NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Action Plan

City of Dortmund

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Summary

GREEN, URBAN, TOGETHER: Dortmund's Path Towards Climate Neutrality

For more than two decades, Dortmund has been working on transforming itself from a city deeply rooted in heavy industry, to a green urban area that takes over responsibility for the next generations in terms of climate neutrality and quality of life. This transformation process has already led to a radical structural change in our city that has allowed us to reinvent ourselves as a city that is one of its kind, with a strong sense of togetherness that can also be witnessed in our joint goal to make Dortmund climate-neutral.

This Action Plan takes into account various initiatives and ongoings city-wide processes that contribute to the overall goal of achieving climate neutrality. With this Action Plan and the respective new governance model, we bring together different approaches and merge them into a coherent concept.

To reach climate neutrality the following fields of action are addressed in this Action Plan: Transport, Buildings & Heating, Electricity, Waste and circular economy and agriculture, forestry and land use (AFOLU – Other). Especially the topics heating, transport and circular economy have a big potential for reducing emissions, which is the main goal of the EU Mission.

This Action plan therefore includes measures from existing strategies, for example the Climate-Air 2030 Action Plan [1], the Mobility 2030 Master Plan[2] but also the Energy Use Plan[3] and various measures by different stakeholders in the city as well as other current strategies.

The economic model was used to validate the action plan and investment plan. The base year for the calculation is 2019, for which baseline emissions totalling 3,670 kt CO_2e were determined. To achieve climate neutrality as defined by the EU's "100 climate-neutral and smart cities" mission, emissions must be reduced by at least 80 % by 2030.

Ambitious Measures for Ambitious Goals

Already before Dortmund started its journey as one of the mission cities, the city had developed a programme that has put the city on a track towards climate neutrality with the Climate-Air 2030 Action Plan, with the target of climate neutrality in 2035. At first glance this political goal of climate neutrality is not in line with the requirements of the EU mission. However, the CCC gives us the opportunity to prioritize our activities and achieve our goal sooner and thereby give the topic the awareness it needs and deserves. With the

[1] City of Dortmund (ed.), 2021, Handlungsprogramm Klima-Luft 2030, Gesamtbericht Juli 2021 [Climate-air 2030 Action Plan, full report July 2021]

[2] City of Dortmund, n. d., Mobility 2030 Master Plan

[3] City of Dortmund, n. d., Heat transition for Dortmund

participation in the EU Mission and working out the CCC Dortmund prioritizes all its activities to reduce emissions and presents a strategy, that shows the way to climate neutrality in 2030.

By developing the CCC Action plan, the City of Dortmund has now enforced ambitions, aiming at climate neutrality already in 2030. Due to this fact, the CCC becomes a central factor for pushing projects in Dortmund to set a new goal of climate neutrality and to increase our efforts in this regard. The CCC is the tool to set all activities in Dortmund regarding climate protection and emission reduction on a new level and really focus on getting results.

The Dortmund transition team will implement the measures of the CCC Action Plan together with the city administration and increase stakeholder involvement as well as citizen involvement. Ultimately, climate neutrality will improve the quality of life for everyone in Dortmund.

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Abbreviations and acronyms

The list of abbreviations and acronyms identifies the abbreviations (a shortened form of a word used in place of the full word) and acronyms (a word formed from the first letters of each of the words in a phrase or name) used in the CCC Action Plan.

Abbreviations and acronyms	Definition
BEG	Federal funding for efficient buildings
BEW	Federal Subsidy for efficient heating networks
BISKO	Bilanzierungssystematik Kommunal
CCC	Climate City Contract
CNAP	Climate Neutrality Action Plan
DWD	German Meteorological Service
DZLE (Climate Agency)	Climate Agency (Dienstleistungszentraum Energieeffizienz und Klimaschutz)
EEG	Federal Climate Change Act
EG	Emschergenossenschaft
ENP	Energy Use Plan
ETS	Emission Trading System
GEG	Building Energy Act
GHG	Greenhouse gas
HWK	Chamber of Skilled Crafts
ICLEI	Local Governments for Sustainability
IGA	International Garden Exhibition
IHK	Chamber of Industry and Commerce
ILS	Research Institute for Regional and Urban Development
KSG	Federal Climate Protection Act
LANUV	State Agency for Nature, Environment and Consumer Protection
LULUCF	Land Use, Land Use Change and Forestry
MiKaDo	Integrated Climate Adaptation Master Plan (Masterplan integriertes Klimaanpassungskonzept)
NRW	North Rhine-Westphalia
PVFVO	Open-space photovoltaic ordinance

RS1	Ruhr Cycle Highway (Radschnellweg Ruhr)
RVR	Ruhr Regional Association
SECAP	Sustainable Energy and Climate Action Plan
SUMP	Sustainable Urban Mobility Plan
TREMOD	Transport Emission Model
VHS	Adult Education Centre
WHP	Workplace Health Promotion

1 Introduction

Dortmund, with approximately 600,000 inhabitants, is the largest city in the Ruhr area and a dynamic hub in North Rhine-Westphalia. Spanning an area of 280.71 km², the city's structure is characterised by a diverse mix of residential neighbourhoods, commercial hubs and industrial zones. A defining asset of Dortmund is its rich green infrastructure: around 50 % of the city area consists of parks, forests, agricultural land and open spaces.[4] Notable landmarks such as the Westfalenpark – one of Germany's largest inner-city parks – the Bolmke nature reserve and the Dortmund city forest provide valuable recreational areas and help sustain a high quality of urban life.

Dortmund is the first and so far only Germany city that has been awarded the title "iCapital – European Capital of Innovation" in the European Union. Dortmund has developed a comprehensive innovation model that involves technological as well as social, cultural and administrative aspects of innovation and is based on a strong sense of togetherness across institutions. Under the motto "innovation next door", Dortmund has developed strong innovation networks, that also include the areas of climate resistance and sustainability.

The city is administratively divided into twelve distinct districts, each with its unique identity and needs. This decentralised governance enables targeted implementation of climate-friendly actions at the local level. Dortmund's Department for Parks and Green Spaces manages approximately 9.35 million m² of green areas, including about 150,000 urban trees, actively contributing to air purification and urban cooling. Furthermore, the city is currently expanding solar energy on public buildings and ensuring that new residential areas meet ambitious energy efficiency standards.

Dortmund combines the following key assets as well as its structural strengths with unique opportunities for sustainable transformation to position the city as a potential model for climate-neutral urban development.

- **Green City Character:** Despite its size, Dortmund provides a high proportion of green areas, helping to mitigate urban heat islands and providing resilience against extreme weather.
- **Strategic Location:** Situated at the crossroads of major transport and logistics corridors, Dortmund has the potential to serve as a model for sustainable mobility in post-industrial regions.
- **Decentralised Structure:** The twelve-district layout enables grassroots-level engagement and effective adaptation measures.

[4] City of Dortmund, 2022, Statistisches Jahrbuch, Dortmunder Statistik 2021 [Statistical Yearbook, Dortmund Statistics 2021]

- **Growing Renewable Energy Base:** The city is steadily increasing solar installations and improving the energy performance of public infrastructure.
- **Sustainable Mobility:** Dortmund has created sustainable infrastructures of public transportation, including modern tram lines and a monorail connecting different innovation hubs in the science and technology park
- **Active Industrial Transformation:** As being part of the broader Ruhr transformation, Dortmund has been transforming from its coal and steel heritage towards new, greener industries, science and technologies. Big Urban Transformation projects such as the artificial "Lake Phoenix" serve as a contribution to innovative flood prevention (water tension basin).

However, climate change confronts Dortmund with significant and growing challenges. Like many large urban areas, the city is particularly vulnerable to the effects of global warming:

- **Heat Stress:** Dense residential neighbourhoods suffer disproportionately during heatwaves. Vulnerable populations, including the elderly and young children, face increasing health risks in the face of average temperatures rise.
- **Sealing Rate and Flood Risk:** High levels of land sealing contribute to flood risks, particularly during heavy rainfall events. Flash flooding and drainage overloads have already become more frequent.
- **Air Quality Issues:** While progress has been made, air pollution remains a concern, especially in traffic-dense corridors.
- **Energy-inefficient Housing Stock:** A significant portion of Dortmund's buildings, particularly in residential areas, is outdated and lacks modern insulation and energy systems. Massive investments will be required in the coming years to retrofit and upgrade the housing stock.
- **Socio-economic Disparities:** Climate change risks exacerbating existing inequalities. Low-income households, often living in less energy-efficient homes and with fewer resources for adaptation, are particularly vulnerable.
- **Complex Transport Structure:** As a major logistics and transport hub, Dortmund must overcome significant emissions from road freight, private car traffic, and public transport fleets that are still partially reliant on fossil fuels.
- **Energy Transition Challenges:** While renewable energy is growing, Dortmund's current energy mix still includes fossil-based heating and industrial energy consumption that needs to be decarbonised.

To maintain its liveability and economic vitality, Dortmund must evolve into a resilient, adaptable, and climate-neutral city. Addressing these interlinked challenges requires not only technical solutions but also social innovation and broad citizen participation.

The Climate City Contract (CCC) presents an opportunity for Dortmund to consolidate its assets — green spaces, administrative structures, and industrial transition — while systematically tackling vulnerabilities. A credible and realistic strategy toward climate neutrality is now a top priority for the city administration. Dortmund's pathway will focus on transforming its building stock, reshaping mobility, strengthening green infrastructure, and closing socio-economic gaps to ensure a just transition for all citizens.

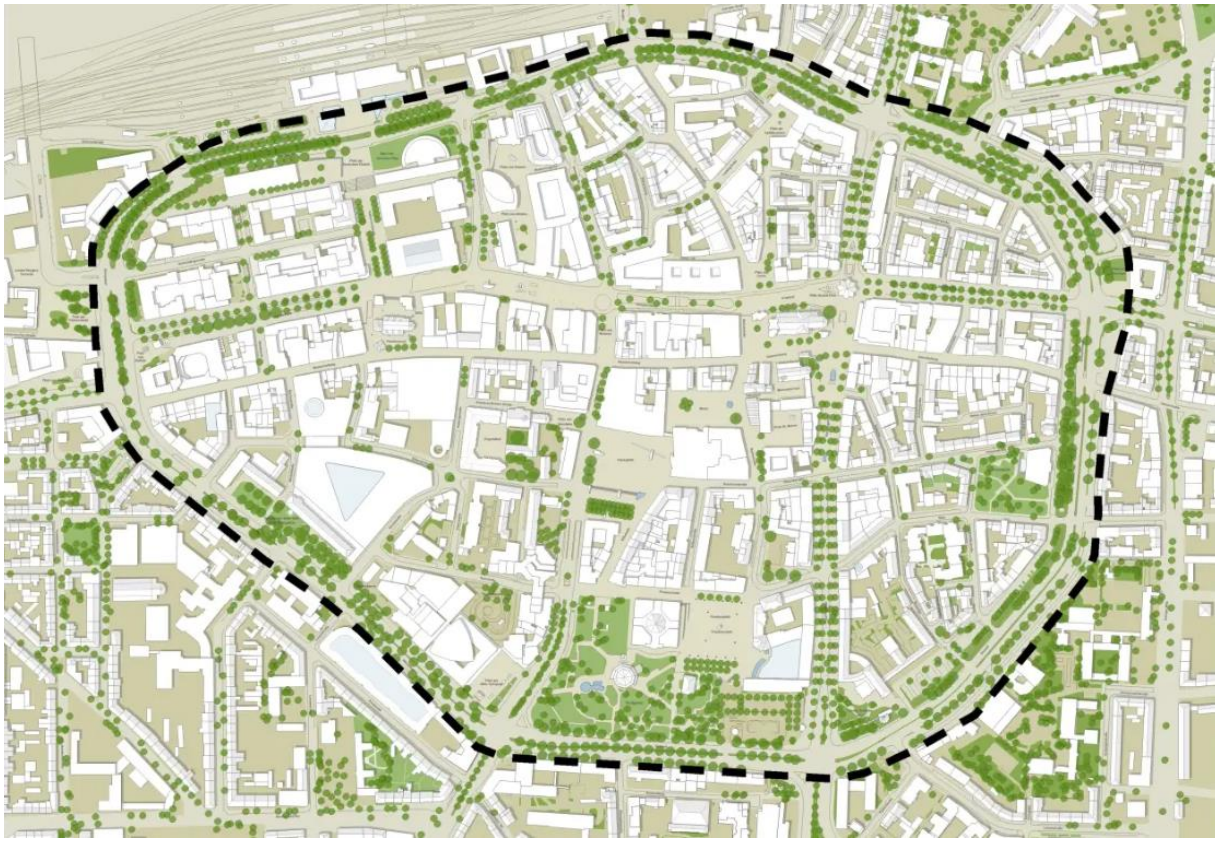

Figure 1: City of Dortmund, (Source: farwickgrote partner; City planning and building regulations office)

Dortmund's 2030 Climate Neutrality Target and Scope

Dortmund has set itself an ambitious climate policy agenda in line with national, European and global climate goals. Under Germany's commitment to the Paris Agreement, the overarching objective is to limit global warming to well below 2 degrees Celsius, with efforts to stay within 1.5 degrees. Within this framework, Dortmund has committed to achieving climate neutrality no later than 2035. However, through its participation in the European Union's *Mission 100 Climate-Neutral and Smart Cities,* the City of Dortmund decided to adopt an even more ambitious target: reaching climate neutrality, as defined by the Mission, by 2030.

This Mission-aligned target translates into an 80 % reduction in greenhouse gas emissions by 2030, compared to the 2019 baseline. Achieving this will require the acceleration of existing measures, the implementation of new initiatives, and the mobilisation of additional resources. The existing Climate-Air 2030 Action Plan of the City of Dortmund currently projects

a 55 % reduction in emissions by 2030, leaving a significant gap between current forecasts and the Mission target. The primary objective of this CCC is to address this gap by identifying and implementing transformative actions across all sectors.

The definition of climate neutrality differs between the two objectives:

- Climate neutrality by 2035: emissions reach 0 compared to 1990 levels
- Climate neutrality by 2030 (EU mission): 80 % reduction in emissions compared to the baseline year (2019)

Scope and exclusions

The city's climate neutrality target covers its entire administrative territory. However, there are two specific sources of emissions that are excluded from the Mission target due to limited municipal control and systemic constraints:

1. Dortmund Airport

   Emissions from air travel are excluded from Dortmund's greenhouse gas inventory, as these fall under national and international aviation frameworks beyond the city's direct influence. Nevertheless, the airport operator is pursuing its own internal climate neutrality objectives, focusing on ground operations and infrastructure.

2. Deutsche Gasrußwerke Industrial Complex

   Emissions from this major industrial facility are similarly excluded, as the path to decarbonisation depends on technological innovation and national-level policy incentives. The city maintains regular dialogue with the company to explore future solutions and synergies, but direct control over emissions reduction pathways is limited.

While these two exclusions are recognised in the scope of the 2030 target, Dortmund remains committed to engaging with both stakeholders to develop longer-term strategies for decarbonisation beyond 2030. Communication and coordination mechanisms will ensure that emissions from these excluded sources are addressed as part of the broader climate neutrality ambition, even if they are not formally counted within the Mission target timeframe. In particular, the Deutsche Gasrußwerke Industrial Complex will play a key role in achieving climate neutrality in the city of Dortmund. This is because the waste heat produced during the manufacturing process will be used to supply existing and future district heating pipelines with climate-neutral waste heat.

Key stakeholders for achieving the 2030 target

Delivering on Dortmund's 2030 climate neutrality target will require a collective effort across sectors, governance levels, and society as a whole. The successful implementation of this Climate City Contract depends on strong cooperation among a diverse set of critical stakeholders:

- **Private sector**

  Companies and industries play a vital role in driving innovation, adopting cleaner technologies, and investing in green infrastructure. Large employers and industrial players, in particular, have significant emissions footprints that must be reduced.

- **Citizens and civil society**

  Households account for a substantial share of energy consumption and emissions, especially in heating and mobility. Engaging citizens in energy efficiency measures, behavioural change, and participation in renewable energy initiatives is essential. Climate neutrality is not only a technical challenge but a societal transformation that directly impacts and benefits citizens.

- **Municipal holding companies**

  Dortmund's municipal utilities and service providers are pivotal actors in the transition, operating energy networks, public transport, waste management, and water services. Their alignment with the CCC targets is critical for systemic change.

- **City Administration and Departments**

  Cross-departmental coordination within the municipal administration ensures the integration of climate action into urban planning, construction, mobility, social policy, and economic development. Administrative leadership is key to driving implementation at scale.

- **Political Leadership (City Council)**

  The political commitment of Dortmund's elected representatives provides the mandate, governance, and resources needed for ambitious climate action. The council's decisions determine the adoption of policies and funding priorities.

- **Networks and organisations**

  Academic institutions, non-governmental organisations, and local associations serve as multipliers and facilitators of climate action, contributing expertise, innovation, and grassroots engagement.

Through participatory processes and structured stakeholder engagement, Dortmund will ensure that its pathway to climate neutrality is widely supported and effectively implemented. Collaboration across all these actors is not only necessary for emissions reduction but also for creating a resilient, socially inclusive, and economically vibrant city.

Alignment with existing climate strategies and planning frameworks

Dortmund's CCC Action Plan builds on a strong foundation of existing climate policies and urban strategies. Rather than replacing current frameworks, the CCC serves as an overarching accelerator and integrator, aligning and scaling up efforts to meet the more ambitious 2030 Mission target. Key existing frameworks include:

- Climate-Air 2030 Action Plan

  Adopted by the City Council in December 2021, this programme provides Dortmund's strategic roadmap for emissions reduction. It includes measures in renewable energy, energy-efficient building refurbishment, sustainable mobility, air quality improvement, and district heating optimisation. Originally targeting climate neutrality by 2050, the programme has since been adjusted to aim for 2035, but the CCC now advances this timeline to 2030 for the Mission scope.

- Integrated Climate Adaptation Master Plan (MiKaDo)

  MiKaDo emphasises climate resilience, integrating adaptation measures into urban planning to safeguard quality of life. Key actions include flood risk management, green-blue infrastructure, renaturation of water bodies, and the greening of facades and rooftops.

- Dynamic Heat Action Plan

  In response to intensifying heatwaves, Dortmund has adopted a heat action strategy that includes public information campaigns, emergency support (e.g. a heat hotline), installation of public drinking fountains, and the planting of heat-resistant trees.

- Mobility Master Plan 2030

  Addressing emissions from the transport sector, this plan promotes sustainable mobility through expanded public transit, cycling infrastructure, car-free zones, and the transition to electric buses and light rail systems. Emission-free zones in the city centre are also part of the strategy.

- Energy Use Plan (ENP)

  The Dortmund Energy Use Plan (ENP) is a central strategic planning instrument of the City of Dortmund, which was initiated even before the nationwide mandate for municipal heat planning (Kommunale Wärmeplanung - KWP). It is based on the city council's resolution on the "Climate-Air 2030 Action Plan," which aims for Dortmund to be climate-neutral by 2035.

The CCC does not stand apart from these efforts; rather, it consolidates them under a unified ambition, providing a sharper focus and an accelerated timeline. By integrating measures from existing plans such as the *Masterplan Mobility* and *Climate-Air Action Programme* into the CCC framework, Dortmund ensures that all associated emissions reductions are counted toward closing the emissions gap identified for 2030.

The CCC is thus a catalyst to take current projects to the next level, prioritise investments, and channel national and EU resources toward projects with the highest impact on emissions reduction. It offers a unique opportunity to coordinate actions across sectors, eliminate silos, and ensure that climate action becomes the overarching priority in all areas of urban development.

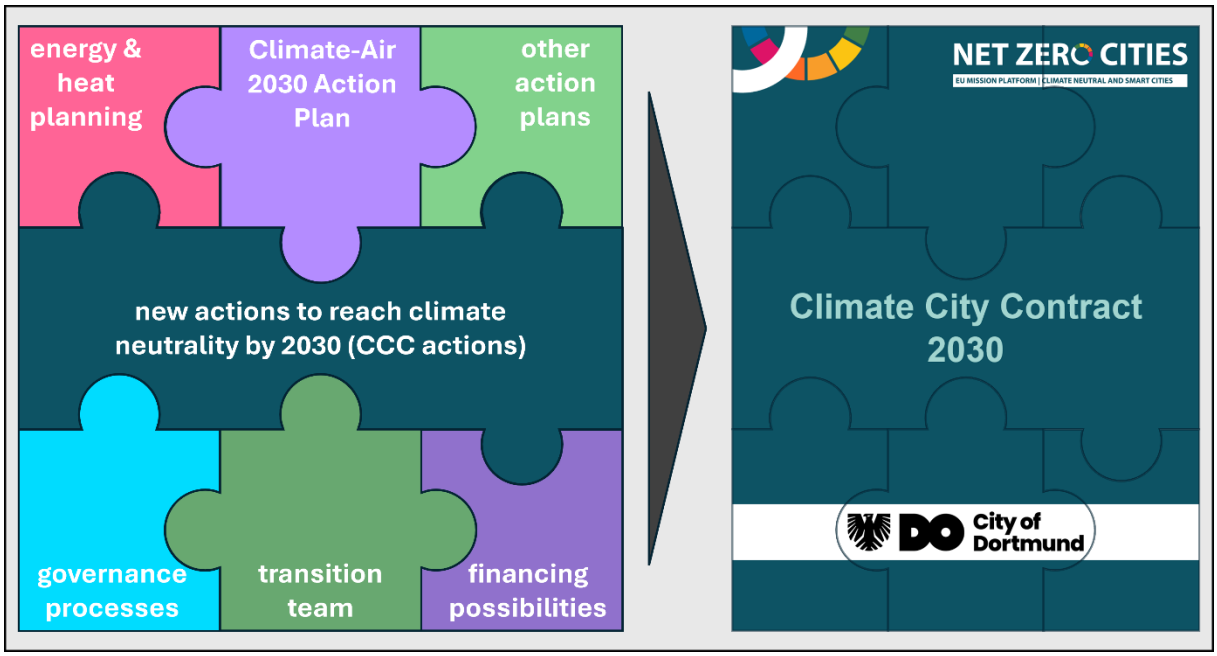

Figure 2: The CCC as a comprehensive framework to unify existing action plans and stakeholder

How the CCC Action Plan Complements Dortmund's Existing Climate Strategies

It creates an opportunity to accelerate existing efforts, mobilise additional resources, and ensure that climate neutrality becomes the city's overarching policy priority. For example, while the *Climate-air 2030 Action Plan* sets the target of climate neutrality by 2035, the CCC introduces a timeline of achieving an 80 % reduction in emissions by 2030 (compared to 2019 levels). This more ambitious goal helps ensure that Dortmund stays on track not only to meet EU Mission expectations but also to ultimately fulfil its own 2035 commitment.

The CCC also provides a mechanism to identify and integrate projects that can particularly benefit from Mission funding, technical support, and visibility — enabling them to achieve a greater impact compared to what would be possible within the scope of existing plans alone. This includes scaling up successful initiatives, fast-tracking innovations, and ensuring that all emissions reductions from existing and new actions are counted as part of the efforts to close the emissions gap through this plan.

In Dortmund's climate governance landscape, the CCC plays a unique and complementary role:

- It acts as an integrator, bringing together measures from pre-existing plans such as the *SECAP*, *SUMPs* and sectoral strategies.
- It provides an accelerated timeline, focusing efforts on meeting the 2030 target rather than the longer 2035 or 2050 horizons.[5]

[5] 2035 = announced Climate neutrality goal of the City of Dortmund by the City Council in 2021, 2050 = Climate neutrality goal EU

- It serves as a tool for prioritisation, helping the city to identify which projects and policies must be scaled up or initiated anew to close the emissions gap.
- It leverages the EU Mission platform to mobilise international cooperation, innovation partnerships, and financial instruments that go beyond the scope of Dortmund's traditional planning frameworks.

Thus, rather than creating parallel or competing agendas, the CCC aligns and amplifies Dortmund's existing commitments, ensuring that all actions — past, present, and future — are directed toward a single, coherent objective: achieving climate neutrality by 2030 under the Mission framework.

The successful implementation of the CCC depends on close cooperation between a wide range of stakeholders. Municipal departments, local businesses, civil society organisations, and citizens all play critical roles in ensuring that the strategies are widely supported and effectively implemented. Local companies and start-ups are actively contributing to climate-friendly urban development through innovation funding programmes and sustainable construction projects. Schools and educational institutions are involved in climate protection initiatives that raise awareness among younger generations and foster long-term behavioural change.

Through these comprehensive and participatory approaches, Dortmund is positioning itself as a pioneer in municipal climate protection. By connecting strong economic and social development to ambitious sustainability goals, the city aims to set new standards for other municipalities in Germany and Europe. The CCC enables Dortmund to make a significant contribution to the EU's *100 Climate-Neutral Cities* mission, therefore ensuring that the city remains liveable, resilient, and climate-friendly for future generations.

Citizen participation and engagement

Active citizen participation is at the heart of Dortmund's approach to climate neutrality. Achieving the ambitious target of reducing emissions by 80 % by 2030 requires not only technical solutions but also the active involvement of the city's residents. Private households account for a significant share of emissions, particularly through heating, electricity use, and personal mobility. Therefore, citizen engagement is both a critical success factor and a central goal in itself: creating a more liveable, resilient city for all inhabitants. During a city-wide strategy process for the forthcoming years and Dortmund's vision for its citizens, the city administration is currently organising a series of participatory events. The concept of sustainability and climate resilience has been identified as a key vision for Dortmund. To this end, a city-wide survey was conducted, which analyses the answers of more than 400 respondents. It is evident that there is a high level of interests among the public regarding the expansion of emission-free mobility and energy efficiency. Most participants expressed a high or very high level of importance regarding the topic of sustainability. This demonstrates the level of support and interest exhibited by the inhabitants of Dortmund.

Dortmund recognises that achieving climate neutrality depends upon the active involvement of citizens in shaping the city's future, rather than citizens being merely passive observers. The CCC Action Plan comprises a comprehensive strategy for public participation, which is structured around two phases: the pre-implementation phase and the implementation phase.

Pre-implementation phase (2024–2025)

In this phase, Dortmund is focusing on building awareness, collecting feedback, and expanding citizen networks:

- **Public feedback on strategies:** Residents are invited to comment on current climate strategies and priorities as the CCC is being finalised. Resident feedback is obtained via various participation formats such as workshops. Residents can also contact the relevant administrative departments with their concerns. The feedback is collected during events and documented by the city administration. Furthermore, surveys about the progress of climate protection measures in Dortmund are conducted through the citywide strategy[6] or the Impact Monitor.[7]
- **Participation in public events:** The city leverages major public gatherings, such as the DortBunt City Festival in May 2025, to engage citizens through interactive formats, discussions, and information stands.
- **Network Building:** A citywide network of interested residents, associations, and civic groups is being established to provide a platform for ongoing dialogue and co-creation of climate projects.

Implementation Phase (From 2025 onwards)

Once the CCC is adopted, participation efforts will intensify and diversify:

- **Climate Newsletter:** A regular newsletter will inform citizens about events, policy updates, and opportunities to get involved in climate action.
- **Targeted Events:** The city will organise numerous events tailored to different groups, including:
    - Schools and universities (youth engagement)
    - District communities (neighbourhood-level action)
    - Thematic workshops (e.g. on sustainable mobility, renewable heating, energy renovation)

[6] City of Dortmund, n. d., Dortmund city talk
[7] City of Dortmund, n. d., Impact-oriented budget/impact monitor

- **Expanding Networks:** The growing network of associations will serve to connect citizens with concrete offers and possibilities to become active, from joining energy cooperatives to initiating local greening projects.
- **New Projects and Partnerships:** Through participatory processes, citizens will also be encouraged to propose new projects and form new associations that contribute directly to the city's climate goals.

By fostering broad-based participation, Dortmund aims to create a climate movement that is deeply rooted in the everyday life of the city. Participation is not only a democratic right but also a mechanism to ensure that climate actions have real impact and public acceptance.

Key Milestones in the CCC Process

- **2022: EU Mission Selection**

  Dortmund was selected among 112 pioneering cities participating in the EU Mission for 100 Climate-Neutral and Smart Cities. This selection marked a strategic shift, positioning climate policy as a top priority and opening access to international networks and funding opportunities.

- **May 2023: Presentation to the Climate Council**

  The CCC process and initial concepts were presented to Dortmund's Climate Council, an important consultative body that brings together political leaders, experts and civic representatives.

- **June 2023: Workshop with City Administration**

  A first workshop was held with representatives from 13 city departments to map existing projects and discuss their contribution to climate neutrality. This resulted in an integrated mapping of ongoing and planned measures to be included in the CCC.

- **September 2023: Workshop with municipal companies**

  A second workshop involved 30 participants from Dortmund's municipal holding companies, aligning their corporate climate goals and projects with the CCC framework. This exchange strengthened coordination and brought additional strategies into the plan.

- **September 2024: Completion of First Draft**

  Based on administrative and stakeholder input, the first draft of the CCC was finalised in September 2024.

- **May 2025: Citizen participation at the DortBunt Festival**

  Public engagement efforts, including interactive sessions and feedback collection at citywide events.

- **June 2025: Workshop with the Climate Council**

  Together with the representatives of the climate council, the current process is outlined and the important next phase of implementation is discussed.

- **September 2025: Second Draft and Refinement**

  A revised version of the CCC is be prepared, incorporating citizen feedback and updated measures.

Beyond 2025, the CCC will remain a living document, subject to regular updates and refinements. Future iterations will:

- Integrate new projects and emerging technologies.
- Expand citizen networks and partnerships.
- Reflect changing regulatory frameworks and funding opportunities.
- Adjust measures to ensure that Dortmund stays on track toward its 2030 target.

Through this iterative and participatory process, Dortmund is building not only a climate strategy but also a citywide alliance for climate neutrality, ensuring that the transition is inclusive, resilient, and socially just.

Table 1: Climate neutrality target by 2030 based on different scopes (1-3)

Table I-1.1: Climate neutrality target by 2030			
Sectors	**Scope 1**	**Scope 2**	**Scope 3**
Stationary energy	Included	Included	
Transport	Included	Included	
Waste/wastewater	Not applicable	Not applicable	Included
Other (AFOLU)	Included	Not applicable	
Geographical boundary	**Same as city administrative boundary**	**Smaller than city administrative boundary**	**Larger than city administrative boundary**
(Tick correct option)	X		

2 Part A – Current State of Climate Action

Part A, "Current State of Climate Action," describes the city's starting point on the path to climate neutrality, including commitments and strategies of key local businesses, and informs the subsequent modules and the outlined pathways to accelerated climate action.

2.1 Module A-1 Greenhouse Gas Emissions Baseline Inventory

Dortmund's Greenhouse Gas (GHG) Emissions Inventory covers the entire administrative boundary of the city, including emissions from energy, transport, waste, and industrial sectors. It follows the German BISKO standard, ensuring full alignment with national and international reporting frameworks. However, two major emission sources are excluded from the target boundary for climate neutrality under the EU Cities Mission:

- **Dortmund Airport**: Emissions from aviation are excluded because they fall outside the city's direct regulatory authority.
- **Deutsche Gasrußwerke industrial complex**: Emissions are excluded because their decarbonisation depends on national policy frameworks and industrial innovation, which are beyond municipal control.

These exclusions have been transparently reported and are consistent with the guidance provided by the EU Mission. All other emissions from stationary energy, mobility, waste, and parts of the AFOLU sector are included in the baseline inventory and the scope of climate neutrality.

Methodology and Tools

Dortmund uses multiple tools and methodologies to track and manage its GHG emissions:

- **BISKO Standard**: Dortmund uses the German *BilanzierungsSystematik Kommunal* (BISKO) as the core framework for compiling its municipal GHG inventory. BISKO ensures comparability and transparency across German cities and covers energy consumption and emissions across households, commerce, industry, and transport sectors.
- **TREMOD Model**: For the transport sector, emissions are calculated using the *Transport Emission Model* (TREMOD), which applies specific emission factors for different vehicle types and fuel categories. This allows Dortmund to additionally track transport emissions at a detailed and city-specific level.
- **ClimateView Platform**: To forecast and assess the impact of climate protection measures, Dortmund uses *ClimateView*, a scenario tool that supports agile transition planning. The tool models the effects of interventions and helps refine Dortmund's pathway toward climate neutrality.
- **Regional Balancing**: As part of the Ruhr Metropolis, Dortmund also contributes to and benefits from regional GHG inventories compiled by the Ruhr Regional Association (RVR). The latest available data covers the years 2012 to 2022, with updates including 2023 and 2024 data expected by late 2026.

Baseline Year and Latest Inventory Data

The latest comprehensive GHG inventory for Dortmund is based on 2020 data, with time series extending back to 2012. The chosen baseline year for the Climate City Contract is 2019, aligning with the EU Mission guidelines. Dortmund's inventory is built on:

- **Energy supplier data** (grid-bound energy) ensuring a high degree of accuracy.
- Emissions expressed as **CO_2 equivalents** (CO_2, CH_4, and N_2O, see Annex 1, S. 259), capturing both direct and upstream emissions.
- **CO_2** as the main proxy, while including upstream emissions to approximate the total GHG footprint.

While the current inventory lags by about 2.5 years, Dortmund is working to establish an annual update cycle using qualified estimates, which will significantly improve timeliness and responsiveness.

Identified emissions gap and future improvements

Dortmund's inventory data reveals a substantial gap between current policy trajectories and the 2030 climate neutrality target:

- The **Climate-Air 2030 Action Plan** forecasts a 55 % reduction in emissions by 2030 compared to 2019.
- Therefore, to meet the **EU Mission target of an 80 % reduction** by 2030, Dortmund must implement additional measures to close the emissions gap.

Without accelerated action, the city is projected to achieve climate neutrality only around 2045 in a business-as-usual scenario, far beyond the Mission timeline. This reality underscores the urgency of scaling up emissions reduction efforts across all sectors, including buildings, transport, energy, and waste management.

Dortmund's current GHG inventory methodology is largely compliant with the EU Cities Mission requirements but has some areas that need to be further developed:

- Some **Scope 3 emissions** (e.g. certain industrial processes, upstream waste emissions) are not yet fully covered.
- **Land-use emissions** and sinks are only partially captured and require more detailed accounting.
- The time lag in official reporting is being addressed through the introduction of a faster **estimate-based annual monitoring system**.
- A revised **ClimateView platform** will allow for more dynamic tracking of emissions reductions and the performance of individual measures, enabling more agile management of the transition pathway.

Role of the Inventory in Climate Action

This comprehensive emissions inventory serves as the foundation for Dortmund's climate strategy:

- It defines the emissions gap that the CCC Action Plan must close to meet the 2030 target.
- It identifies priority sectors for accelerated action: buildings (due to a large inefficient housing stock), transport (as a logistics hub), and energy.
- It informs the selection and scaling of policy measures included in the CCC portfolio.
- It provides a monitoring baseline to track progress and adjust strategies over time.

By enhancing its inventory methods and aligning them with EU Mission guidance, Dortmund ensures that its pathway toward climate neutrality is based on robust, transparent, and actionable data.

Table 2: GHG Emissions by Source Sector - Baseline Year (2019) (1.3a)

A-1.3a: GHG Emissions by Source Sector - Baseline Year					
Base Year	2019				
Unit	t CO_2 equivalent/year				
	Scope 1	Scope 2	Scope 3	Total	% of Total
Transport	839688			839688	23 %
Buildings & Heating	1340957	107693	15204	1463854	40 %
Electricity		1018618		1018618	28 %
Waste*			53392	53392	1 %
Other (incl. IPPU & AFOLU)	293639			293639	8 %
Total	2474284	1126311	68596	3669191	100 %

** Includes Scope 1 Waste emissions (produced and processed in the city) and Scope 3 (produced by the city but processed outside the city border) - solid waste only; wastewater falls under "Other" sector*

Table 3: GHG Emissions by Source Sector - Business as Usual (BAU) 2030 (1.3b)

A-1.3b: GHG Emissions by Source Sector - Business as Usual (BAU) 2030					
Base Year	BAU 2030				
Unit	t CO_2 equivalent/year				
	Scope 1	Scope 2	Scope 3	Total	% of Total
Transport	570549			570549	17 %
Buildings & Heating	1302656	104617	14769	1422043	43 %

Electricity		1018618		1018618	31 %
Waste*			28537	28537	1 %
Other (incl. IPPU & AFOLU)	293639			293639	9 %
Total	2166844	1123235	43307	3333386	100 %

** Includes Scope 1 Waste emissions (produced and processed in the city) and Scope 3 (produced by the city but processed outside the city border) - solid waste only; wastewater falls under "Other"*

Table 4: Activity by Source Sector (NetZeroPlanner economic model data inputs) (1.4)

A-1.4: Activity by Source Sector (from economic model data inputs)			
Base Year		2019	
	Scope 1	Scope 2	Scope 3
Transport			
Transport need - passenger cars + motorcycles (M vehicle-km/year)	2599		
Transport need - buses (M vehicle-km/year)	38		
Transport need - trains/metro (M vehicle-km/year)	15		
Transport need - light duty trucks (<3.5 t) (M tonne-km/year)	245		
Transport need - heavy duty trucks (>3.5 t) (M tonne-km/year)	246		
Buildings & Heating			
Heating demand (space heating + domestic hot water) (GWh/year)	6060		
Electricity			
Electricity demand within city boundaries (GWh/year)		2131	
Waste			
Collected waste within city boundaries (tonnes)			232858
Other (incl. IPPU & AFOLU)			

2.2 Module A-2 Current Policies and Strategies Assessment

The Climate City Contract (CCC) is fully embedded in Dortmund's established climate policy framework and serves to accelerate, align and amplify existing efforts. Rather than replacing current strategies, the CCC acts as an overarching umbrella, integrating measures from

Dortmund's sectoral plans and filling the emissions gap to reach the more ambitious target of 80 % reduction by 2030.

As already mentioned, Dortmund has a strong foundation of climate action through several key frameworks:

- The **Climate-Air 2030 Action Plan** (adopted in 2021) outlines emissions reduction measures in energy, buildings, mobility and air quality. It targets a 55 % reduction in emissions by 2030, compared to 2019 levels.[8]
- The **Integrated Climate Adaptation Master Plan (MiKaDo)** ensures that climate resilience is embedded in urban development, with projects addressing flood protection, urban greening, and heat mitigation.[9]
- The **Dynamic Heat Action Plan** tackles rising heat risks through public education, infrastructure adaptation, and health protection measures.[10]
- The **Masterplan Mobility 2030** drives sustainable transport solutions, expanding public transit, cycling infrastructure, and zero-emission zones in the city centre.[11]

The CCC complements these plans by providing a unified framework and a more ambitious strategy in line with Dortmund's Mission commitment. It consolidates measures from these documents and brings them into alignment with the 2030 target, creating a single action portfolio that addresses the emissions gap and depends on accelerated implementation.

Adapting existing documents for the CCC

The CCC Action Plan is being developed as a strategic instrument to bring together all existing and future climate efforts in Dortmund. This includes:

- Integrating measures from existing plans (e.g. *Climate-Air Action Programme*, *SUMPs*, *SECAP*) into the CCC's action portfolio.
- Ensuring that all associated emissions reductions count towards closing the emissions gap identified in Module A-1.
- Prioritising measures that can be accelerated or scaled up through CCC mechanisms, such as Mission funding, partnerships, and technical support.
- Identifying new projects that complement existing plans but are specifically designed to meet the 2030 timeline.

In this way, Dortmund uses the CCC not as a parallel strategy but as a meta-framework that aligns and accelerates ongoing efforts. The CCC enables Dortmund to move beyond the

[8] City of Dortmund, n. d., Climate-air 2030 Action Plan
[9] City of Dortmund, n. d., Master Plan Integrated Climate Impact Adaptation
[10] City of Dortmund, n. d., Heat Action Plan
[11] City of Dortmund, n. d., Mobility 2030 Master Plan

current trajectories set by the 2030 sectoral plans and mobilise the additional action needed to close the gap to the 80 % emissions reduction target.

Through participatory processes and structured stakeholder engagement, Dortmund ensures that the CCC is widely supported and effectively implemented across the city. Schools and educational institutions are also engaged to raise awareness and build long-term support for climate action.

Dortmund's contribution to the EU mission

By using the CCC to integrate and amplify its existing strategies, Dortmund is positioning itself as a pioneer city within the EU's *100 Climate-Neutral Cities* initiative. The CCC enables Dortmund to:

- Mobilise additional resources and partnerships through the EU Mission platform.
- Demonstrate leadership in integrated urban climate action in Germany and Europe.
- Ensure that ambitious projects and innovative solutions are scaled up to meet the 2030 goal.
- Deliver a climate-neutral, resilient, and inclusive city for future generations.

Through this comprehensive and integrative approach, the CCC allows Dortmund to consolidate its existing achievements while closing the remaining emissions gap and setting new standards for municipal climate protection.

