBev, and large engineering consultancies are expected to lead by example, while cooperatives and smaller companies play key roles in implementation and local capacity-building. The Mission architecture treats businesses not as stakeholders to be consulted, but as co-owners of Leuven's transition pathway.

Leuven's approach to private-sector engagement centres strongly on breakthrough projects and thematic clusters. Key initiatives include:

Collective renovation and green heat programmes, targeting large building owners (companies, institutions, social housing providers) to renovate and connect to district heat networks.

Industrial decarbonisation pilots, such as Net-Zero Brewing (AB InBev), process heat optimisation (imec, BENEO), and residual heat exchange across industrial clusters (e.g., Haasrode Research Park).

Materials Bank and Urban Resource Centre, where circular construction stakeholders (EcoWerf, Vites, KU Leuven, UZ Leuven, imec) collaborate to reclaim, sort, and reuse materials at scale.

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Urban logistics coordination, where companies pool freight flows, electrify fleets, and participate in regional distribution hubs.

Energy communities and third-party financing mechanisms, enabling shared solar, heat exchange, and citizen or cooperative investment (ECoOB).

A plan to create a Leuven Climate Fund for non-profitable but socially valuable projects (e.g., climate adaptation, nature-based solutions).

(City of Leuven & Leuven2030, 2023)

Evolution, phases and milestones

Key milestones in the development of the city's approach to private sector engagement in climate planning, action and financing include the establishment of Leuven 2030 - many years prior to the city's participation in the EU's 100 Climate Neutral Cities Mission -, its Roadmap Climate Neutrality, Leuvens selection for the EU Cities Mission, and the establishment of the CCC comprising stakeholder commitments towards climate neutrality in 2030 (which builds on the Roadmap).

The evolution of Leuven2030, which was initially a small, volunteer-driven network, into a central governance actor for climate neutrality illustrates how local partnerships can become the backbone of an ambitious city-wide mission. Across this trajectory, the city and its partners have incrementally deepened the role of private-sector actors, shifting from informal collaboration to structured commitments, project-based cooperation, and shared governance.

Leuven2030 emerged from a set of informal collaborations among urban planners, mobility experts, researchers, and civil society organisations working with the city on sustainability and spatial topics. At this early stage, the organisation was small and primarily focused on communication, awareness-raising, and agenda-setting. Engagement from private companies occurred mainly through individual champions rather than through structural participation. Nevertheless, this period laid the groundwork for a shared understanding that climate action required cross-sectoral cooperation and that no single actor could drive transition alone.

Between 2015 and 2019, Leuven2030 became more formalised and ambitious. A key milestone was the development of the first Roadmap to Climate Neutrality, co-created with input from experts, citizens, companies, and public institutions. This process brought in a wider range of stakeholders and established the distinctive Leuven2030 governance model, with six stakeholder categories each represented on a shared board.

Private-sector involvement broadened during this phase, especially as larger employers and research institutions - such as KU Leuven, UZ Leuven, and imec - recognised that Leuven2030 offered a neutral and credible platform for aligning corporate sustainability strategies with citywide ambitions.

The years leading up to the Cities Mission saw Leuven's climate governance expand substantially. The municipality adopted new thematic strategies, such as a multi-pillar circularity programme, while Leuven2030 strengthened its operational and technical capacity. The organisation secured major European projects that enabled more targeted work and provided legitimacy and resources for deepening partnerships.

Private-sector engagement became more structured, especially around emerging projects on solar energy, heat networks, energy flexibility, and reuse streams. This period marked a shift: companies were no longer merely observers but began shaping and testing concrete transition pathways, by co-developing experiments and pilot initiatives.

Leuven's selection for the Cities Mission catalysed a reorganisation of its climate governance. The city and Leuven2030 jointly created a multi-tiered Mission architecture (see Section 1). This governance

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design institutionalised cross-departmental collaboration within the city administration and cemented Leuven2030's role as a strategic implementation partner.

The heart of this Mission phase was the development of Leuven's CCC and the accompanying portfolio of 86 projects. To prepare these, Leuven2030 and the city engaged 25-30 organisations through bilateral conversations, ultimately securing formal commitments from 20-25 stakeholders. This way, private-sector participation became linked to explicit project-level commitments and guiding principles.

By 2025, the Leuven ecosystem began orienting towards systemic levers: blended finance mechanisms, regional and national policy alignment, more rigorous monitoring and learning practices, and deeper engagement with anchor institutions. Leuven2030's work on a climate fund, supported by in-house financial expertise, illustrates the shift from project facilitation to enabling investment pipelines.

Engagement processes and practices

The main engagement modalities include bilateral meetings, multi-actor roundtables, matchmaking between firms, communication through newsletters and the website, ad-hoc meetings, thematic working groups, and informal exchanges. Engagement has been strongest with large and well-organised companies, many of which are co-founders and represented in the Leuven 2030 governance, while SMEs are less involved due to capacity constraints and are often approached collectively through business clusters. The CCC functions as a key governance and engagement tool, developed in collaboration with the municipality, formalising commitments within a wider open membership structure rather than replacing existing engagement practices.

Trust-building appears to rely on long-standing relationships: one industry representative explains that Leuven2030 can draw on their experts, because "*if we wouldn't have known each other, we wouldn't have gotten that far*" (Interview #2). Another states: "*I was co-founder of Leuven 2030 as well. So we go way back*." (Interview #3).

The kinds of engagement differs per stakeholder type. For instance, a large engineering consultancy has contributed to specific projects linked to the city's climate transition, such as mobility plans, infrastructure projects, and the development of the CCC. Some of this work was done through formal consultancy contracts, while additional contributions were provided voluntarily as part of the partnership with Leuven 2030.

Governance structures and roles

Leuven 2030 is not part of the municipality, but a membership-based organisation collaborating closely with the city. So while the city remains responsible for its climate actions and is the formal CCC signatory, Leuven2030 provides continuity beyond political cycles.

Leuven 2030 acts as the principal civic and private-sector convenor, with six stakeholder groups formally represented: citizens, civil society, companies, knowledge institutions, municipal institutions, and public/semi-public bodies. This structure is essential for private-sector engagement, as it embeds firms and institutions directly into decision-making processes.

Leuven2030 is a VZW (*vereniging zonder winstoogmerk*, or non-profit), with around 10 core staff members, governed by a board of 18 people, representing the six stakeholder groups - three representatives per group, elected for 4 years. In this governance structure, Leuven2030 has gone through four 4-year cycles. Over these cycles, the chairmanship rotated across public, civil and private actors. Leuven2030 has board meetings every two months. The organisation is funded by a mix of membership fees and EU and local government subsidies.

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Large companies often play a prominent role and are represented in the organisation's board of directors, contributing to governance and strategic direction. Rather than directly funding projects, Leuven 2030 focuses on creating partnerships, enabling joint initiatives, and encouraging companies to follow through on their climate commitments, while also developing tools to assess the impact of these actions on carbon emissions.

"We bring parties together… for instance we join them around the table to find out whether or not they can collaborate on a heat district project." (Interview #1).

Governance tools and collaboration mechanisms

Collaboration between Leuven 2030 and private-sector actors is supported through several governance tools and coordination mechanisms that help structure cooperation and translate commitments into action. The CCC is mentioned as a main instrument, building on Leuven's Climate Neutrality Roadmap 2025 predating it a few years, outlining climate commitments and breakthrough projects across key emission domains and providing a framework for monitoring progress.

Operational collaboration is further enabled through bilateral engagement processes, project-level templates, and participation in Leuven2030's multi-stakeholder governance structure. These mechanisms serve as lightweight agreements that help co-define project ownership, technical feasibility, and implementation needs. SMEs and cooperatives highlighted Leuven2030's matchmaking, facilitation, and problem-solving role as a practical tool in its own right, often necessary to overcome regulatory or administrative barriers.

All tools mentioned are non-binding, relying on moral commitment and collective ownership rather than contractual enforceability. Their strengths lie in providing strategic clarity, enabling cross-sector alignment, and offering a shared reference for accountability. They have facilitated concrete collaborations, including district-heat pilots, solar-roof campaigns, repair-service offerings, and circular-materials initiatives.

Onboarding, inclusion and representation

Companies and other stakeholders are brought into the Leuven 2030 process mainly through targeted outreach and the organisation's broad membership network. The organisation actively identifies and approaches companies that have a significant impact on carbon emissions or that play an important role in the local economy, inviting them to join the network and participate in climate initiatives. Leuven 2030 emphasises inclusion by maintaining an open membership structure and bringing together actors from different sectors in collaborative forums, allowing them to exchange knowledge and participate in joint initiatives. Companies can join the initiative relatively easily by becoming members and signing on to its commitments.

Most engaged companies tend to be larger, professionally organised firms that already have sustainability teams or clear climate strategies, while smaller companies are often approached indirectly through business clusters or collective organisations due to limited capacity for individual engagement. The organisation tailors its support where possible to the actors it works with. At the same time, the organisation recognises that engagement levels vary and that encouraging companies to participate in collective climate action remains a challenge, as businesses often prioritise individual decision-making and investment strategies.

However, the process does not strongly focus on expanding membership; instead, the emphasis has been on working with a smaller group of already engaged organisations. Companies that are members of Leuven 2030 vote for a few representatives who participate in the board and contribute to strategic discussions. The current group of participating companies mostly consists of organisations that are already motivated to engage with climate transition, while reaching the much larger group of

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companies that are not yet involved remains a challenge. Possible future strategies include working through intermediary organisations or economic networks to connect with a broader range of businesses and bring new actors into the process.

"*The interesting group is the hundreds of companies that are not members yet and we should find a way to reach them*." (Interview #3)

However, an energy cooperative involved in Leuven2030 praises its attention to smaller non-profits and small companies too, providing platforms that give visibility and access to actors who might otherwise be excluded.

"*Without Leuven 2030, smaller non-profit and profit companies would be forgotten*." (Interview #4)

Municipal powers, enabling roles and support

When it comes to private-sector engagement, the municipality plays an important but largely enabling and indirect role. The city's main contributions here lie in setting the strategic narrative (e.g., committing to 2030 neutrality), providing institutional legitimacy and access, and embedding climate priorities into spatial and regulatory decisions, while Leuven2030 handles most of the operational matchmaking. Companies repeatedly note that the municipality's presence in joint meetings lends legitimacy and helps overcome barriers such as siloed internal structures or lack of coordination between services.

The municipality provides technical input, mainly through its Sustainability Department. It contributes data for emissions inventories, participates in feasibility discussions (e.g., heat networks), and was instrumental in drafting Leuven's circularity strategy. In permitting-intensive domains such as energy and infrastructure, municipal departments perform essential planning and regulatory functions, determining what is permissible and where. Larger companies interact with multiple municipal services - e.g., for noise, heritage, spatial planning and environment - reflecting the city's role as a gatekeeper for major investments.

"*They try to facilitate as much as possible, but cooperating does not mean that you will eventually get more flexible boundaries. [...] You very quickly find yourself facing certain legal frameworks.*" (Interview #2)

Interviewees indicate limited dedicated municipal funding for Cities Mission activities. The newly created Mission Manager reportedly has no budget of their own, and stakeholders see insufficient municipal resources as a barrier. Grants or co-funding instruments are not highlighted, though the city supports some EU-funded projects and contracts consultants for investment planning. Companies emphasise that the city cannot finance the transition alone and must rely on blended finance mechanisms being developed by Leuven2030.

The city plays a symbolic and communicative role by publicly endorsing climate neutrality, participating in Cities Mission events and co-signing the CCC. Its involvement signals political commitment, though it is Leuven2030 rather than the municipality that more visibly leads campaigns, events and stakeholder communication around climate neutrality.

Private sector commitments, collaboration and outcomes

The commitments made through the CCC and accompanying project portfolio function as voluntary but structured agreements that help steer companies toward concrete contributions. The interviews consistently show that the real function of these written commitments is not to bind companies legally, but to create shared direction, clarify roles, and trigger bilateral follow-up after the CCC's publication.

The translation from commitment to action typically unfolds in three steps. First, companies express interest or intent during the co-design phase. These intentions are captured in the CCC as

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involvement in specific portfolio actions. Second, Leuven2030 and the municipality organise bilateral sessions to turn these indicative commitments into feasible propositions: clarifying the problem, identifying barriers, and determining the type of contribution expected. Finally, implementation progresses through iterative negotiation, drawing on Leuven2030's convening and problem-solving role and the municipality's technical and regulatory functions. The result is a form of collaborative implementation rather than compliance-based delivery.

Two examples illustrate how this mechanism produces tangible outcomes. The emerging district heat pilots originated from commitments by ECoOB, the city and several real estate actors to explore decentralised heat loops. What began as indicative commitments in the CCC evolved - through bilateral feasibility studies and municipal planning support - into the first concrete pilots now under development. Similarly, commitments around circular materials management led Werecircle, KU Leuven, UZ Leuven and social-economy partners to establish coordinated repair and reuse services. The CCC provided the shared strategic framing; the operative collaboration was shaped afterwards through iterative negotiation and capability-building among the involved actors.

Overall, Leuven's commitment framework enables action not because commitments are binding, but because they institutionalise expectations, create visibility for priority projects, and mobilise follow-up processes that anchor collaborations in day-to-day practice.

Monitoring, reporting and accountability

Monitoring and accountability in Leuven's climate collaboration process are primarily linked to the commitments made under Leuven's CCC. Leuven 2030 keeps track of the engagements made by participating organisations and regularly follows up with companies to discuss their progress and identify whether actions are on track. This monitoring is done through direct meetings with companies, where commitments and developments are reviewed and discussed.

"On a regular basis we confronted them with the engagements they took up, in order to make up a status report… we remind them constantly, because there are hundreds of engagements, and it's our job to remind constantly that these things exist." (Interview #1)

In addition, Leuven 2030 is working with analytical tools to assess the impact of different climate measures on carbon emissions, allowing the organisation to estimate whether actions are contributing to overall emission reductions.

"*We try to measure the impact with an assessment tool to estimate the consequences of certain measures on carbon emissions*." (Interview #1)

While accountability relies largely on transparency, dialogue, and peer visibility rather than strict enforcement, the organisation also communicates companies' initiatives through newsletters and other channels, which helps maintain public visibility and encourages continued engagement and progress.

While monitoring is one of Leuven2030's activities, its members help by sharing their data. Imec, for instance has an advanced internal monitoring system. One interviewee notes that the city tends to struggle with data availability compared to companies, for which the scope of what to measure is much smaller and less fragmented. Another interviewee suggests that monitoring and accountability mechanisms within Leuven 2030 are still developing and remain relatively limited. There have been attempts to introduce stronger accountability by asking organisations represented in the Leuven 2030 board to develop and submit climate action plans, but the quality and ambition of these plans varied significantly, and the initiative was not consistently enforced. As a result, systematic monitoring of individual company commitments is not yet fully established. Future efforts may focus more on tracking the climate actions of participating organisations and strengthening accountability mechanisms to ensure that both collective initiatives and individual commitments contribute more effectively to the city's climate goals.

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"*I think we should not only focus on the collective efforts but also on the individual engagements of the organisations*." (Interview #3)

Motivations, incentives and value proposition

Companies engage with Leuven 2030 primarily because the organisation offers access to a strong local network, opportunities for collaboration, and a platform to address complex sustainability challenges that would be difficult to solve individually (including access to experts). Participation allows companies to connect with other businesses, knowledge institutions, and public actors to exchange knowledge or explore joint solutions for issues such as energy systems or sustainable transport. Leuven 2030 also actively communicates the value of engagement by highlighting benefits, such as risk reduction, strategic autonomy in energy systems, increased visibility within the local community, and opportunities to collaborate on innovative projects. Rather than relying on financial incentives, the organisation motivates companies by demonstrating the broader strategic advantages of climate action and by facilitating partnerships that can help companies implement sustainability measures more effectively and efficiently.

"*What they expect from us is that we facilitate complex processes that are not easy for them to organise themselves."* (Interview #1)

A clear differentiation in value propositions has emerged:

Large companies participate to maintain local legitimacy and embeddedness, align with the city's long-term planning environment, as well as for strategic positioning and due to societal responsibility.

SMEs, cooperatives, and social-economy organisations depend on Leuven2030 for access to networks, project opportunities, practical support, and visibility.

The city administration benefits from Leuven2030's capacity to bridge departmental silos and sustain long-term, cross-sectoral relationships.

"*For us it was important that people in the company could see that we were not only working on commercial things but also contributing to societal movements*." (Interview #3)

1.5.2.3 Outlook

Challenges and barriers

Barriers to private sector engagement and CCC implementation are both structural and actor-specific, with clear differences between city-side and company-side constraints.

On the company side, a central barrier to get engaged in climate action is capacity (or lack thereof) and prioritisation, especially for SMEs and social-economy actors. Many smaller organisations operate with limited staff time and lack dedicated sustainability expertise. Climate action competes with short-term operational pressures, making engagement incidental rather than strategic. Even when interest is high, companies often struggle to translate ambitions into concrete projects because of knowledge gaps (e.g. understanding emissions scopes, circular business models, or regulatory requirements) and insufficient project development capacity. Funding is another recurring obstacle: feasibility studies, pilots, and early-stage investments are difficult to finance, particularly where business cases are uncertain or benefits accrue beyond the firm itself.

Another major barrier is that many companies still lack awareness, expertise, or motivation to actively work on climate action, which makes it difficult to mobilize them beyond the already actively engaged group of companies that participate in Leuven 2030. In addition, local authorities have limited

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regulatory power over companies, since most climate-related requirements are defined at the national or European level.

Collaboration between companies on decarbonization projects is also still limited, as many firms focus primarily on their own climate goals rather than joint initiatives. Differences in investment cycles, priorities, and internal planning among companies can also hinder collaboration, even when organisations operate in the same area or sector.

"*Companies are used to making individual decisions; they are not used to collective action*." (Interview #1)

Sector-specific barriers are, among other things, a structural mismatch between local, small-scale initiatives and industrial-scale systems; for instance, local circularity hubs and reuse initiatives operate at volumes that do not easily align with existing waste and materials markets, which are optimised for large, centralised flows. In energy and buildings, split incentives (owners vs. users), long asset lifetimes, and technical complexity slow decision-making. For knowledge-intensive organisations, climate action is constrained less by motivation than by stringent regulatory frameworks (permitting, environmental thresholds) that limit flexibility in e.g., infrastructure improvements.

On the city side, the most salient barrier is institutional fragmentation. Municipal departments often operate in silos, each bound by its own mandates, legal responsibilities, and risk logics. This makes it difficult to respond coherently to cross-cutting climate projects proposed by companies or intermediaries. Capacity constraints within the municipality - limited staff time, limited discretionary budgets, and limited room for experimentation - further restrict proactive engagement. Data gaps, e.g. emissions data, or the monitoring of impact for climate interventions, are also limiting effective action.

Several interviews highlight that cities can articulate ambitious visions, but struggle to consistently translate them into enabling conditions "on the ground," especially when national or regional regulations dominate key levers (policy, funding). Many of the most binding rules affecting companies (permitting, environmental norms, funding frameworks) sit at regional or national level, beyond the direct control of the city. This weakens the city's ability to remove barriers on its own, even when political support for climate action is strong.

Finally, the voluntary nature of the main collaborative tools (mainly the CCC) has its weaknesses: some commitments remain conservative, ownership is uneven across actors, and limited municipal resources constrain follow-through. Several interviewees noted that without Leuven2030's active facilitation, tools risk underperforming due to administrative bottlenecks or insufficient engagement depth.

Enablers and success factors

Despite these constraints, the interviewees point to a set of enablers that make collaboration possible and effective.

The existence of Leuven2030 itself is consistently named the most important enabler: the presence of a trusted intermediary network organisation helps build relationships between different societal groups and encourages companies to go beyond minimum regulatory requirements. City and company actors alike emphasise its role as a broker and translator; convening stakeholders, aligning agendas, and lowering transaction costs for collaboration. Leuven2030 enables companies - especially smaller or non-traditional actors - to gain legitimacy, access decision-makers, and connect to partners they would not reach independently.

A second key enabler is the presence of anchor institutions (e.g. university, hospital, large research centres, major employers) as part of this network. Their participation normalises climate engagement, creates demand for innovative solutions, and helps the initiative reach critical mass.

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Leadership and long-term commitment also matter. The longevity of Leuven2030, predating the EU Cities Mission, is repeatedly cited as a success factor: trust, shared language, and informal working relationships had already been built before the CCC process. This institutional memory enables faster mobilisation and more candid problem-solving. It also offers continuity across political cycles.

Access to external funding and expertise, particularly through European programmes, is also a crucial enabler. EU projects and mission status provide not only financial resources but also legitimacy, learning opportunities, and space for experimentation that would otherwise be difficult within municipal routines. Future enabling mechanisms may include financial instruments such as climate funds or subsidies for feasibility studies, as well as stronger collaboration with economic networks that can help reach a broader group of companies.

Lessons learned and transferable insights

For Leuven2030, the shift from planning to implementation brought significant learning. Both Leuven2030 and the city recognised that the 86-project portfolio was too large to monitor and support effectively with available resources. This triggered a strategic pivot from broad inclusion to focused depth: instead of continually expanding the coalition, Leuven2030 began concentrating on a smaller group of high-leverage stakeholders and priority projects.

This period also surfaced tensions around resources, role clarity, and the limits of voluntary cooperation. Leuven2030 realised that during the CCC drafting year, it had moved too close to the municipality, blurring roles and reducing its ability to challenge the city where needed. This reflection prompted Leuven2030 to re-examine its governance position and clarify that, as an independent multi-stakeholder organisation, it must balance two functions:

Supporting and enabling stakeholders and the city, especially on implementation (e.g., helping actors deliver on project commitments, convening partners, identifying needs, and providing technical or strategic support).

Acting as a critical guardian of ambition, including holding stakeholders - including the municipality itself - accountable for commitments, ensuring that ambition remains high, and signalling when action lags behind stated goals.

As a result of this reflection, Leuven2030 has begun reconsidering its governance structures and proximity to the city, emphasising a need for more independence so that it could credibly play the “critical friend” role again. Meanwhile, the city faced pressure to align its internal budgets and staffing with the high expectations set through the Cities Mission.

The experience of Leuven 2030 suggests several lessons for engaging the private sector in urban climate transitions. Although perhaps obvious, a key insight is the importance of having an independent intermediary organisation that can bring together actors from different sectors and facilitate collaboration in a neutral environment. Building trust and maintaining long-term relationships with companies is essential, as engagement requires continuous dialogue, persistence, and an understanding of companies’ motivations and constraints. Equal stakeholder weighting as part of the Leuven2030 board maintained trust and avoided dominance.

The Leuven experience also highlights that collective climate action does not emerge automatically; it often requires active facilitation to overcome companies’ tendency toward individual decision-making. Voluntary commitments and collective charters can help mobilise frontrunner companies, but without structured follow-up and monitoring, their impact may remain limited. Private-sector partners displayed wide variation in ownership and readiness. Large institutions were generally committed but operated from established internal sustainability programmes, maintaining engagement mainly for alignment and visibility. Smaller organisations, in contrast, relied heavily on Leuven2030 to navigate municipal structures, unlock funding, and overcome administrative or regulatory barriers. Interviewees noted that

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without Leuven2030's convening ability and persistent facilitation, collaborative energy projects or circular pilots would likely stall. So, cooperation must result in real actions, requiring continuous pressure, alignment, and shared ownership. One interviewee also highlights that simply increasing the number of participating companies is less important than creating meaningful engagement and shared learning.

Another important lesson is that companies are more likely to participate when the value of collaboration is clearly articulated, such as opportunities for networking, risk reduction, visibility, or solving complex challenges collectively. Therefore, cities can benefit from creating platforms that encourage interaction, knowledge exchange, and joint initiatives, while consistently reminding actors of their shared commitments and the broader benefits of accelerating the transition.

Conclusion

Leuven2030 is a critical actor underpinning and operationalisings Leuven's path towards climate neutrality. It acts as a neutral, trusted intermediary capable of convening diverse actors around this mission. Its bridging role helps overcome sectoral silos and ensures continuity in engagement, allowing the city to work with a broad ecosystem of anchor institutions, SMEs, cooperatives and social-economy organisations.

Leuven's governance model for private-sector engagement is built on the principle of shared stewardship. Companies are treated as co-owners of the transition, embedded structurally in governance processes rather than approached as external stakeholders to be convinced.

Several success factors underpin this model. First, trust and continuity: long-standing relationships, consistent facilitation, and transparent value propositions create the conditions for companies to engage meaningfully. Second, institutional capacity: Leuven2030's neutrality, resources and convening power enable actors to navigate complexity and co-develop solutions that none could deliver alone. Third, differentiation: tailored engagement for large organisations (seeking legitimacy and planning stability) and smaller actors (needing networks and practical support) ensures relevance across the ecosystem. Finally, iterative learning and persistence - rather than one-off mobilisation - allow Leuven to maintain momentum but also to adapt engagement pathways as opportunities and challenges evolve.

The Leuven2030 initiative demonstrates the critical role of sustained and independent leadership, strategic focus, and, most importantly, a collaborative platform where stakeholders take part on equal footing, in driving urban climate transitions. This case underscores the need for intermediaries who carry out targeted stakeholder engagement as well as structured follow-up to foster meaningful action. While access to funding and expertise remains vital, the success of Leuven2030 ultimately depends on shared ownership, a solid governance structure, and trust built over a long time. These lessons offer valuable guidance for cities seeking to accelerate climate action through inclusive, effective, and resilient partnerships with the private sector.

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1.5.3 Mannheim

1.5.3.1 City Profile and Mission Context

Geographic, Demographic, Socio-Economic Context

Mannheim is a mid-sized German city with a population of over 332,601 as of December 2024[1], making it Germany's twenty-first largest city overall. It sits at the heart of the Rhine-Neckar Metropolitan Region, one of Germany's most economically significant conurbations, with nearly 2.4 million inhabitants[2].

Historically, Mannheim carries a strong identity as a place of innovation: it claims the invention of the automobile, bicycle, and tractor, earning it the informal title of the "city of inventions." This heritage of industrial ingenuity continues to shape the city's economic character and its self-perception as a forward-looking, innovation-driven urban centre.

Mannheim's political landscape is characterised by a 48-seat city council elected by direct vote every five years. The Mayor serves as head of city council and chairs the Mayors Conference, which plays a central role in the city's climate governance structure.

Mannheim's economy is notably diverse, combining large multinational corporations with a strong fabric of small and medium-sized enterprises (SMEs) across many sectors. Among the most prominent economic activities are mechanical engineering and vehicle and machinery manufacturing - a legacy of the city's automotive heritage. Major industrial actors include Roche, ABB, John Deere, Essity, Siemens, Fuchs Lubricants, and Caterpillar Energy Solutions, among others. The city also hosts Hafen Mannheim, a large inland port hosting approximately 500 enterprises employing over 20,000 people. The handcraft and trades sector ("Handwerk") comprises over 3,000 active firms employing around 29,000 people - one of the city's employment-strongest sectors.

Mannheim's private sector faces a conjuncture of pressures and economic headwinds. Germany has experienced two consecutive years of economic contraction - the only G7 economy to do so in 2023 and 2024 - driven by a combination of high energy costs following the loss of cheap Russian gas, a structural shift in demand from its largest export markets, and intensifying global competition in precisely the capital goods and automotive sectors that define Mannheim's industrial base. Companies such as those in machinery manufacturing, automotive supply, and industrial engineering are navigating what many analysts now describe as a potential structural reorganisation of global manufacturing - one that hits German industry harder than most of Europe.

This context is also the lens through which the EU's emerging competitiveness agenda should be read. The Draghi report on the future of European competitiveness, published in September 2024, and the Clean Industrial Deal launched by the European Commission in February 2025, both argue that decarbonisation and industrial competitiveness must be pursued as a single integrated agenda rather than traded off against one another - that the green transition is Europe's best available answer to the competitive pressures it faces, not an obstacle to addressing them. Mannheim's approach to private sector engagement, examined in detail throughout this case study, can be read as an early local experiment in precisely that thesis. Section 3 reflects in more detail on what the Draghi agenda implies for the gaps and opportunities in Mannheim's current approach.

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[1] *Statistische Daten Mannheim Nr. 1/2025*, Kommunale Statistikstelle der Stadt Mannheim, März 2025 (data as of 31.12.2024). Available at mannheim.de/statistik.
[2] Metropolregion Rhein-Neckar GmbH, *Daten & Fakten*, m-r-n.com (accessed April 2024).

Local Governance Setup

Political-Strategic Level

Overall steering of Mannheim's climate work rests with the Office of the First Deputy Mayor. The First Deputy Mayor holds the environmental portfolio, meaning climate responsibility sits at the very top of the executive structure.

The Mission Coordinator - who works directly for the First Deputy Mayor - plays a critical bridging role between the main climate delivery entities described in this case: the Local Green Deal (LGD) team; the Department on Climate, Nature and Environment (Environment Department); and the Climate Action Agency (Klimaschutzagentur Mannheim).

The Transition Team is the overarching coordination structure for Mannheim's Mission strategy. Coordination between the key delivery entities is ensured through regular exchanges between the First Deputy Mayor's office and the leadership of the LGD team, the Climate Action Agency, and the Environment Department. The Economic Development Department, which sits within a different mayoral office, is involved through targeted collaboration on specific projects and initiatives at the working level.

It should also be noted that Mannheim's climate goals are embedded within the broader *Leitbild Mannheim 2030* - the city's overarching Sustainable Development Goal (SDG)-aligned strategic framework, adopted in March 2019 following an extensive participatory process and coordinated under the Mayor's Department of Democracy and Strategy. This framework provides the political and institutional foundation underpinning the city's climate and private sector engagement work described in this case study.

Operational Delivery Level

Day-to-day climate and private sector engagement work is carried out by the following main entities:

- The **First Deputy Mayor** with two climate policy advisors
- The **Local Green Deal team (iDEAL for Mannheim)**, with its thematic affiliation to the First Deputy Mayor but administrative affiliation to the Lord Mayor. The team consists of seven “Managers” (clean energy, sustainable economy, climate friendly mobility, building for the future, sustainable food systems, natural diversity, environmental protection), and a total of 11 staff members, or 9.5 full-time equivalents (FTEs).
- The **Climate, Nature and Environment Department** (Environment Department), which manages the Climate Protection Alliance and co-steers the Heat Transition Academy. The staff includes approximately 6.5 full-time equivalents currently working on climate action and climate adaptation.
- The **Climate Action Agency**, a non-profit with its own governance structure, managing the network KLIMANetz and co-steering the Heat Transition Academy. The Agency has been operational since 2010 and includes a staff of 14 in total, with approximately 10.4 FTEs. The agency is co-funded by the City of Mannheim (51%), MVV Energie AG (40%), and GBG (municipal) housing company (9%).
- The **Economic Development Department**, which leads the Initiative Industriestandort Mannheim (I2M) and the Green Industry Cluster. The department has about two members of its team focused on private sector engagement, while many others from the department are contributing.

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Staffing: An Unusual Investment in Human Capacity

What immediately distinguishes Mannheim from most cities its size is not just the ambition of its climate goals, but the sheer institutional infrastructure it has built to pursue them. Across the Local Green Deal (LGD) team, the Climate Action Agency, and the Environment Department alone, the city deploys substantial personnel resources dedicated to climate work - a level of staffing unusual for a city of 332,601. While some of these roles are sustained through external funding, including EU programmes and national/state-level project support, this investment in human capacity is clearly an important driver of the city's effectiveness in engaging the private sector.

City officials acknowledge that many of these positions were established several years ago when the city was in a stronger financial position and societal support for climate action was broader. In the current political and financial climate, it would be significantly more difficult to create equivalent positions from scratch. The city's current budget pressures mean this staffing base is being maintained rather than expanded - and the risk of losing experienced staff when positions fall vacant is real.

Emissions Profile and Decarbonisation Strategy

The city's central strategy document is the Climate Action Plan 2030 (Klimaschutz-Aktionsplan 2030, or KSAP), which forms the basis of Mannheim's Climate City Contract (CCC) under the EU Mission framework. The KSAP comprises 81 bundles of measures across eight fields of action, of which 34 are identified as top priorities. Notably, it was developed through a robust participatory process in which eight Strategy Groups - including one for Industry led by I2M, and another for Trade, Commerce and Services - co-authored the measures. Several participating companies subsequently signed the CCC, which was approved by the European Commission in January 2024, making Mannheim the first German city to attain the "Mission Label".

According to Mannheim's most recent greenhouse gas inventory, prepared by the IFEU[3]-Institut Heidelberg on behalf of the city using the BISKO standard methodology, total emissions in 2022 stood at approximately 2.82 million tonnes CO_2eq, distributed across sectors as follows[4]:

Sector	Share	Million tonnes CO_2
Industry	46%	1.30
Private households	24%	0.67
Transport	22%	0.62
Commerce/trade/services	4%	0.14
Mannheim Group (municipal companies)	3%	0.11

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[3] Ifeu - Institute for Energy and Environmental Research Heidelberg gGmbH
[4] City of Mannheim, Bericht Treibhausgas-Bilanz 2022 (THG-Bilanz 2022), Informationsvorlage V558/2024, Dezernat V, 23 October 2024. GHG inventory prepared by Ifeu-Institut Heidelberg using the BISKO standard methodology. Available at mannheim.de.

These 2022 figures represent a reduction of approximately 35 percent from 1990 levels, when total emissions were 4.33 million tonnes CO_2eq. However, the trajectory is not straightforwardly positive: emissions rose by around 4 percent between 2021 and 2022, driven primarily by a worsening emissions factor in Germany's national electricity mix following the energy crisis triggered by Russia's invasion of Ukraine, and by a partial recovery of transport activity toward pre-pandemic levels.

The CCC sets a 93 percent reduction target from the 2020 baseline. However, the CCC is explicit that this goal is *not* achievable through municipal action alone - it requires active participation by all companies, organisations and citizens, as well as changed frameworks at EU, federal and state levels.

The eight KSAP action fields signal where the strategic emphasis lies include:

- Energy production (PV, district heating decarbonisation, geothermal, hydrogen)
- Industry (renewable energy use, circular economy)
- Private households (renovation offensive targeting 4 percentof housing stock per year)
- Mobility (modal shift, electrification)
- Municipal administration
- Trade, commerce and services (SME support)
- Land use
- Green-blue infrastructure

Of particular note is that Industry - responsible for approximately 46 percent of total emissions - is considered the critical sector, and one over which the city has limited regulatory leverage. This makes Mannheim´s private sector engagement work so central to its overall climate strategy.

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1.5.3.2 Private Sector Engagement: Approach, Structures, and Practices

Strategic Logic and Philosophy

Mannheim's approach to private sector engagement on climate is grounded in a multi-layered institutional architecture, combining formal governance structures, bilateral relationship-building, and multi-actor platforms. The city positions private sector engagement not as a peripheral add-on to its climate strategy, but as integral to achieving its ambitious goal of climate neutrality by 2030.

Across all its engagement mechanisms, Mannheim pursues a consistent strategic logic: businesses are engaged not primarily through regulation or mandates, but through a combination of personal relationship-building, genuine technical support, peer network facilitation, and formalised voluntary commitments. The city positions itself as a trusted partner and, in several contexts, as a neutral convenor that creates spaces for businesses to find and develop collaborative relationships with each other.

This approach rests on a deliberate philosophy that the Local Green Deal Team of the city articulates as "every deal counts" - a low barrier to entry is a feature, not a weakness. The rationale is that actions should inspire citizens and other companies, and that visibility and momentum matter as much as the scale of any individual commitment.

This is also, on the evidence gathered, a system that works through people. The LGD Managers and the Climate Action Agency consultant are not bureaucratic intermediaries - they are described by

companies as genuine sparring partners who provide real value. The quality of those individual relationships is a critically important driver of the system's effectiveness.

The Engagement Architecture: Mechanisms in Overview

The Environment Department, Local Green Deal Team, Climate Action Agency, and Economic Development Department have created several key modalities of engagement with the private sector in Mannheim:

- The **Local Green Deal (LGD)** platform of more than 280 concrete, publicly visible commitments and actions by businesses and organisations.
- **Climate Action Agency** advisory support: The Agency's energy consultant provides free, ongoing technical advisory support - a long-term "sparring partner" relationship - on energy efficiency and renewables, and access to related funding.
- **KLIMAnetz**: A structured, fee-based peer learning network of 10 companies over a 2.5-year cycle, facilitated by the Climate Action Agency, with collective emissions commitments and at least nine on-site workshops.
- **Climate Protection Alliance**: A voluntary platform of 17 large businesses that meets in biannual plenary meetings focused on knowledge-sharing and progress review.
- **Initiative Industriestandort Mannheim (I2M)**: Eight thematic consortia of large industrial companies on transformation topics including hydrogen and circular economy.
- **Green Industry Cluster**: Networking, matchmaking, funding advice, and knowledge transfer to build a new GreenTech ecosystem across Mannheim and the Rhine-Neckar region, with a focus on startups, SMEs, and research institutions.
- **Heat Transition Academy**: Free, multi-day practical training for Handwerk tradespeople on heat pump installation and district heating, delivered by a broad multi-stakeholder alliance.
- The **Environment Department** also maintains bilateral relationships with businesses.

Evolution and Key Milestones

Mannheim's approach has developed progressively over the past decade:

- 2009: Establishment of the Climate Action Agency
- 2015: Launch of the Climate Protection Alliance
- 2019: Launch of Mannheim’s Mission Statement (Leitbild) and a Climate Urgency Plan, with the goal to become climate neutral before 2050
- 2021: Launch of the Local Green Deal program and application to the EU Mission to become climate neutral by 2030
- 2022 (April): Selection as one of the 100 EU Mission Climate Neutral and Smart Cities.
- 2022 (November): Formal adoption of the KSAP 2030 by City Council.
- 2023/24: Approval of the city´s Climate City Contract/KSAP by the European Commission, earning Mannheim the "Mission Label".
- 2023: Local Green Deal structure takes effect

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- 2024: Creation of a Climate Fund
- 2025: Opening of the Heat Transition Academy

Engagement Processes and Practices

Mannheim engages the private sector on climate through a combination of bilateral and multi-actor modalities.

Bilateral Engagement

The **Local Green Deal** is the central innovation in the city's engagement toolkit. A "deal" is a concrete, voluntary, publicly acknowledged commitment to action, which goes beyond legal requirements, by an individual organisation - ranging from installing a photovoltaic system to complex multi-party infrastructure investments.

LGD Managers in Mannheim reach out to companies (and other organizations), conduct a process of discussion around potential actions, agree on a concrete commitment, and formalise it on the iDEAL for Mannheim platform. The Deal Box mechanism - a curated set of about 130 suggested measures with best practices and funding information - allows managers to proactively identify opportunities businesses may not have recognised themselves.

The LGD Managers play a distinctive role in this process. Each Manager has expertise in their respective EU Green Deal action field and is positioned as a trusted advisor rather than a compliance officer. Their placement between the Mayor's Office and First Deputy Mayor's Office means they can credibly serve as an important point of contact for businesses navigating the municipal administration - a function that companies have reported as genuinely valuable.

To date, more than 280 signed deals have been signed, distributed across the LGD program´s eight action fields. Of these, more than 60 deals are with private companies - including small and medium sized enterprises (SMEs) as well as large companies like ABB, BASF, Deutsche Bahn, Essity, Freudenberg Group, Fuchs Lubricants, IKEA, John Deere, Kyocera, Pepperl+Fuchs, Roche, Sax + Klee, Siemens, Sparkasse Rhein Neckar Nord, TIB Chemicals, and VR Bank Mannheim. The remaining deals involve governmental actors and civic/other organisations.

An important operational detail, confirmed in all company interviews, is that many but not all LGDs formalise actions that companies had already planned or are already doing. However, to be a “deal” these commitments must be above and beyond regulatory requirements and, if they are completed projects, cannot be older than 2021. The logic of including existing projects is that these projects deserve recognition, that the bar to participation should be relatively low, and that company climate actions recognised on the LGD platforms will inspire others and generate momentum. Moreover, as the programme has grown, companies increasingly approach the city proactively to be included in the programme and make their actions visible on the website.

The **Climate Action Agency** delivers advisory support on energy efficiency, renewables, and building retrofits, and facilitates access to funding. In 2025 alone, the agency conducted over 100 consultations with more than 30 companies. The most common topics were heating systems, energy efficiency, funding access, and photovoltaics. The agency currently has one consultant dedicated to company support, who also facilitates the KLIMAnetz network.

In addition to the consultant supporting companies, the Climate Action Agency also has three consultants providing similar services to citizens. Taking into account both the support to businesses and to citizens, the agency's track record is substantial: between 2009 and 2024, it carried out over 42,000 energy consultations and promoted over 5,000 energy efficiency measures, was involved in

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over 800 lectures and events with more than 31,000 participants, and subsidised the installation of PV systems with nearly 10,000 kWp in Mannheim.[5]

Multi-Actor Engagement Formats

KLIMAnetz

The Climate Action Agency manages KLIMAnetz, which is a structured, fee-based peer learning network of 10 companies, partly motivated by the European CSRD compliance requirements that pushed businesses to get serious about emissions accounting. Participating companies began the 2.5-year cycle with individual GHG inventories. Based on these inventories, they committed collectively to defined energy savings and emissions reduction targets, which are reviewed and published annually. The network also organizes at least nine on-site workshops whose topics are entirely determined by the participating companies.

The network is supported by the Climate Action Agency's dedicated energy consultant and an external engineering firm, providing both a trusted long-term relationship and additional technical depth. The companies pay a modest participation fee for the programme.

The preliminary collective goals for the participating companies have been set for year-end 2026 and include energy savings of at least 2,400,000 kWh/year; CO_2 reduction of at least 1,200 tonnes/year; and an increase in renewable capacity of at least 1,700 kWp. The network is currently running behind its collective targets, primarily due to the difficult broader economic climate and the relaxation of EU CSRD obligations.

There are several data points that demonstrate the success of the KLIMAnetz network. There are the investments being made by the companies. Three examples so far include ES Electrotechnik halving its electricity consumption since the project launch; Sax + Klee installing a green façade with city subsidies; and Haag Streit installing a new PV system on a listed building.Another encouraging sign of the network's maturity is that companies are beginning to exchange information independently among themselves without consultant mediation - a marker of genuine peer learning culture taking root.

What stands out about KLIMAnetz, on the evidence from interviews, is the genuine appreciation participants express for its usefulness: Company B described it as "very different from similar networks," pointing to the combination of expert input on member-chosen topics, active peer sharing of company emission solutions, and a group small enough to foster genuine trust. When senior management from Company B attended sessions, they were "excited by the opportunity" in a way that exceeded their expectations - a reaction that signals something qualitatively different from the typical multi-stakeholder spaces.

Climate Protection Alliance

While KLIMAnetz focuses on smaller and medium sized businesses, the Climate Protection Alliance brings together large companies through biannual plenary meetings. Formed in 2015 by the Environment Department, the Alliance involved members formally committed to meeting specific climate goals, maintaining company greenhouse gas (GHG) inventories, implementing carbon emission reducing measures, and ensuring transparency of their energy data.

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[5] CoLAB Project Team, The House of Change: An Action-Packed Story Told by CoLAB (Mannheim: Klimaschutzagentur Mannheim, May 2025). Published under the NetZeroCities Pilot Cities Programme, funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101036519.

Like KLIMAnetz, the Alliance has a deliberately closed membership model - no new members are generally admitted - because the platform is built on trust and confidentiality. Membership currently stands at 17 companies including ABB, BASF, Roche, Daimler Truck AG, Mercedes-Benz Werk Mannheim, EvoBus, MVV Energie AG, GBG, John Deere, and Rhein-Neckar-Verkehr, among others.

The Alliance has been less active in recent years due to municipal capacity constraints. However, what distinguished the Alliance at its most active was the care the city invested in making those meetings genuinely useful. Rather than setting agendas top-down, the city consulted member companies in advance to identify topics of interest and surface presenters from within the group. It also sometimes hosted meetings at company facilities.

Initiative Industriestandort Mannheim (I2M)

The Economic Development Department orchestrates I2M which, like the Climate Protection Alliance, focuses specifically on large industrial companies. During the development of the city´s climate plan (KSAP), I2M served as the Strategy Group for Industry. Large industries self-organised into eight thematic consortia: circular economy; local energy supply; mobility and logistics infrastructure; digital process chains; transformation of the automotive industry; availability of industrial land; hydrogen; and recruitment of skilled workers. Companies include John Deere, BASF, Roche, Hitachi Energy, Daimler-EvoBus, MVV, the Port of Mannheim, Caterpillar Energy Solutions, ABB, Pepperl+Fuchs, Essity, and Fuchs Lubricants, as well as trade unions, employer associations, and the Chamber of Industry and Commerce.

Green Industry Cluster

Since spring 2022, the Economic Development Department has been establishing the Green Industry Cluster to strengthen the city´s GreenTech focus. The Cluster targets seven key markets: environmentally friendly energy generation, storage, and distribution; energy efficiency; resource and material efficiency; sustainable mobility; circular economy; sustainable water management; and sustainable agriculture and forestry. The Cluster offers networking and matchmaking, workshops and training, funding advice, administrative support, and knowledge transfer between members. A physical hub - the Green Tech Innovation Center - is being established.

The Green Industry Cluster is distinct from I2M in an important way: I2M is about transforming the existing large industrial base; the Green Industry Cluster is about building a new GreenTech ecosystem and connecting startups and SMEs with established players and research institutions. Both are run by the Economic Development Department, but they serve fundamentally different parts of the business community.

Heat Transition Academy

The Environment Department and the Climate Action Agency together steer the Heat Transition Academy, which represents a different kind of engagement logic - one directed not at motivating companies to act, but at removing a practical bottleneck that was preventing action from happening. With Mannheim's municipal heat planning complete and the technical roadmap in place, the binding constraint on implementation was not ambition or funding but the shortage of tradespeople with the skills to install heat pumps and connect customers to district heating.

The Academy, which opened in January 2025, offers free multi-day training courses in theory and practice at the premises of Beegy GmbH. The Academy is supported by a broad multi-stakeholder alliance: the City of Mannheim, the Climate Action Agency, MVV Energie, Beegy GmbH, the Rhine-Neckar Chamber of Industry and Commerce, the Mannheim Rhine-Neckar-Odenwald Chamber of Skilled Crafts, and the Rhine-Neckar Sanitary, Heating and Air Conditioning Guild. Companies that complete the training are listed in a publicly accessible directory, giving participants both skills and visibility.

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The Academy is a concrete example of a multi-actor approach that directly addresses a supply-side constraint on decarbonisation - and a model of the city convening partners around a shared problem rather than engaging businesses one by one.

Networking

A notable dynamic running across all formats is that companies seek peer connections. As just described above, the multi-actor spaces (KLIMAnetz, Climate Protection Alliance, I2M, Green Industry Cluster, and Heat Transition Academy) all have as a central tenet company networking and spaces for companies to learn from each other.

However, even the bilateral modalities of engagement like the Local Green Deals have created demand for networking. The city explicitly cultivates this by making all deals publicly visible on the iDEAL portal. The city also intentionally plays the role of strategically connecting companies with similar interests or complementary capabilities. As one data point, Company B described being contacted by another company wanting to learn how they carried out one of their projects after seeing the deal on the iDEAL website.

The LGD team has recognised the appetite for even wider networking among companies with deals and is actively investing more in connection-making. They organized the first dedicated LGD networking event in March 2026, and intend to further strengthen the community of deal partners and collaborations in the period ahead.

Trust-Building and Relationship Management

Another notable feature of Mannheim's approach is its emphasis on trust as the foundation for engagement. The LGD Managers' positioning as advisors - rather than inspectors or enforcers - is central. By providing genuine value (navigating bureaucracy, identifying funding, making connections, suggesting ideas through the Deal Box), the team builds credibility that facilitates more ambitious future commitments. Managers tend to engage at a technical or middle-management level appropriate for building working relationships.

The Climate Action Agency consultant's approach also builds trust through what he describes as "open and honest communication - no lecturing or patronising." Standard consultations are free of charge.

Trust-building is also facilitated by the city's role as a neutral convenor in the multi-actor networks. The Climate Protection Alliance's deliberately closed membership model reflects a conscious trade-off: limiting scale to protect the quality and confidentiality of relationships and data-sharing. The fee-based KLIMAnetz network has a similar structure - closed membership for a relatively small number of companies has resulted in deep learning and networking among its members.

Company Differentiation and Tailored Practices

While all types of companies are supported and engaged through the Local Green Deal team, Mannheim's other private sector engagement has some nuance in its approach to different types of companies. Large companies are primarily engaged through the Climate Protection Alliance and I2M consortia, where formal commitments, GHG inventories, and data transparency are required. SMEs are primarily served through the Climate Action Agency's advisory services, KLIMAnetz, and the Heat Transition Academy.

A comparison of two of the companies interviewed is instructive:

Company B is a medium-sized enterprise. They began their sustainability work in earnest primarily in response to regulatory pressure - the EU´s Corporate Sustainability Reporting Directive (CSRD) and requests for sustainability data from customers and banks. The company joined the KLIMAnetz network to address these regulatory requirements and also signed multiple “deals”. As an anecdote from the interview, they reflected on the experience of driving climate action in the company and

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shared that they find it easier to work with various company departments on measures that are both good for the environment and the bottom line, rather than creating one consolidated climate plan.

Company C is a large global manufacturer who has also signed multiple deals. The company is already equipped with its own sophisticated global sustainability strategy and 2030 reduction targets. They engage with the city primarily to align global goals with local conditions, reduce uncertainty around local policy, and find partners for practical solutions on shared infrastructure challenges such as energy supply and mobility.

Across all company sizes, the primary incentives for engaging in climate action are, in the Climate Action Agency consultant's view: regulatory pressure, customer enquiries, and energy prices. The clearest enabler of action is financial viability. As the consultant notes "if it is economically viable, they want to implement it - regardless of the size of the company. Combating climate change is rarely the reason….it usually comes down to economic KPIs".

However, as is the case in all cities, SMEs in Mannheim are more challenging to engage on climate than larger companies. The experience of the Climate Action Agency is that SMEs often lack internal capacity to work on climate, awareness of where their biggest emissions occur, and resources to act without dedicated support. The current economic downturn in Germany has exacerbated these barriers.

Municipal Governance Structures

Coordination Across Entities

While there are many initiatives and many departments involved, the municipality ensures its work is well integrated and coordinated.

As described in section 1.2, overall steering of Mannheim's climate work rests with the Office of the First Deputy Mayor. The First Deputy Mayor, who is supported by two climate policy advisors, holds the environmental portfolio, meaning climate responsibility sits at the very top of the executive structure.

Operational coordination of the city´s climate work across the various delivery entities is structured through the **Transition Team**, Mannheim's overarching governance mechanism for its climate neutrality mission. Its purpose is precisely to ensure that the LGD team, the Climate Action Agency, and the Environment Department operate as a coherent system.

The **Environment Department** also plays a central coordinating role within Mannheim's private sector engagement architecture. It manages the Climate Protection Alliance.

The **Local Green Deal team**, which began as a project structure, has been formalised into a permanent matrix structure within city administration. Administratively, the team sits in the Lord Mayor´s Office, but it is technically led by the First Deputy Mayor. The Local Green Deal Managers also sit with the relevant departments (e.g., the Sustainable Economy Manager sits in the Economic Development Department). This gives the team, on the one hand, political authority and, on the other hand, the ability to credibly serve as a bridge across city administration.

The **Climate Action Agency,** a dedicated non-profit organisation, is led by two CEOs: one from within the Agency, and one from the City of Mannheim, who also serves as the City Coordinator for the EU Mission and climate policy advisor to the First Deputy Mayor. The Agency is integrated within the Transition Team structure, ensuring that its advisory work is connected to the city's strategic governance.

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This design reflects a deliberate effort to avoid the fragmentation that can emerge when climate functions are siloed in a single department. Mannheim has created a governance architecture in which climate considerations influence decisions across the full breadth of city operations.

Onboarding

Onboarding into the Mission and CCC

As noted earlier, the KSAP was developed through a robust participatory process in which eight Strategy Groups co-authored the measures. Dedicated groups were formed for Industry (led by I2M) and for Trade, Commerce and Services to involve private sector actors in co-designing the strategy. Several Climate Protection Alliance companies subsequently signed the CCC. These Alliance companies are considered part of the "Mission Group": the inner circle of already-committed stakeholders.

Ongoing Onboarding

For the LGD mechanism, the door is open: LGD Managers proactively reach out to companies and respond to inbound interest, and any organisation can apply to make a deal.

The same is true for the technical support from the Climate Action Agency. The consultant continuously provides bilateral support to companies interested in energy efficiency investments, renewable energy installation, and related funding.

The multi-actor networks described above (KLIMAnetz, the Climate Alliance, and I2M) are not open to new participants mid-cycle in order to maintain cohesion. A second cycle of KLIMAnetz would open to a new cohort of companies, if there is enough demand from companies. However, with the relaxing of EU CSRD reporting requirements in 2025 for companies with less than 1,000 employees, there has thus far been less demand for a second KLIMAnetz cohort.

Municipal Powers, Enabling Roles, and Structures

The City's Roles in Practice

The city plays several distinct roles in its private sector engagement:

- Convenor and facilitator: creating platforms where companies can connect and share.
- Matchmaker and connector: connecting deal-partners with each other and organizing networking events.
- Technical advisor: providing advisory support and support in developing deals.
- Relationship broker and city administration navigator: help companies navigate city administration. Company C specifically highlighted this as valuable - engagement helps accelerate discussions with the city and reduces uncertainty around local policy directions.
- Recogniser: through websites, awards, press releases, and local media coverage.

Private Sector Commitments, Collaboration, and Outcomes

Commitments by Scale and Sector

The experience of the companies interviewed in this case study provides a nuanced understanding of commitments made by different sized companies under the various modalities described in this case study:

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Company A's commitments illustrate the scale of what large industrial actors can deliver: a €3 million steam storage system expected to save up to 13,000 tonnes of CO_2 per year; a €22 million flue gas cleaning system that will halve particulate matter and SO_2 emissions; and a recycling service which recycles hundreds tonnes of paper towels in Mannheim in 2023, reducing the CO_2 footprint of that used paper by around 40 percentcompared to conventional disposal.

Company B's commitments illustrate what is accessible to a medium-sized enterprise: a green façade on their office building extension and mobile PV systems for construction containers as a sustainable alternative to diesel generators.

Company C, the largest of the three companies interviewed, has signed three LGD Deals at its Mannheim production facility: a sustainable mobility that involves fleet electrification, installation of hundreds of EV charging points, train tickets for employees, and a company bike programme; waste reduction and recycling targets; and a new operational building with PVs, heat pumps, and fully automated robotic machinery that reduces material consumption.

Inter-Company and Multi-Actor Collaboration

The experience of the companies interviewed in this case study also provide insight into where company networking has evolved into substantive collaborative projects:

- Company A described a vivid example: at a Bundesgartenschau event, where Company A, a facility service company, and a waste handler were all present, a chance encounter led to an ongoing three-way collaboration on sustainable building practices. The three companies are now working together on waste management and resource efficiency for new buildings.
- As described earlier, Company B had a similar experience: another company contacted them after seeing their deal on the iDEAL website, wanting advice on implementing something similar.
- Company C collaborated with a local energy supplier on early-stage e-vehicle charging infrastructure.

Monitoring, Reporting, and Accountability

The City of Mannheim, through the Environment Department, monitors its overall progress toward climate neutrality through municipal greenhouse gas (GHG) inventories. In addition, the city has established a dedicated monitoring system for its Climate Action Plan, covering more than 300 concrete measures. This information is publicly available on the platform ClimateView Mannheim, which is managed by the Environment Department. The platform enables everyone to explore Mannheim's climate mitigation and climate adaptation measures in a transparent and accessible way.

The LGD mechanism's primary monitoring is that most deals are for completed or active projects that companies are taking. Therefore, the evidence for completion typically exists at the time of signing the deals, and further monitoring is not necessary. However, as more companies sign deals, the nature of deals may change to more prospective, planned projects. In this case, a more robust monitoring system may be needed. Currently, the team is working on a methodology to measure CO2-emission reduction of deals.

Among the modalities of *private sector commitments* described in this case study, KLIMAnetz has the most structured monitoring. Companies' collective targets are published and reviewed annually, and individual company progress is tracked by the energy consultant.

The actions taken as a result of Climate Action Agency support have a similar dynamic. The consultant´s support in developing renewable and energy efficiency projects is free to companies, but no funding is provided by the Agency to implement the measures. Companies generally move forward

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with the renewables and energy efficiency projects developed during the support. However, following through on the projects is not a requirement and there is currently no systematic process in place to verify that companies implement the projects.

Motivations, Incentives, and Value Proposition

From the three companies interviewed, the value proposition of and incentives for engaging with the city of Mannheim on climate can be summarised as:

- **Reputational benefit**: Public visibility on the iDEAL platform, recognition at annual events and through Environment Awards, press coverage through the Agency and communication of company actions on climate through the city social media posts, press releases, and local publications.
- **Networking and connection-making**: Access to peer companies working on similar challenges - through LGD events, KLIMAnetz, Climate Protection Alliance, I2M, Green Industry Cluster, the Heat Academy, and the organic connections the ecosystem generates.
- **Technical support and knowledge**: This includes free advisory support from the Climate Action Agency consultant, expert technical input through KLIMAnetz, and Deal Box suggestions from LGD Managers.
- **Funding access:** Some help connecting to the Climate Fund and state/federal programmes.
- **Assistance navigating the city administration:** LGD Managers and the Climate Action Agency consultant as key points of contact for navigating the city administration.
- **Participation in policy dialogue:** Early understanding of local policy directions, and improved communication with authorities on climate protection and biodiversity projects.

Company A's motivations were primarily driven by already-existing sustainability goals, a sense of local responsibility, and the desire to make the collaborative nature of their climate work visible. They describe LGD participation as "doing two things at the same time" - continuing work they were already doing while gaining reputational advantage and networking value.

Company B's motivations began with regulatory pressure (CSRD, EU taxonomy) and customer/bank demands. Their LGD engagement was also driven by the opportunity to formalise existing work and access the city's subsidy for the green façade. The deepest value for them has been through the KLIMAnetz network.

Company C frames climate action as both a responsibility and a strategic opportunity - not just corporate social responsibility. The company explicitly identifies the transition to a low-carbon economy as a significant strategic opportunity, and notes the risk that failure to transition to lower-emission technologies poses to revenue and market share. For Company C, engaging with the city helps align global sustainability targets with local conditions while contributing industrial expertise to practical solutions, and strengthens long-term business resilience.

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1.5.3.3 Outlook, Lessons Learned, and Transferable Insights

Challenges, Barriers, and Enablers

Mannheim presents a case of a city taking strong, diversified action to engage the private sector in the climate transition. Their strong track record presents several enablers off which they can further build. However, like all cities trying to do so, there are also challenges and barriers that they are facing or will face in the near future.

Enablers and Success Factors

Perhap's the most distinctive feature of Mannheim's approach is the degree to which its private sector engagement work is integrated into the political and administrative core of the city. As described in section 1.2, the placement of climate work within the First Deputy Mayor´s portfolio, the Mission Coordinator bridging the various climate entities, the Transition Team creating an overarching coordination structure, the Environment Department playing a central role in the climate work, and all the climate work being embedded in the broader Leitbild Mannheim 2030 framework, gives climate work an institutional authority and cross-departmental reach that is unusual in comparative perspective.

Mannheim has built a layered approach to engaging the private sector on climate that differentiates engagement based on company type and scale. Large industrial companies are engaged through tailored platforms like the Climate Protection Alliance and I2M. SMEs are supported through the Climate Agency, the KLIMAnetz network, and the Local Green Deal team. The Heat Transition Academy addresses the supply-side constraint on labor for the heat transition. The Green Industry Cluster builds the future GreenTech ecosystem. Taken together, this nuance reflects a sophisticated understanding that different types of companies need different things from the city administration.

Several further enablers stand out:

- The quality of specific individuals: LGD Managers and the Agency consultant are described by companies as genuinely knowledgeable, trustworthy, and valuable. The system works in large part because these people are good at their jobs and stay in their roles long enough to build real relationships. This is an enabler but also a vulnerability.
- The KLIMAnetz model: This is a good practice in building a diverse yet cohesive , peer-sharing network. It is expert-supported and yet tailored to the needs of the cohort of companies. It is highly effective at generating genuine learning and trust. Company B described it as qualitatively different from other networks. This model has strong replication potential.
- The Heat Transition Academy: By providing free skills training to skilled trade people and SMEs, the city addresses the supply-side constraint on heat transition implementation.
- Climate as strategic business priority: Company C's framing - that a city's credible climate commitment de-risks their own investments - suggests that cities that establish genuine long-term policy stability can create conditions in which large companies find it commercially rational to engage deeply.

Cutting across these enablers is a consistent pattern: the most effective elements of Mannheim's approach combine a direct, personal, high-quality human relationship, with technical support and with a structured space for peer interaction. No element alone is sufficient, but taken together they create a strong environment for encouraging private action on climate.

Barriers to Engagement and Action

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Like all cities working to engage their private sector in the climate transition, there are barriers and challenges in Mannheim:

- Economic headwinds: The current economic downturn in Germany is a significant barrier, particularly for SMEs. Companies are moving somewhat in the direction of prioritising operational survival over climate investment.
- Scale of SME engagement: The 60 or so private company LGDs are mainly concentrated among larger firms. Scaling engagement with the thousands of SMEs is less consolidated thus far and presents a strong challenge towards the city´s climate goals.
- Regulatory uncertainty: The relaxation of CSRD requirements has removed a key driver that was helping catalyse SME engagement.
- Funding and financing accessibility: Assistance securing subsidies, funding, and financing for climate investments is something that companies in all cities express more support on. All three companies interviewed identified financing as a key challenge and something they would like the city, national, and EU governments to assist companies with more. The city of Mannheim is helping through dedicated funding programmes under its Climate Fund. Funding programmes are managed by the Climate Action Agency.
- Permitting and bureaucracy: Company C specifically identified slow and complex approval procedures at all levels of government, as a barrier to accelerating climate investments.
- Municipal budget pressures: The recent reduction in funds available in the Climate Fund and the risk of not replacing departing staff members risks eroding the personal relationships central to the system's effectiveness.
- Awareness gap: Many companies in Mannheim are doing good sustainability work or would like to do more, but do not know about the LGD programme or the other support available from the city.

Company Suggestions

The main areas where companies see room for improvement:

- Awareness: Companies interviewed felt that many other companies in Mannheim are unaware of the opportunities offered by the city. Company A suggested the city could make greater use of social media and local media beyond its own websites to make more companies aware of the opportunity to formalise their good work as a deal.
- Event frequency: Company A noted that the one recognition event held so far was valuable, but that regular events would be more beneficial.
- Digital tools: Company C suggested structured digital platforms for project matchmaking, data sharing, and tracking joint initiatives as a tool to foster collaboration.

The EU Competitiveness Agenda: Risks and Opportunities

The structural economic pressures described in Sections 1.1 and 3.1 create both a challenge and an opportunity for cities like Mannheim that have invested heavily in private sector climate engagement. The challenge is immediate and visible: when companies are under financial stress, voluntary climate commitments become harder to sustain, funding for co-investment shrinks, and the bandwidth for ambitious climate work narrows. Several dynamics in this case study - the lack of sufficient interest in a second cohort of KLIMAnetz, the reduced municipal allocation to the Climate Fund, and the slowdown in Alliance meetings - reflect this pressure directly.

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On the other hand, the opportunity is also important. The Draghi report and the EU's resulting Clean Industrial Deal rest on the argument that decarbonisation, when properly integrated with industrial and competitiveness policy, is a driver of growth rather than a cost. Mannheim's approach already embeds this logic in several ways that deserve recognition. The Green Industry Cluster is explicitly building a new GreenTech economy in seven key markets - clean energy, resource efficiency, sustainable mobility, circular economy - positioning Mannheim as a production and innovation hub for the industries that stand to benefit most from Europe's green transition. The Climate Protection Alliance, the KLIMAnetz, and the I2M business networks are exactly the kind of sector-specific industrial transformation initiatives that Draghi recommends at the EU level but that Mannheim has been pursuing at municipal level for several years.

There are other areas of the Draghi report that are also relevant to Mannheim's private sector support, but were not addressed in the research for this case study.

First, green public procurement. The Clean Industrial Deal places considerable weight on cities and public authorities using their procurement power to create local demand for low-carbon products and services - essentially using public spending to build the market for the transition.