Table 5: List of strategies and funding from the European Union

Type	Title	Description	Relevance
Policy	Clean Industrial Deal	Framework for no net emissions in 2050 and decoupling economic growth from resource use, outlines intention to increase GHG emissions targets for 2030 by at least 50 % and towards 55 % compared to 1990 levels and revise policy levers to reflect these goals, calls on member states to revise 2023 energy, and climate plans to reflect new targets, need for a 90 % reduction in transport emissions for 2050 climate neutrality	High
Law	European Climate Law	Fundamental law of climate action in the EU and sets the national goals and frameworks for climate policy, writes into law the goals set out in the European Green Deal for Europe's economy	High
Law	Effort Sharing Regulation	Sets the overall ambition level in the buildings, transport and waste sectors, reduction target of at least 40 % compared to 1990 into binding annual GHG emission reduction targets for each member state for	High

Type	Title	Description	Relevance
		2021-2030, covers non-ETS sectors, targets for member states are based on GDP per capita.	
Directive	Energy Efficiency Directive	Local public bodies and social housing bodies governed by public law were encouraged to adopt an energy efficiency plan and put in place an energy management system, update to the Energy Efficiency Directive, establishing an EU energy efficiency target for 2030 of at least 32.5 % with a clause for possible upward revision by 2023.	High
Regulation	Governance of the Energy Union and Climate Action Regulation	EU countries need to establish a 10-year integrated national energy and climate plan (NECP) for the period from 2021 to 2030, outlining how the EU countries intend to address energy efficiency, renewables, greenhouse gas emissions reductions, interconnections, and research and innovation.	High
Electricity	Electricity Regulation	Primarily addressed at national authorities to ensure the functioning of the internal market for electricity, which affects local electricity grids, establishes rules to ensure the functioning of the internal market for electricity and includes requirements related to the development of renewable forms of energy and environmental policy, part of the Clean Energy for All Package.	High
Regulation	Risk Preparedness in the Electricity Sector Regulation	Addressing the electricity sector and thus affecting citizens, rules for cooperation between Member States with a view to preventing, preparing for and managing electricity crises in a spirit of solidarity and transparency.	Medium
Regulation	CO_2 emission performance standards for cars and vans	Contributes to the EU's 2030 greenhouse gas emission reduction target of at least 55 % compared to 1990 levels, provides benefits for consumers from the wider deployment of zero-emission vehicles, in terms of better air quality.	High
Regulation	Alternative Fuels Infrastructure Regulation	Framework for the deployment of alternative fuels infrastructure across the continent, confirms the ban on selling new internal combustion engine vehicles from 2035 onwards and insists on developing	High

Type	Title	Description	Relevance
		charging infrastructure in cities and along motorways across Europe	
Regulation	Trans European Transport Network	Aims at building an effective, EU-wide and multimodal transport network across the EU	Medium
Directive	Energy Taxation Directive	Lays down structural rules and minimum excise duty rates for the taxation of energy products used as motor fuel and heating fuel and electricity; individual Member States are free to set their own rates as long as the minimum rates are respected	Medium
Directive	Ambient Air Quality Directive	Provides the current framework for the control of ambient concentrations of air pollution in the EU, sets air quality standards for 12 air pollutants.	Medium
Directive	Fuel Quality Directive	Requires a reduction of the GHG intensity of road transport fuels by a minimum of 6 % by 2020 compared to 2010	High
Directive	European Industrial Strategy	Support towards achieving a climate-neutral and circular economy through the full mobilisation of industry and transformation of industrial sectors	High
Directive	European Air Quality Directive	The directive aims to improve air quality in the EU by setting standards and limit values for air pollutants based on the recommendations of the World Health Organisation (WHO) and striving for a 'zero pollution target' by 2050.	High

The European and National Climate Framework – Relevance for Dortmund's Climate Policy

In line with the requirements of the Paris Agreement, the European Union and its Member States, including Germany, have submitted their nationally determined contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC). These contributions outline concrete commitments to limit global warming. Specifically, the EU has pledged to reduce greenhouse gas (GHG) emissions by at least 55 % by 2030, compared to 1990 levels.

To achieve this, the EU has set additional energy-related targets: by 2030, the share of renewable energies in final energy consumption is to increase to at least 42 %. These objectives are reflected in the Integrated National Energy and Climate Plans (NECPs), which serve as both planning and monitoring instruments for all EU Member States.

Within the EU framework, emission reductions are split between two major sectors:

- The **Emissions Trading System (ETS)** covers major emitters in energy, heavy industry, and intra-European aviation.
- The **non-ETS sectors** include transport, buildings, agriculture, small industry and waste — areas that fall under national responsibility.

For the ETS sector, emissions are to be reduced by 43 % by 2030 (compared to 2005). These reductions are shared jointly by all EU Member States and regulated at the European level. In contrast, the non-ETS sectors are subject to national targets, which vary between 0 % and -40 % (relative to 2005). Under this scheme, Germany is required to reduce emissions in the non-ETS sectors by 38 % by 2030.

To manage these targets, the EU allocates emissions budgets (in CO_2 equivalents) to each country for the period 2021–2030. Should a Member State exceed its annual budget, flexibility mechanisms can be used — such as the transfer of emissions allowances between countries.

The LULUCF Regulation (Land Use, Land Use Change and Forestry) adds a further requirement: Member States must ensure that the carbon sink function of managed ecosystems such as forests, soils and wetlands is preserved or enhanced. Germany has committed to maintaining this sector as a net carbon sink, in line with its Climate Action Plan 2050. If this target is exceeded, limited carbon- -credits can be applied towards the non-ETS target. If the net sink goal is not met, additional reductions must be achieved through reforestation or offset by further efforts in non-ETS sectors.

Germany's overall climate target for 2030 — a minimum 55 % reduction in GHG emissions compared to 1990 — was originally outlined in the 2010 *Energy Concept* and has since been reaffirmed through the federal government's Climate Action Plan 2050 and the 2018 coalition agreement. In terms of the EU reference year 2005, this target corresponds to a 43 % reduction and thus goes beyond Germany's formal EU obligations in several areas.

For the long term, the EU is currently reviewing its 2050 strategy. Germany and other Member States are actively contributing to this process. The core challenge is to demonstrate that the EU's long-term target is in line with the global goals of the Paris Agreement, while ensuring that economic competitiveness and social cohesion are preserved. Several scientific studies show that a reduction of 95 % or more in GHG emissions by 2050 is technologically feasible — especially when combined with behavioural change and systemic innovation. Residual emissions, likely to remain in sectors such as agriculture and industry, would need to be balanced by negative emissions or offset mechanisms.

For Dortmund, these national and European targets form the framework within which local climate action is embedded. The city's Climate City Contract (CCC) aligns with these overarching goals, translating them into place-based strategies and measures. By supporting the EU's Mission for 100 Climate-Neutral Cities and committing to an 80 % emissions reduction by 2030 (relative to 2019), Dortmund is not only contributing to national

and European targets but also positioning itself as a frontrunner in urban climate transformation.

Table 6: List of federal strategies and fundings

Type	Title	Description	Relevance
Law	Federal Climate Protection Act (Bundes-klimaschutzgesetz - KSG)	Reduction of GHG emissions by 65 % by 2030 compared to 1990, GHG neutrality by 2045, tightening of targets for each sector, binding targets for natural sinks	High
Law	Act for heat planning and the decarbonisation of heat grids (Gesetz für die Wärmeplanung und zur Deekarbonisierung der Wärmenetze - WPG)	Obligation of the federal states to implement municipal heat planning, Heat plans by 30 June 2026 for municipal areas with over 1,000,000 inhabitants, Heat plans by 30 June 2028 for municipal areas with fewer than 100,000 inhabitants	High
Law	Building Energy Act (Gebäudeenergiegesetz - GEG)	Specifications for the energy quality of buildings, creation and use of energy certificates, use of renewable energies in buildings, for local authorities: use of renewable energies in new buildings and renovations	High
Law	Federal Climate Change Act (Erneuerbare Energien-Gesetz - EEG)	Transition to renewable energies, share of renewable energies in gross electricity consumption to be increased to at least 80 % by 2030, regulates the feed-in of electricity by grid operators and the corresponding remuneration	High
Law	German Building Code (Baugesetzbuch - BauGB)	Building planning law, which is regulated in the Building Code, plays a decisive role in the construction and use of renewable energy installations. It mainly determines the conditions under which such plants are permitted under planning law, which is binding for the federal states and municipalities. In accordance with the BauGB, certain areas can be defined in which renewable energy plants can be preferentially erected.	High
Strategy	Climate protection programme 2030	Measures to achieve the 2030 climate targets, emissions trading systems (ETS) for energy, industry and aviation, reduction of emissions in the ETS sector by 43 % by 2030 compared to 2005, reduction of emissions in agriculture, transport and waste (non-ETS) by 38 % by 2030 compared to 2005, Adoption of all legal measures to implement this programme by the Federal Cabinet in 2019	High

Type	Title	Description	Relevance
Strategy	Climate Protection Plan 2050	Develops concrete guiding principles for the individual fields of action for the year 2050, leaves room for innovation and strives to maximise sustainability, describes robust transformative paths for all fields of action, highlights critical path dependencies and Illustrates interdependencies, in particular underpins the interim GHG targets for 2030 with concrete milestones and strategically designed measures, also taking into account impact and cost analyses	High
Funding	Federal subsidy for efficient heating networks (BEW)	Funding for the construction of new heating networks with a high proportion of renewable energies, for the decarbonisation of existing grids, for local authorities for local heating networks with a high proportion of renewable energies in new buildings.	High
Funding	Federal funding for efficient buildings (BEG)	Combines previous funding programmes to increase energy efficiency in the building sector, support the installation of new heating systems, optimise existing heating systems, improve the building envelope and use efficient system technology. Municipalities have the opportunity to receive grants for measures.	High

National Climate Policy and its Implications for Local Action in Dortmund

Germany's Climate Action Plan 2050, adopted in 2016, serves as a long-term strategic framework for achieving national climate targets and guiding all relevant actors — from government and business to academia and civil society. Designed as a living strategy, the plan is based on the principle of continuous learning, regular evaluation, and progressive development in line with the objectives of the Paris Agreement. Rather than being a fixed blueprint, the Climate Action Plan 2050 is intended as a dynamic orientation guide for developing sector-specific measures and climate strategies over time.

This national framework directly influences the scope and priorities of local climate policy in cities like Dortmund. It calls for the active involvement of all societal actors in the design and implementation of climate measures and requires that their economic, social, and environmental impacts be thoroughly assessed. This multi-dimensional approach ensures that policies remain flexible in response to technological innovation while offering planning security for businesses, households, and public institutions.

The Energy and Climate Fund (EKF) plays a central role in financing Germany's climate and energy transition. Through the Climate Action Programme 2030, the federal government has committed hundreds of billions of euros to support emission reduction measures and

sustainable infrastructure. These funds are intended not only to reduce greenhouse gas emissions but also to stimulate economic development and safeguard Germany's competitiveness as a business location. The revenue generated through national CO_2 pricing mechanisms is earmarked exclusively for climate-related measures or for citizen relief — not for general budget use.

In this financial context, municipalities such as Dortmund benefit from targeted support programmes and are expected to implement complementary local actions that contribute to national goals. The alignment between national and municipal action is ensured through mechanisms such as the Climate Action Programme's economic planning via the EKF and the legal anchoring of sectoral targets.

The Climate Action Plan 2050 sets out clear sector-specific reduction targets for energy, buildings, transport, industry, agriculture and waste. These are legally binding and are monitored annually with the support of an independent expert council. Emissions are allocated according to the source principle, which means they are attributed to the sector where they occur, not necessarily to the one that benefits from the reductions. This approach allows for consistent and comprehensive accounting of emissions across all sectors, even though it may differ from the "polluter pays" logic. For example, emission savings from renewable electricity used in households are attributed to the energy sector, not to the building or residential sectors. This accounting method helps ensure reductions can be reported and targeted effectively, while avoiding loopholes.

The implementation of sectoral targets is subject to impact assessments, which evaluate their economic and social consequences. In the Climate Action Plan 2050, two alternative pathways were developed to illustrate different approaches to achieving the same climate goals:

- Path A emphasises energy efficiency as the primary driver of emissions reductions.
- Path B prioritises the expansion of renewable energy.

Both paths were found to be technically and economically feasible. However, Path A — the efficiency-led approach — was associated with slightly lower economic costs. These scenarios also guided the selection and design of measures included in the Climate Action Programme 2030. According to the analysis, these measures could trigger additional investments of between €240 billion and €270 billion by 2030, depending on the selected pathway.

National climate policy acknowledges that while climate protection is a task for society as a whole, individual measures often address specific groups. Accordingly, policy design incorporates not only emissions reduction potential but also principles of social justice, economic viability, affordability, and public participation. An inclusive approach is seen as essential for ensuring broad acceptance and long-term success. The federal government aims to harness the innovative capacity of an open society, supporting a wide range of local initiatives and stakeholders through targeted programmes.

A recent example of such national support for implementation at the municipal level is the "Act for the Immediate Improvement of the Framework Conditions for Renewable Energies in Urban Planning Law", adopted in January 2023. The law simplifies the approval process for installing ground-mounted photovoltaic systems along highways and railways — enabling cities like Dortmund to expand their renewable energy potential in previously underutilised areas.

In this national framework, Dortmund sees both a responsibility and an opportunity: to translate federal strategies into local action and to ensure that the city's Climate City Contract contributes meaningfully to Germany's overall climate goals — in a way that is inclusive, economically sound, and tailored to local needs.

Table 7: List of strategies and funding from the state North Rhine-Westphalia

Type	Title	Description	Relevance
Law	Climate Protection Act North Rhine-Westphalia (Klimaschutzgesetz NRW)	The goal is to achieve greenhouse gas neutrality by 2045, with emissions falling by 65 % by 2030 compared to 1990 levels and by 88 % by 2040. The aim is to preserve the carbon storage capacity of the forest and promote the expansion of renewable energies. Efforts to reduce greenhouse gas emissions are divided into various sectors, including the energy sector, industry, transport, buildings, agriculture and forestry. The state government has a role model function and must provide relevant data.	High
Law	Climate Adaptation Act North Rhine-Westphalia (Klimaanpassungsgesetz NRW - KlAnG)	Climate adaptation targets are set in order to limit the negative effects of climate change and strengthen climate resilience. The aim is to contribute to national and international efforts to adapt to climate change, with the Paris Agreement serving as a basic guideline.	High
Law	State building code (Landesbauordnung)	Wind energy: In future, wind turbines will be required to maintain a distance from property boundaries and residential buildings in accordance with building regulations. This distance will be based on 30 percent of their greatest height, as opposed to the previous 50 percent. Solar systems and heat pumps: The minimum distances under building regulations for solar systems on rooftops and heat pumps from neighbouring properties are to be abolished. In the case of heat pumps, however, building owners must take into account the noise- -impact on the neighbourhood. Solar systems can be installed on roofs without a distance to the	High

Type	Title	Description	Relevance
		boundary wall from 1 January 2024 at the latest. Hydrogen production plants: Installations for hydrogen production as well as certain installations for the production and use of hydrogen, including their enclosures and gas storage facilities with a storage quantity of up to 20 kilograms per device, are to be exempt from all procedures.	
Strategy	First climate protection package North Rhine-Westphalia (Erstes Klimaschutzpaket NRW)	GHG reduction target for 2030 at 65 %, accelerated expansion of renewable energies, supporting local authorities with climate protection and heating transition, increasing the energy efficiency of buildings, climate neutrality in the economy, sustainable means of transport and alternative drives, natural climate protection through forests	High
Policy	Open-space photovoltaic ordinance (Photovoltaik-Freiflächenverordnung – PVFVO)	In order to implement the climate protection targets, the expansion of photovoltaics will be strengthened. To this end, tenders for ground-mounted photovoltaic systems on arable land and grassland in disadvantaged areas are to be opened up. At the same time, it is important to protect the interests of agriculture as well as nature and landscape conservation.	High
Law	Bicycle and local mobility law (Nahmobilitätsgesetz - FaNaG)	Promote cycling and other forms of local mobility in North Rhine-Westphalia in order to contribute to overall sustainable mobility. The aim is to make cycling so attractive throughout the state that more people choose to cycle in their everyday lives. The aim is to achieve a 25 percent share of cycling in the modal split of journeys. The bicycle is to be strengthened as an independent, environmentally and climate-friendly means of transport and as an essential component of intermodal mobility chains, particularly in conjunction with local public transport .	High
Strategy	Action plan for the expansion of the NRW charging infrastructure	Expansion of private and public charging points in NRW by 2030	High
Strategy	Action plan for heavy goods transport	80,000 zero-emission heavy goods vehicles in North Rhine-Westphalia by 2030, 80 public	High

Type	Title	Description	Relevance
		charging points for road freight vehicles, entire fleet climate-neutral from 2045	
Strategy	Synthetic fuels action plan	Implementation of the hydrogen roadmap, market ramp-up of synthetic fuels	Medium
Fund	incentive funding for municipal heat planning	Subsidy of up to 100 % for municipal heat planning	High
Fund	Progress NRW – low-emission mobility	Support for the installation of fast-charging infrastructure for commercial vehicles, charging infrastructure for car-sharing stations, power grid connections for parking spaces, electric and fuel cell vehicles for local authorities.	High

Climate policy in North Rhine-Westphalia and its importance for Dortmund's local climate action

North Rhine-Westphalia (NRW), Germany's most populous federal state and one of its most industrialised regions, has committed to becoming Europe's most modern and environmentally sustainable industrial hub. In July 2021, the NRW state parliament adopted one of the most ambitious climate protection laws among Germany's federal states, setting a legally binding target to achieve greenhouse gas neutrality by 2045.

This long-term objective is accompanied by interim milestones:

- By 2030, emissions are to be reduced by 65 % compared to 1990 levels.
- By 2040, the reduction should reach 88 %.
- By 2045, NRW aims to be fully climate-neutral.

To achieve these goals, the state government has launched comprehensive transformation processes across key sectors: energy, industry, buildings and mobility. A central element of NRW's strategy is the integration of these sectors through digitalisation and sector coupling, enabling more efficient and synergistic emissions reductions.

For Dortmund, as a major city in NRW, this state-level policy provides both a strategic framework and significant opportunities for support. Climate protection is a central responsibility of the Ministry for Economic Affairs, Industry, Climate Protection and Energy of the State of North Rhine-Westphalia (MWIKE). Within this ministry, Department 712 coordinates municipal climate protection policies and initiatives.

Through programmes such as KommunalerKlimaschutz.NRW, the state supports cities like Dortmund in developing and implementing local climate protection projects. These funding lines complement national programmes and EU instruments, enabling Dortmund to finance

infrastructure upgrades, renewable energy expansion and mobility transformation in line with both state and municipal goals.

In addition to MWIKE, other ministries — including the Ministry for Environment, Nature Conservation and Transport, the Ministry for Municipal Affairs and Building, and the Ministry for Agriculture and Consumer Protection — are jointly responsible for the NRW Climate Protection Package, adopted in June 2023. This integrated approach ensures that climate policy is not confined to a single administrative silo but is embedded across all relevant policy areas.

A significant recent policy shift in NRW came in August 2023, when the state government abolished the blanket 1,000-metre minimum distance rule between wind turbines and residential areas. This reform is expected to accelerate the expansion of wind energy — a crucial element in meeting both state and municipal renewable energy targets.

To support this transformation, the state government has committed substantial financial resources:

- Over one billion euros have been directly allocated to the implementation of measures in the climate protection package.
- Additional billions are expected through European co-financing programmes, including EU structural funds and innovation calls.
- State subsidies for housing and regional economic development are increasingly aligned with climate protection goals, ensuring coherence across funding instruments.

Recognising that the energy transition and climate protection require broad societal engagement, NRW is actively involving all stakeholder groups — from large industrial corporations to SMEs, craft enterprises, municipalities and citizens. The goal is to create a shared responsibility for deploying climate-friendly technologies and accelerating the pace of investment in sustainable infrastructure.

To coordinate these efforts and streamline climate-related initiatives, the state established the public enterprise NRW.Energy4Climate in early 2022. Its mandate is to:

- Mobilise public and private investment in climate protection,
- Attract external funding to NRW,
- And ensure the effective implementation of energy transition policies.

For Dortmund, this institutional landscape provides critical strategic support and collaborative opportunities. The city is actively engaged in state-level dialogues and funding programmes and aligns its Climate City Contract (CCC) with NRW's long-term decarbonisation path. As a key urban centre in the Ruhr metropolitan region, Dortmund plays a pivotal role in contributing to NRW's ambition of becoming a European leader in sustainable industrial transformation.

Table 8: List of strategies and funding from the Municipality of Dortmund

Type	Title	Description	Relevance
Strategy	Climate-Air 2030 action programme	The Climate-Air 2030 action programme is the primary strategy for addressing climate neutrality.	High
Strategy	Energy Use Strategy (Energy Use Plan)	Strategic framework for transition of heating system in Dortmund	High
Strategy	Mobility Master Plan	Three sub-concepts: Pedestrian and Accessibility, Cycling and Road Safety, Public Space and Parking. These three sub-concepts consist of six key topics, one type of transportation and one cross-cutting topic. For each of the six priority topics, a strategy was developed with broad public participation, which contains a basic position of the City of Dortmund and defines initial measures to support the topics. • Stationary traffic strategy • Parking Public space strategy • Road safety strategy • Accessibility strategy • Pedestrian traffic strategy	High
Strategy	Integrated Climate Adaptation Master Plan (MiKaDo)	The Integrated Climate Adaptation Master Plan (MiKaDo) is a tool that integrates climate adaptation into all the city's technical and spatial projects, as well as its long-term administrative actions. It also raises awareness of the need for climate impact adaptation among Dortmund's urban population. In addition to the measures compiled here, the master plan's catalogue of measures includes technical, spatial and administrative measures that support heat prevention and adaptation to climate impacts.	Medium
Program	ÖKOPROFIT	Today more than ever, companies are faced with the challenge of acting sustainably while maintaining a high level of competitiveness. ÖKOPROFIT provides participating companies with the tools they need to meet this challenge. ÖKOPROFIT supports companies in reducing their operating costs and protecting the environment at the same time. The project offers flexible solutions regardless of the size and sector of the company. It has proven its worth for years in Dortmund	High

Type	Title	Description	Relevance
		as an introduction to environmental and sustainability management.	
Report	Voluntary Local Review 2022 – The implementation of the UN Sustainable Development Goals in the City of Dortmund	In 2022, the City of Dortmund presented its first Voluntary Local Review, reporting on the implementation of the UN Sustainable Development Goals in the City of Dortmund. It followed the Agenda Interim Report, which informed the political bodies about the content and status of sustainable development in Dortmund from 1999 to 2020. Even though the 2030 Agenda is designed primarily for application by nation states, more and more municipalities – where concrete action is implemented – voluntarily initiate an assessment of their progress in implementing the SDGs in the form of Voluntary Local Reviews (VLRs).	Medium
Strategy	Heat Action Plan	The heat action plan contains measures for the entire population as well as some target group-specific measures. Some measures have already been implemented, while others are still being planned and developed. The initial focus was on the vulnerable group of senior citizens. The first measures were implemented as early as summer 2023 and will be successively transferred to other target groups. The heat action plan follows a dynamic process, as the measures are successively implemented, consolidated and supplemented. The administration strives to continuously adapt and improve these measures in order to ensure effective protection against heat stress and to deal with the challenges dynamically and over the long term.	Medium
Strategy	Smart City Strategy[12]	With the overarching Smart City Strategy DOS 2030, Dortmund and Schwerte want to offer their citizens new and innovative digital solutions and communication channels – going beyond the digitisation of administrative services. They are focusing on an integrated approach that incorporates the central urban policy goals of both cities and places citizens even more at the centre of their actions than before.	Medium
Strategy	Science Masterplan [13]	Science, economy, culture, administration and civil society work together in strong networks such as the	Medium

[12] City of Dortmund, n. d., Smart City Dortmund, The way to an innovative and livable city
[13] City of Dortmund, n. d., Science Masterplan

Type	Title	Description	Relevance
		Science Masterplan or the participatory city strategy. In addition to the large innovation structures and strategic alliances, there are plenty of local, informal innovation hotspots and grassroots initiatives with open workshops, labs and citizen science spaces.	
Project	Emission-free city centre[14]	As part of the "Emission-free City Centre" project, 16 specific measures in the areas of cycling, pedestrian paths, e-mobility, public transport and mobility behaviour have reduced greenhouse gas emissions in Dortmund by December 2022, taking a significant step towards the "Dortmund of tomorrow."	High

Climate policy in Dortmund

As the most populous city in the Ruhr region, Dortmund not only has a great responsibility to implement strategies and programmes for climate protection for its inhabitants but is also a role model for the entire region.

As a city in North Rhine-Westphalia, Dortmund is aligned with the state's climate protection targets but has decided to set itself an even more ambitious target. In 2021 the council decided that climate neutrality should be achieved by 2035. By participating in the EU mission, this target was increased once again, and Dortmund wants to show what the path to climate neutrality by 2030 can look like.

All of the strategies listed in the table above are geared towards the climate neutrality target by 2035, as the programmes were developed before participation in the EU mission. With this CCC Dortmund adds the missing piece to reach the goal of 2030.

Central to Dortmund's actions to achieve climate neutrality is the Climate-Air 2030 Action Plan. This is an update of the original action programme, as the previous document was geared towards the climate neutrality target of 2045. The new target of 2035 meant that it had to be revised. In the current document, measures were considered that should make climate neutrality possible by 2035. All fields of action are presented that are to be implemented by 2030 and are intended to achieve a 55 % reduction in emissions. In addition to the existing fields of action such as air, energy, buildings and mobility, the City of Dortmund added consumption and agriculture.

The following reductions are possible by implementing the Climate-Air 2030 Action Plan:

- Renewable energy: potential reduction of 600,000 tonnes of CO_2 per year
- Sustainable building: 800,000 tonnes of CO_2 per year

[14] City of Dortmund, n. d., Emission-free city center

- Agriculture and nutrition: 200,000 tonnes of CO_2 per year
- Sustainable mobility: 300,000 tonnes of CO_2 per year

In addition to this central programme, there are other strategies that also have an impact on climate protection and adaptation. Some of these are described here:

Dortmund Energy Use Plan (ENP): The Dortmund Energy Use Plan (ENP) is a central strategic planning instrument of the City of Dortmund, which was initiated even before the nationwide mandate for municipal heat planning (KWP). It is based on the city council's resolution on the Climate-Air 2030 Action Plan 2030, which aims for Dortmund to be climate-neutral by 2035.

The ENP/KWP serves as a data-driven and georeferenced basis for decision-making for all stakeholders in Dortmund's energy transition – from the city administration and energy supply companies to private and commercial building owners. The first version of the ENP focuses on the heating sector, as heat provision accounts for more than half of the energy-related greenhouse gas emissions in Dortmund.

Smart City Strategy: Within the Smart City Strategy of the City of Dortmund, there is a specific field of action for measures relating to the environment. The goal is to integrate smart tools and assets to improve measures that have an impact on climate protection.

- Environmental dashboard: monitoring and visualisation of climate and energy data
- Charging infrastructure and smart lighting: integration of charging infrastructure in existing street lights
- Smart waste management: together with the municipal holding company for waste management, a system of smart bins will be installed within the city limits to make waste disposal more efficient.

Masterplan Science: Science, economy, culture, administration and civil society collaborate in strong networks like the Science Masterplan or the participatory city strategy. Alongside major innovation structures and alliances, numerous local initiatives, open workshops, labs and citizen science spaces foster grassroots innovation. In 2022, Dortmund opened a room for innovation and cooperation in the city centre. This city lab, called "Projektor", serves as a meeting point for partners in the innovation ecosystem and provides an open space for smart city activities.

Sustainability plays an important role in the city-science community in Dortmund.

- The Institute for Energy Systems, Energy Efficiency and Energy Economics at TU Dortmund University is one of the leading German institutes in energy research with a focus on renewable energy sources and energy efficiency.
- The University of Applied Sciences and Arts (FH Dortmund) and TU Dortmund University have developed ambitious sustainability programmes and are important partners in the strive for climate neutrality.

- The greenhouse.ruhr[15] competition fosters social and ecological innovation projects.

Dortmund's approach also extends to sharing experiences with partner communities at a regional level as well as internationally. Projects such as "iResilience" aim to strengthen the city's resilience to climate-related phenomena, including persistent heat and heavy rain – with the help of citizens collecting ideas and implementing pilot measures in their neighbourhoods. Dortmund is not only cooperating with other cities in North Rhine-Westphalia, but also internationally, e.g. with the city of Cluj-Napoca in Romania.

In 2023, Dortmund entered the "Intelligent Cities Challenge"[16] as one of ten mentor cities. In this European Commission initiative, Dortmund shares its experience in the green and digital transition.

Emission gap based on the economic model used in the NetZeroPlanner

The forthcoming Action Plan for the City of Dortmund will set out the specific actions and policies designed to achieve net zero by 2030, with an 80 % reduction in GHG emissions (compared to the baseline year 2019) and up to 20 % offsets identified through quantitative analysis. These actions will build upon existing initiatives while introducing new measures to accelerate emission reductions across the city.

The table below shows the calculation of emission reductions resulting from climate neutrality action plans (CNAP), remaining emissions and emissions offset, as well as the emissions gap. These values are generated using the NetZeroPlanner economic model.

Baseline Emissions (2019): This data serves as the official baseline for further calculations in the NetZeroPlanner economic model. They refer to the city's official greenhouse gas balance for the years 2019 to 2020. The raw data for the calculations is collected by the city and made available to the Ruhr Regional Association (Regionalverband Ruhr - RVR) for evaluation using the 'Klimaschutz-Planer' software. This assessment is conducted biennially, which is why the data for 2019 and 2020 has been summarised in the city's greenhouse gas balance report.[17] Data from 2019 was specifically used in the NetZeroPlanner analysis. Data not regularly collected in greenhouse gas accounting (e.g. waste data or various transport parameters) was requested directly from relevant stakeholders and incorporated.

Emissions Reduction Resulting from CNAP: The reduction potentials presented here refer to all the strategic goals, policies and measures set out in this document, as well as the existing strategies, for making the city green, resilient, climate-neutral and smart. It also includes actions from several signatories who are committing to this CCC, and thereby to help the city achieve its goal to reach climate neutrality by 2030. It was a conscious decision not to

[15] Economic Development Agency Dortmund, n. d., greenhouse.ruhr

[16] Intelligent Cities Challenge, n. d., Accelerate your city's green & digital transition with the Intelligent Cities Challenge

[17] City of Dortmund, 2023, Energie- und Treibhausgasbilanz 2020 [Energy and greenhouse gas balance report 2020]

separate the effects of the different action plans. The Climate City Contract (CCC) Action Plan is not intended to replace Dortmund's current climate policies and strategies, but rather to unify and accelerate them within a single framework. The CCC strengthens, integrates and elevates all current and future climate actions in the city, aligning them with the EU Mission's more ambitious target of achieving climate neutrality by 2030. As the CCC functions as an umbrella strategy, the individual climate protection measures are presented together, as they also go alongside each other in their implementation. Future iterations of the CCC will pay particular attention to reducing emissions from the CCC and other action plans, as well as improving the accuracy of data on emissions over time by monitoring and controlling actions using the Climate Check (see 4.1) and the climate dashboard[18].

Remaining Emissions: Remaining emissions are those that are still emitted after all the climate protection measures have been implemented and cannot be avoided or cannot yet be avoided. These emissions must be reduced through technological progress, carbon sinks, or compensation methods that are measurable, reportable and verifiable. The shift in the federal electricity mix towards renewable energy sources also has a significant impact on the level of remaining emissions. However, future iterations of the CCC may be subject to different conditions, which could lead to a reduction in residual emissions. Furthermore, the City Municipality has a robust strategy for developing and improving green spaces and infrastructure within the city (see 3.2.6 and 3.2.7).

Residual Emissions Offsetting: As described above, the city of Dortmund is attempting to offset the remaining emissions using various strategies. Chapter 3.2.7 provides a detailed description of the use of natural offsets/sinks and other offsets.

Emissions Gap (amount necessary to achieve net-zero): The emissions gap represents the amount of CO_2 emissions that must ultimately be reduced to reach net zero. This parameter depends directly on remaining emissions and residual emissions offsetting. It will play a key role in future CCC iterations and regular GHG accounting to determine whether current measures, financial resources and implementation speed are sufficient to achieve the desired goal. If the emissions gap widens over time, this indicates that the climate protection efforts of the City of Dortmund need to be intensified further. Dortmund has the great privilege of already having established many powerful strategies and programmes in recent years. Therefore, the CCC will be used as an umbrella strategy to highlight these existing programmes and further amplify those programmes. During the next iterations, the transition team will monitor the results and report back on whether the CCC needs to take more action. Additionally, those further iterations will also include the differentiation between the measures directly linked to the CCC as well as the existing programmes. Furthermore, the implementation of the CCC and the aforementioned monitoring will lead to the development of additional actions in the future, based on actual needs, additional funding and/or new scientific findings.

[18] City of Dortmund, n. d., Climate dashboard of the city of Dortmund

Table 9: Emission data from NetZeroPlanner economic model, including Baseline Emissions (2019) and Emissions Gap in kt CO_2 e (A 2.1)

A-2.1: Emissions Gap (kt CO_2e)									
	Baseline Emissions (2019)	Emissions Reduction Resulting from CNAP		Remaining Emissions		Residual Emissions Offsetting[1]		Emissions Gap (amount necessary to achieve net-zero)	
	(Absolute value)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)
Transport	840	729	87 %	111	13 %	111	13 %	0	0 %
Buildings & Heating	1,464	1,070	73 %	394	27 %	394	27 %	0	0 %
Electricity	1019	857	84 %	162	16 %	162	16 %	0	0 %
Waste	53	27	51 %	26	49 %	26	49 %	0	0 %
Other (incl. IPPU & AFOLU)[2]	294	235	80 %	59	20 %	59	20 %	0	0 %
Total	3,670	2,918	80 %	752	20 %	752	20 %	0	0 %

[1] *Residual emissions consist of those emissions which can't be reduced through climate action and are being offset. Residual emissions may amount to a maximum of 20 % as stated by the Mission Info Kit.*

[2] *Emissions reduction target percentage for "Other" sector is assumed to be the same as for the other 4 main sectors unless updated by city. Activities and commitments to reduce these emissions are documented in the Climate Neutrality Action Plan.*

2.3 Module A-3 Systemic Barriers and Opportunities to 2030 Climate Neutrality

Governance structure for climate action in Dortmund

Dortmund has established a multi-level governance structure that enables coordinated climate action across municipal departments, municipal companies, political leadership, businesses, and civil society. This structure is designed to ensure that the Climate City Contract (CCC) is both actionable and broadly supported.

At the political level, Dortmund's City Council provides the formal mandate for climate neutrality and adopts key climate policies and budgets. The Council's commitment to the CCC and the 2030 target ensures that climate action is positioned as a top municipal priority.

The city administration plays a central coordinating role:

- The *Environment Agency* leads the development towards climate neutrality in Dortmund
- Other municipal departments—city planning, housing, economic development, and social affairs—integrate climate targets into their sectoral strategies and projects.
- The Climate Advisory Board, an advisory body composed of political representatives, experts, and civil society members, ensures regular consultation and alignment on climate policy.

Dortmund's municipal companies are key implementation actors:

- The city's energy provider, waste management services, public transport operators, and housing companies contribute directly to emissions reduction through infrastructure investments and service delivery.
- These companies align their corporate climate targets with the CCC framework and participate in joint planning processes.

At the regional level, Dortmund collaborates with the Ruhr Regional Association (Regionalverband Ruhr - RVR) to ensure alignment with wider metropolitan climate initiatives and leverage regional synergies.

In order to achieve the climate neutrality targets by 2030 in Dortmund, various levels must work together to create the framework conditions for the planned measures. Decisions at EU, federal and state government level provide important impetus for local work. Locally in Dortmund, the various networks of the city and companies must work together. Climate neutrality as an ambitious goal requires support at all these levels. The CCC is therefore a great opportunity to address all these levels. As the city administration can only implement

a small proportion of the CO_2 reductions through its own measures, the involvement of other stakeholders is necessary to achieve the ambitious 2030 target.

An important stakeholder supporting the city's path to climate neutrality is the Climate Council. The Climate Council provides recommendations to the city council, which are aimed at promoting the implementation of climate protection and climate impact adaptation as well as providing impetus for new measures. (Many of these recommendations have been implemented or are scheduled to be implemented.) This includes, for example, the recommendation of quick wins, i.e. measures that can be implemented quickly, such as the staffing of positions, e. g. for the Climate Protection Fund or the Climate Agency or the Climate Neighbourhood position; as well as the recommendation of big points, i.e. extremely effective measures such as the expansion of the 30 km/h speed limit on city centre roads.

In the mobility sector, recommendations of the Climate Council include the prioritisation of public transport, cycling and walking over motorised private transport and the expansion of public transport in particular. The recommendations include, for example, prioritising eco-mobility in construction site management, improving passenger information (e.g. at stops), the distribution of job tickets for city employees, more frequent bus and rail services, expanding double-track sections for the light rail system, expanding the light rail network and the expansion of intermodality. Furthermore, the Climate Council advised the city council to take measures in mobility, such as creating more space and safety for cyclists, developing concepts for protected cycle paths as well as developing loading and delivery zones, continuing work on micro-depots, carrying out comprehensive car park management, updating the Parking space statutes for more climate effectiveness and promoting pupil's independent mobility on school routes.

In the energy sector, recommendations of the Climate Council contained the recommendation to install photovoltaic systems on the roofs of municipal properties in combination with green roofs. In addition, the Climate Council advised the city council to intensify cooperation with local tradespeople to support energy efficiency, climate protection and climate impact adaptation measures. This also includes the launch of a funding programme for these topics. Furthermore, the Climate Council advised the City Council to develop a strategy for energy-efficient neighbourhood refurbishment.

In addition to that, regarding the building sector, the Climate Council advised the City Council that sufficient and sustainable building should be declared the guiding principle of urban construction.

In the waste sector, the Climate Council recommended to support and promote all measures with which the urban community could avoid waste. For example, by providing premises for repair cafés, holding information events for citizens and businesses on waste prevention and recycling. In addition, the administration could create an information system on types of waste, avoidance, reuse and recycling options.

These examples illustrate the central influence of the Climate Council on achieving Dortmund's climate neutrality goals.

Some specific challenges arise in relation to the various fields of action. For example, measures in the area of mobility are often in competition with each other, as the available space is limited. There is competition for use, which is often accompanied by many conflicts. Particularly when it comes to the general promotion of eco-mobility, the most important lever is changing people's habits, which is not particularly easy to implement as people tend to want to stick to their current behaviour. The city administration faces the major challenge of making eco-mobility so attractive that more people are willing to change their habits. Climate neutrality always goes hand in hand with an improvement in quality of life and offers added value for everyone in the city. As the effects of climate change always end up affecting vulnerable groups in particular, this point is especially important. The civic network is particularly important for communicating these benefits to society, as this is where local acceptance is created.

But private companies in Dortmund are also important in achieving climate neutrality. They set the framework conditions for their company and their employees and set their own climate targets to be achieved. There is great potential here, particularly in the area of building and heating. Energy-efficient refurbishment is one of the most important measures on the path to climate neutrality and offers companies cost savings in addition to CO_2 reduction.

Stakeholder engagement

Achieving climate neutrality by 2030 requires broad participation and collaboration across society. The already in the introduction identified stakeholders will be integrated as follows:

- **Private sector:** Dortmund's local businesses and industries are key to driving innovation and reducing emissions. Large employers and industrial players have been involved in workshops and consultation processes, aligning their own climate goals with the city's targets. Start-ups and SMEs are supported through innovation funding programmes to develop sustainable technologies and business models.
- **Municipal Holding Companies:** These companies operate essential urban infrastructure and are directly responsible for implementing many of the measures in the CCC portfolio. Their participation ensures that energy, transport, and waste systems transition in line with climate targets, as the Commitment Plan and the Signatories of the Municipal Holding Companies show.
- **Politics:** The City Council, District Council and committees are important cornerstones for addressing successes and challenges during implementation. They empower the administration to push ahead with climate protection and emission reduction.
- **Citizens:** Households are engaged through public campaigns, events, and participatory processes.

- **Civil society:** Active citizen participation is central to Dortmund's climate approach. Local associations, NGOs and grassroots movements contribute to raising awareness and implementing projects at neighbourhood level.
- **Educational Institutions:** Schools, universities, and vocational training centres are involved in climate protection projects, sensitising younger generations to climate challenges and empowering them to become active participants in the transition.
- **Research and innovation networks:** Dortmund cooperates with local research institutions and innovation clusters to develop and pilot new solutions for sustainable urban development.

The described sectors show the variety of stakeholders in the City of Dortmund. To demonstrate the complexity and to provide the framework for table A 3.2 System Stakeholder Mapping at the end of this chapter, there were eight systems identified. All the partners and stakeholders regarding the CCC can be matched to those.

- Governance, policy and regulations
- Transport
- Housing and Buildings
- Energy
- Finance and Business models
- Technology and Innovation
- Industry
- Waste and Landuse

The different colouring shows the integration of the described sectors like private sector, politics, research and innovation, educational institutions and civil society. For more information on the named stakeholders itself go to Table 3.2 System Stakeholder Mapping.

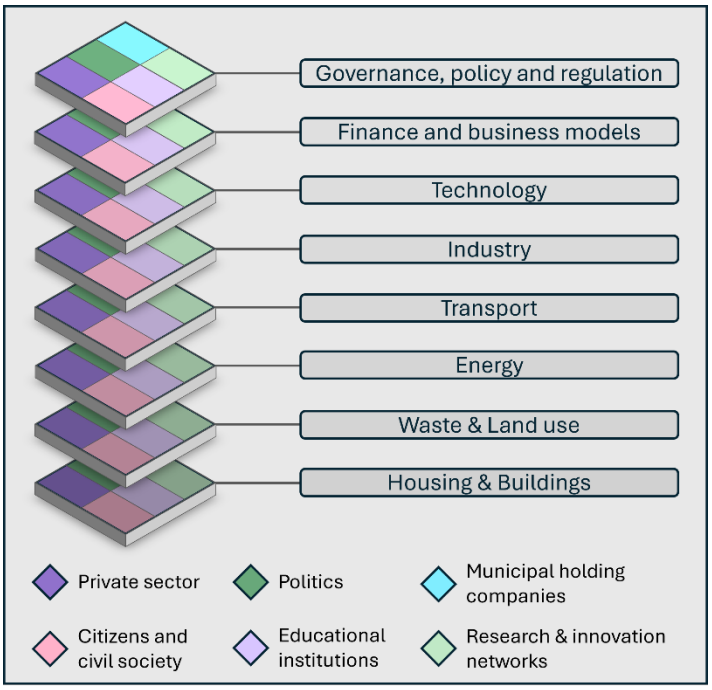

Figure 3: Systems and sectors of Stakeholders in the City of Dortmund for the CCC

To ensure the representation of the CCC to the systems in Dortmund, the city administration has put in place structured participatory processes to ensure that the CCC is widely supported and effectively implemented:

- In **May 2023**, the CCC process was presented to the *Climate Council*, initiating a formal consultation phase.
- In **June 2023**, a cross-departmental workshop involving 13 city departments was held to map existing projects and align sectoral plans with the CCC.
- In **September 2023**, a dedicated workshop with 30 representatives from municipal companies ensured that corporate climate goals and projects are integrated into the CCC framework.
- In **May 2025**, citizen engagement was scaled up through participation at the *DortBunt City Festival*, where residents had the opportunity to provide feedback and learn about climate actions.
- In **June 2025**, participation in events during the Science Year, which in 2025 will focus on energy of the future, provided opportunities for direct exchange with interested citizens.