Second, energy costs as a competitiveness lever. Draghi is emphatic that high energy prices are the primary threat to European industrial competitiveness and this has become even more evident following the conflict in Iran in 2026. While not addressed in this case study, Mannheim's MVV district heating decarbonisation and PV offensive are clear areas where the city has taken action.

Third, green skills at scale. Germany's skilled labour shortage is very broad - with over 80 percent of companies reporting labour shortages in 2024, second only to Japan globally, according to ManpowerGroup's annual Global Talent Shortage Survey[6]. Mannheim's Heat Transition Academy addresses a specific and important bottleneck in the transition labour market.

Finally, there is the question of positioning Mannheim's industrial partners to access the new EU financing instruments that the Clean Industrial Deal is in the process of creating - the Industrial Decarbonisation Bank, the Competitiveness Fund within the next Multiannual Financial Framework, expanded Innovation Fund auctions for key industrial processes, the European Investment Bank, and the NetZeroCities Capital Hub.

Transferability and Comparative Insights

The Mannheim case raises several questions relevant to compare across the cities in this study:

- The LGD mechanism as a transferable model: The combination of bilateral communication and support by LGD Managers, on the one hand, and public visibility and recognition through the iDEAL platform, on the other, is a concrete and replicable approach to encouraging more companies to take action on their emissions. The "every deal counts" philosophy of low barriers to entry is also transferable. Mannheim is a leader in the European Commission's Local Green Deal framework and these learnings provide helpful reflections that can guide the model being applied in other cities.
- The KLIMAnetz model as a replicable format: Small, diverse, expert-led, demand-driven peer networks appear to generate genuine learning and sustained engagement for SMEs. Relatively affordable, creating lasting peer relationships, and responsive to real company needs rather than city-driven agenda.

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[6] ManpowerGroup, *2024 Global Talent Shortage*, ManpowerGroup, 2024 (survey of 40,077 employers in 41 countries, fielded October 2023). Available at go.manpowergroup.com/talent-shortage-2024.

- The Heat Transition Academy as a supply-side intervention: The multi-stakeholder skills training model addresses a constraint - skilled-trades capacity - relevant to many cities pursuing heat transition goals.
- Institutional placement matters: Overall steering of Mannheim's climate work has high-level political commitment, is coordinated through a dedicated Transition Team, and is rooted in an overarching city-wide strategic policy framework. This is a transferable model, not a unique accident of local politics. Cities considering replication should think carefully about where in their governance structure an equivalent function would sit.
- Personal relationships as the real infrastructure: The quality of specific individuals is an important driver of effectiveness. Not easily transferable as a formal model, but a lesson about the importance of investing in the human dimension of climate engagement.
- The inspiration effect is undervalued: The organic connection-making and peer inspiration that emerges from the visibility of deals and the sharing of experiences at events may be one of the most valuable outputs of the LGD, KLIMAnetz, Climate Protection Alliance, and other ecosystems - and one that is not directly designed or measured. Cities replicating the models should invest in creating regular opportunities for companies to meet and learn from each other.
- Large companies need the city as a regulatory and process enabler: For sophisticated industrial actors, the city's most valuable role is often not technical advice but regulatory navigation and policy credibility. Cities seeking to engage large industry should invest in these enabling functions alongside outreach and network-building

Appendix

This case study incorporates input from interviews with Mannheim city climate officials Eileen Roth (Climate Policy Advisor to the First Deputy Mayor and Head of the Climate Action Agency), Ellen Röck (Local Green Deal, COLL€CTProject), Dr. Philipp Boura Kadel (Local Green Deal Manager for Sustainable Mobility), Michael Kolb (Climate Action Agency, energy consultant), and Dominik Stroh (Department of Climate, Nature and Environment official).

Interviews were also conducted with representatives from three private companies in Mannheim. Company A is a large multinational hygiene and health products company whose Mannheim location is its largest European production site. Company B is a medium-sized family-owned building services and technical installation contractor. Company C is a large global equipment manufacturer with a major production facility in Mannheim, employing several thousand people worldwide.

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1.5.4 Milan

1.5.4.1 City Profile & Mission Context

Milan serves as a major economic and administrative hub in northern Italy. The municipality has a diverse population of over 3 million people in the metropolitan area. Socio-economically, Milan functions as a centre for finance, design, and innovation. Yet, the municipality exhibits marked spatial inequalities, with disparities in income, housing affordability, and access to services throughout different urban districts.

Local governance setup

Milan's decision to design the Climate City Contract was not solely based on climate ambition, but also an opportunity to start a discussion with a wider group of stakeholders and to initiate active stakeholder engagement.

At first, these local stakeholders have been identified on the basis of a "molecular strategy", a territorial approach according to which some portions of the city - "molecules" - concentrate innovations and synergies leading to the acceleration of decarbonisation. Progressively, a larger group of local stakeholders were selected for their high potential to contribute to emission reductions and/or their ability to propose enabling strategies aimed at promoting behavioral change and raising awareness among citizens and specific groups. This resulted in the engagement of 25 signatories for the first edition of Milan's Climate City Contract (2024) from the public sector, municipal companies, utilities, universities, financial institutions, developers, housing providers and civil society.

The Municipality has then engaged in an iteration of its Climate City Contract for 2026, to integrate new signatories and new actions, and strengthen the Molecular Approach developed in 2024 through the development of a new technical annex to the Climate City Contract.

The Molecular Approach serves as a strategy to engage new signatories for the Climate City Contract: because it is a place-based approach to decarbonisation acting across multiple sectors (e.g buildings, mobility, green areas) and at an intermediate scale, it has the capacity to mobilize diverse interventions and local stakeholders.

At the basis of this Molecular Model are the urban molecules ("molecole" in italian), which act as portions of the city large enough to generate significant effects on the decarbonization process while remaining manageable for measurement, monitoring, and evaluation of impacts and transformations.

The Model's added value also lies in its capacity to bridge the gap between planning and implementation: it operationalises climate neutrality through measurable spatial units, fosters collaboration across sectors and governance levels, and mobilises innovative finance to make decarbonisation investable and replicable.

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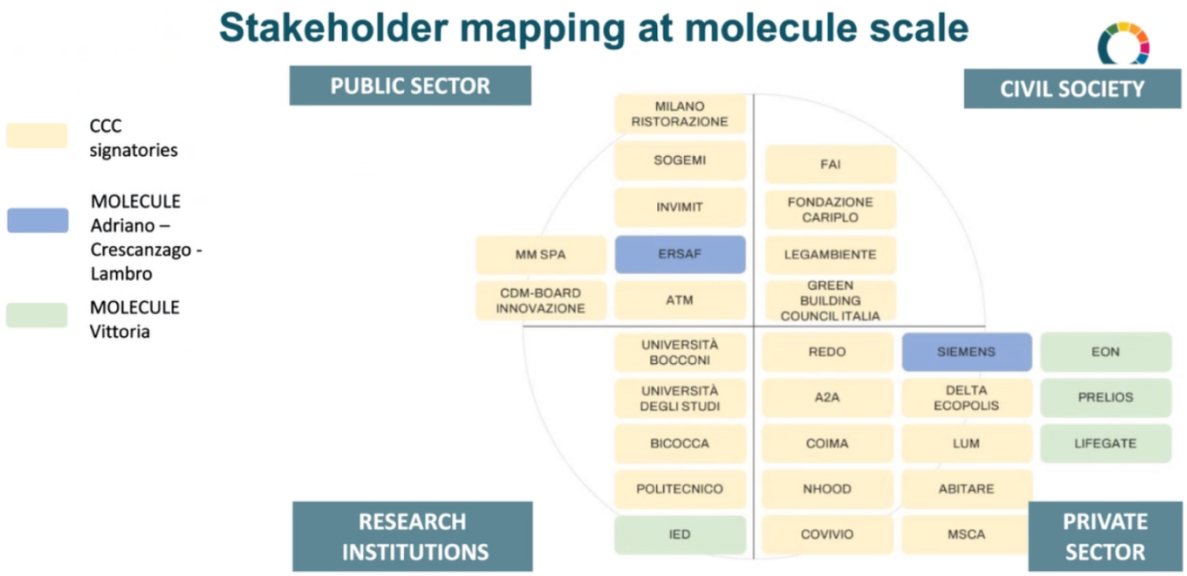


Figure 6 - Stakeholder Mapping at Molecule Scale (diagram shared by the city during a workshop in December 2025).

Molecules create an integrated way of working across silos, which proposes a territorial and cartographical approach. New maps have been created, which also allow the stakeholders to understand how different decarbonization activities may be integrated.

Three potential molecules have been identified as potential living test-bed areas, with activities and research conducted more specifically on the Adriano-Crescenzago-Lambro Molecule, and the Vittoria Molecule. Within this framework, **study visits and co-design workshops** have been organised for the two pilot molecules with CCC signatories and locally relevant actors. The objective was double: on the one hand, to ground the decarbonisation scenarios in real urban conditions, by collectively observing transformation sites, infrastructure and constraints; on the other, to **activate territorial**

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alliances, linking ongoing public and private investments to the city's climate-neutrality pathway and identifying additional stakeholders to be involved in the Climate City Contract.

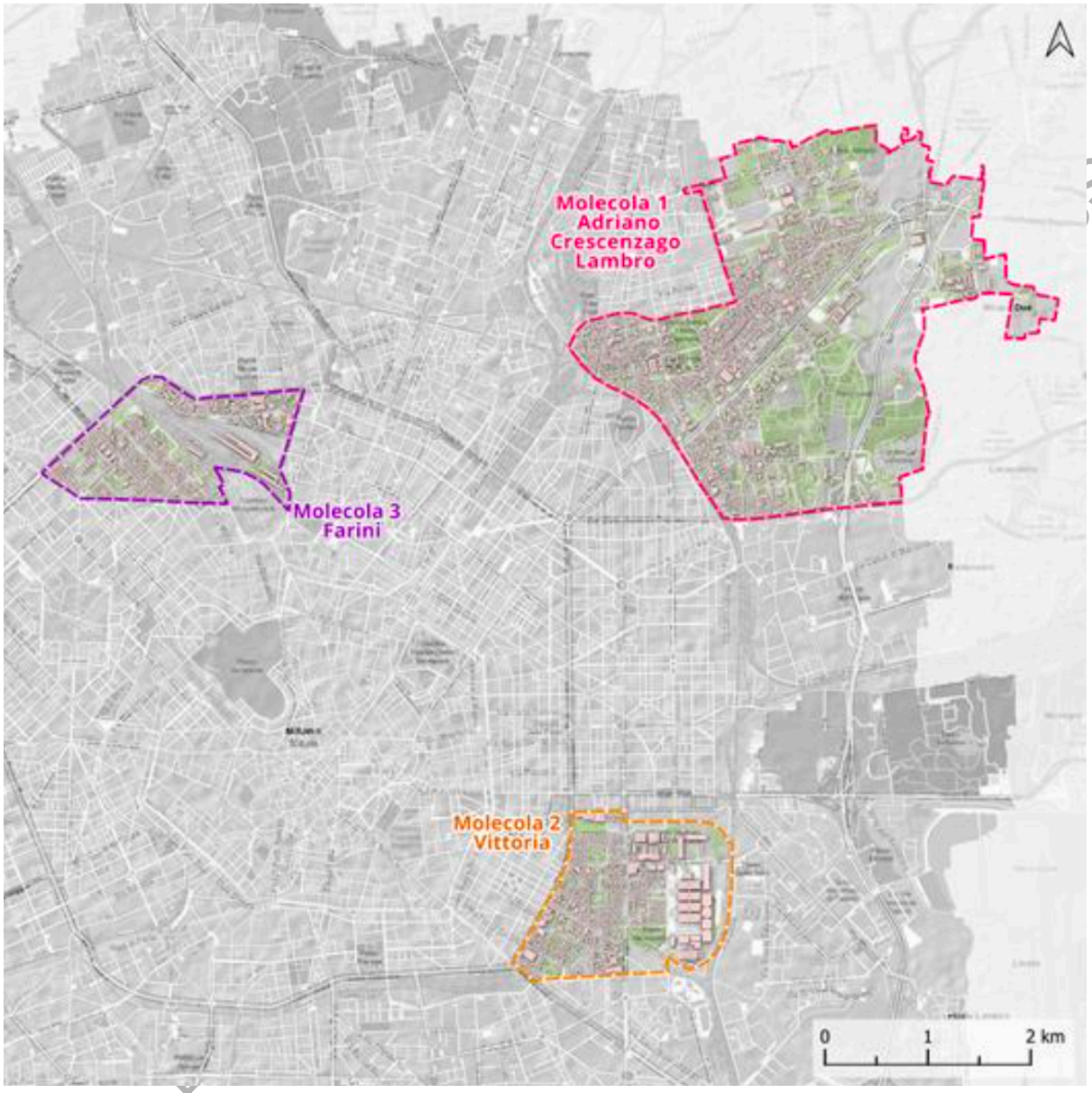


Figure 7 - Boundaries of the selected urban molecules of Milan (D2.2 - Report on Milanese Stakeholders' Engagement for Financing Instruments' Validation).

Milan views these molecules as an "intermediate scale" which are not as small as neighbourhoods but not the size of a whole city. It is something in the middle. This stemmed from their understanding that there were already ambitious urban regeneration projects in specific parts of the city, and that these could be considered actors that could be leveraged to engage others and create new dynamics. This quickly developed into a highly technical approach because they developed scenarios starting at a baseline, which is calculated for the specific areas. In this way, they are attempting to test the governance proposed by the European Commission. They are practicing horizontal governance, in which the city plays a pivotal role but depends on the engagement of a diverse group of actors.

This urban molecule approach has begun a discussion about how to collect data and connect the existing Milan Urban Master Plan with the new layer of decarbonisation knowledge. The CLIMB (CLimate-neutrality through Integrated Molecular model for urBan regeneration with sustainable finance) project, funded by the ECT (Enabling City Transformation) call of the European Horizon

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Europe programme, is led by the Municipality of Milan's Urban Resilience Department in partnership with the Sustainable Urban Lab at Bocconi University. Participants are involved in the energy renovation of social housing to tackle energy poverty, brownfield development that embeds zero-carbon principles, expansion of sustainable mobility options such as bike lanes and electric charging points, innovative housing complexes that use digital tools to encourage energy-saving behaviours, and new green spaces that combine biodiversity, climate resilience, and wellbeing in dense urban areas.

Goals of the CLIMB Project:

- Implement a molecular model for decarbonization and urban regeneration
- Test decarbonization scenarios in "urban molecules" through building energy retrofits, renewable energy integration, sustainable mobility initiatives, and NBS (nature-based solutions)
- Design sustainable finance tools
- Promote collaborative governance among different municipal departments
- Facilitate knowledge exchange with other cities (NetZeroCities)

As mentioned previously, in their upcoming iteration of the CCC, Milan is including a masterplan of the decarbonisation included in the annexes, which integrates the input of new stakeholders. A municipal project manager commented that *"this process is also a kind of co-production because we are discussing continuously with them [...] this is another element of governance that maybe could be considered."*

Emissions profile & decarbonization strategy

Milan's emissions are primarily concentrated in buildings and stationary energy use, which together account for the largest share, followed by transport and mobility. Residential buildings are aged and inefficient, particularly those constructed between the post-war period and the 1970s, and certain parts of the city continue to depend on private vehicles to connect to the city centre. At the molecular scale of the Crescenzago-Adriano-Lambro area, a significant portion of buildings exhibit low energy performance and high energy consumption, while mobility patterns are uneven, with fragmented cycling infrastructure and reliance on cars in less-connected zones.

Milan's decarbonization is strategically focused on three interconnected domains: buildings, energy systems, sustainable mobility, and urban regeneration with nature-based solutions. The Climate City Contract and associated plans identify as a key priority the retrofit of large-scale buildings, the electrification of heating systems (e.g., heat pumps), and the expansion of renewable energy production (e.g., photovoltaics and energy communities). A combination of transport improvements, fleet electrification, and the expansion of active mobility infrastructure (e.g., cycling networks) contributes to the city's advancement towards low-emission mobility. The molecular approach and activities of the CLIMB project further merge these priorities by linking interventions across the three interconnected domains within coordinated decarbonization scenarios extending to 2035 and 2050.

The Climate City Contract journey helped addressing some challenges faced in terms of climate ambition, project integration, policy alignment, and stakeholder engagement. To address this, the municipality is attempting to reduce project fragmentation by fostering interconnectivity between energy, mobility, and green infrastructure through the design of innovative, scalable carbon-neutral regeneration projects. Policy harmonization is ensured by strengthening urban planning tools for mitigation and adaptation, which increase coherence between the air and climate plan, the territorial government plan, and other strategies; and they involve a wide and diverse group of city actors (utilities, universities, service providers, developers, innovators, civil society, foundations) in a shared vision and commitment. Milan's strategy shows a systemic, place-based approach, advancing

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decarbonization through the integration of technical and spatial interventions, with a strong reliance on multi-actor collaboration to deliver impact at scale.

Focal initiative & thematic case for private sector engagement

Private sector signatories to Milan's Climate City Contract embed climate neutrality as a core operational and investment priority, rather than treating it as a peripheral sustainability consideration. This research highlights A2A and NEAR as key partners demonstrating strong strategic alignment with long-term decarbonisation objectives, particularly through integrated, system-level approaches in Milan and selected cities in Northern Italy. A2A has institutionalised this commitment through a structured transition pathway supported by clearly defined, measurable interim targets, and NEAR has positioned itself within the real estate and housing sector as a driver of climate-neutral urban development, concentrated on sustainable housing models, energy efficiency, and embedding environmental and social impact into its investment strategies.

A2A Multi-Utility Services

A2A is one of Italy's largest multi-utility companies in the energy, environmental, and water sectors. The company was formed from a merger of the utilities of Milan and Brescia in 2008, and remains based in northern Italy but has expanded to serve Bergamo, Como, Lodi, Cremona, Piedmont, Veneto, Emilia-Romagna, and some central regions, such as Tuscany, Marche, and Lazio. A2A places strong emphasis on sustainability and the circular economy, and has become a leading national force and point of reference for ecological transitions. To establish an ethos of sustainability through hosting multi-stakeholder events, education initiatives, training programmes, and project development, all of which help enable constructive dialogue with the communities they serve and include everyone in the ecological transitions.

NEAR

Near is a benefit company operating in northern Italy and positioned as a key actor in sustainable housing and urban regeneration. This company was established to drive a structural transformation in how cities are inhabited, financed, and redeveloped, with the ambition to become a national reference point for "responsible living." NEAR is particularly active in affordable housing, build-to-rent models, and student accommodation, while promoting projects that balance financial viability with measurable social and environmental impact. Its activities are concentrated in the Milan metropolitan area and Lombardy, where it contributes to urban regeneration initiatives and aims to attract institutional capital toward sustainable residential development, with long-term objectives to achieve a climate-neutral housing portfolio.

CCC commitments & governance processes

The signatories of the first edition of Milan's Climate City Contract include municipal and public companies, universities, urban regeneration operators, housing services and cooperatives, foundations, environmental associations, business associations, think tanks, and innovation boards. 25 actors from different backgrounds represent these different fields. Milan is currently experimenting to determine whether the Climate City Contract could be an activator that enables new projects and initiatives, rather than merely enforcing the implementation of the Climate Action Plan.

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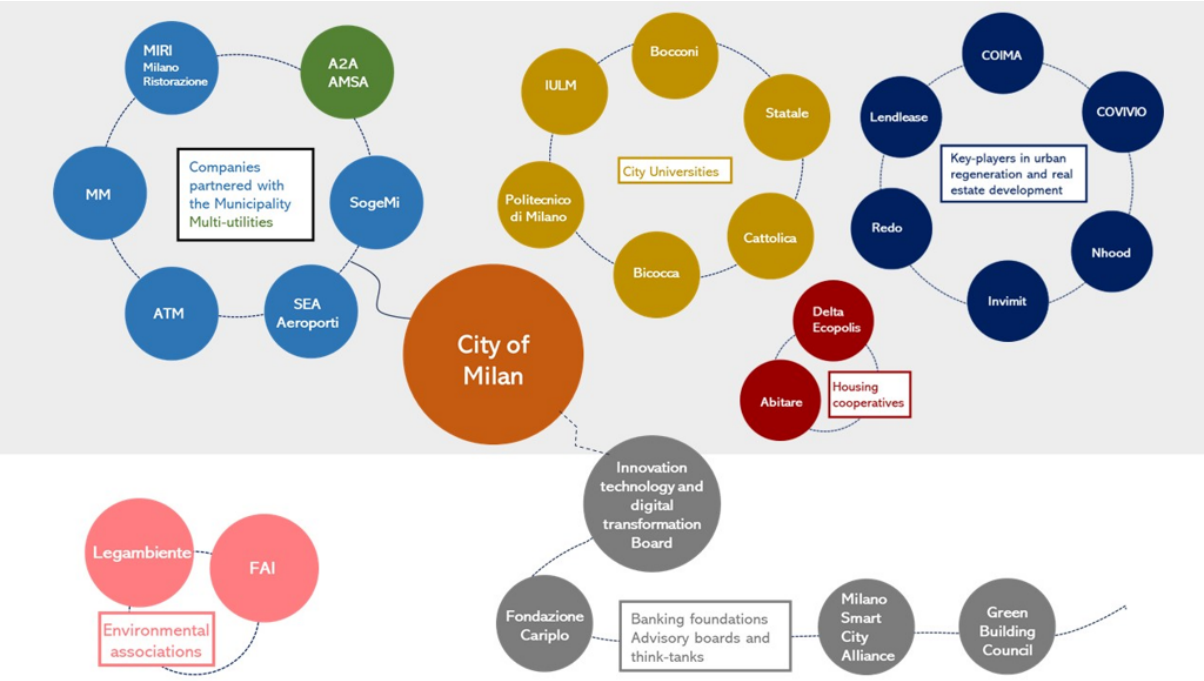


Figure 8 - Map of stakeholders (adapted from Milan's CCC, 2024).

1.5.4.2 Milan's Approach to Private Sector Engagement

Milan's private sector engagement strategy stresses trust-building and voluntary participation, while anchoring collaboration in specific territories through its molecular model. The Climate City Contract is the central engagement tool that brings together approximately 25 stakeholders. Participation relies on innate motivations such as reputation, access to decision-making processes, and opportunities for future collaboration. Milan's approach to private sector engagement is recognition that achieving climate neutrality depends on collaboration, and this is put into action by involving developers, utilities, financial institutions, and research organisations.

Strategic framing of private sector engagement

Immediately, the cultural context created a barrier to involvement: the word "contract," when translated into Italian, is a highly binding term. They needed to create trust that the Climate City Contract is a shared commitment, not a legally binding document which might ensnare them.

The Climate City Contract explicitly positions climate neutrality as a collective endeavour calling for coordinated action across public institutions, private companies, financial actors, and civil society, rather than a policy agenda driven solely by the municipality. Private sector actors are not treated as external stakeholders to be consulted, but as active co-producers of urban transformation, particularly in contexts where they own, operate, or finance key assets (e.g. buildings, energy systems, mobility services). The CLIMB project further operationalises this tactical framing through a molecular approach, in which companies operating in these spaces are involved in concrete regeneration and investment opportunities.

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Evolution, phases, & milestones

The engagement process has evolved through three phases:

- **Co-creation (2023-2024):** Stakeholders contributed to defining the CCC through workshops
- **Maintenance (2025):** Engagement was sustained through events and ad hoc communication.
- **Implementation (2025-2026):** Activities shifted toward territorial and project-based collaboration.

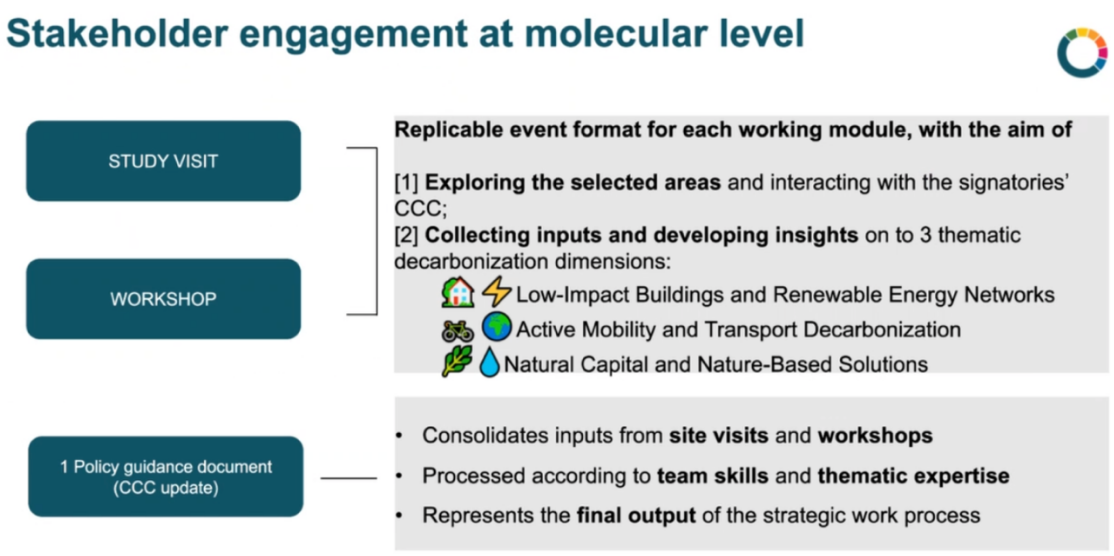


Figure 9 - Stakeholder Mapping at Molecule Scale (diagram shared by the city during a workshop in December 2025).

Types and modalities of engagement

Milan applied a structured and iterative engagement process combining exploration, co-design, and validation. The idea was to engage new and existing stakeholders through the territorial molecules approach, which creates more implications and synergies between the actors involved. This approach was specifically chosen because of its potential to keep these actors engaged.

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Figure 10 - Engagement Processes Timeline (slide shared by the city during a workshop in December 2025).

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Study Visits4

Study visits allowed stakeholders to directly oversee transformations within the urban molecules. In 2025, study visits and workshops took place in molecule 01 (Adriano-Crescenzago-Lambro) and molecule 2 (Vittoria). These visits focused on mobility systems, building retrofits, and nature-based solutions, and increased the shared understanding of local challenges. The study visits are co-designed with the stakeholders. An intangible result of the study visits is the development of a common vision.

Workshops

Workshops followed the study visits. These were structured into three thematic areas:

- Buildings and energy
- Mobility
- Nature-based solutions

Each workshop followed a three-step methodology:

1. Actor mapping
2. Action identification
3. Tools identification

The workshops produced concrete outputs, including prioritised actions and stakeholder mappings.

World Cafe

The World Cafe methodology was introduced by the municipality to engage stakeholders in discussions on financing instruments. Participants included municipal departments and stakeholders. These workshops explored financing mechanisms, barriers, and opportunities for private sector involvement.

Focus Groups

Focus groups on financial instruments applied to decarbonization scenarios are being held with Climate City Contract stakeholders and potential new signatories.

Trust-building & relationship management

In phase 01, the main goal was to prepare the ground and build real enthusiasm and commitment. The municipality sees private sector engagement here as unique, since it's a voluntary, politically initiated process run at the technical level. They use in-person events to identify and invite new signatories for the next Climate City Contract. This shows that trust-building and relationship management begin before formal engagement.

Private sector stakeholders already knew each other before joining this project. They had met and attended conferences together. The municipality used these connections by selecting ambassadors who grasped the vision and could set the tone, acting as reference points to lend trust.

Governance structures and roles

Milan's governance combines strong municipal coordination with contributions from external actors. The Urban Resilience Department leads strategy and management, while AMAT provides technical analysis, and Bocconi University contributes research expertise.

The Urban Resilience Department plays a central role in enabling and coordinating private sector engagement, working in conjunction with the transition team responsible for the Climate City Contract. Within the department, two primary actors oversee the management of activities and stakeholder interactions, including communication processes conducted via telephone and email.

After the COVID-19 pandemic, the municipality permanently changed their ways of working. The days when they work in person together are usually when they discuss and plan how to manage their stakeholder engagement efforts, with special attention to working across the full portfolio to accelerate progress. They amplify these efforts by working with external support actors, but this creates additional commitments that need to be managed and discussed; for this reason, they are selective about when to externalise support, because it can create as many operational challenges as it solves.

A diverse set of skills within the team can result in a fractured understanding. It is important that they all can "speak the same urban issues language" between architects, urban planners, technical experts, etc. They do this by sharing visual maps, having special data-driven discussions, and opening dialogue. Both internally and externally, these types of tools and languages are important.

Inventory of tools, mechanisms, & instruments for governance and collaboration

Milan uses several tools to support collaboration and implementation:

Italian Pilot Activity: Let'sGov

Due to context-specific challenges which are shared by many Italian cities, nine Italian cities have experimented with a collective multi-level and multi-stakeholder governance to achieve their emission reduction targets. The objective was to reduce energy-related emissions through new forms of energy alliances which unlock financial resources and define the conditions for enhanced multi-level governance. This produced increased data accessibility at the city level, increased overall capacity of all cities, and addressed internal and external governance bottlenecks.

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Decarbonization Scenarios

Two types of scenarios are used by the municipality of Milan to guide planning: (1) incremental scenarios targeting 2035, and (2) full decarbonization scenarios targeting 2050. Designed to imagine how the private and public sectors might work together with common goals, these tools support evidence-based decision making and stakeholder dialogue. The output of the decarbonization scenarioscould act as new interpretive layers for municipal plans, which helps inform both the private and public perspectives.

Decarbonization Scenario Development Activities:

- Collection of data on the current state at the molecular level and city level (e.g., built environment, energy demand, green areas) and planning
- Identification of modelling tools (open source) and input data
- Proposal of decarbonisation scenarios for 2030-35 and 2050
- Initial simulation of the decarbonisation scenarios to serve as a working basis for the application of financial instruments
- Identification of applicable financial instruments that are suitable for the implementation of cross-sectoral measures at the molecular and sub-molecular scale, and for engaging private local stakeholders to reduce the financial burden on cities and improve the long-term viability and replicability of decarbonisation investments.
- Defining the conditions for a scalability of the model at the urban level

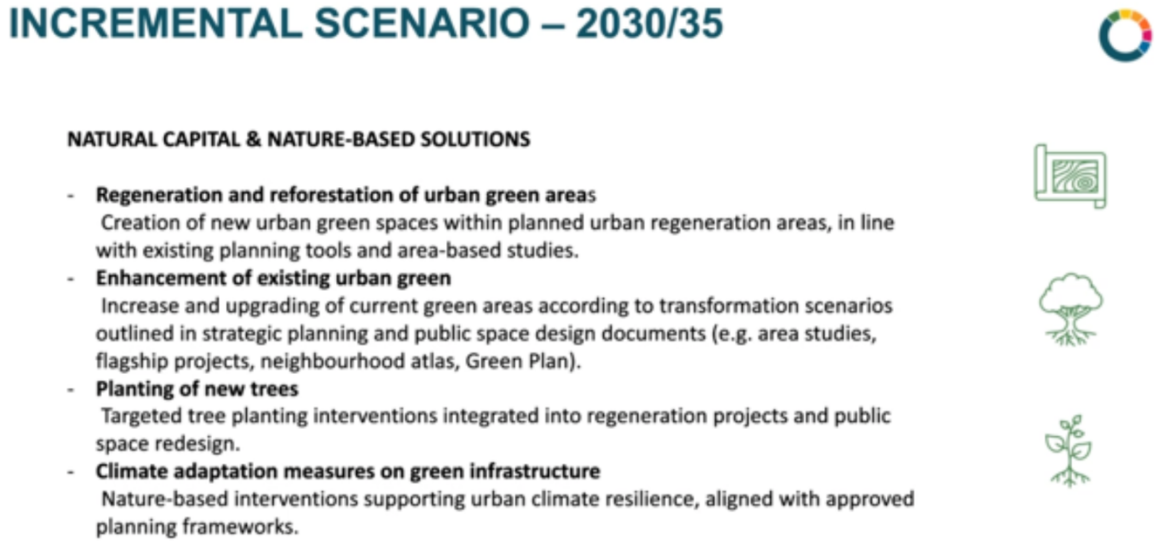


Figure 11 - Example of an Incremental Scenario (slide shared by the city during a workshop in December 2025).

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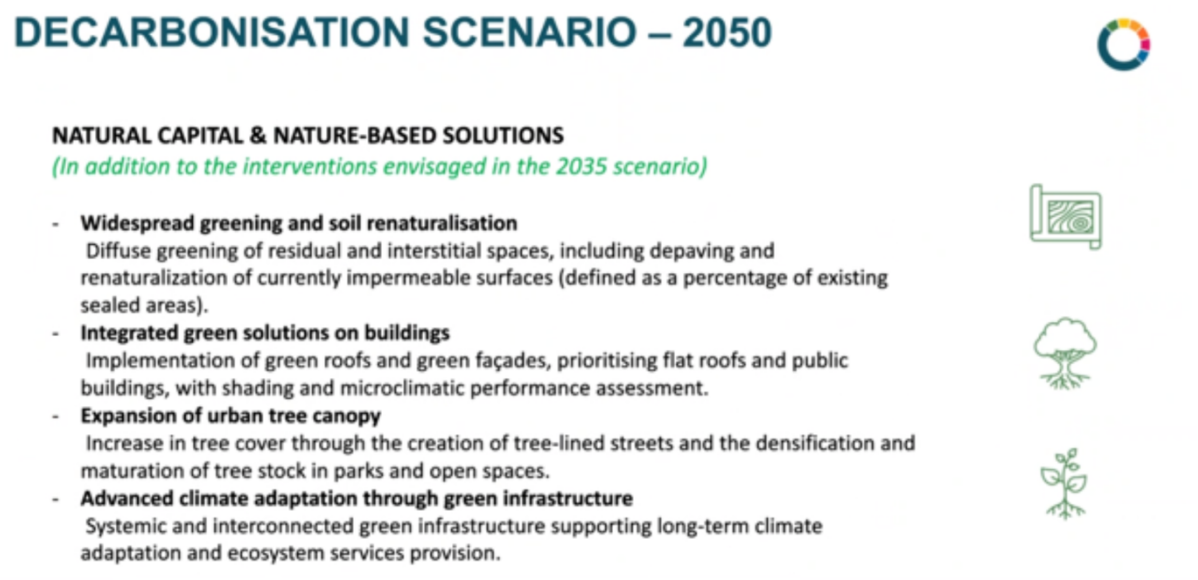


Figure 12 - Example of a Full Decarbonisation Scenario (slide shared by the city during a workshop in December 2025).

Visual Maps and Diagrams

Visual data mapping is an effective tool for reconciling conceptual differences and aligning strategic visions across domains. This approach has proven valuable for both internal coordination and external engagement, supporting functions related to management, strategic development, and planning.

Case Studies

Politecnico di Milano has assisted the municipality in producing a collection of case studies of similar projects conducted by municipalities across Europe, which may serve as inspiration for how local stakeholders might become involved. These cases were shared during stakeholder workshops to build momentum and imagine where the project could go in the coming years.

Onboarding for climate city contract and mission & ongoing evolution

Milan leveraged networks which predate their involvement in the mission. The Climate City Contract acted first as a depository of already financed and secured decarbonisation projects pushed by local stakeholders, gathering not only projects with a direct impact on emission reductions, but also projects that bring indirect impacts and social, environmental and economic co-benefits. The CCC quickly evolved from a mere portfolio to a space of dialogue and co-creation, in which signatories can explore synergies and opportunities of collaboration for decarbonisation at the territorial level. The work conducted on the Molecules acted as an accelerator of this synergical and collaborative approach.

Different segments of private sector stakeholders have evolved along distinct trajectories. Real estate developers, particularly those not previously oriented toward social or environmental goals, have often demonstrated limited initial awareness of the relevance of the process. In contrast, social housing organisations were already well-aligned and institutionally connected, making their rapid onboarding and active participation easily achievable. Universities have also engaged effectively, largely due to their involvement in concrete, project-based initiatives within the molecules. The majority of recruited stakeholders have demonstrated consistent attendance and participation in municipal workshops. However, engagement with certain associations has proven more challenging, despite their alignment

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with environmental objectives, as factors such as personnel turnover and organisational restructuring have at times hindered sustained involvement.

Municipal roles, skills, and gaps

Municipal team members use a shared way of discussing these topics and a common professional language, which helps them communicate effectively with stakeholders. The team possesses specific facilitation and stakeholder engagement skills, gained from previous work experience and applied in this context. They describe this as a skill learned through experience: the ability to spark interest and convey the results of technical processes in an evocative way. These soft skills have proved most effective in mobilising companies.

A gap in this team's skill set lies in its financial competencies: there is a limited mastering of such competencies within the municipal team, and therefore, more difficulties to translate the work provided by the project partner Sustainable Urban Regeneration (SUR) Lab (Bocconi University) on financial instruments, into concrete and applicable processes coherent with municipal realities and challenges.

The Municipality has looked the reinforce the team with a profile with expertise in innovative and sustainable public finance, but despite issuing two public recruitment calls, the team has been unable to secure a suitable candidate, leading to the assumption that individuals with the requisite financial expertise may be more inclined toward opportunities in the private sector than in public institutions. No spin-off projects have taken place so far, as the work and research on the Molecular model is still ongoing and find its conclusion in September 2026. A private sector stakeholder proposed that the municipality play a facilitating role in establishing risk management instruments aimed at aligning both public and private investment opportunities. The development of a platform grounded in a. shared methodological framework was identified as a potential mechanism to support such coordination and enhance the effectiveness of cross-sectoral exchange.

Monitoring, Reporting, & Accountability

The municipality retains responsibility for overseeing and validating calculations associated with decarbonization simulations, which contain activities carried out both by public and private actors. An external support agency owned by the municipality operates in close coordination with municipal staff and is effectively integrated into the municipal work structure as a collaborative partner. Analytical outputs, including reports and technical documents, are periodically produced and disseminated to relevant actors. Additional updates are communicated informally by municipal climate action leads via email, ensuring a continuous flow of information among stakeholders. This hybrid communication approach facilitates ongoing engagement and offers opportunities for deeper analysis.

Motivations, Incentives, & Value Proposition

When the climate city contract development began, it was intentionally designed not to overlap too much with other environmental plans that hold a stronger focus on citizen engagement such as Piano Aria Clima (PAC), . Instead, they used this instrument as an opportunity to target private sector stakeholders who responded positively and were motivated to participate because of the scarcity of similar opportunities for direct contact with the city, as offered by the climate city contract. This was a demographic of stakeholders who were “hungry and genuinely interested” in becoming involved. Milan leveraged this authentic motivation to make the most of the project.

During phase 01, there was noted excitement among private sector stakeholders at the opportunity to be part of the group linked to obtaining the mission label. A mission label can also be promotional, thereby adding value. This makes it worthwhile to invest the time in complex data collection, which was necessary to draft the proposal.

During phase 02, the private sector stakeholders had the privilege of dialoguing with the municipality to express their vision and needs and to lobby for their own ideas. It was a strong incentive.

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1.5.4.3 Outlook and Key Takeaways

Barriers to engagement & action

The timing of implementation creates pressure on maintaining strong relationships. Expectations and motivations change across implementation phases, posing a challenge for municipalities in maintaining alignment with evolving stakeholder dynamics. This accentuates the significance of continuously managing relational engagement, particularly through strong interpersonal connections. Such considerations are especially pertinent in the Italian cultural context, where relational dynamics play a central role in shaping collaboration and coordination.

Challenges with bureaucracy for municipal implementation. Certain private sector stakeholders in Milan argue that, although Europe has set a very strong and credible pathway towards decarbonization, the European Commission has not sufficiently optimised the law to support implementation at the municipal level. The partner NEAR, for instance, cited a project that received approval only after a seven-year authorisation process. Over this prolonged period, both the contextual conditions and organisational readiness shifted significantly, while the urgency of the climate crisis intensified. They characterised this situation as both “devastating and frustrating,” drawing attention to the need for legislative measures to reduce bureaucratic obstacles.

Enablers & success factors

Concrete plans positively impact engagement and action. Practical, pragmatic proposals can serve as tangible evidence of a municipality’s commitment, enhancing stakeholders’ willingness to engage and facilitate implementation. Open-ended goals offer too many possibilities, whereas targeted initiatives provide clearer direction and incentivise private sector alignment and follow-through.

Relational ties to the city. It is important to recognise that, for some stakeholders, the maintenance of a strong relationship with the municipality is crucial. This can be reinforced through instruments such as the Climate City Contract and initiatives like the CLIMB project.

Internal learning & adaptation

Aligning elevated expectations with private sector engagement realities. During phases of reporting and analysis, expectations tend to be elevated, often driven by enthusiasm and ambition. However, this can result in expectations that exceed what is reasonable or operationally feasible. A key challenge for the municipality is to align these expectations with the capacities and constraints of private sector actors. It is important to acknowledge that the private stakeholders are not formally bound to comply, and excessive demands may hinder their willingness or ability to participate. In such instances, the municipality has recognised the importance of adopting a flexible and understanding approach. Failure to maintain this balance is perceived as a shortcoming in preparatory processes on the part of the municipality. In response, Milan attempts to adopt the perspective of private sector stakeholders with an empathetic intent, thereby facilitating continued collaboration and progress.

Choosing the right moment to engage. The selection of appropriate moments for stakeholder engagement is of critical importance, as it can stimulate more meaningful inquiry and iterative dialogue. Careful, strategic timing considerations can therefore significantly influence the quality of interactions and the overall effectiveness of outcomes.

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1.5.5 Bratislava

The **Bratislava Mayor's Climate Challenge**[7] is a pilot programme launched in November 2024 to establish the first structured municipal framework for private-sector engagement in Bratislava's climate action agenda. Rooted in the city's strategy for transitioning to carbon neutrality, the programme supports the city's Climate City Contract (CCC) under the EU's 100 Climate Neutral and Smart Cities Mission by mobilising companies as active partners in delivering emissions reductions. It brings together multiple stakeholders and projects under a shared governance framework, recognising the private sector as a critical actor in achieving the city's climate objectives.

This case study examines the programme's design and early implementation, with a focus on private-sector engagement, governance arrangements, incentives, and lessons learned. Findings remain provisional, as the first company cohort concluded in April 2026.

1.5.5.1 City profile and Mission context

Bratislava is the **capital and largest city of Slovakia**, located in the **western part** of the country along the borders with **Austria and Hungary**. As an **inland metropolitan hub**, the city serves as the administrative, economic, political, and cultural centre of both the region and the nation[8]. The city's 2030 climate targets encompass its **entire administrative territory**, which includes all **17 urban districts.**

The city's population was **476,922 residents** according to the 2022 census, and it is projected to grow to approximately **488,000 by 2030**[9] (Bratislava CCC). The city is currently experiencing a trend of an **ageing population**, with the proportion of seniors (18.4%) being higher than that of children (16.9%). Although natural population growth is low, **migration** remains a significant driver of growth, adding 4,208 people to the region in 2023 (Slovak Statistical Office).

Bratislava is the most prosperous and economically productive region in the country, with a **GDP per capita of 45,187 EUR**, which is twice the national average and **116.1% of the EU average**. The economic profile is led by **services, trade, retail, education, healthcare, and public administration**. In 2023, there were **94,900 business entities** operating in the region, with more than half involved in professional, scientific, or administrative services (Slovak Sadistic Office).

Bratislava **targets a 70% modal share for public and active transport by 2030** yet faces stagnant emissions in transport since 2005 and an 80% rise in private vehicle registrations (2005-2021). Additionally, Slovakia's 2023 EV adoption (5.3%) remains significantly below the EU average (22.7%). (Bratislava CCC)[10]

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[7] Bratislava Mayor's Climate Challenge
[8] Slovak Statistical Office
[9] Bratislava CCC
[10] Bratislava CCC

Local governance setup

With the backing of **the Mayor** and the **Vice Mayor for Climate**, Bratislava's Climate Office, established in 2023, sits within the Urban Analysis and Strategy Unit of the Mayor's Office. It coordinates

climate priorities across city departments and municipal companies to reduce siloed policymaking. The office played a central role in developing the city's first climate plan, initially through the Sustainable Energy and Climate Action Plan (SECAP) and later through the Climate City Contract (CCC). It now acts as the main municipal contact point for sustainability projects, coordinates departmental implementation, and leads several pilot initiatives, including a new city-level heating strategy.

Bratislava operates under a two-level governance structure with 17 districts and a central administration, supported by key municipal companies **OLO** (waste), **BVS** (water), and **TSB** (public lighting), as well as the Metropolitan Institute of Bratislava for spatial planning.

High **national centralisation**, however, limits the city's regulatory and fiscal autonomy, particularly in areas such as energy and building codes. As a result, Bratislava's climate targets and EU commitments exceed current national frameworks, and the city uses its climate strategy as a tool to advocate for stronger national alignment with its 2030 objectives.

The Mayor´s Climate Challenge

The **Bratislava Mayor's Climate Challenge** [11] is a platform where the city and the private sector collaborate on specific projects to reduce emissions and adapt to climate change. This voluntary program was created to help reach the city's goal of reducing greenhouse gas emissions by 63% by 2030. It focuses on building long-term partnerships with responsible companies to create a healthier and more resilient city.

Participants join the program for **two years** by signing a memorandum of cooperation. For every building or facility involved, companies must select **two specific goals**:

- **Energy:** Projects focused on energy efficiency or installing renewable energy sources.
- **Sustainability:** Companies can choose from areas such as waste and recycling, green infrastructure and water management, sustainable mobility, or neighborhood cooperation.

The **2025 pilot year** involved 10 partner companies, primarily from the grocery retail and large office sectors. This initial group included 12 buildings covering a total area of 243,000 m2. These projects are projected to save more than 3 GWh of energy and add 3,100 kWp of new renewable energy capacity. In **2026**, the challenge expanded to include new partners, including the Bratislava Water Company (BVS). This was the first municipal company to join.

The city provides several incentives to support participating businesses and recognize their efforts:

- **Tailor-made training** and consultations with experts on energy and sustainability topics.
- **Public Recognition** through the city's official communication channels and at a final recognition event hosted by the mayor.

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[11] Information based on Bratislava City. (2025). *Bratislava Mayor's Climate Challenge*. https://bratislava.sk/en/enviroment-and-construction/climate/bratislava-mayors-climate-challenge

- **Participants as local leaders**, showing their environmental impact to customers and employees.

Emissions profile and decarbonisation strategy[12]

In 2022, Bratislava's total emissions were **1.67 million** *tCO2e,* which is about 3.51 tCO2e per person. The biggest sources of pollution are as follows: **Buildings** largest sector. Tertiary buildings (offices, shops, and hospitals) 36% of emissions, and residential buildings (homes) cause 31%. Heating is a major source of the city's total emissions and relies heavily on natural gas; **Transport:** both private cars and public transportation; **Waste**: Emissions from municipal waste management.

The city aims to reduce emissions to 2.1 tCO2e per person by 2030, which is a 63% reduction from 2005 levels. The city government only directly controls 11% of total emissions.

Key targets for 2030 include:

- Reducing energy use by 35% in municipal buildings and 23% in private homes.
- Reaching a 70% share for sustainable transport (walking, cycling, and public transit). This includes building 10 km of new tram lines and 42 km of cycling paths.
- Reaching a 65% recycling rate.

Bratislava applies a **climate justice approach,** ensuring that climate action does not increase inequality and instead **contributes to addressing social challenges**. Within the CCC, this is reflected in a focus on vulnerable groups-particularly children, young people, seniors, and people with limited mobility-supported by inclusive governance mechanisms such as the Climate Leaders Forum and the Climate Advisory Committee. Participatory tools, including a Manual of Participatory Planning, are used to ensure citizen involvement in revitalisation projects through workshops and community activities.

CCC commitments and governance processes

Bratislava's climate governance acts as a coordinator and catalyst to build a **"whole-of-society" coalition for climate neutrality.** Because the city government only directly controls about 11% of total emissions, it has embraced a role that focuses on influencing and supporting action by external partners.

Led by the **Vice Mayor for Climate** and the **Climate Office,** this internal effort is supported by **municipal companies**, which were the first formal signatories of the Climate City Contract (CCC).

The key actions by the city and its signatories include modernizing the **Waste-to-Energy (WTE)** facility to recover more heat and electricity and building **10 km of new tram lines** and **42 km of cycling infrastructure**. Additionally, the city is extending its green infrastructure by planting **25,000 new trees and shrubs** by 2030.

To manage these commitments, Bratislava uses a **structured framework:**

[12] Information based on Bratislava *2030 Climate Neutrality Commitments*

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- **Climate Office:** Leads strategic coordination, data collection, and regular reporting to the City Council.
- **Climate Advisory Committee:** A small group of experts providing technical and strategic guidance.
- **Climate Leaders Forum:** A broad platform used to gather diverse perspectives and ensure social acceptance of climate measures.
- **Climate Implementation Groups:** Internal teams of professional staff organized around strategic priorities like energy, waste, and transport.
- **Guiding Principles:** All implementation is guided by **Climate Justice** (ensuring no one is left behind), **Multi-level Governance**, and **Co-creation** with citizens and businesses.

The Climate Advisory Committee and Climate Implementation Groups have yet to be effectively established in practice due to capacity reasons.

In addition, the city is working to develop and introduce **voluntary energy and emissions standards for developers**. These standards promote circular construction, the use of low-carbon materials, and the creation of low-carbon neighbourhoods through pilot projects.

Bratislava also maintains **Energy and Utility Partnerships**, working with private district heating operators to transition away from natural gas through the local heating strategy. Finally, community actors are invited to the **Climate Leaders Forum** to co-develop policy and implementation recommendations.

1.5.5.2 Bratislava's approach to private sector engagement

Historically, cooperation with the private sector had focused largely on fundraising initiatives, such as the "10,000 Trees" campaign implemented several years prior to the city's climate plan. Collaboration between the municipality and companies took place largely on a case-by-case basis, depending on specific projects or workstreams, and the city did not have a formal stakeholder engagement policy to guide cooperation with the private sector.

With the adoption of the Climate Plan and the CCC, the city has moved towards a two-directional partnership model. Bratislava's approach to private sector engagement represents a deliberate **shift from previous, predominantly one-directional forms of cooperation towards more collaborative partnerships with companies.** Under this approach, the municipality makes its own commitments while companies undertake concrete actions that contribute not only to environmental objectives but also to energy efficiency improvements and associated cost savings.

"This is very small programme that is focusing on creating strong partnerships rather than having a hu ge

number of companies." (Interview #1)

Evolution, phases and milestones

The Mayor's Climate Challenge represents Bratislava's first structured approach to engaging the private sector in climate action. The development of the programme was closely linked to the preparation of Bratislava's climate plan followed the logic of the Sustainable Energy and Climate Action Plan (SECAP), which recognises that emissions reductions require the active involvement of multiple actors beyond the municipality itself. At that time, a key enabling factor was the opportunity to

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participate in the **NZC Pilot City Programme**, which provided initial funding and made it possible to move from concept to implementation.

In parallel, the municipality benefited from **cooperation with Bloomberg Associates**, a **pro bono** consultancy supporting cities. Bloomberg Associates assisted the city by providing examples of similar programmes implemented elsewhere and by supporting the selection and shaping of an appropriate engagement approach. Together, the municipality and Bloomberg Associates developed a basic proposal for cooperation with companies, which later became the foundation of the Mayor's Climate Challenge.

A clear sector strategy was defined before the official launch of the programme, and approval to join the programme was sought directly from the CEOs of selected companies. This process involved identifying those companies with the greatest potential impact on the city's emissions, asset management and retail sector, and then, listening to their perspectives, and inviting them not only to participate but also to contribute to shaping the programme call.

This was followed by an intensive co-creation phase, during which the programme was jointly shaped with participating companies and business associations. This process helped define what was realistic, identify elements that needed adjustment, and refine the final design of the programme. Once the framework was agreed, an **application process** was then opened, supported by as many bilateral calls as needed to clearly define company commitments and the specific actions to be implemented. Companies that were unable to specify concrete actions were not selected to participate.

Ten companies (IKEA, Lidl, Billa, Kaufland, 365 Invest, HBReavis, Metro, Tesco, Corwin and IAD Investments Management) joined **the first year of the programme**, together covering twelve buildings with a combined area of almost a quarter of a million square metres.

The **second call** in 2025 built on the networks of first-cohort companies while remaining limited in scale due to capacity constraints. All ten partner organisations from the first year continued their participation, and in January 2026 six additional companies joined the programme (ALTO Real Estate, Bratislavská vodárenská spoločnosť, Erste Asset Management, OMV, Tatra Asset Management, and Wood Real Estate).

Between the first and second editions (participants signed on to two years), **the Mayor's Climate Challenge has been used by the municipality to assess options for future scaling and to identify new target groups.** With the pilot year concluding in March, the municipality is now beginning to gather initial learnings to inform potential adjustments and the design of a third cohort. Another key milestone was the inclusion of municipal companies, enabling the city's own entities to lead by example in the decarbonisation process.

As reflected during the final ceremony of the first year, in April 2026, e**ven voluntary cooperation can deliver substantial results**. Companies implemented measures across 12 buildings with a total floor area of approximately 250,000 m². The results include real energy savings of around 1 GWh, investments exceeding €10 million, and photovoltaic installations with a total capacity of 3.5 MWp, which corresponds to the annual electricity consumption of approximately 1,800 households in Slovakia, or the annual carbon sequestration of approximately 65,000 trees. These results are not yet final, as some activities were completed only recently and their impacts can only be fully assessed after a longer period of operational data collection

Engagement processes and practices

The engagement strategy of the programme is framed **around four core objectives:** building long-term partnerships with companies, demonstrating practical and feasible climate solutions, reducing emissions from existing buildings, and recognising responsible companies and their leadership.

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To achieve these objectives, the programme relies on targeted outreach, bilateral consultations with company leadership and sustainability teams, and joint meetings and trainings that bring participating firms together. From the outset, the programme was deliberately designed as a small-scale initiative, prioritising the development of **high-quality partnerships over broad participation**.

Although the programme was publicly open and any company was eligible to apply, the organising team adopted a proactive and tailored outreach approach prior to the open call. **Companies considered particularly relevant to the programme's objectives were contacted directly**, drawing on the professional networks of the Climate Office team and municipal specialists working on corporate social responsibility. This **early engagement** aimed not only to encourage participation but also **to jointly shape the programme** design with selected companies before its formal launch.

Targeted outreach focused on creating **company-specific motivation and positioning the programme as a distinctive opportunity**. Companies operating in similar sectors were engaged together to foster peer dynamics, and a degree of soft peer pressure-supported by the visibility of peer participation and endorsement by trusted institutional actors-played a role in motivating engagement.

Engagement took place primarily through consultations with the programme manager at the Bratislava Climate Office and through joint meetings involving all participating companies.

Initial and ongoing bilateral calls were a key element of the engagement process. These conversations were essential for establishing a shared understanding of the programme's objectives and for adapting the proposed commitments to company needs, within the limits of the programme's scope and capacity. Transparency and the continuous presence of the municipal programme manager-described as "being there"-were central to building trust throughout the process.

All-company meetings supported collective learning, reinforced the programme's visibility and legitimacy, and sustained senior-level engagement, while training workshops enabled peer exchange and problem-solving around implementation challenges.

Overall, this combination of tailored interaction, transparency, and **sustained support underpinned the trust-based nature of engagement** throughout the Mayor's Climate Challenge.

"The main format of engagement consisted of consultations and joint meetings with other participating companies." (Interview #2)

"We mainly exchange experiences (…) The municipality motivates companies to collaborate more closely." (Interview #2)

Governance structure, tools and collaboration mechanisms

The Climate Office holds overall responsibility for the programme and ensures its alignment with the city's climate objectives. This centralised arrangement enables direct and efficient coordination within municipal competences.

Collaboration between Bratislava and private-sector actors is formalised through a **Memorandum of Understanding** (MoU) signed between the city and each participating company. These non-binding agreements define specific actions and targets and rely on mutual trust and transparency rather than legal enforcement. Signed at the start of the programme, the MoU also serves as the framework for subsequent monitoring.

For example, one participating company committed to reducing its energy consumption by 10% and to eliminating gas-based heating in favour of heat pumps, with a total of 22 measures planned over a two-year period. This illustrates how the MoU translates high-level climate intentions into specific, implementable measures at company level.

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Beyond the MoUs, the partnership is supported through coordination mechanisms embedded in the programme's simplified governance structure.

The programme includes **two key joint moments involving all participating companies**: the **initial signing of the Memorandum of Understanding** and a final public event at the conclusion of the programme. These moments bring together company teams, with particular emphasis on senior decision-makers and CEOs, **helping to reinforce leadership commitment and sustain high-level engagement**. At the end of the programme, participating companies are awarded a certification during a **public ceremony attended by the Mayor of Bratislava**. This closing event serves both to review achieved results and to publicly recognise company efforts, thereby strengthening the programme's visibility and institutional legitimacy.

The programme also includes **four training sessions for staff** from different departments within participating companies, aimed at building internal capacity and facilitating the exchange of experiences and practical solutions.

A single programme lead within the City Climate Office serves as the primary point of contact for companies, enabling direct and continuous communication, flexible coordination, and trust-based support. Bilateral calls are held throughout the programme, allowing companies to raise implementation challenges at any time; where feasible, the Climate Office supports their resolution directly, facilitates coordination with relevant municipal departments within the limits of municipal comp, and encourages peer exchange between companies facing similar challenges.

Onboarding, inclusion and representation

Participation in the Bratislava Mayor's Climate Challenge is formally open to all companies. However, **the programme prioritises organisations with sufficient internal capacity to define, formalise, and implement concrete actions** using their own financial and operational resources. As a result, most participating companies tend to be larger organisations, while small and medium-sized enterprises (SMEs) are not specifically targeted.

Companies and other stakeholders are brought into the programme primarily through targeted outreach rather than open mass communication. This approach reflects the programme's limited budget and its reliance on intensive interaction, continuous availability, and tailored support, which would not have been sustainable with a larger or more diverse group of participants. In addition, organisations with lower levels of maturity in sustainability practices would have required more extensive capacity-building support than the programme could provide.

Sector selection also plays an important role in the onboarding process. The programme focuses on sectors considered to have a greater potential impact on the city's emissions profile, taking into account the types of companies present in Bratislava. In practice, this has led to a particular focus on **retail and asset management companies.** Bringing together competitors within the same sector was a deliberate choice, as it allows companies to discuss similar challenges, pursue comparable goals, and facilitates more consistent monitoring by the municipality. This sectoral focus also reflects both their potential to drive emissions reductions across their own operations and through influence on suppliers, contractors, customers, and other stakeholders.

Company selection is therefore guided by pragmatic considerations rather than strict formal criteria.

The programme seeks to engage companies that are, or can become, **leaders in sustainability**. This reflects the intention to **showcase concrete solutions** and to enable participating companies to demonstrate their achievements, learn from one another, and **inspire others through peer exchange and visible leadership.**

During the initial phase, the programme did not explicitly address climate justice or just-transition considerations, nor did it prioritise the inclusion of specific organisational types such as SMEs or

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cooperatives; however, these dimensions are expected to be reviewed in later phases of the programme. In the current phase of the programme, priority is given to long-term sustainability and embedding of the programme in the city's agenda.

Municipal powers, enabling roles and support

Within the Mayor's Climate Challenge, the municipality contributes primarily through technical advice, guidance on administrative procedures, access to municipal land where space constraints exist, and coordination with relevant municipal departments. In addition, the city supports communication and visibility around climate neutrality and participating companies' actions.

The programme has **helped bring companies' sustainability plans to the forefront of internal decision-making**. By translating long-term sustainability existing ambitions into binding one-year commitments, the Mayor's Climate Challenge strengthens the position of ESG teams within companies, enhances internal accountability, and accelerates the implementation of agreed actions.

A central enabling role is played by the City Climate Office. Through this role, the programme helps **align company actions with municipal priorities** set out in the city's climate action plan and supports companies in identifying and assessing sustainability-related solutions and **facilitates direct coordination with relevant municipal departments** when cross-departmental is required. In parallel, the programme has developed **tailor-made pathways to address specific implementation bottlenecks** faced by certain companies but relevant to others in similar situations. One example is the creation of a procedure allowing companies to rent city-owned land when insufficient on-site space prevents the installation of energy-efficient technologies.

"(…) participation in the programme helped us structure and plan the implementation of these measures in a more organised way. Our ambitions were not created by the programme, but the programme supported better planning" (Interview #2)

Finally, the municipality acts as a connector among participating entities. By creating spaces for interaction and exchange, the programme supports peer-to-peer collaboration, knowledge sharing, and the dissemination of practical solutions among companies facing similar challenges. **Capacity-building support** is provided through four training sessions delivered to company staff from different departments.

"Due to limited space around the building, we faced challenges installing heat pumps. (…) The municipality offered a nearby public plot that was suitable for installation. This was a major contribution. (…) They also helped clarify permitting processes and administrative procedures." (Interview #2)

Private sector commitments, collaboration and outcomes

The programme is defined as highly practical, with a strong focus on concrete and clearly specified actions. Private sector commitments within the Mayor's Climate Challenge are voluntary but structured, with a clear focus on energy efficiency, deployment of renewable energy, and other sustainability measures. The central objective of the programme is **to ensure that these commitments translate into concrete and implementable actions carried out at specific sites within Bratislava**.

If a prospective participant is unable to specify concrete measures, the start of the programme is postponed for that company until the next cohort launches. This requirement ensures that participation is based on readiness to move from ambition to action.

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The interviews consistently show that the real function of these written commitments is not to bind companies legally, but to create shared direction, **clarify roles, and trigger bilateral follow-up.**

Monitoring, reporting and accountability

Through the **Memorandum of Understanding**, participating companies commit to achieving a defined reduction in energy consumption and to implementing a set of concrete actions designed to deliver this outcome. At the start of the programme**, companies provide baseline data and agree to share updated information after one year to assess progress**. In the interim, monitoring concentrates on the practical progress in the implementation of the agreed measures, based on the assumption that these actions contribute directly to the targeted reductions in consumption.

As demonstrating emissions reductions within the programme timeframe can sometimes be challenging**, accountability relies largely on transparency, dialogue, and trust rather than strict enforcement.**

Ongoing monitoring is often managed internally by the companies themselves. In several cases, this responsibility is assigned to dedicated professional teams that oversee implementation on a continuous, step-by-step basis. As one interviewee noted: *“We appointed a professional internal team responsible for managing the entire process.”* (Interview #2)

Beyond internal monitoring and data reporting, the programme places strong emphasis on visibility and learning. The programme plans to showcase the results achieved by participating companies to demonstrate the impact of the measures implemented and to highlight the full range of benefits of taking such actions, including not only environmental but also economic gains. This visibility is conceived as **a motivational strategy to influence other companies** in Bratislava and to **encourage further participation** in future editions of the programme.

Motivations, incentives and value proposition

Companies are motivated to engage with Bratislava Mayor´s Challenge by a combination of factors, including alignment with ESG requirements, contribution to the city’s climate objectives, operational cost savings, public visibility, and peer dynamics among competitors.

The programme deliberately emphasised a cost-savings narrative alongside climate objectives, rather than relying solely on a climate-driven framing. This pragmatic approach was intended to support continuity of action, even in periods when the broader political or economic context is less favourable to climate strategies.

"We are focusing on very concrete actions within the climate challenge because most of those actions lead to cost savings." (Interview #1)

The **value proposition is intentionally rooted in pragmatism**, concentrating cooperation in areas where business decisions can lead to real cost savings, improved building operations, and tangible changes within the city.

This practical orientation is also reflected in company perspectives. Among the new partners in the second year of the programme is **Wood Real Estate**, whose representative emphasised that

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measures implemented by the company must make economic sense and cannot be pursued merely as a public relations exercise[13].

As mentioned before, the programme offers **several non-financial incentives:** partnership approach based on direct communication and the potential for long-term cooperation with the municipality, access to training and peer-to-peer learning spaces that provide communication, inspiration and practical guidance, and external visibility through municipal communication channels, such as showcasing participating companies on dedicated websites.

"We don't have direct financial incentives to offer, but what we can provide is an honest partnership on something that makes sense. We want to build cooperation based on trust and transparency," says Marian Zachar in the article How Bratislava is Turning Business into Partner for Change.

The municipal team has observed that **motivations to join the programme vary depending on the role of the individual within each company:**

For project managers and ESG managers, the programme offers the opportunity to co-shape a municipal initiative, work closely with the municipality, access institutional support, and contribute directly to the city's sustainability agenda.