Ongoing participation mechanisms include:

- A **climate newsletter** to keep citizens informed and engaged.
- Targeted events and workshops for schools, district communities, and thematic groups (e.g. mobility, heating).

- Expansion of networks to connect citizens with concrete opportunities for climate action, such as joining energy cooperatives or initiating local greening projects.

The potential and opportunity offered by an active participation process is crucial for a successful process. With the implementation phase coming next, the City of Dortmund will create a comprehensive communication strategy to address the different target groups in the city. More details will be described in Parts B and C of the Action Plan.

Barriers and Opportunities for the CCC in Dortmund

While Dortmund has built a strong foundation for climate action, several barriers and gaps must be addressed to create the most favourable conditions for achieving climate neutrality by 2030. These challenges span infrastructure, administrative capacities, funding, and systemic coordination.

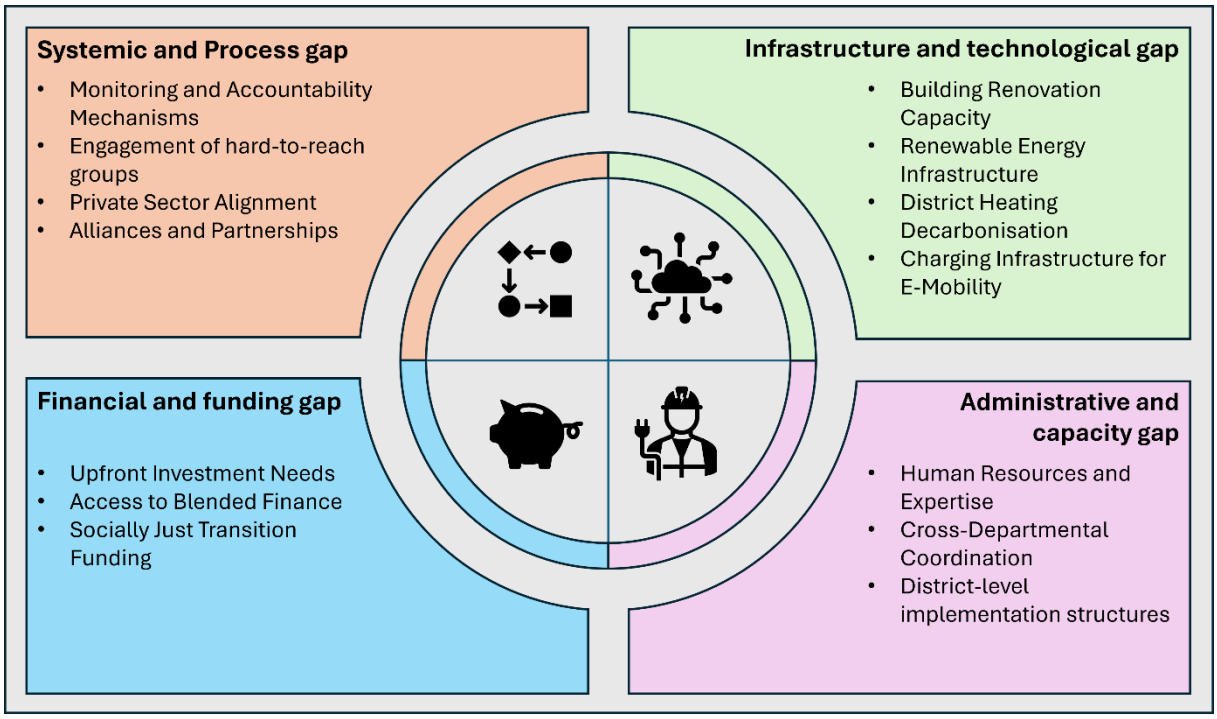

Figure 4: Barriers and Gaps of stakeholders for climate actions

Infrastructure and technological gaps

- **Building Renovation Capacity:** A significant portion of Dortmund's building stock is energy inefficient. Scaling up deep renovation rates requires not only financial resources but also expanded technical capacity among construction firms, craftsmen, and planners.
- **Renewable Energy Infrastructure:** While progress has been made, Dortmund needs to accelerate the deployment of renewable energy, including solar PV on residential and commercial rooftops and local wind energy projects. Grid infrastructure upgrades are required to handle increased renewable feed-in and electrification demands.

- **District Heating Decarbonisation:** Transitioning Dortmund's district heating systems away from fossil fuels to renewable and waste heat sources is a critical, yet complex, infrastructure challenge.
- **Charging Infrastructure for E-Mobility:** To support the shift to electric mobility, Dortmund requires a significant expansion of public and private EV charging points, especially in dense urban districts.

Administrative and capacity gaps

- **Human Resources and Expertise:** There are capacity constraints within the city administration and municipal companies. Additional staffing and upskilling are needed to plan, implement, and monitor the accelerated climate measures required by the 2030 target.
- **Cross-Departmental Coordination:** While coordination mechanisms exist, they need to be further institutionalised and strengthened to avoid siloed approaches and ensure all departments align their plans with the CCC targets. Writing the CCC is only possible because of exchange and communication across departments, and these approaches must be strengthened.
- **District-level implementation structures:** Implementation capacities at the district level (the 12 urban districts) vary and need to be reinforced to deliver projects locally and engage citizens effectively. The district councils must be addressed by the Transition Team about the CCC and the Action Plan. This is especially important because, due to political developments and a more conservative approach, measures regarding climate protection are often questioned.

Financial and funding gaps

1. **Upfront Investment Needs:** Achieving the 80 % emissions reduction by 2030 requires substantial upfront investments across sectors, particularly in buildings, mobility, and energy infrastructure. Existing funding sources, while significant, are not yet sufficient to close the investment gap.
2. **Access to Blended Finance:** Dortmund needs to enhance its capacity to leverage blended finance models, combining public funds, private capital, and EU Mission support.
3. **Socially Just Transition Funding:** Additional resources are required to ensure that low-income households can participate in the transition, particularly in building renovations and energy system changes. At 22.1 %, Dortmund had the highest at-risk-of-poverty rate in North Rhine-Westphalia in 2023.

Systemic and Process Gaps

- **Monitoring and Accountability Mechanisms:** While monitoring systems are being developed, Dortmund needs to strengthen real-time data flows, performance tracking, and accountability processes to ensure timely course corrections.
- **Engagement of hard-to-reach groups:** Citizen engagement needs to be deepened, particularly among vulnerable and low-income populations that face higher transition risks but often have lower participation rates.
- **Private Sector Alignment:** While some businesses are engaged, a broader mobilisation of the private sector is necessary to align industrial and commercial actors with the 2030 climate neutrality target.
- **Alliances and Partnerships:** Building stronger alliances with regional partners, financial institutions, and EU-level innovation platforms will be critical to scale up action and secure needed resources.

Addressing barriers and closing gaps

Dortmund plans to overcome these barriers and close gaps through targeted measures under the CCC framework:

- Becoming a role model for the private sector by adhering to and enforcing climate neutrality in all public activities and strategies.
- Establishing a multi-level communication and networking approach to take impact on framing conditions e.g. law and funding schemes, to ensure a socially sound, economically beneficial but at the same time accelerated transformation process towards climate neutrality
- Expanding administrative and technical capacities through staff recruitment, training, and new organisational structures.
- Developing new funding models and financing partnerships to mobilise the required investments.
- Strengthening governance and coordination mechanisms, including at the district level.
- Scaling up citizen participation and private sector engagement through dedicated programmes and campaigns.
- Leveraging participation in EU networks such as NetZeroCities and StronGER Cities to access technical support and best practices.

By systematically addressing these gaps, Dortmund aims to create the most favourable conditions for a successful, inclusive, and accelerated transition to climate neutrality by 2030.

Dortmund is well positioned to accelerate its transition to climate neutrality by harnessing a diverse set of existing and emerging assets, resources, and governance processes. These

opportunities provide a strong foundation for scaling up climate action and closing the emissions gap identified in the Climate City Contract (CCC).

Access to national, regional and EU funding

One of Dortmund's key assets is its strong connection to national, regional, and European funding streams dedicated to climate action. The city actively tracks funding opportunities listed in official registers and leverages a broad portfolio of financial instruments, including:

- **German national programmes** such as the *KfW energy-efficient refurbishment schemes*, the *Federal Support for Efficient Buildings (BEG)* and the *National Climate Initiative (NKI)*.
- **Regional funds** from North Rhine-Westphalia, supporting renewable energy deployment, sustainable mobility, and district-level climate projects.
- **EU-level funding** through programmes aligned with the EU Mission for 100 Climate-Neutral Cities, including *Horizon Europe*, *LIFE*, and dedicated Mission calls.

The CCC provides Dortmund with a framework to systematically identify projects that can benefit from these funds and to bundle financing for maximum impact. By aligning its action portfolio with the Mission targets, Dortmund can access technical assistance and funding pipelines designed to accelerate emission reductions.

Ecosystem for innovation and collaboration

Dortmund's innovation ecosystem is a major asset that can be harnessed to deliver transformative climate action. The city benefits from strong networks and partnerships at local, regional, and European levels:

- As part of the **StronGER Cities** network, Dortmund collaborates with regional peers to drive sustainable urban transformation and share best practices.
- Participation in the **NZC (Net Zero Cities) platform** connects Dortmund with other frontrunner cities in Europe, providing access to technical expertise, innovation methodologies, and collaborative projects.
- Being a member for ICLEI – Local Governments for Sustainability Dortmund has multiple connections worldwide to find partners and inspiration for activities leading to a sustainable urban development

Locally, Dortmund's ecosystem brings together universities, research institutions, start-ups and established industries: The city's universities and research centres offer expertise in green technologies, urban planning and energy systems, providing scientific backing for CCC measures. The growing start-up scene in Dortmund contributes innovative solutions in areas such as smart mobility, renewable energy, and circular economy. Established industrial players are increasingly aligning their business models with climate neutrality targets, creating new partnerships and investment opportunities.

Flagship projects as catalysts for transformation

Dortmund can also build on a range of flagship projects and initiatives that serve as platforms for broader climate action:

- **The nordwärts** programme focuses on integrated urban development and citizen participation in the northern districts, providing a scalable model for district-level climate projects.
- The city's recognition in the **European Capital of Innovation (iCapital)** awards demonstrates Dortmund's capacity to mobilise cross-sector partnerships and innovative governance models.
- Large-scale infrastructure projects under the **Masterplan Mobility 2030** and the ***Climate-Air 2030 Action Plan 2030*** are already underway and can be scaled up through Mission alignment.

By expanding these successful initiatives and aligning them with CCC priorities, Dortmund can accelerate the implementation of high-impact measures in transport, energy, buildings, and green infrastructure.

Strengthening governance and administrative capacity

Finally, Dortmund's existing governance structures and administrative processes present an opportunity to mainstream climate action across the entire city system:

- The city's Climate Council provides a platform for political leadership, expert input, and stakeholder engagement.
- Cross-departmental coordination processes, initiated through the CCC development phase, can now be institutionalised to ensure sustained collaboration.
- District-level governance mechanisms, developed in programmes such as *nordwärts*, can be expanded to bring climate action closer to citizens.

The CCC enables Dortmund to strengthen these governance processes, improve coordination, and allocate resources more effectively, ensuring that the city's climate neutrality ambition is both actionable and resilient.

Conclusion

By mobilising these funding resources, leveraging its innovation ecosystem, scaling up flagship projects, and strengthening governance structures, Dortmund is equipped to transform existing assets into powerful drivers of climate neutrality. These opportunities, when harnessed through the CCC framework, will enable Dortmund to close its emissions gap and establish itself as a leading example of climate-neutral urban transformation in Europe.

Dortmund recognises that achieving climate neutrality requires more than technical measures — it demands a shared understanding of the systemic nature of the challenge among all stakeholders (including CCC signatories) involved. Different actors — municipal departments, businesses, citizens, research institutions — bring distinct perspectives,

priorities, and constraints. The city has established processes and platforms to collectively build understanding and align these diverse viewpoints toward a common goal.

Cross-sectoral coordination platforms

Dortmund's Climate City Contract (CCC) process has already initiated structured cross-sectoral workshops to bring together representatives from different municipal departments, municipal companies, and external stakeholders. These workshops create spaces for dialogue where:

- Interdependencies between sectors (e.g. mobility and energy, buildings and social policy) are made explicit.
- Conflicting priorities are discussed openly, allowing for negotiated solutions.
- Synergies are identified, such as combining building retrofits with social housing upgrades or aligning mobility projects with public health goals.

Use of systemic tools and models

To support collective understanding, Dortmund employs systemic tools such as the ClimateView platform, which visualises emissions across sectors and models the impacts of different interventions. This tool enables stakeholders to:

- See the cumulative effect of individual actions within the broader city system.
- Understand trade-offs and co-benefits across domains (e.g. air quality improvements through transport decarbonisation).
- Test alternative pathways and collectively decide on the most effective strategies.

By using such models in participatory workshops, Dortmund ensures that all actors gain a shared perspective on the systemic dynamics of the transition.

Networks and Collaborative Projects

Dortmund also leverages its participation in national and European networks such as *StronGER Cities* and *NZC (Net Zero Cities)*, which offer opportunities for collaborative learning and exchange with other cities facing similar systemic challenges. Through these networks, local actors in Dortmund are exposed to best practices and new governance models that account for systemic complexity.

At the local level, projects like nordwärts serve as living labs where systemic issues—such as the link between socio-economic disparities and energy poverty—are addressed through integrated solutions involving citizens, businesses, and public institutions.

The City of Dortmund is involved in numerous sustainability initiatives, together with other local authorities and civil society.

For example, it is a founding member of Faire Metropole Ruhr e.V., coordinates work on the Fairtrade Towns and Fair Kindergartens campaign, is involved in the Federal Network for Fair

Procurement and works on various social and environmentally sustainable projects together with Dortmund's committed civil society.

This was evident, for example, at the DortBunt city festival, where more than 40 initiatives promoted their causes in a sustainability tent village.

This sustainability network meets twice a year to expand cooperation within the network and create synergies and will be an important network for the topics of the CCC.

Participatory processes for broader engagement

Citizen engagement processes in Dortmund are also designed to build systemic understanding beyond expert circles. Public events, district-level workshops, and educational programmes:

- Raise awareness about how individual behaviour connects to larger climate goals.
- Empower citizens to participate in shaping systemic solutions, such as local energy cooperatives or green mobility initiatives.
- Foster a sense of shared responsibility and mutual benefit among diverse social groups.

Institutional Learning and Capacity Building

Finally, Dortmund is investing in institutional learning by:

- Training municipal staff across departments on systemic thinking and climate mainstreaming.
- Strengthening cross-departmental coordination bodies to ensure ongoing dialogue and alignment.
- Embedding climate goals into existing administrative processes, budgets, and performance indicators.

Through this combination of structured dialogue, systemic tools, collaborative projects, participatory engagement, and institutional learning, Dortmund is building a collective understanding that bridges different perspectives and aligns all actors behind the shared goal of climate neutrality.

Dortmund is committed to establishing a robust and transparent system to monitor its progress toward climate neutrality. Monitoring the complex urban climate system requires a combination of quantitative data collection, systemic analysis tools, and governance mechanisms that ensure regular review and adaptive management.

Data collection needs and sources

To effectively track emissions reductions and systemic change, Dortmund collects and will continue to expand data across multiple sectors:

- **Energy consumption data** from grid operators and municipal utilities (electricity, district heating, gas), disaggregated by sector (residential, commercial, industrial).
- **Mobility and transport data**, including vehicle counts, modal shares, fuel consumption statistics, and emissions modelled using the TREMOD system.
- **Building Performance Data** from renovation programmes, energy certificates, and heating system replacements.
- **Waste Management Data** on recycling rates, residual waste volumes, and associated emissions.
- **Renewable energy production data** from solar PV installations, wind energy, and bioenergy plants within the city boundaries.
- **Climate Adaptation Indicators**, such as green space coverage, tree planting numbers, and flood risk maps.
- **Socio-economic data** to monitor the social dimension of the transition, including energy poverty rates and participation levels in climate initiatives.

These datasets are collected through existing administrative systems, cooperation with energy suppliers, transport operators, and waste management companies, as well as through new monitoring initiatives established under the CCC framework. At least once a year, various data on greenhouse gases are requested from municipal enterprises and the private sector. This data is transmitted to the RVR for the calculation of current GHG emissions. The private sector is interested in submitting data because most of them have ambitious climate neutrality goals and want to succeed. Monitoring the reduction is a central aspect of that progress.

Systemic monitoring tools

Dortmund employs advanced tools to monitor and analyse the systemic progress of its climate strategy:

- The **BISKO inventory system** provides standardised accounting of greenhouse gas emissions across sectors.
- The **TREMOD model** is used to calculate transport-related emissions with sector-specific granularity.
- The **ClimateView platform** serves as a dynamic, scenario-based tool that allows Dortmund to:
    - Track progress toward the 80 % emissions reduction target.
    - Visualise the impact of individual measures across the entire urban system.
    - Test different policy scenarios and adjust strategies based on performance.
    - Communicate progress transparently to stakeholders and citizens.

This combination of static inventories and dynamic system modelling ensures that Dortmund's monitoring system captures both emission reductions and systemic shifts, such as changes in mobility patterns or energy sources.

Analysis and governance of monitoring

Dortmund's monitoring system will be embedded in a broader governance and accountability structure:

- Regular progress reports will be produced, summarising emissions data, indicator trends, and the implementation status of CCC measures.
- A dedicated steering group within the city administration will review monitoring data and recommend adjustments to the action plan.
- Results will be presented to the Climate Council and the City Council to ensure political oversight and public accountability.
- Citizens will be informed through public dashboards, newsletters, and participatory events, fostering transparency and trust.

Enhancing monitoring capabilities

To strengthen its monitoring system, Dortmund plans to:

- Introduce an annual estimate-based reporting cycle to complement official data with timely projections.
- Expand monitoring to cover currently underrepresented areas such as Scope 3 emissions and land-use change impacts.
- Link climate monitoring with socio-economic indicators to ensure a just transition and identify vulnerable groups early on.
- Participate in EU-level monitoring initiatives and data-sharing platforms to align with European standards.

By building this comprehensive monitoring and analysis system, Dortmund ensures that its pathway to climate neutrality is data-driven, responsive, and capable of adapting to emerging challenges and opportunities.

Table 10: Stakeholder mapping based in System and Interest in city's climate ambitions (A 3.2)

A-3.2: Systems stakeholder mapping			
System	Stakeholders	Influence on the city's climate neutrality ambition	Interest in the city's climate neutrality ambition
Housing & Buildings	Spar- und Bauverein eG Dortmund	High	The Spar- und Bauverein eG Dortmund has set itself the goal of having a climate-neutral building stock by

			2045, thereby meeting the targets set by the German government.
Housing & Buildings	Vonovia SE	High	CO_2 intensity in existing buildings in Germany down from 33.0 kg to 31.7 kg CO_2 /m²
Housing & Buildings	DOGEWO21	High	To ensure that our housing stock meets the 2045 climate protection targets, we are working tirelessly on intelligent solutions for our neighbourhoods. At Kapellenufer in Sölde, extensive energy efficiency measures were initiated in 2023: the building shells were insulated with mineral wool and the heating system was centralised and converted to modern, resource-efficient air heat pumps. To ensure that heat stays in the house and CO_2 emissions are minimised, the basement ceilings were insulated and all the windows were replaced. The result is an improvement not only for the climate, but also for our tenants' living environment.
Housing & Buildings	Vivawest GmbH	High	We aim to transform both our building stock and our business operations to be climate-neutral by 2045.
Waste & Land use	EDG Entsorgung Dortmund GmbH	Medium	'Sustainability – Climate Effectiveness and Resource Efficiency' has initiated or already implemented important projects as an introduction to a sustainability strategy. These include • the determination of greenhouse gas emissions and the creation of a corporate carbon footprint (CCF) for the group of companies • Building on this, initial measures to reduce CO_2 emissions, such as the targeted conversion of the vehicle fleet to alternative vehicle drives, the expansion of PV systems or projects to generate energy from alternative energy sources such as biomass/waste wood • - a "Become a corporate climate protector now" campaign aimed at all employees and encouraging them to save energy with stickers, banners and competitions, for example

Waste & land use	Emschergenossenschaft (EG) and Lippeverband (LV)	Medium	The following seven fields of action are particularly important for the sustainable development of the associations: • Management of water resources according to the needs of present and future generations • Protection/restoration of near-natural watercourses with their many benefits for people • Improvement of resource efficiency/conservation • Preservation/promotion of biodiversity • Reduction of environmental pollution • Strengthening the resilience and adaptability of water management infrastructure • Occupational safety/health management
Waste & land use	GELSENWASSER AG	High	Two specific examples of our own business activities in accordance with the Scope 1 GHG Protocol (direct GHG emissions): We equip our sites with PV systems (target by 2027 electricity yield approx. 3,500 MWh/a) and efficient heating technology and use state-of-the-art, AI-based control technology in the waterworks area (1.7 t CO_2 e/a). We are also on the way to climate neutrality in terms of the emissions we directly cause from electricity procurement and grid losses (Scope 2 GHG Protocol). Since 2017, we have been purchasing green electricity for all GELSENWASSER AG consumption points. As a result, we are already achieving an 89 % reduction in CO_2 emissions. For Scopes 1+2, we will reduce our GHG emissions to 0 by 2035.
Energy	DEW21	High	We have set ourselves an ambitious target: We want to be climate-neutral by 2035!
Energy	Thyssengas	High	We want to operate our grid in a climate-neutral way by 2045, which is why we are already actively reducing methane and CO_2 emissions
Energy	DONetz	Medium	Dortmunder Netz GmbH (DONETZ) has taken a significant step towards sustainable energy technology.

Transport	VRR	Medium	We are committed to the Paris Climate Agreement and the climate path of the Federal Republic of Germany. Our goal: continuous CO_2 reduction until climate neutrality by 2045.
Transport	Flughafen Dortmund GmbH (Dortmund Airport)	High	Dortmund Airport has drawn up a climate protection strategy that includes ambitious targets: by 2030: Reduction of CO_2 emissions by 65 percent (compared to 2010) by 2045: CO_2 -neutral airport operations (within the direct sphere of influence) The focus is on avoiding and reducing the airport's own operational CO_2 emissions with the aim of achieving CO_2 -neutral airport operations. This is achieved with the help of technical measures in buildings, infrastructure, lighting, the vehicle fleet, energy consumption and energy supply. Dortmund Airport is implementing a large number of CO_2 -saving measures to reduce its CO_2 emissions.
Transport	Deutsche Bahn	Medium	Deutsche Bahn is setting all the signals for climate neutrality. The Group is bringing forward its previous target of 2050 by ten years – to 2040. This includes all areas of the railway in Germany as well as the global logistics subsidiary DB Schenker.
Transport	Dortmunder Stadtwerke Aktiengesellschaft (DSW21)	High	A healthy environment does not come about by chance, but from our joint action. That's why we're now moving towards the future with new e-buses! Our 'StromFahrer' are just waiting to take you into a climate-friendly future. As the electric bus fleet is fuelled with green electricity, you can get where you want to go cleanly – and help Dortmund achieve its climate targets.
Transport	H-Bahn-Gesellschaft Dortmund mbH (H-BAHN21)	High	In 1984, the Dortmund large-cabin suspension railway was the first driverless and unattended fully automatic transport system in Germany to meet all legal standards. Since then, it has had an availability rate of more than 99 per cent. During term time, around 7,000 passengers, most of them students, are transported emission-free on the 3.4-kilometre-long route network every day. It reaches top speeds of up to 50 km/h.

Industry	Deutsche Gasrußwerke	Indirect	Utilisation of waste heat to make district heating climate-neutral
Industry	WILO	Medium	The Wilo Group celebrates three sustainable milestones: The successful completion of the TüV certification as a 'climate-neutral company at the Dortmund site', the award of the Leadership in Energy and Environmental Design (LEED) Gold certification from the U.S. Green Building Council (USGBC) and the Gold certification from the German Sustainable Building Council (DGNB), both for the 'Pioneer Cube' administration building.
Industry	IHK Dortmund	High	Consultancy services for companies.
Industry	Chamber of Crafts, District Craftsmen's Association	High	In partnership with the Federal Office of Economics and Export Control (BAFA), the Kreditanstalt für Wiederaufbau (KfW), the NRW Energy Agency and the NRW Efficiency Agency, we arrange and support comprehensive consultations with subsidised funding: Energy efficiency consulting Production-integrated environmental protection Financing of energy-saving investments.
Technology & Innovation	ILS (Research Institute for Regional and Urban Development)	Medium	Research by aeroplane: 3D thermal images to advance climate protection in Dortmund.
Technology & Innovation	Technology Centre Dortmund GmbH	Medium	The areas of environmental technology include the measurement of pollutants and environmental damage on the one hand, waste disposal, water, soil, noise and radiation protection and the effective utilisation of renewable energies on the other. It also includes concepts and technical measures for environmentally friendly production, energy saving and the reduction of emissions and waste.
Technology & Innovation	FH Dortmund	High	Dortmund University of Applied Sciences and Arts wants to achieve climate neutrality by 2030 and thus fulfil the goals set jointly with the NRW state administration. The participation and integration of all university members and university departments are particularly important to us in the process.

Technology & Innovation	TU Dortmund	High	Taking 13 measures to combat climate change and its effects
Finance and business models	Dortmund Economic Development Agency (municipal enterprise)	High	With multiple networks and projects the topics of sustainability, circular economy and climate protection are promoted. For example with projects like Ökoprofit, DoZirkulär2030, CSR, bewusst wie e.V.
Finance and business models	Continentale Insurance	Medium	Environmental protection is playing an increasingly important role for Continentale. The four head office locations use 100 % green electricity. All other branches will follow suit in the future. We are also working on reducing energy consumption overall. This includes replacing light bulbs and IT hardware. We are gradually converting our vehicle fleet to hybrid and electric vehicles. We favour regional products in our company restaurants. In order to continue this trend in the future, we document our CO_2 emissions on an ongoing basis.
Finance and business models	Volkswohlbund	Medium	Sustainability is not just about environmental aspects. It also includes social and societal commitment – as well as corporate governance. We want to be fit for the future, create and maintain a balance, and always act responsibly. If something is sustainable, it is durable, sensible, preserving, conserving , and environmentally friendly.
Finance and business models	Signal Iduna	High	There are seven areas of action that form the basis for the SIGNAL IDUNA Group's sustainable activities and work. They interlock like clockwork to guide our actions both internally and externally. These fields are underpinned by long-term and short-term goals and linked to a total of 11 of the 17 United Nations Sustainable Development Goals (SDGs). In this way, we are supporting the transformation of the economy into a future worth living.
Finance and business models	Sparkasse Dortmund	High	Sparkasse Dortmund wants to contribute to preserving a future worth living and promotes suitable financial services for individuals and municipalities in their business to climate protection, e.g a portfolio of 300 Mio renewable energy loans. Furthermore, for its own operation the share of renewable energies are increased.

Governance, policy and regulation	Local Mobility Advisory Board	High	The Local Mobility Advisory Board, first established in 2016 and newly appointed in May 2021, is intended to effectively represent the nationwide goal of promoting local mobility in Dortmund as well. Local mobility stands for individual mobility, preferably on foot and by bicycle, but also with other non-motorised transport and movement options (e.g. inline skates or skateboards). The intention, also in terms of climate protection and health promotion, is to make non-motorised movement a 'natural' form of mobility again.
Governance, policy and regulation	City administration / committees	High	Municipal climate protection as the main topic to improve the quality of live for all inhabitants. All concepts and programmes of the city administration have a focus on climate protection and reducing emissions
Governance, policy and regulation	State Government of North Rhine-Westphalia	High	Setting the framework with target of climate neutrality and works together with the municipalities regarding funding programmes and possibilities for identifying financial solutions
Governance, policy and regulation	Climate Advisory Board	High	On 18 November 2021, the City Council of Dortmund decided to set up a Climate Advisory Board (hereinafter referred to as the Climate Council) as part of the Climate Protection and Climate Impact Adaptation. The inaugural meeting of the new, independent and advisory body of the Dortmund City Council took place on 4 May 2022. The members are proposed by the administrative management in consultation with interest groups and appointed by the city council. The Climate Council is also involved in the events organised by the separate Network Building committee.

3 Part B – Pathways towards Climate Neutrality by 2030

Part B represents the core of the CCC Action Plan, shaped by local authorities, local businesses and stakeholders, comprising the most essential elements: scenarios, strategic objectives, impacts, action portfolios and indicators for monitoring, evaluation and learning.

The systems of Dortmund and the stakeholder mapping described in chapter 2.3 Module A-3 are bow being revisited with regard to the following action portfolio in terms of specific obstacles and possible solutions.

Table 11: Interests/motivation, obstacles and possible solutions for different stakeholder systems

Systems	Interests/Motivation	Obstacles to (more) climate protection	Solution
Governance, policy and regulations	• Sustainability • Taking responsibility for the future of all • Implementation of laws and regulations • Secure and climate-neutral energy supply for the city • Conservation of resources • Attractive business location • Safe and attractive living space • Excellent science centre	• Lack of coordination between administrative units • Conflicting goals between climate protection and other tasks • Lack of flexibility in higher-level ordinances/regulations, e.g. public procurement law • Climate protection not a mandatory municipal task. No basic funding • Lack of financing	• participation at EU Mission and creating the CCC for Climate neutrality 2030 agreed by the council of Dortmund • Horizontal transition team • New governance structure Multiprocess management • Revision of the procurement guidelines and other relevant regulations • Committee work at state, federal and EU level • Climate protection anchored as a strategic goal in the municipal budget • Strategic projects staff unit for the acquisition of third-party funds
Industry and Commerce	• Secure energy supply • Stable electricity and energy prices • Energy self-sufficiency • Resource efficiency	• Bureaucracy, lengthy authorisation procedures • Legal hurdles, e.g. building law, parking space regulations	• Acceleration of authorisation procedures • Promotion of sustainable measures • Energy concepts for industrial estates

	• Competitiveness • Competitive advantage • Compliance with laws and regulations, e.g. CSRD report • Attractiveness for customers • Securing skilled labour	• inflexible regulations • High costs • Long ROI times	• Setting up an impulse and steering group for regular dialogue between business, administration and politics • Representation of interests in committees and networks (like Ökoprofit or Business Breakfast)
Technology and Innovation: Science and Research	• Excellent research • Developing solutions for major societal challenges • Attractive university location --> Student acquisition • Training the intellectual elite of tomorrow • Translation of the results into business	• No investment funds from the state • Pendencies of state government and state authorities • Limited decision-making authority • different research focus	• Close co-operation between universities and city administration • Joint research projects, e.g. for heat planning • Regular exchange in advisory boards/committees
Industry and Commerce: Retail	• Attractive and lively (inner) city • Good accessibility • Low basic costs • Secure and cost-effective energy supply • High quality of stay	• Lack of capital • Official requirements, e.g. monument protection	• Guideline City 2030 • Establishment of the City Management
Waste and Landuse: Agriculture	• Future security • competitive food production • Climate resilience • Compliance with (subsidy) regulations, e.g. individual climate accounting	• Climate protection often associated with high investment costs • Organic farming ekes out a niche existence • Price structure for food in the retail trade	• Nutrition Council Dortmund and Region e.V. on agriculture and nutrition with stakeholders, politicians and administration
Civil Society: Pupils / students	• A future worth living and free of fear • Climate protection as a core political objective • Excellent training • liveable, attractive city	• Ignorance of own levers and possibilities • Shifting responsibility to the older generation	• Education for Sustainable Development (ESD) programme • Offers from the VHS and other educational institutions

			• Workshops with schools regarding topics of climate protection
Senior citizens	• A future worth living • Stable prices and costs • Mobility • Independence	• Insufficient knowledge, as offers are often only available digitally • Shifting responsibility to the next generation(s) • Lack of financial resources	• Advice on neighbourhood offices • Subsidies/grants for age-appropriate conversions • Subsidies/grants for energy-efficient refurbishment • City of short distances
Employees/ Commuters	• Fast and reliable routes • Good accessibility of the workplace • future-proof employer • Attractive (working) environment	• Inadequate public transport services • Inadequate cycling infrastructure	• Optimisation of construction site planning • Public transport expansion • Improving cycling infrastructure (velo routes, parking possibilities) • Implementation of the cycling decision • Expansion of P&R services • Expansion of urban greenery
Inhabitants	• High quality of life • Lively and open city • Good transport infrastructure • Reliability of politics and administration • Secure future • Stability in costs and supply • Orientation and planning security • High resilience of the overall system • Participation	• No information on the topic • Misinformation • Information overload has a paralysing effect • Lack of guidelines for own actions, e.g. CO handprint2 • No role models for climate protection • Progress in climate protection not communicated • Other topics are more important • Fear of the future / resignation • Lack of capital	• Masterplan Mobility • Climate campaign / Homepage • Climate Agency • Monitoring tool for climate protection measures • Strategies for energy supply, heat planning • Binding targets, e.g. for the expansion of district heating • Exchange platforms, e.g. on voluntary initiatives • Solar/heat pump parties • Counselling services for citizens • Participation portal, Citizens' Council

3.1 Module B-1 Climate Neutrality Scenarios and Impact Pathways

Module B-1 "Climate Neutrality Scenarios and Impact Pathways" lists and describes impact pathways, early and late outcomes, and direct and indirect impacts with[19] s (co-benefits) according to and adapted from the NetZeroCities Theory of Change and the CCC Action Plan Guidance – clustered by fields of action.

- List of impact pathways, selected from or inspired by the NetZeroCities Theory of Change, including early and late outcomes (strategic objectives) and levers of change structured along the fields of action.
- Descriptions of the impact pathways, summarising their relationship with key priorities and strategic interventions and with the analysis developed in Part A

[19] The NetZeroCities Indicator Framework, a set of indicators for monitoring direct and indirect impacts of the impact pathways, may be useful when selecting impacts, as can the numerous factsheets available in the Knowledge Repository on the NZC Portal.

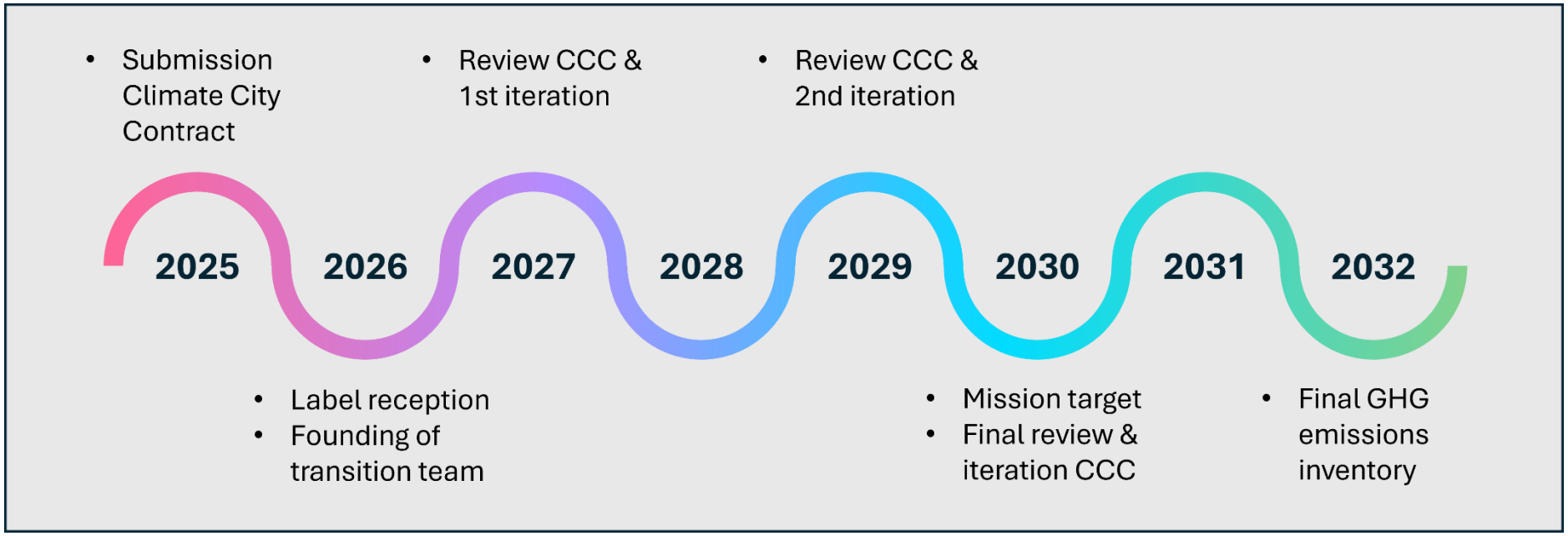

Figure 5: Timeline for the CCC until 2032

The Timeline shows the most important milestones of the implementation phase. The impact of the measures taken by the municipal group, all stakeholders and citizens on the reduction of GHG emissions is monitored on an ongoing basis (chapter 3.3). The following table provides a better overview of the fields of action with their respective systemic levers, early changes, late outcomes, direct and indirect impacts.

Table 12: Impact Pathways based on the fields of actions with corresponding emission reductions and indirect impacts (B 1.1)

B-1.1: Impact Pathways					
Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions)	Indirect impacts (co-benefits)

Buildings & Heating	• Standards, legislation and regulation • Financing and funding • Innovation and technology development • Co-operation and networks • Market design • Public awareness and participation	• Efficient buildings campaign • Increasing sustainable building through guidance, outreach, best-practice showcases, etc. • Optimisation of building energy control • Replacement of inefficient heating circulation pumps at Klinikum Mitte (hospital) • Introduction of cross-location energy management in the older existing buildings with successive conversion to new technologies at SIGNAL IDUNA group • Creation of an energy utilisation plan for the City of Dortmund – focus on heat supply • Preparation of municipal heat planning • Advice of energy-efficient refurbishment for private stakeholders by Climate Agency	• Climate-neutral building stock of municipal buildings • Expansion of renewable local heating networks • Climate-neutral district heating 2035 – heat supply expansion and conversion in Dortmund • 'we.do' – hydrogen electrolyser at Dortmund harbour • Transformation of DOGEWO21's property portfolio towards a climate-neutral portfolio • Cold local heating network for supply of the buildings in the zoo Dortmund	1,070 kt CO_2 e	• Healthy living quality • Healthy working conditions • Increasing the value of properties • Creation of jobs • Regional added value • Fair use of raw materials

Electricity	• Financing and funding • Innovation and technology development • Public awareness and participation	• Campaign for the use of photovoltaics • Installation of intelligent streetlights • exchange of lighting in streetlights to LED • LED conversion of apron lighting • Installation of a photovoltaic system on the Alte Str. 77 property • Installation of a photovoltaic system on the property Deusenerstr. 136 • Installation of a photovoltaic system on the property Oberste-Wilms-Str. 13 • Installation of a photovoltaic system on the property Sunderweg/Dechenstr. • Photovoltaic system at Dortmund North Hospital • Photovoltaic system Klinikum Mitte (hospital) • LED conversion of sound sails at the Dortmund Concert Hall • LED conversion of spotlights at the Dortmund Concert Hall • Installation of photovoltaic systems at the head office of VOLKSWOHL BUND in Dortmund	• Installation of PV systems • PV on own buildings and individual urban railway stations • Ground-mounted photovoltaic system at the Dortmund-Nordost landfill site • Photovoltaic systems expansion at the Dortmund University of Applied Sciences and Arts • Second-life PV system at the Dortmund Concert Hall	857 kt CO_2 e	• Independence from fossil fuels for energy supplies • Creation of jobs • Regional value creation • Pollution control

Transport	• Standards, legislation and regulation • Financing and funding • Innovation and technology development • Co-operation and networks • Public awareness and participation	• Bicycle network priorities • Bicycle parking priorities • Parking space management by space category • Special parking spaces and disabled parking spaces • Speed limit of 30 • Green traffic lights for cyclists • Fleet management City of Dortmund – electric vehicles • Fleet management for municipal utilities • EDG cleaning vehicles • Green charging lanterns • Conversion of the vehicle fleet to alternative drive systems (primarily electric) • B-car project (34 new trams and 64 retrofits of old vehicles) • EDgo2 / acquisition of four battery-powered small sweepers • Low-emission mobility / purchase of three battery-electric light lorries <3.5 Mg	• Operational mobility management – W2W • Conversion of the bus fleet to emission-free drives • conversion of the vehicle fleet to alternative drive systems (DSW21) • Development of 15 locations into mobility hubs with approx.. 300 intelligent charging points to realise CO_2 -neutral commuting and digitalisation of fleet processes	729 $ktCO_2$ e	• Promoting job creation in the public transport sector • Clean air • Less noise pollution • More road safety, fewer serious accidents • Increase in value of properties along formerly busy roads • improved quality of stay in public spaces • healthy living conditions

		• Low-emission mobility / purchase of battery-electric commercial vehicles in classes N1, N2 & N3 • Charging stations for e-mobility • Bicycle shelters with charging stations • Bicycle shelter at Dortmund Central Hospital			
Waste	• Standards, legislation and regulation • Innovation and technology development • Co-operation and networks • Public awareness and participation	• Smart waste bins • Local recycling cycle in Dortmund – utilisation of by-products from mushroom cultivation • Utilisation of industrial by-products from agriculture and forestry – for the sustainable production of mushroom substrate • Energy saving campaign and waste campaign – sufficiency strategies in the professional and university environment	• Do-zirkulär (WiFö) (rethink, reduce, reuse, recycle concept) • Study of the use of reusable solutions at events in Dortmund	27 kt CO_2e	• Strengthening the local economy • Healthy living conditions

Other/AFOLU	• Standards, legislation and regulation • Financing and funding • Innovation and technology development • Co-operation and networks • Market design • Public awareness and participation	• Activation of citizens for climate protection • Activation for private capital for climate protection • Dortmund network for climate protection (KEK) • Climate protection in Dortmund's economy • Local and regional production and marketing • Climate-friendly, healthy foods in municipal facilities • Sustainable agriculture (network and campaign) • Education for climate-friendly, sustainable nutrition • The Dortmund CO_2 calculator (Klix3) • Support of the Schulte-Tigges educational farm – planting an agroforestry system with subsequent permaculture • Print Green – ecological printing inkjet systems • Supraraum – details are the city (network) • Establishing pesticide-free mushroom cultivation	• Information portal 'Air Quality' & Information Gathering – Measurement Network for Air Quality and Bioclimatic Parameters & Analysis and Forecasting of Air Pollution in Urban Areas • Network in the harbour area • North connection KV II plant, Franz-Schlüter-Straße	235 kt CO_2e	• Strengthening the local economy • Creation of jobs • Regional value creation • Pollution control • Healthy living quality • Fair use of agricultural resources

3.2 Module B-2 Climate Neutrality Portfolio Design

Module B-2 "Climate Neutrality Portfolio Design" contains a project description for each action planned in the CCC Action Plan. These actions include interventions targeted at creating/enhancing carbon sinks to address residual emissions.

The Net Zero Planner was used to calculate reductions in different action fields, and the Planner's instructions were followed. The reduction per action field are referring to the assumptions in the Planer. It wasn't possible to quantify the specific reductions for the majority of actions during the creation of the CCC. It will therefore be a high priority for the transition team to increase the amount of reduction for each action, because accurate monitoring requires this data.

- A table of planned interventions grouped per field of action, including interventions by local businesses and industry (B-2.1).
- An outline of each action. The table contains all information for implementation (e.g. topic, kind of intervention, emission sector, scope, allocation, responsible actors, GHG reduction by gases and estimated costs), including interventions aimed at addressing residual emissions (incl. carbon sinks) (B-2.2).
- A summary of the actions and impact planned to address residual emissions (B-2.3).

3.2.1 Buildings & Heating

Although it is not possible to specify a concrete renovation rate for Dortmund, the national average is less than 1 %. By 2024, this figure will have fallen further still compared to 2023 (from 0.7 % to 0.69 %). The most common work carried out is window renovation, followed by roof renovation and finally façade renovation[20]. Renovation and energy-efficient refurbishment are given high priority in Dortmund. Around 80 % of Dortmund's housing stock is over 40 years old, indicating a high need for renovation. Therefore, the City of Dortmund is taking action in several areas to increase the renovation rate.

Analysis of buildings & heating related emissions show a baseline emission of 1,464 kt CO_2e in 2019. Based on NetZeroPlaner projections, the building and heating sector is expected to reduce emissions by 1,070 kt CO_2e by 2030, corresponding to a 73 % reduction. These reductions are recorded in the following subsectors: Building renovations (142 kt CO_2e), New energy-efficient buildings (7 kt CO_2e) and decarbonizing heating generation (921 kt CO_2e). The following measures, among others, are considered to be the strongest influence on this reduction: Preparation of municipal heat planning (BH10), Consultation on energy-efficient refurbishment for private stakeholders by Climate Agency (BH11) and Creation of an energy utilisation plan for the City of Dortmund - focus on heat supply (BH13). The measurable effect

[20] BuVEG, n. d., Sanierungsquote [renovation rate]

of individual actions is determined by specific indicators, as shown in Chapter 3.3 (Economic Indicators).

The Dortmund Energy Use Plan serves as a data-driven and georeferenced basis for decision-making for all stakeholders in Dortmund's energy transition – from the city administration and energy supply companies to private and commercial building owners (BH 14, BH 11). The first version of the ENP focuses on the heating sector, as heat provision accounts for more than half of the energy-related greenhouse gas emissions in Dortmund.

The ENP/KWP is designed as a long-term instrument to be continuously updated, with revisions planned every two years. Future updates will focus more intensively on the electricity, cooling and hydrogen sectors and will incorporate socio-economic and urban planning aspects more strongly. A monitoring system will be introduced to track the energy status of Dortmund's building stock and measure implementation progress.

The findings and information from the ENP/KWP model are intended to be easily accessible and usable for the work of the city administration, political bodies, energy supply companies, and the public. A key component of the results presentation is a web-based geoinformation application. Furthermore, Dortmund plans to select pilot areas with different focuses to test measures and transfer the findings to the entire city area.

Although the heat plan is a strategic instrument with no direct legal effect on individuals (Section 23 (4) WPG), it provides an expert basis for sensible heat supply options and concrete steps towards the heat transition.

The main goals and contents of the ENP/KWP include:

Inventory analysis: A comprehensive survey of current heat and energy demand and consumption, greenhouse gas emissions, and existing infrastructure (gas and heating networks). This also includes information on building types, construction age brackets, and their energy condition.

Potential analysis: Identification of potential for energy savings (e.g. through building refurbishment) and the use of renewable energies such as local waste heat (from industry, commerce, sewer systems and sewage treatment plants), solar energy, and shallow and deep geothermal energy.

Development of a Target Scenario: Creation of a target scenario for a climate-neutral energy supply by Dortmund's target year of 2035 and the federal law's target of 2045. This includes a spatially detailed description of the future supply structure, including the designation of areas suitable for heating networks and individual supply solutions. Currently, **32 areas** are being examined for their suitability for heating networks.

Measures and Implementation Strategy: Derivation of concrete measures and a strategic roadmap to achieve climate neutrality. This includes identifying and prioritising key areas for energy-efficient refurbishment and the spatial positioning of centralised and decentralised energy supply technologies.

Communication and citizen participation: The results will be made available to the public, including through an interactive map and a heating guide on the website **dortmund.de/wärme**. The city is planning information campaigns to showcase alternatives and support citizens in their renovation decisions.

The ENP/KWP is led and implemented by the Environment Agency of the City of Dortmund. External support is provided by Dortmunder Energie- und Wasserversorgung GmbH (DEW21) as the main contractor, together with its subcontractors greenventory, DoData, and DONETZ. Numerous other municipal departments and external stakeholders, such as housing companies, energy suppliers, trade associations, and chambers of commerce, are closely involved.

Project Duration and Status: Preliminary work for the ENP began in the summer of 2022, with the official project launch in February 2023. The Municipal Heat Plan (KWP), which has been integrated into the ENP, must be established for large cities like Dortmund by 30 June 2026 at the latest, in accordance with the German Heat Planning Act (WPG). A political resolution on the heat plan by the Dortmund City Council is an essential foundation for the implementation of the recommended actions and measures.

Table 13: Overview of Savings in the Sector "Buildings & Heating" with Subsectors

Buildings & Heating	Subsector	Savings in 2030 (kt CO_2 /a)
	BH 1 Building renovations	142
	BH 2 New energy-efficient buildings	7
	BH 3 Decarbonising heating generation	921
	Total	**1070**

Table 14: Overview of Measures for the sector "Buildings & Heating"

Measure	Title	BH1	BH2	BH3
BH 01	Climate-neutral building stock of municipal buildings	■	■	■
BH 02	Efficient buildings initiative		■	
BH 03	Increasing sustainable construction	■	■	■
BH 04	Expansion of renewable local heating networks		■	■
BH 05	Climate-neutral district heating 2035 - heat supply expansion and conversion in Dortmund		■	■
BH 06	'we.do' - Hydrogen electrolysis Dortmund			■
BH 07	Transformation of the property portfolio towards a climate-neutral portfolio	■		■
BH 08	Optimisation of building energy control (Airport)		■	■
BH 09	Replacement of inefficient heating circulation pumps		■	■

BH 10	Preparation of municipal heat planning			
BH 11	Consultation on energy-efficient refurbishment for private stakeholders by Climate Agency			
BH 12	Introduction of cross-location energy management in the older existing buildings with successive conversion to new technologies			
BH 13	Creation of an energy utilisation plan for the City of Dortmund - focus on heat supply			
BH 14	Location development at WILO SE – Construction of the Wilopark			

B-2.2: Individual action outlines BH 01		
Action outline	Action name	Climate-neutral building stock of municipal buildings
	Action type	Governance and policy
	Action description	The project aims to systematically transform Dortmund's municipal buildings and those of its city-owned companies into a climate-neutral building stock. As a public role model, the city intends to take immediate action by developing clear building guidelines aligned with the principles of climate-neutral and sustainable construction. A key component is the creation of renovation roadmaps for individual buildings, outlining the required measures and investment needs to achieve climate neutrality. These will feed into a citywide implementation plan with milestones. Initially, ten major construction projects will be planned and executed to climate-neutral standards to build experience and establish best practices. To reduce CO_2 emissions—of which 71 % in 2018 were attributed to the municipal building stock—the project targets a 50 % reduction by 2030 through energy-efficient renovations and switching to renewable heating systems. This goal also applies to the city-owned companies. All new construction projects over €10 million are expected to meet recognized sustainability certification standards (e.g. BNB, DGNB), while smaller projects must apply equivalent sustainability criteria. Fossil-fuel heating

		systems (e.g. gas) will no longer be installed, and a replacement program for existing systems is recommended, potentially through contracting solutions (e.g. with DEW21). To coordinate efforts, a strategic forum will be established among key stakeholders to define a shared understanding of climate neutrality, develop building standards, and set binding targets, emissions factors, and data requirements.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Standards, legislation and regulation Financing and funding Innovation and technology development Cooperation and networks
	Outcome (according to module B-1.1)	Energy conservation, Decarbonisation of the energy supply
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Note: Real estate office, property management
	Action scale & addressed entities	Property office, property management, Municipal subsidiaries and own operations, DOGEWO21
	Involved stakeholders	Department for City Planning and Building Regulations, Municipal subsidiaries and own companies, DOGEWO21, DEW21
	Comments on implementation – consider mentioning resources, timelines, milestones	The initial steps include assessing the municipal building stock regarding structural condition, energy supply, and GHG reduction potential through energy-efficient or climate-neutral renovation and energy system conversion. Individual renovation roadmaps and an overarching implementation plan will be developed. A coordination forum will be established, involving key stakeholders from municipal property offices, public companies, and external experts to align the overall renovation strategy, focusing on renewable energy, implementation monitoring, and knowledge exchange. A building guideline for new construction and renovation will be created, based on sustainable building principles. Additionally, ten climate-neutral building projects (both new and renovated) will

		be planned, implemented, and evaluated to inform future strategies.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	As of 2018, the City of Dortmund's CO_2 emissions amount to approx. 68,210 tonnes of CO_2 equivalent, of which approx. 71 %, or 48,437 tonnes of CO_2 /a, are attributable to existing buildings. By systematically refurbishing the existing buildings and converting the heat supply to renewable energy sources, a savings potential of 50 %, or around 24,000 tonnes of CO_2 equivalent, is considered realistic by 2030. The municipal subsidiaries should also aim to save 50 % of emissions through refurbishment and the conversion of the heat supply.
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Internal administrative expenses (analysis of the building stock, organisation and monitoring of the forum, monitoring of construction measures) For the analysis of individual buildings or the preparation of individual reports, approx. 8,000 euros (depending on the size and complexity of the building) can be assumed for refurbishment concepts (without funding). The BAFA funding programme for energy consulting for non-residential buildings, plants and systems can be used for refurbishment concepts, with which 80 % of the costs for refurbishment concepts up to 8,000 euros are funded. Based on an average cost of 1,500 euros per building to be analysed (taking into account a subsidy for the consultation or, in individual cases, significantly simplified consultations), a cost of 750,000 euros can be assumed for 500 buildings. The development of the overall refurbishment concept and the building guidelines is expected to cost around 100,000 euros.

		Expert support for the forum is expected to cost around 50,000 euros.

B-2.2: Individual action outlines BH 02		
Action outline	Action name	Efficient buildings initiative
	Action type	Governance and policy
	Action description	The "Efficient Buildings Initiative" aims to improve energy efficiency and reduce CO_2 emissions in Dortmund's residential and non-residential buildings. The city supports this through targeted campaigns, consulting services, and planning tools. A key component is the expansion of the municipal Energy Efficiency and Climate Protection Service Center (Climate Agency, formerly dIze), which provides independent advice to homeowners and professionals, promotes climate-friendly renovations, and coordinates outreach activities. Campaigns focus on switching to renewable heating systems and increasing the use of solar energy. The initiative also includes neighborhood-based approaches, cooperation with chambers and associations, and the use of planning law to promote climate-neutral construction in new developments. A monitoring system tracks progress and helps adapt strategies. The long-term goal is a climate-neutral building stock by 2050.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Standards, legislation and regulation Financing and funding Innovation and technology development Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Energy conservation, Decarbonisation of the energy supply, expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.

		Private sector: Companies that are responsible for operational implementation. Note: Environment Agency, Climate Agency, Department for City Planning and Building Regulations
	Action scale & addressed entities	Citizens / Homeowners, Housing associations, Craft businesses, Dortmund companies and other operators of non-residential buildings
	Involved stakeholders	Craft businesses, External construction experts, Communication agencies, Chambers and associations of the economy, Representatives of larger properties in Dortmund such as BLB NRW, university, technology centre, etc.
	Comments on implementation – consider mentioning resources, timelines, milestones	The project focuses on expanding the Climate Agency into a central competence centre with monitoring capabilities and an interdisciplinary construction advisory service. A network of planners, craftsmen, and consultants will be established to improve outreach to property owners and enhance the quality of energy renovation measures. Neighbourhood concepts and management structures will be developed or expanded. External service providers and marketing agencies will support communication efforts. Targeted strategies for non-residential buildings will be created in cooperation with like-minded stakeholders such as planning offices, businesses, chambers, and associations. Climate protection measures aiming for climate neutrality will be anchored in urban land-use planning and beyond.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	The current GHG emissions of all residential buildings in Dortmund are around 1.15 million tonnes of CO_2 equivalent (around 86 % of emissions from private households). According to the German government's 2030 climate protection programme, at least 66 % of CO_2 emissions in the building sector are to be reduced by 2030 compared to 1990 levels. Applied to the City of Dortmund, around 651,000 tonnes of CO_2 still need to be saved in

		residential buildings by 2030. This would correspond to a saving of 57 %. As a more realistic, but nevertheless very ambitious target, a saving of 40 % is assumed for residential buildings in a joint analysis with non-residential buildings. This corresponds to a saving of around 458,000 tonnes of CO_2 equivalent. The current GHG emissions of all non-residential buildings in Dortmund are around 650,000 tonnes of CO_2 equivalent. As a rule, 50 % of emissions in the business sector (trade, commerce, services), in Dortmund 1,294,000 tonnes of CO_2 equivalent as of 2018, are attributable to buildings. In line with the federal government's targets, this would result in potential savings of 40 % by 2030, i.e. 260,000 tonnes of CO_2 equivalent.
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	For the expansion and remodelling of the Climate Agency, personnel costs of around 5 employees and a budget of around 300,000 euros per year for material costs must be assumed. For external services, the Climate Agency requires an additional budget of 100,000 euros per year for external building consultations and 100,000 euros per year for marketing. For the implementation of subsidised neighbourhood refurbishment concepts (KfW Programme 432), the city has an annual own contribution of 40,000 euros for three projects at the same time. For the support of the measures in the neighbourhoods by neighbourhood or refurbishment managers, it is assumed that each neighbourhood will cost around 120,000 euros/a to 150,000 euros/a. The costs for refurbishment managers can also be funded via the KfW 432 programme at 75 % for up to 3 years with a maximum of 210,000 euros (if extended to 5 years with a maximum of 350,000 euros).

		The Climate Agency requires an additional budget of 150,000 euros/a for the implementation of projects in the non-residential building sector.

B-2.2: Individual action outlines BH 03		
Action outline	Action name	Increasing sustainable construction
	Action type	Governance and policy
	Action description	This project aims to anchor sustainable construction as a central pillar of climate protection in Dortmund. Since buildings account for around 40 % of global greenhouse gas emissions across their lifecycle, the promotion of resource-efficient, low-emission, and socially responsible building practices is crucial. The municipal Climate Agency drives the initiative by providing guidance and outreach, especially in the private and non-residential sectors. Public construction projects (e.g. schools, daycares) serve as transparent model examples. The city promotes sustainable materials like timber and integrates sustainability criteria into urban development contracts. The initiative involves local businesses, trades, and planners through training, competitions, and best-practice showcases—helping position Dortmund as a hub for sustainable building innovation.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Standards, legislation and regulation Financing and funding Innovation and technology development Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Resource conservation and reduction of emissions
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.

		Private sector: Companies that are responsible for operational implementation. Note: Environment Agency, Climate Agency, Department for City Planning and Building Regulations, Economic Development Agency
	Action scale & addressed entities	Dortmund companies / private building owners, Ownership of non-residential buildings, Business associations, Construction stakeholders (architects, tradespeople, building trade, building energy consultants), Housing industry, property developers in housing construction
	Involved stakeholders	Planners, tradespeople, Construction industry, Business associations, IHK, HWK, Representatives of larger properties in Dortmund such as BLB NRW, University, Technology Centre, among others
	Comments on implementation – consider mentioning resources, timelines, milestones	First steps: The city will define municipal standards for sustainable building, alternatively applying the national BNB (Sustainable Building Assessment System) to public construction projects. A concept will be developed to integrate sustainable building practices into municipal construction and urban planning—e.g. via urban development contracts. The city will fully leverage its influence to ensure future residential areas are developed to be climate-neutral and sustainable, with mandatory certification and a 50 % reduction in resource use compared to conventional construction. An information strategy will be implemented, including continuous public outreach and training opportunities. Sustainable building will become a key topic in economic development, and initial implementations will be evaluated for further improvement.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Certified buildings show that the goals of sustainable construction, ecology, social issues and the economy are not contradictory, but can be harmonised.

		Average CO_2 savings in certified office buildings (DGNB, BNB) (compared to reference buildings) are around 12 kg of CO_2 equivalents per square metre of net floor area (NGF) and year. With almost 300 certified new office buildings, this corresponds to an annual saving of more than 53,000 tonnes of CO_2 equivalents per year. Just under 5 million m² GFA of new office space has been certified to date (source: DGNB, as at 2018) The exact savings potential for Dortmund depends on construction activity.
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Responsible person at Climate Agency, Expenditure for external services such as consultancy, support for certification by a coordinator and additional engineering services. Approximately 150,000 euros per building can be assumed for the certification of new buildings. For 10 buildings, the costs correspond to 1.5 million euros.

B-2.2: Individual action outlines BH 04		
Action outline	Action name	Expansion of renewable local heating networks
	Action type	Technical intervention, Infrastructure
	Action description	To advance the local heat transition, Dortmund is focusing on expanding innovative district heating networks based on renewable energy sources. These systems are intended to provide climate-friendly heat to neighbourhoods, commercial areas, and public institutions. The Climate Protection Coordination Office will moderate this process, identify potential areas, advise stakeholders, and support access to funding. Pilot projects, such as the network in Hacheney, and partnerships with key actors like DEW21 and DOGEWO21, serve as models. The goal is to supply at least half of DOGEWO21's buildings with climate-neutral heat by 2030 and to promote additional renewable heating networks across the city.
	Field of action	Buildings & Heating

Reference to impact pathway	Systemic lever	Standards, legislation and regulation Financing and funding Innovation and technology development Cooperation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Decarbonisation of energy supply, Decarbonisation of district heating
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Private sector: Companies that are responsible for operational implementation. Note: Environment Agency
	Action scale & addressed entities	Properties owned by the city and municipal Subsidiaries, Housing companies
	Involved stakeholders	Climate Agency, DEW21 and other energy supply companies, DOGEWO, Representatives of the municipal subsidiaries and housing associations
	Comments on implementation – consider mentioning resources, timelines, milestones	First Implementation Steps Establish a coordination group with representatives from the Environmental Office, Department for City Planning and Building Regulations, municipal subsidiaries, the Climate Agency, DEW21, and housing companies. Accelerate progress by launching pilot projects—especially with the municipal real estate sector and DOGEWO—and by promoting best practices. Align efforts closely with the development of the Energy Utilization Plan (ENP).
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Replacement of fossil fuels
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable

	Total costs and costs by CO_2 e unit	Resources Required: One full-time staff position €20,000 per year for operational/material costs

B-2.2: Individual action outlines BH 05		
Action outline	Action name	Climate-neutral district heating 2035 - heat supply expansion and conversion in Dortmund
	Action type	Infrastructure, Technical intervention
	Action description	To achieve a climate-neutral heat supply in Dortmund by 2035, DEW21 is implementing a comprehensive transformation strategy based on three key pillars: **Conversion from Steam to Hot Water:** The traditional steam-based district heating system, in place since the 1950s, has been replaced by a modern hot water system. This shift allows the use of industrial waste heat from Deutsche Gasrußwerke (DGW), enabling the closure of the gas-powered Dortmund CHP plant in September 2022. As a result, annual CO_2e emissions have already been reduced by approximately 45,000 tonnes. **Network Expansion:** DEW21 is constructing a 20-kilometre, low-loss hot water network to supply Dortmund's city centre with sustainable heat. This decision replaces the costly renovation of the outdated steam network and ensures broader access to environmentally friendly heat for residents and businesses. **Generation and Storage Development:** To ensure long-term sustainability, DEW21 is exploring various renewable heat sources, including geothermal energy and the use of municipal material flows. A hydrogen electrolysis project is also underway to decarbonise grey gas. Additionally, seasonal heat storage and regional geothermal storage solutions are being evaluated to improve efficiency and flexibility.

		Together, these efforts form a cornerstone of Dortmund's energy transition and climate protection strategy.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Financing and promotion Innovation and technology development Market design Public awareness and participation
	Outcome (according to module B-1.1)	Decarbonisation of energy supply, Decarbonisation of district heating, expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Dortmunder Energie- und Wasserversorgung GmbH, Deutsche Gasrußwerke, EDG
	Action scale & addressed entities	The entire population: Raising awareness and education on climate protection issues.
	Involved stakeholders	Start-ups and technology providers: Innovation and technical solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	The project is being implemented in three key steps: The switch from steam to hot water enabled the use of industrial waste heat and the shutdown of a gas-fired power plant. A new 20-kilometre hot water network now supplies the city center with efficient, climate-friendly heat. Additionally, DEW21 is developing renewable heat sources, hydrogen solutions, and storage technologies to ensure long-term supply security.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [45,000]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [297 million euros]

B-2.2: Individual action outlines BH 06		
Action outline	Action name	'we.do' - Hydrogen electrolysis Dortmund
	Action type	Infrastructure; Technical intervention
	Action description	DEW21 is planning to build an electrolyser at Dortmund harbour. The electricity for the electrolysis is to be supplied from wind and PV energy from Dortmund sources. DEW21 will use the existing spherical gas storage facility to optimise the utilisation of the green electricity sources in order to be able to supply the hydrogen as required. Part of the H2 volume is supplied to an industrial partner and utilised by DEW21's district heating DEW21 feeds the waste heat from electrolysis and from the industrial partner's production process into its district heating network and can therefore supply Dortmund customers with green heat. In addition, further customers from industry and mobility are being acquired for the additional H2 volumes.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Financing and promotion Innovation and technology development
	Outcome (according to module B-1.1)	Expansion of renewable energies, Decarbonisation of district heating
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Note: As a local energy supplier within the DSW21 Group, DEW21 is responsible for the climate-friendly energy supply of Dortmund's citizens.
	Action scale & addressed entities	The entire population: sensitisation and education on climate protection topics. Specific target groups such as young people, companies or farmers, depending on the focus of the measure. Note: The project enables us to produce and supply almost CO_2 -free heat. The entire population of Dortmund benefits from the reduction of greenhouse gases through the project. In addition, we would like to attract and

		inspire further customers from industry and mobility to use hydrogen as an energy source. This will then lead to a further reduction in the CO_2 balance for the city as a whole, but also to a reduction in the balance for our industrial customers.
	Involved stakeholders	Financial institutions: Provision of financial resources for sustainable projects. Note: The financial partners are currently being requisitioned and have not yet been finalised.
	Comments on implementation – consider mentioning resources, timelines, milestones	DEW21 is developing the "we.do" project in stages, with the electrolyser at Dortmund harbour scheduled for commissioning in the next few years. Local wind and solar energy will power the system, while the existing gas storage ensures flexible hydrogen supply. Key milestones include integration into district heating, use by industrial partners, and expansion to mobility and industrial customers. Waste heat from electrolysis and production will feed into the heating network, supporting Dortmund's green heat transition.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [not yet quantified]
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Saving of greenhouse gas emissions in tonnes of CO_2 equivalent [approx. 10000 t/a]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [double-digit millions]

B-2.2: Individual action outlines BH 07		
Action outline	Action name	Transformation of the property portfolio towards a climate-neutral portfolio
	Action type	Infrastructure ; Technical Intervention
	Action description	In the majority of the portfolio, energy is generated for the production of hot water and space heating by burning fossil fuels either in the company's own plants or by supplying third

		parties. This energy generation is to be converted to climate-neutral energy generation. To this end, additional properties are to be connected to the district heating network of the municipal energy supplier, local heating supply concepts are to be implemented in neighbourhoods where appropriate, and heat pump technologies are to be used when replacing central heating systems and when converting individual gas boilers. These measures will be flanked by upgrading the building envelope as required.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Standards, legislation and regulation Funding and promotion Innovation and technology development Co-operation and networks
	Outcome (according to module B-1.1)	Decarbonisation of energy supply
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: DOGEWO21, energy suppliers, craft enterprises, technology partners
	Action scale & addressed entities	Tenants, DOGEWO21
	Involved stakeholders	Financial institutions: Provide financial resources for sustainable projects. Educational institutions: Research support and knowledge exchange. Start-ups and technology providers: Innovation and technical solutions. Note: KfW, Bank NRW, financial institutions, TU Dortmund, EBZ, IW.2050 e.V., housing industry associations, etc.
	Comments on implementation – consider mentioning resources, timelines, milestones	The transformation of the property portfolio is being rolled out step by step. Fossil-based heating systems are gradually replaced with climate-neutral solutions, including connections to the municipal district heating network, local heating concepts, and heat pump technologies. When heating systems are upgraded, building envelopes are also improved where necessary. Key milestones

		include systematic property assessments, integration into existing heat networks, and the phased replacement of gas-based systems.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Reduction of greenhouse gas emissions in tonnes of CO_2 equivalent [Reduction of GHG emissions from around 30,000 t p.a. (average 2014-2016) to around 12,000 t p.a. in 2045. Climate pathway is currently being drawn up, so a total figure cannot currently be given].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [Currently not possible to state with certainty. Influencing factors are: general price development of construction services, availability of materials and skilled labour, speed of innovation among technology partners. Expected to be in the high three-digit million range [EUR] Running costs (operation, maintenance, etc.): [Currently not possible to state with certainty. Influencing factors are: Development of the generation and distribution costs of renewable energy sources, development of the technical service life of installed technologies, availability of skilled labour]

B-2.2: Individual action outlines BH 08		
Action outline	Action name	Optimisation of building energy control (Airport)
	Action type	Technical intervention
	Action description	Introduction of predictive building control (heating, cooling, electricity)
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Financing and promotion Innovation and technology development

	Outcome (according to module B-1.1)	Electricity saving, Decarbonisation of energy supply
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Responsibility for implementation lies with the airport
	Action scale & addressed entities	Airport
	Involved stakeholders	Financial institutions: Providing financial resources for sustainable projects. Start-ups and technology providers: Innovation and technical solutions. Note: Cooperation with MeteoViva
	Comments on implementation – consider mentioning resources, timelines, milestones	The optimisation is being implemented through the rollout of predictive building control systems for heating, cooling, and electricity. Using data-driven algorithms, these systems anticipate energy needs and adjust operations in real time. Key steps include system integration, pilot testing, and gradual deployment across the property portfolio to increase efficiency, reduce emissions, and lower operating costs.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [845 MWh p.a.] Expected savings: Heat/gas consumption: 22 per cent (>700,000 kWh p.a.) Cooling: 18 per cent (>109,000 kWh p.a.) Electricity: 2 per cent (>30,000 kWh p.a.) Amortisation: 2.2 years, with BEG subsidy: 1.9 years
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [211 to CO_2 p.a.].
	GHG emissions compensated (natural or technological sinks)	Not applicable

	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [Investment volume of EUR 195,650 plus approx. EUR 7,000 for LoRaWAN infrastructure] Running costs (operation, maintenance, etc.): [3,710 EUR/month]

B-2.2: Individual action outlines BH 09		
Action outline	Action name	Replacement of inefficient heating circulation pumps
	Action type	Technical intervention
	Action description	50 year old and inefficient pumps were identified at Klinikum Mitte. These are being replaced with high-efficiency pumps.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Decarbonisation of energy supply, Expansion of renewable energy, Energy efficiency
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation. Note: GeHaTec company
	Action scale & addressed entities	Klinikum Mitte
	Involved stakeholders	Klinikum Mitte, Companies for building heat pumps
	Comments on implementation – consider mentioning resources, timelines, milestones	**Audit & Identification (Completed):** 50 inefficient pumps identified during a technical inspection at Klinikum Mitte. **Procurement Phase (Completed):** Selection and acquisition of high-efficiency replacement pumps. **Installation Phase (Ongoing):** Step-by-step replacement of old pumps without disrupting hospital operations. **Completion & Commissioning (Planned):** Full installation and operational start of all pumps by [insert expected date]. **Monitoring & Evaluation (Planned):** Post-installation performance review to verify energy savings and efficiency gains.

Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [100 MWh/a]
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [27,4]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [100.000 €] Ongoing costs (operation, maintenance, etc.): [no additional costs]

B-2.2: Individual action outlines BH 10		
Action outline	Action name	Preparation of municipal heat planning
	Action type	Governance and Policy
	Action description	The Municipal Heat Plan is a strategic planning tool that focuses on the heating sector. It assesses the current situation and local potential to produce a tailored catalogue of measures. Developed in line with federal and state requirements and based on the energy utilisation plan (BH 14), the Plan guides investment decisions, but does not have direct legal effect. Integrating with other municipal planning instruments supports coordinated, efficient action towards a secure, climate-neutral and cost-effective heat supply.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Standards, legislation and regulation
	Outcome (according to module B-1.1)	Decarbonisation of energy supply, Decarbonisation of district heating
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Private sector: Companies responsible for operational implementation. Note: City of Dortmund, Dortmunder Energie- und Wasserversorgung GmbH

	Action scale & entities addressed	Urban community and urban area
	Stakeholders involved	Civil society: NGOs and environmental organisations as strategic partners in conception and implementation. Start-ups and technology providers: Innovation and technical solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	As part of the municipal heat planning process, a communication strategy for the City of Dortmund's heat transition is also being developed, covering both design and implementation.
Impact & cost	Generated renewable energy (if applicable)	Not as a strategy itself. Its subsequent implementation will reveal possibilities. The strategy has not yet been finalised
	Removed/substituted energy, volume, or fuel type	See above
	GHG emissions reduction estimate (total) per emission source sector	See above
	GHG emissions offset (natural or technological sinks)	See above
	Total costs and costs per CO_2 e unit	Initial costs (installation, acquisition, etc.): approx. 180.000 € Ongoing costs (operation, maintenance, etc.): [confidential]

B-2.2: Individual action outlines BH 11		
Action outline	Action name	Consultation on energy-efficient refurbishment for private stakeholders by Climate Agency
	Action type	Consultation
	Action description	The new Climate Agency Dortmund serves as the central contact point for private homeowners seeking advice on energy-efficient refurbishment. Evolving from the former Energy Efficiency and Climate Protection Service Center, the Climate Agency at Freistuhl 7 offers expanded services, expert guidance, and support on climate protection, sustainability, and funding opportunities. In addition to personalized consulting on energy

		modernization and relevant subsidies, the agency initiates projects, builds networks, and provides digital tools to actively promote the climate-friendly transformation of private properties.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Standards, legislation and regulation Financing and promotion Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Electricity savings, Decarbonisation of energy supply, energy conservation
Implementation	Responsible bodies/person for implementation	Environment Agency
	Action scale & entities addressed	Homeowners, Companies
	Stakeholders involved	Environment Agency, climate agency, Economic development agency
	Comments on implementation – consider mentioning resources, timelines, milestones	The Climate Agency builds on the Climate Agency's expertise with expanded staff, partnerships, and a new consultation center at Freistuhl 7. Key resources include digital tools like the solar cadaster and heat planning map. Implementation is phased: relocation and service expansion completed, new projects and networks ongoing. Milestones include opening the consultation center, launching the craftsmen network, and developing educational programs. The agency aims to increase consultation capacity and engagement by 2026 to support Dortmund's climate goals.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable

	Total costs and costs per CO_2 e unit	Not applicable

B-2.2: Individual action outlines BH 12		
Action outline	Action name	Introduction of cross-location energy management in the older existing buildings with successive conversion to new technologies
	Action type	Conservation of resources
	Action description	At the Dortmund head office of SIGNAL IDUNA Group, the old gas burners in the central heating systems are gradually being converted to low condensing boilers - electronic controllers are also being installed. Three appliances have already been replaced in 2019/2020. Further measures are planned.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Standards, legislation and regulation Funding and promotion Innovation and technology development
	Outcome (according to module B-1.1)	Energy conservation
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation. Note: The SIGNAL IDUNA Group is primarily responsible for the implementation and carries it out independently
	Action scale & addressed entities	SIGNAL IDUNA Group
	Involved stakeholders	Companies for implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	The project leverages existing technical teams and facility management at SIGNAL IDUNA's Dortmund head office. Initial replacements of gas burners with low condensing boilers and electronic controllers began in 2019/2020, with three units already upgraded. Further phased conversions are planned over the coming years. Key milestones include completion of initial replacements, ongoing installation of control systems, and full modernization of heating systems to improve efficiency and reduce emissions.

Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [approx. 2,780,000 kWh natural gas savings p.a. (comparison 2020 vs. 2023)]
	GHG emissions reduction estimate (total) per emission source sector	Savings of greenhouse gas emissions in tons of CO_2 equivalent [656 tons savings p.a. (comparison 2020 vs. 2023)]]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, purchase, etc.): [We have spent € 575,471 on three devices so far]

B-2.2: Individual action outlines BH 13		
Action outline	Action name	Creation of an energy utilisation plan for the City of Dortmund - focus on heat supply
	Action type	Governance and policy
	Action description	An important building block for Dortmund's energy transition is the Energy Utilisation Plan (ENP), which is intended to create the basis for a city-wide strategy for the energy transition. In particular, the ENP includes municipal heat planning and also scenarios for future power supply and hydrogen utilisation. In addition, a transformation plan will show what needs to be done on the way to a climate-neutral heat supply in Dortmund in 2035. It thus forms an important building block with which Dortmund's dependence on fossil fuels can be gradually reduced in a concrete action plan. The project is being implemented under the leadership of the City of Dortmund's Environment Agency. Support is being provided by Dortmunder Energie- und Wasserversorgung GmbH (DSW21) and the expertise of the Freiburg-based company greenventory.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Standards, legislation and regulation

		Funding and promotion Innovation and technology development Co-operation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Decarbonisation of energy supply, Decarbonisation of district heating
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Private sector: Companies responsible for operational implementation. Note: City of Dortmund, Dortmunder Energie- und Wasserversorgung GmbH
	Action scale & addressed entities	The entire population: Raising awareness and education on climate protection issues.
	Involved stakeholders	Civil society: NGOs and environmental organisations as strategic partners in conception and implementation. Start-ups and technology providers: Innovation and technical solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	The Energy Utilisation Plan (ENP) is developed under the City of Dortmund's Environment Agency, with key support from DSW21 and expert consultancy from greenventory. Resources include municipal data, technical expertise, and stakeholder engagement. The project follows a structured timeline with milestones such as initial data collection and analysis, scenario development for heat, power, and hydrogen supply, and the creation of a detailed transformation roadmap. The ENP aims to be completed in phases, providing clear action steps toward a climate-neutral heat supply by 2035 and guiding Dortmund's gradual reduction of fossil fuel dependence.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable

	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [confidential] Ongoing costs (operation, maintenance, etc.): [confidential]

B-2.2: Individual action outlines BH 14		
Action outline	Action name	Location development at WILO SE – Construction of the Wilopark
	Action type	Technical intervention
	Action description	The Wilopark in southern Dortmund serves as WILO SE's new headquarters, combining ecological and economic sustainability with flexibility and space efficiency. On the northern side, the "Factory" offers an innovative, light-filled production building and ample parking. To the south, the "Pioneer Cube" administrative building shapes the city's southern skyline, acting as Dortmund's new "gateway" and providing employees with modern, ergonomic workspaces designed for both focused and collaborative tasks. Sustainability is central to the Wilopark's design. Energy recovery, intelligent building control, and comprehensive energy monitoring reduce annual energy consumption by around 40 % and cut CO_2 emissions by 3,500 tons. Built to DGNB Gold and LEED Gold standards, the buildings maximize natural daylight while meeting high energy efficiency criteria. Rainwater from outdoor areas and over 70,000 m² of rooftops is collected for irrigation, cooling, and controlled discharge into the nearby Pferdebach. Traffic flows have been reorganized, with separate routes for logistics and improved public transport access to the site's central hub, the Focus.
Reference to impact pathway	Field of action	Buildings & Heating
	Systemic lever	Innovation and technology development
	Outcome (according to module B-1.1)	Energy efficiency, Energy conservation, Decarbonisation of energy supply, Reducing emissions of transport, shift to public transport

Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Wilo SE
	Action scale & addressed entities	Wilo SE, Employees Business activities of WILO SE, as well as raising awareness among WILO SE employees of sustainable and energy-efficient construction, among other things.
	Involved stakeholders	Educational institutions: Research support and knowledge exchange. Notes : University of Wuppertal, Faculty of Architecture and Civil Engineering
	Comments on implementation – consider mentioning resources, timelines, milestones	Implementation required close coordination of planning, construction, and commissioning phases, with clearly defined milestones for design approval, structural completion, and system integration. Key resources included specialized engineering teams, sustainable construction materials, and advanced building technologies. Timelines were aligned with environmental certification processes, ensuring DGNB and LEED compliance. Regular progress reviews and stakeholder updates kept the project on track and enabled timely adjustments to meet sustainability and operational goals.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in percent [200]
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [8,703] Reduction in energy consumption of buildings or industrial plants in percent [29.4]
	GHG emissions reduction estimate (total) per emission source sector	Greenhouse gas emissions saved in tonnes of CO_2 equivalent (mandatory information) [7,799]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Energy cost savings [€2,600,760]

3.2.2 Electricity

Dortmund has established ambitious targets for the energy transition, and is making progress in several areas of the expansion of renewable energies.

The city is experiencing dynamic growth in solar energy:

- Since 1992, the number of photovoltaic systems installed has exceeded 14,800, with a collective output in excess of 144 MW as of the close of 2024.
- In 2024, 45.7 MW of new capacity was installed, placing the city second in North Rhine-Westphalia.
- Dortmund has been found to lead the national ranking of large cities in terms of the number of PV systems per 1,000 inhabitants.
- Furthermore, demand for small 'balcony power plants' is increasing, with over 3,600 devices already registered.

Baseline emissions for the electricity sector amounted to 1,019 kt CO_2e in 2019. NetZeroPlaner modelling projects that emissions will be reduced by 857 kt CO_2e by 2030, equating to an 84 % reduction. This reduction is achieved across subsectors, namely efficient lighting & appliances (154 kt CO_2e) and decarbonization electricity generation (703 kt CO_2e). To enable these outcomes, measures including the campaign for the use of photovoltaics (E 01), the PV installation on municipal buildings and tram stations (E 07), and the Energy Cooperation04 – Making Energy Transition easy (E 21) have been identified as critical. Their impact is tracked by dedicated performance indicators, as detailed in Chapter 3.3. (Economic Indicators).

Energy Cooperation and Campaign for photovoltaic

The significance of civil participation and acceptance in relation to climate protection activities has been repeatedly emphasised. In Dortmund, a robust civil authority in the domain of electricity is already in operation, promoting the energy transition and, by extension, the reduction of emissions independently. Bürger Energie eG is a cooperative that was registered in February 2024 with the objective of installing photovoltaic systems on the roofs of Dortmund (E 21). The systems can be procured and installed using the members' shares and bank loans based on these shares. In addition to financial resources, the cooperative requires roof space that is suitable for the systems. In accordance with the implementation of the municipal contract, the City of Dortmund has expressed its intention to provide support to the cooperative's projects. This support will be focused on the creation and exploitation of synergy effects through the city's own campaign for photovoltaics (E 01). The cooperative's activities represent a significant catalyst within the broader context of international collaboration with other Mission Cities. Further potential can be identified through exchanges with similar projects in other mission cities, and financial opportunities can be explored via the Capital Hub.

Exchange of streetlights

The replacement of street lighting (E 03) is a prime example of a highly effective measure for reducing electricity consumption. Since 2017, the City of Dortmund has been undertaking a programme of replacement of the old lights in the city area with LED digital radio lights. This has involved the removal of over 40,000 old lights. The measure is scheduled for completion by 2027, with the installation of the new lighting systems, which are to be completed by 2024, resulting in a 47 % reduction in annual energy consumption. Concurrently, the environmental impact and light pollution are being mitigated, and the novel technology exhibits a reduced incidence of malfunctions and necessitates minimal repair.