Programme Incentives	Companies´ Motivations
• **Long-term Municipal Collaboration:** A partnership-based framework for sustained cooperation.	• **ESG Integration & Compliance:** Aligning corporate strategy with international ESG requirements.
• **Sustained Institutional Support:** Ongoing technical assistance and direct access to the Climate Office.	• **Efficiency & Cost Savings:** Reducing energy consumption, carbon footprints, and associated operating costs
• **Technical Capacity Building:** Access to specialized workshops.	• **Contribution to Local Climate Targets:** Supporting Bratislava's transition toward carbon neutrality.
• **Collaborative Learning Space:** Platforms for peer-to-peer knowledge sharing and industry interaction.	• **Institutional Reputation & Visibility:** Gaining public recognition as a leader in urban sustainability.
• **Enhanced Corporate Visibility:** Formal public recognition via municipal dissemination channels.	• **Municipal Programme Engagement:** Opportunity to co-develop and refine a municipal programme.
• **Measurable Impact Assessment:** Verification of individual performance and collective environmental outcomes.	

For senior decision-makers, such as board members and CEOs, motivations include public visibility as leaders on sustainability and recognition through a programme supported by the Bratislava´s Mayor,

[13] New Partners, New Projects: The Mayor's Climate Challenge in 2026 - Mesto Bratislava

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association with the mayor's public reputation as a supporter of the green transition, and competitive pressure to match or exceed the sustainability performance of peers.

Company interviews indicate that motivations typically include meeting ESG expectations and reducing both costs and emissions. However**, interviews also highlight a more intrinsic motivation: the desire to jointly contribute**, together with the municipality, **to creating a better and healthier city**.

"Our motivations operate on several levels. Firstly, fulfilling commitments toward our tenant. Second, supporting the city's climate efforts as a large company with operational impacts. Third, a pragmatic motivation to reduce energy consumption, lower operating costs, and reduce CO_2 emissions." (Interview #2)

The **credibility and public profile of the Mayor of Bratislava** have played a significant role in reinforcing the legitimacy and perceived relevance of the programme, further encouraging company engagement.

1.5.5.3 Outlook

Challenges and barriers

The implementation of the Mayor's Climate Challenge faces a range of challenges and barriers on both the municipal and company sides. These relate to institutional constraints, regulatory frameworks, organisational capacity, and the practical complexities of collaboration.

On the municipal side, one of the most significant barriers is **institutional fragmentation**. Several climate-related responsibilities are concentrated at national level, which limits the City of Bratislava's direct regulatory and financial capacity to influence private-sector decarbonisation. The municipality has limited influence over energy regulations and building codes and has restricted financial capacity to directly support decarbonisation actions. In addition, capacity constraints within the municipality-such as limited staff time, limited discretionary budgets, and limited room for experimentation-affect the ability to scale the programme beyond a small number of participants.

Administrative complexity also poses a challenge. Companies frequently requested support to address permitting procedures (which are governed by the state) and master plan modifications, which are often lengthy and complex. However, as these processes are largely regulated at national level, municipal capacity to intervene directly remains limited.

On the company side, barriers include **varying levels of corporate readiness**. Sector-specific challenges also arise. In several cases, participating organisations were tenants rather than building owners, which required **coordination with asset managers or property owners** before actions could be implemented. Where agreement on a feasible and meaningful scope of work could not be reached, participation was postponed. In other cases, the strong climate ambition of tenants served as the main incentive to engage despite these structural constraints.

Collaboration between companies has also proven challenging. Differences in corporate strategies, internal procedures, decision-making processes, and levels of ambition have limited collective action. While the programme encourages peer exchange, deeper operational collaboration remains difficult to achieve in practice.

"*Companies are used to making individual decisions; they are not used to collective action*." (Interview #1)

"The municipality motivates companies to collaborate more closely. However, collaboration is limited by differences in commercial strategies and implementation priorities. The intention is there, but practical coordination is not always easy." (Interview #2)

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Finally, **the broader policy and economic context present an additional challenge**. A shifting global environment, with uneven or more cautious political support for climate action in many regions, has made it **more difficult to sustain company motivation over time**. In this context, the programme's emphasis on cost savings and operational benefits is expected to become increasingly important to maintain engagement and ensure continuity.

Looking ahead, **the long-term continuation and scalability of the programme to organisations with lower internal capacity remain a challenge**. Scalation to a larger group or to companies with lower levels of maturity in sustainability practices would require additional resources for more extensive capacity building, implementation support, and outreach. Under current constraints, the programme remains intentionally small-scale, prioritising impact by focusing on large buildings and companies capable of delivering measurable emissions reductions.

Enablers and success factors

Despite the constraints identified, interviewees point to a set of enablers that have made collaboration between the municipality and participating companies both possible and effective.

Nice alignment of the Mayor's Climate Challenge with existing company plans and priorities. For participating companies, engagement was significantly facilitated when programme commitments were consistent with measures that were already being planned or considered internally. This alignment reduced implementation barriers and increased companies' readiness to commit. As one company representative noted,

"It was actually a very positive situation when the municipality approached us, because we already had internal plans in place." (Interview #2)

The trust-based governance and provision of smooth and practical municipal support when it was needed to advance the delivery of company commitments. The continuous availability of the programme manager and the responsive support provided by the Climate Office played a central role in addressing issues as they emerged and in maintaining momentum throughout implementation.

Strong political leadership, particularly the visible backing of the mayor, which reinforced the legitimacy of the initiative.

A clear value proposition centred on feasibility and cost savings. Framing climate action in pragmatic terms helped maintain engagement and supported decision-making within companies.

Lessons learned and transferable insights

Early lessons highlight the value of small-scale, high-intensity engagement; the importance of reputational trust and peer dynamics; and the effectiveness of voluntary, structured commitments as a trigger for action. The programme demonstrates how cities with limited formal powers can still mobilise private actors through facilitation and partnership.

Intentional small-scale design: The programme was deliberately limited in size and financed through NZC Pilot City Projects funding, shaping its scope and participant selection towards companies already on a sustainability transition path with sufficient financial capacity.

Value of small-scale, high-intensity engagement: Targeted, intensive collaboration with a limited number of companies proved effective for mobilising concrete private-sector action.

Role of relational capital: The Programme Manager played a central role in initiating the programme by leveraging personal networks and direct access to senior decision-makers, which was instrumental in forming the first cohort.

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Importance of trust and peer dynamics: Reputational trust and peer influence among companies operating in similar sectors played a key role in encouraging participation and sustaining engagement.

Effectiveness of voluntary but structured commitments: Non-binding yet clearly defined commitments acted as effective triggers for implementation, helping translate ambition into action.

Political leadership and legitimacy: The strong public reputation of the Mayor of Bratislava, closely associated with sustainability and green transition, generated trust and reinforced the programme's legitimacy in a politically challenging context.

Strategic sector focus: Given Bratislava's limited manufacturing base, targeting large building owners provided a feasible and high-impact entry point for a programme of this scope.

Institutional sustainability: The modest budget increased the municipality's ability to maintain and potentially replicate the initiative over time within existing resource constraints.

Leadership effect beyond participants: Strengthening sustainability leadership among reference companies helped enhance their potential to influence other firms within their professional and business networks.

Operating within governance constraints: Despite limited municipal competences and regulatory powers at city level, the programme demonstrates that facilitation and partnership-based approaches can deliver progress within existing governance frameworks.

"This is a pilot programme, and both companies and the municipality are learning from it." (Interview #2)

Conclusion

The Bratislava Mayor's Climate Challenge illustrates how targeted, trust-based collaboration with the private sector can support the delivery of urban climate goals. While still experimental, the programme offers practical insights for other cities seeking to move from ad hoc cooperation to more structured public-private climate partnerships.

From the company perspective, the Mayor's Climate Challenge supported planning, coordination and communication rather than triggering new ambitions. Collaboration was described as constructive and supportive.

"From our perspective, collaboration has been constructive, practical, and supportive." (Interview #2)

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D1.5.2. Case Study Anthology V2

2 Theme 2: City-driven Monitoring, Evaluation and Learning (MEL) in Mission-oriented Urban Climate Governance

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2.1 Introduction

This chapter focusses on how city-driven monitoring, evaluation and learning (MEL) functions as a governance mechanism in six Mission-labelled cities pursuing climate-neutrality commitments: **Stockholm**, **Zaragoza**, **Cork**, **Münster**, **Bergamo** and **Turin**. The cities are part of the EU Mission on 100 Climate-Neutral and Smart Cities and are also engaged in the NetZeroCities (NZC) support framework, which emphasises mission-oriented, systemic approaches to urban climate transitions (Edmondson et al., 2025; NetZeroCities, 2022).

City-driven MEL is understood here as monitoring, evaluation and learning processes that are initiated, coordinated and used by city governments and their partners to steer climate transitions, rather than as functioning for external reporting to national or European institutions. Building on earlier conceptual work on reflexive MEL in city climate governance (Edmondson et al., 2025), the report examines how MEL is embedded in governance architectures, how measurement systems are constructed, and how learning processes support adaptive management, accountability and just transition objectives under mission-oriented frameworks.

The chapter focuses on six cases that collectively provide a diverse sample of Mission Cities with advanced or particularly illustrative MEL practices. Stockholm and Münster represent cities with long-standing climate governance and mature integration of MEL into core management and budgetary systems (City of Stockholm, 2023a, 2024b; City of Münster, 2023). Zaragoza, Cork, Bergamo and Turin illustrate how MEL is being constructed or significantly upgraded through the Climate City Contract (CCC) process, often in combination with new digital platforms, economic modelling tools and co-creation processes (Ayuntamiento de Zaragoza, 2025; Cork City Council, 2024; Municipality of Bergamo, 2023; Città di Torino, 2024).

The aims of the report are threefold. First, to provide a structured comparative synthesis of city-driven MEL across the six cases, focusing on how MEL operates as an enabler of climate action and broader city governance. Second, to draw out shared challenges, breakthroughs and opportunities that can inform mission-wide support for MEL. Third, to contribute to a growing body of knowledge on net-zero delivery frameworks that treat MEL not only as a compliance instrument but as a reflexive governance capability (Vo & Bornemann, 2011; Frantzeskaki et al., 2018).

Methodology

This chapter includes case-studies prepared for each of the six cities following a common approach, combined with a peer-to-peer workshop and supporting conceptual work on reflexive MEL.

Each case study draws on document analysis of the Climate City Contract, associated climate action and investment plans, and other relevant strategies, complemented by semi-structured interviews with city officials and, where applicable, mission partners. For Stockholm, Zaragoza, Cork and Münster, two interviews of approximately 60 minutes were conducted with key officials involved in the MEL system between January and March 2026. Bergamo and Turin, which have more desk-based cases, the analysis combines CCC Action Plans, technical annexes and MEL notes prepared by research partners with follow-up clarifications (Città di Torino, 2024).

In addition to the six case reports, the work draws on material from an online city-to-city peer workshop on city-driven MEL held in April 2026 within the NetZeroCities peer learning programme. The workshop involved presentations and discussions with representatives from Cork, Münster, Zaragoza and Stockholm, focusing on MEL system development, current stages of implementation, challenges and strategies for future iterations (City P2P workshop - MEL, 2026). These reflections provide additional triangulation of the written cases and help illuminate shared concerns and emerging practices.

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Finally, the report builds on the previous NetZeroCities 2025 report on reflexive MEL in city climate governance (Edmondson et al., 2025), which provides a conceptual lens and comparative insights from four earlier Mission Cities. That report identifies five core dimensions of reflexive MEL - governance and partnerships; measurement and monitoring; MEL applications and storytelling; learning and adaptation; and outcomes and success stories - that inform the analytical framework used here.

Interview evidence is cited in the cases using an anonymised numbering system for each respective city (e.g., Stockholm Interview 1, 2026), without disclosing the identities or positions of individual interviewees. All claims drawn from interviews are triangulated where possible with documentary sources such as CCCs, action plans or workshop presentations. The empirical focus is on how MEL systems are designed and used in practice, rather than on formal institutional descriptions alone.

Overview of the six Mission Cities

Across the six cities, greenhouse gas emissions profiles are dominated by stationary energy and transport, with varying contributions from industry and waste (**Table 3**). In Bergamo and Turin, building-related emissions account for around 80% of baseline emissions, while in Cork and Zaragoza, the combination of inefficient building stocks and car-dependent transport systems drives the majority of emissions (Cork City Council, 2024; Ayuntamiento de Zaragoza, 2025; Municipality of Bergamo, 2023; Città di Torino, 2024). Stockholm and Münster have already substantially reduced emissions from district heating and electricity, but face persistent challenges in transport, construction-related scope 3 emissions and consumption-based impacts (City of Stockholm, 2023a; City of Münster, 2023).

All six cities have adopted ambitious 2030 targets under the EU Cities Mission, but they differ in the way boundaries are defined and residual emissions are treated. Some focus on territorial scope 1 and 2 emissions within municipal boundaries, while others also track city-organisation emissions and selected scope 3 categories. These boundary choices condition what is visible in the MEL systems and how progress towards climate-neutrality is interpreted (Edmondson et al., 2025).

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Table 3 - City context of the six cases.

City	Approx. population (city)	Territorial profile	Economic profile (selected features)	Climate-neutrality framing
Stockholm	≈1.0 million (municipal); >2 million in functional urban region	Capital and core of a fast-growing metropolitan region with high service density	Service- and knowledge-based economy; relatively little heavy industry within city limits	Climate-positive by 2030 and fossil-free by 2040 within a cumulative emissions budget (City of Stockholm, 2023a, 2024b).
Zaragoza	≈693,000 (municipal, 2025); ≈745,000 in wider urban/commuter belt	Capital of Aragon in the Ebro Valley; major logistics and transport hub	Diversified economy with strong automotive manufacturing, logistics and services	Target of ~80-85% emissions reduction by 2030 relative to business-as-usual, with CCC organised around five pillars (Ayuntamiento de Zaragoza, 2025).
Cork	≈222,000 (2022); designated growth to ≈280,000 by 2030	Port city at head of large natural harbour; expanded boundary integrating urban core, suburbs and rural fringe	Global hub in life sciences, ICT and international financial services, alongside manufacturing	Mission-aligned target of at least 80% emissions reduction by 2030 vs 2018, with residual emissions treated as hard-to-abate (Cork City Council, 2024).
Münster	≈321,000 (2022) within 303 km²	Standalone urban district and regional centre in largely rural Münsterland	Service-dominated regional hub with strong education, administration and SME sectors	Climate neutrality by 2030 with >95% reduction vs 1990, using a carbon-budget approach (City of Münster, 2023).
Bergamo	≈120-130,000 (municipal); part of a wider urbanised area	Compact city framed as a "lighthouse" in a wider territorial transition	Mixed economy with services, industry and strong civic institutions	Climate neutrality by 2030 within municipal boundary, with a 2021 baseline and portfolio of 217 actions (Municipality of Bergamo, 2023).
Turin	≈861,000 inhabitants (end of 2023) across 130 km²	Capital of Regione Piemonte and core of a metropolitan area with complex socio-economic structure	Fourth-largest Italian economic and productive complex, with strong industrial and knowledge sectors	2030 climate-neutrality pathway anchored in 2019 baseline of 2.4 $MtCO_2$ and 30 macro-actions (Città di Torino, 2024).

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2.2 Key themes for city-driven MEL processes

This section synthesises the main thematic dimensions of city-driven MEL across the six cases, using the common structure of Section 2 in the individual city reports. The themes are:

- (i) governance architecture and institutional set-up;
- (ii) measurement architecture and data governance;
- (iii) indicators, co-benefits and distribution;
- (iv) use of MEL in decision-making and adaptive management; and
- (v) learning, participation and communication.

For each theme, the subsection first clarifies the concept and then summarises how it has been operationalised across the cities.

2.2.1 Governance architecture and institutional set-up

Governance architecture refers to how responsibilities and capacities for MEL are organised within the city administration and in relation to external partners. Across the six cases, MEL is embedded in broader transition governance arrangements, rather than treated as an isolated technical function (Edmondson et al., 2025). Central features include mission teams or climate units, cross-departmental coordination structures, and partnerships with utilities, universities and other stakeholders.

In Stockholm, a climate and environment unit within the Environmental Department acts as the de facto MEL hub, coordinating indicator reporting and narrative accounts from all departments and city-owned companies (City of Stockholm, 2023a). Climate goals and MEL responsibilities are anchored in the Environment Programme and the City Council budget, which assign specific indicators and follow-up duties to committees and company boards. The city created 15-16 thematic focus groups during the climate action plan design phase, later consolidated into five transition teams (consumption, energy, transport, construction and city operations). Coordinators for these teams participate in a cross-sectoral MEL coordination group that meets roughly every two weeks to align reporting and review progress.

Zaragoza's MEL governance builds on a long-standing environmental planning tradition. City Council Environment Office co-leads the Climate Neutral Mission within the municipality alongside the Directorate-General for Funds, building on many years of work in environmental planning. Regarding the CCC development, technical aspects are led by the Environmental Office, in collaboration with the Circe Foundation, jointly coordinating CCC design, implementation and indicator development (Ayuntamiento de Zaragoza, 2025). The city governance is built on a quadruple-helix approach, that reflects the evolving governance model, bringing together the participation of public administration, academia, private sector and civil society, combining traditional participatory bodies such as the Environmental Sector Council with newer innovation labs and data governance initiatives. The Spanish Mission Platform - CitiES2030 - support the city in this process, while provide methodological support for indicator frameworks and economic modelling.

In Cork, the operational responsibility for MEL is centralised in a small Climate Action Office that collates data from across municipal departments and external agencies, including the Environmental Protection Agency and Sustainable Energy Authority of Ireland (Cork City Council, 2024; Medway, 2026). The Climate City Contract is anchored in the statutory Local Authority Climate Action Plan, ensuring that mission MEL is not a parallel structure but integrated into the city's legal obligations. A Climate Neutral Cork leadership group has been established, bringing together universities, major institutions and municipal actors to guide strategic priorities and, in the longer term, to help unlock data sources and analytical capacity for MEL (Medway, 2026).

Münster's governance architecture reflects decades of climate policy continuity. A central climate unit in the Strategic Development Department coordinates MEL and reports directly to political leadership (City of Münster, 2023). Responsibility for emissions and implementation data is distributed across municipal offices, utilities and research partners, notably the Institute for Energy and Environmental Research (ifeu), which developed the inventory tool. The City Council has mandated an annual climate controlling report, explicitly linking MEL to budget processes and ensuring that climate monitoring is integrated into core governance routines (City of Münster, 2023).

In Bergamo, the Transition Team anchored in the Ecology and Environment Department coordinates the Mission and MEL across municipal departments, with the Head of Department acting as Climate Transition Manager (Municipality of Bergamo, 2023). Designated contact persons in departments responsible for mobility, public works, green space, buildings, housing, heritage and European planning ensure cross-administrative engagement. External support from NetZeroCities advisors, TerrAria and AESS bolsters technical and methodological capacity. The wider Urban Ecosystem

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encompasses around 40 stakeholders whose actions and data feed into the MEL system, reflecting a multi-actor governance model.

Turin has established an integrated Mission Team that brings together a municipal Transition Team and a scientific working group at the Politecnico di Torino's Energy Center (Città di Torino, 2024). The municipal side includes departments responsible for environment, ecological transition and European funds, supported by an interdepartmental working group on climate change. The scientific side, coordinated by the ESTenergycenter lab, provides modelling, indicator design, data architecture and methodological validation. This arrangement embeds analytical capacity inside the governance architecture rather than treating it as external consultancy, which is particularly important for a large metropolitan system with complex socio-economic structures.

2.2.2 Measurement architecture and data governance

Measurement architecture covers how cities construct greenhouse gas inventories, indicator sets and data infrastructures to support MEL. Data governance concerns the rules, responsibilities and infrastructures through which data are collected, validated, stored, shared and used. Across the six cases, measurement systems link baseline emissions, sectoral trajectories, action portfolios and, to varying degrees, financial and co-benefit metrics (Ayuntamiento de Zaragoza, 2025; City of Stockholm, 2023a; City of Münster, 2023; Municipality of Bergamo, 2023; Città di Torino, 2024; Cork City Council, 2024).

In Stockholm, the measurement architecture combines a city-wide greenhouse gas inventory aligned with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) with a set of formal indicators embedded in the integrated management system (City of Stockholm, 2023a). Road transport emissions are calculated using the HBEFA traffic model, calibrated with local data on vehicle counts, fuel types and speed profiles. Building-sector emissions rely on local energy consumption data and national emission factors. A written methodological guideline documents data sources and calculation methods, while the integrated management system provides a digital interface for departments to report energy, transport and procurement indicators annually. Nonetheless, full standardisation across sectors remains a work in progress .

Zaragoza uses a comprehensive indicator framework derived largely from prior municipal strategic plans, which were compiled and adapted to fit the **Climate City Contract (CCC) framework**, with the European Conservation Agriculture Federation (ECAF) serving as a primary methodological reference. The Economic Model for Cities Decarbonisation (EMCD), applied to evaluate the life-cycle costs and economic viability of decarbonization strategies, ensuring that monitoring is linked not only to environmental outcomes but also to financial feasibility, was applied through the Spanish Mission platform CitiES2030 (Ayuntamiento de Zaragoza, 2025).

The city's baseline inventory identifies buildings, transport, industry and services as the main emission sectors - totalising 94.7% of the city total emissions, 2023 GHG Inventory, and the Action Plan targets 99% of scope 1 and 2 emissions through measures in four high-impact sectors. Data governance is supported by an Open Government platform where structured, interoperable and geo-referenced data are publicly accessible, and currently being further developed by the IPPCP (Intelligent Private-Public

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Carbon Platform[14]) project, which systematises industrial emissions reporting through a public-private data partnership .

Cork's measurement architecture is shaped by Ireland's highly centralised data landscape. The 2018 and 2023 baseline emissions inventories rely heavily on national Environmental Protection Agency and Sustainable Energy Authority datasets, statistically downscaled to city level (Cork City Council, 2024; Medway, 2026). Recognising the limitations of infrequent, retrospective inventories, the city is customising the NetZeroPlanner tool, with consultancy support, to develop a robust data source library and treatments that enable more regular updating of emissions models and scenario analyses. The aim is a rolling data approach, where new national datasets are incorporated as they become available, and where project-level impacts can be estimated more systematically (Medway, 2026; City P2P workshop - MEL, 2026).

Münster's measurement backbone is an annual greenhouse gas inventory constructed using the BISKO standard and an ifeu-developed tool, providing consistent coverage of all major sectors since 1990 (City of Münster, 2023). Data are supplied by the municipal utility, private energy providers, infrastructure operators and other external partners. In parallel, implementation monitoring is organised through the climate controlling process, which tracks key strategic projects and their status. Data governance relies on established relationships and professional norms rather than highly formalised data-sharing contracts, although interoperability is facilitated by the use of national standards (City of Münster, 2023).

Bergamo's measurement architecture is closely tied to its digital platform ForImpact.ai. The 2021 baseline inventory adapts the Sustainable Energy and Climate Action Plan (SECAP) methodology to NetZeroCities guidance, using IPCC emission factors and local energy and waste data (Municipality of Bergamo, 2023). During the co-planning phase, stakeholders provided action-level information on expected emissions reductions, investment volumes and co-benefits for 217 actions. These data feed into ForImpact.ai, which aggregates implementation status and impacts by sector and lever of change, enabling the Transition Team to monitor progress and prioritise key actions . Data gaps - particularly for privately owned buildings, industrial processes, socio-economic co-benefits and behavioural change - are addressed through proxy indicators, scenario assumptions and iterative refinement.

Turin's measurement system centres on the CLICC platform and the Energy Transition Data Room, which together link a 2019 baseline inventory (2.4 $MtCO_2$) to 30 macro-actions and 227 micro-actions across stationary energy, transport, waste and AFOLU (Città di Torino, 2024). CLICC uses ad hoc models and algorithms to assess ex ante and in silico the impacts of policy options in terms of avoided emissions and costs, and to compare observed trajectories with those expected under the Climate City Contract. The Data Room is designed as a hyperconverged data infrastructure hosting copies of relevant city datasets, enabling high-performance queries and scenario analysis. Data governance involves structured pipelines from municipal departments, utilities, regional agencies and national statistics offices, with scientific validation by ESTenergycenter (Città di Torino, 2024).

2.2.3 Indicators, co-benefits and distribution

Indicators are the operational core of MEL systems, translating climate objectives and impact pathways into measurable variables. All six cities combine greenhouse gas indicators with sectoral implementation metrics, and several incorporate financial and co-benefit indicators. However, the

[14] https://www.zaragoza.es/sede/portal/ippcp/en/

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balance between quantitative and qualitative indicators, and the maturity of co-benefit and distributional measurement, vary considerably (Edmondson et al., 2025; Ayuntamiento de Zaragoza, 2025; City of Stockholm, 2023a; City of Münster, 2023; Municipality of Bergamo, 2023; Città di Torino, 2024; Cork City Council, 2024).

In Stockholm, formal indicators embedded in the budget and integrated management system include total and sectoral greenhouse gas emissions, energy use in city operations, numbers and types of vehicles, public EV chargers, food-related emissions in municipal procurement, and selected circularity metrics such as material logging in construction (City of Stockholm, 2023a, 2025b). Departments and companies report these annually, and underperformance generates 'red marks' that require explanation and corrective measures . Alongside these, Stockholm is experimenting with transformative indicators in selected urban development projects, designed to capture early changes in organisational routines, collaboration patterns or stakeholder engagement that are not yet visible in emissions statistics . Co-benefits such as health and cost savings from reducing plastics in care services, or financial and climate benefits from building material reuse, are recognised but not yet systematically integrated into the core indicator set.

Zaragoza has developed a particularly comprehensive indicator framework. The CCC and its First Iteration specify targets for 2025, 2027 and 2030 for indicators such as per capita emissions, modal shares, public transport electrification, annual building renovation rates and renewable electricity shares (Ayuntamiento de Zaragoza, 2025). Co-benefit indicators were introduced in the iteration process, covering air quality (PM10, NO_2, PM2.5), temperature-related variables, health outcomes, social inclusion, innovation and job creation. The city also distinguishes co-risks - potential negative impacts such as job losses or rising living costs - and seeks to monitor them to support a fair transition. However, availability of disaggregated social data, such as income distribution or energy poverty, remains a major constraint, and some intended indicators had to be dropped or substituted .

Cork's indicator set, distilled from the extensive NetZeroCities framework, includes approximately 23 core metrics, with a deliberate emphasis on feasibility and decision relevance (Cork City Council, 2024; Medway, 2026). Direct indicators focus on emissions from stationary energy, transport, waste and AFOLU, while indirect indicators cover air quality, green jobs, modal share, citizen engagement and social innovation funding. The city recognises that many co-benefit indicators rely on proxy measures and that thresholds (e.g., World Health Organization air quality guidelines) can create communication challenges if local 'improvements' still fall short of stricter external standards. Quantifying co-benefits in monetary terms, particularly in health and well-being, is a priority for future capacity-building but is not yet achieved (Medway, 2026).

Münster's indicator framework remains relatively conservative. Core indicators track absolute and sectoral emissions, shares of renewable energy in electricity and heat consumption, and residual emissions required to reach climate neutrality (City of Münster, 2023). Implementation monitoring focuses on project status (implemented, delayed, under preparation) and estimated impact levels, without attempting precise attribution of emissions reductions to individual measures . Co-benefits such as air quality, health or energy poverty reduction are acknowledged qualitatively in project proposals or contextual reporting, but the city is cautious about making strong causal claims in the absence of robust data.

Bergamo combines quantitative greenhouse gas indicators - primarily tonnes of CO_2 equivalent reduced per year - with investment-related indicators and qualitative descriptors of co-benefits (Municipality of Bergamo, 2023). Indicators emerged directly from stakeholder-provided action data on emissions reductions, investment volumes, timelines and co-benefits, reinforcing the link between the portfolio and MEL. Co-benefits such as improved air quality, social inclusion, health gains and economic development are aggregated narratively by sector, with early examples in green infrastructure and social cohesion projects like Clic.Bergamo. However, systematic measurement of distributional effects, such as energy poverty or job quality, remains under development.

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Turin assigns a central role to indicators through Module B-3 of their Climate City Contract, which specifies metadata for indicators linked to macro-actions and micro-actions (Città di Torino, 2024). The indicator set covers emissions reductions, implementation variables (e.g., square metres of buildings retrofitted, kilometres of district heating expansion), financial indicators (capital expenditure, leverage ratios) and co-benefit metrics where feasible. Distributional aspects, such as impacts on energy poverty, employment and social inclusion, are recognised as important but face data access challenges, especially where information depends on utilities, private firms or national statistical agencies.

2.2.4 Use of MEL in decision-making and adaptive management

Beyond data collection, city-driven MEL is intended to inform strategic and operational decisions. The six cases illustrate different degrees of integration between MEL outputs and budgeting, investment planning, policy design and stakeholder engagement. In all cases, cities emphasise that MEL should support adaptive management - revisiting assumptions, adjusting portfolios and reallocating resources in response to evidence - rather than acting solely as a retrospective compliance mechanism (Edmondson et al., 2025).

In Stockholm, MEL is deeply embedded in the annual budget cycle. Each year, departments and city-owned companies report indicator values and qualitative narratives via the integrated management system; the environmental department synthesises these into a climate assessment that informs both evaluation of the Environment Programme and the drafting of the next budget's strategic priorities (City of Stockholm, 2023a, 2025b). Underperforming indicators can trigger follow-up meetings with sector departments and influence the assignment of new tasks or funding in subsequent budgets. Sectorally, MEL supports the transport transition by tracking gaps to targets (e.g., 80% emissions reduction vs 2010 and 30% reduction in car traffic vs 2017) and assessing whether policy packages around congestion charging, public transport and cycling are sufficient or require strengthening (City of Stockholm, 2023a).

Münster offers a clear example of MEL integration with financial governance. The annual climate controlling report brings together the updated greenhouse gas balance, a status report on strategic climate projects and an entry point into a climate-oriented budget (Klimahaushalt). The report is timed to coincide with City Council budget deliberations, ensuring that climate progress and resource allocation are considered together (City of Münster, 2023). This process allows political and administrative leaders to identify implementation delays, resource gaps and priority investments, even though precise impact attribution remains limited.

In Bergamo, MEL is used to prioritise actions and assess portfolio credibility. The Transition Team uses ForImpact.ai outputs to identify high-impact and investment-critical actions and to distinguish enabling actions that unlock multiple downstream measures (Municipality of Bergamo, 2023). The integration of emissions, investment and implementation data allows the city to assess whether the action portfolio remains aligned with the 2030 neutrality pathway and whether financing commitments from public and private actors are keeping pace. MEL thus informs both strategic discussions with political leadership and operational coordination with stakeholders.

Turin's MEL system supports decision-making at multiple levels. CLICC enables scenario comparison and cost-effectiveness assessment of alternative decarbonisation strategies, helping planners to prioritise combinations of macro-actions and micro-actions based on emissions impact, feasibility and co-benefits (Città di Torino, 2024). The linkage between environmental and financial indicators allows the city to monitor whether the estimated EUR 27.1 billion investment package is being mobilised and where financing gaps or implementation bottlenecks are emerging. MEL outputs are used to justify corrective actions, such as revising sequencing of electrification measures if infrastructure deployment lags, or adjusting social policies if co-benefit indicators reveal unequal distribution of gains.

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Zaragoza and Cork are integrating MEL into decision-making, with clear visible trajectories. In Zaragoza, the **Economic Model City's Decarbonization (EMCD)** was employed, to support economic decision-making by evaluating the life-cycle costs and economic viability of decarbonization strategies, ensuring that monitoring is linked not only to environmental outcomes but also to financial feasibility. The city use MEL findings to influence municipal budget priorities and adjustments to the Action Plan, particularly within the five strategic pillars where emissions reduction potential, co-benefits and economic viability intersect (Ayuntamiento de Zaragoza, 2025). In Cork, MEL currently focuses on ensuring alignment between the Climate City Contract and existing statutory obligations but is evolving towards more concrete use in investment planning as the NetZeroPlanner tool is implemented. The city aims to use MEL evidence to assess the adequacy of project pipelines relative to the 2030 neutrality goal and to support access to funding mechanisms that require robust climate and co-benefit assessments (Cork City Council, 2024; Medway, 2026).

2.2.5 Learning, participation and communication

Reflexive MEL emphasises learning and adaptation across governance levels and stakeholder groups. Learning processes include revising indicators and methods, co-interpreting data with stakeholders, and translating technical results into accessible narratives. Participation and communication are both inputs to, and outputs from, these learning processes (Edmondson et al., 2025).

In Stockholm, learning is institutionalised through the transition teams and the MEL coordination group, which function as recurring arenas where data and narratives from different departments are compared, inconsistencies are discussed and shared interpretations are developed . Methodological revisions, such as the shift to a GPC-compatible inventory, are timed to coincide with major target updates to preserve coherence of trajectories (City of Stockholm, 2023a). Externally, the city communicates MEL findings through local media, dashboards such as the environmental barometer and presentations in stakeholder pacts, although citizen co-interpretation of data remains limited.

Zaragoza's learning approach is anchored in the conception of its Action Plan as a living document subject to regular revision, incorporated in the first iteration of CCC published by October 2025. Indicator revision processes involve both technical staff and stakeholders through structures like the Environmental Sector Council, a consultative body connecting associative and community perspectives with decision-making processes, formally channelling citizen and civil society feedback. Through iteration and further developments embedding multiple-sector's needs, the city achieved notable progress in estimating challenging metrics such as energy poverty, **satellite technology and multispectral imagery** to monitor carbon sequestration and urban heat islands. Alongside, the city if progressing in its communication and dissemination strategy, through the Open Government platform and IPPCP, in addition to the NetZeroCities CESF to translate technical monitoring outputs into accessible narratives for diverse audiences, this facilitate communication and transparency by making emissions and co-benefit data accessible to citizens, companies and researchers.

Bergamo integrates learning into MEL through explicit acceptance that data, indicators and assumptions will improve over time. During the co-planning phase, workshops and bilateral meetings enabled stakeholders to co-create the action portfolio and to discuss expected impacts, barriers and co-benefits, effectively turning MEL into a formative design practice (Municipality of Bergamo, 2023). As implementation progresses, ForImpact.ai provides a shared digital environment where partners can update data and observe aggregated results, creating opportunities for joint reflection and adjustment, provided that governance routines sustain regular review cycles.

Münster's learning processes are incremental and linked to annual reporting cycles rather than to large redesign moments. New evidence is incorporated into inventories, climate controlling templates and project classifications, with a digital Kanban board used to track follow-up responsibilities (City of Münster, 2023). The city distinguishes between participatory processes for long-term visioning - such

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as the 2017 conference with more than 1,000 participants - and expert-led design of indicators and impact pathways, recognising both the value and limits of co-creation for technically complex MEL tasks.

Cork and Zaragoza both use mission peer learning and external support to enhance learning. Cork's engagement with NetZeroCities tools and the CESF-funded NetZeroPlanner customisation is explicitly framed as a learning exercise to understand the adequacy of actions and to build internal analytical capacity (Medway, 2026; City P2P workshop - MEL, 2026). Zaragoza experiments with advanced digital tools such as satellite imagery for urban heat island mapping and carbon sequestration, and with narrative strategies to translate complex MEL outputs into accessible stories for different audiences (Ayuntamiento de Zaragoza, 2025).

Communication tools such as public dashboards, open data portals and progress reports play important roles across the cases. Münster's climate dashboard provides real-time data on selected indicators, such as bicycle counts, supporting transparency and public engagement (City of Münster, 2023). Zaragoza's Open Government platform allows users to explore emissions and co-benefit datasets; Stockholm's environment barometer consolidates key environmental indicators in an accessible format. However, all cities identify further work needed to link these tools to participatory interpretation processes and to tailor narratives to different audiences, including vulnerable groups and sceptical stakeholders.

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2.3 Discussion of main comparative themes

Building on the thematic synthesis (for a summary see **Table 4**), this section compares how the six cities operationalise city-driven MEL across the main dimensions, while also highlighting the main differences, key strengths, shared challenges and emerging opportunities.

2.3.1 Governance practices

The six cases reveal a spectrum of governance models for city-driven MEL.

- Stockholm and Münster embed MEL deeply in existing management and budgetary systems, with climate and environment units acting as hubs that coordinate indicator reporting and synthesis across departments (City of Stockholm, 2023a; City of Münster, 2023).
- Bergamo and Turin have developed mission-specific Transition Teams and integrated Mission Teams that bring together municipal staff, scientific partners and external stakeholders in purpose-built structures (Municipality of Bergamo, 2023; Città di Torino, 2024).
- Zaragoza and Cork have both integrated MEL into existing environmental and climate action offices while experimenting with new governance devices such as leadership groups and quadruple-helix platforms (Ayuntamiento de Zaragoza, 2025; Cork City Council, 2024).

A commonality across all six cities is the presence of a central coordinating entity with explicit MEL responsibilities, whether a climate unit, mission team or transition team. Another is the distribution of data generation and implementation responsibilities across departments, companies and utilities, reflecting the multi-sectoral nature of emissions and interventions.

Distinctions arise in the positioning of scientific partners and intermediaries. Turin and Bergamo integrate universities and technical agencies directly into governance through formal Mission Teams

and platform management roles; Münster and Stockholm rely on research partners for methodological support but maintain stronger internal control over inventories and indicators. Cork and Zaragoza lean on national platforms and external consultants for tool development and economic modelling, constrained by centralised data systems and resource limitations.

2.3.2 Measurement backbones and digital infrastructures

Measurement architectures across the six cities share a multi-layered character - combining greenhouse gas inventories, sectoral implementation indicators and, in some cases, financial and co-benefit metrics - but differ in their digital infrastructures and degrees of integration.

- Münster and Stockholm exemplify cities where long-standing inventory practices have been incrementally aligned with mission requirements, using national standards (BISKO, GPC) and domestic data sources (City of Stockholm, 2023a; City of Münster, 2023).
- Bergamo and Turin have built more integrated digital backbones (ForImpact.ai and CLICC plus the Data Room) directly around the Climate City Contract, emphasising portfolio monitoring and scenario analysis (Municipality of Bergamo, 2023; Città di Torino, 2024).
- Zaragoza and Cork illustrate configurations shaped by national platforms and tools. Zaragoza leverages the CitiES2030 economic model and NetZeroCities indicator framework, embedding MEL within an open data and data governance agenda (Ayuntamiento de Zaragoza, 2025). Cork's reliance on national EPA and SEAI data, combined with limited internal econometric capacity, has motivated the customisation of NetZeroPlanner as a central analytical tool for future MEL. This has been temporarily supported by consultants, but will be integrated into routine functions over time (Cork City Council, 2024; Medway, 2026).

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Table 4 - Overview of city cases across six core themes of city-driven MEL.

City	**Governance & set-up**	**Measurement & data governance**	**Indicators & co-benefits**	**Use of MEL in decision-making**	**Learning, participation & communication**
Stockholm	Climate and environment unit; transition teams; MEL coordination group; responsibilities anchored in budget and Environment Programme.	GPC-compatible inventory; integrated management system for departmental indicators; methodological guideline; partial cross-sector standardisation.	Formal budget indicators for emissions, energy, transport, procurement; experimental transformative indicators; ad hoc co-benefit examples.	Annual climate assessment feeds budget priorities and assignments; sectoral MEL (e.g. transport) used to assess adequacy of policy packages.	Biweekly coordination group; internal learning across departments; external communication via environment barometer and media; limited citizen co-interpretation.
Zaragoza	Environment Office and European Funds Office co-lead Mission; quadruple-helix governance; sector councils; innovation labs.	CCC indicator framework and EMCD-based modelling; annual inventory; Open Government platform; IPPCP manages industrial emissions data.	Comprehensive indicators with 2025/2027/2030 targets; co-benefits (air quality, health, inclusion, jobs); co-risks; emerging energy poverty metrics.	MEL informs prioritisation within five pillars and municipal budget choices; indicators used to recalibrate Action Plan and investments.	Iterative indicator revision; citizen input via Environmental Sector Council; open data and advanced digital tools; exploration of new narratives.
Cork	Climate Action Office as central MEL node; Climate Neutral Cork leadership group; integration with statutory climate action plan.	Baseline inventories relying on national EPA and SEAI data; NetZeroPlanner customisation underway; manual, Excel-based tracking.	Lean set of ~23 indicators balancing emissions and co-benefits; emphasis on feasibility; current lack of monetised co-benefit metrics.	MEL used to align CCC with legal obligations; evolving towards assessing adequacy of project portfolios and supporting investment cases.	Learning through NetZeroCities tools and consultant support; limited resources for participatory MEL; focus on building internal analytical capacity.
Münster	Climate unit in Strategic Development; strong political anchoring; distributed data responsibilities; annual climate controlling mandated.	Annual BISKO-standard inventory; data from utilities and providers; interoperable through national standards.	Core indicators on emissions, renewable shares and project status; cautious, mainly qualitative treatment of co-benefits.	Climate controlling report informs City Council budget deliberations; MEL used to identify delays, resource needs and strategic gaps.	Incremental learning linked to annual reporting; major participatory processes for visioning separated from expert-led MEL design; public climate dashboard for transparency.
Bergamo	Transition Team with cross-departmental contacts; Urban Ecosystem of stakeholders; external technical partners (TerrAria, AESS, NZC advisors).	SECAP-derived baseline adjusted to NZC guidance; ForImpact.ai aggregates action-level data; adaptive treatment of data gaps.	Indicators derived from stakeholder action data (emissions, investment, status); qualitative co-benefit descriptors; early focus on distributional themes.	MEL used to prioritise high-impact and enabling actions; integration with Investment and Commitment Plans; supports discussions with political and external partners.	Co-creation in portfolio design; ForImpact.ai as shared learning environment; recognition that assumptions and indicators will evolve over time.
Turin	Integrated Mission Team combining municipal Transition Team and ESTenergycenter scientific group; interdepartmental working group.	2019 baseline inventory; CLICC platform models macro- and micro-actions; Energy Transition Data Room hosts city data; structured pipelines from partners.	Indicators linking emissions, implementation variables, finance and co-benefits; explicit handling of uncertainty and data gaps.	MEL informs prioritisation of macro-actions, investment oversight and corrective measures when trajectories deviate from targets.	Co-design of pathways and indicators with stakeholders; scenario-based learning; communication of co-benefits to diverse audiences; reliance on scientific partnership for continuous improvement.

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2.3.3 Indicator strategies and co-benefit practices

Indicator strategies differ in scope and complexity.

- Zaragoza and Turin have arguably the most extensive indicator sets, with clear targets across multiple time horizons and explicit inclusion of co-benefits and co-risks (Ayuntamiento de Zaragoza, 2025; Città di Torino, 2024).
- Bergamo's indicator framework emerged bottom-up from stakeholder-provided action data, ensuring close correspondence between the portfolio and MEL but leaving co-benefit metrics largely qualitative (Municipality of Bergamo, 2023).
- Stockholm and Münster prioritise indicators that fit into existing management systems and legal accountability frameworks, limiting the number of co-benefit indicators and experimenting cautiously with transformative metrics (City of Stockholm, 2023a; City of Münster, 2023).
- Cork, constrained by data and capacity, has selected a lean set of indicators that balance emissions, key co-benefits and feasibility (Cork City Council, 2024; Medway, 2026).

Across all cases, systematic measurement of co-benefits and distributional effects remains a major challenge. Air quality is the most consistently quantified co-benefit, particularly where monitoring stations already exist (Ayuntamiento de Zaragoza, 2025; City of Stockholm, 2023a). Health outcomes, energy poverty and employment impacts are more difficult to operationalise, often depending on external datasets and complex attribution assumptions. Cities express concern about over-claiming causal impacts and about the administrative burden of repeated surveys or bespoke data collections.

This suggests a need for increased mission-level support in developing proportionate methodologies to populate co-benefit indicators, potentially further leveraging national and European data sources.

2.3.4 Main differences and key strengths

Table 5 summarises the main strengths and distinctive features of each city's MEL system across the core Section 2 themes. It highlights that rather than converging on a single model, cities are developing complementary approaches that reflect their institutional histories, data environments and strategic choices.

The table highlights that each city's MEL system has distinctive strengths that can inform mission-wide learning:

- Stockholm and Münster demonstrate how integration into existing management systems can give MEL significant steering power.
- Bergamo and Turin show the potential of platform-based, multi-actor MEL architectures.
- Zaragoza exemplifies advanced data governance and co-benefit integration, while Cork illustrates a pragmatic pathway for capacity-constrained cities to progressively deepen MEL practices.

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Table 5 - Main comparative dimensions and key strenghts across the city cases.

City	Governance architecture	Measurement backbone	Digital / platform tools	Indicator and co-benefit strategy	Notable strengths
Stockholm	Climate and environment unit as MEL hub; transition teams and MEL coordination group embedded in municipal budget system.	GPC-aligned inventory plus integrated management indicators.	Integrated digital reporting system; environment barometer.	Strong focus on indicators that fit budget and management logic; early experimentation with transformative indicators; selective co-benefit tracking.	Deep integration of MEL into core governance and budget cycles; strong internal synthesis capacity.
Zaragoza	Environment Office and European Funds Office co-lead Mission; quadruple-helix governance with sector councils and innovation labs.	CCC indicator framework plus EMCD-based modelling and annual inventory.	Open Government platform; IPPCP public-private climate data platform.	Comprehensive indicator set with explicit co-benefits and co-risks; emerging energy poverty metrics.	Advanced data governance and open-data practices; strong alignment between MEL, economic modelling and just transition agenda.
Cork	Lean Climate Action Office coordinating across departments; Climate Neutral Cork leadership group.	Baseline inventories using national EPA and SEAI data; NetZeroPlanner adoption underway.	Planned NetZeroPlanner customisation; Excel-based tracking for climate action plan.	Lean indicator set balancing emissions and key co-benefits, chosen for feasibility in a capacity-constrained context.	Pragmatic approach that integrates Mission MEL into statutory climate action planning and seeks to build analytical capacity over time.
Münster	Climate unit in Strategic Development Department; annual climate controlling mandated by City Council.	Annual BISKO-standard inventory since 1990.	Public climate dashboard; digital Kanban for follow-up.	Focused indicator set on emissions and implementation status; cautious qualitative treatment of co-benefits.	High degree of institutionalisation and political anchoring; strong link between MEL and budget decisions.
Bergamo	Transition Team with cross-departmental contact persons; Urban Ecosystem of ~40 stakeholders.	SECAP-adapted baseline plus action-level monitoring based on stakeholder inputs.	ForImpact.ai platform for portfolio and MEL.	Indicators derived from action data; qualitative co-benefit descriptors; emerging focus on distributional aspects.	Strong integration of MEL with action and investment plans; platform-based governance of a multi-actor portfolio.
Turin	Integrated Mission Team combining municipal departments and ESTenergycenter scientific group.	2019 baseline inventory linked to 30 macro-actions and 227 micro-actions.	CLICC modelling platform and Energy Transition Data Room.	Rich indicator set linking emissions, implementation, finance and co-benefits; recognition of data uncertainties.	Sophisticated science-based MEL architecture that connects climate data, investment oversight and adaptive management.

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2.3.5 Shared challenges and opportunities

Across the six cases, several shared challenges and opportunities emerge for city-driven MEL under mission-oriented climate governance. These resonate with findings from the first NetZeroCities report on city-driven MEL (Edmondson et al., 2025).

- **Data gaps and uneven measurement are a pervasive challenge**. Cities face structural difficulties in obtaining reliable, disaggregated data on privately owned buildings, small and medium-sized enterprises, mobility behaviour, socio-economic co-benefits and certain scope 3 emissions (Ayuntamiento de Zaragoza, 2025; Cork City Council, 2024; Municipality of Bergamo, 2023; Città di Torino, 2024; City of Stockholm, 2023a; City of Münster, 2023). Reliance on national models and statistical downscaling introduces uncertainties that can undermine confidence in local estimates, particularly for sub-sectors where municipal influence is limited.
- **Capacity and resource constraints affect all cities, albeit to different degrees**. Even relatively well-resourced administrations such as Stockholm and Münster report pressure on core MEL teams and the need to prioritise basic monitoring over more advanced co-benefit analysis or participatory interpretation. In Cork and Zaragoza, the combination of limited human resources, complex data environments and ambitious reporting expectations makes it difficult to sustain sophisticated MEL functions without external support (Medway, 2026).
- **Methodological uncertainty and attribution challenges remain**. Cities are reluctant to attribute emissions changes or co-benefits to specific measures where multiple factors interact, national policies play a decisive role, or data are insufficient to support strong causal claims (City of Münster, 2023; Medway, 2026). As a result, several cases prioritise MEL functions that track implementation status and overall trajectories rather than detailed impact attribution, accepting a trade-off between precision and governance usability.
- **Multi-level governance (mis)alignments complicate MEL design and interpretation**. Many key levers for decarbonisation - such as building codes, grid regulation, vehicle standards or taxation - are controlled at national or EU level, while cities are held accountable for ambitious neutrality targets (Edmondson et al., 2025; City of Münster, 2023). This creates difficulties in distinguishing which parts of emissions trajectories can reasonably be ascribed to municipal actions versus broader structural changes, and challenges in designing indicators that reflect municipal agency and influence.

Despite these challenges, the cases also highlight significant opportunities and breakthroughs.

- Integration of MEL with budgetary and investment processes in Stockholm, Münster, Bergamo and Turin strengthens the strategic relevance of MEL and embeds climate considerations in core governance routines (City of Stockholm, 2025a; City of Münster, 2023; Municipality of Bergamo, 2023; Città di Torino, 2024).
- Platform-based MEL architectures, such as ForImpact.ai, CLICC and Zaragoza's data platforms, demonstrate the potential for multi-actor, portfolio-oriented monitoring that goes beyond traditional inventories (Municipality of Bergamo, 2023; Città di Torino, 2024; Ayuntamiento de Zaragoza, 2025).
- Mission-wide tools and peer learning provide shared reference points that enable cities to adapt methodologies rather than starting from scratch. These tools include the NetZeroCities indicator framework, NetZeroPlanner, EMCD, scope 3 guidance, MEL guidance and outcome harvesting etc.

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Reflexive framing of MEL as a living, adaptive system is increasingly visible, with cities revising indicators and methods iteratively and openly acknowledging uncertainties and data limitations. These developments offer promising foundations for future support.

2.4 Conclusions and outlook

The six cases of Stockholm, Zaragoza, Cork, Münster, Bergamo and Turin show that city-driven MEL is emerging as a central component of mission-oriented urban climate governance, rather than a peripheral reporting obligation. While starting points and trajectories differ, common features include: (i) anchoring MEL in Climate City Contracts and related plans, (ii) linking emissions trajectories with action portfolios and investments, (iii) using MEL as a mechanism for effective partnership building with the utilities, data provider or the private sector, and (iv) gradually expanding indicator frameworks to encompass co-benefits and distributional dimensions.

The comparative overview suggests that MEL systems are most effective when they are:

- (i) integrated into core management and budgetary processes, as in Stockholm and Münster;
- (ii) designed from the outset alongside action portfolios and investment plans, as in Bergamo and Turin;
- (iii) supported by appropriate digital and data governance infrastructures, as in Bergamo, Turin and Zaragoza; and
- (iv) treated as reflexive, adaptive systems that explicitly recognise uncertainty and support learning-by-doing, as all six cases increasingly do.

These features make MEL not only a tool for accountability but also a practical governance mechanism for steering complex transitions.

For the broader Mission Cities community, the experiences documented here underline the importance of investing in MEL as a governance capability. This includes resourcing dedicated teams and intermediaries, strengthening data infrastructures and interoperability, and institutionalising learning processes that connect MEL findings to decisions on budgets, planning and procurement. At mission and national levels, support is needed to develop proportionate methods for co-benefits and distributional metrics, to improve access to high-quality data for key indicators, and to align multi-level governance frameworks so that city MEL can more accurately reflect and influence the conditions for climate-neutral urban futures (Edmondson et al., 2025).

Looking ahead, further work could deepen comparative analysis across a wider set of Mission Cities, with particular attention to scope 3 emissions, just transition metrics and the role of private-sector data in city-driven MEL. Similarly, further work could help support cities bridge their MEL efforts on their pilots/demonstrators' implementation and the achievements of their CCC impacts with varying scales of interventions (city-wide vs. domain-specific).The six cases discussed here provide a rich foundation for such efforts, illustrating both the potential and the limitations of current MEL systems and offering concrete examples of how cities are transforming monitoring and evaluation into engines of learning and governance for climate neutrality.

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2.5 City Cases: City-driven Monitoring, Evaluation and Learning (MEL)

2.5.1 Stockholm

2.5.1.1 City context

Stockholm is Sweden's capital and largest city, a political and administrative centre and the core of a fast-growing metropolitan region with more than one million inhabitants within the municipal boundary and over two million in the wider functional urban area (City of Stockholm, 2025a). As a service- and knowledge-based economy with relatively little heavy industry inside the city limits, Stockholm's greenhouse gas (GHG) profile is dominated by emissions from buildings, transport, waste and consumption rather than from large point sources in energy-intensive manufacturing (City of Stockholm, 2023a; Interview 1, 2026).

The city has articulated increasingly ambitious climate goals over several decades. The Environment Programme 2020-2023 set an overarching goal of a fossil-free and climate-positive Stockholm by 2040, underpinned by a emission budget capping cumulative emissions at 19 million tonnes of CO2-equivalent between 2020 and 2040 (City of Stockholm, 2020). Building on this trajectory, the 2030 Climate Neutrality Action Plan (2023), prepared within the EU Cities Mission and NetZeroCities framework, raised the ambition further by targeting a climate-positive city already by 2030 and a fossil-free city by 2040 (City of Stockholm, 2023a). This target was integrated into the Stockholm's new Environmental Programme (2024), which also includes four other climate goals, including consumption based emissions (City of Stockholm, 2024a). The budget complements the climate goal by describing the total volume of emissions in carbon dioxide equivalents (CO2e) that may be emitted on the way to achieving the goal. Stockholm's emissions budget 2024-2040 states that a maximum of 9 million tonnes CO2e may be emitted for the period 2024-2040. This is a raising of ambitions compared with the City's previous Climate Action Plan (City of Stockholm, 2024b).

Emissions within the city's territorial system boundary decreased from approximately 3.4 million tonnes CO2e in 1990 to an estimated 1.2 million tonnes CO2e in 2024, corresponding to a reduction in per capita emissions from 5.4 to about 1.2 tonnes (City of Stockholm, 2024). Achieving climate positivity by 2030 requires annual emissions to fall further to around 700,000 tonnes CO2e, combined with negative emissions of roughly 800,000 tonnes CO2e from a planned full-scale Bioenergy with Carbon Capture and Storage (BECCS) facility, yielding net negative emissions of about 100,000 tonnes CO2e by 2030 (City of Stockholm, 2023a).

The city's 2026 Budget embeds these long-term goals in a broader vision of "a green and fossil-free Stockholm leading a just climate transition" and explicitly links climate targets to welfare, equality and social cohesion (City of Stockholm, 2025a). The budget asserts that Stockholm must both meet and often exceed Paris Agreement commitments, positioning climate action as a core dimension of a fair city that "holds together" socially and economically (City of Stockholm, 2025a).

Stockholm's commitments are codified in both a national Climate City Contract 2030, negotiated through the Viable Cities programme with several Swedish government agencies, and a European Climate City Contract submitted through NetZeroCities and awarded the Mission Label in 2023 (City of Stockholm, 2023b; NetZeroCities, 2023). The national contract emphasises coordination between local and national levels, while the European contract stresses the link between municipal governance, European support instruments and the mission target of 100 climate-neutral and smart cities by 2030 (City of Stockholm, 2023b; European Commission, 2021).

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2.5.1.2 MEL as a governance mechanism in Stockholm

Monitoring, evaluation and learning (MEL) have gradually evolved from relatively narrow reporting tools into a central governance device connecting Stockholm's climate goals, budgets and organisational structures. In the 2030 Climate Neutrality Action Plan, indicators for MEL are presented as integral to the city's management system, being embedded in the financial budget and reported annually through an integrated management system to the City Council (City of Stockholm, 2023a). This aligns with reflexive MEL concepts developed in NetZeroCities research, which highlight MEL as a means of adaptive, participatory and mission-oriented governance rather than merely a compliance function (Edmondson et al., 2025).

Governance architecture and institutional set-up

Stockholm's MEL system combines several layers: (i) a city-wide GHG inventory aligned with the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC); (ii) a set of formal indicators embedded in the municipal budget and management control system; (iii) sectoral and project-level metrics used by departments and city-owned companies; and (iv) emerging "transformative indicators" aimed at capturing early changes in practices and relationships (City of Stockholm, 2023a; Interview 1, 2026; Interview 2, 2026). These elements are coordinated by a climate and environment unit that acts as a de facto MEL hub, while responsibility for data generation and implementation is distributed across the administration (Interview 1, 2026; Interview 2, 2026).

Transition arenas and organisational structure

The institutional context for MEL is shaped by Stockholm's transition governance architecture. In preparing the climate action plan and related impact pathways, the city convened approximately 15-16 thematic focus groups, each addressing key domains such as buildings, different aspects of transport, energy, food and city operations (Interview 1, 2026). Over the course of roughly one year, these groups followed a structured workshop process that began with open brainstorming about "what needs to happen" to reach climate goals, without initial constraints of budget or municipal mandate, and then gradually narrowed down to lists of actions considered feasible for the city or its companies to implement (Interview 1, 2026).

Participation in these focus groups was broad but primarily internal to city departments and city owned companies. Almost all municipal departments and city-owned companies participated in at least one group, meaning that operational staff, rather than only senior managers, contributed to defining impact pathways and candidate actions (Interview 1, 2026). Selected groups invited researchers or university partners to workshops on specific themes, but external stakeholders were not systematically embedded in the governance structure at this stage (Interview 1, 2026).

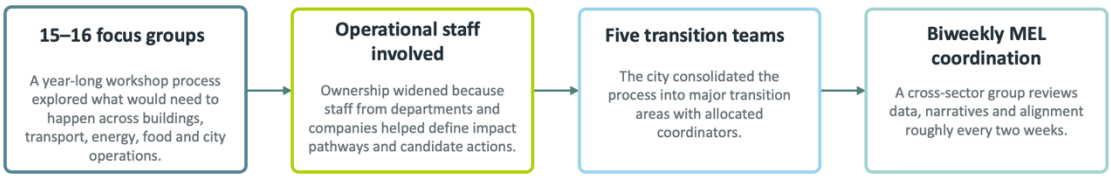


Figure 13 - MEL operationalisation process in Stockholm.

Following this design phase, the city consolidated the 15-16 focus groups into five transition teams corresponding to major emission and leverage domains: citizens' consumption, energy, transport, construction, and city operations (including procurement and internal activities) (Interview 1, 2026). Each transition team has designated coordinating personnel with allocated time, and these

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coordinators participate in a cross-sectoral MEL coordination group that meets roughly every two weeks to exchange information, review data and align reporting (Interview 2, 2026).

Leadership and strategic steering

MEL is anchored in the City Council's budget and in the Environment Programme, which together set climate targets and allocate responsibilities. The 2026 Budget assigns the City Executive Board responsibility for coordinating the implementation of the environmental programme and the climate action plan, including the transition areas "Acting for a fair and inclusive climate transition" and "Steering towards low-climate-impact consumption" (City of Stockholm, 2025a). It also tasks the Board with leading work on the Swedish and European Climate City Contracts, developing city-wide climate adaptation, and strengthening partnerships and pacts with businesses and civil society (City of Stockholm, 2025a).

The budget makes explicit the intention for Stockholm to be a "world leader" in reducing emissions and that environmental and climate goals must be integrated into welfare and equality policies (City of Stockholm, 2025a). It positions MEL not only as a technical instrument but as a means of ensuring "order and good governance" through strong economic control, transparent performance tracking and alignment of investments with climate and welfare priorities (City of Stockholm, 2025a).

Measurement architecture and data governance

Stockholm’s measurement architecture distinguishes between (i) formal indicators embedded in the municipal budget and integrated management system, (ii) GHG inventory indicators for the city as a geography and for the city organisation, and (iii) emerging “transformative indicators” intended to capture early signs of systemic change. Formal indicators typically concern quantitative variables such as electricity use, district heating consumption, emissions from food procurement, plastic use, and selected transport metrics, which departments and city companies report annually through a digital integrated management system (Interview 1, 2026).

For the city-wide GHG inventory, different subcategories (e.g. road transport, harbour, working machinery, water transport) are modelled using combinations of national statistics, the HBEFA road traffic model, and locally collected data on traffic volumes, fuel composition, and renewable shares.

The city emphasises methodological consistency over time to read trends accurately, while acknowledging significant uncertainties in some subcategories, especially working machines where data are generated by national models with long time lags and coarse municipal resolution.

Data governance is partly formalised through a written methodological guideline for climate calculations and the integrated management system that defines roles for reporting indicators at departmental level. Even so, there isn’t fully standardised cross-sector data governance frameworks for all MEL-related data flows. Consequently sectoral practices coexist, and the climate team must cross-check whether external partners have changed their methods since previous years (Interview 1, 2026).

Indicator architecture and data systems

Stockholm's MEL architecture makes a distinction between formal indicators, which are written into the budget and integrated management system, and a wider set of technical and experimental indicators used for analysis and project monitoring (Interview 1, 2026; City of Stockholm, 2023a). Formal indicators are typically quantitative and include, among others, total and sectoral GHG emissions, district heating and electricity use, numbers and types of vehicles, numbers of public EV chargers, food-related emissions in municipal procurement, volumes of specific materials such as plastic, and

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selected climate adaptation or air quality metrics (Interview 1, 2026; Interview 2, 2026; City of Stockholm, 2025b).

Departments and city-owned companies are required to report annually on relevant indicators through a digital integrated management system, which is also used for broader Agenda 2030 and welfare indicators (Interview 1, 2026). For example, city operations report their electricity and heat consumption, waste volumes, food procurement emissions and plastic usage; these data are then aggregated at city level and used both for internal management and for external reporting to mechanisms such as CDP (Interview 1, 2026; Interview 2, 2026).

In parallel, the climate unit compiles a city-wide GHG inventory disaggregated by sub-sectors such as heating, electricity, road transport, working machinery, shipping and aviation (City of Stockholm, 2023a; Interview 2, 2026). Emissions from road transport, for instance, are estimated using the European HBEFA model, which combines road network characteristics, speed profiles and vehicle fleet composition with emission factors; Stockholm then calibrates the model using local data from the traffic department on vehicle counts and fuel types (Interview 2, 2026).

Heating-sector emissions have decreased by roughly 75% since 1990 due to reduced energy demand and a shift to renewable fuels, while emissions from electricity and gas use have halved as the Nordic electricity mix has decarbonised (City of Stockholm, 2023a). By contrast transport emissions have only fallen by around 15% over the same period, and represents a major remaining mitigation challenge (City of Stockholm, 2023a). These trends are reflected in the city's MEL focus: scopes 1 and 2 emissions from transport and energy are well tracked, whereas scope 3 emissions and consumption-based impacts remain less well quantified (Interview 2, 2026).

Scope 1-3 coverage and data gaps

Stockholm's MEL framework now covers scopes 1 and 2 comprehensively at the territorial scale and reasonably well for the municipal organisation, but scope 3 remains partial. Where indicators and robust data exist, attention and activity levels tend to be higher, whereas areas without verified numerical data rely more on qualitative descriptions that are more difficult to translate into strategic steering (Interview 2, 2026). This is evident for construction-related emissions, working machinery and household consumption, which together constitute a large part of the city's wider carbon footprint (City of Stockholm, 2023a; Interview 2, 2026).

For construction and civil engineering, the city increasingly demands climate-related requirements in procurement, including life-cycle climate criteria and environmental logging of materials through a Building Materials Assessment system (City of Stockholm, 2025b). The 2026 Budget sets city-wide indicators such as "Proportion of completed construction and civil engineering contracts where goods have been environmentally assessed and logged in the Building Materials Assessment" and "Proportion of procurements that contribute to circularity" (City of Stockholm, 2025b). Even so, the interviews highlighted that the city still lacks systematic data on quantities of high-impact materials like concrete and asphalt procured annually, limiting its ability to fully leverage procurement as a decarbonisation tool (Interview 1, 2026; Interview 2, 2026).

For working machinery, the city currently relies on national statistical models, which produce delayed and uncertain municipality-level estimates that are sufficient for covering all categories in the inventory but not reliable enough to discern local trends or the effects of specific interventions (Interview 2, 2026). In contrast, data for road transport and building energy use are considered relatively robust, albeit still dependent on consistent emission factors and model assumptions provided by national agencies such as the Swedish Energy Agency (Interview 2, 2026).

Consumption-based emissions, especially from household consumption, remain largely outside the current MEL system, beyond high-level references in the Climate City Contract and Climate Action Plan (City of Stockholm, 2023a; City of Stockholm, 2023b). Climate officials explicitly identify this as

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an area where new indicators and learning from other cities would be particularly valuable, alongside improved monitoring of climate-related aspects of city planning processes (Interview 2, 2026).

Indicators, co-benefits and distribution

Within the formal MEL system, quantitative indicators predominate because they fit well into the budget and management control logic and are perceived as more legitimate for political decision-making (Interview 1, 2026; Interview 2, 2026). Examples include targets for energy purchased by the city organisation (1,675 GWh in 2026, declining to 1,625 GWh by 2028), electricity production from solar energy (10.7-11.6 GWh), and the proportion of procurements that contribute to circularity (City of Stockholm, 2025b). These climate-related indicators sit alongside a broader set of welfare and governance indicators, such as co-creation indices for employees, procurement follow-up rates and job placements, illustrating how MEL is embedded in a holistic governance framework (City of Stockholm, 2025b).

Qualitative and narrative indicators nonetheless play an important role in Stockholm's MEL practice. Each year, all departments and city-owned companies submit qualitative reports describing what they have done in relation to various targets, perceived effects of their actions and emerging challenges (Interview 1, 2026). The environmental department synthesises this material into a strategic assessment of climate progress, identifying areas where activity is increasing, gaps remain or additional coordination is needed, even when precise quantitative effects cannot be attributed (Interview 1, 2026).

Recent work on "transformative indicators" in at least one urban development process seeks to better capture early signs of change (including shifts in organisational routines, cross-departmental collaboration or stakeholder engagement) that are not yet visible in emission statistics (Interview 1, 2026). This aligns conceptually with the reflexive MEL literature, which stresses the importance of tracking institutional and behavioural changes alongside material impacts (Edmondson et al., 2025). At the time of writing, however, these transformative indicators remain experimental and have not yet been systematised across the transition teams (Interview 1, 2026; Interview 2, 2026).

Co-benefits (i.e. health improvements, cost savings, enhanced comfort, or social inclusion) are acknowledged in Stockholm's climate discourse but are not consistently integrated into the core indicator set. Interviews noted that initiatives to reduce plastic use in preschools and elder care bring significant co-benefits: reduced exposure to harmful chemicals, increased comfort for elderly residents when plastic covers are replaced with textiles, and substantial cost savings when single-use products are reduced without compromising hygiene (Interview 2, 2026). Similarly, the establishment of a reuse centre for building materials, prioritised in the 2026 Budget, is expected to generate both climate and financial benefits (City of Stockholm, 2025b). Yet these co-benefits are often captured in separate indicators or narrative accounts rather than being systematically linked to climate MEL (Interview 2, 2026).

Use of MEL in decision-making and adaptive management

Integration with the budget and management system

The City of Stockholm has integrated environmental and climate objectives into its management system for more than two decades, and MEL is now firmly embedded in the annual budget cycle (City of Stockholm, 2023a; City of Stockholm, 2025a). Each year, the City Council adopts a budget that includes a set of indicators for environmental, climate and governance goals. Committees and company boards are obliged to plan activities, monitor progress and report results against these

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indicators (City of Stockholm, 2025a, 2025b). Underperformance is visible through the integrated management system and may result in "red marks" that require explanation and corrective measures (Interview 1, 2026).



Figure 14 - Integration of MEL in Stockholm's budgeting process.

Climate staff describe how indicator data and narrative reports from all departments and companies are collected early in the year, synthesised into a climate assessment, and then used to inform both the evaluation of the Environment Programme and the drafting of the next budget's strategic priorities (Interview 1, 2026; Interview 2, 2026). This process creates an annual learning and accountability cycle, even if it is not formally labelled as such: evidence on trends and activities feeds into political deliberation, which then shapes new assignments, funding allocations and indicator choices (City of Stockholm, 2025a; Interview 2, 2026).

Policy assessment in key sectors

In the transport sector, MEL informs policy primarily at sectoral rather than individual-action level. The GHG inventory tracks emissions from road traffic, harbours and other modes, while additional indicators record trends in vehicle types, EV chargers, parking policies and modal shares (City of Stockholm, 2023a; City of Stockholm, 2025b; Interview 2, 2026). These data underpin efforts to tighten procurement requirements for transport services, for example by mandating fossil-free or fully electric vehicles in contracts and then attempting to monitor whether suppliers comply (Interview 1, 2026). Yet interviewees acknowledge that robust, systematic follow-up on contracted transport remains challenging, and that better data on vehicles and fuel use in procured services would substantially strengthen MEL's steering power in this area (Interview 1, 2026; Interview 2, 2026).

In construction and urban development, the climate action plan and budget identify decarbonising construction machinery, materials and processes as a major priority, given the significant share of scope 3 emissions associated with building and infrastructure projects (City of Stockholm, 2023a; City of Stockholm, 2025a). MEL supports this by tracking environmental logging of building materials, piloting reuse centres for construction materials, and gradually tightening procurement criteria for low-carbon concrete and asphalt (City of Stockholm, 2025b; Interview 1, 2026). However, the city is still in the early stages of linking these interventions to quantified emission outcomes, and climate staff highlight the need for more granular data on material flows to strengthen feedback loops (Interview 1, 2026; Interview 2, 2026).

The Climate Action Plan also emphasises the importance of monitoring progress towards intermediate targets such as an 80% reduction in transport-sector emissions by 2030 relative to 2010 and a 30% reduction in car traffic volumes relative to 2017 (City of Stockholm, 2023a). MEL plays a central role in

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tracking whether planned measures (including congestion charges, public transport enhancements, cycling infrastructure and eventual zero-emission zones) are sufficient to close the emission gap, but the action plan also underscores the dependence on national and EU policy changes for achieving these targets (City of Stockholm, 2023a; Interview 1, 2026).

Reflexive revision of indicators and methods

Stockholm's MEL practice exhibits elements of reflexive governance, especially in its approach to revising methods and indicator sets over time. The city recently replaced a long-standing local "Stockholm model" for emission calculations with an internationally recognised GPC-compatible method, simplifying communication and alignment with European mission requirements (Interview 2, 2026; City of Stockholm, 2023a). They also maintain a methodological guideline describing data sources, emission factors and calculation steps, while acknowledging that changes in upstream models and emission factors (including those provided by national agencies) can significantly affect reported emissions (Interview 2, 2026).

At the same time, officials are acutely aware that methodological changes can disrupt time series and complicate interpretation of trends and targets (Interview 2, 2026). As a result, substantial revisions to methods or emission factors are preferentially timed to coincide with the adoption of new targets, including the shift to climate positivity by 2030, so that trajectories can be recalibrated in a coherent way (Interview 2, 2026; City of Stockholm, 2023a). This illustrates a balancing act between improving accuracy and maintaining continuity for political accountability and public communication.

Learning, participation and communication

From a reflexive MEL perspective, learning is not only about technical improvements in data and methods but also about how the city uses MEL to question assumptions, coordinate actors and engage stakeholders (Edmondson et al., 2025). Stockholm's experience shows partial but not yet fully institutionalised progress on this front. Internally, the transition teams and MEL coordination group function as recurring spaces where data and narratives from different departments are compared, inconsistencies are discussed, and shared interpretations are developed; particularly when climate staff seek follow-up meetings with sector departments whose reports are unclear or incomplete (Interview 2, 2026).

Externally, the city communicates climate progress and challenges through several channels, including local newspapers, online dashboards like the environment barometer, and presentations in stakeholder pacts and networks (City of Stockholm, 2023a; City of Stockholm, 2025a). The 2030 Action Plan underscores the importance of making data transparent and accessible to citizens, so that progress towards climate neutrality is visible and can be scrutinised (City of Stockholm, 2023a). Even so, the available evidence suggests that citizens and civil society organisations are more engaged as recipients of information and participants in specific projects than as more active contributors, such as through co-creation or collective sensemaking and data interpretation processes (Interview 1, 2026).

Participation and multi-actor collaboration are more fully institutionalised in adjacent parts of Stockholm's climate governance, for instance through Environment and Climate Pacts with businesses, Electrification Pacts with transport actors, and strategic partnerships with universities including KTH Stockholm University and Karolinska Institutet (City of Stockholm, 2023a; City of Stockholm, 2023b). These arrangements provide opportunities for more reflexive MEL practices (i.e. co-interpretation of data, citizen science or joint definition of co-benefit indicators) but the current MEL system governance has only begun to tap this potential (Interview 2, 2026).

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Outcomes and Impact

The outcomes of Stockholm's MEL system can be observed by looking beyond immediate emission trends to the ways in which MEL has reshaped governance processes. Integrating climate indicators into the city's budget and management system has helped increase transparency and created stronger incentives for departments and companies to align their activities with climate targets (City of Stockholm, 2025a, 2025b; Interview 1, 2026). The requirement to report both quantitative indicators and narrative accounts each year fosters a culture in which climate-relevant work must be documented and justified, rather than remaining invisible or discretionary (Interview 1, 2026).

MEL has also helped reveal systemic gaps and dependencies that were previously less visible. For example, the analysis of emission trends against the city's climate budget and 2030 neutrality target makes clear that current trajectories in transport and construction are insufficient without major policy and technological shifts, including electrification, behaviour change and the deployment of BECCS (City of Stockholm, 2023a).

At the same time, several potential avenues could further strengthen the MEL operationalisation to support city climate governance. First, sector-level quantitative indicators remain predominant. While these date points are necessary for high-level tracking and comparability, this level of granularity does not enable the city's to fully evaluate the effectiveness of individual measures, and could be complimented by further experimentation with more qualitative, process-based indicators at scale (Interview 1, 2026; Interview 2, 2026). Second, the integration of co-benefits, distributional impacts and justice considerations into MEL could be strengthened to avoid narrowing political debates about climate action to emission figures alone. While budget documents repeatedly stress the need for a "just climate transition" and for reducing socio-economic inequalities, additional indicators and data points could be developed and integrated to support planning and delivery of these objectives (City of Stockholm, 2025a; Interview 2, 2026).

Third, while Stockholm's MEL practice displays elements of reflexivity (such as workshops to identify desired indicators, methodological documentation and experimental transformative indicators) the learning function is still less formalised than monitoring and evaluation. Interviewees explicitly argue that more structured approaches are needed to translate MEL findings into revised strategies, to question whether existing pathways are sufficient, and to learn systematically from pilots and cross-city exchanges (Interview 2, 2026; Edmondson et al., 2025).

2.5.1.3 Conclusion and lessons for mission-oriented urban climate governance

Stockholm's experience offers several lessons for other mission cities seeking to use MEL as a governance mechanism rather than only a reporting tool.

- Embedding climate indicators and narratives within the core budget and management system can significantly strengthen institutional commitment and accountability, provided that climate objectives are made visible alongside other political priorities. This reduces the risk that MEL remains a peripheral technical exercise detached from resource allocation and strategic steering.
- Broad internal co-creation processes (for example, the 15-16 focus groups that fed into the climate action plan and the subsequent transition teams) can generate more realistic and widely owned impact pathways, but they require strong central facilitation to reconcile overlapping proposals and to manage cross-sectoral dependencies and translate bottom-up suggestions into politically acceptable commitments. MEL systems should therefore allocate explicit capacity for such facilitation and synthesis work, not only for data handling.
- Methodological transparency and consistency are crucial for maintaining trust in MEL outputs, and must be balanced against the need for improvement and alignment with international

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standards. Stockholm's shift to GPC-compatible inventories and its documentation of emission factors and data sources illustrate good practice, while its caution about changing methods only at key target-revision moments reflects a pragmatic compromise between rigour and continuity.

- Reflexive MEL requires more than trends in aggregate emission indicators. Cities need to invest in indicators and methods that can capture co-benefits, social and distributional effects, and early signals of systemic change, particularly in areas such as plastics reduction, circular economy and consumption-based emissions where climate and social objectives intersect. Stockholm's emerging work on transformative indicators and co-benefit-rich initiatives demonstrates the potential of such approaches but also their current underutilisation.
- MEL in mission-oriented governance must be understood as a multi-level instrument. In Stockholm, MEL not only informs municipal decisions but also documents where national policies and infrastructure constraints (for example, electricity grid reinforcement or standards for CCS and negative emissions accounting) limit local action. By making these dependencies visible, city-driven MEL can contribute evidence to national and European debates, thereby helping to realign higher-level frameworks with local climate neutrality trajectories.

Stockholm has developed a city-driven MEL system that is tightly integrated with its budget and management structures and aligned with both national and European Climate City Contracts. This system has supported substantial emission reductions, clarified remaining gaps to climate neutrality, and strengthened internal accountability for climate-related actions. At the same time, it faces ongoing challenges around scope 3 coverage, co-benefit integration, action-level evaluation and the institutionalisation of learning. For other mission cities, Stockholm's experience underscores that MEL can be a powerful governance mechanism for climate transitions when it is treated not merely as a reporting requirement but as a reflexive, multi-level and justice-oriented process of monitoring, evaluation and learning.

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2.5.2 Zaragoza

2.5.2.1 Background Information

Zaragoza is the capital of the autonomous community of Aragon and one of Spain's largest cities, with a population of around 700,000 inhabitants in the metropolitan area.

The city is also known for its rich cultural heritage, exemplified by landmarks such as the Basilica of Our Lady of the Pillar.

In April 2022, was selected by the European Commission as one of the '100 Climate Neutral and Smart Cities', a recognition that opens the door to new European collaborations and support to reach the goal climate neutrality by 2030.

This case study presents the pathway towards advancing their Climate Neutral Mission journey and highlights their learnings, as well as their continued commitment to learning and reviewing their progress, reflected in the First Iteration of the Zaragoza Climate City Contract (CCC).

Geographic and Demographic Context

The broader **metropolitan area of Zaragoza** (urban and commuter belt) is estimated at approximately **745,000 people in 2026** (ongoing small annual growth). This metropolitan figure includes nearby towns and suburbs closely linked economically and socially to Zaragoza's urban core.

Age distribution within the municipality, according to the latest age structure figures for Zaragoza city (INE 2025 base):

- Ages 0-17 (youth): ~111,297 residents
- Ages 18-64 (working-age): ~429,426 residents
- Ages 65+ (elderly): ~158,284 residents

The city serves as an important economic and logistical hub in northeastern Spain, thanks to its strategic position between major cities. The local economy is diverse, with key industries including manufacturing (notably automotive, with the Opel plant in Figueruelas), logistics, agriculture, and a growing services sector.

It lies within the Ebro Valley, along the banks of the Ebro River, the longest river entirely within Spain. This central position has historically made Zaragoza a key crossroads for trade, transport, and communication.

The geographical boundary for its climate neutrality target covers the entire municipal area, encompassing 974 km².

Zaragoza institutional declaration of commitment to advance the objective of reducing emissions by 50-55 % by 2030 compared to baseline levels, is reflected in the city council's central climate strategy

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is the *Estrategia de Cambio Climático, Calidad del Aire y Salud de Zaragoza (ECAZ 3.0) 2030*[15], approved on 26 April 2019. This strategy integrates climate mitigation (reducing greenhouse gas emissions), air quality improvement, and public health protection with the United Nations Sustainable Development Goal 13 (Climate Action) and was developed through broad technical and social participation. It also reflects

Zaragoza's city council is formally committed to several climate and sustainability initiatives, including:

- *Pacto de las Alcaldías por el Clima y la Energía* - joining this European initiative to align local policies with EU climate goals.
- Community *#PorElClima* membership - a national initiative uniting local authorities and organizations in climate action aligned with the Paris Agreement.
- A sequence of municipal declarations and agreements recognizing climate change urgency (e.g., *Declaración Institucional frente al Cambio Climático in 2019*), as well as joining urban sustainability pacts and urban food system commitments.

In April 2022, Zaragoza was selected by the European Commission as one of the '100 Climate Neutral and Smart Cities', a recognition that opens the door to new European collaborations and support to reach the goal climate neutrality by 2030. The municipal government also has a dedicated Office for Environment, Climate Action and Public Health to coordinate policy implementation and interdepartmental governance. The city submitted its Climate City Contract in 2023, *Original CCC hereafter*, and in 2025 developed the First Iteration to its Climate City Contract (CCC), *CCC- First Iteration hereafter*, which incorporate learnings and new approaches to speed up the climate neutral journey.

Economic Activity and Key Indicators

Regional GDP per capita: The autonomous community of Aragon, which includes Zaragoza, had an estimated GDP per capita of €36,7K in 2024, placing it above the Spanish national average (Approx. € 32,6K) and among the higher-income regions of Spain.

Number of Businesses & Business Density: according to the latest municipal economic indicators from the Ayuntamiento de Zaragoza, there were approximately 42,897 registered businesses in Zaragoza's municipality in 2025. To approximate businesses per 1,000 residents: with a ~693,000 population in 2025, this is about 62 businesses per 1,000 people. (This excludes non-market public bodies not covered in the business register and focuses on active enterprises per INE data.)

Types of Businesses / Key Industries: Zaragoza's economic landscape is diversified, with several strong industrial and service sectors reflecting both historical specialization and modern development:

- **Manufacturing and industry:** Particularly automotive (e.g., Opel plant and component supply chains) and related manufacturing sectors (machinery, appliances, textiles, paper & packaging).
- **Logistics and transport:** The city's hub position in northeast Spain makes it a major logistics node, anchored by the Plataforma Logística de Zaragoza (PLAZA) and extensive road/rail connectivity.

[15] https://www.zaragoza.es/contenidos/medioambiente/ecaz/ECAZ30_WEB03102019.pdf

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- **Services:** Includes professional/business services, retail, tourism and hospitality, education, finance, and ICT (information and communications).
- **Agriculture and agro-industry:** While agricultural businesses are a small share within the city, the surrounding province has a significant agro-industrial economy (e.g., cereal, viticulture, food processing).

Employment Distribution by Sector:

The employment structure in Zaragoza municipality, according with from municipal statistics, indicates the following approximate distribution among its major sectors:

- **Services:** concentrates 82.2 % of employment, the dominant employer in the city.
- **Industry:** gathers 12.2 %, significantly higher relative to many other major Spanish cities, reflecting strong manufacturing presence.
- **Construction:** represents 4.8 %, roughly similar to other large Spanish cities.
- **Agriculture:** Very small share within the city core, with **0.54 % of establishments** dedicated to it, consistent with urban economies where agriculture is primarily rural/provincial rather than metropolitan.

Climate Neutrality Mission and Climate City Contracts Objectives

Zaragoza has recently submitted the first iteration of their CCC, which review and further develop the city commitments towards climate neutrality. The main defined objective is to achieve an **80% reduction in emissions by 2030** (compared to the maintenance of the current circumstances or business-as-usual case), reinforcing the goal set in the Original CCC, leveraged on the decarbonisation potential of key sectors of activity. This will lead to a systemic transformation of the city.

According to the Zaragoza GHG inventory by sector, the main contributors are the following sectors: buildings (26.1%), transport (28.5%), industry (36.7%), and institutional and services (3.4%).

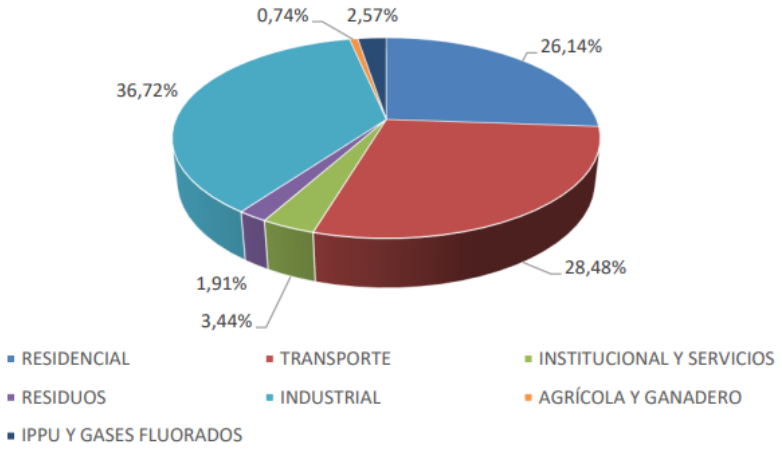


Figure 15 - Distribution of gross greenhouse gas (GHG) emissions by sector in 2023.

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Source: Zaragoza Emissions' Inventory, year 2023.[16]

Accordingly, in the city original CCC the four sectors having the greatest decarbonisation potential are identified as follows:

1. Transport
2. Buildings and heating
3. Electricity generation
4. Waste

As per the *CCC - First Iteration*, it is estimated that these four sectors can jointly achieve the **80% reduction of total emissions.** According to the economic case developed for the city in the framework of this Agreement, the actions planned in the city, aimed mainly at these four sectors, would **mean a reduction of 1,474,000 tons of carbon dioxide emissions until 2030**[17].

The analysis of strategic priorities led to the definition of three main pillars - as per the Zaragoza Original CCC - which represented the city's strategic priorities for emissions reduction: (1) sustainable and smart mobility; (2) re-naturalisation and the circular economy; and (3) energy efficiency and renewable energy. Building on this, the CCC -First Iteration, October 2025, refine these priorities and expand them into five key pillars, as follows:

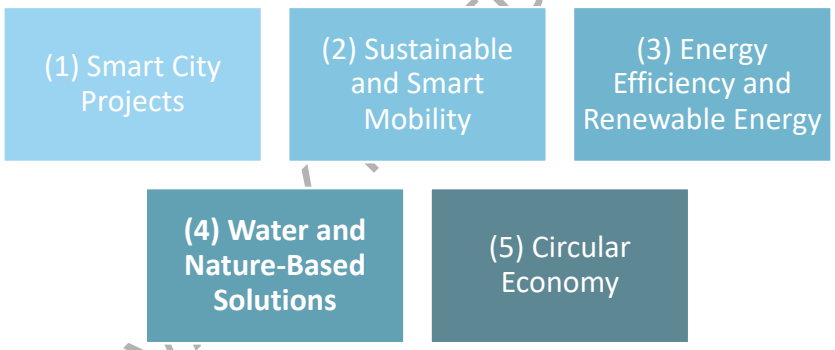


Figure 16 - Zaragoza five key pillars to emission reductions. CCC-First Iteration. Oct 2025.

The Zaragoza Action Plan reflects these priorities, and specific measures are indicated, such as transport electrification, energy efficiency in buildings and heating decarbonisation, shift to renewable electricity generation. Mitigation measures are combined with other re-naturalisation and circular economy strategies to achieve the city emissions targets.

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[16] Zaragoza Emissions Inventory, 2026.
[17] "These total emissions are calculated based on the aggregation of expected reductions through a series of levers for action." Zaragoza CCC First Iteration. October, 2025.

Some of the initiatives summarised in the **CCC First Iteration** that address the five defined pillars are as follows:

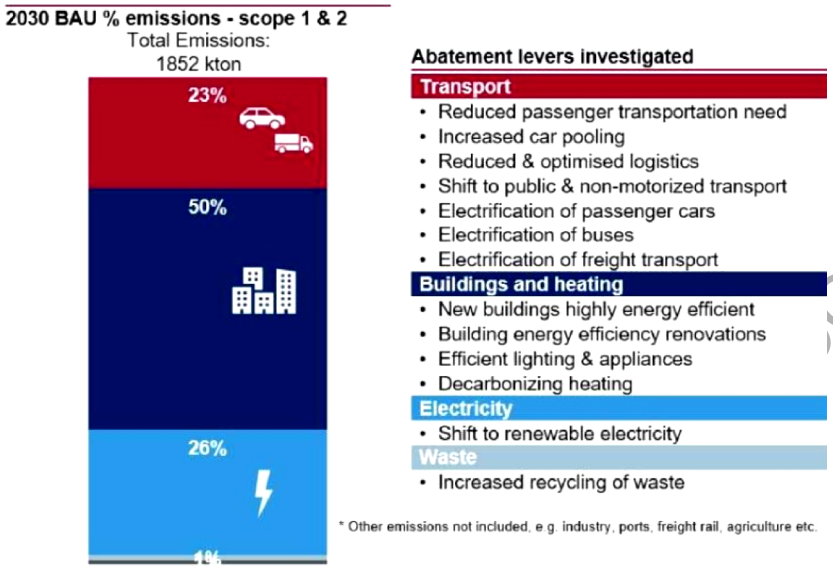


Figure 17 - The Action Plan subsectors target 99 per cent of total Scope 1 and 2 emissions.(Source Zaragoza CCC - First Iteration)

Pillar	**Key Actions & Measures**	**Impacts / Outcomes**
1. Smart City Projects	• EU-funded innovation projects (NEUTRALPATH, INCUBE, CHRONICLE) • Development of energy-positive districts and smart neighbourhoods • Multi-stakeholder governance (public, private, citizens)	• Improved efficiency and data-driven urban management • Enhanced sustainability and innovation capacity • Stronger collaboration for climate neutrality
2. Sustainable & Smart Mobility	• Electrification of public transport (buses, taxis) • Charging infrastructure (depots + public points) • Financial incentives for zero-emission taxis • Optimisation of urban logistics	• ~274,000 tCO_2/year reduction • Better air quality and lower noise • Increased walking and cycling • Reduced travel demand (proximity, teleworking)
3. Energy Efficiency & Renewable Energy	• Retrofitting 25,000 homes • Replacement of fossil-fuel heating systems • Renewable energy communities and solar installations • Industrial energy communities (MercaEnergy) • "Balsas Positivo" project • Energy-positive districts	• ~780,000 tCO_2/year reduction (largest impact) • Reduced energy consumption • Lower energy poverty • Improved housing quality
4. Water & Nature-Based Solutions	• El Bosque de los Zaragozanos (1,000 ha, 700,000 trees) • Huerva River restoration • Green infrastructure strategy	• Carbon sequestration • Increased biodiversity • Improved public health • Reduced flood risks • Enhanced climate resilience
5. Circular Economy	• Circular Biochar project (industrial-scale biorefinery) • Treatment of ~1/3 of organic waste • Reuse of organic waste (e.g., compost/biomass)	• ~700 jobs created • Waste-to-resource systems • Increased circularity • Synergies with nature-based solutions

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With an **initial investment estimated at 3,925 million euros between 2020 and 2030** (corresponding to 6,887 euros per capita), benefits of 6,223 million euros are projected between 2020 and 2050. Specifically, the economic case analysed shows a return on investment (ROI) of 59%.

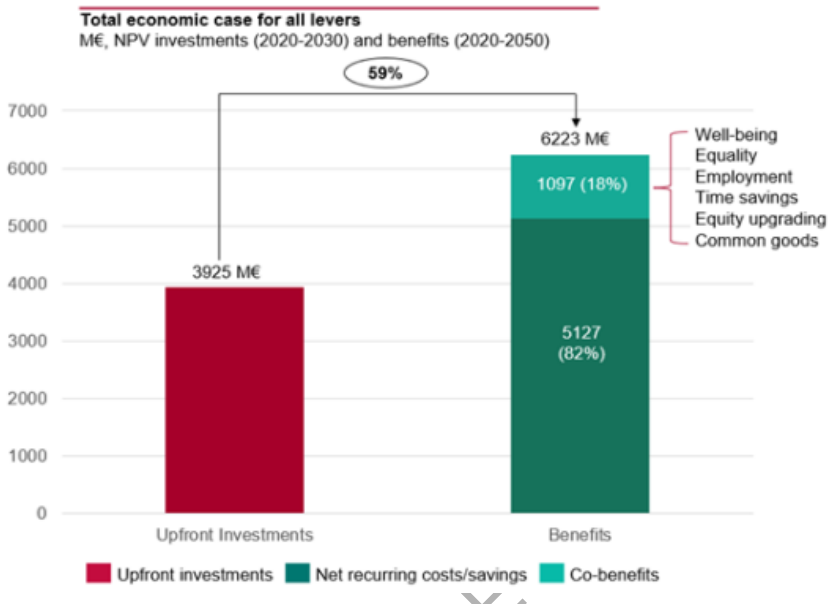


Figure 18 - Conclusions of the economic case for the city of Zaragoza (Source: Zaragoza CCC: First Iteration).

According to the Investment Plan, presented as part of the Original CCC, the following actions are presented to attract companies to create jobs and attract investments towards the climate initiatives and aligned with the city climate commitments of systemic transformation towards net zero:

- **Economic Output and Investment:** The city has a "Fiscal Plan for Investment Attraction," which has facilitated nearly **€1 billion in private investment** in the medium term.
- **Employment:** New investments from groups like Saltoki, Becton Dickinson, and Quirón are expected to create more than **2,500 direct jobs**.

Major business and industrial sectors of the city, including **automotive** (e.g., Stellantis, Dana Automoción), **logistics** (e.g., Zaragoza Logistics Center, Carreras), and **agri-food** are larger contributors to these figures.

MEL framework and indicators (from CCC Action Plan and Investment Plan)

The MEL framework defined in the Zaragoza's Climate City Contracts is established as a dynamic and iterative process designed to review and adjust commitments, actions, and investments needed to reach climate neutrality. It will be mainly based on measurable and verifiable climate action planning based on Zaragoza's baseline inventory of greenhouse gas emissions. Data is treated as something public and open to all citizens, focusing on being structured and shared across.

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In the CAP, the Comprehensive Indicator Sets developed by NetZeroCities[18] is used to develop the MEL framework for the Original CCC. These are categorized by outcomes and impacts across the pre-defined city's *three* priority pillars, as per the Original CCC definition: Sustainable Mobility, Energy/Efficiency, and Re-naturalization/Circular Economy. In the MEL framework specific target values are set for 2025, 2027, and 2030 for diverse metrics, such as the percentage of bus fleet electrification (100% by 2030) and the annual building renovation rate (4% target). Beyond direct GHG reductions, the MEL process tracks indirect positive impacts resulting from the climate action, called co-benefits).

The CCC First Iteration includes additional indicators on co-benefits in the MEL framework, accounting for the improved air quality, public health, social inclusion, innovation, and job creation in the city. Identifying and evaluating them properly is key to gaining political and social support for climate neutrality, as they demonstrate that this transition not only protects the environment but also improves quality of life.

Additionally, in the CCC-First Iteration, co-risks are also included, monitoring possible negative effects on the initiatives, such as job losses or increased cost of living, to ensure a fair and sustainable transition.**Fourteen impact pathways of the city come from the Economic Model**, which has been elaborated with the support of the Spanish National Platform, CitiES2030.

In the CCC - First Iteration, indicators metadata were included, accounting for the evolution on indicators that inform the impact pathways defined. Data on daily temperature (Average daily maximum temperature (TXX), air quality indicators - such as PM10 concentration levels, NO2 concentration levels, PM2.5 concentration levels; data on noise pollution such as *Percentage of population exposed to day-afternoon-night noise levels (Lden)* 55 dB; on city infrastructure such as *Green Spaces*; on transport and energy consumption. This enrich the city robust and comprehensive MEL framework.

The Investment Plan attached to the Original CCC, relies on the framework of Economic Model for Cities' Decarbonisation (EMCD), used by cities joined to the Spanish Mission Platform, citiES2030. The model uses a life-cycle approach to assess the economic viability of different decarbonization strategies, taking into account upfront cost and also recurring costs and benefits of each option over its lifetime. Decarbonisation costs, such as cost of renewable energy deployment, the cost of energy efficiency measures and the cost of changes in transport systems, are also integrated.

Aligned with the actions defined in the CCCs, Zaragoza defined financial indicators to account for the costs (CAPEX, OPEX), co-benefits NPV, Return on Investment (ROI), to estimate total investment per kton CO2e reduction NPV.

Complementary to the financial estimates, the city defined a framework for policies to enable capital deployment. This is a comprehensive approach to address financial markets decisions, and create favourable conditions to develop funding mechanisms to implement the initiatives defined in the CCCs.

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[18] The Indicator Framework, methodology defined by NetZeroCities, describes a set of indicators for monitoring the impact of Climate City Contracts (CCC) in terms of: 1) Required Indicators: Direct Benefits - Impact on GHG emissions. and 2) Recommended Indicators: Co Benefits/ Co Risks - Indirect impact. NetZeroCities Comprehensive Indicator Framework.

2.5.2.2 City MEL processes and application

The following sections are based on information from the original and first-iteration versions of the Zaragoza Climate City Contract, as well as an interview conducted with key representatives of the City of Zaragoza who have played an important role in defining, implementing, and monitoring the city's climate commitments and projects. The interview included representatives from the following institutions:

- City Council Environment Office, which co-leads the Climate Neutral Mission within the municipality alongside the Directorate-General for Funds, building on many years of work in environmental planning. It oversees key initiatives linked to the Covenant of Mayors, including emissions inventories, mitigation and adaptation plans, and energy poverty strategies, as well as the development and monitoring of indicators for municipal environmental strategies.
- The European Funds Office of the Zaragoza Municipality, with a role of coordinating the Climate Neutral Mission from an organizational perspective, ensuring that projects across all municipal departments contribute to the city's climate commitments. The technical aspects of the Climate City Contract are led by the Environmental Office, in collaboration with the Circe Foundation.
- Circular Economy Group at Circe, a technology centre, that has been collaborating with the city council for many years on various initiatives and supported the city with technical assistance on the Climate City Contract development.

Processes/Collaboration in design and operationalisation of MEL

The participatory process used to define the indicators for Zaragoza's Climate Contract is rooted in a long-standing tradition of inclusive planning and stakeholder engagement within the city. Rather than being developed from scratch, the indicators build on a solid foundation of previous strategies and plans-such as the Green Infrastructure Plan, the Air Quality, Climate Change and Health Strategy, and the Climate Adaptation Plan (approved in 2023)-all of which were developed through comprehensive participatory processes. These earlier initiatives had already established clear objectives, impacts, and associated indicator systems, which provided the basis for the current framework.

The defined structural participatory processes, aims to involve citizens in decision-making and in the implementation of public policies, in order to achieve a fairer and more sustainable city. In the field of citizen participation, Zaragoza has promoted the creation of various mechanisms for consultation and dialogue with citizens, through the creation of sectoral councils and the holding of popular consultations.

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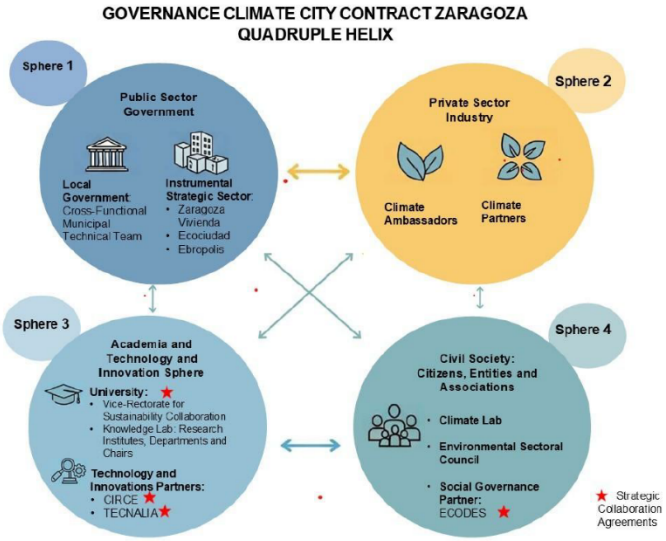


Figure 19 - Governance Climate City Contract Zaragoza. Quadruple Helix Approach. (Source: Zaragoza CCC - First Iteration - Annex. Part C).

With Zaragoza's participation in the Cities Mission, this existing foundation was further developed and systematized through an evolving governance model based on the quadruple helix approach. This model brings together public administration, academia, the private sector, and civil society, aiming to structure participation in a more integrated and consistent way. While stakeholder engagement had already been present in earlier processes, the current approach seeks to formalize and strengthen these interactions. Traditional participatory bodies, such as the City Environmental Sectoral Council, continue to play a role, but are now complemented by more systemic approaches, including the introduction of innovation labs and new communication strategies tailored to different audiences.

A key element in the definition of indicators has been the active involvement of all municipal departments. Indicators were co-developed through internal collaboration across the different areas of the city council, ensuring alignment with existing projects, policy priorities, and operational realities. This process was closely linked to the city's strategic priorities within the Climate Mission, which are structured around ***five main pillars***[19]. For each of these pillars, specific indicators were identified to measure progress. For example, in the area of mobility, indicators include reductions in motorized transport and the electrification of public buses. This collaborative approach ensures that indicators are both relevant and feasible, reflecting the practical implementation of ongoing initiatives.

"…within each of these pillars, the areas were defined-that is, by involving all departments of the city government and, of course, taking into account all the projects that were already underway…"

The participatory process also extends beyond the initial definition of indicators into their ongoing monitoring and evaluation. Regular coordination meetings - held annually or biennially - bring together

[19] See in Section 1:
Climate Neutrality Mission and Climate **City Contracts Objectives** .

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the relevant municipal departments to review progress, assess the implementation of projects, and address any delays or budgetary constraints. This iterative process allows the indicator framework to be continuously refined and adapted to changing circumstances.

Finally, many of the indicators included in the Climate Contract are derived from pre-existing systems, particularly those developed under earlier strategies such as the Air Quality, Climate Change and Health framework. These indicators have been incorporated into the Climate Mission and adjusted to reflect current needs and conditions. As a result, the participatory process can be understood as both direct and indirect: while new forms of collaboration and governance have been introduced, a significant portion of the indicator framework is the outcome of previous participatory efforts.

Measurement and Monitoring

Zaragoza's monitoring approach is built around **a yearly or biennial review process**, through which the city periodically assesses progress across its climate commitments. To support economic decision-making, the city has employed the **Economic Model City's Decarbonization (EMCD)** to evaluate the life-cycle costs and economic viability of decarbonization strategies, ensuring that monitoring is linked not only to environmental outcomes but also to financial feasibility.

The indicator set originated largely from prior municipal strategic plans, which already incorporated monitoring frameworks. These were compiled and adapted to fit the **Climate City Contract (CCC) framework**, with the European Conservation Agriculture Federation (ECAF) serving as a primary methodological reference. The city has currently finished its first iteration phase, updating indicators to better reflect its current state and policy priorities.

Beyond sectoral indicators, Zaragoza has also started to track **co-benefit indicators**, which capture broader impacts such as energy poverty and urban greening. However, city officials noted that social indicators pose particular challenges: they require robust definitions, sound methodologies, and reliable data sources before they can be systematically monitored. By contrast, more technical indicators - such as per capita emissions or public transport usage - are comparatively straightforward to obtain, as they rely on well-established data collection processes.

Data Governance Practices

Zaragoza operates under an **Open Government Platform** guided by "Data Government" principles, treating data as a **public good**. Data is structured, interoperable, and geo-referenced, enabling integration across different municipal systems and indicators. All compiled data is publicly accessible through the municipal platform, allowing citizens, researchers, and civil society organizations to consult it freely. One recognized limitation in current governance practices concerns **social indicators**, where data protection regulations and methodological gaps restrict availability and comparability - a challenge the city is actively working to address in its ongoing indicator revision process.

Additionally, **universities and research institutions** make active use of the city's open data, contributing to its broader analytical value. This has resulted in collaborative outputs such as emissions inventory maps published on the municipal website, which link emissions data to other urban indicators like the percentage of green areas.

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Recently, data governance is being primarily worked out through the **IPPCP (Intelligent Private-Public neutral Carbon Platform)**[20] project, a European initiative running until August 2026. Its core objective is to establish a **public-private partnership for climate data governance**, with a focus on systematizing industrial emissions recording, projecting to expand it to other sectors soon. The platform is designed to allow companies to input their emissions data directly, streamlining reporting processes while simultaneously satisfying the requirements of multiple frameworks such as the Cities Mission, the Covenant of Mayors, and the CDP (Carbon Disclosure Project)[21].

Ownership and privacy rights are explicitly considered within this framework, particularly as industrial actors are invited to contribute proprietary emissions data. The city is therefore navigating a tension inherent to open data principles: maximizing transparency and interoperability while respecting the data privacy and property rights of participating companies. Data dissemination is built into the platform's design, balanced against the protection of data privacy and intellectual property rights.

"…to improve this entire process-both from a technical standpoint and in terms of transparency, visibility, and awareness-and, above all, to foster participation and co-creation from the outset with the industrial sector and all the various stakeholders and actors involved…"

Indicators and Metrics

Zaragoza has established a comprehensive indicator framework with defined targets at three-time horizons: **2025, 2027, and 2030**. These indicators span multiple sectors and are embedded within the Climate City Contract (CCC) framework, which was developed iteratively with the support of the **Spanish National Platform citiES2030**. The emissions inventory, a core component of the monitoring system, is revised and updated annually, while other indicators - such as air quality data collected through local monitoring stations - are updated on a more frequent but non-continuous basis.

Concrete quantitative targets illustrate the commitment to decarbonization: the city aims to **electrify 100% of its public bus fleet by 2030**, achieve a **4% annual building renovation rate**, and source **85% of its electricity from renewable energy**. These targets translate high-level climate commitments into measurable, sector-specific milestones.

The CCC iteration process has allowed Zaragoza to refine and update these indicators to better reflect its current priorities and operational capacity. Notably, the incorporation of **energy poverty** as a tracked indicator represents a recent advancement, enabled by the development of a dedicated strategic plan on the issue - though officials acknowledged it is still too early to assess the full monitoring challenges it will present.

Co-benefit indicators were also formally incorporated during the CCC iteration process and cover a range of **environmental, economic, and social dimensions**, including air quality, health outcomes, job creation, and financial returns.

The availability of co-benefit data, however, has been uneven. Some indicators were relatively straightforward to obtain because they aligned with existing workstreams - air quality indicators, particularly ozone measurements, are a clear example, supported by local monitoring stations. Others, such as **temperature-related indicators**, proved more elusive and required methodological

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[20] https://www.zaragoza.es/sede/portal/ippcp/en/
[21] Carbon Disclosure Project.

adaptation to use available proxies in a representative way; these also demand constant surveillance given their variability.

A third category of co-benefit indicators could not be sourced at all in their intended form and had to be substituted or dropped. The **average income indicator** is a notable case: the Spanish National Institute of Statistics (INE) does not disaggregate income data at the level of granularity needed for medium-sized cities, leaving a gap that has yet to be resolved.

"…Data is key to decision-making. That is why we must prioritize obtaining high-quality data and providing it to the administration…"

Looking ahead, city officials pointed to promising developments at the national and European level that could strengthen co-benefit monitoring capacity. Initiatives such as the **Copernicus** European satellite project and the Spanish Ministry's **Respire** project - which measures greenhouse gas and methane emissions - may eventually offer access to more granular local data, though officials remained cautious about the timeline for their applicability at the city level.

Balance of Quantitative and Qualitative Indicators

City officials openly acknowledged that the indicator of the **CAP** framework is **skewed toward quantitative data and in the IP framework, there are not qualitative indicators considered**. This is described this as a difficult but deliberate trade-off. Quantitative indicators are generally easier to obtain, more standardized, and frequently mandatory under regulatory frameworks. The building retrofit sector illustrates this dynamic well: energy efficiency certificates are legally required in all renovation projects, making energy performance straightforward to track, whereas quality-of-life certifications are not mandated and would impose disproportionate administrative burdens with no regulatory obligation.

Qualitative indicators, by contrast, typically rely on **surveys**, which must be repeated periodically and carry significant economic costs. This makes systematic inclusion difficult, particularly within resource-constrained municipal contexts.

The challenge is also sector dependent. Measuring the impact of **decarbonization activities** - which produce direct, traceable emissions reductions - lends itself naturally to quantitative assessment. However, activities such as **urban re-naturalization** generate impacts that are more experiential and wellness-oriented, making them inherently harder to quantify. Officials noted that such impacts are subjective and not easily traceable through conventional metrics.

One pathway being explored to partially bridge this gap is the use of **health indicators** - for instance, data on physical and mental health outcomes - which can serve as indirect proxies for quality of life and help capture dimensions that purely technical indicators miss.

Use/Application of MEL Processes

Zaragoza's MEL system serves a dual temporal purpose: in the **short term**, it enables the city to monitor the implementation of projects and course-correct when actions deviate from intended outcomes; in the **long term**, it helps determine which initiatives merit continued investment and institutional support. Officials emphasized that indicators are not merely reporting instruments - they actively **encourage public policies to stay on track** with their overall climate objectives.

Monitoring findings directly feed into the revision and adjustment of actions and investments. This creates a **feedback loop between evidence and planning**: if pre-defined indicators tied to the city's five strategic pillars were not demonstrating progress on emissions reduction, the city would be compelled to recalibrate its approach and redirect resources accordingly. As officials noted, the

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current focus on energy efficiency, self-consumption, building retrofitting, sustainable mobility, electrification of public transport, and digital transformation reflects precisely the kind of data-informed prioritization that the MEL system is designed to support.

Decision-making authority over priorities rests with the **mayor's office,** alongside continuing projects led primarily by the urbanism department. These priorities are further shaped by the **annual budget cycle**, which officials highlighted as a concrete expression of political commitment to climate neutrality - a signal that MEL outputs have genuine institutional weight rather than being treated as a compliance exercise.

"…Of course, Zaragoza's commitment-as reflected in the city council's budget-is focused on supporting all these pillars that were already outlined in both the climate contract and the iteration. These are the areas that have the greatest impact on decarbonization. And then, of course, there's the added focus on a just transition…"

The hierarchy of indicators used for decision-making follows a clear logic: **emissions reduction indicators** are considered the most fundamental, as they directly reveal whether the city is achieving its core climate objective, across which sectors, and at what pace. These are then complemented by **economic indicators**, which help operationalize decisions about where and how to act. Finally, **cross-sectoral indicators** - such as those related to energy poverty or air quality - add a layer of contextual intelligence, capturing indirect and spillover effects of climate actions across multiple domains.

Accessibility and Use of Data Sources (Including Addressing Gaps)

A key conceptual distinction raised by city officials concerns the difference between **emissions** and **immissions** - the former referring to pollutants released at source, and the latter to the concentration of pollutants present in the ambient environment. Officials stressed the importance of monitoring both separately, as conflating them can lead to misleading interpretations of progress and misguided policy responses.

Data accessibility varies considerably across indicator types. Technical and sectoral indicators - such as per capita emissions or public transport usage - are generally well-established and obtainable, even if they require analytical processing. More socially oriented indicators, including those related to energy poverty or quality of life, present greater challenges due to data availability constraints, methodological complexity, and, in some cases, data protection restrictions.

Particularly in the context of **building retrofitting**, MEL data has been identified as especially valuable. Given the intersection between building energy performance and energy poverty, monitoring indicators in this sector can simultaneously track decarbonization progress and flag social vulnerability - enabling more targeted and equitable resource allocation. Prior to the CCC framework, all relevant actions were financed through external sources; the institutionalization of MEL has supported the transition toward internally budgeted, strategically prioritized investment.

Use of Real-Time Monitoring and Digital Tools

Zaragoza has invested in advanced digital tools to enhance the precision and scope of its monitoring capabilities. The city uses **high-precision satellite technology and multispectral imagery** to monitor carbon sequestration in urban forests and identify **urban heat island** phenomena - applications that go beyond conventional emissions tracking and extend MEL into the domain of nature-based solutions and climate adaptation.

For more conventional indicators, local air quality monitoring stations provide regular data updates, offering a degree of near-continuous surveillance for atmospheric indicators such as ozone levels.

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However, officials noted that this does not constitute fully **continuous monitoring** across the board, and many indicators remain dependent on periodic data collection rather than real-time feeds.

Learning and Adaptation

Processes for Revising Indicators and MEL Frameworks Based on Feedback

Zaragoza's approach to learning and adaptation is anchored in the conception of its Action Plan as a **"living document"** - one that is subject to regular revision in response to socio-economic evolution, new evidence, and shifting policy contexts. This framing institutionalizes adaptability as a core feature of the MEL system rather than treating it as an exceptional response to failure.

The revision of indicators is an ongoing process. The city has currently finished the first iteration **of the CCC**, through which indicators are being updated to better reflect the city's current operational state and emerging priorities. This iterative cycle ensures that the monitoring framework does not become static or misaligned with the realities it is meant to track. Officials confirmed that if indicators tied to the city's strategic pillars were not demonstrating meaningful progress on emissions reduction, the city would be compelled to recalibrate its direction - underscoring the direct link between monitoring outputs and planning adjustments.

Citizen and civil society feedback is formally channeled into municipal planning through the **Environment Sector Council**, which acts as a consultative body connecting associative and community perspectives with decision-making processes. This mechanism provides an institutionalized pathway for qualitative, bottom-up input to complement the quantitative data streams that dominate the MEL framework.

Incorporation of New Evidence into Existing Systems

A recurring theme in Zaragoza's learning process is the challenge of **data granularity and source diversity**, which shapes how new evidence can be meaningfully incorporated into the MEL system. Data sources vary significantly by indicator type: some are locally generated - such as water consumption figures or public transport usage - while others, such as air quality measurements, are produced by the city's own monitoring stations. However, a third and more problematic category encompasses indicators that require data from **regional or national sources**, such as energy poverty-related metrics, where the city has limited direct control over data collection and faces challenges of extrapolation and comparability.

A particularly illustrative case is **building retrofitting in privately owned properties**. While data on public buildings is managed by *Zaragoza Vivienda* - which systematically compiles emissions reductions, energy efficiency measures, and renovation records - data on private buildings remains difficult to access. A similar gap exists for **heating system decarbonization**, where the city must often rely on regional or national aggregates rather than local measurements, reducing the precision and policy relevance of the resulting indicators.

Data protection constraints add a further layer of complexity. In some cases, such as electricity consumption, the city cannot disaggregate data to identify what share stems from energy efficiency improvements. As a result, officials must **estimate and self-adjust certain data measures** - a practice that, while pragmatic, introduces uncertainty. Officials were clear that the fundamental challenge is not access per se, but rather **granularity and detail**: certain data, such as energy data, is simply not calculated at the local level through official channels, creating structural gaps that require methodological workarounds.

In response to these limitations, the city's stated direction is toward **higher quality and more granular data infrastructure**. Officials explicitly positioned better data as the foundation for adaptive governance, arguing that data quality is key to both adaptation and sound decision-making.

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Outcomes and Impact

Examples of How MEL Data Has Influenced Policy or Resource Allocation

As outlined in previous sections, Zaragoza's MEL framework has played a meaningful role in shaping the city's climate governance, even in the absence of a formally established impact evaluation system. The clearest evidence of MEL data influencing decision-making lies in the **institutionalization of climate priorities within the annual municipal budget** - a shift that officials themselves identified as a strong signal of political commitment. The city's current focus areas, including energy efficiency, self-consumption, building retrofitting, sustainable mobility, electrification of public transport, and digital transformation, reflect a data-informed consolidation of priorities around the pillars demonstrating the greatest potential for emissions reduction.

The MEL framework has also enabled **course correction in the short term**, allowing the city to identify when projects are not advancing as expected and redirect efforts accordingly. In the longer term, it supports decisions about which initiatives warrant sustained institutional and financial support.

Success Stories and Challenges

One notable area of progress is the incorporation of previously difficult indicators into the monitoring framework. The inclusion of **energy poverty** as a tracked indicator, enabled by the development of a dedicated municipal strategic plan, represents a meaningful step toward more socially comprehensive MEL. Similarly, the use of **satellite technology and multispectral imagery** to monitor carbon sequestration and urban heat islands reflects an expanding technical ambition in how the city measures its environmental impact.

However, Zaragoza's officials were candid about the limitations of the current system. Most significantly, there is **no formally established process for systematically evaluating the impact of MEL outputs** on policy or climate outcomes. While data informs decisions in practice, this connection remains largely implicit rather than institutionalized through a dedicated evaluation mechanism. Officials acknowledged this gap and left open the possibility of developing such a system in the future - suggesting awareness that closing this loop is a necessary step toward a more mature MEL architecture.

A further challenge lies in **communicating MEL findings effectively** to diverse audiences. The city is currently working through the **CESF (City Expert Support Facility) of NetZeroCities** to improve the dissemination of compiled data and render it meaningful through new narratives tailored to different age and social groups. This effort is being developed in collaboration with the municipal area of transparency and open data, reflecting a broader ambition to transform technical monitoring outputs into publicly accessible, civically relevant information. While this work is ongoing, it underscores a recognized gap between data production and public engagement that the city is actively seeking to address.

2.5.2.3 Conclusion and Lessons Learned

Summary of key insights from the city's MEL practices.

Zaragoza's MEL experience offers a revealing portrait of a mid-sized city navigating the practical complexities of building a robust monitoring, evaluation, and learning system within a real-world institutional and resource context. Several cross-cutting insights emerge from the analysis of its practices.

Zaragoza's most fundamental characteristic of its MEL approach is its **commitment to iteration**. The CCC is treated as a living document, and the city has invested significantly in a structured iteration process - supported by the Spanish National Platform citiES2030- to revise indicators, update

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frameworks, and align monitoring with its evolving policy priorities. One of the most valuable steps in this process has been conducting a **series of internal interviews across different municipal departments and areas**, which surfaced data gaps, clarified ownership of indicators, and strengthened cross-departmental coherence. This internal consultation model stands out as a replicable good practice for cities seeking to ground their MEL frameworks in institutional reality rather than external templates.

Zaragoza's participation in the broader network of EU Mission Cities has proven to be more than a technical exercise. Officials highlighted how **working jointly with peer cities on the iteration process** helped build institutional confidence - both in the validity of their approach and in their capacity to navigate uncertainty. The support of partners such as CIRCE has been similarly instrumental, reinforcing the value of combining local political ownership with external technical expertise. This points to a broader lesson: **MEL capacity is not built in isolation**, and peer learning networks play a meaningful role in sustaining momentum through complex, multi-year processes.

A recurring insight across all dimensions of Zaragoza's MEL system is the difficulty of balancing technically measurable indicators with socially meaningful ones. The framework is currently weighted toward quantitative data, not by design preference but by practical necessity - social indicators are costly to collect, methodologically demanding, and often constrained by data protection rules. While the city has made progress in areas such as energy poverty, significant gaps remain. Health indicators have been identified as a potential indirect proxy for quality-of-life outcomes, but this approach is still nascent.

Across sectors, the **core challenge** is not data access in principle, but **granularity and local specificity**. Nationally and regionally aggregated data frequently falls short of the resolution needed for meaningful local policy decisions, particularly in areas such as private building retrofitting, heating system decarbonization, and energy consumption disaggregation. The city's response - estimating and self-adjusting where necessary, while investing in new governance structures such as the IPPCP platform - reflects pragmatic adaptability, but also underscores the structural limitations that mid-sized cities face in building truly locally grounded MEL systems.

Zaragoza has recognized that producing data is not sufficient - making it meaningful to diverse audiences is an equally important challenge. The ongoing work with the NetZeroCities CESF to develop narratives adapted to different social and age groups, in collaboration with the municipal transparency and open data office, signals a maturing understanding of MEL as a **communication and civic engagement tool**, not only a technical monitoring instrument. Critically, this dissemination effort extends inward as well: ensuring that MEL findings reach and inform other municipal departments - not just climate-focused teams - is identified as a key priority for deepening the institutional impact of the system.

Finally, a straightforward acknowledgment from city officials points to an important structural gap: there is currently **no formally established process for evaluating the impact of MEL outputs** on policy decisions or climate outcomes. While data clearly influences priorities and budget allocations in practice, this influence remains implicit. The development of a more systematic impact evaluation mechanism has been identified as a future aspiration - and its absence serves as a reminder that even well-developed MEL systems require a dedicated feedback loop connecting monitoring outputs to assessable real-world change.

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Next steps and support needs: future plans and areas where external support is required.

Zaragoza's immediate priorities reflect a consolidation and deepening of the work already underway, rather than a wholesale reorientation of its climate strategy. A central commitment is the **strengthening of existing partnerships**, particularly with their core technological partner CIRCE and

their broader network of social partners. These relationships have proven foundational to the city's MEL and iteration processes, and officials emphasized the importance of maintaining their continuity and depth.

A key strategic direction is the **expansion of multi-stakeholder governance with a new governance method**, with a particular focus on meaningfully involving the private sector alongside academia and civil society. This vision goes beyond consultation - officials described it as working "hand-on-hand" with all relevant actors across both societal and technological dimensions, pointing toward a more co-productive model of climate governance in which MEL data and planning processes are shared responsibilities rather than purely municipal functions. The ongoing IPPCP project, which aims to build a public-private climate data platform, is an early expression of this direction, but officials signaled ambitions that extend well beyond a single project.

Alongside governance innovation, the city is actively progressing its **communication and dissemination strategy**, working through the NetZeroCities CESF to translate technical monitoring outputs into accessible narratives for diverse audiences. This work is seen as essential not only for civic engagement but also for ensuring that MEL findings penetrate across municipal departments and contribute to a shared institutional understanding of climate progress.

Areas Where External Support Is Required

Officials were unequivocal about the centrality of **finance** as both an enabling condition and a political signal. Without dedicated budget, climate commitments risk remaining on paper - the iteration process and strategic plans cannot be operationalized in the absence of real resource allocation. This is not merely a technical constraint; it is also a governance one, as budgetary commitment reflects and sustains political will. Securing stable and sufficient financing is therefore identified as a prerequisite for translating MEL insights into durable action.

The Role of the National Platform and NetZeroCities

Zaragoza expressed a clear view on where external support could be most impactful: the **Spanish National Platform citiES2030**, and by extension NetZeroCities, could provide significantly greater value by taking a more active role in the **financial dimension** of cities' climate transitions. Specifically, officials envisioned the National Platform acting as a **nexus between cities, the national administration, and the European Commission** - helping cities identify, access, and navigate funding opportunities that are often complex, fragmented, or difficult to reach from the local level alone.

"…Without citiES2030, the seven cities that initially earned the label would have faced a much longer process, and we wouldn't have known which direction to take…"

In this framing, the Platform's most valuable contribution would not be purely technical or methodological, but rather **institutional and relational** - leveraging its position within the broader governance architecture to open financial pathways that individual mid-sized cities struggle to access independently. This perspective points to a broader insight: for cities like Zaragoza, which have developed meaningful internal MEL capacity and political commitment, the binding constraint is increasingly not knowledge or frameworks, but resources and the institutional connections needed to secure them.

Recommendations for other cities aiming for climate neutrality.

Zaragoza's experience navigating the practical complexities of climate monitoring and data governance yields a set of grounded recommendations for cities embarking on or advancing their own climate neutrality journeys.

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A foundational lesson from Zaragoza is that effective MEL begins within the municipality itself. Involving all departments - not only those with an explicit climate mandate - is essential for building a coherent and institutionally owned monitoring system. Calculating emissions across an entire city is an inherently cross-sectoral endeavor, and without internal alignment, data gaps, duplications, and misaligned priorities will undermine the process. Cities should invest early in structured internal consultation mechanisms, as Zaragoza did through its departmental interview process during the CCC iteration, to surface existing data assets, clarify ownership, and build shared understanding of the monitoring framework.

External collaboration - with the private sector, academia, and civil society - is equally critical, but officials were candid that achieving meaningful engagement is neither quick nor straightforward. Cities should approach this as an ongoing process of relationship-building rather than a one-off consultation exercise. The goal is for all actors to genuinely understand and internalize the **collective benefit of collaboration**, which requires sustained dialogue, transparency about how data will be used, and tangible returns for those who contribute.

A particularly valuable insight from Zaragoza concerns the **asymmetry between large and small companies** in their capacity to engage with climate monitoring and decarbonization. Larger firms generally already have decarbonization plans in place, making alignment and data sharing comparatively manageable. Small and medium-sized enterprises (SMEs), however, frequently lack the human and technical resources to participate meaningfully, making their adherence to city-level climate missions a disproportionate burden. Cities should design **tailored engagement pathways for SMEs**, recognizing that a uniform approach will systematically exclude a large and emissions-relevant segment of the local economy.

Zaragoza's own response to this challenge offers a practical model: the city has established **collaboration pacts with the Confederation of Entrepreneurs and with CEPYME** (the Spanish Confederation of Small and Medium Enterprises) to create a structured channel for reaching this group. The underlying logic is instructive - the municipality needs SME data to build a complete emissions picture, so the responsibility is on the city to **simplify the data provision process** as much as possible, and to return that data to companies in a processed, digestible, and useful form. This reciprocal value exchange transforms data collection from an administrative burden into a genuinely collaborative relationship.

Before companies will share their data - particularly smaller ones with limited resources and potentially greater reticence - cities **must demonstrate that their intentions are collaborative** rather than regulatory, and that participation will yield tangible benefits. **Building this trust** takes time and consistency, and cities should plan accordingly, setting realistic expectations about the pace at which broad stakeholder engagement can be achieved.

Finally, Zaragoza's experience suggests that cities should resist the temptation to wait for a perfect data environment before acting. Gaps in granularity, methodological limitations, and uneven stakeholder participation are not exceptional problems to be solved before monitoring can begin - they are permanent features of the landscape that must be managed iteratively. The city's willingness to estimate, adapt, and continuously revise its framework is not a sign of weakness but of institutional maturity. Other cities would do well to adopt a similarly pragmatic orientation, treating their MEL systems as works in progress that improve through use rather than blueprints that must be perfected before deployment.

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2.5.3 Cork

2.5.3.1 City Profile

Geographic and regional context

Cork City, Ireland's second-largest urban center, is a city defined by its relationship with water and its strategic location. Situated at the head of one of the world's largest natural harbors, its geography is historically shaped by the River Lee, which bifurcates to create a historic island center. This "island" identity, while central to its heritage, presents modern challenges for climate resilience, particularly regarding flood risk management and the constraints of medieval street patterns on modern transit.

In 2019, Cork underwent a transformative boundary expansion. This administrative shift quadrupled the city's land area to approximately 187 km2. This was not merely an expansion of borders; it was an integration of highly diverse land-use types. The city now manages a "rural-urban" mosaic: a dense urban core, sprawling post-war residential suburbs, and a newly integrated rural-urban fringe that includes critical greenbelts and agricultural land.

Population / demographics

The demographic profile of Cork is a crucial driver of its climate strategy. As of the 2022 Census, the city's population is approximately 222,000, but under the National Planning Framework, it is designated for aggressive growth, targeting 280,000 by 2030. Unlike many European cities facing stagnant growth or aging populations, Cork possesses a notable "youth bulge." This is largely sustained by its status as a premier educational hub, hosting over 35,000 students at University College Cork (UCC) and Munster Technological University (MTU).

With 62% of the population within the working-age bracket (20-64) and 23% in the youth bracket, the city benefits from a significant "innovation dividend." This young, educated workforce provides the talent pool necessary for a burgeoning green tech sector. However, this growth also exerts immense pressure on the city's infrastructure. To achieve neutrality, Cork must bypass the "lock-in" effects of traditional suburban development, ensuring that new housing for this growing population is decoupled from private car dependency and high-carbon heating systems.

Socio-economic conditions

Economically, Cork is a global powerhouse, particularly in life sciences, Information and Communication Technology (ICT), and international financial services. It is the European headquarters for Apple and a major manufacturing node for pharmaceutical giants like Pfizer and Janssen. This concentration of multinational corporations drives a high Gross Value Added (GVA) per capita, but it also creates a substantial carbon liability.

The 2018 Baseline Emissions Inventory identified total territorial emissions of 987 kt CO2 eq. A sectoral analysis reveals a stark reality:

- Stationary Energy: The heating, cooling, and powering of residential, commercial, and institutional buildings account for 49% of total emissions.

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- Road Transport: Private vehicle use and freight account for 34%.
- Industry and Waste: While significant, these are secondary to the systemic challenges of heat and mobility.

Because Cork's economy is heavily anchored in energy-intensive manufacturing and high-end services, the climate mission is fundamentally a challenge of systemic infrastructure transformation rather than marginal behavioral change.

Sector	$CO_{2,eq}$ (ktonnes)	Sector Includes:
Road Transport	289.5	Emissions from vehicles driving on road links
Household	331.6	Emissions from heating and electricity energy demand in the home
Commercial & Industrial	216.0	Emissions from commercial and industrial buildings
Public Services	64.7	Emissions from known public energy use including public gas and electricity meter points; street lighting; schools and universities; hospitals and clinics; military barracks; prison
Agriculture, LULUCF & Fisheries	62.1	Emissions from farming (based on farmland) and fisheries (based on registered ships to Port of Cork)
Waste Handling & Treatment	21.8	Emissions from treatment of waste and wastewater
Total	985.7	

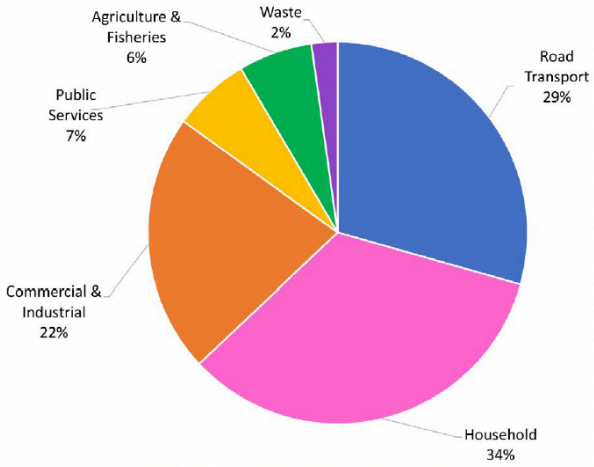


Figure 20 - Cork's main emission sources. Source: Cork Climate Action Plan, Climate City Contract (CCC), 2024.