Table 15: Overview of savings in the sector 'Electricity' with subsectors

Electricity	Subsector	Savings in 2030 (kt CO_2 /a)
	E 1 Efficient lighting and appliances	154
	E 2 Decarbonising electricity generation	703
	Total	**857**

Table 16: Overview of measures in the sector 'Electricity'

Measure	Title	E1	E2
E 01	Campaign for the use of photovoltaics		
E 02	Installation of intelligent streetlights		
E 03	Exchange of Lightning in streetlights to LED		
E 04	LED conversion of apron lighting (Airport Dortmund)		
E 05	PV installation aircraft hangar (Airport Dortmund)		
E 06	PV installation administration building (Airport Dortmund)		
E 07	PV installation on municipal buildings and tram stations (DSW21)		
E 08	Installation of a photovoltaic system on the Alte Str. 77 property		
E 09	Installation of a photovoltaic system on the property - Deusenerstr. 136		
E 10	Installation of a photovoltaic system on the property - Oberste-Wilms-Str. 13		
E 11	Installation of a photovoltaic system on the property - Sunderweg/Dechenstr.		
E 12	Ground-mounted photovoltaic system		
E 13	CO_2e Emissions of the City of Dortmund through the Emschergenossenschaft and Lippeverband for the Concerns of the (Wastewater) Industry		
E 14	Expansion of PV systems at Dortmund University of Applied Sciences		
E 15	Photovoltaic system at Dortmund North Hospital		

E 16	Photovoltaic system Dortmund Hospital gGmbH		
E 17	Second-life PV system at the Dortmund Concert Hall		
E 18	LED conversion of sound sails at the Dortmund Concert Hall		
E 19	LED conversion of spotlights at the Dortmund Concert Hall		
E 20	Installation of photovoltaic systems at the Volkswohlbund head office in Dortmund		
E 21	Energy Cooperation - Making the energy transition easy		

B-2.2: Individual action outlines E 01		
Action outline	Action name	Campaign for the use of photovoltaics
	Action type	Campaign
	Action description	The "Campaign for the Use of Photovoltaics" aims to significantly increase the use of solar energy in Dortmund. Despite high technical potential, only about 2–3 % of suitable roof and open spaces are currently being utilized. This campaign seeks to change that through mandatory installation of PV systems on municipal buildings, collaboration with local trades to ensure installation capacity, targeted outreach to businesses, and support for citizens. Further components include the promotion of tenant electricity models, the use of existing state-level initiatives, and the creation of a best-practice database. The overall goal is to build a decentralized, climate-friendly, and future-oriented energy supply in Dortmund.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Private sector: Companies that are responsible for operational implementation.

		Note: Environment Agency
	Action scale & addressed entities	Department for Municipal Properties, Housing cooperatives, Citizens, Trade and industry
	Involved stakeholders	Department for Marketing + Communication, DEW21, Solar engineers/guild for electrical engineering, Climate Agency
	Comments on implementation – consider mentioning resources, timelines, milestones	Initial Implementation Steps Adopt a resolution mandating PV on suitable municipal roofs. Identify key communication barriers across target groups. Prepare and tailor information for different audiences. Develop new implementation models, e.g. DEW21 installs and operates systems for housing companies. Define communication channels, including print, digital, events, and service centers (e.g. Climate Agency).
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Implementation of PV projects with the aim of utilising 30 % of the existing potential by 2030 (309,816 t CO_2 /a). This means a future energy yield of 595 GWh/a with an installed capacity of 838 MWp. For this output, around 8,380,000 m² of roof or open space will be required for the expansion of photovoltaics.
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Costs for a research assistant, cost estimate: 82,964 euros from 2022, 85,150 euros from 2023, 87,193 euros from 2024, 89,286 euros from 2025, (to implement this measure, around 30 % FTE or around 70 ATs/a) and 100,000 euros/a for campaign materials

B-2.2: Individual action outlines E 02		
Action outline	Action name	Installation of intelligent streetlights
	Action type	Technical intervention, Infrastructure
	Action description	As part of its smart city strategy, the City of Dortmund is implementing intelligent street lighting systems that combine cutting-edge digital radio technology with adaptive lighting controls and motion sensors. The system enables safe and energy-efficient lighting of public spaces at night while minimizing unnecessary light emissions. By adapting to actual user presence and local conditions, the city is achieving an advanced level of sustainable light management. Key Components of the Project: Adaptive Lighting (Dynamic "Running Light") Intelligent motion sensors trigger lighting only where and when needed. This system has been installed along 8 pedestrian and bicycle paths, covering a total length of more than 14 kilometers. It improves safety while significantly reducing energy use and light pollution. Light-on-Demand via Mobile App With the "Light Switch" app, event organizers and facility operators at 4 key locations can directly control lighting systems. This allows individual, real-time adjustment of lighting conditions to suit specific events and usage needs.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development Cooperation and networks
	Outcome (according to module B-1.1)	Energy conservation, promotion of biodiversity
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Notes: The project is led by the City of Dortmund. Implementation was carried out in cooperation with:

		Municipal utilities and technical service providers IT and Smart City Team Local event organizers and facility operators
	Action scale & entities addressed	The project was implemented at selected high-priority locations across the city, focusing on eight pedestrian and bicycle pathways totaling over 14 kilometers, as well as four designated public event and facility areas equipped with app-based lighting control. The initiative addressed the needs of a wide range of entities, including: Pedestrians and cyclists, benefiting from increased nighttime safety through adaptive lighting Event organizers and facility operators, who gained direct control of lighting infrastructure via the "Light Switch" app
	Stakeholders involved	City of Dortmund (project leadership and coordination) Municipal utilities and energy providers Event organizers and facility operators
	Comments on implementation – consider mentioning resources, timelines, milestones	The City of Dortmund is implementing intelligent street lighting using existing urban infrastructure and advanced digital technologies. Key resources include adaptive motion sensors, digital radio control systems, and the "Light Switch" app for user interaction. The rollout follows a phased approach: initial installation along 8 pedestrian and bicycle paths (over 14 km) is completed, with ongoing integration at key event locations. Milestones include full operational deployment of adaptive lighting, app-based control activation, and continuous monitoring to optimize energy savings and user safety. This project supports Dortmund's smart city goals and sustainable urban development.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable

	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Not applicable

B-2.2: Individual action outlines E 03		
Action outline	Action name	Exchange of Lightning in streetlights to LED
	Action type	Technical intervention, Infrastructure
	Action description	The City of Dortmund has implemented a comprehensive modernization program to replace outdated street lighting systems with state-of-the-art LED radio-controlled luminaires. Since 2017, the proportion of these LED smart lights has risen rapidly, reaching 86 % by 2024. In total, 42,000 conventional luminaires have been replaced, positioning Dortmund as the leading German city in terms of the number of installed smart LED streetlights. This renewal provides significant benefits for residents, the environment, and municipal operations: Improved Infrastructure and Safety The replacement of aging streetlights has eliminated traffic hazards caused by insufficient structural stability. Additionally, repositioning lamp posts has improved access to properties and driveways. Enhanced Urban Quality of Life The new LED technology significantly reduces light pollution and environmental impact, supporting insect protection. The intelligent lighting adapts to actual requirements, thereby lowering unnecessary illumination. Operational Efficiency and Cost Reduction Modern, reliable technology leads to fewer malfunctions, faster repairs, and reduced operating costs—even in times of rising energy prices. Annual energy consumption has been reduced by 9.15 million kWh (equivalent to 47 %), while connected load decreased by 1.3 MW (29 %).

		Citizen-Centric Added Value With the largest fleet of smart LED luminaires in Germany, Dortmund sets a benchmark for innovative and sustainable urban infrastructure. Residents benefit from safer streets, modern lighting comfort, and cost-efficient energy use. This project exemplifies Dortmund's strategy to combine climate protection, digital transformation, and citizen-oriented urban development.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development
	Outcome (according to module B-1.1)	Energy conservation
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Notes: The project was implemented under the responsibility of the City of Dortmund, in cooperation with municipal utilities and specialized contractors. Relevant departments of the city administration oversaw planning, coordination, and quality assurance.
	Action scale & entities addressed	The project was implemented citywide across Dortmund, focusing in particular on densely populated residential areas with high lighting requirements. The initiative addressed a broad range of stakeholders, including: Residents and property owners, who benefit directly from improved lighting quality and safety Local businesses and service providers affected by infrastructure upgrades Municipal departments responsible for urban development, traffic safety, and environmental protection Utility companies involved in the operation and maintenance of the lighting systems
	Stakeholders involved	City of Dortmund (project leadership and coordination)

		Municipal utilities and energy providers Specialized contractors and service companies Residents and local communities Local businesses impacted by infrastructure changes Environmental and conservation organizations Departments responsible for traffic safety, urban development, and public space management
	Comments on implementation – consider mentioning resources, timelines, milestones	The project was carried out over several years, beginning in 2017 and progressing in defined stages. A clear timeline and milestone planning ensured effective coordination and transparency throughout the process. Significant resources were allocated to the initiative, including substantial financial investments in procurement of modern LED radio-controlled luminaires, technical infrastructure upgrades, and workforce training. Milestones included the systematic replacement of existing lighting, reaching the 50 % LED coverage mark, and achieving an 86 % share of LED smart lights by 2024.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	The conversion of 42,000 conventional streetlights to energy-efficient LED smart luminaires has resulted in a substantial reduction in electricity consumption and associated greenhouse gas (GHG) emissions. Energy Sector (Electricity Use – Street Lighting): Annual Energy Savings: 9.15 million kWh Estimated CO_2 Reduction: Approx. 3,700–4,200 tons CO_2 per year* *(depending on the electricity emission factor used, e.g. 0.4–0.46 kg CO_2/kWh)*
	GHG emissions offset (natural or technological sinks)	Not applicable

	Total costs and costs per CO_2 e unit	The total investment for the street lighting modernization project amounted to approximately €3.2 million, co-funded by the Federal Ministry for Economic Affairs and Climate Action. Annual Energy Savings: 9.15 million kWh Estimated Annual CO_2e Reduction: approx. 3,700–4,200 tons CO_2e *(based on an average electricity emission factor of 0.4–0.46 kg CO_2/kWh)* Assuming an average lifespan of 15 years for the LED infrastructure: Total Estimated CO_2e Reduction over 15 years: → ~55,500–63,000 tons CO_2e Cost per ton of CO_2e reduced (over 15 years): → €50–€58 per ton CO_2e

B-2.2: Individual action outlines E 04		
Action outline	Action name	LED conversion of apron lighting (Airport Dortmund)
	Action type	Technical intervention, Infrastructure
	Action description	Conversion of the apron lighting to LED technology.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development
	Outcome (according to module B-1.1)	Energy conservation
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Responsibility for implementation lies with the airport
	Action scale & addressed entities	Airport Dortmund
	Involved stakeholders	Financial institutions: Providing financial resources for sustainable projects. Start-ups and technology providers: Innovation and technical solutions.
	Comments on implementation – consider	The LED conversion of apron lighting at Dortmund Airport is being executed using

	mentioning resources, timelines, milestones	existing electrical infrastructure and LED lighting technology suppliers. The project follows a clear timeline with phases for planning, procurement, installation, and testing to minimize operational disruption. Key milestones include completion of pilot installations, full replacement of all apron lights, and verification of energy savings and improved lighting quality. This upgrade reduces energy consumption and maintenance costs while enhancing airport safety.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [250T€]

B-2.2: Individual action outlines E 05		
Action outline	Action name	PV installation aircraft hangar (Airport Dortmund)
	Action type	Technical intervention
	Action description	Installation of PV systems at the Aircraft hangar. Generating station energy of 338,550 kWh/year and PV Generator output of 351.1 kWp
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Financing and promotion Innovation and technology development
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Responsibility for implementation lies with the airport

	Action scale & addressed entities	Airport Dortmund
	Involved stakeholders	Financial institutions: Providing financial resources for sustainable projects. Start-ups and technology providers: Innovation and technical solutions. Note: Cooperation with DEW21
	Comments on implementation – consider mentioning resources, timelines, milestones	The installation of PV systems on the aircraft hangar at Dortmund Airport is planned in collaboration with experienced solar technology providers. Key resources include structural assessments, procurement of solar panels, and skilled installation teams. The project timeline includes site preparation, system installation, and commissioning phases to ensure minimal disruption to airport operations. Milestones involve completion of structural checks, installation of panels, and connection to the local grid. This measure supports the airport's renewable energy goals and reduces its carbon footprint.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [203 to CO_2 e p.a.].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [Investment volume of EUR 451,000]

B-2.2: Individual action outlines E 06		
Action outline	Action name	PV installation administration building (Airport Dortmund)
	Action type	Technical intervention
	Action description	Installation of PV systems at the Administration building : Generating station energy of 54,415 kWh/year and PV Generator output of 60 kWp
	Field of action	Electricity

Reference to impact pathway	Systemic lever	Innovation and technology development
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Responsibility for implementation lies with the airport
	Action scale & addressed entities	Airport Dortmund
	Involved stakeholders	Financial institutions: Providing financial resources for sustainable projects. Start-ups and technology providers: Innovation and technical solutions. Note: Cooperation with DEW21, Specialized contractors and service companies
	Comments on implementation – consider mentioning resources, timelines, milestones	The installation of PV systems on the administration building at Dortmund Airport involves coordination with solar technology experts and facility management. Key resources include structural analysis, procurement of photovoltaic panels, and certified installers. The project timeline covers site preparation, panel installation, and system commissioning to ensure smooth operation without impacting daily activities. Milestones include completion of structural assessments, installation of PV modules, and successful grid integration. This initiative contributes to the airport's sustainability targets by increasing on-site renewable energy generation.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [25.6 to CO_2 e p.a.].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [Investment volume of EUR 114,600]

B-2.2: Individual action outlines E07		
Action outline	Action name	PV installation on municipal buildings and tram stations (DSW21)
	Action type	Technical intervention
	Action description	Equipping buildings of DSW21 at the depots with PV as well as individual light rail stops where possible.
Reference to impact pathway	Field of action	Energy systems
	Systemic lever	Standards, legislation and regulation Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Note: Municipal enterprise DWS 21
	Action scale & addressed entities	The entire population: Raising awareness and education on climate protection issues.
	Involved stakeholders	City of Dortmund, DSW21, Specialized contractors and service companies
	Comments on implementation – consider mentioning resources, timelines, milestones	DSW21 is implementing PV installations on its depot buildings and select urban railway stations where structurally feasible. The project utilizes internal facility teams alongside external solar specialists. Key steps include site assessments, panel procurement, and phased installation to avoid service disruptions. Milestones include completing structural evaluations, installing PV systems on priority sites, and integrating generated power into existing energy management. This initiative supports DSW21's commitment to increasing renewable energy use and reducing operational emissions.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [59 % by the end of the measure 08. 2027]
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [1.87 MWh by the end of the measure 08.2027]

	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [1,091 t CO_2 equivalent by the end of the measure 08.2027]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [approx. € 2.7 million] Ongoing costs (operation, maintenance, etc.): [135.000 €]

B-2.2: Individual action outlines E 08		
Action outline	Action name	Installation of a photovoltaic system on the Alte Str. 77 property
	Action type	Technical intervention
	Action description	The existing roof areas of the property, which are suitable for accommodating photovoltaic modules due to their geometry, static conditions and lighting situation, were equipped with a photovoltaic system for the purpose of generating renewable energy.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	Company EDG Holding GmbH
	Involved stakeholders	City of Dortmund, EDG, Specialized contractors and service companies
	Comments on implementation – consider mentioning resources, timelines, milestones	The photovoltaic system was installed on the suitable roof areas of Alte Str. 77, based on structural and lighting assessments. Key steps included planning, procurement, and installation, completed with minimal disruption. This system increases on-site renewable energy generation and supports sustainability goals.

Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [In addition to the existing systems, the installed PV capacity was increased by 41 %].
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [9.89 MWh]
	GHG emissions reduction estimate (total) per emission source sector	Saving of greenhouse gas emissions in tonnes of CO_2 equivalent [An energy saving of 9.89 MWh is equivalent to saving approx. 4.95 tonnes of CO_2].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [135,000 € net]

B-2.2: Individual action outlines E09		
Action outline	Action name	Installation of a photovoltaic system on the property - Deusenerstr. 136
	Action type	Technical intervention
	Action description	The existing roof areas of the property, which are suitable for accommodating photovoltaic modules due to their geometry, static conditions and lighting situation, were equipped with a photovoltaic system for the purpose of generating renewable energy.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	Company EDG Holding GmbH
	Involved stakeholders	City of Dortmund, EDG, Specialized contractors and service companies
	Comments on implementation – consider	A photovoltaic system was installed on the suitable roof areas of Deusenerstr. 136 following structural and lighting evaluations. The project included planning, equipment procurement,

	mentioning resources, timelines, milestones	and installation, ensuring efficient integration. This installation enhances renewable energy generation on-site and contributes to sustainability objectives.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [In addition to the existing systems, the installed PV capacity in the company was increased by 9 %].
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [6.68 MWh]
	GHG emissions reduction estimate (total) per emission source sector	Saving of greenhouse gas emissions in tonnes of CO_2 equivalent [An energy saving of 6.68 MWh is equivalent to a saving of approx. 3.34 CO_2].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [27,000 euros net]

B-2.2: Individual action outlines E 10		
Action outline	Action name	Installation of a photovoltaic system on the property - Oberste-Wilms-Str. 13
	Action type	Technical intervention
	Action description	The existing roof areas of the property, which are suitable for accommodating photovoltaic modules due to their geometry, static conditions and lighting situation, were equipped with a photovoltaic system for the purpose of generating renewable energy.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	Company EDG Holding GmbH

	Involved stakeholders	City of Dortmund, EDG, Specialized contractors and service companies
	Comments on implementation – consider mentioning resources, timelines, milestones	The photovoltaic system was installed on the structurally suitable roof areas of Oberste-Wilms-Str. 13 after thorough assessment. The project involved planning, procurement, and installation phases, completed efficiently to maximize renewable energy production on site.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [In addition to the existing systems, the installed PV capacity in the company was increased by a further 36 %].
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [10.09 MWh]
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [An energy saving of 10.09 MWh is equivalent to a saving of approx. 5.045 tonnes of CO_2].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [398,000 euros net]

B-2.2: Individual action outlines E 11		
Action outline	Action name	Installation of a photovoltaic system on the property - Sunderweg/Dechenstr.
	Action type	Technical intervention
	Action description	The existing roof areas of the property, which are suitable for accommodating photovoltaic modules due to their geometry, static conditions and lighting situation, were equipped with a photovoltaic system for the purpose of generating renewable energy.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies

Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	Company EDG Holding GmbH
	Involved stakeholders	City of Dortmund, EDG, Specialized contractors and service companies
	Comments on implementation – consider mentioning resources, timelines, milestones	A photovoltaic system was installed on the structurally suitable roof areas of the Sunderweg/Dechenstr property. The project included site assessment, equipment procurement, and installation, successfully increasing on-site renewable energy generation.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [In addition to the existing systems, the installed PV capacity in the company was increased by 163 %].
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [539 MWh]
	GHG emissions reduction estimate (total) per emission source sector	Saving of greenhouse gas emissions in tonnes of CO_2 equivalent [An energy saving of 539 MWh is equivalent to saving approx. 269.5 tonnes of CO_2].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [678,000 € net]

B-2.2: Individual action outlines E 12		
Action outline	Action name	Ground-mounted photovoltaic system
	Action type	Technical intervention
	Action description	At the Dortmund-Northeast landfill site, there is an area of around 8 hectares that does not need to be used for landfill operations for the next 25 years. A photovoltaic system is to be installed here. In cooperation with DEW21 and with the expected approval of the Arnsberg district government, a pilot project is being developed to utilise the area to generate renewable energy during ongoing landfill operations.

Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and technology development Cooperation and networks
	Outcome (according to module B-1.1)	Expansion of renewable energies, energy conservation
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	The entire population: Raising awareness and education on climate protection issues.
	Involved stakeholders	Educational Institutions: Research Support and Knowledge Exchange. Note: As part of a course at the University of Applied Sciences Ruhr West (Prof. Dr. Michael Römmich), students were assigned an Excel case study focusing on photovoltaic (PV) systems at the Dortmund-Northeast landfill for an initial energy economic assessment of project ideas. The goal of this collaboration is to facilitate an intensive exchange of knowledge between EDG Entsorgung GmbH and the University of Applied Sciences Ruhr West. Additionally, students were given the opportunity to participate in a guided tour of the Northeast landfill to gain insights into the site and the planned developments. The results of the case study will be used by EDG Entsorgung GmbH as part of the decision-making process for investing in the PV park.
	Comments on implementation – consider mentioning resources, timelines, milestones	The ground-mounted photovoltaic system at Dortmund-Nordost landfill is being developed as a pilot project in cooperation with DEW21 and pending approval from the Arnsberg district government. Key resources include site preparation, PV system procurement, and coordination with landfill operations to ensure safety and minimal disruption. Milestones cover securing approvals, installation phases, and commissioning, aiming to generate renewable energy on the 8-hectare site while landfill activities continue.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable

	GHG emissions reduction estimate (total) per emission source sector	Reduction of Greenhouse Gas Emissions in Tons of CO_2 Equivalent [With a planned average generation of 9,900 MWh per year, a CO_2 reduction of 19,800 Mg per year is achieved.]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial Costs (Setup, Acquisition, etc.): [€7,400,000]

B-2.2: Individual action outlines E 13		
Action outline	Action name	CO_2e Emissions of the City of Dortmund through the Emschergenossenschaft and Lippeverband for the Concerns of the (Wastewater) Industry
	Action type	Technical intervention
	Action description	Upgrading of Biological Treatment: New aeration elements and turbo compressors are expected to result in significant energy savings. Construction of Second Primary Clarifier: Significant increase in gas production and self-energy generation is expected. Renewal of Inlet Pumping Station: Increased efficiency and reduced energy consumption. Feasibility Study for PV/Wind Energy Expansion Rainwater Decoupling: Measures under ZI Klima.Werk.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and Technology Development Cooperation and Networks Public Awareness and Participation
	Outcome (according to module B-1.1)	Energy conservation
Implementation	Responsible bodies/person for implementation	Public Sector: Governments and municipal administrations for strategic planning and implementation. Notes : EGLV
	Action scale & addressed entities	EGLV

	Involved stakeholders	City of Dortmund, EGLV, Specialized contractors and service companies
	Comments on implementation – consider mentioning resources, timelines, milestones	The project upgrades wastewater treatment with new aeration systems, a second primary clarifier, and an improved pumping station to boost efficiency and biogas production. A PV and wind feasibility study is in progress, alongside rainwater decoupling measures. Key milestones include equipment upgrades, infrastructure commissioning, and renewable energy planning to reduce CO_2e emissions.
Impact & cost	Generated renewable energy (if applicable)	Increase in the Share of Renewable Energy in Percentage.
	Removed/substituted energy, volume, or fuel type	Energy Savings. Specific numbers not applicable.
	GHG emissions reduction estimate (total) per emission source sector	Reduction of Greenhouse Gas Emissions in Tons of CO_2 Equivalent: [16,575 t; 2021: 21,728 t; 2030: 5,153 t]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Not applicable

B-2.2: Individual action outlines E 14		
Action outline	Action name	Expansion of PV systems at Dortmund University of Applied Sciences
	Action type	Technical intervention
	Action description	Dortmund University of Applied Sciences and Arts has teaching and administrative buildings that are suitable for expansion with PV systems. The gradual expansion of the systems is planned over the coming years.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Funding and promotion
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.

		Private sector: Companies responsible for operational implementation. Note: The expansion of PV systems must always be planned in cooperation with the BLB NRW as the owner of the properties. The construction of the systems themselves is realised with private companies.
	Action scale & addressed entities	Dortmund University of Applied Sciences and Arts
	Involved stakeholders	Local communities and citizens' initiatives: Participation and involvement in local projects. Note: The expansion with a citizens' energy cooperative or the participation of employees in the plants is conceivable
	Comments on implementation – consider mentioning resources, timelines, milestones	The project plans a gradual expansion of photovoltaic systems on suitable teaching and administrative buildings at Dortmund University of Applied Sciences and Arts. Key steps include site assessments, phased installation, and integration with existing energy systems. Milestones involve completing initial expansions, ongoing installations, and full system commissioning to enhance renewable energy use over the coming years.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [65 %]
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Saving of greenhouse gas emissions in tonnes of CO_2 equivalent [approx. 800 t. CO^2e]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [The entire expansion amounts to 1.8 million euros] Ongoing costs (operation, maintenance, etc.): [Maintenance costs cannot be estimated]

B-2.2: Individual action outlines E 15		
Action outline	Action name	Photovoltaic system at Dortmund North Hospital

	Action type	Technical intervention
	Action description	A PV system is installed on the roof of Building I at Dortmund North Hospital. The electricity generated is consumed at all times.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation. Note: Gnuse company, Dortmund Hospital gGmbH
	Action scale & addressed entities	Dortmund Hospital gGmbH
	Involved stakeholders	Dortmund Hospital gGmbH, Companies that are responsible for operational implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	The photovoltaic system on the roof of Building I at Dortmund North Hospital was installed following structural and site assessments. The project included procurement and installation phases, ensuring continuous on-site consumption of the generated electricity. Key milestones were system commissioning and integration with the hospital's energy supply.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [0.9]
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [13.5]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [194.000 €] Ongoing costs (operation, maintenance, etc.): [3.000 €]

B-2.2: Individual action outlines E 16		
Action outline	Action name	Photovoltaic system Dortmund Hospital gGmbH
	Action type	Technical intervention
	Action description	A PV system is installed on the roof of the Central Operating Theatre and Functional Centre. The electricity generated is consumed at all times.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation. Note: Gnuse company, Dortmund Hospital gGmbH
	Action scale & addressed entities	Dortmund Hospital gGmbH
	Involved stakeholders	Dortmund Hospital gGmbH, Companies that are responsible for operational implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	The photovoltaic system on the roof of the Central Operating Theatre and Functional Centre at Dortmund Hospital gGmbH was installed after detailed site evaluation. The project included equipment procurement, installation, and commissioning, ensuring continuous on-site use of the generated electricity. Key milestones involved system integration and operational testing.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in per cent [0.8]
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [35]
	GHG emissions compensated (natural or technological sinks)	Not applicable

	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [400.000 €] Ongoing costs (operation, maintenance, etc.): [5.000 €]

B-2.2: Individual action outlines E 17		
Action outline	Action name	Second-life PV system at the Dortmund Concert Hall - a sustainable energy project in cooperation with science
	Action type	Technical intervention
	Action description	In June 2023, 347 second-life solar panels refurbished by the Fraunhofer Heinrich Hertz Institute were installed on the roof of the Dortmund Concert Hall, covering 1,100 m². Together with a second-life battery storage system made from repurposed automotive batteries, the system supplies around 10 % of the hall's electricity needs—quietly and vibration-free to meet the acoustic demands of the venue. This innovative project is part of a broader sustainability strategy that spans energy, mobility, purchasing, and operations. As a flagship initiative, it highlights how cultural institutions can lead in climate action and resource conservation through science-based collaboration and system-wide change.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Cooperation project with the Fraunhofer Heinrich Hertz Institute, Dortmund Concert Hall
	Action scale & addressed entities	Dortmund Concert Hall
	Involved stakeholders	Educational institutions: Research support and knowledge exchange. Note: Cooperation project with the Fraunhofer Heinrich Hertz Institute

	Comments on implementation – consider mentioning resources, timelines, milestones	The second-life PV system at Dortmund Concert Hall, installed in June 2023 with refurbished solar panels and repurposed battery storage from Fraunhofer Heinrich Hertz Institute, showcases a science-driven sustainable energy approach. Key resources include expert collaboration, second-life materials, and tailored installation to meet acoustic requirements. Milestones included panel installation, battery integration, and system commissioning, delivering about 10 % of the hall's electricity sustainably while supporting broader institutional climate goals.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in percent
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [90,000 kWh / year]
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tons of CO_2 equivalent [48.82]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Running costs (operation, maintenance, etc.): [not yet quantifiable]

B-2.2: Individual action outlines E 18		
Action outline	Action name	LED conversion of sound sails at the Dortmund Concert Hall
	Action type	Technical intervention
	Action description	The sound sails in the large hall of the Dortmund Concert Hall not only contribute significantly to the unique acoustics of the hall, but also illuminate the entire stage from above. The lighting is therefore used for concerts and rehearsals as well as for hall lighting. The 36 luminaires installed are subject to special challenges, as they must not impair the acoustics through ventilation noise or vibrations. They must be dimmable, but also bright enough to illuminate the stage and the artists in the best possible way and they must emit a warm, harmonious light. The process of finding the right light sources took over a year

		and was completed in summer 2023 with the installation of 36 new lights.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and technology development
	Outcome (according to module B-1.1)	Energy conservation
Implementation	Responsible bodies/person for implementation	Dortmund Concert Hall, Companies responsible for operational implementation
	Action scale & addressed entities	Dortmund Concert Hall
	Involved stakeholders	Companies responsible for operational implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	The LED conversion of the 36 sound sails at Dortmund Concert Hall was completed in summer 2023 after over a year of development to meet strict acoustic and lighting requirements. The new dimmable, vibration-free luminaires provide warm, high-quality light for stage and hall use without affecting acoustics. Key milestones included testing, selection of suitable LEDs, and final installation, enhancing energy efficiency and performance.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [24,192 kWh / year]
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tons of CO_2 equivalent [10,16]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Running costs (operation, maintenance, etc.): [not yet quantifiable]

B-2.2: Individual action outlines E 19		
Action outline	Action name	LED conversion of spotlights at the Dortmund Concert Hall
	Action type	Technical intervention
	Action description	In addition to the sound sails, numerous spotlights illuminate the stage in the main hall

		of the Dortmund Concert Hall. They are used at various events, in particular staged concerts, shows and pop and world music concerts, to provide optimum illumination of the stage action. In summer 2023, all the spotlights were converted to LED and now help to ensure that the power peaks at concerts are not too high and that energy consumption is reduced, especially in the evening hours.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and technology development
	Outcome (according to module B-1.1)	Energy conservation
Implementation	Responsible bodies/person for implementation	Dortmund Concert Hall, Companies responsible for operational implementation
	Action scale & addressed entities	Dortmund Concert Hall
	Involved stakeholders	Companies responsible for operational implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	In summer 2023, all spotlights at Dortmund Concert Hall were converted to energy-efficient LEDs. This upgrade improves stage illumination for diverse events while reducing power peaks and overall energy consumption, especially during evening performances. Key milestones included planning, procurement, and installation phases completed on schedule.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [approx. 4,000 kWh / year]
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tons of CO_2 equivalent [1,68]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Running costs (operation, maintenance, etc.): [not yet quantifiable]

B-2.2: Individual action outlines E 20		
Action outline	Action name	Installation of photovoltaic systems at the Volkswohlbund head office in Dortmund
	Action type	Technical intervention
	Action description	In 2023, the Volkswohlbund decided to build a photovoltaic system on the flat roofs of the head office in Dortmund (Südwall 37-41, 44137 Dortmund) in order to drive forward the expansion of renewable energies and also save our own operating costs. These now cover a total area of 1,500 m2. The system has a nominal output of 256 kWp. The system is operated by the newly founded VOLKSWOHLBUND Energy GmbH, which will continue to support and manage further energy projects in the future.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Innovation and technology development
	Outcome (according to module B-1.1)	Expansion of renewable energies
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation. Note : VOLKSWOHLBUND Energy GmbH
	Action scale & addressed entities	VOLKSWOHLBUND Insurance Company
	Involved stakeholders	Note:The photovoltaic system was financed by VOLKSWOHLBUND Insurance Company.
	Comments on implementation – consider mentioning resources, timelines, milestones	In 2023, a 256 kWp photovoltaic system was installed on the 1,500 m² flat roofs of the VOLKSWOHLBUND Insurance Company's head office in Dortmund. The project involved detailed planning, equipment procurement, and installation. The system is operated by the newly founded VOLKSWOHLBUND Energy GmbH, which will manage ongoing and future renewable energy initiatives. Key milestones included system commissioning and integration into building operations, supporting cost savings and sustainability goals.
Impact & cost	Generated renewable energy (if applicable)	Increase in percentage of renewable energy [Since the construction of the head office and its completion in 2010, the Volkswohlbund has been using geothermal energy for cooling and heating. They have also been using green

		electricity since 01.01.2022, plus the photovoltaic system, so it is not yet possible to provide a quantitative figure].
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [We save around 30 % of our original energy costs].
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [400,000.00 Euro] Running costs (operation, maintenance, etc.): [3,900.00 euros]

B-2.2: Individual action outlines E 20		
Action outline	Action name	Energy Cooperation - Making the energy transition easy
	Action type	Campaign, Technical intervention
	Action description	Installation and operation of solar power systems on private, public and commercial roofs in Dortmund. BürgerEnergie Dortmund eG aims to promote the energy transition in Dortmund. Our cooperative installs and operates photovoltaic systems for social institutions and homeowners' associations, among others.
Reference to impact pathway	Field of action	Electricity
	Systemic lever	Standards, legislation and regulation Financing and promotion Innovation and technology development Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of renewable energies, Decarbonisation of energy supply

Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation. Note : The cooperative is responsible for implementation.
	Action scale & addressed entities	Specific target groups such as young people, businesses or farmers, depending on the focus of the measure. Note : All those who offer suitable roof space/All those who could potentially become members/All those who want to purchase tenant electricity
	Involved stakeholders	Financial institutions: Provision of financial resources for sustainable projects. Note: If the projects cannot be financed through member loans, we will need funds from financial institutions, among others. Civil society: NGOs and environmental associations as strategic partners in design and implementation. Note: Exchange with many energy cooperatives; specifically, Teckwerke Bürgerenergie eG is currently an important partner, as is BEG-58 from Hagen. Local communities and citizens' initiatives: participation and involvement in local projects. Note: The main players are the members of the cooperative.
	Comments on implementation – consider mentioning resources, timelines, milestones	The project is implemented in phases, from site assessment and permitting to installation and grid connection, with milestones including contract signing, equipment delivery, and commissioning. Key resources involve qualified installation teams, photovoltaic equipment, and financing through the cooperative model. Timelines vary by project size but are typically aligned with seasonal and regulatory requirements to ensure efficient deployment and maximum energy yield.
Impact & cost	Generated renewable energy (if applicable)	Increase in the share of renewable energies in percent [100]
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [Value cannot be quantified for the entire measure with projects that have not yet been designed T]

	GHG emissions reduction estimate (total) per emission source sector	Greenhouse gas emissions saved in tonnes of CO_2 equivalent [Value cannot be quantified for the entire measure with projects that have not yet been designed]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, procurement, etc.): [project-dependent] Running costs (operation, maintenance, etc.): [project-dependent] Financing model (own funds, subsidies, loans, etc.): [own funds (member loans), loans, subsidies, own contribution Energy cost savings [project-dependent] Savings through avoided emissions [project-dependent]

3.2.3 Transport

The measures in the mobility sector deal with motorised and non-motorised transport in Dortmund, which includes private mobility as well as commercial transport and logistics. Commuter transport is also included here. Accordingly, all passenger transport as well as commercial and freight transport in the City of Dortmund that is handled by road or rail is considered. This includes destination traffic that ends in Dortmund, domestic traffic with a starting point and end point in Dortmund, source traffic with a starting point in Dortmund and a destination outside the city limits, as well as transit traffic with a starting point and end point outside Dortmund that crosses the city limits. In the inventory sheet analysis, only the proportion of journeys within Dortmund city limits is considered, but there are greater savings if journeys are avoided or are made by eco-mobility instead of by car.

In the baseline year 2019, the modal split in Dortmund looked like this:[21]

- 13 % on foot
- 11 % by bike
- 52 % by car
- 24 % by public transport

[21] City of Dortmund (ed.), 2020, Dortmunder Mobilitätsbefragung 2019, Kurzbericht [Dortmund Mobility Survey 2019, brief report]

In 2019, the transport sector was responsible for 840 kt CO_2e of emissions. By 2030, NetZeroPlaner's estimates predict a reduction of 729 kt CO_2e, corresponding to a 87 % decrease. These reductions are expected to come from a reduction in the need for motorised passenger transportation (218 kt CO_2e), a shift towards public and non-motorised transport (89 kt CO_2e), increased carpooling (37 kt CO_2e), the electrification of cars and motorcycles (53 kt CO_2e), the electrification of buses (68 kt CO_2e), optimised logistics (149 kt CO_2e), and the electrification of trucks (115 kt CO_2e). The largest contributions are linked to policy and planning instruments, such as prioritising bicycle networks (TA 01), converting the vehicle fleet to alternative drive systems (primarily electric) (TA 08), and developing 15 locations as mobility hubs with charging points (TA 16). The effectiveness of these measures is assessed using defined indicators, as outlined in Chapter 3.3 (Economic Indicators).

The main measures in this context are set out in the Mobility Master Plan of the City of Dortmund and focus primarily on reducing motorised individual transport, making cycling more attractive, expanding public transport and electrifying vehicles, particularly in relation to the transport and delivery of goods and services within the city. Some key measures are highlighted here as examples; otherwise, the measures are listed in the Transport portfolio (TA 01 to TA 22) with a profile for further information.

Expansion of cycle routes

The expansion of nine cycle routes in Dortmund has developed into a concrete objective over the last few years. As part of the "emissions-free city centre" programme, which was funded by the EFRE 2019 programme with 6.4 million euros, a number of measures were taken to make cycling more attractive. Some of these had to be adapted due to competing reconstruction measures on the affected sections. However, with, the project was the catalyst for the development of nine cycle routes into the city centre from the city districts, which are intended to enable effortless and safe cycling. This concrete project, which was finalised in collaboration with the district councils, is now being implemented and is an important part of the efforts in the Action Field Transportation. An important factor is the strengthening of eco-friendly transport and the shift from motorised transport to cycling, walking or public transport. A safe and attractive infrastructure for eco-friendly transport is essential for this and is being given priority.

Large-scale extension of the 30 km/h speed limit

Since 2014, Dortmund has been working to reduce noise emissions and thus improve quality of life. These efforts are based on a regularly updated noise action plan. In 2022, work began on introducing a speed limit of 30 km/h on certain sections of road. This will reduce both traffic noise and greenhouse gas emissions. It will also increase safety for all road users. At the end of 2024 and beginning of 2025, a speed limit was approved for more than 50 additional roads. It will be introduced in stages until 2029. Ultimately, most roads close to the city centre will be subject to a speed limit of 30 km/h.

Public transport package

A broad package of measures will continuously improve the attractiveness of public transport services. The transport network will be expanded, the vehicle fleet will be electrified and timetable flexibility will be increased. Service frequencies will be increased and night-time services extended. In addition, a new bus route will be introduced to facilitate transfers between different light rail lines. Major infrastructure projects include the expansion of a light rail line and the elevated railway on the university campus in the coming years. This will provide public transport with everything it needs to function as the backbone of the transport transition.

Zero-emission delivery traffic

As part of a pilot scheme, micro-depots were trialled in the city centre. Various parcel delivery services used emission-free transport options, such as electric cargo bikes, for the 'last mile'. The city planned the micro-depot as a temporary measure, intending to find a permanent property that would meet the requirements of the parcel service providers. However, the search for a suitable property was unsuccessful. Nevertheless, the City of Dortmund intends to resume the search and leverage the established network of service providers from the pilot project to identify a new location.

The city of Dortmund generally recognises the potential of electrified deliveries and freight transport and is using the international Net Zero Cities network to find further projects and measures. These challenges are on the agenda for many EU cities, and there are already some innovative projects from which Dortmund could learn in the coming months and years.

Table 17: Overview of the savings in the sector 'Transport' with subsectors

Transport	Subsector	Savings in 2030 (kt CO_2 /a)
	T1 Reduced motorised passenger transport need	218
	T2 Shift to public and non-motorised transport	89
	T3 Increased carpooling	37
	T4 Electrification of cars and motorcycles	53
	T5 Electrification of buses	68
	T6 Optimised logistics	149
	T7 Electrification of trucks	115
	Total	**729**

Table 18: Overview of measures in the sector 'Transport'

Measure	Title	T 1	T 2	T3	T4	T5	T6	T7
TA 01	Bicycle network priorities	■	■				■	
TA 02	Bicycle parking priorities	■	■					
TA 03	Parking space management by spatial categories	■	■					
TA 04	Special parking spaces and disabled parking spaces						■	
TA 05	Speed limit of 30 km/h on main streets	■	■				■	
TA 06	Green traffic lights for cyclists	■	■				■	
TA 07	Green Charging Lanterns				■			
TA 08	Conversion of the vehicle fleet to alternative drive systems (primarily electric) (DSW21)				■			
TA 09	B-car project		■				■	
TA 10	Operational mobility management	■						
TA 11	Conversion of the bus fleet to emission-free drives					■	■	
TA 12	EDgo2 / Acquisition of four battery-powered small sweepers					■	■	
TA 13	Low-emission mobility / purchase of three battery-electric light lorries <3.5 Mg.					■		■
TA 14	Low-emission mobility / purchase of three battery-electric light lorries <3.5 Mg.					■		■
TA 15	Local and Sustainable Electricity Generation as a Prerequisite for Electrifying the Commercial Fleet by 2030					■		
TA 16	Development of 15 locations as mobility hubs with charging points				■			■
TA 17	Charging stations for e-mobility				■		■	
TA 18	Bicycle shelters with charging stations	■	■					
TA 19	Bicycle shelter at Dortmund Central Hospital	■	■				■	■
TA 20	Microdepots for delivery services – Emmission-free delivery	■	■				■	
TA 21	Increasing the availability of car sharing	■		■			■	
TA 22	North connection KV II plant	■					■	

B-2.2: Individual action outlines T 01		
Action outline	Action name	Bicycle network priorities
	Action type	Infrastructure
	Action description	The project aims to promote cycling in Dortmund and enhance road safety for all users. A safe, continuous, and attractive cycling network will be developed, differentiating between routes for everyday use and those for leisure. The everyday cycling network connects city districts with the city center and provides links within and between districts, while the leisure network focuses on recreation and follows green corridors and scenic routes. By 2030, Dortmund strives to establish itself as a cycling city by doubling the share of bicycle traffic, promoting social inclusion, and ensuring accessibility for all. The road safety strategy is comprehensive and preventive, focusing on traffic education, infrastructure improvements, and the use of digital tools and data. It is built on active community engagement, targeted communication, and a clear prioritization of safety measures. The aim is to significantly reduce traffic risks—especially for vulnerable road users—and create a safer, more inclusive urban mobility system.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Cooperation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Increased Bicycle network
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation, companies. Notes: Department for City Planning and Building Regulations, Department for Public Order and Police, Department of Civil Engineering and Road traffic authority
	Action scale & addressed entities	All citizens and tourists of the city Dortmund

	Involved stakeholders	Department for City Planning and Building Regulations, Public order office and police, Civil engineering office and Road traffic authority
	Comments on implementation – consider mentioning resources, timelines, milestones	The measures described in the cycling strategy are part of the ongoing work to promote cycling and will be continued and increased in scope. By prioritising measures for the bicycle network the conditions for switching to the bicycle sector are created. The definition of the cycling target network is a first step towards prioritising the most important measures in infrastructure development. The fields of action defined in the road safety strategy with the associated measures are a first step towards the defined target of reducing road accidents with fatalities and serious injuries by 70 % by 2030 as an interim target.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	- Reduction of pollutant and noise emissions - Improving the health and quality of life of citizens - Increasing road safety
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Additional costs will be incurred for the implementation of the measures, which, in addition to construction costs, will also result from additional personnel positions in various areas of planning, construction and operation (e.g. maintenance, traffic monitoring). Funding from the federal or state governments will be available for individual measures, which can be used to reduce expenditure for the City of Dortmund.