Overview of the city's climate neutrality mission and objectives

Cork's climate neutrality mission is anchored in its commitment to the EU Mission for 100 Climate-Neutral and Smart Cities, aiming for a systemic urban transformation by 2030 through the strategic framework of its Climate City Contract (CCC). According to the Baseline Emissions Inventory (2024), the city's emissions profile is dominated by Stationary Energy (49%), primarily from residential and commercial heating, and Road Transport (34%), which together represent the most critical domains for decarbonization. To address these, the Action Plan prioritizes 130 high-impact measures, including a massive residential retrofit program to upgrade 10,000+ homes and the full implementation of the Cork Metropolitan Area Transport Strategy (CMATS) to achieve a radical modal shift.

These actions are supported by a robust Investment Plan that identifies a multi-billion euro capital requirement, necessitating a sophisticated Monitoring, Evaluation, and Learning (MEL) framework to track progress. This framework utilizes a "rolling" data approach through the Net Zero Planner to bridge the interagency data gap, employing a hierarchical set of indicators that balance absolute GHG reductions with qualitative co-benefits such as public health, air quality, and social equity. Central to this mission is a partnership ecosystem involving University College Cork (UCC), Munster Technological University (MTU), and national agencies like the SEAI and NTA, ensuring that monitoring data directly informs the mobilization of both public and private finance for a just and inclusive transition.

The city's climate strategy is organized into a portfolio of **130 high-impact measures**. Key sector-specific priorities include:

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- **Stationary Energy (Residential & Commercial):** A massive residential retrofit program targeting over **10,000 homes** to upgrade their Building Energy Rating (BER) to B2 or higher.
- **Transport:** Full implementation of the **Cork Metropolitan Area Transport Strategy (CMATS)**, which includes significant investment in the "BusConnects" program (estimated at 71% of transport action impact) and a 9% shift toward pedestrian and cycling infrastructure.
- **Energy Systems:** Transitioning to **District Heating** and increasing renewable energy penetration, largely through private sector-led solar and wind integration.
- **Governance and Community:** Establishing the "Climate Neutral Cork" leadership group and public platform to coordinate interagency data sharing and citizen co-creation.

Estimated GHG Reductions

In 2022, Cork City underscored its commitment to rapid decarbonization and peer learning by joining the EU Mission for Climate-Neutral and Smart Cities, alongside concurrent commitments to the EU Missions on Climate Adaptation and Ocean Restoration. The Cork Climate City Contract (CCC) serves as an ambitious extension of the existing Climate Action Plan (CAP), specifically targeting net-zero greenhouse gas emissions by 2030.

Cork has established a tiered reduction target relative to its **2018 baseline of 942.5 ktCO_2-eq**:

- **Core Target:** A minimum of an **80% emissions reduction** over 2018 levels by 2030 for the EU Mission.
- **National Alignment:** Achieving a **51% reduction** in line with the Irish National Climate Ambition by 2030.
- **Residual Emissions:** The remaining 20% of emissions are classified as "hard-to-decarbonize" (e.g., heritage buildings and national grid base-load) and will require carbon sequestration or natural sinks.

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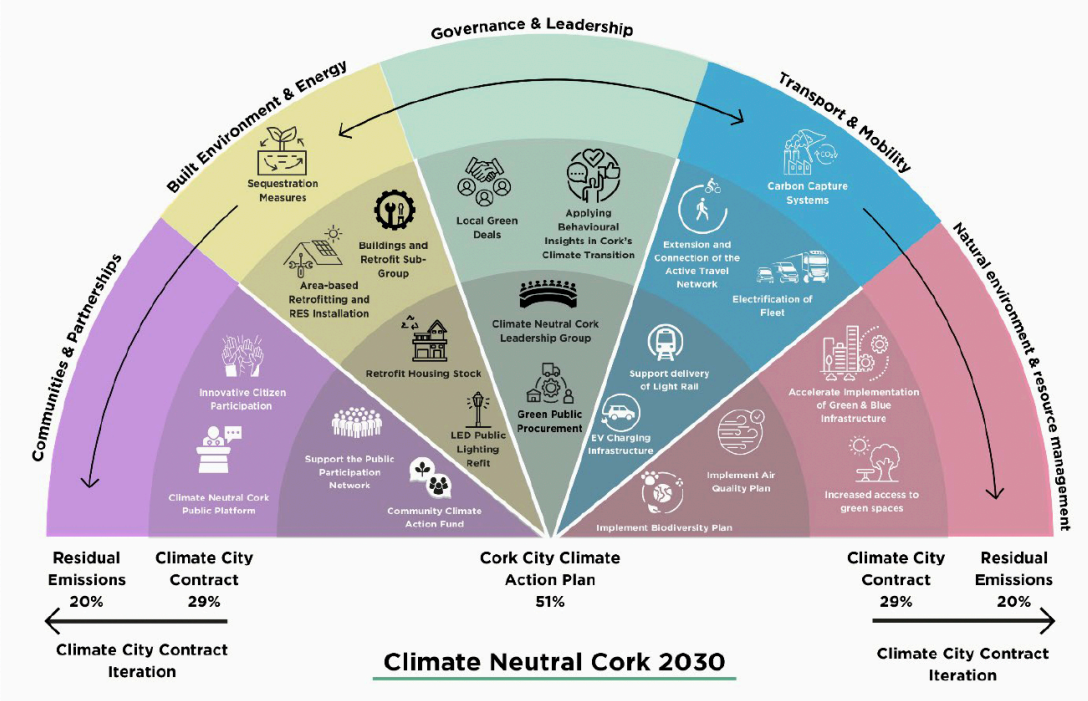


Figure 21 - Climate Neutral Cork 2030. Source: Cork Climate Action Plan, Climate City Contract (CCC), 2024.

MEL Framework & Indicators

Main indicators using NZC MEL framework:

Direct Indicators - GHG emission	Indirect Indicators
GHG from stationery energy (Domestic)	Residential emission currently sequestered.
GHG from stationery energy (commercial/Industrial/IPPU)	
GHG from transport	Negative emission through natural sinks.
GHG from waste	Improved air quality
GHG from AFLOU	Urban heat island effect
GHG from public sector	Wellbeing of citizens
GHG from supplied energy	Green spaces
	Citizen involvement in co-design/co-creation of climate action.
	Funding for social innovation initiatives for climate neutrality.
	Energy consumption per household
	Modal share of active and public transport

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Green jobs

Public capital invested in climate action projects recycling rate of municipal waste.

Brownfield use.

%of tree canopy within the city

Citizen awareness regarding sustainability and the environment.

2.5.3.2 City MEL processes and application

Processes/Collaboration in design and operationalisation of MEL

In defining Cork's impact pathways, the city leveraged existing statutory processes to ensure alignment between local and European commitments. The foundational work was conducted during the development of the 2023 Local Authority Climate Action Plan (LACAP). This statutory instrument served as the "anchor" for the Climate City Contract (CCC), ensuring that the Mission's goals were not developed in a vacuum but were integrated into the city's legal obligations.

The participatory process involved a broad spectrum of stakeholders, including the public, civil society, the business community, and internal municipal staff and elected representatives. Rather than producing granular technical metrics, this phase served as a strategic "steer," identifying the high-level priorities and measures of progress that resonated with the city's ecosystem. This collaborative approach ensured that the impact pathways reflected both the community's aspirations and the council's operational realities.

Cork has established a diverse Climate Neutral Cork Leadership Group-including universities and major institutions. Although their role in MEL is currently strategic rather than operational due to lack of budget for such activities. it is identified as a priority for future development. Despite the presence of high-level academic partners, the city has not yet formally tasked or resourced these partners to conduct specific data collection or longitudinal studies. Moving forward, the role of Leadership Group is expected to help identify and "unlock" the right sources of information for datasets that currently lack clear ownership or established methodologies.

The operational responsibility for MEL in Cork City is centralized at the coordination level while being distributed at the source level. The climate Action office acts as the primary "owner" of the reporting process-responsible for gathering, collating, and interpreting data from across the municipal departments. The process relies on "leaning into" different municipal departments, but there is no large, dedicated "Transition Team" for data; rather, it is a lean operation that coordinates across existing administrative silos.

Measurement and Monitoring

Cork has adopted a "reflexive learning process" whereby the city has structured its monitoring around "Impact Pathways," which have been adapted from the NetZeroCities Theory of Change.

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Measuring the impact of actions within the private sector remains one of the most significant hurdles for the MEL process. Cork has adopted a "Representative Group" strategy rather than engaging with individual firms; to manage administrative bandwidth, the city engages with the Cork Chamber of Commerce, the Construction Industry Federation, and the Business Association rather than individual businesses. The city relies on these groups' periodic research and advocacy data.

Ownership and Interoperability: The city's data governance is currently an exercise in "active coordination" rather than a fully automated system. The Climate Action Officer acts as the central node for collation and interpretation, but the "ownership" of the primary data flows remains with national bodies or external agencies. The intent is to move toward a system where reporting is less of a "single point in time" event and more of a continuous flow. However, the lack of mandate or standardized "playbooks" for external stakeholders to provide data systematically remains a barrier to full interoperability.

Internal Governance: Data management in Cork City is characterized by manual, labour-intensive processes rather than a centralized digital platform. While the city has various corporate and development plans with established KPIs, there is no "single source of truth" or dedicated software (like a CRM) to aggregate these data points. Reporting typically involves staff from specific departments manually tracking down information through informal internal networks. For the Local Authority Climate Action Plan (LACAP), the city uses a shared Excel-based tracking system with a RAG (Red-Amber-Green) status indicator to provide a snapshot of implementation progress.

Indicators and Metrics

While the qualitative "steer" came from local consultation, the technical selection of indicators for the CCC was driven by a pragmatic need for standardisation and feasibility. Cork City opted to utilize the NetZeroCities (NZC) monitoring framework and its indicators for three primary reasons:

- Comparability: To ensure measurements are mainstreamed and comparable with other European Mission cities.
- Guidance-Led Efficiency: To leverage established metadata and methodologies, reducing the administrative burden of creating bespoke metrics from scratch.
- Recognizing that the NZC framework contains a vast number of potential metrics, the city intentionally discriminated between indicators to avoid "measurement overwhelm."

Consequently, the city distilled the framework down to approximately 23 core indicators. This lean approach was designed to prevent the creation of unrealistic expectations regarding data collection while still covering the essential domains of the climate transition.

The current indicator set is intentionally weighted toward quantitative metrics, particularly within the major emissions domains such as domestic stationary energy and transport. This reflects the city's reliance on Baseline Emissions Inventories (BEI), which remain the primary tool for tracking progress toward the 2030 neutrality goal.

However, the city acknowledges a transition in its data maturity. Many primary indicators currently rely on statistical estimations. Efforts are underway to update the baseline year to 2023 to provide a more contemporary snapshot of the city's emissions profile.

More than half of the selected indicators focus on indirect emissions and co-benefits. For example, Air Quality is utilized as a key proxy for the success of transport and energy interventions, bridging the gap between technical climate targets and public health outcomes.

The indicators were selected with an awareness of their intended use-not just for reporting to the EU, but to provide a feedback loop for the Investment Plan. By focusing on measurable sectors, the MEL

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process aims to provide the evidence base needed to justify the significant private and public capital mobilization outlined in the CCC.

While Cork City has detailed health benefit and job creation impacts in its investment planning, it currently lacks a robust mechanism for quantifying these co-benefit impacts in monetary terms. The city intends to address this in future iterations of the CCC by developing the capacity to reliably quantify co-benefit impacts in health and related sectors. The current challenges for measuring and quantifying co-benefits are:

- Threshold Conflicts: Using air quality as an example, a "cognitive issue" exists between national reporting standards and international ideals (WHO thresholds). Reporting against stricter WHO guidelines would redefine "good" air quality as "poor," creating political and communication challenges.
- Proxy Limitations: Many co-benefit indicators, such as "citizen well-being" are viewed as "shaky" or "blunt tools." The city struggles to draw actionable conclusions from these snapshots; for instance, it is unclear if a low well-being score necessitates more climate action or simply reflects a temporary mood unrelated to policy.
- The Scale of Impact: Certain indicators like "urban heat island" effects are deemed more relevant for larger, more densely concreted metropolises like Dublin. For Cork, these metrics may not show meaningful change within the 2030 Mission window, raising questions about their utility for short-term adaptive management.

Use/Application of MEL Processes

Given Cork's huge emissions originated from just two sectors: the Built Environment and Transport, the MEL process is being recalibrated to focus markedly on these areas:

The Built Environment: Priorities are divided between the private/commercial sector and the public estate. As the second-largest social landlord in Ireland (managing ~11,000 properties), the city views social housing retrofitting as a primary, measurable lever for both emissions reduction and social impact.

Transport and Modal Share: Despite high car dependency and a public transport network currently deemed "not fit for purpose," monitoring modal shift remains a top priority. However, this is hampered by a lack of direct observation sensors, forcing a reliance on "downscaled" national data.

The City Council acts as the central node for collation, but ownership of primary data flows remains with national bodies such as the Environmental Protection Agency (EPA) and the Sustainable Energy Authority of Ireland (SEAI). The city uses EPA emissions projections (compiled annually) as a key source for energy systems, industry, waste, and agriculture projections.

"you can't manage what you can't measure." Says Cork's Climate Action Coordinator, Peter Medway. He identifies the lack of mandatory, empirical impact reporting as a "massive gap" that currently leaves Local Authorities without the funded capacity to gather and assess the true consequences of their actions.

Outcomes and Impact

While the city has established a rigorous structure, it has noted that at the current stage of implementation, it is "too early to measure material impact on the city's emissions". However, the data gathered-such as the Baseline Emissions Inventory (BEI) has already served as the "anchor" for the Climate City Contract, ensuring that the Mission's goals are integrated into the city's legal obligations

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rather than being developed in a vacuum. Furthermore, the climate crisis has already begun to influence changes in the public spending code, with the city awaiting national Green Public Procurement policy to further shape resource allocation.

Challenges and opportunities

Cork City's MEL process faces significant hurdles in tracking climate progress. A fundamental challenge is the "2% vs. 98% gap": the City Council directly controls only 2% of local emissions, leaving them heavily dependent on external stakeholders-from national agencies to private firms-to track the remaining 98%.

Data management is further complicated by three primary issues:

- Funding Mismatches: While cities can often secure capital for sensor hardware, they struggle to fund the recurrent operational costs (data cleaning and maintenance) required to keep information reliable. Without this "high-quality flow," evidence-based decisions, such as reallocating road space for bus lanes, remain difficult to justify.
- Methodological Friction: The city relies on "downscaling" national estimates to local levels, creating a disconnect between the city's "bottom-up" analysis and the government's "top-down" inventory. This variance makes it hard to reconcile local progress with national targets.
- Fragmented Engagement: To manage limited capacity, the city relies on business representative groups as proxies for the private sector. However, these groups collect data for advocacy, not for climate monitoring, resulting in inconsistencies that complicate tracking metrics like "green jobs."

Cork's evolving MEL framework presents several strategic opportunities to strengthen its climate-neutrality transition:

- Mainstreaming Climate Action: Through cross-directorate workshops, the city is aiming to shift climate considerations from a "secondary check-box" to a primary planning lens. By mapping planned infrastructure investments against emissions data, departments can actively integrate decarbonization into their 3-5 year programs.
- Evidence-Based Investment: The MEL system serves as a technical bridge to unlock capital. By providing empirical analysis of low-carbon outcomes, the city can better satisfy rigorous funding requirements like the EU Taxonomy.
- Strategic CCC Evolution: The upcoming Climate City Contract iteration offers the chance to transition from high-level goals to a concrete, investable pipeline of projects. Formalizing disclosure through the CDP-ICLEI Track further enhances international accountability, positioning Cork to attract the private and institutional investment necessary to close the remaining emissions gap.
- The bespoke NetZeroPlanner Tool (NZP) for Cork can be "a tool for adequacy". Its value lies in assessing the adequacy of actions. By mapping projects (e.g., active travel routes) against the city's emissions profile, the tool can help in determining if the combined impact of these measures is sufficient to meet 2030 neutrality goals. While it doesn't answer the question "Is the project on time?", It answers "Are we doing enough?"

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2.5.3.3 Conclusion and Lessons Learned

The MEL process in Cork was intentionally designed to provide a strategic "steer" rather than focusing solely on producing granular technical metrics. This approach ensured that the identified priorities and measures of progress resonated with the city's broader ecosystem, bridging the gap between community aspirations and the council's operational realities.

The city has moved away from static reporting, instead adopting a "reflexive learning process" This structure accommodates both formal, documented reviews of actions and informal individual and group learning, allowing the city to adapt as it progresses.

The MEL system's strength lies in its integration with the 2023 Local Authority Climate Action Plan (LACAP), which served as an "anchor". By aligning the Climate City Contract (CCC) with these pre-existing legal obligations, the city ensured climate goals were not developed in a vacuum.

Moving forward, Cork is making major efforts in Detailed Project Specification. While current impact pathways remain at a high level, the city plans to specify delivery projects in much greater detail for the 2026 iteration of the CCC. This transition involves developing "bankable projects" that include specific budgets, timelines, and expected impacts.

The city has identified a "massive gap" in the funded capacity for Local Authorities to gather and assess the true consequences of their climate actions. Future needs include:

- Standardization: Developing reliable methodologies to quantify co-benefit impacts (e.g., health and related sectors) in monetary terms.
- Monitoring Private Investment: Building the capacity to monitor private sector investment in climate goals and identifying routes to mobilize private finance.
- Policy Support: Advocating for long-term funding models from central government, as current annual budget cycles hinder the medium-to-long-term certainty required for climate investment.

Last, several key learnings from Cork's MEL case can be inferred:

- Cities should integrate climate action into established structures rather than creating redundant networks. Using existing statutory instruments as an anchor helps ensure climate neutrality is viewed as a core local obligation.
- Local governments should leverage "soft power" by engaging in dialogue with central government departments-an opportunity often rarely afforded to local units-to create new partnerships and resolve legislative blockages.
- Cities should not wait for the perfect data set to start; instead, they should adopt a phased approach, starting with high-level pathways and evolving toward detailed, bankable projects as internal capacity and evidence bases grow over time.

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2.5.4 Münster

2.5.4.1 1. City Profile

Background information

Münster is a city in the federal state of North Rhine-Westphalia in western Germany. It had an official population of about 320,946 in 2022, spread across an area of 303.3 square kilometres. The city lies in the northern part of the state and serves as the economic and administrative centre of the surrounding Münsterland region, a larger area of about 1.66 million residents that includes both the city and rural districts. Münster's economy features a strong services sector, supported by public administration, education and research institutions (including one of Germany's largest universities), as well as small and medium enterprises in logistics, insurance, mechanical engineering and healthcare. The service sector alone accounts for nearly 87% of employment among jobs subject to social insurance, with manufacturing at around 12-13 % and agriculture less than 1 %.[22]

Münster's city population of roughly 321,000 in 2022 shows a balanced gender mix and a notable share of foreign residents (about 12 %), with a relatively young and dynamic demographic profile overall. Age breakdowns for the city show that around 13.4 % of residents are under 16, 30.1 % are aged 18-34, 31.2 % are 35-59, and about 23.9 % are older than 60 (15 % aged 60-74 and 9 % 75+).[23] Münster itself is a standalone urban district rather than part of a larger metropolitan region, but the wider Münsterland has a mix of urban and rural populations tied economically and socially to the city.

Münster's economic output on a per-person basis is above regional averages; the city's GDP per capita is around €59,300 (2021 figures) and generally exceeds that of North Rhine-Westphalia as a whole. The labour market is relatively strong with unemployment rates generally below national averages and a significant commuter inflow from surrounding rural areas. Businesses are moderately dense: there were about 40.6 registered companies per 1,000 inhabitants in 2021, reflecting a vibrant small and medium enterprise ecosystem. Employment is heavily weighted toward services such as education, public administration, finance and health, while manufacturing and construction provide secondary employment opportunities. This mix supports a high quality of life and contributes to Münster's role as a regional hub for commerce, culture and innovation within its largely rural hinterland.

Climate Neutrality Objectives

Muenster's greenhouse gas inventory identifies 2021 as the baseline year, with total emissions primarily driven by the built environment and transport sectors. The city's main sources of emissions are buildings (56%), transport (30%) industrial processes and product use (10%), and agriculture, forestry, and land use (3%).

Münster has set a highly ambitious climate neutrality target for 2030, aiming to reduce CO_2 emissions by more than 95% compared to 1990 levels. In absolute terms, this means cutting annual emissions from 2.62 million tonnes in 1990 by approximately 2.49 million tonnes by 2030. This target is consistent with an 82% reduction relative to the 2021 baseline, as calculated by the city's economic

[22] https://www.muensterland.com/en/economy/living/places/munster/working
[23] https://www.bundeswahlleiterin.de/en/europawahlen/2024/strukturdaten/bund-99/land-5/kreis-5515.html

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model. Building on more than three decades of climate action, Münster already recorded a comparatively low carbon intensity of 5.8 tonnes per capita in 2020, well below the German national average, reflecting the city's strong starting position and decentralized energy system.

Table 6 - Münster emissions inventory by sector.

Sector	Scope 1 (tCO_2e/yr)	Scope 2 (tCO_2e/yr)	Scope 3 (tCO_2e/yr)	Total Emissions (tCO_2e/yr)	% of Total
Transport	549,780	16,082	-	565,862	30%
Buildings	136,893	922,466	-	1,059,359	57%
IPPU	1,631	189,350	-	190,981	10%
Waste	2,595	190	-	2,785	0.2%
AFOLU	53,739	-	-	53,739	3%
Total	744,638	1,128,088	-	1,874,841	100%

Münster's Climate Neutrality Action Plan is structured around a combination of high-impact technical measures and non-technical actions aimed at societal transformation. Key technical fields of action include low-carbon energy production, sustainable mobility, and building-related carbon reduction measures, focusing on efficiency improvements and emissions reductions across the existing building stock. In parallel, the city places strong emphasis on engaging businesses and academic institutions as drivers of innovation and emissions reduction, ensuring that economic development aligns with long-term climate goals. These measures are complemented by governance tools such as a municipal climate budget, which helps guide decision-making and prioritise investments based on their emissions impact.

Beyond sectoral measures, Münster explicitly frames climate neutrality within the concept of a carbon budget, recognising that percentage reductions alone are insufficient to meet the Paris Agreement objectives. The city adopts a per-capita carbon budget approach aligned with recommendations from the German Advisory Council on the Environment, aiming to limit cumulative emissions in line with a 1.5°C pathway. Education, food systems, and broader cultural change are therefore integral components of the strategy, supporting behavioural shifts alongside technical solutions. Together, these actions position Münster's climate strategy as both technically robust and socially grounded, with a strong focus on absolute emissions limits, long-term resilience, and quality of life.

MEL Framework & Indicators

To track progress toward climate neutrality and ensure accountability, Münster has embedded these indicators within a structured monitoring, evaluation, and learning (MEL) system aligned with its 2030 climate neutrality pathway. The MEL framework is designed to move beyond high-level targets by systematically measuring sector-specific emissions reductions, the energy transition across electricity and heat, and the treatment of residual emissions within a carbon-budget logic. By combining technical emissions data with sectoral performance indicators, the system enables regular assessment of whether implemented measures are delivering the required absolute CO_2 reductions.

Main indicators

- CO2 Reduction
- Share of RE in total electricity consumption

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- Share of RE in total heat consumption
- CO2 reduction in the stationary sector
- CO2 reduction in the transport/mobility sector
- CO2 reduction of grid-bound energy sources
- Waste and Circular Economy
- CO2 reduction in the industry sector
- CO2 reduction in the agricultural sector
- Remaining residual emissions

Additionally, the city is participating in the Pilot Project CoLAB project, which focuses on the quantitative determination of co-benefits.

2.5.4.2 MEL processes and application

Processes/Collaboration in design and operationalisation of MEL

Münster's MEL system is not the result of a single, discrete design phase but rather the outcome of long-term institutional learning embedded in decades of climate governance. While broad co-creation has played a significant role in shaping Münster's climate ambitions and strategic direction, the design of MEL frameworks and impact pathways has remained largely expert-led due to their methodological complexity.

A key participatory milestone occurred in 2017, when Münster organised a large-scale conference process linked to the development of its "Master Plan 100% Climate Protection." More than 1,000 participants contributed to articulating a shared long-term vision for the city's development. This process did not focus on indicators or impact pathways themselves but instead defined the strategic foundations upon which subsequent technical analyses were built. This visioning exercise later informed greenhouse gas modelling, scenario development, and the recalculation of targets following the City Council's 2019 decision to advance climate neutrality from 2050 to 2030.

Collaboration in Münster's MEL system is strongest at the institutional and expert level, involving a network of research partners, municipal companies, and data providers. A central partner is the Institute for Energy and Environmental Research (ifeu), which developed the emissions accounting tool used by the city. This tool is based on the German BISKO standard, enabling consistent, comparable greenhouse gas inventories across municipalities. While the inventory itself is produced in-house by a dedicated municipal staff member, ifeu provides methodological support, tool development, and periodic updates.

Beyond research institutions, Münster relies on a broad ecosystem of data providers. These include the municipally owned energy utility (Stadtwerke), private energy suppliers, universities, and technical service actors, who supply data on heating systems. This distributed data landscape reflects the city-wide scope of emissions accounting and requires strong informal coordination and trust-based relationships rather than rigid contractual arrangements.

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Measurement and Monitoring

At the core of Münster's MEL system is an annual greenhouse gas inventory, produced consistently over many years using a standardised methodology (BISKO-Standard). The inventory covers emissions across all major sectors and serves as the primary instrument for tracking progress toward climate neutrality. Its annual repetition allows the city to assess trends, identify structural challenges, and communicate the scale of remaining emissions reductions required.

In parallel, Münster uses implementation monitoring through its climate controlling process. Rather than attempting to quantify the precise emissions impact of each individual measure, the city tracks whether measures have been implemented as planned, are delayed, or require additional resources. For indirect measures, such as cycling infrastructure, monitoring focuses on outputs within municipal control (e.g. kilometres of bike lanes built) rather than behavioural outcomes that depend on external factors

External stakeholders play a crucial role in providing data, though monitoring itself remains institutionally anchored within the municipality. Energy consumption data, for example, is supplied by utilities and system operators, while mobility-related data may come from sensors or infrastructure operators. The city also collaborates with research partners to maintain methodological consistency and ensure alignment with national standards.

Ownership of core datasets remains with the municipality, while external partners contribute specific inputs under established professional norms. Interoperability is achieved through the use of standardised methodologies (notably BISKO), which facilitate comparison with other German cities and support benchmarking. This comparability is politically valuable, as it helps decision-makers understand what can realistically be achieved at the municipal level versus what depends on national or regional frameworks

Indicators and Metrics

Münster's indicators are derived from existing planning and reporting practices, rather than being developed solely for the Climate City Contract. Core indicators focus on absolute and sectoral greenhouse gas emissions, energy consumption, and selected structural variables such as renewable energy installations or vehicle density. These indicators are directly aligned with the city's climate neutrality objectives and carbon budget logic.

For implementation monitoring, Münster uses qualitative and semi-quantitative indicators, such as implementation status and estimated impact levels (e.g. high, medium, low). These are assessed using a structured framework that considers both the reach of a measure (how many people or actors it potentially affects) and the type of intervention, ranging from information provision to regulation

While Münster acknowledges the importance of co-benefits such as air quality, health, or energy poverty reduction, the city chooses a cautious approach to measuring them. The city avoids making strong causal claims unless robust data is available, prioritising transparency over political storytelling. Co-benefits may be described in project-level proposals or contextual reporting but are not systematically quantified within the MEL system.

Use/Application of MEL Processes

MEL data in Münster is designed to support political and administrative decision-making, rather than academic evaluation. The annual climate controlling report is a key mechanism in the city's MEL process, designed to provide a clear overview of what has been implemented, what is delayed, and what resources are required to continue progress.

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The annual climate controlling reports explicitly link emissions monitoring, project implementation, and financial governance into a single, recurring decision-support instrument. As mandated by the City Council, the climate controlling report is updated every year and timed to coincide with municipal budget deliberations, ensuring that climate progress is assessed alongside fiscal priorities. The report is structured around three core elements:

1. The energy and greenhouse gas balance, which provides a consistent, city-wide assessment of emissions trends since 1990
2. A status report on strategic climate projects, presented through standardised project "fact sheets" that document implementation progress, planned next steps, and expected direct or indirect CO_2 impacts
3. An entry point into a climate-oriented budget ("Klimahaushalt"), which transparently links strategic projects to specific budget lines and financial allocations

Importantly, the report adopts an explicitly iterative and agile approach, refining indicators, project templates, and impact classifications over time as data availability and governance needs evolve. Rather than functioning as a static monitoring tool, climate controlling is designed to help political and administrative leadership identify delays, resource gaps, and prioritisation needs, while also acknowledging the limits of municipal influence and the dependence on broader societal and multi-level transformations to achieve climate neutrality.

The primary purpose of Münster's MEL system is strategic steering and accountability, not precise impact attribution. The greenhouse gas inventory illustrates the scale of the challenge, while implementation monitoring ensures follow-through on political commitments.

Münster operates a public climate dashboard (Klimadashboard Münster), which presents selected indicators and real-time data (e.g. bicycle counts) to citizens and decision-makers. The dashboard's primary function is transparency and communication, rather than formal MEL. Nonetheless, it complements internal reporting by increasing visibility and public awareness.

Learning and Adaptation

Learning in Münster's MEL system is incremental and governance-driven rather than experimental. Indicators and measures are revised as part of annual reporting cycles, and new actions can be added to the action plan as strategic projects evolve. This creates a dynamic system without constant methodological upheaval. A digital Kanban board is used to track who is responsible for evaluating challenges and deciding if something needs to be done.

New evidence is incorporated primarily through updates to inventories, planning studies, and national regulatory developments. However, the city recognises strong path dependency: once major infrastructure or regulatory measures are underway, annual data is more likely to inform implementation adjustments than fundamental strategy changes.

Outcomes and Impact

The clearest impact of MEL in Münster is its role in securing sustained political attention and funding. By linking climate controlling to budget decisions, the city ensures that climate action remains embedded in core governance processes.

Successes include long-term continuity, institutional learning, and strong integration with governance. Challenges include limited capacity to attribute impacts to individual measures and dependence on national policy frameworks. For example, when it comes to a clean transition in the heating sector,

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narratives have played a large role in shaping national legislation, and the municipality depends on the national level to achieve its goals when it comes to transforming how buildings are heated. The municipality uses its monitoring data to contribute to the narrative and communicate real results to citizens using tools such as the Klimadashboard.

2.5.4.3 Conclusion and Lessons Learned

Münster's experience illustrates a well-established approach to monitoring, evaluation, and learning (MEL) that has evolved over decades rather than being designed solely in response to the Climate City Contract or the EU Mission framework. A central insight from this case is that effective MEL does not depend on highly sophisticated or real-time impact attribution models, but on institutional continuity, political relevance, and strategic clarity. Münster's system prioritises consistency in data collection, transparency in reporting, and strong links between monitoring outputs and decision-making arenas, particularly the municipal budget process.

One of the most significant lessons from Münster is the deliberate separation between participatory processes and technical MEL design. Citizen engagement has played a decisive role in shaping long-term visions and legitimising ambitious climate targets, most notably through large-scale participatory processes such the development of the 2017 master plan. However, the city has consciously avoided participatory co-creation of indicators or impact pathways, recognising the methodological complexity and uncertainty inherent in emissions modelling. This distinction helps maintain trust and credibility in that political and societal buy-in is generated through inclusive engagement processes, while monitoring and evaluation rely on expert knowledge and standardised methodologies. For other cities, this highlights the value of being explicit about what can and cannot be meaningfully co-created.

Another key lesson lies in Münster's pragmatic understanding of what MEL can realistically achieve at the municipal level. Rather than attempting to causally link individual measures to specific emissions outcomes, which carries with it many confounding variables, the city focuses on two complementary pillars: (1) an annual, standardised greenhouse gas inventory that shows overall progress and remaining challenges, and (2) an implementation-oriented monitoring report that tracks whether planned measures are actually being delivered. This approach acknowledges uncertainty while still providing actionable information to decision-makers. It also avoids the risk of false precision, which can undermine confidence in MEL systems.

Münster's integration of MEL into core governance and financial processes emerges as a critical success factor. The alignment of annual climate controlling reports with City Council budget discussions ensures that monitoring results directly inform resource allocation and political prioritisation. This linkage transforms MEL from a reporting obligation into a strategic steering instrument, reinforcing accountability across departments. The city's governance model distributes climate responsibility across all municipal offices, coordinated by a central climate unit reporting to the mayor. This further strengthens MEL integration and prevents climate action from being siloed.

At the same time, the case reveals important limitations and ongoing challenges. Data availability and methodological constraints limit the city's ability to systematically capture co-benefits such as health, social equity, or energy poverty reduction. While Münster deliberately errs on the side of transparency and methodological caution, this can make it harder to communicate the full value of climate action to the public and political stakeholders. In addition, strong path dependencies mean that MEL is more effective at tracking implementation and highlighting structural challenges than at enabling rapid strategic course correction. Finally, many decisive levers remain dependent on national legislation, constraining the scope of municipal action and learning.

Looking ahead, Münster's future MEL development would benefit from greater alignment at national and European levels, particularly around methodologies for carbon budgets, residual emissions, and

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co-benefits. External support in the form of shared tools, harmonised indicators, and peer-learning platforms could help cities like Münster deepen their learning without increasing administrative burden. For other cities pursuing climate neutrality, Münster's experience showcases the value in designing MEL systems that are politically useful, institutionally embedded, and methodologically honest.

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2.5.5 Bergamo

Disclaimer: This case study follows the section sequence of the other city cases, but is compiled from the Bergamo Climate City Contract Action Plan (Municipality of Bergamo, 2023), existing materials and Bergamo MEL desk-based research conducted by the co-author , but is not supported by interview evidence, workshop participation, or direct review from the city officials.

2.5.5.1 City context

Bergamo's climate neutrality work is situated in the uploaded Climate City Contract Action Plan as part of a wider period of civic resilience, institutional mobilisation and environmental ambition. The Action Plan links the city's climate neutrality pathway to the idea of a "lighthouse city", a framing associated with leadership, tolerance, creativity, research and technological development. This civic framing is important because the Climate City Contract is not presented only as a technical emissions-reduction programme. It is positioned as a territorial transition that connects cultural, environmental, social and economic renewal with the European Mission objective of climate neutrality by 2030 (Municipality of Bergamo, 2023).

The city's climate neutrality approach is rooted in existing municipal planning instruments. The Action Plan states that the Climate City Contract is designed to fit into the city's main strategic plans through synergy and non-overlap. Relevant frameworks include the Climate Transition Strategy, the Circular Economy Strategy, the Sustainable Urban Mobility Plan, the Territory Government Plan, and the Sustainable Energy and Climate Action Plan. This matters for city-driven MEL because the monitoring and learning system does not begin from an empty institutional field. It is built on prior planning processes, energy and emissions inventories, mobility planning, circular economy work, territorial planning and climate transition strategy (Municipality of Bergamo, 2023).

The Sustainable Energy and Climate Action Plan provides the starting point for the Climate City Contract baseline. The municipality joined the Covenant of Mayors in 2009, prepared an initial Sustainable Energy Action Plan in 2011, and developed the Sustainable Energy and Climate Action Plan in 2023 with the support of TerrAria. The Climate City Contract baseline uses the SECAP inventory as its basis while adapting it to NetZeroCities guidance, including the addition of the waste sector. This continuity between SECAP and the Climate City Contract is significant for MEL because it creates a bridge between established emissions accounting routines and the more portfolio-oriented logic of mission implementation (Municipality of Bergamo, 2023).

The 2030 climate neutrality boundary corresponds to the municipal administrative boundary. Stationary energy and transport are included under scopes 1 and 2, with transport scope 3 excluded in line with NetZeroCities guidance. Waste and wastewater are included under scope 1 and scope 3. IPPU and AFOLU are analysed in the Action Plan but are not included in the core Climate City Contract baseline because their estimated emissions fall below the applied threshold. This boundary-setting is a key governance decision because it determines what is formally tracked within the neutrality pathway, while still making additional sectors analytically visible for possible future integration (Municipality of Bergamo, 2023).

The 2021 Climate City Contract baseline is estimated at 465,645 tCO2eq, net of IPPU and AFOLU. Buildings dominate the profile, accounting for approximately 377,960 tCO2eq, or around 80 percent of emissions. Transport accounts for approximately 83,895 tCO2eq, or around 18 percent. Within buildings, the residential sector accounts for 149,314 tCO2eq, the tertiary sector including municipal services for 143,596 tCO2eq, and industry and agriculture for 85,050 tCO2eq. Private and commercial transport is the main transport subcategory, with 80,417 tCO2eq. The emissions profile therefore indicates that a city-driven MEL system must be able to monitor high-impact building and transport

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actions while also capturing enabling actions that affect implementation conditions across the wider portfolio (Municipality of Bergamo, 2023).

The co-planned action portfolio is central to Bergamo's city context. During the co-planning phase, 217 actions were collected from around 40 stakeholders. These included 85 actions in buildings, 32 in transport, five in AFOLU, 30 in waste, and 65 transversal actions. This distribution reflects the emissions profile but also shows that the Climate City Contract is broader than the largest emitting sectors alone. The portfolio includes sectoral and transversal actions that require coordination across municipal departments, external stakeholders, utilities, transport actors, healthcare institutions, universities, private companies, associations and foundations (Municipality of Bergamo, 2023).

The Action Plan states that the implementation of the Climate City Contract follows the NetZeroCities transition map, structured around building a strong mandate, understanding the system, co-designing a portfolio, and activating an inclusive ecosystem for a just climate transition. These elements establish the governance context for MEL. Monitoring, evaluation and learning must therefore support not only the measurement of emissions reductions, but also the coordination of a distributed action portfolio, stakeholder commitments, investment needs, co-benefits, and learning processes required to sustain implementation through 2030 (Municipality of Bergamo, 2023).

2.5.5.2 MEL as a governance mechanism in Bergamo

In Bergamo, city-driven monitoring, evaluation and learning is best understood as an emerging governance mechanism that connects planning, implementation, stakeholder coordination and adaptation. The Bergamo MEL notes identify four central characteristics of the city's approach: MEL is integrated with the Action and Investment Plans; MEL supports decision-making; ForImpact.ai enables monitoring, aggregation and storytelling; and data gaps are addressed through proxies and learning-by-doing. These characteristics indicate that MEL is not framed as a separate reporting layer, but as a connective function within the Climate City Contract architecture.

The governance relevance of MEL is visible in the relationship between the Action Plan, Investment Plan and Commitment Plan. The Action Plan defines actions, expected impacts, timelines and responsibilities. The Investment Plan translates actions into capital needs, financing sources, risks and cost-effectiveness considerations. The Commitment Plan formalises the roles and commitments of actors involved in the transition. MEL functions across these elements by helping to assess whether priority actions are progressing, whether investment flows align with impact pathways, and where sequencing or support mechanisms may need to be adjusted (Municipality of Bergamo, 2023).

This arrangement means that MEL has both strategic and operational roles. Strategically, it supports the city's ability to understand whether the action portfolio remains aligned with the 2030 neutrality pathway. Operationally, it helps track action implementation status, investment mobilisation, delivery readiness and emerging barriers. Its relevance therefore lies not only in accounting for emissions reductions after implementation, but in providing implementation intelligence while actions are being developed, financed, adjusted and delivered.

The ForImpact digital platform is central to this governance function. The Action Plan describes the platform as an innovation tool introduced with the Mission and made available to the municipality to support continuous engagement of Mission partners, governance of the Climate City Contract, monitoring of actions, direct and indirect impacts, developments over time, and achievement of city objectives. The MEL notes further describe ForImpact.ai as a digital backbone for structuring and aggregating action-level data, monitoring implementation progress, visualising emissions reductions, investment volumes and qualitative co-benefits, and providing a shared digital environment for collaboration across the Climate City Contract ecosystem (Municipality of Bergamo, 2023).

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Governance architecture and institutional set-up

Bergamo's MEL governance architecture is anchored in the Transition Team. The Action Plan states that responsibility for governance of the Mission within the municipal administration lies with the Ecology and Environment Department, with four officials and a manager actively involved. The Head of Department acts as Climate Transition Manager, while the Mobility Manager and Energy Manager are also members of the Transition Team. This gives the mission process an administrative centre while connecting it to key technical functions for mobility and energy (Municipality of Bergamo, 2023).

The Transition Team extends across municipal departments through designated contact persons. Departments involved include Mobility and Transport, Public Green, Botanical Garden, Buildings and Monuments, Technological Systems, School and Sports Buildings, Major Requalification Works, Contracts and Tenders, Planning of administrative activities and public works, Network Structures and Hydraulic Works, Housing Service, Heritage, and European Planning. This configuration is important because the emissions profile and action portfolio require competencies distributed across the administration. MEL therefore depends on cross-departmental data generation and coordination, not only on the environmental unit (Municipality of Bergamo, 2023).

Political leadership is also part of the governance architecture. The Action Plan states that the Mayor directly involved the relevant sectors to ensure full engagement and that both the Mayor and the Councillor for Environment and Mobility are actively involved at political level. The MEL notes similarly identify strong political backing from the Mayor and the Councillor for Environment and Mobility. This matters because city-driven MEL is only useful as a governance mechanism if information can inform political and administrative prioritisation, resource allocation and stakeholder engagement (Municipality of Bergamo, 2023).

External support strengthens the institutional set-up. NetZeroCities advisors supported the drafting of documentation through discussions and remote working sessions. TerrAria, already involved in the Sustainable Energy and Climate Action Plan, contributed technical expertise and acts as Energy Manager for the municipality. AESS supported implementation of the Action and Investment Plans, including stakeholder meetings, portfolio development, emissions and investment analysis, identification of barriers and opportunities, governance lines, strategic planning and impact pathway analysis. These actors provide methodological and technical capacity while the municipality retains the coordinating role (Municipality of Bergamo, 2023).

The Action Plan describes the Urban Ecosystem as the extension of the Transition Team to all actors in the city involved in the Mission, including citizens, the public and private sectors, trade associations, and the world of research and education. This distinction between the internal Transition Team and the broader Urban Ecosystem is central to Bergamo's governance model. The former provides municipal coordination; the latter reflects the distributed actors whose actions, data and investments are necessary for achieving the 2030 target (Municipality of Bergamo, 2023).

Co-creation has been a foundational mechanism for building this ecosystem. The external process began with a public expression of interest approved by managerial resolution on 30 August 2023. This invited large companies, SMEs, startups, third sector bodies, universities, research centres and other stakeholders to express willingness to join the Climate City Contract pathway. A public event was held on 11 October 2023 in Palazzo Frizzoni with 16 local organisations, followed by one-to-one meetings to co-create the action portfolio. The Action Plan presents the expression of interest as an innovative governance action aligned with transparency principles in Italy's public contracts framework (Municipality of Bergamo, 2023).

For MEL, the importance of this process is that stakeholders did not simply endorse a municipal strategy. They contributed actions, information, expected impacts and potential co-benefits. The MEL notes state that this co-creation process helped ground emissions reduction estimates in stakeholder-owned actions, identify interdependencies across sectors, surface implementation barriers and enabling conditions early, and ensure that pathways reflected real investment intentions rather than

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only technical scenarios. The governance architecture therefore links participation, action design, data generation and future monitoring.

Measurement architecture and data governance

Bergamo's measurement architecture is built around the aggregation of action-level data. The MEL notes state that indicators were developed in parallel with the Action Plan rather than as a standalone exercise. They emerged from stakeholder-provided action data, particularly emissions reduction estimates, investment volumes, implementation timelines and qualitative co-benefits. This gives the indicator framework a direct connection to the portfolio used to model the transition and supports the use of MEL for implementation management rather than only ex-post reporting.

The core quantitative indicators focus on greenhouse gas emissions reductions in tCO2eq per year, investment volumes mobilised by sector and stakeholder type, and action implementation status over time. These are appropriate indicators for the stage of the Bergamo Climate City Contract because they connect the baseline, the action portfolio and the investment logic. They also allow the municipality to distinguish between actions that are high-impact, actions that are investment-critical, and actions that are important enabling conditions even when their direct emissions reductions are less easily quantified.

The baseline inventory provides the main reference point for emissions-related measurement. It is based primarily on the 2021 SECAP inventory, with methodological adjustments to comply with NetZeroCities guidance. The Action Plan applies IPCC emission factors in tCO2eq/MWh, adopts the national 2021 electricity emission factor, retains the local emission factor for district heating, and includes the waste sector while excluding IPPU and AFOLU from the core baseline because they remain below the relevant threshold. This methodological adaptation shows that Bergamo's measurement architecture must reconcile continuity with prior local planning and alignment with Mission-specific accounting requirements (Municipality of Bergamo, 2023).

Measurement is more robust in some sectors than in others. The MEL notes state that reliable quantitative data are more available for energy systems, transport infrastructure and large building projects. By contrast, softer or enabling actions, including awareness, governance and behavioural change, require proxy and process indicators. This reflects a common challenge in city climate governance: the most easily measured indicators are often material or technical, while many necessary conditions for implementation concern institutional routines, stakeholder engagement, social acceptance and learning.

The platform-based architecture is designed to improve data governance across a distributed ecosystem. ForImpact.ai structures data inputs, enables aggregation at sector and city level, and provides a shared reporting environment where public and private stakeholders can document actions, update implementation status and report expected or realised impacts. This reduces reliance on fragmented bilateral reporting and supports traceability of commitments. However, the MEL notes also state that a fully formalised standards or data playbook is still under development. The platform therefore supports consistency, but further methodological standardisation is needed to strengthen comparability and reliability.

Data gaps are treated as a structural feature of the Climate City Contract process rather than as a reason to delay implementation. Robust data are generally available for municipal assets and services, large infrastructure and energy projects, and actions implemented by regulated or technically mature actors such as utilities and transport operators. More significant gaps persist in privately owned buildings, industrial processes, behavioural and lifestyle-related actions, socio-economic co-benefits, and real-time performance data from private-sector actors.

The main barriers to data availability include fragmented data ownership, limited standardisation, confidentiality constraints and uneven technical capacity among stakeholders. Bergamo's response is

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adaptive monitoring: phased refinement of indicators, triangulation of data sources, and iterative improvement of assumptions as implementation progresses. Where direct measurement is not available, the city uses proxies and qualitative assessment. Uncertainty is addressed through transparent documentation of assumptions, the use of ranges rather than point estimates where appropriate, and updates as new information becomes available.

Indicators, co-benefits and distribution

Bergamo's indicator set combines quantitative, proxy, process and qualitative elements. Quantitative greenhouse gas indicators remain central because they provide accountability against the 2030 neutrality trajectory. However, the MEL notes state that the indicator set is complemented by early-outcome indicators, process indicators and qualitative descriptors of co-benefits. This balance is significant because the Climate City Contract depends not only on measurable emissions reductions but also on governance milestones, stakeholder engagement, infrastructure delivery, investment mobilisation and social acceptance.

The Action Plan's impact pathways are organised by sectors and systemic levers of change. The relevant sectors include energy systems, mobility and transport, built environment, waste and circular economy, and green infrastructure and nature-based solutions. The levers include technology, governance, social innovation, democracy and participation, finance and investments, and training and information. This structure widens the indicator challenge. It requires the city to monitor sectoral change while also tracking transversal conditions that influence whether actions can be implemented at the pace required for climate neutrality (Municipality of Bergamo, 2023).

Co-benefits are a central part of the Bergamo case, especially for stakeholder engagement and political legitimacy. The MEL notes identify improved air quality, increased urban liveability, health benefits, social inclusion and economic development as co-benefits associated with the action portfolio. At the current stage, co-benefits are primarily identified qualitatively at action level and aggregated narratively by sector. This approach allows the city to recognise wider value beyond emissions reduction, but it also indicates that co-benefit measurement remains less mature than emissions and investment tracking.

The uneven measurement of co-benefits is especially important for issues such as job creation, reduced energy poverty and socio-economic effects. These require data from external actors, including health authorities, utilities and social services. The MEL notes state that partnerships and memoranda of understanding are in place, but systematic data collection and harmonised methodologies are still under development. This suggests that Bergamo's MEL system has begun to identify distributional and social dimensions, but it still needs stronger methods and data-sharing routines to assess these effects consistently.

The Climate City Contract contains several social and governance innovation actions that relate to co-benefits. The Action Plan refers to district networks created to promote and spread practices of citizen involvement, the Clic.Bergamo project focused on strengthening social cohesion as an enabling factor for transition and new urban welfare, and the involvement of the Guarantor of Children's Rights to extend sustainable practices to minors and families. These initiatives show that social cohesion, participation and intergenerational engagement are part of the transition architecture, even if their effects are not yet fully captured through quantitative indicators (Municipality of Bergamo, 2023).

Green infrastructure is another area where co-benefits are visible. The Action Plan notes that the city's green space planning, design and management draws on data from the municipal green space plan and that the municipal administration has planned the planting of 20,000 new trees over seven years to improve air quality. This type of action can contribute to climate, air quality, liveability and adaptation-related benefits. For MEL, it illustrates the need to connect action implementation

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indicators, such as trees planted or green space managed, with wider environmental and social outcome indicators where data are available (Municipality of Bergamo, 2023).

Use of MEL in decision-making and implementation

The intended use of MEL in Bergamo is clearly governance-oriented. The MEL notes state that the system is intended to support strategic and operational decision-making, guide prioritisation and sequencing of actions, inform investment discussions with public and private actors, and enable learning and adaptation over time. Baseline and monitoring data are expected to be used internally by the Transition Team and political leadership, and externally for Mission reporting, stakeholder engagement and communication.

Prioritisation is one of the main uses of MEL. The notes state that priority actions for closer monitoring are those that deliver large shares of emissions reductions, involve significant capital investments, or act as enablers for multiple downstream actions. Examples include energy systems, transport infrastructure, district heating, electrification infrastructure and governance platforms. Monitoring intensity is therefore expected to be proportionate to systemic importance rather than uniform across all actions. This is an important principle for mission governance because it allows attention to be directed to actions that shape the feasibility of the whole portfolio.

MEL also informs the selection of key actions from the broader portfolio. The criteria identified in the notes include emissions impact magnitude, readiness and feasibility, investment leverage, and strategic relevance to the 2030 pathway. These criteria show that the system combines impact logic with implementation logic. An action may be important because it reduces emissions directly, because it unlocks finance, because it enables later actions, or because it is sufficiently ready to move into implementation. City-driven MEL therefore supports the practical sequencing of transition activity.

The integration of MEL with the Investment Plan is particularly important. The Climate City Contract portfolio requires significant mobilisation of public and private investment. The MEL notes describe investment volume, capital expenditure, financing sources, risks and cost-effectiveness considerations as part of the information landscape. This means that MEL can support investment discussions by showing whether actions with high emissions potential are matched with credible financing pathways, whether investment gaps are emerging, and whether stakeholder commitments are being translated into delivery.

Different stakeholder groups use MEL outputs differently. The MEL notes indicate that political leaders focus on progress, risks and priorities; technical departments use data for implementation management; external partners use MEL to align investments and commitments; and citizens engage primarily through simplified indicators and narratives. This differentiation is important because a single MEL system must serve multiple governance functions. The same data architecture must support political accountability, technical coordination, partnership management and public communication.

The use of MEL in implementation is still developing. The case materials show a strong architecture for action-level monitoring, but they also indicate that data standards, co-benefit measurement and uncertainty management are not yet fully mature. This means that Bergamo's use of MEL is currently formative and adaptive. It supports implementation while simultaneously revealing where the governance and data infrastructure require further development. The value of MEL therefore lies not only in providing answers, but in making the conditions for effective implementation more visible.

Learning, reflexivity and adaptation

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Learning is embedded in Bergamo's MEL approach through the explicit acceptance that data, indicators and assumptions will need to improve over time. The MEL notes describe the approach as learning-by-doing, using proxies and qualitative assessment where robust data are not yet available. This is a pragmatic response to the realities of mission implementation. Waiting for perfect data would risk delaying action, while acting without monitoring would weaken accountability. Bergamo's current model attempts to hold these requirements together through adaptive monitoring.

Reflexivity is visible in the way the city treats uncertainty. The notes state that ease of analysis varies by indicator. Quantitative indicators linked to emissions reductions and investment are relatively straightforward to aggregate when structured through ForImpact.ai. More complex challenges arise where estimates rely on assumptions, actions are in feasibility or early implementation stages, or impacts depend on behavioural uptake. The city responds by documenting assumptions transparently, using ranges where appropriate, and updating indicators as new information becomes available .

The co-planning process also created a learning function before implementation. Workshops, bilateral meetings and thematic roundtables enabled stakeholders to propose actions, contribute data, and discuss impacts, barriers, risks and co-benefits. This helped identify interdependencies and enabling conditions early. In governance terms, the process transformed MEL from a later reporting activity into a formative design practice. Learning occurred as the city and stakeholders jointly clarified what actions were possible, what data existed, what barriers were likely, and what co-benefits could be expected (Municipality of Bergamo, 2023).

The Action Plan explicitly recognises the challenge of building a systemic Theory of Change across different organisations, sectors and actor groups. This is a key reflexive insight. A mission portfolio cannot be governed as a simple list of projects because actions interact across systems, depend on enabling conditions and require sequencing. MEL can support this by tracking whether assumptions about interdependencies, feasibility, investment and stakeholder roles remain valid during implementation. In this sense, learning is not only about improving indicators; it is about testing and adjusting the transition logic itself (Municipality of Bergamo, 2023).

The case notes identify several areas where external support would strengthen learning and adaptation. These include shared methodologies for co-benefit measurement, improved access to private-sector and utility data, and stronger uncertainty management and scenario analysis at city scale. These needs are not peripheral technical issues. They directly affect the ability of MEL to guide prioritisation, investment and communication. They also suggest areas where Mission-wide learning could support Bergamo and other cities facing similar methodological constraints.

Learning is also connected to governance routines. The Action Plan states that the ForImpact platform, together with the permanence and strengthening of the Transition Team, is intended to support the sustainability of the project by 2030 and the continued engagement of the urban ecosystem. This indicates that learning is expected to be institutionalised through repeated monitoring, review and engagement rather than through one-off evaluation. The challenge for the next phase is to translate platform data and stakeholder reporting into regular cycles of reflection, decision-making and adaptation (Municipality of Bergamo, 2023).

Outcomes and emerging signs of institutional change

The uploaded materials do not provide a summative evaluation of implemented outcomes. They present Bergamo at a stage where the Climate City Contract has created a co-planned portfolio, institutional structures and monitoring architecture for implementation. For this reason, the most appropriate outcomes to identify are early governance and process outcomes rather than verified emissions outcomes. These early outcomes are nonetheless important because they indicate whether the city is building the capacities needed for climate-neutrality delivery (Municipality of Bergamo, 2023).

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The first emerging outcome is the establishment of a cross-departmental Transition Team. The Action Plan describes the Ecology and Environment Department, Climate Transition Manager, Mobility Manager, Energy Manager and designated contact persons across multiple departments as part of the institutional architecture. This represents a shift from climate action as a sectoral environmental responsibility toward a broader administrative coordination model involving mobility, buildings, public works, green space, procurement, housing, heritage and European planning. For MEL, this provides the organisational basis for data collection, action monitoring and cross-sector learning (Municipality of Bergamo, 2023).

The second outcome is the mobilisation of the Urban Ecosystem around the Climate City Contract. The expression of interest, public event, workshops and bilateral meetings produced a portfolio of 217 actions from around 40 stakeholders. This is a tangible process outcome because it converts broad mission ambition into a structured action portfolio with stakeholder inputs. It also creates a basis for accountability because actions can be monitored through their expected impacts, investment needs, timelines and implementation status (Municipality of Bergamo, 2023).

The third outcome is the integration of emissions, investment and implementation data. The MEL notes state that Bergamo's indicator framework emerged from action-level data on emissions reductions, investment volumes, implementation timelines and qualitative co-benefits. This is a significant governance development because many climate planning processes separate emissions modelling from investment planning and stakeholder commitments. Bergamo's model attempts to connect these elements through the Action Plan, Investment Plan and ForImpact.ai, making it possible to assess whether the portfolio is not only ambitious but also financially and operationally credible.

The fourth outcome is the establishment of a shared digital infrastructure for portfolio monitoring. ForImpact.ai provides a common space for structuring and aggregating action-level data, visualising emissions reductions, investment volumes and co-benefits, and supporting traceability of commitments. This is an institutional outcome because it changes how information can circulate across the municipality and stakeholder ecosystem. It also creates the potential for more transparent and adaptive portfolio governance if the platform becomes embedded in regular review and decision-making routines (Municipality of Bergamo, 2023).

The fifth outcome is the identification of data gaps and methodological needs. The case notes explicitly identify gaps in privately owned buildings, industrial processes, behavioural and lifestyle-related actions, socio-economic co-benefits and real-time performance data from private-sector actors. Making these gaps visible is itself a governance outcome. It helps the city identify where data-sharing agreements, memoranda of understanding, common reporting templates, co-benefit methodologies and technical support are needed. This is a necessary step in moving from initial portfolio design toward a more robust implementation and learning system.

2.5.5.3 Conclusion and lessons

Bergamo's case shows how city-driven MEL can be constructed as a governance mechanism for a mission-oriented climate transition. The central feature of the case is integration. MEL is not treated as a separate reporting requirement but as a connective function linking the Action Plan, Investment Plan, Commitment Plan, Transition Team, stakeholder ecosystem and ForImpact.ai platform. This enables the city to connect emissions reductions, investment mobilisation, action implementation status, co-benefits, barriers and learning in one emerging governance architecture (Municipality of Bergamo, 2023).

The first lesson is that MEL can be designed from the action portfolio rather than added after planning. Bergamo's indicators were developed in parallel with the Action Plan and derived from stakeholder-provided action data. This creates a stronger connection between impact pathways and

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implementation monitoring than would be possible if indicators were developed separately. For mission cities, this suggests that the design of MEL should begin during co-creation, when actions, responsibilities, investment needs, assumptions and expected co-benefits are being defined .

The second lesson is that stakeholder-owned data can strengthen the realism of transition pathways. Bergamo's co-planning process collected actions from external and internal stakeholders and used these to ground emissions reduction estimates, identify interdependencies and surface barriers. This helps avoid a purely technical scenario that is disconnected from investment intentions and implementation capacities. However, it also creates a need for common data standards, reporting fields and validation routines so that stakeholder inputs can be aggregated credibly over time (Municipality of Bergamo, 2023).

The third lesson is that digital infrastructure can reduce fragmentation, but only when embedded in governance routines. ForImpact.ai provides a shared environment for monitoring action-level data, impacts, investment volumes and co-benefits. It supports transparency and traceability across the Climate City Contract ecosystem. Yet its effectiveness depends on the Transition Team, municipal departments and external stakeholders using the platform consistently, updating data, interpreting results and connecting findings to decisions. The platform is therefore an enabler of MEL governance, not a substitute for institutional responsibility.

The fourth lesson is that co-benefits need earlier and more systematic methodological attention. Bergamo recognises co-benefits as important for engagement and legitimacy, but current assessment remains mainly qualitative and action-level. This is understandable at an early stage, particularly where data on health, energy poverty, employment and socio-economic effects depend on external sources. Nevertheless, if co-benefits are to inform prioritisation and public communication, they require clearer methods, data-sharing arrangements and a stronger distinction between outputs, early outcomes and longer-term effects.

The fifth lesson is that data gaps should be treated as governance signals. Bergamo's approach does not assume complete data availability at the outset. Instead, it uses proxy indicators, qualitative assessment, transparent assumptions and iterative refinement. This is appropriate for a mission portfolio in which many actions are at different stages of maturity. The identification of gaps in private buildings, industrial processes, behavioural change, co-benefits and private-sector performance data can guide the next generation of institutional agreements and methodological development.

The sixth lesson is that city-driven MEL must connect accountability with learning. Bergamo needs to maintain accountability to the 2030 neutrality pathway through emissions, investment and implementation indicators. At the same time, it needs to support learning about feasibility, sequencing, stakeholder roles, data quality and co-benefits. A rigid system focused only on final emissions outcomes would be insufficient for implementation. A loose system based only on qualitative learning would be insufficient for accountability. Bergamo's emerging model attempts to balance these demands through structured platform-based monitoring and adaptive refinement (Municipality of Bergamo, 2023).

In conclusion, Bergamo provides an example of city-driven MEL at a formative but strategically important stage. The city has created a co-planned action portfolio, established a Transition Team, mobilised an Urban Ecosystem, connected the Climate City Contract to existing municipal strategies, and introduced a digital platform for monitoring and engagement. The main task ahead is to consolidate this architecture into repeated cycles of data collection, review, decision-making, adaptation and communication. If this is achieved, MEL can become a practical governance mechanism for steering the climate neutrality transition rather than a narrow reporting function (Municipality of Bergamo, 2023).

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2.5.6 Turin

Disclaimer: This case study follows the section sequence of the other city cases, but is compiled from the Turin Climate City Contract Action Plan (Città di Torino, 2024), existing materials, and Turin MEL desk-based research conducted by the co-author , but is not supported by interview evidence, workshop participation, or direct review from the city officials.

2.5.6.1 City context

Turin is the capital of the Regione Piemonte and the Città Metropolitana di Torino. The Climate City Contract describes the municipality as having 860,973 inhabitants at the end of 2023, covering an area of 130 km2 and being divided into eight districts. It is also presented as Italy's fourth-largest economic and productive complex, with strong roles in industry, universities, arts, tourism, science and culture. This urban profile matters for monitoring, evaluation and learning (MEL) because the transition to climate neutrality must operate across a city with a complex socio-economic structure, legacy industrial systems, major knowledge institutions, extensive service sectors and important metropolitan interdependencies (Città di Torino, 2024).

The city context is also marked by demographic and economic change. The Climate City Contract reports that Turin's resident population has declined since its peak in 2012, while the age structure shows a decrease in younger cohorts and an increase in the population aged 65 and over. Employment increased in 2022 compared with the previous year, but remained below the last pre-COVID year of 2019. The document also notes the structural effects of deindustrialisation, while emphasising that manufacturing remains significant in comparison with other European metropolitan cities and that the local enterprise structure is strongly characterised by small and micro-enterprises. These conditions shape the governance relevance of MEL because the climate transition depends not only on technical measures but also on the city's ability to align investment, employment, industrial restructuring, skills development and social inclusion (Città di Torino, 2024).

The current municipal administration, elected in 2021 and led by Mayor Stefano Lo Russo, frames ecological transition as part of a wider set of energy, digital, economic-productive and socio-cultural transitions. The Climate City Contract situates this agenda within a metropolitan Green Deal orientation, with attention to renewable energy production, energy communities, reduced energy demand, upgrading public and private building stocks, separate waste collection, emission reduction, air quality, electric mobility and green infrastructure. It also emphasises the role of investee companies and metropolitan coordination, indicating that climate neutrality is treated as a multi-actor and multi-level governance challenge rather than as an exclusively municipal operational programme (Città di Torino, 2024).

Turin's Climate City Contract is anchored in a 2019 reference year. The Action Plan explains that 2019 was selected because it was the most recent year with available data and because 2020 was excluded to avoid anomalous trends associated with the COVID-19 pandemic. The 2019 CO_2 emissions inventory accounted for 2.4 MtCO2 per year. These emissions were mainly concentrated in residential, tertiary, industrial and private transport sectors, which together accounted for about 82% of emissions. By energy commodity, natural gas accounted for 33% and refined petroleum products for 25%. These baseline figures provide the core measurement reference for the city's climate-neutrality pathway and establish the quantitative basis for monitoring implementation progress (Città di Torino, 2024).