B-2.2: Individual action outlines T 02		
	Action name	Bicycle parking priorities

Action outline	Action type	Infrastructure
	Action description	The "Bicycle Parking Priorities" project aims to significantly expand secure and convenient bicycle parking infrastructure throughout Dortmund. By 2025, the city plans to install 10,000 new bicycle racks across the urban area, including 1,000 in the city centre—partly funded through the "Emission-Free City Center" program. In addition, 100 new bike storage units ("bike sheds") will be built in densely populated neighbourhoods near the city centre to provide secure, residential bicycle parking. To meet medium- and long-term parking needs, ten new locations for the VRR bicycle parking system Dein Radschloss will be developed—e.g. at the university, the technology park, and other district centres—complementing existing sites in Aplerbeck and Mengede. Two new Dein Radschloss facilities will be added annually from 2022 onward, with system expansion across all district centres planned by 2030. The city is also assessing the feasibility of building additional large-scale bike stations, modelled after the successful facility at Dortmund's central station. The overall goal is to make cycling more attractive and practical by ensuring high-quality parking options citywide.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Cooperation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Increase of bicycle infrastructure
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation, companies. Notes : Department for City Planning and Building Regulations, Department for Public Order and Police, Department of Civil Engineering and Road traffic authority

	Action scale & addressed entities	All citizens and tourists of the city Dortmund
	Involved stakeholders	Department for City Planning and Building Regulations, Public order office and police, Civil engineering office and Road traffic authority
	Comments on implementation – consider mentioning resources, timelines, milestones	Installation of 10,000 bicycle racks citywide for short-term parking needs, including 1,000 in the city center as part of the "Emission-Free City Center" program. Promotion and support of additional private bike sheds in densely built neighborhoods to expand local residential parking options. Development of 10 new *Dein Radschloss* stations by 2025 to meet medium- and long-term parking demand, with annual expansion continuing through 2030 in all district centers. Evaluation of additional large-scale bike stations at strategic locations, following the successful model at Dortmund Central Station.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Reduction of pollutant and noise emissions - Improving the health and quality of life of citizens - Increasing road safety
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Additional costs will be incurred for the implementation of the measures, which, in addition to construction costs, will also result from additional personnel positions in various areas of planning, construction and operation (e.g. maintenance, traffic monitoring). Funding from the federal or state governments will be available for individual measures, which can be used to reduce expenditure for the City of Dortmund.

B-2.2: Individual action outlines T 03

Action outline	Action name	Parking space management by spatial categories
	Action type	Infrastructure
	Action description	The project "Parking space Management by Spatial Categories" aims to establish a differentiated, needs-based approach to managing on-street parking in Dortmund. Six spatial categories have been defined, each with tailored strategies to address specific local conditions and parking demands: • City Centre (incl. Wallring) • Inner-city neighbourhoods • District centres • High-demand destination areas • Commercial/special zones with high parking pressure • Residential areas (new and existing developments) The overall goal is to improve the efficiency, fairness, and sustainability of urban space use through targeted parking regulations. Measures include expanding managed parking zones (e.g. resident parking), adjusting parking fees and time limits, shifting long-term parking into off-street facilities, and reallocating public space for walking, cycling, and green areas. The project also involves increasing enforcement, piloting dynamic pricing models, and launching a citywide communication strategy. Developed in collaboration with local political and administrative stakeholders, this approach supports broader transport and climate goals—reducing car dependency, preventing parking overflow into surrounding neighbourhoods, and improving quality of life across all spatial categories.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Cooperation and networks Public awareness and participation

	Outcome (according to module B-1.1)	Reduce emissions in transport
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation, companies. Notes : Department for City Planning and Building Regulations, Department for Public Order and Police, Department of Civil Engineering and Road Traffic Authority
	Action scale & addressed entities	All urban social target groups
	Involved stakeholders	Parks Department, Urban renewal, Citizen services
	Comments on implementation – consider mentioning resources, timelines, milestones	Following a council decision to realise the measures, they will be implemented. In addition, further planning projects to promote cycling and increase road safety are underway independently of the strategies. For example, the evaluation of the scale of charges for parking on public streets was in preparation at the time of writing.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	- Reduction of pollutant and noise emissions - Improving the health and quality of life of citizens - Increasing road safety
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Additional costs will be incurred for the implementation of the measures, which, in addition to construction costs, will also result from additional personnel positions in various areas of planning, construction and operation (e.g. maintenance, traffic monitoring). Funding from the federal or state governments will be available for individual measures, which can be used to reduce expenditure for the City of Dortmund.

B-2.2: Individual action outlines T 04		
Action outline	Action name	Special parking spaces and disabled parking spaces
	Action type	Infrastructure
	Action description	The project aims to improve the availability and quality of designated special parking spaces in Dortmund's public parking structures and surface lots. A key focus is the consistent provision of accessible parking for people with disabilities—at least 3 % of all spaces—both in new constructions and through gradual upgrades of existing facilities. Additional measures include the designation of privileged parking spaces for electric vehicles and carsharing vehicles in central locations, potentially with time-limited fee reductions. As the number of electric vehicles increases, these privileges will be gradually scaled back based on local vehicle fleet data. The project also promotes the inclusion of women's and family parking spaces in all newly built public parking structures to enhance safety and convenience. Existing regulations for tradespeople parking permits will continue, and the city will assess whether similar permits can be offered to commercial tenants. Overall, the project supports a socially inclusive, accessible, and sustainable approach to managing public parking infrastructure.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Cooperation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Reduce emissions in transport
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation, companies. Notes : Department for City Planning and Building Regulations, Department for Public Order and Police, Department of Civil Engineering and Road Traffic Authority

	Action scale & addressed entities	All urban social target groups
	Involved stakeholders	Department of Parks and Green Spaces, Department of Urban Renewal, Citizen services
	Comments on implementation – consider mentioning resources, timelines, milestones	Following a council decision to realise the measures, they will be implemented. In addition, further planning projects to promote cycling and increase road safety are underway independently of the strategies. For example, the evaluation of the scale of charges for parking on public streets was in preparation at the time of writing.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	- Reduction of pollutant and noise emissions - Improving the health and quality of life of citizens - Increasing road safety
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Additional costs will be incurred for the implementation of the measures, which, in addition to construction costs, will also result from additional personnel positions in various areas of planning, construction and operation (e.g. maintenance, traffic monitoring). Funding from the federal or state governments will be available for individual measures, which can be used to reduce expenditure for the City of Dortmund.

B-2.2: Individual action outlines T 05		
Action outline	Action name	Speed limit of 30 km/h on main streets
	Action type	Infrastructure, Governance and policy
	Action description	By 2029, almost all major roads in the area around Dortmund city centre will be subject to a speed limit of 30 km/h. The introduction will take place gradually over the coming years. As a speed limit of 30 km/h is already standard in

		Dortmund's residential areas, large parts of the road network in the city will be subject to a speed limit of 30 km/h by 2029.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regluation
	Outcome (according to module B-1.1)	Reduce emissions in transport, Noise reduction
Implementation	Responsible bodies/person for implementation	City-Administration of Dortmund
	Action scale & entities addressed	Road users, citizens
	Stakeholders involved	City Council, City Administration
	Comments on implementation – consider mentioning resources, timelines, milestones	A noise action plan has been drawn up regularly for Dortmund since 2014. It identifies key areas of noise pollution and proposes measures to tackle it. As a result, Dortmund City Council decided back in 2022 to introduce a speed limit of 30 km/h on the first sections of road. In order to gain more leeway in this area, Dortmund joined the city initiative 'Liveable cities through appropriate speeds' in November 2022. The latest version of the noise action plan was published in December 2024. On 19 December, the city council decided to introduce a speed limit of 30 km/h on two further road sections. On 23 May 2025, this decision was extended to more than 50 road sections. In addition, it was decided to gradually extend these speed limits until 2029. After this phase, almost all major roads in the city centre will be subject to a speed limit.
Impact ; cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Not applicable

B-2.2: Individual action outlines T 06		
Action outline	Action name	Green traffic lights for cyclists
	Action type	Infrastructure, Technical intervention
	Action description	With its *"Green Lights for Cyclists"* project, the City of Dortmund is actively enhancing cycling infrastructure through smart traffic technology. At the heart of the initiative are intelligent traffic lights equipped with radar and thermal sensors that automatically detect approaching cyclists—up to 35 meters before an intersection. These systems request or extend green phases based on real-time demand, allowing cyclists to ride more smoothly with fewer stops. This increases comfort, reduces travel time, and boosts the appeal of cycling as a mode of transport. Between 2020 and 2025, a total of 37 traffic signals will be upgraded—30 are already in operation, with 11 more to be completed by the end of the year 2025. The focus lies on key cycling corridors, including future radial bike routes and the high-speed cycling route *RS1* (Ruhr Cycle Highway - Radschnellweg Ruhr)[22], which will cross Dortmund from west to east. The measures are tailored to each location, taking into account traffic patterns, infrastructure, and cyclists' actual needs. The system is fully app-independent and barrier-free. Advanced sensor technology enables precise differentiation between cyclists, pedestrians, and motor vehicles. As part of Dortmund's broader strategy for sustainable urban mobility, the project contributes to reducing CO_2 emissions and making cycling a more attractive and environmentally friendly choice in urban traffic. In 2025, the initiative was nominated for the German Cycling Award in the "Infrastructure" category.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation

[22] Radschnellweg Ruhr RS1 [14.08.2025]

		Innovation and technology development Cooperation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Shift from motorized transport to bike, improvement bike infrastructure
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Notes: The project is led by the City of Dortmund's Department of Civil Engineering and the Transport Transition Office
	Action scale & entities addressed	The project has a city-wide scope, focusing on strategic intersections across Dortmund's urban area. It targets key cycling corridors, including planned radial bike routes connecting city districts with the centre, and the future Ruhr Cycle Highway. The upgrades are tailored to high-traffic junctions to maximize impact on cycling flow and comfort. The project primarily benefits cyclists, who gain faster and safer passage through intersections. It involves the City of Dortmund (Civil Engineering Department and Transport Transition Office), traffic management authorities, and technology providers. Other stakeholders include pedestrians and motorists (indirectly affected), the State of North Rhine-Westphalia as funding body, and urban planners, who see the project as a model for sustainable mobility infrastructure.
	Stakeholders involved	City of Dortmund Department of Civil Engineering & Transport Transition Office Traffic Management Authorities Responsible for signal programming and traffic flow optimization. Technology Providers & Engineering Consultants Supplying and integrating sensor systems and software. Urban Planners and Sustainability Experts Supporting and evaluating the project as part of broader climate-friendly mobility strategies.

	Comments on implementation – consider mentioning resources, timelines, milestones	The project runs from 2020 to 2025, with 37 intersections being upgraded in phases. As of mid-2025, 30 sites are operational, with 11 more to follow by year-end. Implementation is led by the Department of Civil Engineering and the Transport Transition Office, in coordination with traffic technology providers and the city's traffic control centre. The project is funded by the State of North Rhine-Westphalia with up to 95 % financial support. Key investments include smart sensors (radar and thermal cameras), signal program updates, and engineering services. Milestones: *2020*: Project launch and pilot phase *2021–2024*: Gradual system rollout *2025*: Final installations *2026*: Evaluation and further adjustments to traffic light systems Signal programs are continuously optimized to improve flow for cyclists while maintaining balance across all traffic modes.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	This measure is one of many steps towards adapting the transport infrastructure to the changing requirements of sustainable mobility. Promoting cycling and creating optimal conditions for cyclists not only helps to reduce CO_2 emissions, but also increases the appeal of cycling as an environmentally friendly alternative in urban areas.
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	The project is supported by state funding covering up to 95 % of the investment.

B-2.2: Individual action outlines T 07		
Action outline	Action name	Green Charging Lanterns

	Action type	Infrastructure, Technical intervention
	Action description	Establishment of a Charging Infrastructure for Electric Vehicles in Dortmund and the Neighbouring Municipalities of Iserlohn and Schwerte. The aim of the project was to install charging stations for electric vehicles using innovative low-cost technologies. These charging points were integrated into existing street lighting infrastructure in public areas. This approach is particularly beneficial for EV owners who do not have access to private charging facilities at home, offering an affordable and accessible solution. By implementing this project, an important contribution was made to the transformation of the Transport sector. Access to electromobility is being simplified, while the visibility of the required infrastructure in public spaces is significantly increased. This not only fosters greater public acceptance but also provides a strong incentive for switching to electric vehicles. The promotion of electric mobility supports the reduction of air pollution and greenhouse gas emissions. It is a key element in the city's broader strategy to enhance urban attractiveness and advance climate protection efforts.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Innovation and technology development Market design Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of charging infrastructure
Implementation	Responsible bodies/person for implementation	The city administration of Dortmund coordinates the process.
	Action scale & entities addressed	Over the course of the project, the focus area was narrowed down to densely populated residential neighbourhoods in Dortmund. A wide range of stakeholders were involved, including various departments of the city administration, the business community, local actors, and civil society.

	Stakeholders involved	City of Dortmund, Ebee Smart Technologies GmbH, City of Iserlohn, Stadtwerke Iserlohn GmbH, University of Wuppertal, Stadtwerke Schwerte GmbH, Technical University of Dortmund, Dortmunder Energie- und Wasserversorgung GmbH (DEW21)
	Comments on implementation – consider mentioning resources, timelines, milestones	The project ran from August 2018 to December 2022. Due to technical limitations, lantern-based charging could not be implemented in the cities of Iserlohn and Schwerte. In Dortmund, the originally planned number of 400 charging points had to be reduced to 320. Additionally, the hardware was upgraded during the course of the project to improve accessibility and meet growing demand. The final charging stations offered higher charging power and were compatible with all types of charging cables. This latter feature represents a unique selling point that clearly distinguishes the Dortmund solution from the only comparable project in London. The installation progressed at a rate of five charging stations per week in 2022. A key component of the project was a broad public participation process, which led to several adjustments. As part of this process, thousands of potential locations for charging stations were proposed by residents.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	The number of electric vehicle registrations in Dortmund increased from 1.8 % in 2021 to 4.5 % in 2023. The project has attracted interest from several cities, including Hamburg, Berlin, and Paris.
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	The project received €3.2 million in funding from the German Federal Ministry for Economic Affairs and Climate Action.

B-2.2: Individual action outlines T 08

Action outline	Action name	Conversion of the vehicle fleet to alternative drive systems (primarily electric) (DSW21)
	Action type	Technical intervention
	Action description	By 2030, an additional 35 vehicles including airport-specific vehicles (i.e. 32 % of all fleet vehicles currently still powered by diesel) will be replaced by electric vehicles.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Innovation and technology development
	Outcome (according to module B-1.1)	Electrification of vehicles
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: Responsibility for implementation lies with the airport
	Action scale & addressed entities	DSW21
	Involved stakeholders	Financial institutions: Providing financial resources for sustainable projects. Start-ups and technology providers: Innovation and technical solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	DSW21 plans to convert 35 vehicles, including airport-specific ones, to electric drive systems by 2030, replacing 32 % of the current diesel fleet. Implementation includes phased vehicle procurement, infrastructure upgrades for charging, and staff training. Key milestones involve fleet assessment, procurement cycles, and achieving full electric operation by the target year to reduce emissions and improve sustainability.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [successively up to 67.4 tonnes of CO_2 e per year from 2024 -2030]
	GHG emissions compensated (natural or technological sinks)	Not applicable

	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [estimated investment volume of approx. EUR 4.3 million] Ongoing costs (operation, maintenance, etc.): [lower maintenance and servicing costs due to electric drive]

B-2.2: Individual action outlines T 09		
Action outline	Action name	B-car project
	Action type	Infrastructure, Procurement
	Action description	Acquisition of 34 new light rail vehicles and the identical modernisation of the 64 existing vehicles.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Innovation and technology development
	Outcome (according to module B-1.1)	Expansion of public transport
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Note: Municipal enterprise DSW 21
	Action scale & addressed entities	The entire population: Raising awareness and education on climate protection issues.
	Involved stakeholders	DSW21 and municipal enterprise
	Comments on implementation – consider mentioning resources, timelines, milestones	The B-car project involves acquiring 34 new light rail vehicles and modernizing 64 existing ones to a uniform standard. Implementation includes vehicle procurement, refurbishment planning, and coordination to minimize service disruptions. Key milestones cover delivery of new vehicles, completion of modernization phases, and full fleet integration to enhance efficiency and reliability.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [4.8 million kWh reduced electricity consumption]
	GHG emissions reduction estimate (total) per emission source sector	Not applicable

	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [€ 280 million] Ongoing costs (operation, maintenance, etc.): [approx. € 1.5 million estimated additional costs per year]

B-2.2: Individual action outlines T 10		
Action outline	Action name	Operational mobility management
	Action type	Consultation
	Action description	On-site analyses, accessibility and residential location analyses, company surveys and two workshops with representatives of the city, companies and DSW21. Numerous potential measures were discussed in the first workshop, which were then prioritised in the second workshop and integrated into this concept. The structure of the action plan is divided into various sections. These include measures to optimise the accessibility of the Harbour industrial estate, operational mobility management to address companies and businesses and the fields of action of network management and communication. These have been identified as key aspects for the sustainable anchoring of the project during the funding period and beyond. The goal of optimised mobility will inevitably reduce emissions, and a central criterion in the development of the measures was the consideration of the needs of the companies and their employees, particularly with regard to the location in the harbour area. At the same time, care was taken to place the measures in an economic context. This played a particularly important role in the discussion and development of measures in the area of local public transport, as economic requirements were also given special consideration. In addition to the economic aspects, the needs of heavy goods traffic were also taken into account.
	Field of action	Transport

Reference to impact pathway	Systemic lever	Funding and promotion Co-operation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Reducing emissions in transport, shift from motorized transport
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Note: Responsible for implementation: City of Dortmund, DSW21, Planersocietät, Baum Consult, IHK Dortmund, IHK BEMO, Zukunftsnetz Mobilität NRW, ILS, Dortmunder Hafen AG, Dachser SE, Container Terminal Dortmund, Deutsche Gasrußwerke GmbH, Lungmuß Feuerfest, Rhenus Port Logistics Rhein-Ruhr GmbH, Dolezych GmbH & Co.KG, Deufol West GmbH, SAZ Stahl]
	Action scale & addressed entities	Employees, Companies & Businesses
	Involved stakeholders	DSW21
	Comments on implementation – consider mentioning resources, timelines, milestones	The operational mobility management project involved on-site analyses, company surveys, and two collaborative workshops with city, company, and DSW21 representatives. Identified measures focus on improving accessibility in the Hafen industrial estate, enhancing company mobility, and strengthening network management and communication. Prioritization balanced sustainability, economic viability, and the specific needs of employees and heavy goods traffic. Key milestones include completing analyses, developing and integrating the action plan, and monitoring implementation throughout the funding period and beyond to reduce emissions and optimize mobility.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [cannot be measured at this time. A reduction is assumed].
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [cannot be measured at this

		stage. A reduction is assumed - see description of measures]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [3.4 million euros] Ongoing costs (operation, maintenance, etc.): [cannot be quantified at this stage].

B-2.2: Individual action outlines T 11		
Action outline	Action name	Conversion of the bus fleet to emission-free drives
	Action type	Infrastructure, Procurement
	Action description	Procurement of 30 buses with electric drive
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation
	Outcome (according to module B-1.1)	Electrification of vehicles
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Note: Municipal enterprise
	Action scale & addressed entities	The entire population: Raising awareness and education on climate protection issues.
	Involved stakeholders	DSW21
	Comments on implementation – consider mentioning resources, timelines, milestones	The project plans the procurement of 30 electric buses to replace conventional diesel vehicles. Implementation includes vehicle acquisition, charging infrastructure setup, and driver training. Key milestones are delivery of the buses, infrastructure commissioning, and full integration into the fleet, aiming to reduce emissions and support sustainable public transport.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable

	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [2,376 tonnes of CO_2]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [approx. € 34.1 million] Ongoing costs (operation, maintenance, etc.): [not yet to be estimated due to initial operation]

B-2.2: Individual action outlines T 12		
Action outline	Action name	EDgo2 / Acquisition of four battery-powered small sweepers
	Action type	Technical intervention
	Action description	In EDgo2, fuels based on fossil fuels are to be substituted by renewable energy sources through the acquisition of four electrically powered road sweeper. To this end, EDG has its own photovoltaic system at the main site and obtains electricity from 100 % renewable energy sources. Another positive aspect is the lower noise emissions that can be expected from the use of electric CHP during the night shift, where a noise reduction of 6 dB (A) is anticipated.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Innovation and technology development
	Outcome (according to module B-1.1)	Electrification of vehicles
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	Company EDG Entsorgung Dortmund GmbH
	Involved stakeholders	EDG
	Comments on implementation – consider mentioning resources, timelines, milestones	The EDgo2 project involves acquiring four battery-powered small sweepers to replace fossil fuel vehicles. Powered by EDG's onsite photovoltaic system and 100 % renewable electricity, these sweepers reduce emissions and noise, especially during night shifts

		(expected noise reduction of 6 dB(A)). Key milestones include vehicle procurement, integration with renewable power supply, and deployment for night operations to enhance sustainability and community comfort.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [140,000 kWh of energy can be saved annually as a result of converting four E-KKMs to electric drive (1 litre of diesel = 9.8 kWh of energy)].
	GHG emissions reduction estimate (total) per emission source sector	Saving of greenhouse gas emissions in tonnes of CO_2 equivalent [The use of four E-KKM can save approx. 104 Mg of CO_2 per year].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, purchase, etc.): [1,081,405 € net]

B-2.2: Individual action outlines T 13		
Action outline	Action name	Low-emission mobility / purchase of three battery-electric light lorries <3.5 Mg.
	Action type	Technical intervention, Procurement
	Action description	Acquisition of three electrically powered light trucks <3.5 Mg. for wastepaper basket collection in Dortmund city centre
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Innovation and technology development
	Outcome (according to module B-1.1)	Electrification of vehicles
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	Company EDG Entsorgung Dortmund GmbH
	Involved stakeholders	Company EDG Entsorgung Dortmund GmbH
	Comments on implementation – consider	The project involves acquiring three battery-electric light trucks (<3.5 Mg) for wastepaper basket collection in Dortmund city centre.

	mentioning resources, timelines, milestones	Implementation includes vehicle procurement, charging infrastructure setup, and operational integration. Key milestones cover delivery, driver training, and deployment, aiming to reduce emissions and improve air quality in the city centre.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [The use of three electric light trucks can save approx. 60 Mg of CO_2 per year].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [237.405,- € net]

B-2.2: Individual action outlines T 14		
Action outline	Action name	Low-emission mobility / purchase of battery-electric commercial vehicles in classes N1, N2 & N3
	Action type	Technical intervention, Procurement
	Action description	Acquisition of electrically powered municipal utility vehicles of classes N1, N2 and N3. 2 x large sweepers; 1 x waste collection vehicle for household and organic waste collection; 1 x waste collection vehicle for bulky waste collection; 5 x small sweepers; 1 x light lorry <3.5 Mg.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Innovation and technology development
	Outcome (according to module B-1.1)	Electrification of vehicles
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Note: Company EDG Entsorgung Dortmund GmbH

	Action scale & addressed entities	Company EDG Entsorgung Dortmund GmbH
	Involved stakeholders	Company EDG Entsorgung Dortmund GmbH
	Comments on implementation – consider mentioning resources, timelines, milestones	The project includes acquiring a fleet of electric municipal utility vehicles across classes N1, N2, and N3: 2 large sweepers, 2 waste collection vehicles (household/organic and bulky waste), 5 small sweepers, and 1 light lorry (<3.5 Mg). Implementation involves vehicle procurement, charging infrastructure expansion, and staff training. Key milestones include phased delivery, commissioning, and full operational deployment to reduce emissions and improve urban sustainability.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [As a result of the substitution of 2 waste collection vehicles, 85,000 kWh of energy can be saved annually, the use of the 5 E-KKM can save around 175,000 kWh and the use of 2 truck mounted sweepers 37,000 kWh].
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [The transformation process can save approx. 400 Mg of CO_2 per year].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [€ 2,744,331.52 net]

B-2.2: Individual action outlines T 15		
Action outline	Action name	Local and Sustainable Electricity Generation as a Prerequisite for Electrifying the Commercial Fleet by 2030
	Action type	Technical intervention, Procurement
	Action description	Due to the rapid market development and the mid-term availability of electric vehicles in the segment of series-ready commercial vehicles, the long-term barrier lies in the widespread development of suitable charging infrastructure for these vehicles. The unique model aims to ensure climate-neutral

		operations for the technical departments of certain sectors. As a fundamental objective, the first step involves providing the required amount of electricity from locally generated renewable energy to achieve ecological benefits and avoid increased strain on existing supply routes. Overall, based on the described fuel consumption, approximately 900,000 kWh of electricity per year is expected to be needed. Implementation options should remain open to various technologies, such as a combination of PV systems and on-site combined heat and power plants. In addition, the digitization of local work processes in the respective departments should be pursued. Following this, the comprehensive electrification of operational sites, including the integration of storage technologies and an increase in the share of electric-powered commercial vehicles at the operational sites, should be realized. A feasibility study is currently being commissioned to develop the above-mentioned concept, incorporating options for using locally generated climate-neutral energy.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Innovation and Technology Development
	Outcome (according to module B-1.1)	Electrification of vehicles
Implementation	Responsible bodies/person for implementation	Public Sector: Governments and municipal administrations for strategic planning and execution. Note: City of Dortmund.
	Action scale & addressed entities	While the implementation lays with the city administration, it also holds potential as a best-practice example for municipalities or the private sector.
	Involved stakeholders	Educational Institutions: Research support and knowledge exchange. Note: The results of the feasibility study will be crucial. Potential collaboration with educational institutions in implementing on-site energy production (technology-neutral).

		Start-ups and Technology Providers: Innovation and technical solutions. Note: As mentioned above, these parties could be involved in the production of on-site energy and the development of charging solutions.
	Comments on implementation – consider mentioning resources, timelines, milestones	This project focuses on enabling climate-neutral electrification of the commercial fleet by securing local, sustainable electricity generation. Implementation begins with a feasibility study to assess options such as PV systems and on-site combined heat and power plants, targeting around 900,000 kWh/year. Key milestones include completing the study, developing a concept for integrating renewable energy and storage, and gradually electrifying operational sites and vehicles. Resources include collaboration with technical departments and investment in infrastructure and digitalisation.
Impact & cost	Generated renewable energy (if applicable)	Increase in the Share of Renewable Energy in Percentage [Electricity generation to cover self-consumption through locally generated energy]
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Reduction of Greenhouse Gas Emissions in Tons of CO_2 Equivalent: [670 tons per year]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial Costs (Setup, Acquisition, etc.): [Total costs of the measure are unclear and currently not quantifiable; cost of the feasibility study for the corresponding concept: €120,000]

B-2.2: Individual action outlines T 16		
Action outline	Action name	Development of 15 locations as mobility hubs with charging points
	Action type	Infrastructure
	Action description	Due to the rapid market development of available electric vehicles and the significantly decreasing willingness of employees to use

		their private cars for business purposes, an accelerated, nationwide expansion of intelligent charging infrastructure is necessary by 2027. Without prioritising the installation of charging infrastructure, the described switch to locally emission-free business trips cannot be achieved before 2030. As every electric company vehicle requires a charging point at its dedicated parking space, where the battery can be fully charged overnight or during the day between business trips, a total of around 300 new charging points need to be installed at around 20 city-wide locations, company buildings including public spaces such as P+R car parks. The majority of the charging points are to be planned at so-called mobility hubs, which are central locations that can be reached on foot by a large number of employees. The digitalisation and connection of the individual components is critical to achieving the positive effects in terms of climate protection. The implementation of the project can be seen as part of Dortmund's ongoing development towards becoming a smart city. In addition, the intelligent charging infrastructure to be set up, together with the aforementioned reservation and scheduling software and the networked service vehicles, will enable the automated and needs-based provision of mobility resources, taking into account user requirements, charging capacity, battery charge level of the vehicles, etc.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Funding and promotion Innovation and technology development
	Outcome (according to module B-1.1)	Expansion of charging stations, reducing transport
Implementation	Responsible bodies/person for implementation	Public sector: Governments, municipal administrations for strategic planning and implementation. Note: City administration

	Action scale & addressed entities	Sensitisation of employees of the City of Dortmund with regard to climate protection and sustainable mobility
	Involved stakeholders	City of Dortmund, Companies responsible for operational implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	The project targets the development of 15 mobility hubs with approximately 300 intelligent charging points by 2027 to support CO_2 -neutral commuting and fleet digitalisation. Key resources include infrastructure investment, digital networking, and software for scheduling and reservation. Milestones involve site selection, installation phases, and integration of digital systems. Timely rollout is critical to meet the increasing demand for electric vehicle charging and to enable climate-friendly business travel before 2030. Coordination with city planning and stakeholders ensures alignment with Dortmund's smart city goals.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [255 tonnes p.a.]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [2.500.000 €] Running costs (operation, maintenance, etc.): [30,000 p.a. €]

B-2.2: Individual action outlines T 17		
Action outline	Action name	Charging stations for e-mobility
	Action type	Infrastructure
	Action description	Installation of 7 public and 4 non-public charging stations with a total of 20 charging points on the site with electricity from renewable energies

Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Funding and promotion Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Expansion of charging stations
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: PSZD
	Action scale & addressed entities	Specific target groups such as young people, companies or farmers, depending on the focus of the measure. Note: Employees, parents, tenants, visitors
	Involved stakeholders	Financial institutions: Provision of financial resources for sustainable projects. Note: GLS-Bank, Bochum
	Comments on implementation – consider mentioning resources, timelines, milestones	The project involves installing 7 public and 4 non-public charging stations, totaling 20 charging points powered by renewable energy. Key steps include site preparation, equipment procurement, and connection to the green electricity supply. Implementation milestones cover installation, testing, and commissioning. The project relies on coordination with energy providers to ensure renewable supply and aims for completion within the planned timeline to support local e-mobility growth.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Saving of greenhouse gas emissions in tons of CO_2 equivalent [no own vehicle fleet, therefore not quantifiable]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [177543,15 €]

		Ongoing costs (operation, maintenance, etc.): [Fees for billing and control: approx. 600 €/year]

B-2.2: Individual action outlines T 18		
Action outline	Action name	Bicycle shelters with charging stations
	Action type	Infrastructure
	Action description	Construction of covered and lockable bicycle shelters for 30 bicycles with charging facilities for e-bikes
Reference to impact pathway	Field of action	Transport
	Systemic lever	Funding and promotion Cooperation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Promotion of bike cycling
Implementation	Responsible bodies/person for implementation	Private sector: Companies responsible for operational implementation. Note: PSZD
	Action scale & addressed entities	Specific target groups such as young people, companies or farmers, depending on the focus of the measure. Note: Employees, trainees, tenants of retirement homes
	Involved stakeholders	Local communities and citizens' initiatives: Participation and involvement in local projects. Note: Senior citizens' organization, nursing school, vocational college
	Comments on implementation – consider mentioning resources, timelines, milestones	The project includes building covered, lockable shelters for 30 bicycles equipped with e-bike charging stations. Key phases involve site preparation, shelter construction, and installation of electrical infrastructure. Coordination with local energy suppliers ensures reliable charging from renewable sources. The timeline covers design, construction, and commissioning, aiming for completion within the planned schedule to promote sustainable and secure e-bike use.
Impact & cost	Generated renewable energy (if applicable)	Not applicable

	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Reduction of air pollutants such as NOx, SO2, PM10 in tons [The provision of lockable bicycle shelters reduces the use of cars and public transport].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [33.500]

B-2.2: Individual action outlines T 19		
Action outline	Action name	Bicycle shelter at Dortmund Central Hospital
	Action type	Infrastructure
	Action description	As an incentive for more employees to cycle to work in future, a new covered bicycle parking area for 66 bicycles was built.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Innovation and technology development Cooperation and networks
	Outcome (according to module B-1.1)	Promotion of bike cycling
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation. Note: Dortmund Hospital gGmbH
	Action scale & addressed entities	Dortmund Hospital gGmbH, Employees
	Involved stakeholders	Companies that are responsible for operational implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	The project involved constructing a covered bicycle shelter for 66 bikes at Dortmund Central Hospital to encourage cycling among employees. Key steps included site selection, design, and construction, with a focus on accessibility and security. The timeline ensured timely completion to support sustainable commuting options, contributing to the hospital's broader environmental goals.

Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [20]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [100.000 €] Running costs (operation, maintenance, etc.): [500 € p.a.]

B-2.2: Individual action outlines T 20		
Action outline	Action name	Microdepots for delivery services – Emmission-free delivery
	Action type	Infrastructure
	Action description	Following the successful testing of the concept in 2022, Dortmund's city administration is seeking to identify a new location for at least one micro-depot. To this end, the city management is in constant dialogue with inner-city retailers and logistics companies.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Cooperation and networks Innovation and technology development
	Outcome (according to module B-1.1)	Electrification of transport
Implementation	Responsible bodies/person for implementation	City-Administration, City Management
	Action scale & entities addressed	Logistic companies
	Stakeholders involved	IHK, Logistic-companies
	Comments on implementation – consider mentioning resources, timelines, milestones	In 2020, the first information forum on the topic of 'emission-free delivery traffic' took place. With the aim of establishing climate-friendly delivery traffic in the city centre, a micro-depot was installed for 14 months between 2021 and 2022. It consisted of five shipping containers.

		Deliveries were brought there in the morning and distributed to end users by bicycle throughout the day. Eleven cargo bikes were used to deliver 25,000 parcels per month. In December 2021, the project was named the most beautiful micro-depot in Germany. At the end of the project, no new location could be found. As the results were considered positive by all parties involved, a non-binding agreement was made to continue the concept.
Impact cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Not applicable

B-2.2: Individual action outlines T 21		
Action outline	Action name	Increasing the availability of car sharing
	Action type	Infrastructure
	Action description	The city has decided to expand its car-sharing services and has presented a strategy for doing so. Following an application phase in summer 2025, the first new car-sharing parking spaces will be available for use from spring 2026. In addition, a strategy is being developed to increase the proportion of electric cars in the car-sharing fleet.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Innovation and technology development Standards, Legislation and regulation
	Outcome (according to module B-1.1)	Expansion of car sharing
Implementation	Responsible bodies/person for implementation	City-Administration

	Action scale & entities addressed	Car Sharing Companies, citizens, car sharing users
	Stakeholders involved	City Administration, Car Sharing Companies, car sharing users
	Comments on implementation – consider mentioning resources, timelines, milestones	An analysis of the city reveals areas where car sharing is in particularly high demand. The urban area was divided into 1,241 grid cells, 188 of which have a particularly high potential for car sharing. Locations near bus and train stations are particularly attractive as they facilitate switching from public transport to car sharing. In order to ensure that car sharing grows beyond the city centre, providers must apply for parking spaces in both the city centre and the suburbs. For instance, a company could apply for four spaces in the city centre and two in a suburb. A maximum of eight parking spaces are permitted per location. Currently, only 5 % of car-sharing vehicles are electric. Dortmund wants to change this, but charging stations are only economical if they are used for at least four charging processes per day. The city is developing a strategy to enable more electric car sharing and improve the user-friendliness of the charging infrastructure.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Not applicable

B-2.2: Individual action outlines T 22		
Action outline	Action name	North connection KV II plant, Franz-Schlüter-Straße
	Action type	Infrastructure

	Action description	Container Terminal Dortmund GmbH (CTD) operates the combined transport facility (CT) on Franz-Schlüter-Strasse. The operating licence has been awarded by DSW21 until 2038. In the course of the construction of the DB ICE maintenance depot by 2027, the opportunity arose for the CT facility to have a direct connection (= northern connection) to the DB network, i.e. the main network. Coordination talks are currently taking place with DSW21 in the Dortmunder Hafen AG, CTD, Dortmunder Eisenbahn GmbH (DE) and DE Infrastruktur GmbH (DI) group of companies, among others. The northern connection would mean that the 'southern bypass' via Westerholz, the storage road to the CT terminal, would be avoided. As the delivery in the harbour can only take place with a diesel locomotive, the direct connection could save around 21 km of distance and thus achieve a not inconsiderable reduction in emissions. In addition, lorry traffic between the container terminal in Kanalstr. and the CT terminal in Franz-Schlüter-Str. could be reduced, so that CO_2 savings could also be achieved here. In addition, the lives of people living around the harbour area will be improved by less lorry traffic, but also by the changed train connection. With the previous southern bypass, local residents are affected by the diesel noise and odour, for example, as well as the sounding of the warning signal. With the northern connection, the impact can be reduced.
Reference to impact pathway	Field of action	Transport
	Systemic lever	Standards, legislation and regulation Funding and promotion
	Outcome (according to module B-1.1)	Reducing emissions in transport
Implementation	Responsible bodies/person for implementation	Public sector: governments, municipal administrations for strategic planning and implementation. Note: Responsibility for implementation lies with the Dortmunder Hafen AG group of companies
	Action scale & addressed entities	Dortmund Hafen AG group, Dortmunder Eisenbahn GmbH, DSW21

	Involved stakeholders	Financial institutions: Provision of financial resources for sustainable projects. Note: must be assessed/considered as part of further planning, e.g. for financing products be assessed/considered
	Comments on implementation – consider mentioning resources, timelines, milestones	The project is realized by coordinating planning and approvals with all stakeholders, followed by construction of the northern rail link. Afterwards, operations are shifted from the southern bypass to the new direct connection.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [cannot yet be measured precisely, see description of measures. However, a reduction will be achieved]
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [6 to 7 million euros] Ongoing costs (operation, maintenance, etc.): [still open]

3.2.4 Waste

A clean cityscape and a reduction in waste and an improved recycling rate improve the quality of life for people in Dortmund. To this end, the city offers citizens a number of opportunities to get involved.

- Waste prevention campaigns: Together with local partners, the City of Dortmund develops and implements targeted campaigns to raise awareness of waste prevention among citizens
- Waste sponsorships: The City of Dortmund supports and promotes waste sponsorships, in which committed citizens take responsibility for specific areas or public spaces in their city.
- Public relations: targeted public relations are used to raise awareness of sustainable waste management. Information and Education for citizens about the importance of waste prevention and responsible waste management.

In addition to the campaigns and participation-driven actions, there are some central measures in Dortmund that will reduce emissions in the waste sector. Some of these measures are described below; for more information, please refer to the attached portfolio.

In 2019, emissions from the waste sector totalled 53 kt CO_2e. NetZeroPlaner projects a reduction of 27 kt CO_2e (51 %) by 2030, primarily through increased waste recycling. Key measures include the project DOzirkulär (W 01), the utilisation of industrial by-products from agriculture and forestry (W 04) or the energy saving campaign and waste campaign – sufficiency strategies in the professional and university environment (W 05).

DoZirkulär (W01)

The Dortmund2030 funding project "DOzirkulär", which aims to promote a circular and public welfare-oriented economy, will receive an additional 1.2 million euros in funding from the Federal Ministry for Economic Affairs and Climate Action (BMWK) for another three years as part of the federal 'Future Region' competition. This marks the continuation of the City of Dortmund's journey towards a more sustainable economy.

The goal of a circular economy is to close material loops as completely as possible and to reduce resource use, thereby contributing to climate neutrality and the preservation of natural ecosystems. For businesses, it offers opportunities to access new markets through innovative models and reduce dependence on vulnerable supply chains. An increasing number of companies and start-ups in Dortmund are already developing and marketing circular innovations — laying the foundation for a more sustainable, resilient future.

Since the project began, 18 proposals have been developed in the areas of construction, nutrition, and electronics. One of the project's goals is to support local companies and initiatives in making their economic activities more circular and oriented towards the common good. Numerous stakeholders from business, science, city administration and civil society were brought together through workshops, network meetings and individual consultations, and innovative ideas were developed that create both ecological and social added value.

The objectives of the construction, food and electronics value chains are:

- In the food sector, the objectives are to promote sustainable and regional production and procurement, reduce avoidable food and packaging waste, and improve the use of food waste and by-products.
- In the construction value chain, the focus is on raising awareness and providing education on sustainable construction, as well as reducing resource consumption through reuse and repurposing.
- In the electronics sector, the focus is on reprocessing and reusing electronic devices, developing expertise and training skilled workers in recycling for Dortmund-based companies, and disseminating circular design methods within Dortmund-based electronics companies.

Smart Bins (W02)

Dortmund has teamed up with the town of Schwerte to develop a smart city strategy and is implementing the measures outlined in it. In the area of the environment, this includes the smart bin project. By equipping the bins with technology, the frequency with which they need to be emptied will be reduced, thereby avoiding unnecessary journeys.

The project is being tested in selected areas of the city. These are primarily areas that are clearly separated from the urban area and often require specific access for emptying rubbish bins. These include several green spaces and parks (Fredenbaumpark, Tremoniapark and Stadtwäldchen) as well as Dortmund Zoo. Approximately 90 waste bins are to be purchased and financed through the Smart City Strategy until 2027. After that, the project will be handed over to the directorates in the administration.

Table 19: Overview of the savings in the sector 'Waste'

Waste	Subsector	Savings in 2030 (kt CO_2 /a)
	W 1 Increased waste recycling	27
	Total	**27**

Table 20: Overview of the measures in the sector 'Waste'

Measure	Title	W1
W 01	DO-zirkulär (Economic Development Agency)	
W 02	Smart waste bins	
W 03	Study on the use of reusable solutions at events in Dortmund	
W 04	Local recycling cycle in Dortmund - Utilisation of by-products from mushroom cultivation	
W 05	Energy saving campaign and waste campaign - sufficiency strategies in the professional and university environment	

B-2.2: Individual action outlines W 01		
Action outline	Action name	DO-zirkulär (Economic Development Agency)
	Action type	Campaign, Technical intervention
	Action description	*Shaping a Circular Future for Dortmund* **DoZirkulär2030** is a forward-looking concept that will identify practical measures for the city administration, Dortmund-based businesses, the scientific community, and consumers. The aim is to inspire new business models and innovative ideas by focusing on the core principles of circular economy:

		Rethink - promoting fresh, innovative approaches, **Reduce** - lowering overall resource consumption, **Reuse -** extending product lifecycles, and **Recycle** – encouraging material reuse at the end of product cycles. At the same time, these measures are intended to support socially sustainable and community-oriented development.
Reference to impact pathway	Field of action	Waste
	Systemic lever	Standards, legislation and regulation Financing and promotion Innovation and technology development Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Promotion of innovative projects in the circular economy
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Private sector: Companies responsible for operational implementation.
	Action scale & entities addressed	Companies, Science, Citizens
	Stakeholders involved	Economic Development Agency, Companies responsible for operational implementation
	Comments on implementation – consider mentioning resources, timelines, milestones	Developmentphase of pilot projects from 2020-2025 Implementationphase of 19 projects from 2025-2028
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable

	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Not applicable

B-2.2: Individual action outlines W 02		
Action outline	Action name	Smart waste bins
	Action type	Technical intervention, Infrastructure, Procurement
	Action description	This project aims to sustainably improve city cleanliness and maintenance through smart waste management. Sensors in waste bins monitor fill levels in real time, enabling demand-driven, efficient emptying schedules. This prevents overflows, reduces unnecessary collection trips, and lowers CO_2 emissions. At five pilot sites in Dortmund the technology will be tested and optimized. Targeted route planning saves costs, time, and resources while enhancing the city's appearance and the quality of life for people and animals. The project supports the EU's "100 Climate-Neutral Cities by 2030" mission and strives to make waste disposal more sustainable, economical, and environmentally friendly.
Reference to impact pathway	Field of action	Waste
	Systemic lever	Standards, legislation and regulation Innovation and technology development Public awareness and participation
	Outcome (according to module B-1.1)	Reducing emissions (more efficient disposal management)
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & entities addressed	The project is implemented at a local urban scale within Dortmund and Schwerte, focusing on high-traffic public areas. It serves as a pilot for wider city adoption, with potential scalability to other urban districts. Entities Addressed: City Authorities: Responsible for planning, implementation, and maintenance

		Waste Collection Services: Benefit from optimized routes and improved operational efficiency. Residents and Visitors: Indirect beneficiaries enjoying cleaner public spaces and improved urban quality of life.
	Stakeholders involved	City of Dortmund and Schwerte Departments of Waste Management and Urban Development Waste Collection Services Operators responsible for waste bin emptying and route planning Technology Providers Suppliers of sensor hardware, software, and data management systems Environmental and Sustainability Organizations Advocates for climate-friendly urban solutions
	Comments on implementation – consider mentioning resources, timelines, milestones	The project is planned as a multi-year initiative, starting with a pilot phase and followed by a potential expansion. Key milestones include procurement in the end of 2025 and installation in the first half of 2026. Other milestones with implementation are sensor installation, system integration, and the rollout of demand-driven collection routes.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Reduction of fuel consumption by optimizing routes, leading to lower CO_2 emissions from collection trucks. This is the primary source of savings.
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Total Project Cost (Pilot): €500,000 Estimated GHG Reduction: Assuming a 10 % reduction of emissions from waste collection in the pilot areas.

B-2.2: Individual action outlines W 04

Action outline	Action name	Study on the use of reusable solutions at events in Dortmund Commissioned by the Dortmund Economic Development Agency
	Action type	Consultation
	Action description	Conducting a study on the use of reusable solutions at events as part of our consulting activities.
Reference to impact pathway	Field of action	Waste
	Systemic lever	Standards, legislation and regulation Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Decrease amount of waste
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Private sector: Companies responsible for operational implementation.
	Action scale & addressed entities	The entire population: sensitisation and education on climate protection topics. Specific target groups such as young people, businesses or farmers, depending on the focus of the measure. Note: entire population; specific approach to catering businesses and event organisers.
	Involved stakeholders	Start-ups and technology providers: Innovation and tech solutions. Local communities and citizens' initiatives: Participation and engagement in local projects.
	Comments on implementation – consider mentioning resources, timelines, milestones	The recommendations of the study now need to be implemented. Economic development / public sector can support the private sector in this. Utilise local reusable suppliers; motivate the population to use reusable solutions.
Impact & cost	Generated renewable energy (if applicable)	Not applicable

	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Not applicable

B-2.2: Individual action outlines W 05		
Action outline	Action name	Local recycling cycle in Dortmund - Utilisation of by-products from mushroom cultivation
	Action type	Technical intervention
	Action description	The used mushroom substrates are ideal as fertiliser due to their richness in nutrients and decomposition by the edible mushroom. The companie blue gill plans to sell or give this fertiliser to organic farms and other agricultural businesses. The utilisation of used mushroom substrate as fertiliser not only offers a potential additional source of income, but also contributes to sustainability. In addition, inner-city communication and education concepts on the subject are being planned. Blue Gill's wants to create a food hub by locating at the Hansa coking plant in collaboration with Greenspace Manufaktur, which will play a mediating role in promoting a fundamental sustainability mentality. These and other measures will be communicated with the population in order to raise awareness. This communication is to be achieved through concepts that include a youth centre, guided event formats and tours of the production sites.
Reference to impact pathway	Field of action	Waste
	Systemic lever	Standards, legislation and regulation Innovation and technology development Cooperation and networks
	Outcome (according to module B-1.1)	Promotion of innovative projects, new tools for circular economy

Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation.
	Action scale & addressed entities	The entire population: sensitisation and education on climate protection topics. Specific target groups such as young people, companies or farmers, depending on the focus of the measure.
	Involved stakeholders	International organisations: Support and financing of climate protection projects. Civil society: NGOs and environmental organisations as strategic partners in conception and implementation. Educational institutions: Research support and knowledge exchange. Start-ups and technology providers: Innovation and technical solutions. Local communities and citizens' initiatives: Participation and engagement in local projects. Note: Possible support from the International Garden Exhibition IGA 2027, the Foundation for the Preservation of Industrial Monuments and Historical Culture, the South Westphalia University of Applied Sciences and the Economic Development Agency. Conceptual support from Greenspace Manufaktur and the South Westphalia University of Applied Sciences. The actors involved include Greenspace Manufaktur and the start-ups and initiatives involved in the Foodhub project on the site of the Hansa coking plant.
	Comments on implementation – consider mentioning resources, timelines, milestones	Creation of a food hub (on the site of the Hansa coking plant) Communication of the project to the public
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable

	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [Under evaluation]. Ongoing costs (operation, maintenance, etc.): [Under evaluation.]

B-2.2: Individual action outlines W 06		
Action outline	Action name	Energy saving campaign and waste campaign - sufficiency strategies in the professional and university environment
	Action type	Campaign
	Action description	Energy and environmental management are the operational levers for greater ecological sustainability. The impact of both topics is noticeable through a change in user behaviour. In addition to the transfer of knowledge and information, the campaigns use participatory methods in particular, which strengthen self-efficacy and thus promote a subjective positive evaluation. In addition to user behaviour, savings can be made through technical and organisational innovations. These include, for example: Smart heating, digital room booking systems, etc.
Reference to impact pathway	Field of action	Waste
	Systemic lever	Cooperation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Reducing amount of waste, energy conservation
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Private sector: Companies responsible for operational implementation.
	Action scale & addressed entities	Note: 17,000 university members

	Involved stakeholders	Civil society: NGOs and environmental organisations as strategic partners in conception and implementation. Local communities and citizens' initiatives: Participation and engagement in local projects. Note: Actors involved: The expansion with a citizens' energy cooperative or the participation of employees in the plants is conceivable.
	Comments on implementation – consider mentioning resources, timelines, milestones	The campaign targets behaviour change through knowledge transfer and participatory methods to boost user engagement and self-efficacy in professional and university settings. Alongside raising awareness, technical and organisational innovations—such as smart heating and digital room booking—are promoted to achieve measurable energy and waste reductions. Milestones include campaign roll-out, user workshops, and integration of technical solutions for lasting impact.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Energy savings in kilowatt hours (kWh) or megawatt hours (MWh) [up to 40,000 kWh/year].
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [up to 5,000 t].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, acquisition, etc.): [low costs for event materials] Ongoing costs (operation, maintenance, etc.): [see above]

3.2.5 AFOLU (Other)

The field of action AFOLU (Other) covers various topics such as agriculture, forestry, land use and others. As Dortmund is a large city with little agriculture or forestry, there are fewer measures to reduce emissions in this area. This document therefore also addresses other topics.

For example, the city administration has a unique situation in Germany in that three staff members in the Environment Agency are working on the topic of nutrition and investigating what a dietary transition might look like.

The City of Dortmund is actively committed to promoting a food transition. Strengthening a regional, sustainable food system in line with the food transition has numerous positive effects on the climate and the environment. To this end, three positions have been created at the City of Dortmund to implement a number of projects, thus representing a focus area within AFOLU. In Germany, each person generates an average of 1.7 tons of GHG emissions per year through their diet alone. This accounts for approximately 15 percent of all consumption-related GHG emissions per person. However, in order to achieve the climate target of maximum global warming of +2°C, each person's total emissions must be limited to one ton of GHG per year. Measures in agriculture, changes in eating habits in line with nationwide development trends, and the reduction of food waste have particular potential to reduce GHG emissions in Dortmund.

In addition, the AFOLU (Other) field of action also includes measures from the activation and participation area. Some of these measures are also addressed in Chapter C, as participation and activation play a central role there. However, it is not really possible to present specific measures with stakeholders and milestones in this context, which is why they have been included in the AFOLU (Other) portfolio.

In general, the baseline emissions of 294 kt CO_2e in the AFOLU (other) sector in 2019 are projected to fall by 235 kt CO_2e (80 %) by 2030. The key drivers of this reduction are the implementation of climate-friendly, healthy food in municipal facilities (O 07) as well as the increase in sustainable agriculture (O 08). As previously mentioned in Chapter 1, large emitters such as Deutsche Gasrußwerke Industrial Complex are not included in these calculations.

Table 21: Overview of measures in the sector 'Other (AFOLU)'

Measure	Title
O 01	Activation and Financial support for citizens for climate protection
O 02	Activation of private capital for climate protection
O 03	Dortmund network for climate protection
O 04	Climate protection in Dortmund´s economy
O 05	Air Quality Dortmund – Measure, Analyze, Inform
O 06	Local and regional production and marketing
O 07	Climate-friendly, healthy food in municipal facilities
O 08	Sustainable agriculture
O 09	Education for climate-friendly, sustainable nutrition
O 10	The Dortmund CO_2 calculator (Klix[3])

O 11	Support for the Schulte-Tigges educational farm - planting an agroforestry system with subsequent permaculture
O 12	Print Green - Ecological printing with inkjet systems
O 13	supraraum – details are the city
O 14	Network in the harbour area

B-2.2: Individual action outlines O 01		
Action outline	Action name	Activation and Financial support for citizens for climate protection
	Action type	Financial intervention, Governance and policy
	Action description	The City of Dortmund will consolidate existing funding approaches into a clear guideline and develop targeted new schemes to encourage quicker adoption of climate-friendly measures. For decisions with potential negative climate impact, incentives will be offered to reduce their effects. The program aims to complement federal and state funding, focusing on priorities of the Climate-Air 2030 Action Plan: modernization of buildings, expansion of renewable energy (especially photovoltaics), and support for eco-friendly mobility (e.g. electromobility). Measures for climate adaptation may also be eligible. Funding can address higher quality standards, close gaps in existing programs, and support advisory services. The program will be reviewed annually and adapted as needed, drawing on the experience of other major cities.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Financing and promotion, Corporation and networks, market design, public awareness and participation
	Outcome (according to module B-1.1)	Increase amounts of projects regarding climate protection through citizens
Implementation	Responsible bodies/person for implementation	Environment Agency
	Action scale & entities addressed	Private individuals in Dortmund, especially house and apartment owners Companies in Dortmund
	Stakeholders involved	If necessary, other specialized offices (e.g. for housing subsidies) for funding management.

		Other specialized offices, experts and multipliers/institutions depending on the funding topic
	Comments on implementation – consider mentioning resources, timelines, milestones	Implementation will begin with a review of existing climate protection-related funding offers and an assessment of successful programs in other municipalities. Based on these findings, a funding guideline will be developed in close cooperation with experts and key stakeholders. Proposed resources include an annual funding volume of EUR 5 million and the establishment of clear work structures for funding management. Key milestones include: • Completion of reviews, expert consultations, and draft guideline • Adoption of the guideline by the City Council of Dortmund • Launch of a public information campaign to promote the funding opportunities The program will be continuously monitored, with utilization of subsidies tracked and adjustments made annually to ensure effectiveness and alignment with climate protection goals.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	The administration requires 1-2 staff positions for funding management. Funds totalling EUR 150,000 should be budgeted for the next three years for development of the concept and for the information campaign. Additional campaign funds should be raised from businesses and civil society (see also profile "Activation of private capital").

		Estimation per CO_2 e unit not possible

B-2.2: Individual action outlines O 02		
Action outline	Action name	Activation of private capital for climate protection
	Action type	Financial intervention
	Action description	A revolving regional fund shall be established in cooperation with commercial and savings banks. The funds will be issued to interested companies and private households for climate protection measures with a simplified application process. Repayment (including interest) will be made from the savings generated by the investments.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Financing and promotion, Corporation and networks, market design, public awareness and participation
	Outcome (according to module B-1.1)	Increase amounts of projects regarding climate protection through citizens
Implementation	Responsible bodies/person for implementation	Environment Agency
	Action scale & entities addressed	Financially strong companies and private individuals Poorly capitalized project sponsors
	Stakeholders involved	Commercial and savings banks Potential investors
	Comments on implementation – consider mentioning resources, timelines, milestones	Discussions with credit institutions (commercial and savings banks) to clarify their willingness to cooperate Information event on the topic of climate funds for interested investors Creation of a regionally adapted list of criteria for the evaluation of potential measures to be financed by the fund Creation of an organizational structure for management of the fund (e.g. in the form of a cooperative) Raising EUR 300,000 as the basis for the fund Financing of initial examples of measures

Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Guidance / coordination until an organization is founded by an employee of the city: 10-20 h per month (for 2 years) Fees for external experts, consultants and specialists: EUR 50,000 EUR 50,000 Estimation per CO_2 e unit not possible

B-2.2: Individual action outlines O 03		
Action outline	Action name	Dortmund network for climate protection
	Action type	Network
	Action description	The "Energy Efficiency and Climate Protection Consultation Group" (KEK) was founded in 2009 as a body in which various stakeholders have joined forces under the leadership of the mayor: municipal facilities, municipal utilities and waste disposal companies, the Chamber of Industry and Commerce and the Chamber of Crafts, consumer advice and civic associations and clubs. This initial network will then be expanded and intensified in conjunction with the updated Climate-Air 2030 action program. The future task of the KEK will be to establish and expand a network of active supporters from urban society so that stakeholders from urban society are more closely integrated and involved in the implementation of the Climate-Air 2030 action program and the commitment of urban society is supported and recognized. In the future, the Environment Agency will regularly present the results of the monitoring process to the KEK in order to discuss and initiate opportunities to improve the

		implementation process based on the results. This will create transparency and at the same time strengthen the required cooperation within Dortmund during the implementation of the action program. In addition to the exchange of information and experience, the network should initiate cooperation between the participants as well as initiate specific projects and activities to improve climate protection in Dortmund. The organization of the network (network management and moderation) shall be performed by an external service provider.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Financing and promotion, cooperation and networks, market design, public awareness and participation
	Outcome (according to module B-1.1)	Increase activity regarding climate protection at the private sector
Implementation	Responsible bodies/person for implementation	Environment Agency
	Action scale & entities addressed	All citizens of the City of Dortmund Companies in Dortmund
	Stakeholders involved	Municipal shareholdings with a major impact on the GHG balance Community groups with climate protection activities Trade associations and committed companies
	Comments on implementation – consider mentioning resources, timelines, milestones	Obtaining LOIs on the concept and willingness to participate in the network of municipal shareholdings Preparation of a funding application for a municipal climate protection network Clarification of the focus of networking right at the beginning (based on the Climate-Air 2030 action program) and the organizational framework. Kickoff meeting of the network

Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	The Environment Agency provides one employee to support the networking process (average additional time required of 10-20 hours per month) The costs for network management, the organization of network meetings and events as well as material resources amount to EUR 300,000 in the first year and EUR 150,000 each in the second and third years. Estimation per CO_2 e unit not possible

B-2.2: Individual action outlines O 04		
Action outline	Action name	Climate protection in Dortmund´s economy
	Action type	Network, Governance and Policy
	Action description	The project aims to effectively promote climate action within Dortmund's business community by strategically expanding and coordinating existing initiatives and networks. Building on the successes of programs like ÖKOPROFIT, energy efficiency networks, and the model project "Innovation Business Park Dorstfeld-West," sustainable solutions for energy savings, resource efficiency, and the use of renewable energy sources will be transferred to additional commercial and industrial areas. Key priorities include the long-term continuation of successful approaches, improved coordination of existing offerings, and targeted communication with businesses. The City of Dortmund is working closely with economic stakeholders, chambers, and utility companies to systematically activate the climate protection potential of local enterprises and strengthen their role as drivers of

		transformation. The goal is to develop a binding rollout plan that ensures the establishment of future-proof, climate-friendly business locations across Dortmund.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Standards, legislation and regulation Financing and funding Innovation and technology development Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Increase amounts of projects regarding climate protection through private sector
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation, companies. Notes : Dortmund Environment Agency
	Action scale & addressed entities	Companies and organisations of the economy, Public institutions
	Involved stakeholders	Dortmund Economic Development Agency City planning and building regulations office - Dortmund Chamber of Industry and Commerce Dortmund Chamber of Crafts TU Dortmund University If applicable, providers of the three project types mentioned (ÖKOPROFIT - B.A.U.M., energy efficiency networks - DEW21/Arcanum; DOdata GmbH)
	Comments on implementation – consider mentioning resources, timelines, milestones	Implementation will start with a mapping and review of existing climate-related business initiatives in Dortmund, followed by consultations with key economic stakeholders, chambers, and utility companies to identify synergies and gaps. Building on programs like ÖKOPROFIT and existing energy efficiency networks, a coordinated action plan will be developed. Proposed resources include dedicated project management capacity within the city administration, external expertise for technical

		and communication measures, and a funding framework to support business participation (e.g. pilot investments in renewable energy and efficiency measures). Key milestones: • Stakeholder consultations, review of existing programs, and identification of target business areas • Development of a binding rollout plan and approval by the City Council • Launch of coordinated activities, pilot projects, and a targeted business outreach campaign • Ongoing: Annual monitoring of business participation, energy savings, and emissions reductions, with plan adjustments as needed The project will integrate lessons learned from previous initiatives and ensure that business climate action becomes a sustained and visible driver of Dortmund's transformation.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	The evaluations of the Dortmund ÖKOPROFIT projects clearly show the CO_2 savings potential: 50 companies that have completed the ÖKOPROFIT programme since 2011 have achieved savings of almost 5,000 tonnes of CO_2 per year.
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	If necessary, a specialised office or a partnership from the participating specialised offices should be consulted for the conceptual preparation of the roll-out (especially for the inventory) (costs 30,000 euros). Project-related specialist offices should be brought in to carry out the advisory, qualifying, networking and, if necessary, organising work. Funds totalling 70,000 euros per year should be made available for this until 2025.

		Linking with existing funding and support approaches can reduce the municipal contributions and/or increase the effectiveness of the roll-out.

B-2.2: Individual action outlines O 05		
Action outline	Action name	Air Quality Dortmund – Measure, Analyze, Inform
	Action type	Technical intervention
	Action description	The project combines three interconnected measures to improve data availability and decision-making on air quality and bioclimatic factors in Dortmund. Information Portal: Development of a central online platform (web & app) based on the Environment Agency's DOLIS system. It will present air quality data, expected climate changes, and their health impacts, linking municipal, governmental, and scientific sources. Monitoring Network: Establishment of a dense (citizen-based) measurement network using standardized, low-cost sensors to continuously record particulate matter (PM10, PM2.5) and bioclimatic parameters across the city. Monitoring sites will be selected by the Environment Agency to ensure high data quality. Analysis & Forecasting: Commissioning of an expert report to model the spatial distribution of pollutants, forecast future developments, and assess scenarios considering climate protection measures. By combining these results with noise mapping and socio-spatial data, environmental hotspots will be identified and targeted action plans developed. The project creates a solid data foundation, makes environmental impacts transparent, and fosters acceptance for measures aimed at improving air quality and urban climate.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Innovation and technology development Cooperation and networks

		Market design Public awareness and participation
	Outcome (according to module B-1.1)	Monitor results in Air quality
Implementation	Responsible bodies/person for implementation	Environment Agency, Pollution Control
	Action scale & addressed entities	City administration (for action planning) Citizens Companies, Public authorities, Students, teachers, educational institutions All actual and potential emitters
	Involved stakeholders	Chief Information/Innovation Office Specialist consultants with expertise in pollution control (offices, institutes, LANUV) Dortmund IT Solutions and Digitalization (dosys) Consulting institutes/offices with expertise in pollution control Specialist consultants with expertise in pollution control (offices, institutes, LANUV, DWD) Measuring network setup: Chief Information/Innovation Office; implementation by DOdata, DSW21; Department of Civil Engineering (measuring network installation)
	Comments on implementation – consider mentioning resources, timelines, milestones	The project will require coordinated resources from the Environment Agency, IT services, and citizen participation networks. Key milestones include: (1) Portal design and integration into the city's web and app platforms; (2) Deployment of the sensor network with data validation protocols; (3) Completion of the expert report and publication of forecasts. A phased timeline over 18–24 months is recommended, with early deliverables focusing on portal launch and initial sensor installations to ensure quick public visibility and data flow.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable

	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Contract awarded to an office/joint office for the design and creation of an "air quality" internet platform. Calculated amount: Approx. EUR 15,000 One research assistant, salary group EG 13, estimated cost: EUR 89,286 from 2025, (for the implementation of these measures approx. 20 % FTE financing: Examine funding as part of smart city projects Current funding programs, e.g. as successors to the "Smart Cities Model Projects" or "Digital Model Regions" programs at the state and federal levels DWD and maybe LANUV services possible as part of administrative assistance One research assistant, salary group EG 13, estimated cost: EUR 89,286 from 2025, (around 50 % FTEs to implement these measures) Procurement of sensors (information/advertising, installation/ongoing support of monitoring network, data transmission, data platform; evaluation. Meas. technology: approx. EUR 150 to 250 per station (standard equipment) Contract for data transmission and data processing: 30,000 EUR/yr Replacement of particulate matter sensors every two years: approx. 1,000 EUR/2 yrs (total of over 50 stations) DWD and LANUV services possible as part of administrative assistance Additional cost per new NO_2 measuring station of 1,500 EUR/yr Preparation of report, EUR 50,000

		One research assistant, salary group EG 13, estimated cost: EUR 89,286 from 2025, (around 10 % FTEs to implement these measures) Personnel expenses for any subsequent action plans to be developed Estimation of costs per CO_2 e unit not possible

B-2.2: Individual action outlines O 06		
Action outline	Action name	Local and regional production and marketing
	Action type	Governance and policy, procurement, campaigns
	Action description	The goal is to expand and strengthen the local marketing of food and regional food production. To achieve this, it is important to make existing offers visible, connect them and remove structural barriers to a local supply for Dortmund residents. The primary aim is to boost local marketing by placing local and regional products in food stores and food wholesalers. By linking regional producers with Dortmund's gastronomy sector or canteen kitchens, farmers can count on calculable sales on the one hand, and the catering trade can stand out with newly created, regional and seasonal menus on the other, which encourages guests to use the products in their own kitchens. Furthermore, expansion partnerships in the sense of solidarity agriculture, direct marketing (possibly via food hubs or other forms) and rental gardens promote home cultivation, contribute to food education and also create greater acceptance and appreciation of agriculture. Private cultivation (allotments, gardens, balconies), urban gardening and urban farming projects should be supported and promoted by the city, e. g. via the distribution of the open-source tomato Sunviva as it has been done since. Other examples of further support from the city administration:

		• the creation of urban gardening areas in urban spaces • the enhancement of urban (green) spaces with edible/food-relevant plants/shrubs/trees • the prevention of food waste within the marketing system, addressing and involving housing associations and building owners/landlords • creation of an overview of the demand for regional products in food stores and the needs of urban society for rental gardens or solidarity agriculture to promote the regional cultivation of market crops by farmers • promotion of climate-friendly, organic cultivation in allotment gardens and in private gardens or on balconies • using communication and education as fundamental marketing tools
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Standards, legislation and regulation Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Promotion of local food production
Implementation	Responsible bodies/person for implementation	Climate Protection Management City Administration Politicians
	Action scale & addressed entities	Urban society Consumers People interested in gardening Allotment gardeners Daycare centers, schools
	Involved stakeholders	Food retailers and other food traders Agricultural industry Westphalia-Lippe Agricultural Association (WLV)

		Working Group for Rural Agriculture (AbL) Regional Movement Direct marketers Local weekly markets Solidarity-based agriculture Urban gardening projects Urban farming projects Allotment garden associations Housing associations, building owners/landlords Logisticians
	Comments on implementation – consider mentioning resources, timelines, milestones	Inventory of local stakeholders and regional production and marketing structures Analysis of marketing channels in neighboring municipalities and regional best practice examples Addressing food retailers: How should offers be placed? Where would support from the city be helpful? Addressing other local stakeholders (gastronomy, producers, citizens, housing associations) Creation/strengthening of networks between the stakeholders If necessary for a "Urban Farming" pilot project, establish contact with the ILS, attract investors, assess possible locations and select a location, start project
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable

	Total costs and costs by CO_2 e unit	One research assistant, salary group EG 13, full-time, estimated cost: EUR 89,286 from 2025 per year Travel expenses for networking outside of Dortmund: EUR 800 per year Networking meetings, beverages, etc.: EUR 1,000 per year Possible establishment of a cooperative: Examination of the business concept, registration in the cooperative register, application via a notary (one time, EUR 1,500 - 4,000) Possible "Urban Farming" pilot project: Variable, depending on project design (see funding programs) Estimation of costs per CO_2 e unit not possible

B-2.2: Individual action outlines O 07		
Action outline	Action name	Climate-friendly, healthy food in municipal facilities
	Action type	Governance and policy
	Action description	The city administration of Dortmund strives to be a role model in the area of "healthy and climate-friendly foods". The food offered in all municipal facilities, canteens and out-of-home catering outlets (daycare centers, schools, nursing homes, work and educational facilities) is therefore to be made healthier, more sustainable and more climate-friendly. A jointly developed list of criteria (facilities, cooks, students, climate protection management, nutritionists) can be used to manage and evaluate the tendering/awarding/procurement process in a targeted manner. The city administration can provide supportive advice on the restructuring of canteens and kitchens and on the adaptation of tenders via an advisory office. Some goals to be pursued when restructuring municipal canteens: • Increased use of regional, seasonal and organic food per meal (cooperation between agriculture and canteen kitchens,

		establishing canteen kitchens as points of sale for regional products) • Promotion of tap water as drinking water (possibly in cooperation with the NRW Consumer Association, DEW21 or the "a tip:tap" association) • Reduction of waste products such as to-go cups or containers • Development of a strategy for the use of food waste (composting, fermentation, etc.) and for the prevention of food waste (possibly cooperation with social facilities, "Too Good To Go" food rescue) in municipal facilities. • Saving energy in canteens and canteen kitchens.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Standards, legislation and regulations Financing and promotion Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Promotion of local food production
Implementation	Responsible bodies/person for implementation	Specialist Office for Nutrition Climate Protection Management School administration (Allocation and Procurement Centre) Municipal canteens and kitchens Administration of ither municipal facilities Team International Relations (City of Dortmund)
	Action scale & addressed entities	Users of canteens, out-of-home catering (adults, schoolchildren, children, senior citizens) Cooks in commercial kitchens
	Involved stakeholders	Commercial kitchens Agriculture & NRW Chamber of Agriculture Operators of canteens and cafeterias/caterers

		Providers of all-day childcare (e.g. FABIDO daycare center, school) Workplace Health Promotion (WHP) of the city administration as well as of companies Nursing homes Nutrition experts Allocation and Procurement Centre of the City of Dortmund
	Comments on implementation – consider mentioning resources, timelines, milestones	The project starts with assessing current food supply in municipal facilities and the availability of regional, seasonal, and organic products. Based on best practices (*100-Kantinen*, *NRW KANtinen*, *KEEKS*), a criteria catalogue for climate-friendly procurement will be developed with key stakeholders. Resources include a dedicated municipal nutrition advisory role, budget for training, awareness campaigns, and infrastructure (e.g. tap water stations), plus partnerships with regional agriculture and waste prevention initiatives. Milestones: Data collection, stakeholder workshops, analysis of existing canteens Finalize criteria catalogue, adopt political resolutions, design menu concepts Launch training, install infrastructure, start awareness campaign Ongoing: Annual review and adjustment of practices
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	One research assistant, salary group EG 13, full-time, estimated cost: EUR 89,286 from 2025 per

		year + supplementary advisory services: EUR 5,000 per year, estimation of costs per CO_2 e unit not possible

B-2.2: Individual action outlines O 08		
Action outline	Action name	Sustainable agriculture
	Action type	Network, Campaigns
	Action description	The project aims to strengthen exchange between the municipal administration and the agricultural sector to align needs, share experiences, and identify cooperation opportunities. Together with farmers, associations, landowners, and environmental groups, a strategy for climate-friendly, climate-resilient agriculture will be developed, ensuring that local farms are active contributors to Dortmund's climate protection goals. Exemplary measures include: Increasing food production while reducing waste Promoting sustainable lease agreements to enable organic and innovative cultivation methods and increase regional crops Cooperating with educational and adventure farms for awareness and training Preserving and reactivating regional agricultural structures (e.g. abattoirs, dairies, urban fruit farms) Expanding organic farming
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Standards, legislation and regulation Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Promotion of local food production
Implementation	Responsible bodies/person for implementation	Climate Protection Management Municipal Real Estate Management External advisors for agriculture (WLV, NRW Chamber of Agriculture)

	Action scale & addressed entities	Farmers
	Involved stakeholders	NRW Chamber of Agriculture Westphalia-Lippe Agricultural Association (WLV) Working Group for Rural Agriculture (AbL) Regional Movement Farmers' associations City of Dortmund Landowners Churches (as landowners)
	Comments on implementation – consider mentioning resources, timelines, milestones	Start with best practice analysis and farmer consultations to identify needs and build trust. Establish a stakeholder network to develop a joint strategy for climate-friendly, resilient agriculture, including farm-specific measures. Milestones: Analysis, consultations, network setup Strategy agreement Implementation and annual review
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	One research assistant, full-time, estimated cost EUR 89,286 from 2025 per year + travel expenses – EUR 1,200 per year, estimation of costs per CO_2 e unit not possible

B-2.2: Individual action outlines O 09		
Action outline	Action name	Education for climate-friendly, sustainable nutrition

	Action type	Campaigns
	Action description	To increase awareness and education in the area of climate-friendly nutrition, corresponding offers are to be integrated into municipal structures. The primary goal is to make existing offers, projects and programs in Dortmund visible and connect the respective stakeholders with each other (e.g. ESD, Education - Sustainability - Municipality (BiNaKom) joint project, Team International Relations, WLV). A structured overview of all offers enables the identification of: • Well-running projects that can be further developed or expanded if necessary • Parallel structures that need to be combined • Additional educational needs in the area of climate-friendly agriculture and nutrition In principle, everyone should be able to see a common thread of climate-friendly agriculture and nutrition in the educational modules. Existing education and training measures should be identified and categorized so that, in a next step, a step-by-step concept can be developed from day-care centers to secondary level II and adult education. Offerings that demonstrate the interactions between the following should be available: • Nutrition and greenhouse gases • Nutrition and cultivation • Nutrition and food waste • Nutrition and health • Nutrition and sustainable forms of economic activity
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Cooperation and networks Market design Public awareness and participation

	Outcome (according to module B-1.1)	Promotion of local food production
Implementation	Responsible bodies/person for implementation	Specialist Office for Nutrition Climate Protection Management Department for School administration
	Action scale & entities addressed	Urban society Students, children Interested adults
	Stakeholders involved	Competence Center for Education for Sustainable Development (ESD) Team International Relations (INA) Westphalia-Lippe Agricultural Association (WLV) Westphalia-Lippe Rural Women's Association (WLLV) Urbanist*innen Learning farms / farmers FABIDO as an educational institution Cookbook Museum VHS (Adult Education Centre) Extracurricular learning centres Universities and universities of applied sciences
	Comments on implementation – consider mentioning resources, timelines, milestones	Compilation and analysis of existing offers Identification of missing educational modules that complement the existing educational offerings Organization of stakeholder meetings for the purpose of networking If necessary, development of new offers or combinations of offers Raise awareness of educational offerings in the urban community, daycare centers, schools, adult education centers, etc.
Impact & cost	Generated renewable energy (if applicable)	Not applicable

	Removed/substituted energy, volume, or fuel type	Reduction in the consumption of all resources mentioned or shift to more climate-friendly resources
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	One research assistant, salary group EG 13, full-time, estimated cost EUR 89,286 from 2025 per year, estimation of costs per CO_2 e unit not possible

B-2.2: Individual action outlines O 10		
Action outline	Action name	The Dortmund CO_2 calculator (Klix[3])
	Action type	Technical Intervention, Campaigns
	Action description	Developments in recent years and decades show that the population's CO_2 footprint has remained constant. There are many tips and opportunities for citizens to optimize their footprint by making minor adjustments in everyday life regarding mobility, consumer behaviour, nutrition, or energy issues. Since these adjustments are all individual decisions, the information needs to be presented transparently to the citizens of Dortmund. On the one hand, information should be provided about how much emissions they are (co-)causing, and on the other hand, the associated local options should be pointed out. The CO_2 calculator is intended to provide information on climate-neutral behaviour. This can be information on local activities or mobility services as well as national and state-wide funding opportunities. The CO_2 calculator can also be used for a competition between citizens, whereby rankings and placings are provided as positive incentives for citizens to lead to a more sustainable lifestyle. In addition

		to energy consumption and mobility behaviour, the calculator is intended above all to positively influence general consumption and eating habits. The results of the CO_2 calculator shall be calculated using local data wherever possible so that local changes in behaviour can have a direct impact on your own carbon footprint. At the same time, the City of Dortmund can obtain important information on the measures, information and incentives introduced based on the CO_2 footprint of its citizens.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Innovation and technology development Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Increase awareness for responsibility regarding climate protection
Implementation	Responsible bodies/person for implementation	Environment Agency
	Action scale & entities addressed	Environment Agency Department for Marketing + Communication Chief Information/Innovation Office Economic Development Agency Citizens
	Stakeholders involved	TU Dortmund University Dortmund University of Applied Sciences and Arts BUND DEW21
	Comments on implementation – consider mentioning resources, timelines, milestones	Identification of existing CO_2 calculators for private individuals (done) Selection of a CO_2 calculator (done: Klix[3]) Integration of the CO_2 calculator into the homepage of the City of Dortmund

		Links to local initiatives and opportunities for behavioural change
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Reduction in the consumption of all resources mentioned or shift to more climate-friendly resources
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions offset (natural or technological sinks)	Not applicable
	Total costs and costs per CO_2 e unit	Salary €89,286.00 from 2025 per year, estimation of costs per CO_2 e unit not possible

B-2.2: Individual action outlines O 11		
Action outline	Action name	Support for the Schulte-Tigges educational farm - planting an agroforestry system with subsequent permaculture
	Action type	Network
	Action description	The City of Dortmund supports the Schulte-Tigges educational farm, which is working with children and young people from neighboring districts to establish an agroforestry and subsequent permaculture. Agroforestry models are a modern approach in which rows of trees are integrated into arable farming. The trees create a good CO_2 reservoir, erosion can be mitigated and the water retention capacity in the upper soil layers is strengthened. The Schulte-Tigges educational farm is a hands-on farm focusing on agriculture, nutrition, nature, the environment and consumption in the north of Dortmund. As part of a solidarity farming initiative, they supply around 200 households in and around Dortmund with regional, seasonal, organic vegetables. The educational program on the topics of agriculture, nature, nutrition and consumption is aimed at all target groups from children to adults. As an extracurricular place of learning, it is visited by numerous schools and

		daycare centers, primarily from the north of Dortmund. In 2020, the farm was the first place of learning in Dortmund to be awarded the NRW Education for Sustainable Development certificate.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Cooperation and networks Market design Public awareness and participation
	Outcome (according to module B-1.1)	Increase awareness for sustainable farming
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation.
	Action scale & addressed entities	Specific target groups such as young people, companies or farmers, depending on the focus of the measure.
	Involved stakeholders	Educational institutions: Research support and knowledge exchange. Note: The project was/is designed and implemented by Lernbauerhof Schulte-Tigges, Kümper Heide 21, 44329 Dortmund.
	Comments on implementation – consider mentioning resources, timelines, milestones	Implementation involves coordinated planning of tree planting, soil preparation, and subsequent permaculture integration, with milestones including species selection, planting seasons, and establishment of maintenance routines. Resources include volunteer groups, agricultural experts, seedlings, tools, and educational materials for workshops with children and youth. Timelines follow seasonal cycles, ensuring optimal planting conditions and gradual development of the agroforestry into a functioning permaculture system.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable

	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (installation, acquisition, etc.): [14,000.00 Euro]

B-2.2: Individual action outlines O 12		
Action outline	Action name	Print Green - Ecological printing with inkjet systems
	Action type	Technical intervention
	Action description	Offering ecological printing with inkjet technology (business inkjet) and optimising the printer fleet according to environmental factors is part of GREEN IT's service portfolio. By combining business inkjet with optimisation measures, such as the use of a duplex quota, the reduction of ink application and a consumption-based billing model, environmentally conscious action in the office printing sector is rewarded with cost savings. This catalogue of measures takes into account the values that apply to GREEN IT customers in Dortmund. When it comes to printing today, there is no way around modern inkjet solutions. Business inkjet printers score highly thanks to their pollutant-free technology and extremely low power consumption. Up to 83 % less power consumption and CO_2 emissions than laser technology, as no warm-up is required for start-up. Up to 96 % fewer consumables as there are fewer replacement components.
Reference to impact pathway	Field of action	Green infrastructure & nature-based solutions
	Systemic lever	Innovation and technology development Co-operation and networks Market design
	Outcome (according to module B-1.1)	Resource conservation
Implementation	Responsible bodies/person for implementation	Private sector: Companies that are responsible for operational implementation.

		Note: GREEN IT Das Systemhaus GmbH from Dortmund in co-operation with the partner/manufacturer Epson Germany
	Action scale & addressed entities	Specific target groups such as young people, companies or farmers, depending on the focus of the measure. Note: B2B - companies of all sizes and sectors, Germany-wide; however, only companies from the Dortmund city area are included in the above calculation
	Involved stakeholders	Start-ups and technology providers: Innovation and technical solutions. Note: GREEN IT Das Systemhaus GmbH from Dortmund in co-operation with the partner/manufacturer Epson Germany
	Comments on implementation – consider mentioning resources, timelines, milestones	Implementation includes assessing existing printer fleets, defining optimization targets, and phasing in business inkjet systems. Key milestones involve equipment rollout, configuration of eco-print settings (duplex, reduced ink use), and training for end users. Resources include the new inkjet devices, software for monitoring consumption, and service teams for installation and support. Timelines are flexible, with staged integration to minimize disruption and quickly realize energy and cost savings.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [based on savings at customers in the Dortmund city area, use of inkjet systems vs. comparable laser systems = 97.67 tonnes p.a.].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Not applicable

B-2.2: Individual action outlines O 13

Action outline	Action name	supraraum – details are the city
	Action type	Network
	Action description	The 'supraraum' is a venue in Dortmund's city centre addressing social issues such as innovative processes, cultural influences, and developments in urban and rural areas, with the aim of fostering positive regional change. It focuses on challenges of urbanisation, digitalisation, and climate change to promote forward-looking and inclusive urban development. The first four themed events – crossfading city, transforming city, unlearning city, and reading city – are designed to move from reflection to concrete action. Next steps involve shaping, testing, and communicating transformation together with stakeholders from Dortmund's urban environment.
Reference to impact pathway	Field of action	Other (AFOLU)
	Systemic lever	Co-operation and networks Public awareness and participation
	Outcome (according to module B-1.1)	Increase awareness for sustainable urban planning
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation.
	Action scale & addressed entities	The entire population: sensitisation and education on climate protection topics. Specific target groups such as young people, companies or farmers, depending on the focus of the measure.
	Involved stakeholders	Educational institutions: Research support and knowledge exchange. Note: Existing and possible collaborations: Dortmund Kreativ, Smart City Dortmund Alliance, to:DO, ruhrvalley Innovation Network, NRW Chamber of Architects, Baukunstarchiv NRW, polis - Magazin, Dortmund Municipal Museums, Dortmund Universities, Dortmund Technology Centre, IGA2027, companies in Dortmund. Local communities and citizens' initiatives: Participation and involvement in local projects.