The city had already developed several climate and sustainability instruments before the Mission process, including the Piano d'Azione per l'Energia Sostenibile e il Clima (PAESC), the Torino Action Plan for Energy (TAPE), the Piano Regolatore per l'Illuminazione Comunale (PRIC), the Piano Urbano

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per la Mobilità Sostenibile (PUMS), and the Piano Strategico dell'Infrastruttura Verde. The Climate City Contract positions these instruments as part of an existing trajectory that had already contributed to an observed reduction trend in the city's emissions inventory. The EU Mission therefore appears in the Action Plan as an opportunity to accelerate and integrate this trajectory, rather than as the first climate policy framework used by the city (Città di Torino, 2024).

The Action Plan sets out a transition strategy organised around 30 macro-actions and a portfolio of 227 micro-actions. The macro-actions cover stationary energy, transport, waste and wastewater, and AFOLU, including urban green infrastructure as a CO_2 sink. They include energy requalification of residential, tertiary, industrial and municipal buildings; district heating expansion; electrification of heating through heat pumps; renewable energy communities; industrial efficiency improvements; public lighting efficiency; photovoltaic electricity production; electrification of private vehicles, buses and the municipal fleet; traffic limitation zones; bicycles, carsharing and carpooling; the second metro line; waste reduction and separate waste collection; carbon capture and storage on the waste-to-energy plant and district heating generation plants; urban forestry; and green roofs. The aggregated effect of implementing the macro-actions is estimated in the Action Plan as a reduction of 2 MtCO2 per year, equivalent to 85.2% of the 2019 reference value, with associated investment costs estimated at EUR 27.1 billion (Città di Torino, 2024).

This context makes Turin a relevant case for city-driven MEL because the city's challenge is not simply to report emissions. The Climate City Contract requires the city to track whether a large and differentiated portfolio of actions, distributed across multiple sectors and actors, is moving the urban system towards a demanding 2030 trajectory. The submitted MEL material therefore frames the Climate City Contract as a dynamic and multilayer model: integrated across environmental, social and economic domains; science-based through modelling and quantitative assessment; dynamic in comparing actual trajectories with target trajectories; quantitative through indicators and key performance indicators; inclusive through dialogue with the social fabric; and transversal in integrating communication and stakeholder competences (Città di Torino, 2024).

2.5.6.2 MEL as a governance mechanism in Turin

Monitoring, evaluation and learning in Turin is presented as an integrated governance instrument rather than a narrow reporting procedure. The submitted MEL material describes a system that connects scientific modelling, stakeholder engagement, financial oversight, adaptive management and public communication into a single architecture. This is consistent with the Climate City Contract's own description of a work process based on three pillars: process governance, city actors' involvement and transition co-design, and science-based support to policy decision-making. MEL therefore functions as a means of governing the transition, because it links the emission baseline, impact pathways, action portfolio, data infrastructure, investment plan and stakeholder accountability (Città di Torino, 2024).

The governance significance of MEL lies in how evidence is intended to be used. In the Turin case, monitoring does not stop at measuring annual emissions or counting actions. It is intended to compare the evolving urban trajectory with the trajectory required for climate neutrality, identify deviations, interpret why deviations occur and support corrective actions. This means that MEL is explicitly connected to adaptive management. The Climate City Contract describes the CLICC platform as a tool that will track the evolution of urban systems and related emissions, check their coherence with what is expected by the Climate City Contract, and support corrective actions when needed to realign the city's trajectory with its targets (Città di Torino, 2024).

Governance architecture and institutional set-up

Turin's MEL governance architecture is organised around an integrated Mission Team. The Climate City Contract states that this Mission Team was created to manage the definition of decarbonisation pathways, assess impacts and costs, and monitor the city's evolutionary trajectories towards its goals.

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The Mission Team merges two working groups. The first is the municipal Transition Team, involving the Environment and Ecological Transition Department and the European Funds and PNRR Department, supported by the Interdepartmental Working Group on Climate Change. The second is the working group established at the Energy Center of the Politecnico di Torino under the scientific coordination of the EST@energycenter Lab (Città di Torino, 2024).

This institutional arrangement gives the MEL system a dual character. On one side, it is embedded within municipal departments responsible for ecological transition, European funds and recovery funding. On the other side, it is supported by a multidisciplinary scientific team with expertise in energy systems modelling, environmental impact assessment, urban green infrastructure, building physics, urban morphology and regulation. The submitted MEL material confirms that the partnership with EST@energycenter is central to modelling, indicator specification, data architecture and validation. The governance model therefore does not treat scientific support as an external consultancy detached from implementation. Instead, it embeds analytical capacity within the institutional machinery of the Climate City Contract (Città di Torino, 2024).

Roles and responsibilities for MEL are differentiated across departments and partners. The submitted case material identifies the Environment and Ecological Transition Department as responsible for environmental metrics and the European Funds and PNRR Department as responsible for financial performance tracking. Sectoral leads manage domain-specific data streams across buildings, mobility, waste and other fields. EST@energycenter provides scientific oversight and methodological validation, while utilities and partner organisations contribute operational data. This division of labour is important because the transition is distributed across the city system. MEL must therefore draw on data from multiple delivery settings while maintaining enough central coordination to allow portfolio-level interpretation.

Stakeholder involvement is a constitutive feature of the governance architecture. The Climate City Contract describes a co-design process involving local stakeholders and building on three framework initiatives: Torino City Lab, CTE Next and Torino Social Impact. The local ecosystem includes institutional bodies beyond the municipality, including Regione Piemonte and the Città Metropolitana di Torino, public multi-utility companies, private sector actors, the banking system, trade associations, third sector entities, non-profit organisations, the academic world and citizens, with specific attention to younger generations and vulnerable groups. The submitted MEL material further specifies that the co-creation process between April 2022 and March 2024 involved the Municipal Transition Team, the Interdepartmental Working Group on Climate Change, EST@energycenter, public utilities, financial institutions, industry associations, third sector organisations, youth representatives, vulnerable groups, corporate actors and SMEs (Città di Torino, 2024).

The co-design process is directly relevant to MEL because stakeholders were not only invited to validate predefined measures. The submitted material indicates that they contributed to identifying systemic barriers, feasibility constraints, investment needs and co-benefits associated with macro-actions. The process informed the definition of macro-actions, the modelling of decarbonisation pathways, the selection of indicators under Module B-3 and the structuring of the Investment Plan. This sequence matters analytically because it means that the MEL system was not added after the action portfolio had already been finalised. It was developed in interaction with the pathways, actions and investment logic that it would later be expected to monitor .

The governance architecture also has a multi-level dimension. The Climate City Contract identifies the Regione Piemonte and the Città Metropolitana di Torino as part of the local ecosystem, providing a form of vertical external governance. This is important for a city such as Turin because many relevant systems, including transport, energy infrastructure, economic development and environmental regulation, extend beyond the municipal boundary. MEL can therefore help make visible where climate-neutrality implementation depends on metropolitan, regional or national conditions. In this sense, the governance architecture positions MEL not only as an internal management process but also as an evidence base for coordination across levels of governance (Città di Torino, 2024).

Measurement architecture and data governance

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Turin's measurement architecture is built around a direct connection between baseline emissions, impact pathways, macro-actions, indicators and investment planning. The submitted MEL material states that indicators were developed through a science-based methodology led by EST@energycenter and integrated into the CLICC platform. They are aligned with the 2019 baseline emissions inventory of 2.4 MtCO2 per year, sectoral emission-reduction targets, the 30 macro-actions identified in the Action Plan and the investment tracking structure defined in the Investment Plan. This alignment is central to the case because it allows monitoring to assess not only whether emissions are changing, but whether implementation variables and financial mobilisation are consistent with the pathway required for 2030 climate neutrality.

The Climate City Contract presents the CLICC platform as a web-based IT platform designed to assess ex ante and in silico the impacts of possible policy actions and strategies in terms of avoided CO_2 emissions and associated costs. It is based on ad hoc models and algorithms, allowing decision-makers to compare policy options quantitatively and objectively. The platform also supports the automatic compilation of sections of the Climate City Contract. When connected to the Energy & Transition Data Room, it is intended to track the evolution of the urban system and its emissions, compare observed and expected trajectories, and support corrective interventions (Città di Torino, 2024).

The Energy & Transition Data Room is the second major component of Turin's measurement architecture. The Climate City Contract describes it as a research mirror located at the Energy Center of the Politecnico di Torino and intended to host a copy of relevant city data. It is based conceptually on coupling a data lakehouse approach, able to store and manage structured, semi-structured and unstructured data, with a distributed database approach intended to improve resilience and performance. The infrastructure is described as a hyperconverged cluster with a distributed architecture of five nodes and three copies of all data distributed across those nodes. This technical design is important because MEL depends on the capacity to integrate heterogeneous data sources while ensuring continuity, redundancy and high-performance querying (Città di Torino, 2024).

Data governance is therefore treated as an institutional and technical requirement for climate-neutrality governance. The submitted MEL material states that the city has established structured data pipelines and is developing standardised reporting templates with key partners. Environmental data are overseen by the Environment and Ecological Transition Department, financial data by the European Funds and PNRR Department, sectoral data by dedicated technical leads, and scientific validation by EST@energycenter. These arrangements respond to the practical reality that different datasets originate from municipal departments, utilities, regional agencies, national statistics, private companies and research organisations.

The case material also makes clear that data availability is uneven. In areas such as public building renovation and district heating expansion, indicator calculations are relatively more straightforward because activity data and emission factors are more established. In more dynamic domains, including private mobility behaviour, private fleet electrification and distributed renewable generation, aggregation and verification require additional modelling and cross-validation. The submitted material also identifies gaps around granular building-level energy performance, behavioural shifts in mobility, private sector data and co-benefits such as energy poverty alleviation or green-sector job creation. These gaps demonstrate why the measurement system must be adaptive and why modelled estimates, proxy indicators and periodic methodological updates are part of the MEL architecture.

Uncertainty is explicitly recognised. The submitted MEL material describes three main ways of managing it: scenario modelling and sensitivity analysis within CLICC; periodic updating of emission factors and modelling parameters using more recent national and European data; and a distinction between measured data and estimated projections. This is an important feature of robust MEL because it prevents the system from treating all indicators as if they had the same evidentiary status. It also enables collective interpretation when observed performance diverges from projections. Deviations can then be assessed as possible implementation delays, unrealistic assumptions, structural constraints or data-quality effects.

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The measurement architecture is also closely linked to the city ontology developed for the CLICC approach. The Action Plan presents the science-based support pillar as a process of systematically collecting, cleaning, validating and updating data that characterise sectors and sub-sectors of the urban system. This implies a view of the city as an interconnected system in which emissions sources, energy carriers, infrastructures, actors, investments and policy actions must be represented coherently. MEL is therefore dependent on data architecture, but the purpose of data architecture is governance: to enable policy choices to be compared, implementation to be tracked and pathways to be recalibrated as evidence changes (Città di Torino, 2024).

Indicators, co-benefits and distribution

Turin's indicator set combines emissions metrics, implementation variables, financial indicators and process-oriented metrics. For each macro-area, including stationary energy, transport, waste and AFOLU, indicators quantify direct CO_2 reductions, track implementation variables and reflect financial performance. Examples from the submitted MEL material include square metres retrofitted, kilometres of district heating expansion, renewable generation capacity, electrification rates, capital expenditure mobilisation and leverage ratios. Indicators were selected on the basis of data availability, robustness, replicability and decision-making relevance. This selection logic connects technical feasibility with governance use, because an indicator is valuable only if it can support monitoring, interpretation and action .

The balance between quantitative and qualitative indicators is a notable feature of the case. Quantitative indicators focus on tonnes of CO_2 reduced, renewable generation capacity and electrification rates. Qualitative or process-oriented indicators include governance innovations implemented, stakeholder engagement milestones and social innovation deployment. Early proxy indicators include building renovation rates, modal-shift indicators and district heating penetration. The submitted material recognises that some outcomes, such as behavioural change and private sector cultural transition, remain difficult to quantify and are therefore tracked through proxy and participation metrics. This is consistent with the broader logic of city-driven MEL, where early signs of systemic change may precede measurable emissions reductions.

The Climate City Contract confirms the centrality of indicators through Module B-3, which is dedicated to indicators for monitoring, evaluation and learning, and through the listing of indicator metadata. The same document also connects indicators with the 30 macro-actions and the 227 micro-actions uploaded to the CLICC platform to monitor their evolution. This creates a layered monitoring structure: macro-actions define the city-wide levers required to alter the emissions inventory, while micro-actions provide more operationally specific activities already in progress or to be developed. This structure supports both strategic tracking and operational follow-up, provided that data streams are maintained across implementation partners (Città di Torino, 2024).

Co-benefits are integrated into the Action Plan and the MEL material. The Climate City Contract states that for each macro-action, related co-benefits were identified in fields including air-quality improvement, energy poverty and social inequalities, and health. The submitted MEL material expands this by identifying improved air quality, health outcomes, energy cost savings, job creation and equity impacts as co-benefits reflected in supporting indicators where feasible. Examples include workforce participation in deep renovation programmes and reductions in household energy expenditure as proxy indicators for employment and energy poverty outcomes. This approach broadens the evaluative frame from emissions alone to the wider public value of climate action (Città di Torino, 2024).

The integration of co-benefits is important for distributional governance. Turin's city context includes an ageing population, ongoing economic restructuring and a business system dominated by small and micro-enterprises. A climate-neutrality pathway that depends on building renovation, transport transformation, heating electrification, district heating expansion and private investment will have social and economic implications. Co-benefit indicators can therefore help make visible whether

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implementation contributes to reduced energy expenditure, improved health, employment opportunities and more equitable outcomes. However, the submitted MEL material also indicates that the data required for co-benefit tracking are more complex and include socio-economic datasets, environmental monitoring and operational data from utilities and transport operators (Città di Torino, 2024).

Access to co-benefit data is uneven. Some datasets are routinely collected by public agencies such as ARPA Piemonte or ISTAT, while others require negotiation with private corporations or utilities. This raises issues of confidentiality, quality control and comparability. The Energy & Transition Data Room, data-sharing agreements and standardised reporting templates are therefore significant not only for emissions accounting but also for integrating wider social, economic and environmental indicators. The city's MEL system is presented as a way to connect these heterogeneous datasets into a common evidence base for adaptive management.

The indicator architecture also supports prioritisation. The submitted MEL material identifies deep renovation of existing buildings, decarbonisation and expansion of district heating, and electrification as among the most important macro-actions to monitor closely because they have high potential for emissions reduction, involve substantial public and private investment, and require alignment of technical, financial and regulatory mechanisms. Richer data layers and higher monitoring frequency are therefore assigned to these high-impact areas. In this way, indicators are not neutral reporting devices; they help determine where managerial attention, stakeholder engagement and resources need to be concentrated .

Use of MEL in decision-making and adaptive management

There are four interconnected purposes for Turin's MEL framework.

- First, it tracks progress along the 2030 neutrality trajectory.
- Second, it informs adaptive governance by revealing bottlenecks and opportunities for correction.
- Third, it supports investment oversight and capital mobilisation.
- Fourth, it provides accountability to residents, investors and European institutions.

This multi-purpose orientation is consistent with the Climate City Contract's own framing of the CLICC platform as a tool for comparing strategies, assessing costs and impacts, tracking trajectories and supporting corrective interventions (Città di Torino, 2024).

MEL informs decision-making through scenario comparison and cost-effectiveness assessment. Data from CLICC and associated dashboards allow planners to compare alternative pathways, assess marginal abatement costs and evaluate investment readiness. Actions that demonstrate strong emission impact, implementation feasibility and robust co-benefits can be elevated in priority. Conversely, actions that underperform against indicators can trigger renewed analysis of barriers and corrective measures. This creates an adaptive threshold logic: indicators are used not simply to judge success or failure, but to decide when a strategy needs to be adjusted .

Financial decision-making is a particularly important dimension of the case. The Climate City Contract estimates the investment cost of the macro-action package at EUR 27.1 billion. The submitted MEL material indicates that economic and financial indicators from the Investment Plan are linked to environmental indicators, including capital expenditure mobilisation and leverage ratios. This linkage enables monitoring to assess whether the financial conditions for emissions reduction are being created. It also allows the city to identify where public budgets, European funds, PNRR resources, private finance or utility investment may need to be aligned more effectively with implementation priorities (Città di Torino, 2024).

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Operational decision-making is also supported through sectoral monitoring. For building renovation, MEL can track renovation rates, associated emissions reductions, financial mobilisation and co-benefits such as energy cost savings. For district heating, MEL can track network expansion, decarbonisation of generation and interactions with electrification pathways. For mobility, MEL can monitor electrification rates, traffic limitation zones, alternative mobility uptake and public transport infrastructure. For waste, MEL can track waste reduction, separate collection and the possible contribution of carbon capture on waste-to-energy infrastructure. This sectoral use of MEL supports the city in interpreting implementation not as a list of isolated projects but as a portfolio of interacting interventions (Città di Torino, 2024).

Adaptive management is explicitly built into the system. The submitted MEL material states that findings from MEL can help reframe and adapt original assumptions and risks. If electrification rates depend on infrastructure expansion that lags behind schedule, the city can revisit sequencing strategies or complementary measures. If co-benefit indicators show uneven distribution of gains, corrective social policies may be considered. If updated data diverge from projected trajectories, the Transition Team can convene technical reviews to assess whether the divergence is due to implementation delays, assumptions or structural constraints. This positions MEL as a reflexive governance process rather than a compliance mechanism.

The capacity to revise indicators and assumptions is also institutionalised. The submitted material states that the Mission Team, supported by EST@energycenter, has scope to revise methodologies, indicators and reporting cycles where evidence suggests that changes would improve clarity, relevance or usability. Periodic review operates at multiple levels; EST@energycenter updates methods, emission factors, modelling parameters and scenario assumptions; the Mission Team reviews progress against the 2030 trajectory; and key stakeholders may be involved in consultative review sessions. This layered process maintains alignment between the baseline inventory, macro-action portfolio, investment commitments and long-term neutrality target .

This adaptive orientation is important because the Climate City Contract is based on a demanding and uncertain transition. Some high-impact measures depend on technological adoption, market conditions, private sector participation, regulatory frameworks and behavioural change. The city's MEL framework therefore cannot assume that the pathway designed ex ante will remain fully valid throughout implementation. It must instead provide a way to learn whether assumptions hold, identify which barriers are emerging and adjust the portfolio accordingly. The Turin case is thus a strong example of MEL as a navigational rather than purely retrospective tool (Città di Torino, 2024).

Learning, participation and communication

Learning in the Turin case is grounded in the connection between co-creation, modelling, data interpretation and revision. The co-design process described in the Climate City Contract involved working tables, workshops with thematic stakeholders, meetings addressed to young people and youth associations, and activities to engage vulnerable subjects. These activities were intended to inform participants about the Mission, create a common action perspective, co-create knowledge on the city's carbon footprint, initiate co-design of the action portfolio and engage stakeholders for implementation. This means that learning was not restricted to internal technical teams; it was part of the process through which the Climate City Contract was developed (Città di Torino, 2024).

Participation is also relevant during implementation. The submitted MEL material states that different stakeholder groups use the MEL system in different ways. Municipal leaders use indicators for strategic performance and policy adjustment, utilities integrate them into operational reporting cycles, financial partners use them for risk and return assessment, and civil society actors use them for transparency and advocacy. Core indicators such as total GHG reductions, renovation rates and investment performance become shared reference points for dialogue and accountability. This shared reference function is important because climate-neutrality implementation depends on actors whose decisions are distributed across the city system.

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Collective interpretation is another learning function. The submitted material states that assessment is not limited to technical calculation but includes structured interpretation involving internal and external stakeholders. At institutional level, the Mission Team reviews aggregated data outputs against impact pathways. Sectoral working groups examine individual macro-actions and identify cross-sector interactions. Sense-making is especially important where trade-offs arise, such as balancing district heating expansion with electrification strategies or reconciling transport decarbonisation with social equity considerations. In selected phases, interpretation extends to utilities, academic partners and organised civil society actors.

The digital infrastructure supports learning by enabling scenario testing and iterative recalculation. CLICC allows dynamic modelling, scenario comparison and automated documentation generation. While not all data streams are real-time, the system supports regular updates and recalculations. The Energy & Transition Data Room is intended to improve data integration and analytical capacity. The submitted MEL material notes that artificial intelligence is not yet systematically deployed across all sectors, although the modelling environment enables advanced algorithmic simulations and future opportunities may include predictive mobility analysis and building performance optimisation. These digital capacities are relevant only insofar as they feed into governance processes of interpretation and adaptation (Città di Torino, 2024).

Communication is treated as a differentiated governance function. The submitted material indicates that MEL outputs serve different audiences: European institutions and investors require credibility and evidence of progress; municipal leadership requires prioritisation and oversight; citizens require transparency; and private sector actors require signals about opportunities for alignment and partnership. The Climate City Contract's emphasis on inclusiveness and transversal communication is consistent with this, because the transition must be communicated not only as a technical decarbonisation programme but as a broader urban transformation agenda (Città di Torino, 2024).

Co-benefits are central to communication and narrative construction. Turin uses indicators related to air-quality improvements, job creation and reduced energy bills to present climate neutrality as a socio-economic transformation opportunity as well as an environmental imperative. Co-benefit evidence can also support investment by showing positive spillovers such as increased building value, reduced health costs or lower household energy expenditure. This narrative function matters because public and private support for implementation may depend on whether climate action is understood as delivering tangible benefits beyond carbon reduction.

The learning function is nevertheless still dependent on data quality, stakeholder participation and administrative capacity. The submitted material identifies ongoing challenges in data completeness, interoperability, private sector monitoring and co-benefit measurement. It also notes that high administrative workload can constrain the time available for revising methods and indicators, although the partnership with Politecnico di Torino helps mitigate this constraint. This suggests that learning must be actively resourced. Without time for synthesis, interpretation and revision, monitoring risks becoming stronger than learning even when the technical infrastructure is sophisticated.

Outcomes and impact

The outcomes of Turin's MEL system can be assessed in terms of governance capacity as well as projected emissions reduction. The Climate City Contract estimates that implementing the macro-action package would reduce emissions by 2 MtCO2 per year, equivalent to 85.2% of the 2019 baseline value of 2.4 MtCO2 per year. This quantified pathway is important, but the distinctive contribution of MEL lies in how the city has built a system to track whether the pathway remains credible as implementation proceeds. MEL supports the city in linking the target to actions, data, investment, actors and corrective governance processes (Città di Torino, 2024).

- **Integration of climate data and decision-making**. The CLICC platform and Energy & Transition Data Room provide the city with a structured way to organise evidence, test pathways, monitor actions and compare actual and expected trajectories. This reduces

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reliance on fragmented data handling and creates a common infrastructure for emission modelling, indicator calculation and documentation. The Climate City Contract presents this as part of a possible “Torino Model” for science-based support to cities in energy and environmental policy decision-making, potentially reproducible in other contexts (Città di Torino, 2024).

- **Integration of environmental and financial monitoring**. By linking CO_2 reduction indicators with capital mobilisation and investment readiness, the city can identify whether climate-neutrality implementation is being matched by the resources required. This is particularly significant given the EUR 27.1 billion estimated investment need. The MEL system can therefore support prioritisation, reveal financing gaps and provide evidence for engagement with investors, utilities, European institutions and national funding streams. In this sense, MEL contributes to the credibility of the Climate City Contract as an implementation framework rather than simply a strategic document (Città di Torino, 2024).
- **Stronger stakeholder accountability**. The co-design process created a basis for shared ownership of pathways and indicators, while standardised templates, data-sharing agreements and the CCC membership scheme described in the submitted material provide mechanisms for integrating private sector contributions. This is important because many relevant actions, including building renovation, private fleet electrification, renewable deployment and industrial efficiency, depend on actors outside direct municipal control. MEL can therefore help translate distributed contributions into a shared monitoring regime, though the submitted material also recognises that coverage and comparability of private sector data remain areas for improvement .
- **Improved capacity for adaptive management**. The system is designed to reveal deviations from the expected pathway and to support corrective actions. This can help the city identify where assumptions are unrealistic, where implementation is delayed, where enabling infrastructure is insufficient or where co-benefits are not being distributed as expected. The value of this outcome is not only technical; it is institutional. It gives the Mission Team, municipal departments and partners a structured reason to revisit choices, update models and reallocate attention or resources (Città di Torino, 2024).

Several limitations and risks remain. Data gaps persist in granular building-level energy performance, private mobility behaviour, distributed renewable generation, private sector emissions reductions and co-benefits such as energy poverty and green employment. Interoperability across legacy systems and partner databases requires ongoing coordination. Proxy indicators and scenario estimates must be used carefully to avoid overstating what has been measured. Administrative capacity must also be protected so that learning and adaptation are not displaced by reporting obligations. These limitations do not undermine the case; rather, they show why Turin’s MEL approach must remain iterative and why indicators should be treated as navigational instruments rather than fixed benchmarks .

2.5.6.3 Conclusion and lessons for mission-oriented urban climate governance

Turin’s experience offers several lessons for mission-oriented city climate governance.

- **MEL is most effective when it is designed with the impact pathways, action portfolio and investment plan**, rather than added afterwards as a reporting layer. In Turin, the indicator system is aligned with the 2019 baseline inventory, sectoral targets, 30 macro-actions, 227 micro-actions and investment tracking. This gives MEL practical relevance because the system measures what the city intends to govern, finance and adapt (Città di Torino, 2024).
- **Scientific modelling can strengthen city-driven MEL when it is embedded in governance**. The partnership between the municipality and EST@energycenter provides methodological capacity, scenario modelling, data architecture and validation. The CLICC

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platform and Energy & Transition Data Room demonstrate how digital infrastructure can support decision-making, but their governance value depends on their connection to municipal departments, sectoral leads, utilities, investors and stakeholders. Technical modelling therefore becomes a governance capability when it supports interpretation, prioritisation and revision (Città di Torino, 2024).

- **City-driven MEL needs to operate across a distributed governance landscape**. Turin's transition depends on municipal departments, public utilities, regional and metropolitan actors, financial institutions, industry, SMEs, third sector organisations, citizens, young people and vulnerable groups. The co-design process strengthened the relevance of impact pathways and indicators by incorporating feasibility constraints, investment needs and co-benefits. For other mission cities, this suggests that MEL systems should include mechanisms for external data contribution, shared interpretation and stakeholder accountability, not only internal administrative reporting (Città di Torino, 2024).
- **Co-benefits and distributional effects need to be integrated from the beginning**. Turin identifies co-benefits for each macro-action and links environmental indicators to air quality, health, energy cost savings, job creation and equity where feasible. However, the case also shows that co-benefit data are more difficult to access and interpret than many technical emissions indicators. Mission cities should therefore treat co-benefit monitoring as a methodological and governance challenge, requiring socio-economic data, proxy indicators, public agency cooperation, private data-sharing and careful interpretation (Città di Torino, 2024).
- **MEL should be understood as an adaptive management system**. Turin's framework is designed to compare actual and expected trajectories, distinguish measured and estimated data, revise assumptions, update indicators and initiate corrective action where pathways diverge from expectations. This is essential for climate-neutrality implementation because cities must act under conditions of uncertainty, technological change, market fluctuation, regulatory dependency and behavioural complexity. MEL therefore provides a way to maintain accountability while still allowing the pathway to evolve .

Overall, Turin illustrates a relatively advanced model of city-driven MEL in which monitoring, evaluation and learning are embedded in the operational governance of a Climate City Contract. The system links a quantified emissions baseline with macro-actions, micro-actions, co-benefits, digital platforms, data governance, financial tracking, stakeholder engagement and adaptive review. Its main challenge will be to sustain the institutional, technical and participatory capacity required to keep the system useful during implementation. For other mission cities, the key lesson is that MEL can support climate neutrality when it is treated not as a compliance requirement but as a reflexive governance capability: a way to organise evidence, align actors, steer investment, communicate value and revise action as the transition unfolds.

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D1.5.3. Case Study Anthology V2

3 Theme 3: Mission Governance

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3.1 Introduction

This chapter analyses how mission governance supports city-level climate neutrality transitions in four European Mission Cities: Umeå, Oslo, Turku and Aachen. It focuses on internal governance arrangements and cross-departmental coordination as key enablers of climate action, positioning mission governance as a mechanism that connects ambitious political commitments with everyday administrative practice and broader city governance.

Mission governance is understood here as the set of structures, roles, processes and ways of working through which a municipality organises itself to deliver a clearly defined, time-bound public goal - in this case climate neutrality - and turns that goal into coordinated action across departments, municipal companies and key external stakeholders towards the shared mission. This framing builds directly on the Cities Mission interview guide, which emphasises shared vision and objectives, coordination mechanisms, political and leadership support, clear roles and mandates, integration into everyday operations, changes to rules and norms, and the capacity to experiment and learn over time.

This chapter synthesises evidence from four in-depth mission governance case studies to provide an overview of how mission governance is currently designed and practised in different European urban contexts. It highlights convergences and divergences across the cases, and how different institutional choices respond to similar implementation challenges. It also distils practical lessons on institutional design options, enabling conditions and governance innovations that can inform other cities and policy-makers working within the EU Mission 100 Climate-Neutral and Smart Cities and related net-zero delivery frameworks.

The synthesis draws across the four city case studies on mission governance prepared for **Umeå**, **Oslo**, **Turku** and **Aachen**, complemented by a cross-city peer-learning workshop and the common Cities Mission interview guide on mission governance and cross-departmental coordination.

Across the four cities, data collection combined document analysis and semi-structured interviews. For each city, two in-depth interviews of approximately 90 minutes were conducted with senior officials directly involved in the design and implementation of climate-neutrality governance, typically including a Mission coordinator or climate director and a senior counterpart in a key implementing department. Interviews were conducted between December 2025 and March 2026 using the shared interview guide, which covers cross-administration coordination, roles and mandates, monitoring, rules and norms, and forward-looking challenges and opportunities.

Interview material was triangulated with municipal documents such as climate strategies, climate neutrality action plans, climate budgets and Climate City Contracts; with national and European programme documentation; and with analytical inputs from prior governance reviews and external support providers. In addition, a two-and-a-half-hour online city-to-city workshop on mission governance, held in April 2026, brought together representatives from all four cities to present their approaches and reflect jointly on internal governance, cross-departmental coordination, emerging breakthroughs and persistent obstacles. Observations and insights from this workshop form an additional comparative lens for the synthesis.

Table 7 includes the interview sample across the four cases. To protect anonymity, interviews are referenced in the text using only an interview number - without naming individual respondents or specifying their exact positions.

The interview guide was designed to focus less on individual attitudes and more on institutional arrangements, governance practices and organisational learning journeys. Insights from the interviews were integrated analytically into the cases rather than presented as extended narratives or quoted at length, in order to foreground governance mechanisms.

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Table 7 - Interviews

City	Interviewee(s) approximate role(s)	Interview	Date
Umeå	Senior strategic development officer, climate neutrality programme	Interview 1	Feb 2026
	Sustainability manager / boundary-spanning change leader	Interview 2	Feb 2026
Oslo	Senior official, Climate Agency - climate strategy and budget	Interview 3	Dec 2025
		Interview 4	Jan 2026
Turku	Climate director, Climate, Nature and Circular Economy Team	Interview 5	Jan 2026
	Senior specialist, climate plan implementation	Interview 6	Feb 2026
Aachen	Mission manager / head of Climate Neutral Office	Interview 7	Feb 2026
		Interview 8	Mar 2026

The four cities were selected to highlight geographical diversity, institutional variety and differences in climate-governance approaches within the EU Cities Mission, while sharing substantive climate-neutrality commitments and participation in NetZeroCities support programmes.

Together, they span a Nordic mid-sized city in northern Sweden, the Norwegian national capital with a long-established climate budget and climate agency, a rapidly growing coastal city in south-west Finland, and a German university city embedded in a structurally transforming coal-mining region. All four have developed Climate City Contracts and related climate plans, and all participate in national or European climate-city initiatives beyond the Mission.

Table 8 summarises key contextual characteristics across the four cities, drawing on Section 1 of the individual case studies. It provides a basis for interpreting differences in mission governance design, particularly in relation to demographic structure, economic profile, regional setting and climate-policy trajectories.

Despite their differences, the four cities share several structurally important features: all are regional centres with significant higher-education and research sectors; all face transport and building emissions as major mitigation challenges; and all have chosen to anchor climate neutrality in formal council decisions and integrated climate plans rather than treating it as a purely project-based agenda. These commonalities create a shared foundation for experimenting with mission governance as a lever for systemic transformation.

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Table 8 - Comparative information across the four city cases.

City	**Population and demographics**	**Regional and geographic setting**	**Economic profile**	**Climate targets and mission framing**
Umeå	≈135,000 residents in the municipality with sustained annual growth of around 1,400 people and a relatively young age profile.	Northern Sweden, coastal city on the Bothnian Bay, regional hub for Västerbotten County with a subarctic but coastal-moderated climate.	University and research city with strong knowledge-intensive services, public sector employment and green industrial linkages in the wider region.	Layered climate-neutrality targets: climate-neutral municipal organisation by 2025, urban area by 2030, municipality by 2040, and consumption-based emissions of 1 tCO_2e per capita by 2050, framed under the "Climate Neutral Umeå 2040" programme.
Oslo	≈710,000 residents in 2023, with strong population growth over the last decade and a relatively young demographic profile and high share of foreign-born residents compared to Norwegian average.	Capital of Norway, located at the head of the Oslo Fjord, combining dense urban districts with extensive protected forest areas and functioning as national political and economic and cultural centre.	Service-based metropolitan economy centred on public administration, knowledge-based services, finance, ICT, education and construction.	Ambition to reduce territorial greenhouse gas emissions by 95% by 2030 compared with 2009, combined with a 10% reduction in total energy use and substantial cuts in consumption-based emissions, framed through a Climate Strategy and Climate Budget.
Turku	Over 200,000 residents in the municipality and more than 300,000 in the wider urban region, with steady recent growth and an increasingly multicultural population.	Historic coastal city in south-western Finland at the mouth of the Aura River on the Baltic Sea, regional capital of Southwest Finland and key Baltic Sea hub.	Diverse economy with major sectors in maritime and shipbuilding, technology and life sciences, logistics and transport services.	Target of carbon neutrality by 2029 - equivalent to a 90% reduction in emissions from 1990 levels - with a subsequent shift toward climate positivity and "resource wisdom", framed through a SECAP-based Climate Plan and recognised by the EU Mission Label.
Aachen	≈262,000 residents in 2022 with moderate growth and a young demographic profile strongly shaped by four universities and a large student population.	Westernmost city in Germany, bordering Belgium and the Netherlands, regional centre for a nine-municipality city region and located on the fringe of the Rhenish mining district.	Heterogeneous urban economy combining services, trade and logistics with manufacturing - especially mechanical engineering - and a large higher-education and research sector.	Climate-neutrality target for 2030 grounded in a proportional share of the remaining global GHG budget, anchored in an Integrated Climate Protection Concept (IKSK 2.0) and a Climate City Contract co-signed by a broad coalition of local actors.

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3.2 Key themes in mission governance

This section presents insights from the four cities across core themes of mission governance. For each theme, it synthesises how mission governance processes are practically organised in Umeå, Oslo, Turku and Aachen.

3.2.1 Mission, common vision and shared objectives

Across all four cities, climate neutrality is framed as a whole-of-city mission that must be embedded in core municipal strategies, rather than as an add-on environmental programme.

In Umeå, climate neutrality is one of four overarching municipal goals alongside sustainable growth and two dimensions of social sustainability, institutionalised through the Programme for a Climate Neutral Umeå 2040 in the municipal planning directive. Climate objectives are thus explicitly positioned as integral to the city's overall development trajectory rather than as a separate sustainability track (Interviews 1-2).

In Oslo, the mission framing is articulated primarily through the Climate Strategy and the Climate Budget. The city rarely uses the language of "mission" internally, but functionally treats climate neutrality as a central organising goal, with the Climate Budget serving as a yearly operationalisation of the overarching targets. The fact that the Climate Strategy enjoys broad support across almost all political parties has been crucial for establishing a shared direction, giving the climate agenda continuity across electoral cycles and providing a strong mandate for the Climate Agency's coordinating role (Interviews 3-4).

Turku presents climate neutrality in 2029, coinciding with the city's 800th anniversary, as a defining milestone for its future identity. The mission is framed in increasingly integrated terms that combine mitigation, circular economy and nature positivity, with climate, nature and circular economy now treated as equal pillars in the city's strategic framework. The Climate Plan, Circular Economy Roadmap and emerging Nature Roadmap together define a wider sustainability mission that extends beyond emissions reductions towards questions of "resource wisdom" and sustainable lifestyles (Interviews 5-6).

In Aachen, the mission narrative is grounded in a layered mandate that combines a 2020 council resolution linking the city's climate target to its proportional share of the remaining global GHG budget, a citizen-led petition adopted unanimously in 2022 that sets climate neutrality by 2030, and a Climate City Contract co-signed by over 150 organisations. This combination of political resolutions and civic mobilisation gives the mission a particularly strong normative and democratic underpinning, even as the challenge remains to translate this into everyday ownership across a 6,000-person administration (Interviews 7-8).

3.2.2 Mission governance context and transition teams

Each city has developed a core coordination structure, a transition team or equivalent mission governance nucleus/nodes, that sits at the intersection of political leadership, central administration and sectoral departments.

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These structures differ in their formal status, composition and degree of centralisation, but they play analogous roles in steering the mission, maintaining cross-departmental alignment and interfacing with external partners and support programmes.

In Umeå, mission governance is deliberately distributed rather than concentrated in a single climate office. The Strategic Development Unit within the City Management Department houses the designated officers responsible for coordinating the climate neutrality programme, including the steering mechanism for the municipality and municipal companies and the secretariat for the Umeå Climate Roadmap partnership. This unit sits close to the city manager and oversees a portfolio of sectoral transition teams - for energy transition, mobility transition and construction emissions - that bring together relevant departments, municipal companies and external stakeholders around specific transition domains (Interviews 1-2).

Oslo's transition team is more centralised. The Climate Agency, established in 2016, functions as a dedicated climate office with a broad mandate not only to coordinate but also to initiate and propose new measures. Located close to the Governing Mayor within the Department of Environment and Transport, the agency concentrates climate expertise in one unit of around 50 staff and is responsible for drafting the Climate Budget, negotiating measures with departments and agencies, and coordinating Oslo's participation in EU and city-network initiatives. Its integrative leadership role is widely recognised as a core success factor (Interviews 3-4).

In Turku, the Climate, Nature and Circular Economy Team within Business and Economic Development Services serves as the strategic hub for mission governance. The team, led by the Climate Director and comprising around thirteen professionals, is responsible for developing and updating the Climate Plan and for coordinating implementation and stakeholders engagement. Its location - recently moved from a position akin to the Mayor's Office into an economic-development service division - reflects an intentional effort to embed climate work in the city's broader development and investment agenda, while maintaining strong links to central administration and political leadership (Interviews 5-6).

Aachen's mission governance context is shaped by a distributed Mission Management Team (MMT) and a Steering Circle that together form the core transition team. The MMT coordinates three strands - EU Mission coordination, IKSK implementation and Climate City Contract partner engagement - across different parts of the administration and the externally positioned Climate Neutral Office. The Steering Circle, comprising two Deputy Mayors and departmental heads, functions as the primary forum for strategic steering, reviewing progress and taking key mission-related decisions. This architecture emerged through an iterative redesign process supported by external facilitators, moving from loosely connected project structures towards a clearer, more formalised governance system (Interviews 7-8).

3.2.3 External support and influence on governance

External support from European and national programmes, consultancies and peer-city networks has played an important role in shaping how mission governance has evolved in all four cities, albeit in different ways.

In Umeå, NetZeroCities support has been particularly influential through a governance review of the Umeå Climate Roadmap partnership conducted by an external think-tank. Applying a "humble governance" framework, this review prompted a critical reflection on the partnership's structure and led to recommendations such as establishing smaller working groups with clearer mandates and clarifying the distribution of roles between the municipality and external partners (Interviews 1-2).

Oslo's climate governance model predates the Cities Mission and has not been fundamentally redesigned through external support. Instead, NetZeroCities and other international initiatives have

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functioned mainly as platforms for topic-specific peer learning and for influencing European and global agendas on issues such as fossil-free construction. Oslo has used networks like C40 and ICLEI to disseminate its climate budget model and to co-shape markets for zero-emission construction, rather than to reconfigure its internal governance (Interviews 3-4).

In Turku, external support has been closely tied to internal organisational development. Participation in NetZeroCities pilot project has enabled the city to dedicate work packages to internal communication and capacity building, including climate and nature dialogue trainings and climate leadership development. The EU taxonomy has provided a methodological frame for the climate budget, while collaboration with external consultants has supported the design of new cross-sectoral steering groups on wellbeing, business and environment that are intended to reinforce horizontal governance of strategic themes (Interviews 5-6).

Aachen offers one of the clearest examples of external governance support as a direct lever for mission governance redesign. Long-term facilitation by an external consultancy, supported through NetZeroCities, enabled off-site retreats with senior leadership and mission team members that surfaced tensions around roles, decision-making and reporting lines. The resulting redesign formalised the Mission Management Team and Steering Circle, clarified reporting cycles, and introduced coaching for preparing agenda items and decision proposals. External project frameworks have likewise provided protected space for experimenting with green procurement and new financial instruments that would have been difficult to introduce through standard administrative processes alone (Interviews 7-8).

3.2.4 Roles, mandates and organisational set-up

Clarifying how responsibility for the Mission is distributed across departments, municipal companies and external actors is a central task of mission governance. All four cities have taken steps to formalise roles and align mandates with mission objectives, but they continue to navigate gaps and overlaps, especially in cross-cutting domains such as sustainable mobility, public procurement and emissions from the municipality as an employer.

In Umeå, the City Council's decision to introduce a new steering mechanism for the four overarching municipal goals, including climate neutrality, has been a major structural shift. Specific political committees and municipal companies are formally designated as responsible for each goal, and the Strategic Development Unit holds the city-officer roles for climate. At the same time, a core-mandate framework in the planning directive emphasises that committees and companies must fulfil their core mandates before taking on strategic objectives, requiring climate objectives to be interpreted and implemented in ways that align with long-term organisational purposes rather than being added as external demands (Interviews 1-2).

Oslo's approach to roles and mandates centres on embedding climate responsibilities through the Climate Budget. The Climate Agency co-develops measures with relevant departments and agencies, but once the Climate Budget is approved by the City Council it becomes legally binding, assigning clear responsibility for implementation and reporting to specific entities. This structure ensures that climate measures are treated on a par with financial commitments, and it creates a strong incentive for departments to engage proactively in measure design rather than risk having externally designed measures imposed on them (Interviews 3-4).

In Turku, the Climate, Nature and Circular Economy Team plays a coordinating and enabling role, but implementation responsibilities remain distributed across service divisions and city-owned companies. The Climate Plan is gradually becoming more explicit in assigning responsibilities in thematic areas such as nature and carbon sinks, while tools like EU taxonomy-based climate budgeting and climate investment planning are used to embed climate considerations in departmental investment decisions.

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However, some domains - for example climate engagement in schools and kindergartens - still rely heavily on individual motivation and lack fully formalised mandates (Interviews 5-6).

Aachen has pursued a mixed approach. Under the IKSK, 36 climate protection managers have been appointed across departments, each responsible for specific measures, representing a systematic attempt to embed Mission responsibilities into existing organisational units. Yet many mission-related tasks, including coordination of the EU Mission, continue to be carried as add-ons to pre-existing roles without formal job-description changes. This selective formalisation leads to variation in how fully the mission is integrated into departmental routines, with some managers well embedded and others struggling to reconcile climate tasks with competing priorities (Interviews 7-8).

3.2.5 Coordination mechanisms and cross-departmental work

Mission governance requires both formal and informal coordination mechanisms that enable departments and municipal companies to work together on cross-cutting transition challenges. All four cities combine structured interdepartmental forums with project-based collaboration and relational work, though the balance between these elements varies.

In Umeå, a significant evolution has been the dissolution of dedicated programme steering groups for the four overarching goals and the transfer of their functions to existing senior governance bodies: the city manager's group of departmental directors and the municipal companies' group of chief executives. This shift embeds climate governance discussions in forums with genuine decision-making authority and aligns climate considerations more closely with financial and strategic deliberations. Sectoral transition teams and the Climate Roadmap secretariat provide more specialised spaces for coordination at the operational level, particularly with external partners (Interviews 1-2).

Oslo's main coordination mechanism is the Climate Budget process itself, which requires all departments and agencies to engage in measure development, commit to output indicators and report progress three times a year. The Climate Agency also convenes cross-departmental working groups on specific issues - such as climate adaptation - and works bilaterally with departments to develop measures tailored to their mandates. A key cultural practice is investing time in building a shared vocabulary and mutual understanding, recognising that departments operate with different professional languages and priorities (Interviews 3-4).

Turku coordinates cross-departmental work through a combination of climate-plan update processes, thematic internal working groups and emerging cross-sectoral steering groups. The periodic evaluation and revision of the Climate Plan functions as a major participatory process, involving around 200 internal and external experts and giving departments a direct role in shaping sectoral goals and measures. This process, alongside regular internal working groups on sustainable construction, circular economy and climate communication, has been central to building shared ownership and clarifying how climate objectives relate to each department's everyday work (Interviews 5-6).

In Aachen, the formal coordination architecture consists of four tiers: the Steering Circle for strategic political and administrative steering; the Mission Management Team for operational coordination; a climate team that brings together project managers responsible for IKSK measures; and a Climate City Contract Curatorium that engages premium partners and political leaders. Beyond these formal structures, leadership has explicitly encouraged informal network-building through lunch meetings, "climate breakfasts" and bilateral check-ins, recognising that trust-based relationships are often essential to enabling cross-departmental collaboration in practice (Interviews 7-8).

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3.2.6 KPIs, monitoring and everyday operations

Monitoring progress on the Mission and integrating indicators into everyday operations are persistent challenges across the four cities. All have developed multi-layered monitoring architectures that combine territorial emissions inventories with programme or measure-level indicators, but all also face methodological and organisational difficulties in linking specific actions to measurable emission reductions and in embedding indicators into management routines.

In Umeå, national regional emissions statistics provide the main source for territorial emissions monitoring, supplemented by sector-specific data such as bicycle counts, travel surveys and energy-usage figures. Annual programme reports compile this information into a narrative of progress on the four overarching goals. The city is moving toward prognosis-based reporting that models future trajectories, inspired by other Swedish cities. Even so, it continues to grapple with attribution challenges and with incomplete integration of climate indicators into departmental operational plans (Interviews 1-2).

Oslo's monitoring system is closely tied to the Climate Budget. Output indicators are defined for each measure - for example kilometres of new bike lanes or number of public charging stations - and responsible entities report progress three times a year. A "Climate Barometer" provides near-real-time indicators across key sectors, complementing the annual emissions inventory. Indicators are developed in collaboration between the Climate Agency and departments and are embedded into departmental activity plans, ensuring at least a baseline integration into everyday operations. Nonetheless, the city continues to refine methodologies and data sources, recognising that early versions of indicators were sometimes crude and that methodological improvement is an ongoing process (Interviews 3-4).

Turku uses annual climate reporting to the City Council to monitor implementation of the Climate Plan, alongside sectoral indicators and EU taxonomy-based assessment of investments above a certain threshold. The climate budget, while structured differently from Oslo's, functions as a lens to examine whether major investments align with climate and sustainability criteria. Internal and external communication tools - including a "climate situation room" online platform and climate webinars - help to feed monitoring insights back into organisational learning and public awareness, but integrating indicators systematically into all departmental routines remains a work in progress (Interviews 5-6).

Aachen utilises an annual CO_2 balance following national standards as the primary territorial indicator, complemented by measure-level tracking in tools such as PlanForge and sector-specific indicator sets - for example, a mobility strategy with 25 ratified indicators. However, the CO_2 balance aggregates sources that are both within and outside municipal influence - including highway transit traffic - which creates difficulties for attributing changes to municipal measures and can distort political perceptions of sectoral performance. The mission team therefore invests significant effort in interpreting and explaining indicators for decision-makers, highlighting where observed trends reflect factors outside the city's control (Interviews 7-8).

3.2.7 Rules, norms and internal institutional change

Mission governance extends beyond formal structures to encompass changes in rules, procedures, organisational culture and norms. All four cities report incremental but important shifts in areas such as procurement, budgeting, risk culture and internal capacity-building, often emerging from specific projects and experiments rather than from comprehensive reform packages.

In Umeå, the municipal planning directive and the 0.5% budget allocation rule - requiring all political committees to allocate a share of their budgets to the overarching goals - represent notable rule

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changes that broaden financial responsibility for climate work beyond traditionally “green” departments. The revision of procurement policies, shifting responsibility for climate criteria from the procurement unit to ordering departments, is another example of institutional redesign intended to embed climate considerations more deeply in everyday decision-making (Interviews 1-2).

Oslo has used the Climate Budget as a vehicle for steady evolution of rules and norms. Procurement regulations now require environmental weighting in public tenders, and zero-emission standards have been introduced for municipal construction sites, supported by a proactive and experimental approach to piloting new criteria. Organisational culture has gradually shifted, with initial scepticism about measures such as fossil-free construction giving way to wider acceptance following successful pilots. This illustrates how experimentation can de-risk change and help internalise new norms (Interviews 3-4).

Turku has reoriented budgeting and investment planning through EU taxonomy evaluations and climate-budget work, encouraging departments to consider climate and sustainability criteria in project design and appraisal. Capacity-building initiatives under NetZeroCities projects - such as nature webinars, climate dialogue trainings and participation in city-wide HR webinars - have sought to normalise climate and nature themes as part of mainstream professional development, not only as specialised topics for climate staff (Interviews 5-6).

In Aachen, institutional change has been largely pragmatic and project-driven. A prominent example is the experimental introduction of lifecycle-based procurement criteria, including CO_2 shadow pricing, within an externally funded project on green procurement. Internal auditing, typically a guardian of compliance and cost-effectiveness, agreed to treat project procurements as experimental, allowing deviations from standard price-weighting rules. Once piloted successfully, these approaches are moving towards formal adoption, illustrating a pattern in which practice precedes and legitimises rule change rather than the other way around (Interviews 7-8).

3.2.8 Leadership, political support and multi-level context

Strong and relatively stable political support has been a precondition for ambitious mission governance in all four cities, though the nature of this support and its interaction with changing political landscapes differ. Leadership by mayors, deputy mayors and senior officials has been crucial in legitimising mission governance innovations and in sustaining momentum through periods of organisational strain.

In Umeå, climate neutrality is anchored in formal council decisions that elevate it to one of four overarching goals, providing a strong political mandate. The city manager and development director play visible roles in championing the mission internally, while participation in national programmes such as Viable Cities and regional networks underscores the city’s role in a broader green industrial transformation in northern Sweden. Leadership has also been important in navigating tensions between central coordination and departmental autonomy, particularly as the governance model has shifted from centralised steering groups to more distributed responsibility (Interviews 1-2).

Oslo benefits from unusually broad political consensus on climate policy, with the Climate Strategy supported by almost all parties in the City Council. This continuity has allowed the Climate Agency to operate with a clear and enduring mandate across changes in governing coalitions, focusing on implementation rather than re-justifying basic goals. At the same time, Oslo’s strong international profile and engagement in networks such as C40 and NetZeroCities reinforce political ambition by situating local efforts within a wider global leadership narrative (Interviews 3-4).

In Turku, both the previous and current mayors have been active climate leaders, including through roles in networks such as ICLEI. Climate and nature are strongly reflected in the mayoral programme

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and city strategy, providing political backing for the climate team's work. Political leadership has been important in sustaining long-term processes such as the Climate Plan updates and the establishment of climate partner networks, even when departmental structures and leadership change (Interviews 5-6, 2026).

Aachen's political context is distinctive in that two successive changes of mayoral leadership - from a green-led to a centre-right administration - have not altered the formal commitment to the 2030 climate-neutrality target. Instead, what has shifted is the narrative frame: from a broader future vision to an emphasis on structural economic transition in the post-coal Rhenish mining district. Deputy mayors responsible for climate and urban development have played central roles in maintaining mission credibility and in anchoring the Climate City Contract politically, while the citizen-led petition provides an additional democratic mandate that mission governance actors can invoke when negotiating internally contested decisions (Interviews 7-8, 2026).

3.3 Comparative review of mission governance approaches

Building on the thematic overview, this section compares how the four cities operationalise mission governance across the main dimensions.

Table 8 provides a high-level comparison of mission governance arrangements in Umeå, Oslo, Turku and Aachen across the main themes of the analytical framework. It captures the most salient similarities and differences relevant for understanding how each city has organised itself to deliver on its climate-neutrality mission.

The table also shows that while all four cities use similar building blocks - climate plans, climate budgets, partnership frameworks - they combine them in different ways which reflect their institutional histories, administrative cultures and political contexts.

3.3.1 Distinctive strengths across the four cases

Each city exhibits distinctive strengths in its mission governance approach that are instructive for other Mission Cities.

In Umeå, a key strength lies in the intentional integration of climate neutrality into the municipality's core governance architecture. By framing climate neutrality as one of four overarching goals, anchored in the Programme for a Climate Neutral Umeå 2040 and operationalised through a steering mechanism that designates responsible committees and companies, the city has avoided the trap of treating climate as a parallel agenda. The Umeå Climate Roadmap partnership further extends this integration to external actors, with a structured cycle for commitment, action and learning.

Oslo's most notable strength is the maturity and coherence of its climate budget model, which tightly couples political targets, departmental responsibilities, indicators and financial planning. The Climate Agency's strong mandate and integrative role, combined with the legal status of the Climate Budget as part of the city's financial budget, give Oslo a powerful governance instrument that is rare among cities. Over a decade of iterative refinement has produced a system that is both structured and adaptable, capable of incorporating new themes such as consumption-based emissions and climate adaptation as understanding and data evolve.

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Table 9 - Comparison of key dimensions of Mission Governance across cases

	Umeå	Oslo	Turku	Aachen
Transition team / core coordination	Strategic Development Unit in City Management Department, plus sectoral transition teams and Climate Roadmap secretariat; distributed governance model.	Dedicated Climate Agency with broad mandate to coordinate and initiate measures; centralised climate office close to Governing Mayor.	Climate, Nature and Circular Economy Team as strategic hub within Business and Economic Development; strong links to central administration.	Mission Management Team spanning administration and Climate Neutral Office, overseen by a Steering Circle of deputy mayors and department heads.
Primary governance tools	Programme for a Climate Neutral Umeå 2040, municipal steering mechanism for overarching goals, Umeå Climate Roadmap partnership framework.	Climate Strategy and integrated Climate Budget as Chapter 2 of the financial budget; Climate Barometer for indicators.	SECAP-based Climate Plan, climate budget linked to EU taxonomy for investments, Climate City Contract and climate partner networks.	Integrated Climate Protection Concept (IKSK 2.0), Climate City Contract with multi-tier partner commitments, annual CO_2 balance and PlanForge tracking.
Distribution of roles and mandates	Council designates responsible committees and companies for overarching goals; Strategic Development Unit supports departments; core-mandate framework shapes how climate objectives are interpreted.	Climate Budget assigns legally binding responsibility for measures to specific departments and agencies; Climate Agency leads design and assessment.	Implementation responsibilities distributed across service divisions; Climate Team provides strategic guidance; responsibilities gradually clarified in updated Climate Plan.	36 climate protection managers across departments; mission roles partly formalised and partly based on add-on tasks; Climate Neutral Office bridges administration and external partners.
Cross-departmental coordination	Senior coordination through city manager's group and municipal companies group; sectoral transition teams and Climate Roadmap secretariat; informal forums such as "growth breakfasts".	Climate Budget process as central coordination mechanism; cross-departmental working groups on specific themes; intensive bilateral engagement by Climate Agency.	Participatory Climate Plan updates involving around 200 experts; internal working groups on sustainable construction, circular economy and communication; emerging cross-sectoral steering groups.	Four-tier coordination architecture (Steering Circle, Mission Management Team, climate team, CCC Curatorium) plus informal lunches and climate breakfasts encouraged by leadership.
Monitoring and indicators	National regional emissions statistics, annual programme reports, and evolving prognosis-based reporting; integration of indicators into departmental plans still uneven.	Annual emissions inventory, Climate Budget output indicators with thrice-yearly reporting, and a Climate Barometer with near-real-time indicators embedded in departmental plans.	Annual climate report to council, sectoral indicators and taxonomy-based investment assessment; climate situation room and webinars used for feedback and learning.	Annual CO_2 balance, PlanForge for IKSK measures, sectoral indicator sets (e.g. mobility strategy), and scenario tools such as ClimateView; significant attribution challenges.
Rules, norms and institutional change	0.5% budget allocation for overarching goals, revised procurement responsibilities and core-mandate logic; ongoing efforts to embed climate into HR and organisational routines.	Environmental weighting in public procurements, zero-emission criteria for construction, and iterative refinement of Climate Budget methodologies; growing culture of experimentation.	EU taxonomy integrated into budgeting and investment planning; capacity-building projects (webinars, trainings) mainstream climate and nature topics.	Project-based experimentation with lifecycle procurement, financial architecture and capacity-building, often preceding formal rule changes; culture of pragmatic adaptation.

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Turku stands out for its systematic and long-term approach to internal and external engagement. The participatory processes used to develop and update the Climate Plan, involving around 200 internal and external experts, have been central to building shared ownership across a wide range of departments and stakeholders. The integration of climate, nature and circular economy into a coherent sustainability framework, supported by dedicated strategic documents and the Climate Team network and Climate Partner network, gives Turku a relatively holistic mission governance architecture that extends beyond emissions to broader ecological and social questions.

Aachen's strength lies in its layered mandate and the way it has used external support to navigate a complex governance environment. The combination of council resolutions, a citizen-led petition and a broad coalition of Climate City Contract partners provides a strong democratic foundation for the Mission. The iterative redesign of mission governance, facilitated by external partners, demonstrates a willingness to critically examine and adjust internal structures - a form of institutional learning that is itself a hallmark of effective mission governance. Aachen's use of project frameworks to pilot changes in procurement, finance and communication also illustrates how cities with constrained capacity can nonetheless innovate institutionally.

3.3.2 Shared challenges and governance trade-offs

Despite their differing strengths, the four cities face a set of shared challenges that highlight the governance trade-offs inherent in mission-oriented approaches.

- A first shared challenge concerns extending ownership of the mission beyond core climate departments and politically engaged units. Even where political support is strong and climate is embedded in high-level strategies, departments whose mandates appear less directly linked to climate - such as education, social services or business development - are often slower to integrate climate objectives into their routines. This creates an ongoing governance task of translating mission goals into meaningful roles for all parts of the organisation.
- A second challenge relates to mandate ambiguities in cross-cutting domains. In Umeå, responsibility for emissions from staff commuting - identified as the largest emission source for the municipality as an organisation - remains contested between the technical department, HR and the strategic development unit. In Turku and Aachen, responsibilities for mobility are split between planning and service provision, complicating coordinated action on transport. In Oslo, while mandates are relatively clear, some emerging domains such as circular economy have required explicit clarification of the Climate Agency's role. These examples underline that mission governance often exposes gaps and overlaps in existing institutional designs, requiring sustained negotiation rather than one-off organisational charts.
- A third shared challenge is the attribution problem in monitoring: politicians and the public increasingly expect clear evidence that climate investments translate into emission reductions, yet causal links between specific measures and aggregate emission trends are often difficult to demonstrate. All four cities rely on combinations of territorial inventories and measure-level indicators, but each acknowledges that their systems cannot fully trace the impact of individual actions. This creates pressure on mission governance actors to develop intermediate indicators, narrative explanations and evaluation practices that are credible enough to sustain political support while acknowledging uncertainty and complexity.
- Finally, sustaining organisational capacity over time is a common concern. Mission governance often depends on a relatively small set of highly committed individuals - climate directors, mission managers, senior strategists - who act as relational linchpins and knowledge carriers. Turnover in these roles, coupled with broader staff changes and shifting political priorities, can threaten continuity. Cities respond through formalisation (e.g.

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establishing permanent positions and embedding responsibilities in job descriptions) and through institutionalisation of processes (e.g. recurring climate-plan updates, routine reporting cycles). Even so, all four cases suggest that mission governance remains vulnerable to capacity constraints and that building resilient teams and knowledge systems is an ongoing governance priority.

3.3.3 Shared challenges and opportunities

Drawing together the comparative insights, several cross-cutting challenges and opportunities stand out as particularly salient for Mission Cities seeking to strengthen mission governance. These relate to anchoring the mission in core governance, deepening internal integration, navigating multi-level constraints and expanding the scope of mission governance beyond mitigation alone.

On the challenge side, all four cities grapple with how to move from climate as a strategic priority to climate as a routine consideration in everyday decisions across all departments and levels. This involves not only formal instruments - such as climate budgets, taxonomy-based investment screening and earmarked budget shares - but also cultural work to make climate objectives meaningful and actionable for staff whose daily tasks do not obviously relate to emissions. It also requires confronting the limits of municipal influence in domains such as consumption-based emissions, private building stock and regional mobility, and developing governance strategies that mobilise external actors without over-stretching municipal mandates.

On the opportunity side, mission governance frameworks create leverage points that cities can use to accelerate broader governance innovation. The Cities Mission label and Climate City Contracts provide external reference points that can justify internal reforms and new practices, as seen in Turku's climate budgeting and Aachen's procurement experiments. External governance reviews, such as Umeå's partnership assessment or Aachen's mission-governance facilitation, can surface tensions that are difficult to articulate internally and provide structured processes for working through them. City-to-city peer learning, as reflected in the joint workshop, offers a space for comparing governance choices and outcomes, giving practitioners both inspiration and cautionary tales.

Another opportunity lies in expanding mission governance beyond mitigation to encompass adaptation, just transition and broader ecological concerns. Turku's integration of climate, nature and circular economy as equal pillars, and Aachen's focus on post-coal structural transformation, point to emerging multi-dimensional missions that require even more integrated governance approaches. As climate impacts intensify and social equity concerns come to the fore, cities will need mission governance frameworks that can hold multiple, sometimes competing, objectives in view and that can support difficult trade-offs transparently.

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3.4 Conclusions and outlook

The four mission governance cases examined in this synthesis demonstrate that mission governance can function as a powerful accelerator of city-level climate transitions when it successfully combines clear political mandates, adaptive coordination structures, robust yet pragmatic monitoring and a deliberate focus on institutional learning and cultural change. While each city has followed a distinct governance trajectory, several common design principles emerge.

- First, anchoring climate neutrality in core municipal governance - through overarching goals, integrated climate strategies and budgets, and formal council decisions - appears crucial for giving mission governance sufficient authority and durability. Climate missions that remain at the level of projects or voluntary commitments risk being marginalised when fiscal or political pressures mount. By contrast, when missions are embedded in planning directives, budget rules and performance frameworks, they are more likely to shape day-to-day decisions and survive electoral cycles.
- Second, effective mission governance depends on a balance between central coordination and distributed ownership. Central units such as Oslo's Climate Agency, Turku's Climate Team, Umeå's Strategic Development Unit and Aachen's Mission Management Team provide essential integrative capacity, but they cannot deliver the mission alone. The most promising arrangements are those that combine strong central hubs with mechanisms that empower line departments, municipal companies and external partners to take responsibility for specific parts of the mission in ways that align with their mandates and capabilities.
- Third, experimentation and learning are core features rather than by-products of mission governance. All four cities have used pilots, projects and external support frameworks to test new rules, instruments and collaboration formats - from zero-emission construction criteria and green procurement to climate communication trainings and new steering groups. These experiments have generated both tangible emission reductions and less tangible but equally important institutional learning, gradually shifting norms and expectations about what constitutes "normal" governance practice in the context of climate emergency.

Looking ahead to 2030 and beyond, mission governance in these cities faces a dual task. First governance needs to evolve to deepen internal integration by extending climate ownership to all parts of the municipal family, refining monitoring and evaluation systems and securing stable capacity and resources. Second, it must align with, or integrate, emerging agendas such as climate adaptation, biodiversity and just transition, at the same time as engaging and creating shared ownership of the climate governance with private sector actors, civil society and residents as co-creators of transformative change. The experience of Umeå, Oslo, Turku and Aachen suggests that this is possible if mission governance remains adaptive, reflexive and open to critical self-examination.

For the broader Mission Cities community and policy-makers, the cases underscore the value of sustained governance support that goes beyond technical guidance and project funding to include facilitation, peer-learning and institutional experimentation. As Mission Cities move from planning to large-scale implementation, mission governance will increasingly be judged not only by its ability to design strategies but also by its capacity to navigate difficult trade-offs, maintain public legitimacy and institutionalise climate action as an ordinary part of governing the city. The four cases analysed here offer concrete examples of how this can be done, and of the work that still lies ahead.

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3.5 City Cases: Mission Governance

3.5.1 Umeå

3.5.1.1 1. General City Information

Basic City Profile

Umeå is northern Sweden's most populous municipality, with a total population of approximately 135 273 residents as of the December 2025, of whom 91,916 reside in the urban area. Total population has increased by 2.3% from 132,235 in December 2022 and has displayed sustained growth by approximately 1,400 residents annually over the preceding five years. Accordingly, long term projections estimate 200,000 inhabitants by 2050. The average resident age of 39 years reflects a relatively young demographic profile, shaped in part by Umeå's substantial university and research sector, with Umeå University and related knowledge institutions constituting central pillars of the local economy.

The labour market is comparatively strong, with Umeå's unemployment rate of 4.4 per cent in 2022 substantially below the national average of 6.6 per cent, and employment in private services, research, and knowledge intensive sectors has remained robust despite national inflationary pressures. Västerbotten County has the lowest unemployment in Sweden, with Umeå around 4 per cent, and long-term unemployment at 1.2 per cent compared with 2.7 per cent nationally, which underscores both the strength and tightness of the local labour market (Umeå Municipality, 2025a).

The municipality is also the largest single employer in northern Sweden, with approximately 13,000 municipal employees, a structural fact of direct significance for climate governance, since staff commuter travel constitutes one of the organisation's largest controllable emission sources (Interview 2, 2026). The municipality anticipates recruiting approximately 1,000 full time employees annually through 2031 to meet demand arising from ongoing economic expansion, which may create both opportunities and challenges for embedding climate conscious working practices in an expanding workforce (Umeå Municipality, 2025a).

Geographic and Regional Context

Umeå is situated in Västerbotten County at approximately 63°N, on the western shore of the Bothnian Bay. The climate is subarctic and temperate, moderated by coastal proximity, with average daily temperatures above 10°C for only three months annually. This climatic context drives significant heating demands, making the district heating network, which supplies approximately 80 per cent of buildings within the city, a strategically important energy infrastructure asset (2030 Climate Neutrality Action Plan for the City of Umeå, 2024).

The city is vulnerable to localised climate impacts, including flooding and erosion along the Umeälven and Sävaån rivers, and faces increasing risks from heavy rainfall, forest fires, and drought under projected climate trajectories, which reinforces its commitment to accelerated mitigation and adaptation. Regionally, Umeå functions as the economic and administrative hub of Västerbotten County and plays a strategic role in the wider context of northern Sweden's green

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industrial transformation, where large scale electrification and decarbonisation investments in sectors such as steel production, mining, and forestry are creating new labour demands and investment flows.

Governance and Institutional Setting

Umeå is governed through a City Council, which sets overall strategic goals and adopts annual budgets. Below the council, the Municipal Executive Board holds overarching responsibility for the municipality's four strategic goals, namely sustainable growth, two dimensions of social sustainability, and climate neutrality. Political committees govern individual departmental areas and are formally assigned climate related responsibilities through the annual budget process (Interview 2, 2026).

From 2021, the City Council decided that all committees and wholly owned municipal companies must have a written core mandate that clarifies the municipal purpose of the committee or company, as well as its role and responsibilities, and that these core mandates should apply for at least one term of office and be monitored annually (Umeå Municipality, 2025a). For companies, the core mandate is set out in the articles of association and specified in shareholder directives, while for committees, the core mandate is established in the Regulations for Municipal Committees and the Executive Board and incorporated into the planning directive (Umeå Municipality, 2025a). This core mandate system forms the basis for operational and corporate governance, with a clear order of priority whereby core mandates take precedence over strategic objectives, and both take precedence over any additional tasks when resources are constrained (Umeå Municipality, 2025a).

The administrative structure most relevant to climate governance includes the City Management Department, which houses the Strategic Development Unit (Strategisk Utvecklingsenhet) and to which the city manager is attached, the Technical and Municipal Buildings Department, responsible for sustainable mobility, cycle infrastructure, public transport management, and the energy performance of municipal buildings, the City Planning Department, which manages comprehensive and detailed planning and land use decisions, and the Environmental Department, responsible for regulatory and permitting functions. The city also owns a portfolio of municipal companies under the holding entity Umeå Kommunföretag, including the energy company Umeå Energi, the housing company AB Bostaden, and the waste and water utility Vakin, all of whom receive formal owner directives specifying climate responsibilities (Interview 2, 2026; 2030 Climate Neutrality Action Plan for the City of Umeå, 2024).

Climate and Sustainability Commitments

Umeå has adopted a layered and time differentiated set of climate neutrality targets. The city of Umeå, understood as the urban area, commits to climate neutrality by 2030, the full Umeå municipality is to be climate neutral by 2040, the municipal group as an organisation has committed to climate neutrality by 2025, and consumption based emissions are to reach 2 tonnes of CO_2e per person by 2040 and 1 tonne by 2050, bringing the city into alignment with the Paris Agreement's allocation framework (2030 Climate Neutrality Action Plan for the City of Umeå, 2024, Interview 2, 2026). These targets are formally adopted by the City Council and embedded in the municipality's strategic governance architecture.

The long-term climate neutrality ambition is organised through the Programme for a Climate Neutral Umeå 2040, one of the three strategic programmes established alongside the Growth Programme and the Social Sustainability Programme in the municipal planning directive, which

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collectively operationalise the four overarching goals across the organisation (Umeå Municipality, 2025a). The planning directive sets out financial guidelines and a two per cent surplus target to ensure sound financial management, which frames the room for manoeuvre for climate related investments in the 2026-2029 period (Umeå Municipality, 2025a).

Umeå participates in the European Commission's Mission for 100 Climate Neutral and Smart Cities through the NetZeroCities consortium, and in Sweden's national Viable Cities programme. A formal Climate City Contract has been developed in alignment with both initiatives. The city is also a signatory to the Covenant of Mayors and participates in the Thriving Northern Cities regional network (2030 Climate Neutrality Action Plan for the City of Umeå, 2024, Interview 2, 2026).

City Mission and Climate Neutrality Agenda

Umeå's climate mission is framed under the banner "Klimatneutralt Umeå" and is embedded as one of four overarching municipal goals rather than positioned as a standalone sustainability programme. This integration into the core municipal governance framework is an intentional design choice, intended to distribute ownership across the organisation rather than concentrating responsibility in a single department (Interview 2, 2026). The 2030 Climate Neutrality Action Plan for the City of Umeå frames the transition as a just transition that simultaneously advances social, economic, and ecological objectives, explicitly aligned with the city's growth and social sustainability commitments (2030 Climate Neutrality Action Plan for the City of Umeå, 2024).

The Umeå Climate Roadmap functions as the city's local green deal and has recently been revised for the period 2026-2028 as an official municipal partnership framework, under the title *Umeå Climate Roadmap: A partnership and framework for Umeå's climate transition 2026-2028* (Umeå Municipality, 2025b). By signing a letter of intent, organisations, businesses, and public sector bodies commit to work together in partnership to accelerate Umeå's climate transition and significantly reduce greenhouse gas emissions in accordance with the Paris Agreement, and they explicitly support the goals of a climate neutral Umeå by 2040 and the consumption-based emission targets (Umeå Municipality, 2025b). Within this framework, the mission is operationalised through five focus areas, mobility and transport, energy and the built environment, consumption and the circular economy, food and agriculture, and complementary climate challenges, and a set of specified climate challenges within each focus area that partners are encouraged to adopt (Umeå Municipality, 2025b).

Key Challenges and Opportunities

Umeå's primary structural mitigation challenge is its high dependency on fossil fuels in the transport sector, despite early and substantial investments in public transport electrification, with 100 per cent of local public transport trips conducted by electric bus from 2026 (previously 75%), and significant renewable energy capacity, including a municipal co owned hydroelectric plant producing over 2 TWh annually (2030 Climate Neutrality Action Plan for the City of Umeå, 2024). The gap analysis conducted as part of the Climate City Contract process confirmed that, even if all existing departmental programmes were fully implemented, significant emission reduction gaps would remain, requiring additional and more transformative interventions (2030 Climate Neutrality Action Plan for the City of Umeå, 2024).

Significant enabling assets include very high levels of civic engagement, with over 80 per cent of citizens engaged in civil society organisations, and Umeå citizens having been rated Europe's most environmentally aware in 2014, while the wider Övre Norrland region ranks first among 272

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EU regions on the Social Progress Index, reflecting high levels of social trust that underpin collaborative governance (2030 Climate Neutrality Action Plan for the City of Umeå, 2024). At the same time, the municipal planning directive highlights structural challenges, such as a tightening labour market, demographic shifts with fewer children and more people aged 80 and over, a housing shortage expected to increase in 2025-2026, and an investment level significantly above historical norms, all of which place pressure on municipal capacity and finances during the climate transition (Umeå Municipality, 2025a). In addition, external factors have extensively reduced construction of new housing and increase the level of insecurity of green investments in the region making municipal planning and implementation difficult.

3.5.1.2 Mission Governance in Umeå

Mission Governance Context and Transition Team

Umeå does not operate a single, formally designated transition team or climate office in the conventional sense. Rather, mission governance is distributed across several interlocking structures whose composition, formal relationships, and relative authority have evolved considerably since the initial governance framework was established in 2022.

The primary coordinating function rests with the Strategic Development Unit within the City Management Department. This unit houses the designated city officers formally responsible for steering the climate neutrality programme, including the steering mechanism for the municipality and municipal companies adopted by the City Council, and the secretariat for the Umeå Climate Roadmap partnership (Interview 2, 2026). The unit sits within the same department as the city manager, which provides proximity to senior administrative leadership, although without formal hierarchical authority over line departments. The Development Director formally holds programme responsibility at director level.

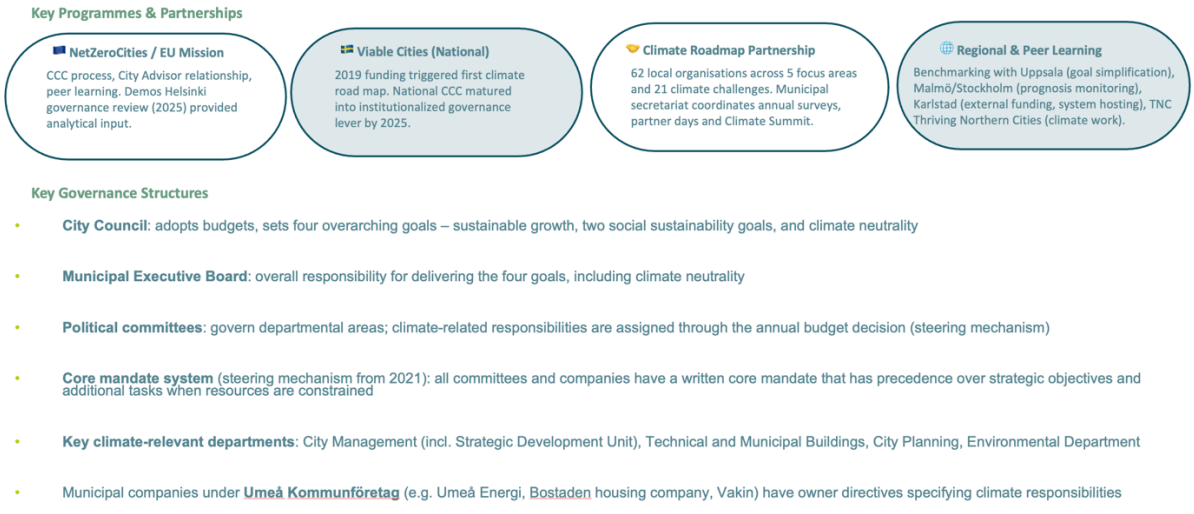


Figure 22 - Key programs and governance structures in Umeå

Alongside the Strategic Development Unit, a Sustainability Manager role, introduced relatively recently and described by its holder as still being defined in terms of its precise mandate, serves a boundary spanning function, working to connect internal departments and external partners in the climate transition (Interview 2, 2026). The role is explicitly framed as that of change leader and

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boundary spanner, seeking to engage the municipality as a whole in a climate transition that extends beyond the departments most directly assigned to climate work.

An informal internal group referred to as "Team Climate" has at times drawn on personnel principally from the Strategic Development Unit alongside representatives from other departments to coordinate concrete activities and transition planning (Interview 2, 2026). Supplementing this, sector specific transition teams have been established in areas including energy transition, mobility transition, and construction emissions, each involving different constellations of municipal departments, companies, and external actors. These teams differ significantly in their degree of formalisation, time horizon, and membership composition, a feature of the governance architecture that both reflects adaptive flexibility and creates coordination complexity.



Figure 23 - Evolution of Mission Governance in Umeå

The origins of the current architecture trace to two inflection points. First, the Viable Cities national funding award in 2019 enabled the appointment of dedicated climate transition officers for the first time, providing the administrative foundation for sustained mission coordination (Interview 2, 2026). Second, and more decisively, the 2022 City Council decision introduced a new steering mechanism that formally designated specific political committees and municipal companies as responsible for the four overarching municipal goals, including climate neutrality, and appointed city officers to coordinate the programme (Interview 2, 2026). From 2023, this steering mechanism was operationalised, and the municipality entered a phase of sustained governance experimentation and learning.

External Support and Influence on Governance

External support has played a substantive role in shaping Umeå's approach to mission governance, providing both specific methodological inputs and important catalytic moments for internal reflection and restructuring.

The NetZeroCities programme has been the most significant source of structured external support. Through the Climate City Contract process, Umeå has received a City Advisor relationship and access to the NetZeroCities platform for peer exchange and methodology development. NetZeroCities and EIT Climate KIC commissioned Demos Helsinki to conduct a governance review of the Umeå Climate Roadmap partnership in spring 2025, resulting in the application of a Humble Governance framework to the partnership's future development and recommendations for its structural evolution (Demos Helsinki, 2025a). This external review provided the municipality with a structured analytical lens for examining its own coordination challenges and prompted specific recommendations, such as the establishment of smaller

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working groups with clearer mandates and a more deliberate distribution of roles between the municipality and external partners (Demos Helsinki, 2025a). A portfolio mapping methodology developed within the NetZeroCities consortium is being piloted in Umeå as a bridge between the external Climate City Contract process, different important ext. actors in Umeå, especially partners in Umeå climate roadmap and municipal owned companies.

Beyond NetZeroCities, the Viable Cities national programme has provided both funding and a governance framework that has been progressively mainstreamed into Umeå's internal processes. Practitioners report that the national Climate City Contract process has matured to the point where it can function as a genuine governance lever, informing internal work rather than operating solely as an external reporting obligation (Interview 2, 2026). Peer learning from other Swedish and Nordic cities has also influenced governance design, including comparison with Uppsala Municipality on goal structure and governance simplification, and exchange with Karlstad, Malmö, and Stockholm on external funding, monitoring practices, and prognosis based reporting (Interview 2, 2026).

External engagement has introduced several tools that have been partially embedded in Umeå's practice, including the Humble Governance four principle model of consensus, delegation, learning, and responsiveness, normative scenario based planning developed in partnership with Material Economics and ClimateView, the Umeå-model on carbon calculation for construction co developed with sector partners within the Umeå Climate Roadmap partnership, and the Changemakers for Impact leadership development programme developed by innovation officers etc. in Umeå municipality and implemented in the Umeå climate roadmap partnership etc. (2030 Climate Neutrality Action Plan for the City of Umeå, 2024, Demos Helsinki, 2025a). System hosting methodology, inspired by the development of Karlstad University, represents a further avenue of methodological learning around managing complex multi stakeholder governance challenges.

The cumulative effect of external support has been most tangible in prompting honest self-assessment of governance design, identifying where coordination structures lacked decision mandate, where roles were ambiguous, and where internal communication and follow up had been insufficient. The Demos Helsinki review, in particular, functioned as a mirror that surfaced tensions and design flaws that internal actors found difficult to articulate within existing structures.

Mission, Common Vision, and Shared Objectives

The mission is articulated at multiple levels and through multiple frames, reflecting the layered nature of Umeå's climate commitments. At the broadest level, climate neutrality is positioned as one of four equal overarching municipal goals, alongside sustainable growth and two dimensions of social sustainability, an architectural choice that integrates climate into the municipality's core governance logic rather than treating it as a supplementary agenda (Interview 2, 2026). Operationally, the mission is broken down into distinct time bounded targets, city boundary neutrality by 2030, whole municipality neutrality by 2040, organisational neutrality by 2025, and a long-term consumption based reduction pathway extending to 2050 (2030 Climate Neutrality Action Plan for the City of Umeå, 2024). The Programme for a Climate Neutral Umeå 2040 in the planning directive provides the overarching programme frame through which these ambitions are pursued (Umeå Municipality, 2025a).

The Umeå Climate Roadmap supplements this internal architecture with a partnership framework that structures the external collaboration and provides a common vocabulary for multi stakeholder

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engagement. The revised roadmap for 2026-2028 specifies that partners undertake to support the climate neutrality and consumption based targets, to take active part in common learning and dialogue, to yearly share information of implemented climate actions, to work actively to reduce their emissions, and to link their own climate work to at least five of the climate challenges defined in the roadmap, which are organised under the focus areas of mobility and transport, energy and the built environment, consumption and the circular economy, food and agriculture, and complementary climate challenges (Umeå Municipality, 2025b). It also outlines a structured six step cycle for partners, including assessment of current emissions, adoption of reduction targets, selection of roadmap challenges, alignment with sectoral roadmaps such as those of Fossil Free Sweden, development of action plans, and annual follow up and review (Umeå Municipality, 2025b).

The development process for the mission and its objectives was substantially political in character. The new climate goals were adopted through a formal City Council decision in 2020 and operationalised through a further council decision in 2022 that introduced the steering mechanism and designated responsible committees. The process involved extensive prior political deliberation, motivated in part by political frustration with an excessively complex preceding goal architecture, and followed benchmarking of other municipalities' governance designs (Interview 2, 2026). The initial version of the Climate Roadmap partnership was developed through a more explicitly co created process involving departments, municipal companies, and prospective external partners in 2021-2022, attracting 37 founding signatories at launch in December 2022 (Interview 2, 2026). The 2026-2028 revision is the outcome of an iterative process in which Umeå Municipality, acting as system host, has led dialogue with existing partners to refine focus areas, climate challenges, and collaboration formats in light of experience and external inspiration, particularly from the Uppsala Climate Protocol (Umeå Municipality, 2025b).

Shared understanding of the mission across the municipal organisation remains uneven and constitutes one of the most significant barriers to implementation. Municipal companies demonstrate the strongest ownership and have moved at the greatest speed toward implementation, attributed in part to the clarity and specificity of owner directives and in part to the organisational agility of company structures relative to public administration (Interview 2, 2026). Within the municipal departments, a clear gradient exists, the Technical and Municipal Buildings Department, the City Planning Department, and the Environmental Department demonstrate relatively strong engagement, whereas departments such as Education, Elder Care, and Business Development treat climate objectives as peripheral to their core mandates (Workshop Summary, 2025). The Business Development function is assigned an overall goal is sustainable growth. Consequently, they focus more on growth than on climate, and a more engaged business department in climate work could help mobilise more forward momentum (Workshop Summary, 2025).

Internal communication of the mission to departments has been an acknowledged weakness. The Climate Roadmap partnership, while well known among senior officers, has been poorly understood across many departmental units, and workshop participants in 2025 confirmed that outreach to departments had been insufficient during the partnership's first three-year period (Workshop Summary, 2025). Annual programme reports, partnership days, and Climate Summits constitute the primary communication channels, but these currently reach an engaged minority rather than generating broad institutional awareness (Demos Helsinki, 2025b). The revised roadmap for 2026-2028 explicitly emphasises joint learning and dialogue, including commitments for partners to participate in the annual climate summit and partnership days, to contribute to thematic groups under the focus areas, and to engage in a strategic group for the development of the partnership, which creates a potential vehicle for strengthening internal and external communication over the next period (Umeå Municipality, 2025b).

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Roles, Mandates, and Organisational Set up

The distribution of responsibility for the climate mission across Umeå's municipal departments is formally structured through the annual City Council budget decision, which designates specific political committees and municipal companies as responsible for contributing to the four overall goals. For climate neutrality, the most directly appointed committees are those overseeing the Technical and Municipal Buildings Department, the Environmental Department, and the City Planning Department, with the Municipal Executive Board and the Strategic Development Unit holding overarching coordination responsibility (Interview 2, 2026).

Within this formal architecture, responsibilities are broadly allocated as follows. The Technical and Municipal Buildings Department carries responsibility for sustainable mobility, including cycling infrastructure, public transport planning and management, and construction machinery electrification, as well as for the construction and energy and climate performance of municipal buildings. The City Planning Department is responsible for land use, zoning, and detailed planning decisions that shape the long term physical conditions for the transition. The Strategic Development Unit provides strategic coordination, supports implementing departments, and holds the formal city officer designations for the climate programme (Interview 2, 2026). Municipal companies operate under owner directives and have developed their own internal transition processes with considerable autonomy, often moving more quickly than the municipal departments.

The degree of formalisation in role definition has increased substantially since 2022 but remains incomplete in several critical areas. From 2026, the Strategic Development Unit's mandate to support implementing departments has been made more specific and explicit, a direct response to the recognition that informal coordination has been insufficient to drive departmental integration (Interview 2, 2026). Simultaneously, the 2026 budget decision mandates that all political committees allocate 0.5 per cent of their budgets to work on the overall goals, including climate neutrality, a flat percentage applied across all committees regardless of the scale or nature of their climate related portfolio, which represents the first systematic attempt to broaden financial commitment beyond the departments most directly assigned to the mission (Interview 2, 2026, Umeå Municipality, 2025a).

The core mandate framework set out in the planning directive introduces a further layer of mandate clarity. Committees and companies are expected to fulfil their core mandates first and only then to contribute to strategic objectives and additional tasks, which implies that climate related strategic objectives must be interpreted and implemented in ways that are compatible with, and embedded in, the long-term purpose of each committee and company (Umeå Municipality, 2025a). Annual follow up requires committees and companies to assess to what extent they have fulfilled their core mandates and to report to the Municipal Executive Board, which compiles this information for the City Council, providing an institutionalised mechanism for reflecting on mandate alignment (Umeå Municipality, 2025a).

Several structural and personnel changes reflect the growing institutionalisation of climate governance capability. The former head of the Strategic Development Unit has moved into a project management leadership role within the Technical and Municipal Buildings Department, which institutionalises climate transition knowledge within the organisation responsible for the largest implementation portfolio (Interview 2, 2026). The Sustainability Manager role represents a new category of senior municipal function oriented explicitly toward boundary spanning and cross departmental facilitation (Interview 2, 2026). A strategist focusing on coordination with the municipal holding company has also been appointed, which contributes to aligning municipal company and departmental programmes (Interview 2, 2026).

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Despite these advances, significant gaps and overlaps in responsibility allocation persist. The most analytically significant concerns the municipality's role as the region's largest employer and, by extension, its responsibility for addressing commuter travel emissions, identified as the largest emission source in the municipality as an organisation. Responsibility for this domain is contested and unresolved among the Technical Department, which holds sustainable mobility competence, the HR Department, which holds employee policy authority, and the Strategic Development Unit, which holds strategic coordination responsibility (Interview 2, 2026). No single owner had been designated for this area at the time of the interviews, and this accountability gap is particularly significant given the emission impact of the domain.

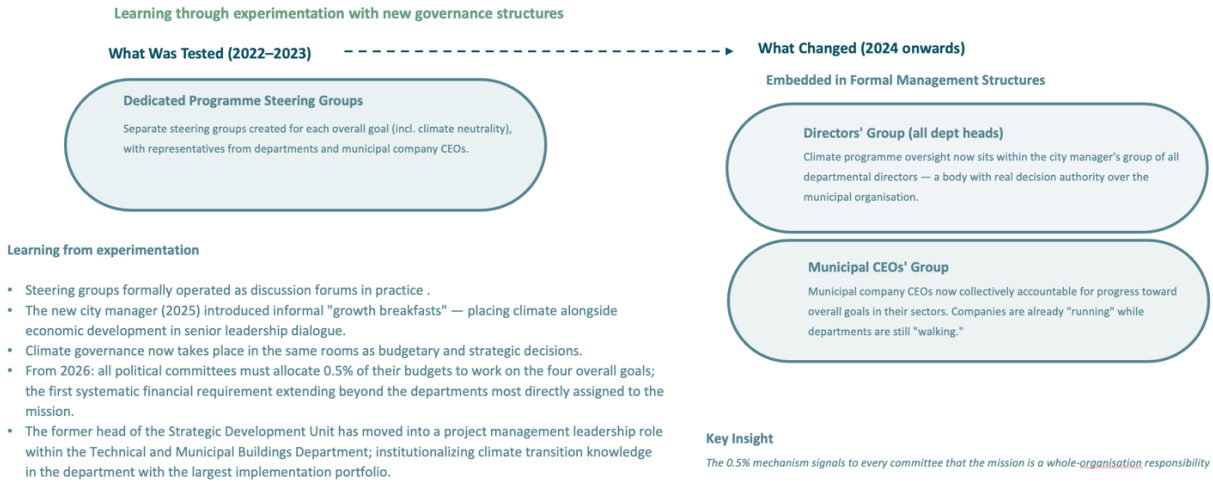


Figure 24 - Experimentation with governance structures in Umeå.

More broadly, the governance learning journey undertaken since 2022 has produced an important institutional insight, responsibility for climate objectives is most effectively held by the political committees and departments that possess both the mandate and the resources to act, rather than directed from the Strategic Development Unit. Early efforts to have the strategic coordination function specify departmental actions produced political resistance, since committees perceived such direction as an encroachment on their mandate and accountability (Interview 2, 2026). The current approach, which focuses on providing support and facilitation rather than direction, is described as a major learning, marking a transition from a centralised to a distributed ownership model.

Coordination Mechanisms and Cross Departmental Work

Cross departmental coordination in Umeå is characterised by an important structural evolution, a transition from purpose-built programme steering groups to embedding climate programme oversight within existing formal decision-making structures. Until 2024, the governance architecture included dedicated programme steering groups for each of the four overall goals, composed of relevant departmental representatives and municipal company chief executives. These groups operated as discussion forums without decision making authority and were disconnected from the formal management processes through which resources are allocated and priorities confirmed, which limited their ability to drive accountability or resolve conflicting departmental priorities (Interview 2, 2026).

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From 2024, the programme steering groups were dissolved and their functions were redistributed to two pre-existing senior governance bodies, the city manager's group of all departmental directors and the municipal companies' group of chief executives. These groups are now collectively responsible for overseeing progress toward the overall goals, including climate neutrality, within their respective sectors. This change is widely regarded by practitioners as a significant improvement, since it embeds climate governance within spaces that possess genuine decision authority and ensures that climate discussions take place in the same rooms as budgetary and strategic decisions (Interview 2, 2026, Interview 2, 2026).

In addition to this overarching governance structure, mission specific coordination processes exist at the sectoral level. Sector specific transition teams address energy transition, mobility transition, and construction emissions, each involving different configurations of municipal departments, companies, and external partners (Interview 2, 2026). The Climate Roadmap secretariat within the Strategic Development Unit functions as a permanent coordinating body for the external partnership, managing partner communications, facilitating partnership days and the annual climate summit, coordinating the annual monitoring survey, and supporting the strategic group that co develops the partnership model and joint learning and dialogue (Umeå Municipality, 2025b). Informal "growth breakfasts" convened by the new city manager have provided an additional venue for cross departmental dialogue that brings together climate and economic development agendas at senior level (Interview 2, 2026).

Concrete cross departmental collaboration has been most evident in specific project contexts. The fossil free working machines pilot, a joint initiative between the Strategic Development Unit and the Technical and Municipal Buildings Department, secured public investment funding for the remaking of a central city square using fossil free construction machinery and created opportunities to engage local supply chain partners in the transition (Interview 2, 2026). The development of Umeå's energy programme involved a co-created normative scenario process linking the municipality, Umeå Energi, regional stakeholders, and research institutions (Interview 2, 2026). The revised public procurement policy, developed in collaboration between the Strategic Development Unit and the Procurement Unit, formally shifted responsibility for setting climate criteria in procurements from the procurement function to the ordering department, an institutional redesign with significant implications for how climate objectives propagate through the spending decisions of the organisation (Interview 2, 2026).

Persistent coordination challenges remain. The siloed character of the municipal organisation, in which each directorate operates with substantial autonomy relative to the city manager's authority, limits lateral coordination capacity. The cultural distance between departments with strong climate mandates, such as Technical and Municipal Buildings, and those without, such as Education or Business Development, has yet to be closed, and the 2025 workshop confirmed that many departments have insufficient knowledge of the Climate Roadmap to identify their own role within it (Workshop Summary, 2025). Coordination with external partners under the Climate Roadmap, while structured, faces the challenge of uneven engagement levels, highly committed partners are well served by existing structures, while the partnership has yet to develop effective mechanisms for drawing in less engaged actors or those facing more significant transition barriers (Demos Helsinki, 2025a, Umeå Municipality, 2025b).

KPIs, Monitoring, and Everyday Operations

Umeå's monitoring architecture for the climate mission operates at multiple levels, combining national emissions databases, internal programme indicators, and the voluntary annual partner survey of the Climate Roadmap. The primary emissions data source is the national Regional Emission Statistics database, supplemented by the municipality's own tracking of sector specific

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activity data, including bicycle counts, travel surveys, and energy consumption figures from the district heating and electricity networks (2030 Climate Neutrality Action Plan for the City of Umeå, 2024). Annual programme reports compile this data into a formal account of progress against the four overall goals, including climate neutrality, which is reported to the City Council and made publicly available (Interview 2, 2026).

The integration of climate indicators into departmental operational plans has been developing progressively but remains incomplete. Each of the four programmes now includes formally specified indicators embedded in its programme document, providing a more structured framework for departmental reporting than existed in the programme's early years (Interview 2, 2026, Umeå Municipality, 2025a). The municipal planning directive contains a dedicated section on monitoring, analysis, and evaluation, which sets out expectations for follow up of strategic objectives and programmes, including the Programme for a Climate Neutral Umeå 2040, within the annual cycle of budget, accounts, and evaluation (Umeå Municipality, 2025a). Inspired by monitoring approaches in Malmö and Stockholm, the municipality is in the process of shifting toward prognosis-based reporting, a more analytically demanding approach that models future emission trajectories rather than simply recording historical data (Interview 2, 2026).

Notwithstanding these advances, significant challenges in monitoring and integration persist. A central difficulty is the inability to draw a clear causal line from specific municipal actions to measurable emission reductions, which is a challenge that politicians increasingly press the administration to address, seeking clearer evidence of the relationship between investment and impact (Interview 2, 2026). This attribution problem is particularly acute in sectors involving complex system dynamics, such as transport, where the emission impact of any single intervention depends on multiple co evolving factors.

At the partnership level, monitoring is structured through an annual voluntary review in which Climate Roadmap signatories undertake to share information on the activities and results of their climate work, including how they have worked on their selected climate challenges and the progress of their internal climate and sustainability processes (Umeå Municipality, 2025b). The annual review is explicitly framed as both a way of monitoring how climate work is progressing among partners and in Umeå as a whole and as a central part of shared learning and dialogue. Information gathered through the review is shared within the partnership and communicated externally (Umeå Municipality, 2025b). A portfolio mapping exercise, intended to provide a system level view of all planned and ongoing climate actions across the partnership and assess their aggregate emission impact, has been initiated but is not yet complete (Demos Helsinki, 2025a).

No evidence has been identified of climate or mission related KPIs being formally linked to individual staff performance reviews or appraisal processes within the municipal organisation. This gap between strategic objectives and human resource management systems represents a structural limitation on the extent to which the climate mission can be said to be embedded in everyday organisational operations. The 0.5 per cent budget allocation, effective from 2026, represents the most tangible mechanism linking the climate mission to operational resource decisions across all committees, although its flat application, regardless of the scale of climate exposure in each portfolio, limits its precision as an instrument for driving proportionate action (Interview 2, 2026, Umeå Municipality, 2025a).

Rules, Norms, and Internal Institutional Change

Several changes to formal rules and procedures have been introduced since 2022 as part of the governance transformation. The most significant is the revised public procurement policy, which reassigns responsibility for setting sustainability and climate criteria in public contracts from the

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central Procurement Unit to the relevant ordering departments. This structural change reflects a broader principle, namely that accountability for climate outcomes in a domain should lie with the actors that make the relevant decisions and hold the relevant budgets rather than with a support function (Interview 2, 2026). Implementing this principle in procurement requires ordering departments to develop or access technical knowledge about what climate criteria are legally permissible and practically effective, a capacity building challenge that the Strategic Development Unit is now mandated to support (Interview 2, 2026).

The Umeå-model, a carbon calculation tool for construction projects developed collaboratively with sector partners within the Umeå Climate Roadmap partnership, represents a further formalisation of climate considerations into operational practice. The model provides a project level framework for calculating climate impact in line with the Paris Agreement's emission budget logic and has been adopted by the Technical and Municipal Buildings Department as a tool for evaluating building projects. This co production of a technical standard, developed with industry partners rather than imposed from above, illustrates the practical application of a facilitative approach to institutional change.

The annual budget decision mechanism, through which the City Council designates 0.5 per cent of each committee's budget for work on the overall goals from 2026, constitutes a formal procedural change with significant institutional implications. It signals political intent that all departments, including those that have previously treated climate as external to their mandates, are expected to engage with the overall goals, and it is explicitly framed in the planning directive as part of the restructuring of resource allocation in a context of high investment levels and tightening labour market conditions (Interview 2, 2026, Umeå Municipality, 2025a).

Cultural change within the organisation is more difficult to assess, but available evidence suggests meaningful movement in certain parts of the administration alongside persistent resistance in others. Municipal companies represent the clearest site of cultural transformation, owner directives have provided a decisive mandate signal, and company structures, with their faster decision cycles and more direct accountability to outputs, appear to have enabled more rapid embedding of climate objectives in operational planning (Interview 2, 2026). Within the municipal departments, a notable cultural shift has occurred within the Strategic Development Unit, where the recognition that effective governance requires facilitating and supporting departmental ownership rather than directing action from the centre represents a significant change in the unit's self-conception and operational approach (Interview 2, 2026).

Persistent cultural barriers remain in departments with more distant relationships to the mission. The Business Development function's mandate alignment means their work is more focussed on growth, and more engagement in climate work could help move forward more effectively (Workshop Summary, 2025). More broadly, the risk that governance processes become ends in themselves, generating high quality discussions and documentation without translating into emission reductions, is identified in the Humble Governance review as a live concern, particularly in partnership settings where consensus building norms can suppress accountability expectations (Demos Helsinki, 2025a).

Capacity building efforts have included development of the concept Changemakers for Impact leadership and facilitation programme. Facilitation education for several municipal departments in the city has been conducted annually since 2024, a 3 day education program with the purpose to be able to lead and facilitate transition. In addition, focus is placed on implementation through the development of concepts and methods linking local, regional and national levels, through exploration of the system hosting methodology by Karlstad University, and the capacity building dimensions of the Pilot City Collaboration under NetZeroCities (Demos Helsinki, 2025a). These activities have reached a core group of committed individuals within the Strategic Development

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Unit and the broader climate transition network, but evidence of systematic, organisation wide capacity development for climate governance remains limited.

A significant cross cutting feature of Umeå's governance is what the Humble Governance framework identifies as a defining characteristic of mature adaptive governance, namely a willingness to acknowledge uncertainty, defer to others' expertise, and operate through iteration rather than blueprint (Demos Helsinki, 2025a). This orientation is evident in practitioners' explicit admissions about unclear mandates and unresolved responsibilities, in the iterative redesign of governance structures, and in the co production of tools and models with partners rather than top-down specification (Interview 2, 2026, Interview 2, 2026). This epistemic humility is simultaneously a governance strength, enabling adaptive learning, and a risk factor if not counterbalanced by sufficient clarity of accountability and decision authority.

Leadership, Political Support, and Multi Level Context

Political support for Umeå's climate mission has been sustained since the initial goal adoption in 2020 and has intensified progressively through formal institutional commitments. The 2022 City Council decision introducing the steering mechanism represented the pivotal moment of political commitment, embedding climate neutrality in the core municipal governance architecture and creating the formal basis for departmental accountability (Interview 2, 2026). The planning directive for 2026-2029, adopted as the proposal of the Social Democrats and the Green Party, integrates the Programme for a Climate Neutral Umeå 2040 into the overall strategic objective framework and sets financial guidelines that must be reconciled with climate investment needs (Umeå Municipality, 2025a).

Political engagement with the mission has not been passive. Several assignments have been issued by political committees to restructure the governance processes within the municipality, and politicians are described as actively monitoring the pace of departmental integration and as being willing to use formal governance instruments to accelerate it when progress is deemed insufficient. The 0.5 per cent budget mandate from 2026 was explicitly motivated by political frustration that not all departments were engaging adequately with the overall goals, a political decision to use resource allocation as a tool for distributional governance reform (Interview 2, 2026). Similarly, the reduction in the number of overall goals from a previous larger set of objectives to four focused commitments reflected a political ambition to increase clarity and accountability at departmental level (Interview 2, 2026).

At the administrative leadership level, the arrival of a new city manager in 2025 is widely identified as a significant accelerator of cross departmental ownership. The new city manager's engagement, including the introduction of informal growth breakfasts that place climate alongside economic development in a senior leadership dialogue, has provided a visible signal that the mission is a whole organisation priority rather than the preserve of the Strategic Development Unit (Interview 2, 2026). The degree to which this change represents durable institutional embedding versus dependence on a single individual's personal commitment is an important forward looking question.

The multi level governance context provides both enabling resources and important constraints. The European Union's mission framework provides financial support, methodological toolkits, and structured peer learning opportunities through the NetZeroCities platform. The Viable Cities national programme provides a domestic accountability framework and network. The Thriving Northern Cities regional network offers a peer learning context relevant to the distinctive challenges of northern Sweden's transition, while national legislation requiring energy planning and strategic environmental assessment provides a minimum floor of climate related procedural

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obligations across all Swedish municipalities (2030 Climate Neutrality Action Plan for the City of Umeå, 2024, Interview 2, 2026). No material evidence has been identified of constraining national regulatory frameworks that directly impede Umeå's mission governance, although the relationship between municipal autonomy and national industrial transformation strategies in northern Sweden represents an area warranting continued attention.

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3.5.1.3 Looking Ahead, Challenges, Opportunities, and Lessons

The most significant forward looking governance challenges identified through this analysis cluster around three dimensions, accountability depth, organisational sustainability, and data adequacy.

On accountability depth, the central challenge is extending genuine climate ownership beyond the small group of committed departments and individuals currently driving the mission to the broader municipal organisation and the full universe of Climate Roadmap partners. The flat 0.5 per cent budget mechanism is a necessary instrument for signalling that all committees must engage with the overall goals, but it is not sufficient on its own to ensure that the resulting activities are strategically purposeful or proportionate to departmental emission exposure (Umeå Municipality, 2025a). More differentiated approaches to mandate assignment and follow up, including targeted engagement strategies for currently less engaged departments such as Business Development, represent a priority for the next governance phase (Workshop Summary, 2026).

On organisational sustainability, the current governance architecture remains partially dependent on a small number of committed individuals, whose departure would create significant institutional knowledge and relationship losses. The structures of accountability within the directors' group and the chief executives' group are more durable, but the operational coordination capacity of the Strategic Development Unit depends on maintaining specific individual expertise. Developing more distributed and embedded climate competence across the organisation, including through systematic integration with human resources processes and skills supply plans, is a critical gap, particularly in light of the tightening labour market and projected labour shortages in key sectors identified in the planning directive (Umeå Municipality, 2025a).

On data adequacy, completing the portfolio mapping exercise, developing prognosis-based reporting, and improving the ability to attribute emission impacts to specific interventions are all pressing technical priorities. Politicians are increasingly pressing for clearer evidence of the relationship between governance inputs and climate outcomes, a demand that current monitoring systems are not yet fully equipped to meet (Interview 2, 2026, Demos Helsinki, 2025a). The requirement in the Climate Roadmap for partners to carry out annual reviews of their climate actions and to estimate emission reductions provides an important lever for strengthening the data base, but it will require further methodological support and capacity building if it is to generate high quality information at scale (Umeå Municipality, 2025b).

Several significant windows of opportunity can be identified for the near term. The new three-year period of the Umeå Climate Roadmap partnership from 2026 to 2028 provides a structured occasion to implement the structural recommendations from the Humble Governance review, including the establishment of smaller, more active working groups and clearer role definition for municipal departments and external partners within the partnership (Demos Helsinki, 2025a, Umeå Municipality, 2025b). The maturation of the national Climate City Contract process as a genuine governance lever provides a further opportunity to align European Union mission objectives with internal planning cycles more closely than has been possible in previous years (Interview 2, 2026). The broader Nordic green industrial transformation, generating new investment and institutional interest in the region, could create additional political salience for Umeå's climate leadership and attract co funding for transition investments, although it also heightens competition for scarce labour and capital (Umeå Municipality, 2025a).

Several lessons emerge from Umeå's governance experience that are likely to be of relevance to peer cities. First, purpose-built coordination structures that lack formal decision authority are a governance design risk, the experience of Umeå's former programme steering groups demonstrates that placing governance conversations outside the rooms where decisions are actually made generates discussion without accountability. Embedding climate governance within existing formal management structures is more demanding in terms of agenda management but more likely to produce durable ownership (Interview 2, 2026).

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Second, the distribution of mandate and responsibility must follow resource and decision authority, the insight that political committees must hold ownership of their own climate actions rather than receiving direction from a strategic coordination function reflects a broader principle about the conditions under which institutional actors develop genuine accountability (Interview 2, 2026). Third, the pace of governance learning required to manage complex multi actor transitions in real time demands tolerance for structural iteration, Umeå's willingness to acknowledge that its initial structures were not optimal and to redesign them, while institutionally challenging, has produced a more effective architecture than premature consolidation would have allowed (Demos Helsinki, 2025a).

Umeå's experience suggests that the principles of consensus, delegation, learning, and responsiveness, operationalised through structured but adaptive processes, can sustain meaningful collective action under conditions of significant uncertainty (Demos Helsinki, 2025a, Umeå Municipality, 2025b). Equally, the identification of risks, including diffuse accountability, process over results dynamics, and low demand setting in consensus-oriented environments, are areas where Umea’s climate transition can be more actively managed to produce the rapid emission reductions the mission demands.

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3.5.2 Oslo

3.5.2.1 General City Information

Oslo is the capital of Norway, located in the south-eastern part of the country at the head of the Oslo Fjord, forming the core of the Oslo metropolitan region (City of Oslo, 2024). The city has a cold temperate climate with an average air temperature of 5.6°C, and its topography combines fjord coastline, river valleys, and forested hills, with green areas covering 78% of the municipal territory (Happy City Index, 2025; OECD, 2026). Oslo is a compact metropolitan city combining dense urban areas with large protected green zones, notably the Marka forest, and the municipality includes both highly urbanised districts and peri-urban natural areas, resulting in strong land-use and mobility pressures (City of Oslo, 2024). The city had a total population of 710,929 in 2023, of which 71.1% was of working age, with a comparatively young age profile and a low old-age dependency ratio of 18.4% (OECD, 2026). Population growth has been significant, at 14.3% between 2014 and 2024 compared to the Norwegian average of 8.7%, and 50.7% of the population is foreign-born (OECD, 2026). This continued urbanisation pressure intensifies demands on transport, housing, and energy systems, which are among the main sources of greenhouse gas emissions in the city (City of Oslo, 2024). Despite being the national capital, Oslo's median equivalised household disposable income (429,180.8 NOK) and employment rate (72.5%) are below national averages (OECD, 2026), and these socio-economic characteristics are relevant context for the fairness of the city's climate transition.

Oslo operates under a parliamentary system of governance in which the City Government, headed by the Governing Mayor, represents the executive branch and is responsible to the City Council, the legislative body that sets overall policy direction and approves the annual budget (City of Oslo, 2024). The City of Oslo holds both municipal and county functions, giving it extended responsibilities compared to other Norwegian municipalities and strengthening its capacity to coordinate policy across sectors relevant to climate and sustainability (City of Oslo, 2024). The city is Norway's political, economic, and cultural centre, serving as a major university and research city, innovation hub, and transport node (City of Oslo, 2024; Happy City Index, 2025). Its key sectors include public administration, knowledge-based services, finance, ICT, education, healthcare, construction, and transport (City of Oslo, 2024). Oslo is also Norway's second-largest public procurer after the national government, with annual purchases of approximately 36 billion NOK (3.2 billion EUR), a large proportion of which is connected to buildings and construction. This significant procurement power is a central lever in the city's climate governance approach, as explored in Sections 2 and 3.

Central to Oslo's climate governance is the Climate Agency, established in 2016 to follow up on the implementation of the city's Climate Strategy (City of Oslo, 2024). The Climate Strategy, adopted with the support of 8 out of 10 political parties in the city council, sets five targets towards 2030: reducing direct greenhouse gas emissions by 95% compared to 2009 levels, significantly lowering indirect emissions, preserving and enhancing natural carbon storage, reducing total energy consumption by 10% compared to 2009, and strengthening climate resilience (City of Oslo, 2024). In addition, the City Government has adopted a Thematic Plan for a Circular Economy towards 2030. Key strategic priorities include zero-emission transport and mobility, fossil-free construction and municipal operations, energy efficiency and renewable energy, climate adaptation and nature-based solutions, and reducing emissions embedded in consumption and procurement (City of Oslo, 2024). The main operational mechanism for implementing the Strategy is the annual Climate Budget, which is integrated as Chapter 2 of the city's fiscal budget, formally owned by the Department of Finance. The Climate Budget translates climate targets into concrete actions, assigns implementation responsibility to municipal entities, and requires regular reporting (City of Oslo, 2024). This structured approach has made Oslo an internationally recognised trailblazer in climate governance (Shank, 2024).

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Oslo's climate ambitions are pursued within a multi-level governance context. At the national level, key climate authorities include the Ministry of Climate and Environment, the Ministry of Transport, and the Ministry of Petroleum and Energy (City of Oslo, 2024). The relationship between the city and the national government is of particular importance, as national legislation can both enable and constrain local climate action. Internationally, Oslo is an active member of C40, which opened an office in the city to accelerate climate budget work and clean construction collaboration (C40, 2020). The city is also a member of ICLEI and CNCA, a signatory of the Covenant of Mayors, an active initiator in the EU Big Buyers Initiative, and a participant in the Norwegian national city network on climate change and in the EU Cities Mission through NetZeroCities (City of Oslo, 2024). Oslo's path towards climate neutrality faces several challenges, including continued population growth, emissions from construction and consumption outside city boundaries, coordination challenges across agencies and sectors, and constraints posed by national legislation (City of Oslo, 2024). At the same time, the city benefits from strong political commitment, well-established governance tools, high administrative capacity, and an active innovation ecosystem with engaged research institutions and private sector actors (City of Oslo, 2024).

3.5.2.2 Mission governance in Oslo

Mission Governance Context & Transition Team

Oslo established a Climate Agency established in 2016 as the agency responsible for implementing the city's climate strategy, and it is located in the Department of Environment and Transport (City of Oslo, 2024). It was set up with the goal of strengthening the in-house coordination capacity and ensuring that climate goals and strategy are taken forward (Vedeld et al. 2021). In the organisational structure, the agency was allocated close to the Governing Mayor's office and with strong mandates and resources (Vedeld et al. 2021). The Climate Agency is also the body responsible for Oslo's participation in the EU Cities Mission.

The Climate Agency drafts recommendations for yearly budgeting conferences for the climate budget and it suggests and negotiates measures with all agencies and departments. It has an official mandate to give feedback on budgeting of other entities, comment on other entities' activity plans, and to give feedback and assess climate impacts of other agencies' budget propositions (City of Oslo, 2024). Based on obligatory climate reporting across the municipal organisation, the Climate Agency consolidates the information and gives feedback to the city government on where more climate action is needed or where climate impacts differ from pre-assessments (City of Oslo, 2024).

According to the case study interviews (2025, 2026), the role and mandate of the Oslo Climate Agency differs from many other cities' similar agencies, as it has a mandate to be visionary and not only act as a coordinating body. In practice, this means that the Agency has the possibility to instigate new initiatives and suggest them to other departments and agencies, and to come up with visionary ideas on how to reach the city's climate goals, which is found important for its success (Interview, 2025). According to Oslo's internal communication materials shared by the interviewees, it is also important that the Climate Agency clearly communicates its broad mandate and role both internally and externally, and it has identified principles for its communications such as using clear and understandable language, acting as positive motivators towards others, and showing respect for different competences and knowledge.

External Support & Influence on Governance

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Oslo is active in various international networks and projects such as NetZeroCities, ICLEI and C40. According to the interviewees (2026), peer-learning on specific topics from the most advanced frontrunner cities (e.g., on clean construction or EU policy) has been the most useful element of the NetZeroCities platform for the city.

Oslo is also a very active member of the C40 network and initiated a clean construction initiative within the network. The interviewees note that they saw potential in joining forces with other cities because Oslo on its own is too small to change the market, and demand for clean construction machinery needs to come from other cities too. They also worked to raise the electronic construction agenda internationally in order to develop the market and indirectly help clean construction in Oslo (Interview, 2026).

They are also active in smaller and more specialised initiatives. The Procura+ network for procurement is mentioned as influential for procurement as a learning platform (Interview, 2026). On innovation and implementation, Oslo also works with various consultancies, universities and businesses, especially during piloting phases (Interview, 2026).

Contributions to breaking silos and rethinking governance

The interviews do not provide concrete examples of contributions from external support to rethinking the city's climate governance. It is noted that the city has had its climate governance model already since 2016, preceding the Missions work. The value of NetZeroCities and other external support has rather been to enable subject-specific peer-learning on specific topics from other advanced cities.

Rather than influencing the city's internal governance, the interviews point to the value of NetZeroCities from a multi-level governance perspective. According to the interviews (2026), EU-industry dialogues have been beneficial for Oslo, and Oslo appreciates the possibility to learn about EU policy and how to influence EU policy-making on issues that are relevant for Oslo's climate ambitions.

In general, external support and cooperation through networks such as NetZeroCities and C40 seem to be most valuable when they provide an opportunity to learn from advanced cities, and of influencing the international agenda. The clean construction work in C40 is an example of that, and so is the EU impact work through NetZeroCities. Oslo is also sharing experiences with other cities especially related to the climate budget tool, where Oslo's work has been broadly disseminated internationally through C40 and other channels (Interviews, 2025, 2026).

A learning highlighted in the interviews (2025, 2026) concerning the external support in NetZeroCities is that the project's early activities targeted cities who were just about to start their climate work. The value of the support appeared to be somewhat less evident for cities with more advanced climate policies and governance, such as Oslo. However, as noted, later the peer-learning and EU level interaction have been found useful for the city.

According to the interviews (2026), Oslo would need more support in the form of funding, since the funding for international work is especially difficult for the city to attain. There is also a need for funding support for implementation of concrete climate action. Some national funding is available, but the interviewees point that it is very limited.

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Framing and understanding of the mission

In the interviews and in the city's written publications, Oslo does not commonly use the mission vocabulary, but instead talk about their climate strategy and the climate budget, and the governance around those. According to Vedeld & Hofstad (2022), as well as interviewees (2025, 2026), Oslo's climate goals provide guidance and direction, while the climate budget is the tool to select actions and implement action.

According to the interviewees (2025), it has been particularly central for reaching a shared direction that the climate strategy is supported by a broad majority of parties in the city council. The fact that all departments and agencies are included in the climate budget work is also mentioned as important factors that contribute to an understanding of a shared direction.

As the climate budget is included in the financial budget as section 2 and is owned by the finance department, it makes departments and agencies understand that they need to prioritise climate. According to an interviewee (2025), all this leads to a situation where "no-one in the municipality has an excuse not to do something".

It is emphasised that the EU Cities Mission has not directly influenced the local climate policy or governance, as the structures and policies were already in place when the EU Mission was launched, but that the Mission has functioned as a peer-learning opportunity (Interview, 2025).

Development process for mission and objectives

According to Oslo's Climate City Contract, Oslo's Climate Strategy was developed in a consultative process. First, the Climate Agency developed a white paper with analysis of the local conditions, gaps, barriers and opportunities. It also suggested target areas that were later decided in a participative process that invited different kinds of organisations and the general public to contribute. In practice, breakfast meetings, meetings with private sector actors and general feedback meetings were organised. The white paper was also distributed for public consultation, where 75 comments were received from the public and private and third sector organisations (City of Oslo, 2024).

8 out of 10 political parties in the city council were in favour of the Climate Strategy when it was adapted in 2020. In addition, Oslo has also started Business for Climate Network where participating businesses sign a contract and agree to contribute to the city's climate objectives (City of Oslo, 2024).

Internal communication of the mission

The interviewees (2025) especially highlight that the Climate Agency works directly and individually with all departments and agencies. They note that it is central to their work to learn about the different parts of the organisation that they work with, and to recognise that different approaches are needed in communication with different parts of the city organisation as they can have differing cultures and goals. Communication and interaction may need to be tailor-made to each department or agency.

Building trust and taking time to create a common vocabulary have been found important and useful in communicating and cooperating between the Climate Agency and other departments and agencies. It has also been found important to always clearly explain the mandate of the Climate Agency so that everyone understands that they have a mandate to actively engage other departments and even instigate climate action in other departments (Interview, 2025).

2.4. Roles, Mandates & Organisational Set-up

The responsibility for implementing the climate measures outlined in the Oslo Climate Budget 2025 is distributed among various municipal agencies and departments. This distribution of tasks is designed to make the Climate Budget a more effective governance tool for all municipal agencies and

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departments, with reporting requirements similar to those for the overall budget. The allocation of responsibilities spans major infrastructure projects, day-to-day operations, and regulatory roles, ensuring a city-wide approach to achieving Oslo's five climate goals. Actors involved in the Climate Budget measures range from agencies responsible for waste and energy (KON, EBY, REG) and mobility & infrastructure (BYM, Ruter) to those with cross-cutting procurement and management roles (All, UKE) and policy & planning functions (KLI, PBE) (City of Oslo, 2025, pp. 5-7).

In this distributed responsibility setting, the Climate Agency operates as the leading agency. According to Vedeld & Hofstad (2022), the Climate Agency has integrative leadership characteristics, as shown by leading the co-design of climate policy, building institutional capacity for internal climate policy integration, and ensuring alignment across the municipal organisation.

As explained by the interviewees (2025), the Climate Agency works with all city departments and agencies to co-create various measures to reduce emissions to reach the climate targets set for 2030. To illustrate the logic of responsibility distribution in this collaboration, for example in the field of waste management, the Climate Agency would be interested in reducing all types of emissions while the Waste Management Agency would be primarily interested in household waste, due to their specific responsibility within the city organisation.

Interviewees (2025) describe a typical process of collaboration as starting with the Climate Agency working with the departments and agencies to develop an overall approach to the responsibilities of the department or agency in question, and to map different possible emission reductions. Once an agreement has been reached on the measures, then the Climate Agency puts it forward as a suggestion to be included in the Climate Budget. Following the City Government's approval, the relevant department or agency would be in charge of implementing the reduction measure and report back to the Climate Agency on the implementation status. In addition, the Climate Agency also reports to the City Council three times a year. If their report suggests that a measure has not resulted in the emission reduction as anticipated, they put forward additional suggestions to amend the measure.

Also as a part of this workflow, interviewees (2025) explained that during the budget process, every department in Oslo submits proposals for additional financial allocations for cost increases and new initiatives. These proposals are assessed by the Climate Agency for their climate impact, although some, such as hiring teachers, have little effect. The Climate Agency conducts an overall assessment of all proposals, ranking them based on efficiency for reducing emissions and adapting to climate change, providing the city government with a clear overview of the proposals' impact.

A strong incentive for all parts of the organisation to collaborate with the Climate Agency and actively participate in developing new climate policies and measures stems from the understanding that their involvement is beneficial. Interviewees (2026) note that all departments and agencies are aware of the city's climate ambitions. If they do not contribute to the design process, the Climate Agency will develop the policies anyway. These externally designed policies may then be more challenging for the department or agency to implement, as their specialized knowledge would not have been incorporated.

Alignment of mandates with mission objectives

The interviewees (2025) reported that in the City of Oslo, the departments have clear mandates within their own field, which naturally strengthens departments' ability to take action on climate matters. Nevertheless, there are also cases where a specific need for emissions reduction do not fall under the mandate of a specific department. In those cases, the Climate Agency makes a recommendation as to how to approach the responsibility and process. In some of these cases, changes in national legislation also removed the mandate gap, by enabling the City to take action as needed.

With another perspective into the question of mandate, the success of Oslo's Climate Budget stems primarily from its broad political mandate, which the interviewees (2025) see as its key advantage

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when compared to other cities' approaches. Operationally, the Climate Budget's effectiveness is ensured by its integration as Chapter 2 of the city budget. This structure mandates the prioritisation of climate goals across the city hall. Crucially, once the Climate Budget is approved by the City Council, it becomes legally binding, dictating the actions that must be taken despite potential departmental disagreements (Interview, 2025).

Structural and role changes to support the mission

Interviewees (2026) point out that the establishment of the Climate Agency in 2016 was a major structural change that was put in place to actively work on climate goals. Centralizing climate expertise in one office allowed other departments to leverage that knowledge without needing their own dedicated staff, leading to significant city savings and improved efficiency through better coordination (Shank, 2023).

Interviewees (2026) further point out changes in the mandate of the agency responsible for the city's overall procurement strategy as another example of major revisions following Oslo's increased climate ambitions and the inclusion of environmental weighing in all procurement processes.

Gaps and overlaps in responsibilities

The city has identified the mandate related to zero emission construction as a potential gap in mandate. This is because zero emission construction is identified as a field where local action possibilities appear limited or where national-level action is needed to enable the local level action. Despite this, the city has proactively adapted its approach, particularly in the construction sector, by piloting and subsequently implementing zero-emission criteria in procurement weighting (Interview, 2025). This indicates a shift in mandate and operational prioritisation to support climate goals.

Similarly in circular economy, the Climate Agency's mandate regarding the subject has been clarified and expanded. Currently, the Agency is primarily responsible for coordinating internal efforts in circular economy. Previously, this responsibility was shared among four agencies, and consolidation to one lead agency has increased the impact (Interview, 2025).

2.5. Coordination Mechanisms & Cross-Departmental Work

The Climate Agency operates as a "horizontal convener", with the Climate Budget being the main "coordination and steering tool" (Hofstad, 2022), defining the various climate goals and clearly stating the responsibilities across departments. Against this background, climate governance work in the City of Oslo can be described as highly structured cross-departmental collaboration resulting from shared formal responsibilities across Finance, Environment, and Transport Departments (Brown & Hoti, 2025), as well as across all the other departments and agencies with specific mandates (Interview, 2025).

In order to avoid departmental disagreements from arising, interviewees (2025) emphasised that it is crucial to do the foundational work of finding a shared understanding and vocabulary with all relevant stakeholders across the city hall. What significantly helps agencies and departments to reach a shared conclusion is a clear mandate for the climate work required. When agencies and departments know *what* they are trying to achieve and *with what* (resources, timelines, regulatory limits, etc), the focus shifts to *how* best to implement. In this case, a joint proposal becomes a practical solution for coordinated implementation, as a joint proposal yields greater influence and streamlines the subsequent implementation stage. Typically, one agency (e.g., the Climate Agency) develops the measures, while another agency and department may be responsible for implementation, which shows the need for collaboration to ensure that proposed measures are practical and achievable.

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Apart from the Climate Budget itself, interviewees (2025) provided examples of new forms of cross-departmental coordination approaches. A semi-permanent structure was mentioned: an action plan and a steering group involving relevant agencies to address climate adaptation issues such as heavy precipitation. As an example of a procedural change, interviewees noted a process where all city agencies are involved in an assessment of the climate impact of all new proposals, to ensure funds do not inadvertently increase emissions. Furthermore, climate considerations are now routinely mandatory for every measure put forward for political consideration. This has been supported by the Climate Agency's active engagement and involvement in other departments' strategies with hands-on efforts on the biggest emissions sources.

2.6. KPIs, Monitoring & Everyday Operations

According to the Climate City Contract (City of Oslo, 2024), the Climate Budget reporting is the main system of monitoring progress in city departments and agencies. The entities responsible for measures in the Climate Budget must report on their measures similarly to how they report on their finances. Progress on each measure is also reported three times a year based on measure-specific output indicators. Indicators can, for example, be focused on the amount of public charging stations installed, or kilometers of new bike lanes constructed.

The output indicators that are set in the Climate Budget for the responsible departments and agencies are also included in the department's or agency's own activity plan (City of Oslo, 2024) which may further contribute to their work being aligned with the objectives. The KPIs are developed in cooperation between the Climate Agency and the responsible entities (Interview, 2026).

In addition, the Climate Budget's annual updates include an evaluation of the latest GHG inventory. The process includes evaluating and adjusting measures based on the information on their impact, as well as evaluating the climate effects of potential new measures.

The Climate City Contract (City of Oslo, 2024) also notes that the Climate Agency has established a Climate Barometer that monitors the outcomes of different measures across the most important sectors. The Climate Barometer functions as a more real-time supplement to the GHG emission inventory that has a lag time of over a year. The indicators in the Climate Barometer are also evaluated three times a year to ensure that the Climate Budget measures are on track, and they are also used to complement the annual evaluation of the climate effects of the Climate Budget's measures. The set of indicators in the climate barometer is continuously being improved. According to the interviews (2026), Oslo also works together with the organisations responsible for national GHG emissions calculations to add detail to the system in order to refine the calculations made in Oslo.

2.7. Rules, Norms & Internal Institutional Change

Reflecting on the changes in how the Climate Agency works within the Climate Budget framework, interviewees (2025) noted that initially, the primary focus of assessment was solely on CO_2 emissions, specifically reduction potential or the cost per ton of emission reduction measures. This approach has evolved into a broader assessment that now incorporates climate adaptation and other consequences, such as energy supply.

The Climate Budget and calculation methodology undergo continuous refinement, becoming more sophisticated each year as emission cuts are achieved as intended. While many cities seek a perfect initial calculation and comprehensive monitoring, the City of Oslo has taken a more proactive and experimentative approach, focusing on the biggest emission factors and how to reduce them, recognizing that the perfect monitoring approach and process will be established through the ongoing process (Interview, 2025).

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Another concrete example of changes in procedures when aiming to increased climate ambition is that Oslo has implemented new procurement practices, requiring environmental weighting of 30% in all processes. Interviewees (2026) note that the procurement processes were also revised to also consider Scope 3 emissions to align with the increased visibility of Scope 3 emissions in Oslo's Climate Budget.The city also updated tender criteria to mandate zero emissions for all municipal construction sites by 2025 (Shank, 2023).

Shifts in organisational culture and norms

Interviewees (2026) have noted a gradual change in organizational culture and attitudes toward climate action through several examples. Within zero-emission construction technology, the interviewees shared that the proposed changes were met with high skepticism, particularly by the procurement staff. However, successful piloting led to a significant positive change among the end-users as well as the procurement criteria developed in the city.

Interviewees (2026) acknowledged that the cultural barriers are diverse, depending on the specific measures or agencies involved. Crucially, the process of adopting the current climate goals have led to a gradual increase in knowledge across the city organisation, involving more people and resulting in the implementation of more new solutions. This suggests that the process of striving for ambitious climate goals in itself generates organisation learning and change. In addition, interviewees (2026) also suggested that introduction of new technologies also impact organisational culture and attitudes.

Capacity-building and staff support

According to Shank (2023), the requirement for Oslo's climate office to coordinate with all other city departments on every new proposal fosters new skills. Climate staff quickly gained competence in the diverse cultures, capacities, languages, and approaches of other city offices. This resulting professional development has been beneficial for the staff's career and an asset for the city.

Nevertheless, regarding skill gaps and development, interviewees (2026) pointed out the challenge of assessing competence needs across a massive organisation of 55000 employees many[24] of whom work on climate-related issues. Determination of needs for extra knowledge and competence is a case-by-case consideration, while also depending on available budget and political priorities. While training and staying current with new developments are recognised as important, secondments are also common practice.

2.8. Leadership, Political Support & Multi-Level Context

It is highlighted both by the interviews (2025, 2026) and by Vedeld & Hofstad (2022), that designing clear climate goals with a broad support across parties in the city council has been important, and also a "prerequisite for the adoption of the climate budget as a proactive policy instrument" (Vedeld & Hofstad, 2022, p.71).

According to the interviews (2026), the political support from the council level and the different parties has been constant, and the mandate to the city officials from the city council to prioritise climate is

[24] Interviewees (2026) note that although the climate work is streamlined across the city organisation, groups such as teachers, kindergartens, hospitals, elderly care and similar do not strictly work on climate related issues.

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unchanged. Rather than changes in the commitment to climate ambition, there have been slight changes in different political parties' focus areas in implementing climate policies. For instance, the current majority party focuses more on business and innovation, in comparison to the earlier social-democratic local government.

There are no separate formal political commitments apart from the Climate Strategy and the Climate Budget in Oslo in the field of their climate policy. The interviewees (2026) do not consider it likely that the political climate would change in Oslo in the near future because, for instance, the climate budgets have been approved by the parties unanimously.

Engagement of senior officials and department heads

According to the interviews (2026), there are only minor differences in how much senior officials and department heads engage with Oslo's climate goal. All departments and agencies are involved in the climate budget and need to implement the measures that they are responsible for, but some department heads are more personally involved while others delegate to other seniors in their organisations. The interviewees also note that the engagement of departments also depend on how critical the sector or agency is for mitigation in Oslo. They also note some small disagreements arising when adapting new technology and ensuring that it is secure and resilient (e.g. when electrifying fire-fighting vehicles).

Overall the Climate Budget and the climate budgeting process include all departments and thereby all senior officials and department heads. Once a measure is included in the Climate Budget, the responsible departments and agencies commit to implementing it. The Climate Agency continuously follows up the implementation of the measures of the Climate Budget, and all the departments report on their actions three times a year. According to the interviews (2026), this means that all parts of the organisation know that if they do not implement the agreed actions, they will need to provide justifications.

Multi-level governance context

The interviews (2025, 2026) particularly highlight the importance of interaction and dialogue between the City of Oslo and the Norwegian national government. The national level legislation is considered a major barrier to Oslo's climate ambitions, and the city actively advocates for financial or legal changes. As an example, Oslo succeeded in getting the national government to give the local level the needed legal basis to regulate emissions from private construction sites, and they are currently in the process of the national government allowing the introduction of zero-emissions zones, thanks to the years of dialogue between the national government and the City of Oslo.

As noted in Chapter 3, despite Norway being a non-EU Member State, engaging and influencing EU policy is also highlighted as a relevant multi-level governance context for Oslo (Interviews, 2025, 2026).

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3.5.2.3 Looking Ahead: Challenges, Opportunities & Lessons

Future challenges for mission governance in Oslo

According to the interviews (2026), the major global changes towards less ambitious climate policy are expected to be a major challenge for Oslo, which is framed to be “a small city in a big world” .

Global changes in, for example, technology and decreasing green investments are expected to also affect Oslo, as relevant technology might become less available and more expensive. Also the reduced ambition at the EU level, for example related to the EU Green Deal implementation, is expected to indirectly influence Oslo (Interview, 2026).

In developing its internal working methods, the next challenge that Oslo is facing is related to the integration of climate adaptation to its climate budget, requiring new ways of thinking and managing. Developing good indicators and measures on adaptation is found especially challenging, but the city is cooperating with other cities with experience on this, such as New York (Interview, 2026).

Opportunities for mission governance in Oslo

The interviews (2026) point to private businesses’ continuous engagement and climate work as an opportunity. In a situation where political support is decreasing globally in many places, companies are still showing ambition despite the unclear political situation, which is an opportunity for cooperation and joining forces with cities as well.

According to the interviews (2026), continued cooperation with the national government is a further opportunity for Oslo. As noted, dialogue between the city and the national level has already led to legal changes that enable more ambitious climate action at local level (e.g., on clean construction and low emission zones). However, it is still a challenge that national level processes are long, and Oslo still has several topics where national level changes would be required to enable the city to cut its emissions according to its goals. For instance, when it comes to consumption-based emissions and circular economy, national policies on taxation, VAT, and goals for re-use could be considered a barrier. Property transfer tax is another example, as it does not exist for new buildings, but exists when transforming an existing building into new homes which risks dis-incentivising more climate-friendly re-use instead of new construction.

Advice and lessons for other cities

The interviewees (2026) state that it is important for a city to set ambitious goals from the start, give the city organisation a clear mandate to work towards those goals, and have strong support from the political system. Also the system of working across the city organisation and making all departments and agencies responsible for action (especially through the system and process established in the Climate Budget) have been essential.

The interviewees (2025, 2026) also advise other cities not to wait until they have all the possible knowledge about measures, or perfect calculation methods, before taking action. They note that Oslo has focused on taking concrete action and, for instance, testing new technologies as early as possible. They also advise identifying and prioritising the biggest sources of emissions at first, as well as starting with addressing the largest emissions in areas where the city organisation has agency and possibility to act, i.e., has the legal basis or other means to reduce emissions in those areas.

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3.5.3 Turku

3.5.3.1 General City Information

Basic city profile

Turku is a historic coastal city in southwestern Finland and the regional capital of Southwest Finland, situated at the mouth of the Aura River on the Baltic Sea. Founded in 1229, it is Finland's oldest city and one of the country's most significant urban centres, with a population over 200 000 inhabitants in the municipality and over 300 000 in the broader urban region, making it the third largest urban area in Finland after the Helsinki and Tampere regions.

The city's age profile is typical for a European urban area: approximately 25 % are children and youth (0-17 years), 60-62 % are working age adults (18-64 years), and around 20 % are over 65, with a median age of about 40 years. In recent years, Turku's population has been growing steadily, driven by internal migration and international immigration, and forecasts suggest continued growth in the coming decades. The city is also becoming increasingly multicultural, with a rising share of residents from foreign language backgrounds, reflecting broader demographic trends in Finland.

Geographically, Turku serves as a dynamic hub in the Baltic Sea region, combining urban services with rich natural surroundings and a vibrant cultural and academic life anchored by multiple universities and research institutions.

Turku's economy is driven by several key sectors. The city is a major centre for maritime and shipbuilding. Technology and life sciences also play an important role, with firms specializing in biotech, medical technology, and ICT. Additionally, Turku's logistics and transport sector benefits from its strategic coastal location, supporting ports, freight, and shipping services. The largest sources of CO_2 emissions in Turku come from energy, heating (particularly district heating for buildings), transport (including road traffic and shipping), and industry, with shipbuilding and manufacturing contributing significantly to the city's overall emissions.

Municipal structure and political leadership

The governance of Turku is based on a democratic municipal structure headed by a City Council elected by residents every four years. The Council exercises the highest decision-making authority in the municipality, determining the city's strategic objectives, budget, and key policies, including climate and sustainability objectives, and appointing members to various committees that oversee sectors such as urban environment, culture, and social services. The current council term (2025-2029) comprises 67 councillors from a range of political groups representing both majority and minority positions in local politics. The executive leadership is centred on the Mayor's Office, supported by a Chief of Staff and central administration responsible for coordinating city operations, implementing council decisions, and steering strategic priorities across service divisions and city-owned companies.

City Mission and Climate Neutrality Agenda

Turku has positioned itself on the international stage for climate action through participation in and the EU Mission for 100 Climate Neutral and Smart Cities and the NetZeroCities pilot programme. In March 2024 the city received the prestigious EU Mission Label, which recognizes successful development of its **Climate City Contract (CCC).** With the ambitious goal of achieving **carbon neutrality by 2029** (meaning a 90% reduction in emissions compared to 1990 levels), **and transitioning towards climate positivity thereafter**, the city has developed comprehensive climate plans and partnerships that engage companies, residents, and civil society in emissions reduction, circular economy, and nature-based solutions. Other key goals include the sustainable use of natural resources and

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maintaining a rich urban and local natural environment. The shift to climate-positivity increasingly emphasizes consumption-based emissions and is complemented by a target for resource wisdom by 2040. More broadly, the climate work in Turku is beginning to move from a sole focus on emission reductions toward a wider sustainability framework, reflecting on what constitutes a sustainable and good life in times of ecological crisis and within planetary boundaries.

Key regional bodies relevant to climate and mission governance include the Urban Environment Committee and regional committees such as the Southwest Finland Waste Management Committee and the Turku Region Public Transport Committee, which play important roles in implementing infrastructure and environmental policy. Within the administration, dedicated departments and programmes focus on climate, nature, and sustainability work guided by Turku's **Climate Plan 2029**.

The city has focused on climate and sustainable development goals since at least 2009, when the first climate program was launched. Turku joined the Covenant of Mayors in 2010, and the first SECAP-based Climate Plan was approved by the city council in 2018. That plan has been updated once and is currently being revised again. In 2025, the City Board set the goal of nature positivity by 2030, aiming to give biodiversity and nature the same strategic focus as climate. Circular economy has also been a priority, with a roadmap published in 2021 after a multi-year development process. Today, climate, nature, and circular economy are treated equally on the agenda, each supported by dedicated strategic documents and programs that are regularly updated.

3.5.3.2 Mission Governance Context & Transition Team

Transition team / coordinating unit

The climate work is coordinated by the **Climate, Nature and Circular Economy Team** within Business and Economic Development. The team, led by Risto Veivo, Climate Director, has currently 13 professionals with backgrounds in natural and social sciences and operates close to central administration. Its main tasks are advancing the Climate Plan and the CCC strategically, aligned with the city strategy and mayoral program, and collaborating with stakeholders. Recently the department has been moved from a position comparable to the Mayor's Office to Business and Economic Development Services as part of a broader city reorganization. A separate Environmental Protection Department handles more direct biodiversity and nature work, while this team focuses on strategic, long-term planning for climate, nature, and circular economy.

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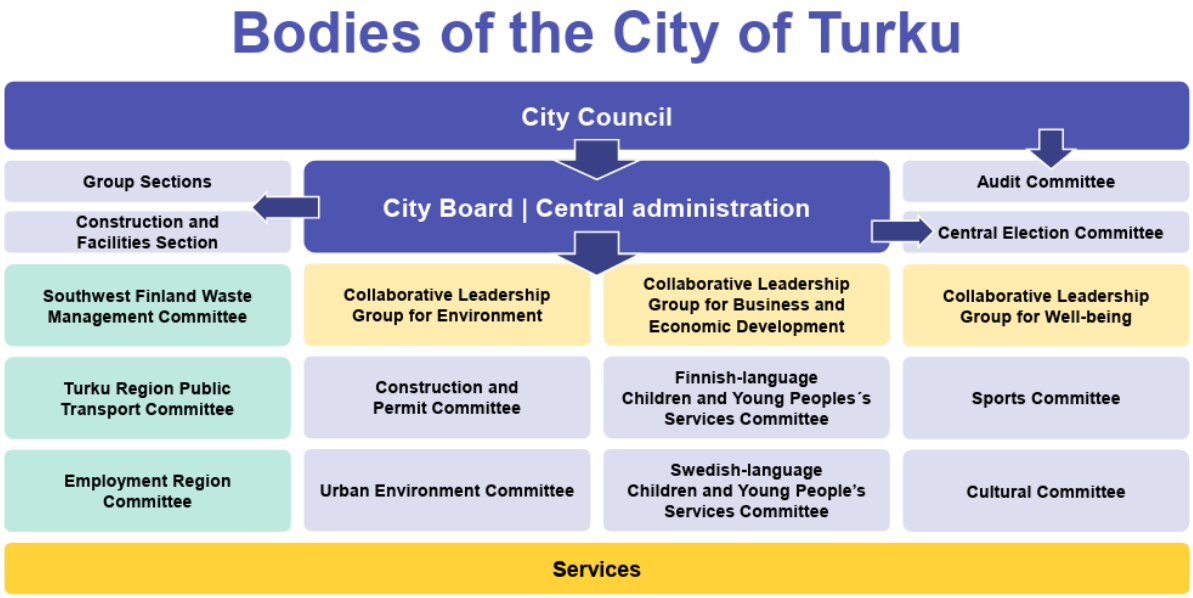


Figure 25 - Organisational chart of Turku.



Figure 26 - Organisational chart of Turku Service division of Business and Economic Development.

The implementation of the Climate Plan has been embedded into Turku's regular management processes and is overseen by both the City Council and the City Board. The City Board receives a report on the implementation and progress of the Climate Plan at least once a year, in addition to the climate report submitted to the City Council. The achievement of the objectives set for 2021, 2025, and 2029 is reviewed during each Council term as part of the Climate Plan's periodic updates.

Recognising the vital role of the private sector in achieving climate neutrality, Turku actively encourages companies and organisations to join the city's **Climate Team network** by making a climate pledge. The Climate Team network currently includes around 140 organisations. Members join the network with already implemented climate, biodiversity or circular economy actions - both small

and large scale - which are documented on the Carbon Neutral Turku website and highlighted in the annual climate report.

Another important body in the city's climate work is the **Climate Coordination Group**. Serving as a key hub for information exchange and expertise, it provides ongoing support for the city's climate initiatives. The group consists of approximately 200 internal and external experts and plays a central role in the Climate Plan process.

Additionally, to co-develop the CCC, Turku has established a **Climate Partner network** comprising nearly 50 organisations. This group brings together key companies and local institutions such as universities, welfare organisations, the church, and cultural actors including theatres, which have formally committed to supporting the city's climate objectives while implementing their own concrete actions. Climate Partners are invited by the city, and their commitment document is negotiated individually with each organisation, ensuring a clear contribution to the climate neutrality goal. Collectively, these organisations send a strong signal of shared commitment to climate goals and contribute to building a broader understanding of progress as well as forthcoming developments. The network has continued to expand and strengthen over time, while some Climate Partners are also part of the Climate Team network.

External Support & Influence on Governance

Overview of external support

As part of the NetZeroCities Pilot Cities Programme, Turku implemented the 1.5-Degree City project. Within this pilot, the city created opportunities for residents to actively participate in climate action, supported companies in developing low-carbon business practices through the ongoing work of the Climate Team network, and established an online platform "Climate Situation Room" for knowledge-based governance. In collaboration with the University of Turku's Department of Psychology, insights from behavioural science and "nudging" methods were applied to encourage climate-positive behaviour. The project promoted a 1.5-degree climate-friendly lifestyle among residents through dialogues, an empowering climate communications campaign, and a network of climate ambassadors composed of relatable role models from Turku. In addition, the initiative included piloting sustainable leisure-time mobility solutions in partnership with citizens.

In addition to NetZeroCities support, city networks play a central role in learning and collaboration. The city is actively involved in several long-standing networks, including Finnish Sustainable Communities (FISU), The Towards Carbon Neutral Municipalities (Hinku), Local Governments for Sustainability (ICLEI), The European Regions Research and Innovation Network (ERRIN), and others, alongside its participation as a Mission City. These networks provide important opportunities to exchange experiences with other cities, replicate successful practices, and foster collaboration across internal departments. Political leaders are also involved in these networks, which sends a strong internal signal about the importance of climate action and the city's active role in national and international cooperation.

Finally, the city has worked with an external consultancy, which supported a broader leadership and organizational development process. Part of this work focused on climate leadership, examining how it is currently organized within the city and how it could be further developed. Through this collaboration, the agency contributed to governance-related improvements.

Contributions to breaking silos and rethinking governance

As part of this recent city-wide leadership design process supported by an external consultancy, a new governance structure was introduced in the form of three **cross-sectoral "co-influential steering groups."** These groups focus on well-being, business and economic development, and the

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environment, and are intended to ensure that key strategic themes cut across all departments and city activities. The Climate Team is directly involved in the **Environmental Steering Group**, with a senior representative participating and parts of the team holding preparatory responsibilities. Each steering group includes five elected politicians alongside senior officials from the city administration, such as service area leaders and department heads. The groups are designed to keep their respective themes consistently on the political and administrative agenda.

This structure is very new, having been introduced in autumn 2025, and meeting practices are still evolving. While related strategic processes - such as the Climate Plan and the Nature Roadmap - already exist, discussions are ongoing about the exact role and authority of the steering groups, including whether they will function primarily as decision-making bodies or advisory forums.

Mission, Common Vision & Shared Objectives

Framing and understanding of the mission

Accessing the EU Mission for Climate-Neutral and Smart Cities and developing the CCC has clearly acted as an accelerator of climate work and stakeholder engagement, as it required bringing together the most central actors in the Turku region. Through this process, the city has also been able to secure funding. The CCC Action Plan was developed based on the existing Climate Plan, while the CCC Investment Plan was more newly constructed during the process, building on and linking to the Climate Budget that the city had already started to develop. The CCC has been particularly relevant in strengthening the investment framework, helping to better link city investments with climate budgeting and align these more closely with the EU level. It has also played a role in establishing the Climate Partner network, including the creation of CCC commitments, with new partners continuing to be invited to join. More broadly, the Mission has provided not only resources, but also a clear framework and a strong network to support and further develop Turku's climate work.

The city's climate work is guided also by several high-level strategic documents. The Climate Plan is one of the key overarching frameworks and is regularly updated each council term. At the beginning of 2026 the plan has been undergoing evaluation and revision, with an updated version expected to be presented to the city council in June. In parallel, the city is developing its first Nature Roadmap. Together with the Climate Plan and the Circular Economy Roadmap, which is expected to be updated next year, these documents form the core strategic framework guiding climate, biodiversity, and circular economy work. Other thematic strategies - such as those related to forests or the Baltic Sea - also exist, but these three documents are considered the primary pillars of the city's sustainability agenda.

Development process for mission and objectives

Internal engagement in Turku has evolved gradually over more than a decade, as the importance of climate and nature has become more visible across the city organisation. Today, the topic is clearly on the city's agenda, but this did not happen automatically. Progress required persistence, relationship-building, and continuous dialogue to build mutual understanding. Political leadership has also supported this development. Both previous and current Mayors have been very active, including internationally through ICLEI, which has helped strengthen these topics. **Despite political changes, climate and nature remain strongly reflected in the current mayoral programme and the ongoing city strategy renewal.**

External frameworks also accelerated progress. The EU taxonomy provided structure and a clear narrative for sustainability work, while participation in initiatives led by the European Commission strengthened networks and cooperation with actors such as the European Investment Bank. Mission funding also enabled the climate team to expand to four dedicated staff members, allowing broader cooperation with regional partners.

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Getting departments on board - especially the planning and construction service area - has been a process spanning several years. The Climate Team worked through repeated workshops, discussions, and integration of climate considerations into existing processes. For example, the city introduced EU taxonomy evaluations into investment planning, assessing the sustainability of major projects such as infrastructure and buildings. Initially, this approach was not well understood, but through continuous engagement departments gradually recognized its value and practical relevance.

Persistence was key. The climate team regularly requested time in department meetings, presented agenda points, and sought input and support. Having a bridge-builder within the team, such as a colleague who came from a construction background, helped connect people, make climate topics more relevant, and navigate resistance.

Collaboration across departments varies. The planning and construction service area is particularly important because of its strong influence on climate and nature outcomes, and cooperation with them has improved significantly. The procurement department is another strong partner, actively developing sustainable procurement criteria and initiatives. Cooperation with the mobility function is also important, as they lead many sustainable transport projects, although coordination can sometimes be challenging due to structural separation within the organisation.

Engagement with some sectors, such as children and youth services (schools and daycare), has been more limited because their daily priorities differ. In contrast, cooperation with cultural services has worked relatively well. Overall, collaboration across the large city organisation has strengthened over time, with particular focus on departments that have the greatest impact on climate and nature outcomes.

Internal communication of the mission

To strengthen internal engagement, several tools have been developed. A new webpage under the 1.5 Degree City project serves as a shared resource base and is used in internal discussions. In the ongoing INTACT project (funded under NetZeroCities “Enabling City Transformation” Programme), one full work package is dedicated specifically to internal communication and engagement, recognizing that this requires more systematic effort. Initiatives include nature webinars, climate and nature dialogue trainings, new intranet pages, participation in the selected city-wide HR webinars led by the Mayor, and long-running climate webinars that, although originally aimed at external stakeholders, also attract internal staff. Campaigns, info screens in buildings, and broader communication efforts have further supported outreach. In addition, regular meetings and internal working groups - such as those on sustainable construction, circular economy, climate engagement and communication - support ongoing collaboration across departments.

A smaller project funded by the Finnish Ministry of the Environment highlighted differing internal attitudes: some staff are highly motivated, some are willing but unsure how to act, and some are resistant. Through targeted one-to-one discussions with department representatives, the climate team explored perceived roles, opportunities, and barriers related to climate, nature, and circular economy topics. This marked a shift toward deeper internal activation work, which now continues under larger projects.

A key lesson has been that engagement often starts with information-sharing but needs to move toward more participatory approaches. **Not all departments can directly influence emission reductions, but they can contribute in other ways, such as citizen engagement, communication, or process development. Making climate and nature issues understandable and relevant to each department’s daily work, and ensuring that ownership extends beyond the climate team, remains central to long-term integration.**

Roles, Mandates & Organisational Set-up

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Distribution of responsibility for the mission

The Climate Director is responsible for the city's climate strategy and governance and plays a key connecting role. He ensures that climate issues remain visible in the right forums, particularly in political contexts. His ability to identify where to engage, whom to involve, and how to frame issues has been important for maintaining continuity and keeping the climate agenda on track. The core team consists of the Climate Director and four senior specialists in permanent positions, while the rest of the team works mainly on project-based or temporary contracts as project managers or specialists. The Climate Director, senior specialists, and project managers meet regularly to discuss strategic issues and the overall direction of the work. The team is also organized thematically: some members focus on climate mitigation and adaptation, others on biodiversity or the circular economy, and two colleagues works specifically on climate finance and investments. This structure combines strategic oversight with thematic expertise.

Implementation of climate actions takes place at multiple levels but is not fully formalised by department. Guidance comes from political leadership, strategic documents such as the Climate Plan, and ongoing project-based initiatives. The new version of the Climate Plan is beginning to specify responsibilities more clearly in some thematic areas, such as nature and carbon sinks, although assigning all actions to specific departments would require significant coordination and resources.

Some challenges remain. For example, work on carbon sinks and compensation is complicated by unclear legislation, while climate engagement in schools and kindergartens often depends on individual motivation and resources. Coordination can also be difficult in areas such as mobility, where services and planning are located in different parts of the organisation. Overall, responsibilities are shared, and cross-departmental cooperation continues to evolve to address these challenges.

Alignment of mandates with mission objectives

Perceptions of climate work across departments vary. Mobility teams are generally very supportive of climate action and actively seek solutions, although political decisions can sometimes limit progress. The construction and planning departments employ many staff members, and the flow of understanding and information can be slow, requiring repeated discussions and structural support such as climate budgeting and taxonomy workshops. Over time, attitudes have improved, and department heads now recognize the relevance and importance of climate work.

Engagement also depends on personal attitudes. Some staff feel their work has a real impact, while others question its significance in the context of global emissions. This creates a wide range of perspectives among both leaders and staff. **Consistent dialogue, workshops, and structured processes over several years have been key to building understanding and commitment.**

Coordination Mechanisms & Cross-Departmental Work

Formal coordination mechanisms

The evaluation and **update of the Climate Plan is a highly participatory process** involving Climate Coordination Group consisting of **staff from multiple city departments as well as external stakeholders** such as universities, higher education institutions, companies, and other key partners. The Group brings together a plenary body alongside smaller thematic groups aligned with the SECAP model (including energy, mobility, city structure and construction, nature and carbon sinks, adaptation, strategy and vision, and communication and participation). It is closely involved in both the evaluation and updating of the Climate Plan, while also supporting its implementation. The group convenes more frequently during key planning phases, in addition to its regular biannual meetings.

The Climate Plan itself is less detailed than in some other cities. Rather than assigning specific responsibilities, it sets overarching targets for each thematic area. After approval by the city council, the thematic groups continue to meet to review progress, assess developments, and identify

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necessary actions. This creates a continuous follow-up cycle rather than limiting engagement to the planning phase. For example, in the energy group, city-owned energy companies play a central role. Progress is monitored through indicators such as the share of renewable energy in district heating, and discussions focus on performance, barriers, and next steps. This ongoing engagement helps keep climate objectives visible, although progress varies across sectors.

Implementation and follow-up are also supported through regular meetings with department heads, presentations to service-area executive boards, and interaction with political leadership. Annual climate reports are presented to the city council, providing opportunities for discussion and accountability. Together, these formal and informal processes help ensure that the Climate Plan remains a living framework rather than a static document.

Examples of cross-departmental collaboration

Climate action across the organisation is coordinated through projects, strategic engagement, and regular interaction at multiple levels. Projects are central: some are developed within individual departments, such as mobility or procurement, while others are co-created across departments. Often the climate team initiates projects but later transfers ownership to relevant departments, enabling them to secure funding and take long-term responsibility.

Strategic influence is also exercised through involvement in major steering documents, such as the city strategy and the mayoral programme, ensuring that climate and nature objectives are embedded in these frameworks. Coordination is supported by regular meetings: Senior expert group and the full team meet biweekly, while project work is typically organised through more frequent meetings. Together, these mechanisms help align departments, sustain momentum, and integrate climate action across the organisation.

Enablers and opportunities for coordination

In Turku, momentum has not come from single quick wins but from persistence and strong leadership. Climate Director has played a key role in knowing when to push, how to adapt to changing circumstances, and how to keep climate issues on the agenda even when progress is difficult. **As the climate target year approaches and many cities doubt they will reach their goals, Turku has chosen to maintain its ambition and is updating its Climate Plan rather than lowering expectations.** This continued commitment has helped sustain motivation. At the same time, actively highlighting successful examples within different departments has been important. Communicating what works builds trust, strengthens engagement, and ensures achievements are recognized.

KPIs, Monitoring & Everyday Operations

Monitoring systems and indicators

Annual climate monitoring covers multiple sectors to track progress toward carbon neutrality. The main focus areas are energy, transport/mobility, industry, agriculture, waste management, machinery, and heating. CO_2 calculations are the core indicators, complemented by qualitative reporting on projects, pilots, citizen participation, and nature-related actions. Reporting follows the structure of the Climate Plan and aligns with Covenant of Mayors standards.

The monitoring informs priorities indirectly. Energy has been a major success area, so transport and mobility are now relatively more significant as emissions there remain higher. Indicators are included in the city strategy, so decision-makers can track them, though specific departmental actions are not yet formally tied to KPIs. In some sectors, like mobility, the team starts to identify more precise indicators to guide internal efforts, but annual data availability can be a limitation.

Data for climate monitoring in Finland is supported by reliable annual CO_2 emissions data for each municipality, provided by the state-owned research organisation SYKE (Finnish Environment Institute).

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This ensures consistent tracking of overall emissions and progress toward climate targets. Mid-targets for emissions (e.g., 75% reduction by 2025) are tracked annually, and so far, the city has met or exceeded them. Internal departments provide underlying data, but availability varies by sector. For example, mobility data is collected only every 4-5 years, making annual tracking difficult. While broad indicators are stable and outsourced, more detailed, sector-specific indicators (like mobility) would need additional annual data and resources to be useful. Consumption-based emissions are a newer indicator being piloted across Finnish cities, but it's not yet part of routine reporting. Overall, the process is structured but depends heavily on both external calculation services and periodic internal data collection.

Rules, Norms & Internal Institutional Change

Team culture and trust are equally important. Because the work involves experimentation and uncertainty, a supportive environment where people can share doubts and test new ideas is highly valued. Optimism also plays a key role: the team believes that ambitious goals such as carbon neutrality and nature positivity are achievable, which encourages proactive thinking and enthusiasm for new initiatives.

A broad mix of expertise is essential within the team. Members come from diverse backgrounds in natural and social sciences, which helps address the wide-ranging challenges related to climate, nature, and the circular economy. Much of the work involves continuous problem-solving in complex and uncertain situations, making strong communication and collaboration crucial both within the team and with other departments and external partners.

At the same time, some capacity gaps remain. The loss of a colleague with construction expertise has been noticeable, and financial and calculation skills are limited. The team also feels it could ideally be larger to fully cover all thematic areas. Despite these constraints, the combination of diverse expertise and a collaborative culture have enabled steady progress. The team participates in training offered by the city and through professional networks, including courses in service design and leadership that are applied directly in their work. Learning also takes place through exchanges with other Finnish cities and European initiatives, although time can be a limiting factor. Experimentation is a normal part of the team's approach, with small pilots used to test ideas and develop solutions. This experimental mindset is less common across the wider city organisation.

Leadership, Political Support & Multi-Level Context

The decision to join the EU Mission came from the city's EU office, which raised the idea several times. Early momentum came from city officials, including Climate Director and colleagues, who pushed the agenda forward. Political support has grown over time, especially under Mayor Minna Arve, who was very active internationally and pro-climate. Prior to her, earlier Mayors and city leadership were gradually becoming involved, building support step by step.

Ambitious targets, such as early climate goals set in 2009 and tightened in 2018 and 2022, were initially seen as impossible, but meeting them faster than expected helped create confidence that climate action is achievable. Wider societal movements, like Fridays for Future in 2017-18, also increased public visibility of climate issues and strengthened political backing.

Political support for climate action in Turku has remained strong despite changes in leadership. The Social Democratic Party currently leads the city, following over 20 years of more centre-right leadership. The new Mayor, Piia Elo, naturally supports climate and nature goals, and the team actively worked to ensure these issues were included in the mayoral program and the upcoming city strategy. Dialogue with political leaders is ongoing, and climate and nature priorities continue to be

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maintained and adapted, for example by connecting them with children, youth, and just transition focus areas.

National politics in Finland have shifted more to the right, but in Turku local elections have favoured climate-supportive parties, showing a degree of separation between national and city-level trends. While some Finnish cities have reduced their climate teams, Turku has strengthened its capacity by adding senior specialists and permanent positions, supporting continuity and long-term planning.

At the national level, priorities have changed: requirements such as mandatory municipal climate plans have been removed and related funding has been reduced, making climate work more challenging. One consequence is that Turku's climate team was moved into the economic services department, reflecting the growing emphasis on city growth and economic development. As a result, the team increasingly frames climate action in terms of economic benefits alongside environmental goals - an approach also reflected in the current update of the Climate Plan and its internal communication.

3.5.3.3 Looking Ahead: Challenges, Opportunities & Lessons

Looking forward, the main challenge is making climate work more integrated across departments. It's not just about the climate team doing things, but about helping all staff see their role and feel empowered to take action. This involves two levels: motivating individual employees to find climate solutions in their work and ensuring leadership supports and implements climate priorities in their teams.

Opportunities include using the Climate Plan update and the new Nature Roadmap as tools to engage staff and departments. There's also potential in working more closely with companies, making collaboration more effective, relevant, and even enjoyable. Leadership engagement is another area to leverage, especially with the new Mayor focusing on children and youth, which could open new ways to connect climate work to longer-term goals and everyday benefits, like health and sustainable living.

For cities seeking to create a strong internal environment for climate work, three key points stand out:

- First, **dialogue and communication** are crucial. Regular conversations across departments, building trust, and repeating messages help make climate work visible and understood. It's not enough to just give instructions - people need to see why it matters and feel involved.
- Second, **ambitious, clear targets** motivate action. Setting concrete goals with visible deadlines helps people understand what they are working towards and gives a sense of urgency. Targets that are too far in the future risk losing momentum, so shorter-term, actionable milestones are important.
- Third, **linking climate work to the city's broader image and identity** creates momentum. Framing climate and nature efforts as central to the city's reputation, both locally and internationally, encourages internal ownership. It shows that climate action isn't just a task - it's part of what defines the city and how it is seen externally.

These three elements together - open dialogue, ambitious targets, and connecting to the city's identity - create an environment where climate work is supported, understood, and actively pursued.

Overall, successful climate governance in Turku has been built on a few key elements. Decision-makers have shown strong and consistent support, with broad agreement on the city's climate policy. The climate team has worked under the guidance of the Mayor, and although it now sits within business and economic development services, this link has remained while the team itself has continued to grow and strengthen. Just as importantly, work is carried out in close collaboration across departments, in a co-creative and mutually supportive way.

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3.5.4 Aachen

3.5.4.1 General City Information

Basic City Profile

Aachen is an independent city in North Rhine-Westphalia (NRW), Germany, with a total area of 160.9 km² and a population of approximately 262,000 inhabitants as of 2022 (CCC: Action Plan). Its population density of 1,548.5 inhabitants per km² is well above the NRW state average of 525.5 inhabitants per km².

Aachen's demographic profile is relatively young, shaped significantly by its status as a university city. The population grew by 2.4% between 2018 and 2023, slightly above the German average of 1.9%, and the foreign-born population stands at 28.5%. The 18-25 age group is the only cohort with positive net migration. In the 2019/20 winter semester, enrolled students were equivalent to almost a quarter of the city's total population, reflected in a household structure where 56.7% of households are single-person (CCC: Action Plan; OECD Local Data Portal, 2021-2022).

The economic structure is heterogeneous: approximately 67% of employees work in services, 17% in trade and logistics, and 15% in manufacturing, particularly mechanical engineering. The largest employer is RWTH Aachen University. Mean equivalised household disposable income stands at €23,309, below the German average of €30,853 (OECD Local Data Portal, 2020), partly attributable to the student population.

Geographic and Regional Context

Aachen is located in the westernmost part of Germany, bordering Belgium and the Netherlands, and serves as the regional centre for the Aachen city region, which includes nine surrounding municipalities. The city is part of the Rhenish mining district, characterised by lignite mining across the Hambach, Garzweiler, and Inden open-cast mines, and is classified as a structurally weak region under the EU's regional aid framework, making it eligible for ERDF funding (CCC: Action Plan).

Approximately 60% of the building stock is residential, with the majority built between 1949 and 1978, a period associated with low energy efficiency standards. The city's strong transport connectivity, including cross-border commuter flows from Belgium and the Netherlands and links to three federal motorways, means that a significant share of mobility-related emissions falls outside Aachen's direct governance reach. Highway transit traffic in particular distorts the city's mobility sector emissions figures, complicating progress measurement (Interviews, 2026; CCC: Action Plan).

Governance and Institutional Setting

Aachen's city administration is organised into seven directorates, 23 specialist areas, six district offices, and six municipal enterprises, employing over 6,000 staff. The municipal family, comprising core administration, enterprises, and holdings, has a maximum direct and indirect influence of approximately 50% on the reduction of energy-related GHG emissions in the city as a whole. This makes external stakeholder engagement a governance necessity rather than a choice (CCC: Action Plan).

Two directorates carry primary responsibility for the mission: Directorate III for Urban Development, Construction and Mobility, and Directorate VII for Climate and Environment, Municipal Operations and Buildings, the latter newly created in 2021. A Climate Neutral Office, operating with its own identity

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and staffing outside the core administration, serves as an additional coordination and convening unit. Municipal enterprises are also significant actors, particularly in energy supply, public transport, and district heating. Stadtwerke Aachen is the majority shareholder in grid operator Regionetz GmbH, bundling electricity, gas, heating, and water grid management across the city and surrounding region (CCC: Action Plan).

Since the city's inclusion in the EU Mission, two successive mayoral elections have taken place, resulting in a shift from a green-led to a centre-right administration. Political commitment to the mission and the 2030 target has been maintained through both transitions (Interviews, 2026).

Climate and Sustainability Commitments

Aachen has a documented climate commitment stretching back to 1991, when it established an office for energy and climate protection and joined the European Climate Alliance. The city has been a member of the EU Covenant of Mayors since 2009 and has received European Energy Award gold certification in 2011, 2015, 2019, and 2023 (CCC: Action Plan).

In 2019, the City Council declared a climate emergency. In January 2020, Aachen became the first German city to formally adopt a climate target based on its proportional share of the remaining global GHG budget (16.3M tCO_2eq), linking its policy directly to the Paris Agreement. In May 2022, a citizen-led petition signed by over 11,000 residents was adopted unanimously by the City Council, setting the goal of climate neutrality by 2030 across all territorial emissions and sectors (CCC: Action Plan).

City Mission and Climate Neutrality Agenda

Aachen's mission is operationalised through two complementary instruments: the Integrated Climate Protection Concept (IKSK), which establishes municipal measures and a staged reduction pathway, and the Climate City Contract (CCC), which extends commitments to the city's broader ecosystem of partners and stakeholders. The IKSK 2.0 targets climate neutrality, or at least an 80% reduction in emissions compared to 1990, by 2030, incorporating both the core administration and municipal holdings. The CCC Action Plan covers seven fields of action: governance, energy, buildings, mobility, economy, societal transformation, and offsetting, with key priorities including heat supply decarbonisation, renewable electricity expansion, mobility transition, and building renovation at a target rate of 4% annually (CCC: Action Plan).

The CCC is backed by 73 (160 (as of April 2026 (31 premium, 72 framework, 39 basic, 18 LOI) signatories across four tiers of commitment. Premium partners, including RWTH Aachen University, municipal utility STAWAG, public transport operator ASEAG, and civil society organisation Klimaentscheid Aachen, are each voluntarily committed to achieving climate neutrality by 2030. The broader coalition spans universities, companies, hospitals, business associations, schools, churches and civic groups (CCC: Commitments).

Key Challenges and Opportunities

The structural governance challenge for Aachen is that roughly half of the city's GHG emissions lie outside the direct influence of the municipal family, distributing responsibility across actors the city can engage but not direct. Within the emissions that are more directly addressable, two sectoral challenges are particularly acute. The decommissioning of the Weisweiler lignite-fired power plant in 2029, which currently feeds the district heating network, requires coordinated action across utilities, regional actors, and the administration within a fixed timeline. The mobility transition faces structural lock-in: car density has grown 30% over 30 years despite only 3.1% population growth, and the

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transition requires alignment across planning, infrastructure, procurement, and public transport (CCC: Action Plan). Below-average household income relative to the German mean adds an equity dimension to these governance decisions.

Against these challenges, Aachen holds several structural assets. The university ecosystem is directly embedded in the mission coalition as a premium partner and provides a foundation for innovation partnerships. The city's position at the centre of the Rhenish mining district's post-coal transformation gives it access to structural funds and a regional political mandate for change. Municipal ownership of key energy infrastructure, including STAWAG and the existing district heating network, provides direct leverage over energy transition decisions that extends beyond what regulatory instruments alone could achieve.

3.5.4.2 Mission Governance in Aachen

Mission Governance Context and Transition Team

Aachen's transition team is a distributed coordination structure spanning EU, municipal, and ecosystem logics. The team is not a conventional organisational unit. It is distributed across the city administration and the Climate Neutral Office, with a closer core group, the Mission Management Team (MMT), and a wider tier of colleagues who coordinate on specific tasks such as CO_2 monitoring and network engagement (Interviews, 2026).

The MMT coordinates three distinct strands with differentiated responsibilities and reporting lines to the Steering Circle (STK). The first is *Coordination of the EU Mission*, sitting within the Department for Procurement, Contracts and Grant Management. The second is *Coordination of the IKSK*, sitting within the Department of Climate and Environment and responsible for overseeing 30 core municipal measures. The third is *Coordination of the Climate City Contract*, led by the head of the Climate Neutral Office, responsible for managing external partners and commitment-signer actions. The STK brings together the two Deputy Mayors and heads of key departments, and functions as the primary forum for strategic decision-making and political steering.

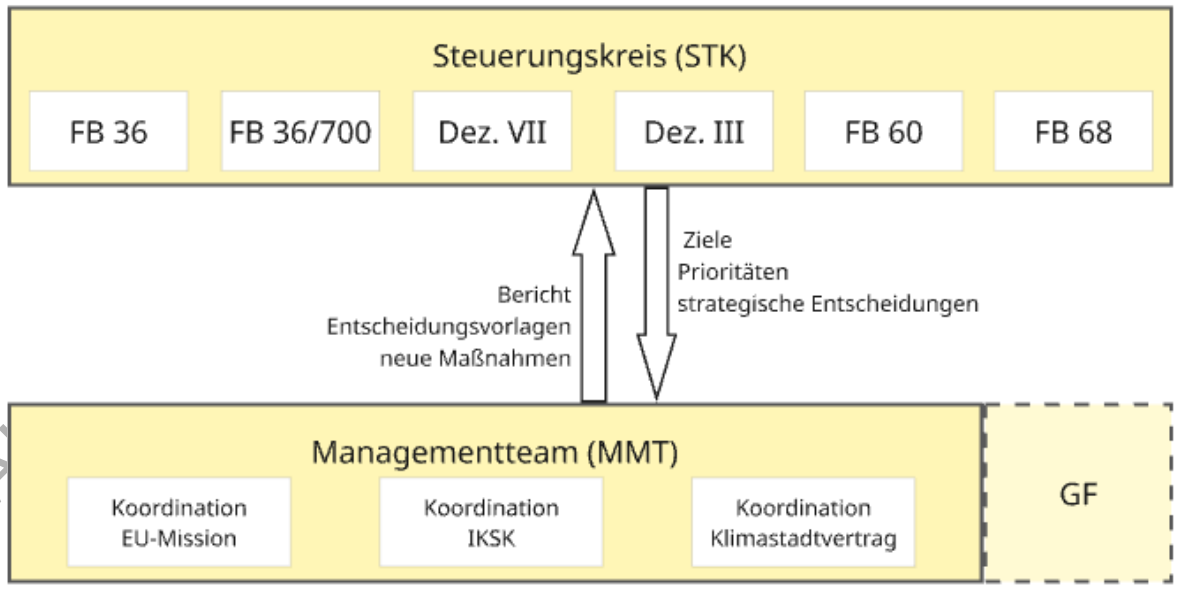


Figure 27 - Governance structure for "Climate-Neutral Aachen 2030": Steering Circle (STK) and Mission Management Team (MMT). *Source: City of Aachen.*

The MMT meets bi-weekly and functions as the primary space for operational coordination: aligning positions across the three strands, surfacing emerging issues, and preparing decisions and reporting

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for the STK. The STK meets every six to eight weeks, opening with political updates from the Deputy Mayors, moving through a prepared focus topic, receiving structured progress reports from each MMT strand, and closing with an EU Mission highlight. Interviewees described one of the governance challenges the redesign process had to resolve as unclear roles, responsibilities, and reporting structures: decisions requiring political input were not always sufficiently prepared, while questions of who should take responsibility for which issues, and how they should move through the system, were still being worked out.

The team was not the result of a single formal design decision, but developed over time through a series of decisions linked to the mission process. Following Aachen's selection as an EU Mission City in April 2022, an initial transition team was established under the two Deputy Mayors. The coordination function expanded during the CCC development phase, following a board-level decision to fund a second full-time role focused on building the local ecosystem. Through this period, the team operated as a loose network without clearly defined roles or boundaries, with responsibilities absorbed by whoever was most available and decisions taken informally. Following submission of the CCC in 2024, a period of reduced momentum and uncertainty about how to work together in the implementation phase made those gaps more visible. This triggered a governance redesign, supported by Rupprecht Consult and Dark Matter Labs through a NetZeroCities City Expert Support Facility request, producing defined roles, agreed meeting rhythms, and formalised reporting lines, formally constituting the MMT and STK as the governance architecture for implementation (Interviews, 2026).

External Support and Influence on Governance

External support has been a consistent enabling condition throughout the mission, most effective where sustained over time and where it provided functions that were difficult to organise internally: independent facilitation, governance structuring, and additional capacity the administration did not have readily available.

Rupprecht Consult has been the primary source of governance support, commissioned in 2023 and extended through the CEFS mechanism into the implementation phase. Drawing on the OSTO systems analysis model, their work spanned organisational design, facilitation of off-site retreats, and moderation of Steering Circle meetings during the first months. The retreats, in particular, created protected time in which senior leadership and the team could work through governance design questions, on roles, decision-making structures, and reporting, that internal hierarchies made difficult to address from within. The city assessed that none of the team could have moderated such a process internally, and that external facilitation was key to enabling questions about authority, coordination gaps, and working arrangements to be surfaced and worked through in a way that would have been difficult to achieve internally (Interviews, 2026).

Coaching sessions with the MMT ahead of Steering Circle meetings were identified as a specific and effective intervention. The focus was on structuring proposals clearly: leading with the decision required, presenting the relevant options, and making the implications of each explicit. The coaching process helped establish this as a discipline, and shifted the quality of what the STK could do in its meetings, improving the way decisions were prepared and brought forward.

Technical support for the IKSK update was provided separately by GERTEC GmbH and the Wuppertal Institute, developed jointly with the CCC process to ensure alignment between municipal measures and the wider action plan. The NetZeroCities City Advisor relationship provided longitudinal contextual knowledge, trust built over time, and an outside perspective that helped the city identify opportunities and frame its work. NZC Capital Hub engagement explored blended funding mechanisms. A NZC-supported climate communication workshop brought colleagues from across departments together to work on narrative framing and difficult conversations with climate sceptics. A recurring lesson from the city's experience was the value of continuity: where external relationships

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were sustained over time, partners developed a stronger understanding of the city's context and constraints, which made their support more effective at key moments (Interviews, 2026).

Mission, Common Vision, and Shared Objectives

The 2030 climate neutrality target rests on an unusually strong and layered mandate, combining political decisions and civic mobilisation, but translating that mandate into consistent ownership in day to day implementation across a 6,000-person administration remains the central implementation challenge.

The target is grounded in two City Council resolutions and reinforced by a citizen-led petition signed by over 11,000 residents, adopted unanimously by the council in May 2022. The CCC, ratified by council in 2024 and co-signed by 160 (134 by the time of CCC submission) organisations, extends this commitment across the city's ecosystem. The layered character of this foundation was not accidental. Three processes ran in parallel during the period following Aachen's inclusion in the Mission. The IKSK was revised to extend its target horizon to 2030, with the update led by GERTEC GmbH through a participatory process involving structured workshops with staff across the administration, and presented through multiple political committees before council approval in March 2024. The CCC was developed to consolidate commitments from the wider city ecosystem and incorporate the IKSK as administration-owned measures within a broader action plan. And a communication campaign was developed jointly and launched at the same day at the CCC submission event with the slogan "Us.Now," targeting the urban community.. Each process involved different actors and operated through different accountability mechanisms, together creating a broader and more layered foundation for the mission, which has helped maintain continuity as political priorities and framing have evolved (Interviews, 2026; CCC: Commitments).

Within the administration, the target is understood as a collective obligation rather than a departmental project. Alignment is strongest where mandates already correspond to mission objectives, primarily in Environment, Buildings, Mobility, Utilities, and Procurement. It is harder to establish in non-technical departments, where the connection to existing mandates is less direct and structural friction is more common. Interviewees noted that even in departments where engagement was strong, the mission had not yet consistently reached the level of individual staff members: political decisions and overarching targets could remain loosely connected to what they meant in practice for day-to-day responsibilities, particularly for those not directly involved in strategic or leadership discussions. Progress toward mainstreaming climate action across the administration remains a work in progress, particularly beyond the departments most directly engaged.

Internal communication has been an important part of the effort to build shared ownership. After selection as a Mission City, the team engaged colleagues across the administration through presentations on the mission's objectives, with the aim of building early awareness of what it required from different parts of the organisation. A standing climate team, meeting approximately every six weeks and bringing together project managers responsible for IKSK measures, provides a regular cross-departmental forum at working level. A climate protection conference for department heads also continues, meeting quarterly. Alongside these formal forums, informal communication has been actively cultivated: regular lunch check ins between mission coordination team members and colleagues in areas such as mobility and circularity, and climate breakfasts open to a wider group, have helped maintain connections that formal meeting structures alone do not provide. Leadership explicitly encouraged this layer of exchange, recognising the importance of informal contact alongside more formal coordination arrangements (Interviews, 2026).

The limits of formal internal communication were visible in the extent to which the mission had reached everyday work across the administration. The challenge was not primarily one of willingness. Interviewees suggested that once colleagues had been onboarded, they were often willing, and in many cases enthusiastic, to contribute. A harder task was translating political commitments and

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shared objectives into forms of involvement that connected to day to day responsibilities across a large and differentiated organisation. This became more pronounced as the mission moved from planning into implementation, with broad awareness and alignment needed to be complemented by other forms of ownership and action.

Roles, Mandates, and Organisational Set-up

Responsibility for the mission is broadly distributed but only partially formalised, with some areas strongly institutionalised and others relying on informal arrangements, creating tensions in departments whose operating logic does not fully align with climate action.

A substantial part of Aachen's climate implementation capacity predates the Mission. Under IKSK 2020, €120 million was allocated for climate protection measures, including the appointment of 36 climate protection managers across all departments, with these positions later extended through to 2030 (CCC: Commitments). These managers, each assigned to specific measures, represent the most systematic layer of formal role assignment in the mission. Beyond this, mission-specific roles are limited. The only positions created specifically for the mission are the head of the Climate Neutral Office and two project managers coordinator for the NZC pilot CoLab. One of these positions was made permanent.For most staff, including the Mission Coordinater, mission-related responsibilities are carried as informal additions to existing roles, without formal mandate change or job description revision. The pattern this creates is one of selective formalisation: where the IKSK assigns a measure to a department and that measure maps clearly onto existing competencies, there is a degree of formal grounding; where responsibilities are less clearly embedded in existing roles, implementation depends more on informal coordination and individual initiative (Interviews, 2026).

The 36 climate protection managers represent the most tangible attempt to embed mission responsibilities formally across the organisation. In departments where assigned measures align closely with existing work, the manager role tends to be well integrated into normal working practice. In departments where the assignment is more peripheral, the role can sit awkwardly alongside core responsibilities, with climate protection tasks treated as an add-on rather than a central function. Where measures are progressing more slowly, the challenge appears to relate not only to technical capacity, but also to whether the responsible manager has the organisational backing, the time, and the cross-departmental access needed to drive implementation effectively.

Mandate tensions are most visible in three areas. The treasury's obligation to manage the annual municipal budget in compliance with NRW state regulations creates tension with the multi-year planning logic that climate action requires, reflected at times in gaps between climate budgets allocated and amounts spent. Internal auditing's compliance mandate prioritises cost-effectiveness, creating friction with the mission's objective of embedding lifecycle and sustainability criteria in procurement decisions. The communications department is in a phase of adjustment following the change in mayoral leadership, with the alignment of its mandate with climate communication goals evolving under changed political conditions. These are not attitudinal resistances; they reflect the boundaries of institutional mandates and the time it takes for those to adjust (Interviews, 2026).

Economic development presents a different kind of challenge, not structural friction but distance. Climate and economic objectives have been broadly compatible in practice, but the department's primary focus on digitalisation and job creation means it operates on a somewhat different set of priorities, and the mission is less consistently felt as a shared priority.

Two structural additions addressed gaps the core administration did not have the capacity to fill from within. The Climate Neutral Office, positioned outside the administration with its own corporate identity and web presence, enables engagement with the CCC partner ecosystem in ways the administrative structure would make more difficult, and has functioned as a connector between external partners and internal departments. The financial architect, an external specialist contracted on a limited basis of

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approximately five days per month, addressed a recognised gap in financial expertise; conversations with bodies such as the European Investment Bank had previously lacked a clear internal lead. The role was placed through the Climate Neutral Office rather than directly within the city administration, a choice shaped in part by the political and cultural context and the collaborator's public profile as a known climate advocate. It is currently contributing to the development of a climate compensation fund mechanism and to building the financing pipeline required to support the mission's investment ambitions (Interviews, 2026).

Coordination Mechanisms and Cross-Departmental Work

A four-tier formal structure provides the coordination structure for the mission: the Steering Circle for strategic decision-making and political steering, meeting every six to eight weeks; the MMT for operational coordination, meeting bi-weekly; the climate team for working-level measure tracking, meeting approximately every six weeks; and the CCC Curatorium for ecosystem engagement with approximately thirty premium partners, all political parties, the Deputy Mayors, and the executive mayor, meeting twice yearly. This formal architecture is necessary, but on its own insufficient. Informal network-building, actively encouraged by leadership, has been essential to enabling cross-departmental collaboration in practice, operating through a different logic than formal coordination: less about managing defined responsibilities, and more about building the trust and mutual awareness that allows people to reach across departmental boundaries without always requiring a formal mandate to do so (Interviews, 2026).

The CCC Curatorium functions as the primary interface between the city administration and the broader partner ecosystem. Its composition, approximately thirty premium partners alongside all political parties, the Deputy Mayors, and the executive mayor, gives it a distinct character: it is neither a purely administrative forum nor a purely political one, but a space where institutional partners engage directly with senior political leadership around the shared commitments of the Climate City Contract. Interviewees described the Curatorium as a forum for surfacing shared challenges and testing ideas across organisational boundaries. It has given rise to thematic working groups on specific topics, including a climate compensation fund and the heat transition, which allow deeper engagement between the city and specific partner groups on issues where the standard Curatorium format does not provide sufficient time or depth. The twice-yearly rhythm means it cannot function as an operational coordination mechanism, but it has proven valuable as a space for legitimacy and accountability: a regular occasion on which the city's senior political leadership reports on mission progress to the partners who have co-signed the contract (Interviews, 2026).

Project frameworks have been important in enabling collaboration where formal mandates do not naturally converge. Within externally funded projects, departments can work beyond their usual constraints with fewer internal barriers: funding reduces the relevance of financial risk as a constraint, and the project framework provides legitimacy for working in different ways. Interviewees noted that this dynamic also creates space for colleagues who are intrinsically motivated but rarely find the organisational room to act on that motivation within standard administrative structures. The EU-project context gives them both the permission and the practical tools to contribute in ways that normal working conditions do not. The green procurement project, run under the Enabling City Transitions programme, illustrates this clearly. It brought together procurement, road construction, facility management, and internal auditing around the shared task of testing sustainability criteria in public purchasing. External funding mitigated financial risk, while a specialised lawyer provided technical grounding, and a connection to Oslo offered a best-practice reference that gave departments the confidence to attempt procurements they would not have tried alone. In this case, internal auditing endorsed the procurements as experimental, permitting price weighting to shift from the standard 50% to 30% in favour of quality and sustainability criteria. That endorsement would have been more difficult outside the project structure, not because internal auditing was unwilling, but because the project

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framework gave the deviation from standard practice a legitimate basis that normal administrative channels did not readily provide (Interviews, 2026).

A different type of cross-sectoral collaboration has emerged through the mission's network-building work. The mission team introduced the managing director of a recently professionalised citizen energy cooperative (through funding of the ALTHEA EU-project) to the municipal colleague responsible for charging infrastructure. The connection led to a project combining photovoltaic energy, storage, and publicly accessible charging infrastructure, financially viable under existing funding schemes and linking climate, energy, and mobility objectives in a way that neither actor had been able to pursue alone. This kind of facilitated emergence, where the team's role is to build relationships rather than coordinate activities, has become more frequent from late 2025 onwards, suggesting the cumulative effect of sustained network-building over time that formal coordination structures alone would not have generated (Interviews, 2026).

Coordination challenges persist alongside this momentum. Departmental capacity constraints limit the time available for horizontal work. Procurement rules and administrative approval cycles create delays between decision and implementation. The shift in mayoral leadership has required ongoing adaptation in how the mission is framed and communicated internally and externally, adding a layer of narrative management to an already demanding coordination effort (Interviews, 2026).

KPIs, Monitoring, and Everyday Operations

The central challenge in Aachen's monitoring is attribution: the city's instruments operate at a level of aggregation that makes it difficult to connect specific municipal actions to measurable outcomes. This creates direct tension with political expectations for clear evidence of impact. That tension is not only a technical inconvenience; it shapes what the mission team can propose, defend, and resource in conversations with political leadership.

The foundational instrument is the annual CO_2 balance, calculated using the ECORegion tool in accordance with the BISKO standard since 2010. It provides the territorial overview used for political reporting, but cannot distinguish between emissions within and outside municipal influence, or attribute progress to specific measures. Highway transit traffic passing through Aachen further distorts figures, making the mobility sector appear to underperform despite meaningful progress in areas under municipal control. This is not only a measurement problem. When political leadership reads the CO_2 balance and sees a sector performing poorly, it can generate pressure on the departments responsible for that sector, regardless of whether the underperformance reflects anything those departments could have influenced. The monitoring instrument therefore shapes political judgement in ways that can misalign incentives and obscure where progress is and is not being made. The mission team has limited means to correct that reading without more granular data (Interviews, 2026).

In practice, the mission team works to manage the gap between what the monitoring system produces and what political decision-making requires. Progress updates to the Steering Circle bring together different layers of reporting, including measure-level updates and the CO_2 balance. Interviewees also emphasised the importance of distinguishing between territorial emissions trends and those areas where the city's own measures can reasonably be expected to have influence, for example by separating out factors such as transit traffic in the mobility sector. The team works across these different layers of information, combining aggregate indicators such as the CO_2 balance with measure-level updates from tools such as PlanForge, even where the causal link between specific measures and emission reductions cannot be precisely quantified. Interviewees indicated that this requires interpretation and explanation to make the data meaningful for decision-making, as the monitoring instruments themselves do not directly provide this level of clarity. As the mission moves further into implementation, and expectations for clearer evidence of impact are present, these practices are likely to come under greater pressure in the absence of a more robust attribution framework (Interviews, 2026).

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Two additional instruments address the need for more granular tracking. PlanForge enables systematic progress reporting on individual IKSK measures across departments. Interviewees noted that its use varies considerably in practice: in some departments it functions as a genuine planning and management aid, consulted regularly and updated as part of ongoing project work; in others it is treated primarily as a reporting obligation, completed when updates are requested and rarely consulted in between. The extent to which PlanForge supports active measure management, rather than simply documenting status, depends significantly on the culture and capacity of individual departments rather than on the tool itself. ClimateView provides sector-disaggregated analysis with scenario modelling capability, integrating data from the economic model developed as part of the CCC to link strategic targets with operational monitoring. It was formally adopted in early 2026, with public publication planned for April. Neither instrument fully resolves the attribution challenge.

Many IKSK measures are framed at a level of ambition, such as transitioning the heat system or enabling citizen behaviour change, that makes connecting them to trackable milestones difficult. The city has also ratified 25 mobility-related indicators as part of the Mobilitätsstrategie 2030, providing a more structured monitoring framework in that sector. Across other domains, the gap between what can be measured and what political leadership expects to see remains. This gap is consequential: in the absence of credible intermediate indicators, it becomes more difficult for the mission team to demonstrate that investments are producing progress, which can complicate efforts to protect those investments in budget negotiations and to sustain political commitment to measures whose effects materialise over longer timeframes (Interviews, 2026).

Rules, Norms, and Internal Institutional Change

Institutional change in Aachen has been predominantly pragmatic and project-driven, emerging through specific initiatives rather than comprehensive structural reform. Project frameworks have created space for motivated staff to act in ways that standard procedures would otherwise limit.

The clearest example concerns procurement. New criteria incorporating CO_2 shadow pricing and lifecycle considerations have been developed and tested experimentally within the NZC ECT programme, with explicit endorsement from internal auditing. Formal adoption is moving through political processes, with a council vote expected after the summer break. The case illustrates a pattern that runs across Aachen's institutional change: formal adoption follows demonstrated practice rather than preceding it (Interviews, 2026).

Where resistance exists, most consistently in the treasury and internal auditing, it reflects the boundaries of formal mandates rather than opposition to climate action. These departments operate within formal remits and procedural logics that constrain their ability to adapt without changes to rules, approvals, or authorising frameworks. The procurement case makes this distinction concrete: once a project framework provided legitimacy, internal auditing was able to endorse approaches it would not typically support through normal channels (Interviews, 2026).

Capacity building has followed a similar logic: targeted and opportunity-driven, integrated into normal professional development rather than delivered as a separate mission programme. A training session on an ecological construction planning tool, organised for colleagues working on mission-relevant projects, attracted significantly more participants than anticipated. Interviewees described the response as surprising, pointing to a broader latent appetite for this kind of skills development across the administration that had not previously found an outlet. A climate communication workshop, organised with NZC support, brought together colleagues from across departments to work on how to frame the climate narrative and how to lead difficult conversations with climate sceptics, an area where the team had identified a practical gap between the importance of communication and the confidence of many colleagues to engage in it effectively.

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EU-funded project frameworks have also functioned as capacity-building vehicles in a more embedded sense: the ECT green procurement project provided colleagues in procurement, road construction, and facility management with technical grounding through a specialised lawyer, a concrete best-practice reference through the connection to Oslo, and a protected context within which to apply new approaches with reduced perceived risk. The team's choice not to establish a dedicated training budget for the mission reflects an implicit position: mission-relevant skills are more likely to be sustained when developed through existing professional development structures within departments, rather than through a separate mission-branded programme that may not be embedded in everyday practice (Interviews, 2026).

Leadership, Political Support, and Multi-Level Context

Political support for the mission is grounded in a combination of formal commitments that have provided continuity across political cycles. Two City Council resolutions, a citizen-led mandate with over 11,000 signatures, and a CCC ratified by council and co-signed by 160 organisations provide overlapping anchors that the mission team can draw on when alignment needs reinforcing. Through two successive changes of mayoral leadership, formal commitment to the 2030 target has been maintained. What has shifted is framing. Under the previous administration, climate neutrality was one of seven pillars of a broader vision of the city's future. Under the current mayor, the primary frame is structural economic transition, with climate action positioned within the post-coal transformation of the Rhenish mining district. Each shift has required adaptation in narrative and in how internal alignment and the external coalition are maintained (Interviews, 2026).

The Deputy Mayors responsible for the mission have played a central role in establishing credibility, both internally and with external partners. Their involvement extended beyond formal governance participation: during the development of the CCC, the Deputy Mayors accompanied initial outreach meetings with the leadership of major universities, companies, and associations, signalling at senior level that the city was taking the coalition-building process seriously. That direct engagement was identified as an important factor in building early trust and momentum, particularly in the first phase of securing commitment from major institutional partners (Interviews, 2026).

The multi-level governance context is broadly enabling. The 2021 NRW climate protection law, committing the state to greenhouse gas neutrality by 2045, provides policy alignment with Aachen's municipal target. The three NRW Mission Cities, Aachen, Münster, and Dortmund, have formed an alliance to address the state government jointly on mission-related needs. At federal level, the eightGerman Mission Cities have constituted the stronGER Cities network, which holds permanent representation in the federal steering forum on the Mission and has submitted joint advocacy statements calling for Mission Cities to be able to test innovations at pilot scale without undue procedural constraint (CCC: Action Plan; CCC: Commitments).

3.5.4.3 Looking Ahead: Challenges, Opportunities, and Lessons

Three structural challenges are expected to shape the governance of the mission through to 2030. The most persistent is the mismatch between the multi-year investment horizon required for heat transition, building renovation, and mobility transformation, and the annual budgeting cycle that governs municipal planning. This constraint is rooted in municipal budget law, which requires annual planning, and it creates an ongoing tension between the mission's strategic horizon and the administration's financial planning logic. Without a medium-term fiscal framework aligned to the 2030 target, funding gaps are difficult to anticipate systematically, and the investment case continues to be assembled year by year rather than as part of a coherent multi-year strategy.

Adapting the mission's framing under a changed political direction is a second ongoing challenge. The shift in mayoral leadership has required adjustment not only in external communication but also in how

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climate objectives are positioned internally and within the broader economic transition narrative. Managing that adaptation without losing momentum or internal coherence remains an active task for the coordination team.

A third challenge is capacity. As the mission moves from development to implementation, the portfolio of work has expanded, and the CCC has significantly broadened the scope of ecosystem engagement. Interviewees noted that this increases pressure on coordination capacity, with priorities competing for limited time and attention (Interviews, 2026).

Concrete opportunities exist in the near term. The ELENA facility offers support for developing investable projects and blended financing structures, providing potential momentum for the pipeline that the financial architect role has begun to build. The anticipated council vote on revised green procurement criteria represents a procedural window for embedding mission objectives into a core administrative function with implications across departments. Interviewees also pointed to increased cross-sectoral collaboration from late 2025 onwards, suggesting that earlier network-building efforts are beginning to enable more forms of coordination that no longer need the same level of direct initiation from the mission team (Interviews, 2026).

Three observations from Aachen's experience may be relevant for other cities building mission governance. First, senior political commitment appears most effective where it is made visible through concrete actions, such as participating in partner outreach, taking early resource decisions, or engaging directly in governance forums, rather than through formal declarations alone. In Aachen, interviewees associated this visible engagement with increased credibility in the early stages of coalition-building.

Second, informal networks built alongside formal structures appear to play an important role in enabling cross-departmental collaboration. Interviewees linked recent examples of more organic collaboration to relationships developed over time, suggesting that these networks complement formal coordination mechanisms rather than replace them.

Third, the continuity of the mission through changes in political leadership is associated with the layering of formal commitments, including council resolutions, a citizen mandate, and the CCC coalition. Together, these provide multiple points of reference that can be drawn on to maintain alignment over time. For cities beginning similar processes, this points to the potential value of building multiple forms of commitment early (Interviews, 2026).

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