		Note: Dr. Martin Kiel, the black frame, www.theblackframe.com; André Maaßen, Art des Hauses, www.art-des-hauses.com.
	Comments on implementation – consider mentioning resources, timelines, milestones	Implementation is structured around themed event series, with milestones including concept development, stakeholder engagement, and public workshops. Resources involve event spaces, facilitation teams, communication channels, and partnerships with local actors in urban development. Timelines align with the scheduled event cycles, enabling progressive transition from dialogue to actionable projects that address urbanisation, digitalisation, and climate change.
Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Not applicable
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Not applicable

B-2.2: Individual action outlines O 14		
Action outline	Action name	Network in the harbour area
	Action type	Network
	Action description	The network provides a platform for female entrepreneurs to exchange best practices in climate protection, define common goals, and develop solutions. Regular meetings, workshops, and events foster knowledge sharing and collaboration. In cooperation with public institutions such as the Environment Agency, participants can strengthen environmental awareness, demonstrate commitment to sustainability, and benefit from administrative expertise and resources.
	Field of action	Other (AFOLU)

Reference to impact pathway	Systemic lever	Funding and promotion Co-operation and networks
	Outcome (according to module B-1.1)	Promotion of climate protection in the private sector
Implementation	Responsible bodies/person for implementation	Public sector: governments, local authorities for strategic planning and implementation. Note: Public authorities: Environment Agency, Economic Development Agency, Chamber of Industry and Commerce, Urban Planning and Building Regulation Office, local harbour entrepreneurs
	Action scale & addressed entities	Specific target groups such as young people, companies or farmers, depending on the focus of the measure. Note: Female entrepreneurs based in the harbour area
	Involved stakeholders	Female entrepreneurs in the harbour area – Core target group, contributing ideas, experience, and resources. Public bodies (e.g. Environment Agency) – Provide expertise, resources, guidance, and potentially funding. Workshop and event organisers – Plan and facilitate meetings, workshops, and networking sessions. Local business associations / chambers of commerce – Potential partners for outreach and member engagement. Community / local residents – Indirect beneficiaries of the network's sustainability initiatives.
	Comments on implementation – consider mentioning resources, timelines, milestones	Implementation is based on establishing a structured event calendar with regular meetings, workshops, and networking sessions. Milestones include initial stakeholder mapping, launch event, and the development of shared climate protection goals. Resources comprise meeting venues, facilitation teams, communication tools, and collaboration with public bodies such as the Environment Agency. Timelines are cyclical, ensuring continuous knowledge exchange and progressive development of joint sustainability initiatives.

Impact & cost	Generated renewable energy (if applicable)	Not applicable
	Removed/substituted energy, volume, or fuel type	Not applicable
	GHG emissions reduction estimate (total) per emission source sector	Savings in greenhouse gas emissions in tonnes of CO_2 equivalent [cannot be measured at this stage. A reduction is assumed].
	GHG emissions compensated (natural or technological sinks)	Not applicable
	Total costs and costs by CO_2 e unit	Initial costs (set-up, purchase, etc.): [6,000 euros] Costs (operation, maintenance, etc.): [still open]

3.2.6 Green Infrastructure

Green infrastructure encompasses measures such as roof and façade greening, unsealing, urban open spaces, urban plantings, parks, urban gardens and green traffic areas. It is an essential component of climate-resilient urban planning, as it promotes several ecological, climatic and social goals at the same time. A defining asset of Dortmund is its rich green infrastructure: around 50 % of the city area consists of parks, forests, agricultural land and open spaces. Despite the high proportion of green infrastructure, numerous further measures are planned to secure those areas and expand it.

Roof and façade greening

In future, green roofs will be mandatory in development plans for new buildings or when redesigning existing flat roofs, provided they serve climate protection, the cityscape or water management purposes. The city of Dortmund offers subsidies of up to 50 % of the costs for greening and unsealing measures, as well as savings on wastewater charges.[23]

There are separate subsidies for social institutions. One example is the Soziale Zentrum Dortmund e. V., which received funding (approx. €1.53 million) for façade insulation, roof and façade greening, unsealing and greening of the surrounding area. These measures improved the microclimate, reduced heating energy requirements and supported the CO_2 balance – without specifying concrete figures.[24]

Other green spaces and projects

Phoenix Park (60 hectares, part of the Emscher Landscape Park) and the UmweltKulturPark (12 hectares of permaculture) are striking examples of urban green spaces that promote

[23] City of Dortmund, n. d., Promotion of roof and facade greening and unsealing

[24] Zentrum KlimaAnpassung, n. d., Stadt Dortmund - Fassadenerneuerung [City of Dortmund – Facade renovation]

biodiversity and fulfil climate-ecological functions. The Tremoniapark, located on a former industrial site, on the other hand also shows how urban transformation can be achieved through green spaces – complemented by ecological construction projects and rainwater management in the 'WohnreWir' residential quarter.

Furthermore, the forest of Dortmund covers up to 14 % of the area and has thus increased by 77 % since the 1960s. Some of the trees in those forests are over 100 years old, significantly impacting local biodiversity and forest structure. The city's forests are extremely important for the quality of life and well-being of Dortmund's citizens. The forest has various utilitarian, protective, and recreational functions. According to a UN study, forests provide basic services (e.g. photosynthesis and soil formation), supply services (e.g. wood, drinking water, game meat and fruit), regulatory services (e.g. local climate protection through air cooling and filtering out fine dust, storing CO_2, producing O_2, filtering water, providing flood protection, noise protection and visual protection) and cultural services (e.g. education, sport, spirituality, art and forest aesthetics)[25].

City-wide concepts: 'Green Wall – Green City'

The greening concept 'Green Wall – Green City' was awarded a landscape architecture prize in 2024. It forms the central basis for greening and climate adaptation in Dortmund's city centre and aims to sustainably redesign the urban structure of the Wallring, thus creating a climate-resilient, liveable city centre in which urban climate stresses such as heat and pollution are further reduced.[26] The concept is incorporated into the 'Master Plan for Squares' and serves as a planning basis in the urban development process.[27]

Overview of measures:

- Trees and planting areas
    - Replanting and adding trees along the ramparts.
    - Creating continuous rows of trees that provide shade, improve the microclimate and bind fine dust.
    - Creation of additional planting areas in previously heavily sealed areas.
- Roof and façade greening
    - Greening of building façades along the rampart to reduce summer heat and improve the quality of life.
    - Extensive and intensive roof greening, also to promote rainwater retention.

[25] Reid, W., Mooney, H., Cropper, A., & Capistrano, D. (2005). *Millennium Ecosystem Assessment. Ecosystems and Human Well-Being: Synthesis*. Island Press.

[26] City of Dortmund, 2024, Greening concept "Green Wall - Green City" wins landscape architecture prize

[27] Wir in Dortmund, 2023, 5.760 Tonnen weniger CO_2, mehr Sicherheit im Straßenverkehr: Projekt Emissionsfreie Innenstadt blickt zurück und nach vorn [5,760 tonnes less CO_2, greater road safety: the Emission-Free City Centre project looks back and ahead]

- Unsealing and rainwater management
    - Removal of asphalt and concrete surfaces where possible.
    - Installation of rainwater infiltration trenches and water-permeable surfaces to improve infiltration and reduce the risk of flooding.
    - Integration of blue infrastructure (e.g. open gutters, water features) to cool and increase the attractiveness of the urban space.
- Upgrading of squares and recreational areas
    - Greening of squares along the wall, e.g. with trees, shaded seating and cooling elements.
    - Improvement of pedestrian connectivity and promotion of active mobility through more attractive, cooler routes.
- Climate simulations and scientific basis
    - As part of the concept, climate simulations were created to show how the planned greening measures will mitigate temperature peaks and improve the supply of fresh air.
    - This data serves as a basis for integration into the master plan for public spaces and other urban development processes.

Ecological effects – CO_2 effects and climate benefits

- CO_2 binding and savings

  Vegetation (roof and façade greening, parks, gardens) binds CO_2, improves air quality and acts as a natural air conditioning system.[28] Exact CO_2 values are usually difficult to quantify, as they depend heavily on location, plant species, growth phase and care. Insulation measures (e.g. at the social centre) reduce heating energy requirements and thus CO_2 emissions, but cannot be quantified across the board.[29]

- Further climate benefits

  Green spaces mitigate the heat island effect by providing shade and promoting water infiltration, evaporative cooling and air circulation, which helps to better control heavy rainfall events.
  They contribute to reducing air pollutants and unsealing, which relieves the natural water balance and strengthens urban resilience.[30]

[28] Wir in Dortmund, 2019, Klimaschutz: Viel Potenzial für grüne Dächer [Climate protection: Great potential for green roofs]
[29] Zentrum KlimaAnpassung, n. d., Stadt Dortmund - Fassadenerneuerung City of Dortmund – Facade renovation]
[30] IHK zu Dortmund, 2024, Förderprogramme "Biologische Vielfalt" [Funding programs for 'Biological Diversity']

Table 22: Role of green infrastructure in the Climate City Contract Dortmund

Effect	Comment
Microclimate	Heat reduction, air purification, water management
CO_2 binding & savings	Vegetation binds CO_2, insulation saves energy
Resilience & quality of life	Unsealing, quality of stay, biodiversity
Scientific planning	Concepts such as the 'Green Wall' form the basis for measures

The integration of green infrastructure in the Climate City Contract offers a multi-layered solution for climate, environmental and urban development policy. Although it is difficult to quantify exact CO_2 values, one thing is clear: every measure – from green roofs and green facades to parks – makes a positive contribution to reducing climate impact. Green infrastructure is therefore a key component in making Dortmund more climate-neutral, resilient and liveable.

3.2.7 Summary strategy for residual emissions

The City of Dortmund is prioritising the reduction of greenhouse gas emissions to the greatest possible extent by 2030, with a focus on efficiency, consistency and sufficiency. Despite these efforts, certain emissions in various sectors will remain unavoidable.

Based on 2019 emissions of 3,670 kt CO_2eq and the NetZeroCities economic model with an 80 % reduction scenario, approximately 752 kt CO_2eq/year of residual emissions would remain unavoidable by 2030 (including Scope 3 emissions, according to NetZeroPlaner). Compensation is only considered as a last resort, with clear priority given to energy efficiency, expanding renewable energy, and saving energy.

By 2030, residual emissions are projected to represent 20 % of the total, with 15 % coming from transport, 52 % from buildings and heating, 22 % from electricity generation, 3 % from waste and 8 % from other sources (including IPPU and AFOLU).

Transport sector – 111 kt CO_2e (15 %)

Due to the complexity of transitioning a sector shaped by many decision-makers and diverse mobility patterns, residual emissions from transport will remain significant. Fossil fuel-powered private cars are expected to account for a large proportion of these emissions. As local governments only have partial control over the transport sector, the maximum reduction achievable by 2030 is estimated to be around 87 % compared to 2019 levels. While this Action Plan sets out measures to encourage the use of cleaner alternatives, achieving substantial reductions will require the active involvement of the urban society to help move the transport sector towards climate neutrality.

Buildings & Heating as well as Electricity – 556 kt CO_2e (74 %)

Although significant reductions in CO_2 emissions are expected through the decarbonisation of the energy and heating sectors, some residual emissions will inevitably remain due to processes that are difficult or impossible to decarbonise completely. In industry, for example, certain CO_2-generating activities cannot be eliminated. In the heating sector, technical challenges persist, particularly in older city centre buildings that currently rely on natural gas.

Therefore, residual emissions are largely tied to individual heating systems. While many households still use natural gas for heating. A multifaceted strategy involving financial incentives, education and retrofitting support will be required to transition to cleaner heating solutions. Multi-apartment buildings pose an additional challenge, as decision-making among co-owners is often complicated by differing financial means and priorities.

Waste – 26 kt CO_2e (3 %)

With an estimated total greenhouse gas emission of around 26 kt CO_2eq from the city in 2030, the waste sector will account for only a small proportion of the overall emissions. Some Scope 3 emissions will persist beyond this point due to the continued transportation of waste to incineration facilities outside the city. Closing the waste management loop through innovative solutions, together with advances in wastewater treatment, will be essential. However, a comprehensive assessment of the potential impact of these initiatives is currently hindered by limited data and knowledge.

Other (incl. IPPU & AFOLU) – 59 kt CO_2e (8 %)

The action plan follows an ambitious pathway for cutting emissions from *energy use* in the industrial sector. By 2030, most of the remaining emissions will stem from *industrial processes* that are difficult to eliminate.

Residual agricultural emissions originate primarily from the following sources: methane emissions from livestock, emissions from fertiliser stocks, and emissions resulting from manure application and other farming practices on agricultural land.

Working on possible solutions, the following actions need to be refined; resource-efficient management of all cultivated land could save approximately 4,600 t CO_2e per year. Dietary changes also present a major opportunity: aligning consumption patterns with more sustainable trends could potentially reduce emissions by 137,640 t CO_2e annually. Additionally, tackling food waste offers possible savings of 82,900 t CO_2e per year, of which

43,100 t CO_2e could be achieved at the citizen level (all values including Scope 2 & 3 emissions)[31][32].

As a complementary approach, an increase in organic and vegetarian catering is proposed, with targets for the share of organic food set at a minimum of 20 %, rising to 30 % in 2028/2029 and 50 % in 2030/2031. Together, these measures address both production- and consumption-related drivers of agricultural emissions, offering a broad and integrated pathway for emission reductions in the sector. Even though these changes will require the active involvement of the urban society also.

Natural offsets/sinks and other offsets for residual emissions:

While the City of Dortmund is aiming to minimise greenhouse gas emissions through ambitious mitigation measures, residual emissions will still be present after 2030. As reducing emissions to zero within a short timeframe is not feasible, the city will pursue a combination of technological and nature-based solutions to manage and compensate for these emissions.

Technological options, including the direct capture of CO_2 from process gases and post-combustion carbon capture (PCCC), are of particular interest to the municipality. This is due to the possibility of retrofitting larger CO_2 sources, such as combined heat and power plants, which are under the municipality's responsibility. In contrast, direct air capture (DAC) is most likely unsuitable for municipal use due to its high energy demands and costs. Meanwhile, carbon capture and utilisation (CCU) is only relevant in specific industrial applications, which often fall outside the remit of city administrations. Although carbon capture and storage (CCS) infrastructure is emerging in parts of Europe, the associated high connection costs make near-term implementation unlikely. Overall, carbon capture is expected to play only a minor role in achieving climate neutrality by 2030. In parallel, the City of Dortmund will prioritise nature-based solutions. This will include expanding green infrastructure, developing forests as natural carbon sinks, improving soil management and supporting regional, national and international climate projects.

The urban forest of Dortmund currently covers an area of 2,526 hectares. More than half of this area (56 %) is dominated by native deciduous tree species, particularly European beech (*Fagus sylvatica*) and various oak species (*Quercus robur* and *Quercus petraea*). The forest's high level of naturalness is reflected in this exceptionally high proportion of native deciduous tree species. Around 900 hectares of the forest consists of stands that are over 100 years old, which provides significant ecological value and potential for biodiversity. At the time of the most recent forest inventory (January 2015), the standing timber stock averaged 218 cubic

[31] City of Dortmund, 2023, Anpassung des Handlungsprogramms Klima-Luft 2030 an das Ziel Klimaneutralität bis 2035 [Adaptation of the Climate-air 2030 Action Plan to the goal of climate neutrality by 2035] pp. 55-60

[32] Clark et al., 2020, Global food system emissions could preclude achieving the 1.5° and 2°C climate change targets

metres per hectare, amounting to a total timber volume of around 520,000 cubic metres across the entire forest. The mean annual increment was estimated at 7.5 m³/ha/year. Eighteen forest sites, covering 132 hectares in total (around 5 % of the forest area), have been marked for natural forest development, where natural processes are permitted to unfold without human intervention. Assuming an average dry bulk density of 680 kg/m³ for European beech, an growth rate of 7.5 m³/ha/year and a beech population density of 50 % of the urban forest area, the CO_2 sequestration rate is estimated to be around 11,000 t CO_2eq/year.

Forest management follows the Dauerwald structural model (continuous-cover forestry), with the long-term aim of developing a near-natural mixed deciduous forest. The target structure comprises a framework of large-diameter, old trees of various site-adapted, climate-resilient species, with all age classes represented in small-scale, irregular groupings (known as the 'Plenterwald' structure). Clear-cutting and whole-tree harvesting are avoided at all costs. Particular emphasis is placed on protecting the forest soil and enabling undisturbed soil development.

One of the strategic objectives is to increase the forest's timber reserves. The long-term target for standing stock is a dynamic timber volume of 400 m³ per hectare — approximately double the current level — while maintaining ecological integrity. The City Council is actively supporting forest development by mandating the planting of 5,000 'future trees' each year, as well as one tree for each newborn child. These measures are intended to enhance forest resilience, biodiversity and carbon sequestration capacity over the coming decades. Furthermore, the increase in tree numbers and dynamic timber volume will impact the urban forests of Dortmund's potential as a carbon sink.

However, in addition to the urban forest, Dortmund has the potential for further sinks, some of which are very small-scale. These include recreational areas, such as green spaces, parks and allotment gardens, as well as cemeteries. These areas cover a total of 2,368 hectares. The city's greening plan specifically addresses these areas within the historic city centre. This includes upgrading public green spaces (including planting trees), planting trees in general and increasing vertical and roof greening (extensive and intensive). As well as preventing heat stress for citizens and increasing retention volume, many of these measures are also suitable for sequestering CO_2 on a small scale. Those and other potential carbon sinks weren't quantified during the preparation of the CCC due to the lack of data. The Transition Team will focus on finding more technical solutions and possibilities to reduce the residual emissions. For this outcome a collaboration with the universities in Dortmund and neighbouring regions will be addressed and the chapter will be updated in the next iterations.

Offsetting residual emissions will focus on high-quality carbon credits, particularly from projects within EU countries or neighbouring states. However, the city has not yet finalised a comprehensive residual emissions strategy. Nevertheless, the city is committed to developing one through the Climate-Air Action Programme 2030, updates to the Climate City Contract and climate-oriented budget planning. Collaboration with private companies

will be essential for technological innovation and for their own ESG and carbon neutrality initiatives, which will contribute to offsetting a significant proportion of residual emissions.

3.3 Module B-3 Indicators for Monitoring, Evaluation and Learning

Module B-3 "Indicators for Monitoring, Evaluation and Learning" contains a selection of indicators to monitor and evaluate progress along the selected impact pathways and fields of action described in Module B-1, as well as a monitoring and evaluation plan, i.e., metadata on each indicator selected, in addition to milestones and timeline. More specifically:

- An overview table listing the indicators selected per outcome and impact, including targets and evaluation points (B-3.1);
- A metadata table for each indicator selected (B-3.2).

Table 23: List of economic indicators including baseline and target (2030) (B 3.1)

Sector	Indicator	Indicator Unit	Indicator Baseline	Indicator Target 2025	Indicator Target 2027	Indicator Target 2030
Transport	Reduced motorized passenger transportation need	% reduction by 2030	0 %	19,09 %	25,45 %	35 %
	Reduced passenger kilometres by car through shift to public & non-motorized transportation	% reduction in car passenger kilometres by 2030	0 %	17,45 %	23,27 %	32 %
	Car pooling	Average passengers per car	1,4	1,55	1,60	1,68
	Electrification of cars + motorcycles by 2035	% of fleet electrified	3 %	20 %	26 %	34 %
	Electrification of buses	% of fleet electrified	0 %	54,55 %	72,73 %	100 %
	Optimization of trucking logistics – light duty trucks (< 3.5 t)	Average utilization of maximum load weight for light duty trucks (< 3.5 t)	23 %	35 %	39 %	45 %

	Optimization of trucking logistics – heavy duty trucks (> 3.5 t)	Average utilization of maximum load weight for light duty trucks (> 3.5 t)	45 %	53,18 %	55,91 %	60 %
	Electrification of light duty trucks <3.5t by 2034	% of fleet electrified	1 %	54 %	72 %	98 %
	Electrification of heavy duty trucks >3.5t by 2034	% of fleet electrified	0 %	32 %	43 %	59 %
Buildings & Heating	Building renovations (envelope)	% annual renovation rate	1,0 %	3,18 %	3,91 %	5,0 %
	New buildings built to top performing standard	% of buildings built to the top standard	0 %	27 %	36 %	50 %
	Heating technologies	Share of heating as district heating	8 %	22,18 %	26,91 %	34 %
	Decarbonizing district heating	Share of district heating produced using fossil fuels	68 %	30,91 %	18,55 %	0 %
	Decarbonizing district heating	Share of district heating produced using electric heat pumps	0 %	16,91 %	22,55 %	31 %
	Decarbonizing district heating	Share of district heating produced using bio fuels	0 %	7,09 %	9,45 %	13 %
	Heating technologies	Share of heating as local heating	92 %	77,82 %	73,09 %	66 %
	Decarbonizing local heating	Share of local heating produced using fossil fuels	100 %	78,18 %	70,91 %	60 %
	Decarbonizing local heating	Share of local heating produced using electric heat pumps	0 %	16,91 %	22,55 %	31 %

	Decarbonizing local heating	Share of local heating produced using bio fuels	0 %	4,91 %	6,55 %	9 %
Electricity	Efficient lighting and appliances	% annual renovation rate	1,0 %	3,18 %	3,91 %	5,0 %
	Renewable / fossil fuel electricity production	Share of electricity produced using fossil fuels	42 %	22,91 %	16,55 %	7 %
Waste	Paper recycling	% recycling rate	87 %	91,91 %	93,55 %	96 %
	Metal recycling	% recycling rate	64 %	67,27 %	68,36 %	70 %
	Plastic recycling	% recycling rate	53 %	55,73 %	56,64 %	58 %
	Glass recycling	% recycling rate	68 %	71,82 %	73,09 %	75 %
	Organic recycling	% recycling rate	50 %	52,73 %	53,64 %	55 %

B-3.2: Indicator Metadata	
Indicator Name	Reduced motorized passenger transportation need
Indicator Unit	% reduction by 2030
Definition	
Calculation	Passenger kilometres / capita
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co- benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality, lower noise emissions
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Mobility Planning FB 61/3; Google EIE

Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Reduced passenger kilometres by car through shift to public & non-motorised transportation
Indicator Unit	% reduction by 2030
Definition	
Calculation	Passenger car kilometres / total number of citizens of the City of Dortmund
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality, lower noise emissions
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See Table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Mobility planning FB 61/3, DSW21, Google EIE
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	

Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator Metadata	
Indicator Name	Car pooling
Indicator Unit	Average passengers per car
Definition	
Calculation	
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co- benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality, lower noise emissions
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Google EIE, national average
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Electrification of cars + motorcycles
Indicator Unit	% of fleet electrified

Definition	
Calculation	(number of electrified vehicles)/ (total number of vehicles)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality, lower noise emissions
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See Table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Driving Licence Registration Office, Federal Motor Transport Authority
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Electrification of buses
Indicator Unit	% of fleet electrified
Definition	
Calculation	(number of electrified vehicles)/ (total number of vehicles)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]

If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality, lower noise emissions
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See Table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DSW21
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Optimisation of trucking logistics – light duty trucks (< 3.5 t)
Indicator Unit	Average utilisation of maximum load weight for light duty trucks (< 3.5 t)
Definition	
Calculation	
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	[no]
If yes, which co-benefit does it measure?	

Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Companies participating in the CCC, Statistical Yearbook Dortmund
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Optimisation of trucking logistics – heavy duty trucks (> 3.5 t)
Indicator Unit	Average utilisation of maximum load weight for light-duty trucks (> 3.5 t)
Definition	
Calculation	
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	[no]
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See Table B-1.1

Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Companies participating in the CCC, Statistical Yearbook Dortmund
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Electrification of light-duty trucks <3.5t
Indicator Unit	% of fleet electrified
Definition	
Calculation	(number of electrified vehicles)/ (total number of vehicles)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality, lower noise emissions
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See Table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Driving Licence Registration Office, Federal Motor Transport Authority, Statistical Yearbook Dortmund

Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Electrification of heavy-duty trucks >3.5t
Indicator Unit	% of fleet electrified
Definition	
Calculation	(number of electrified vehicles)/ (total number of vehicles)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality, lower noise emissions
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Mobility & transport See Table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Driving Licence Registration Office, Federal Motor Transport Authority, Statistical Yearbook Dortmund
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	

Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Building renovations (envelope)
Indicator Unit	% annual renovation rate
Definition	
Calculation	
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[no]
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Thermal energy demand CO_2 inventory, Municipal Heat Planning (KWP), heated building area housing market report, census
Is the data source local or regional/national?	local
Expected availability	annual/biennial
Suggested collection interval	annual/biennial
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	New buildings built to top performing standard

Indicator Unit	% of buildings built to the top standard
Definition	
Calculation	(new buildings with performing standard)/ (total new buildings)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[no]
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Housing market report, Statistical Yearbook Dortmund
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Heating technologies
Indicator Unit	Share of heating as district heating
Definition	
Calculation	(district heating consumption) / (total heat consumption)
Indicator context	

Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Decarbonising district heating
Indicator Unit	Share of district heating produced using fossil fuels
Definition	
Calculation	(district heating generation from fossil fuels) / (total district heating generation)
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]

If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See Table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Decarbonising district heating
Indicator Unit	Share of district heating produced using electric heat pumps
Definition	
Calculation	(district heating generation from heat pumps) / (total district heating generation)
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1

Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Decarbonising district heating
Indicator Unit	Share of district heating produced using biofuels
Definition	
Calculation	(district heating generation from heat pumps) / (total district heating generation)
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See Table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)

Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Heating technologies
Indicator Unit	Share of heating as local heating
Definition	
Calculation	(district heating consumption) / (total heat consumption)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	

Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Decarbonising local heating
Indicator Unit	Share of local heating produced using fossil fuels
Definition	
Calculation	(local heating generation from fossil fuels) / (total local heating generation)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Decarbonising local heating

Indicator Unit	Share of local heating produced using electric heat pumps
Definition	
Calculation	(local heating from heat pumps) / (total local heating generation)
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Decarbonising local heating
Indicator Unit	Share of local heating produced using biofuels
Definition	
Calculation	(local heating generation from biofuels) / (total local heating generation)
Indicator Context	

Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, Energy Usage Plan (ENP) & Municipal Heat Planning (KWP)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Efficient lighting and appliances
Indicator Unit	% annual renovation rate
Definition	
Calculation	
Indicator Context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Buildings and heating
Does the indicator measure indirect impacts (i.e., co-benefits)?	[no]
If yes, which co-benefit does it measure?	

Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	Thermal energy demand CO_2 inventory, real estate industry
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Renewable/fossil fuel electricity production
Indicator Unit	Share of electricity produced using fossil fuels share of electricity produced using renewable fuels
Definition	
Calculation	There is a national value Local (DEW21 value of renewable electricity) * 0.6 + (national value renewable electricity) * 0.4 DEW21's (local energy supplier) market share in Dortmund: 60.1 %
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Electricity
Does the indicator measure indirect impacts (i.e., co-benefits)?	[yes]
If yes, which co-benefit does it measure?	Improvement of air quality

Is the indicator useful for monitoring the output/impact of action(s)?	[yes]
If yes, which action and impact pathway is it relevant for?	Energy systems See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	DoNetz, DEW21, federal electricity mix (national electricity mix)
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

B-3.2: Indicator metadata	
Indicator name	Paper recycling Metal recycling Plastic recycling Glass recycling Organic recycling
Indicator Unit	% recycling rate
Definition	
Calculation	
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	[yes]
If yes, which emission source sectors does it measure?	Waste
Does the indicator measure indirect impacts (i.e., co-benefits)?	[no]
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	[yes]

If yes, which action and impact pathway is it relevant for?	Waste & circular economy See table B-1.1
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	[yes/no]
Data requirements	
Expected data source	EDG, Statistical Yearbook Dortmund, LANUV's waste balance report
Is the data source local or regional/national?	local
Expected availability	annual
Suggested collection interval	annual
References	
Deliverables describing the indicator	Economic model
Other indicator systems using this indicator	

The list of indicators was not developed with stakeholders. However, future cooperation with stakeholders is important, as they provide the data required for the indicators. Furthermore, there are areas where indicators would have been desirable but do not currently appear feasible.

In connection with co-benefits such as reduced noise pollution, indicators for reduced noise pollution were sought in collaboration with the team 'Immission Control' located within the Environmental Agency. However, no suitable indicator could be found, as the data for direct measurement in decibel (dB) is currently only updated every 10-15 years and the creation of a clean indicator for indirect measurement currently seems unrealistic. E. g., an indirect measurement of reduced noise pollution was considered by looking at the change from 50 kilometers an hour (km/h) zones to 30 km/h zones. However, this does not seem feasible, as main roads cause the most traffic, but at the same time most 30 km/h zones are not main roads, meaning that the figures cannot be put into a reasonable comparison. In addition, there are roads that are 30 km/h zones during the day, for example, but 50 km/h zones at night.

However, the question of further indicators for co-benefits such as reduced noise pollution will be revisited in future CCC iterations.

Additionally, air pollution control is monitored by team 'Immission Control' as well, in accordance with the provisions of the 39th Ordinance for the Implementation of the Federal Immission Control Act (BImSchV). There are several locations in the City of Dortmund where either the city itself or the State Office for Nature, Environment and Climate North Rhine-Westphalia (LANUK) measures particulate matter and NO_2 using passive collectors and measuring containers. The City of Dortmund has recently complied with the limit values.

Nevertheless, it should be noted that a new EU directive (2024/2881) has been in force since 2024 and must be transposed into national law by 2026. This new EU directive halves the limit values of the 39th BImSchV and will become mandatory from 2030. However, the team 'Immission Control' does not output target values for Table B-3.1, but only describes which values are measured.

No indicators for socially equitable climate protection have been developed yet. However, this aspect is to be given greater consideration in the CCC iterations. For the purpose of socially equitable climate protection, various indicators are conceivable in the areas of inequality, mitigation of negative climate impacts, distribution of direct benefits and co-benefits, participation and inclusion, governance and accountability. In addition, it should be examined whether the City of Dortmund can first derive indicators in this area from ICLEI's INCLU:DE project, in which the city is participating[33]. The INCLU:DE project has not yet been completed.

Moreover, indicators for reuse/reduction of use of virgin resources are not feasible yet. However, Dortmund's project DoZirkulär2023 consists of 19 pilot projects designed to promote the circular economy in Dortmund[34]. It focuses on the principles of rethink, reduce, reuse and recycle and covers three value chains: construction, electronics and food. In future, the CCC iterations will be used to examine the extent to which indicators for reuse/reduction of use of virgin resources can be derived.

Transparency note: The indicators in table B-1.1 measure the same outcomes as the indicators in tables B-14 and B-15 in the Investment Plan. However, the names have been slightly changed between tables, or several indicators have been combined. The Net Zero Planner is used as a lever for the investment plan indicators. Monitoring then checks whether the capital-intensive measures have been implemented. Furthermore, there is also an impact monitor. More detailed information can be found in 1.1 Module IP-A1 of the Investment Plan.

Monitoring and controlling

The CCC Action Plan of Dortmund is a living process consisting of practical and implantation-orientated measures and activities. They form the foundation of the implementation phase and bring together all stakeholders involved for the path to climate neutrality. The Action Plan requires an ongoing target/actual value comparison of achievement as well as readjustment, correction, stopping and restarting. For a more detail description for this process got to chapter 4.1 Module Governance Innovation Interventions.

The Project portfolio plan in the Action Plan makes it possible to visualize at a glance all the measures the City of Dortmund wants to implement. It gives information about the focus and

[33] Just and Sustainable Cities, n. d., INCLU:DE

[34] Economic Development Agency Dortmund, n. d., Dortmund wirtschaftet fair im Kreislauf [Dortmund operates fairly within the cycle]

project category and the most important players. It is structured according to fields of action, key areas of action, measures and activities. With that portfolio and the identified indicators in this chapter the Transition Team has a powerful tool to tackle the monitoring process in the next years. For more information about the tasks of the Transition Team see Chapter 4.1 Module C-1 Governance Innovation Interventions.

In addition, there are other indicators that have not yet been developed or could not yet be developed, but which are desired for the future: indicators that measure the co-benefits of GHG reduction measures, such as the reduction of noise or air pollution, indicators for socially equitable climate protection, or indicators for the circular economy. More detailed information on this can be found in 1.1 Module B-3 Indicators for Monitoring, Evaluation and Learning.

4 Part C – Enabling Climate Neutrality by 2030

This section explains Dortmund's governance innovations interventions as well as social innovation interventions.

Section 4.1 describes the transition team and its role within the city administration and how the transition team interacts with other stakeholders. It also outlines a rough timeline and discusses citizen participation.

In 4.2, a table provides an overview of governance innovation and social innovation interventions, describing their systemic barriers, the leadership and stakeholders involved, their enabling impact and co-benefits, followed by a separate explanation of individual barriers.

4.1 Module C-1 Governance Innovation Interventions

The path to climate neutrality is a systemic task and an agile process, requiring the equal involvement of the city (politics and administration), its citizens, and stakeholders such as companies, associations, and interest groups. The steps already taken in this regard are detailed in the introduction to the Action Plan.

To tackle this complex task, innovative governance approaches have been developed for the city contract and will come into force during the implementation phase. Some considerations relating to available resources need to be finalised within the city administration. This chapter presents the ideal governance process.

The City of Dortmund has an important pioneering role, acting as the central hub. In recent years, the administration has developed and implemented measures based on climate protection concepts. The greenhouse gas balance is regularly recorded, communicated transparently to the outside world, and compared with existing measures to identify areas requiring action. The CCC's governance approach is based on these well-established processes.

Structure of Transition Team and task in the city administration

The transition team organises regular meetings to evaluate and monitor the project.

During the creation of the CCC, the transition team consisted of colleagues from the Department for Mayoral and City Council´s Affairs and the Environment Agency. For the implementation phase following the award of the label, the transition team will be expanded to include colleagues from various departments: mobility, urban planning, finance, and economic development.

At the beginning of the implementation process, it is important for the transition team to set specific objectives and milestones. To this end, the transition team is collaborating with the NZC Platform to create a process for mapping all the measures in the Action Plan portfolio.

The entire governance process revolves around the transition team. However, responsibility for carrying out the measures cannot lie solely with the transition team if the implementation is to be successful. It is therefore important to establish topic-related boards, the organisation and coordination of which will be taken over by other colleagues from the city administration. These topics could include mobility, renewable energies and energy efficiency, publicity, sustainable building, agriculture and nutrition, and the circular economy. The various city administration departments will provide the expertise for these boards. These boards will also match the designation of the Climate Council's boards. Besides the meetings of the Council four times a year they have boards for the described topics to discuss and work on subjects in more detail. As the council will be a central tool for addressing and pushing forward the CCC's agenda, the boards will be able to align their topics more effectively.

To support the efforts of these boards and establish a structured approach to achieving climate neutrality by 2030, the city has introduced the 'Climate Check' governance process. This mechanism enables the early detection of deviations from the target pathway and the rapid implementation of corrective measures. The process operates through the following five stages:

- Gap analysis: Using the climate dashboard to identify and assess deviations.
- Planning: Prioritising high-impact measures and evaluating them through an interdisciplinary team.
- Implementation: Adapting measures, agreeing on options with decision-makers, and preparing detailed plans.
- Monitoring and control: Tracking progress and re-initiating the process if necessary.
- Learning and improvement: Documenting results, sharing lessons, and refining the process.

Stakeholder engagement is integrated throughout the process, ensuring the participation of municipal departments, political bodies, civil society and the private sector from the outset. Transparency is maintained through open communication regarding progress, results and decisions. The effectiveness of the Climate Check depends on clearly defined responsibilities, strong interdisciplinary cooperation, the flexibility to adapt to changing circumstances and sustained political support. As an early warning and adaptive governance tool, Climate Check strengthens the city's capacity to meet its 2030 climate neutrality goal while embedding continuous learning in climate policy.

A separate board will be responsible for the overall coordination and monitoring of the process. This task will be carried out by a team consisting of a colleague from the Department for Mayoral and City Council´s Affairs and a colleague from the Environment Agency. As they are not part of the topic-related boards, they will take on a management role.

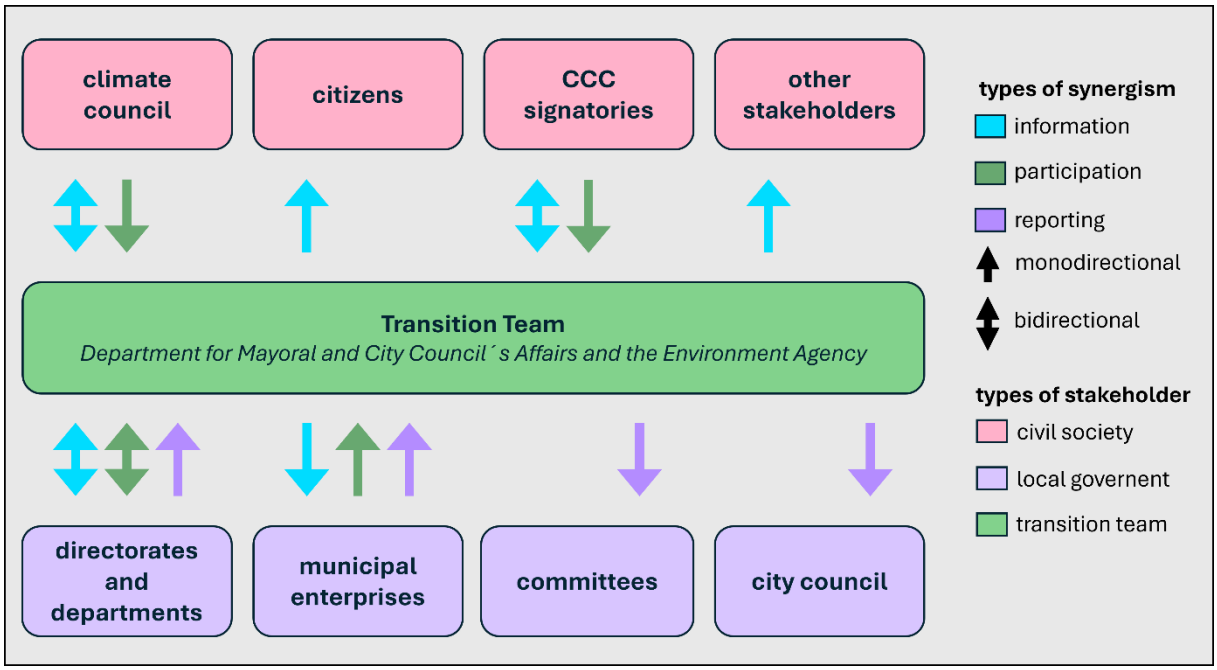

Figure 6: Governance Structure around the Transition Team including types of synergism and stakeholders

The topic related boards are led by a tandem of colleagues of the city administration and could look like that:

- Mobility Planning
- Renewable energy and energy efficiency: Environment Agency and Economic Development Agency Dortmund
- Publicity: Department for Mayoral and City Council´s Affairs and Department for Marketing + Communication
- Sustainable buildings: Department for City Planning and Building Regulations and Environment Agency
- Agriculture and nutrition: Environment Agency
- Circular economy: Economic Development Agency Dortmund

The colleagues of the described departments have the lead for the boards and will report at the regularly meetings of the transition team.

After receiving positive feedback on the Mission label, the first task for the city administration should be to establish the expanded transition team and identify the members of the topic-related boards. Without this structure, the implementation phase cannot start.

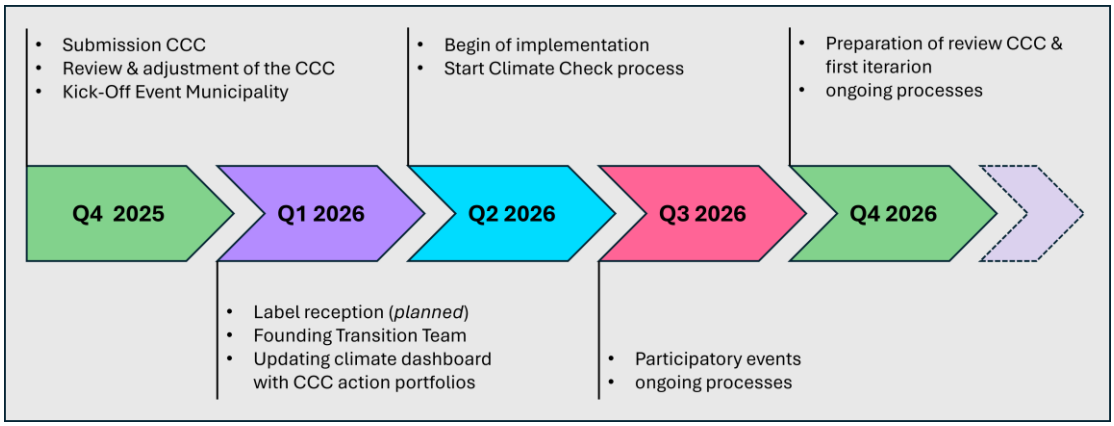

Figure 7: Participation and communication strategy for the City of Dortmund after submitting the CCC

It is important for a successful implementation that no new parallel structures are being created. Companies, citizens and associations are already active in many projects in the city and are being approached by various parties for activities. In order to achieve climate neutrality in Dortmund by 2030, we need people who are motivated to work with the city towards this goal and who are not overwhelmed or tired because they are approached from too many sides. The aim is therefore to integrate the city contract into existing networks and series of events and to show that it is not a separate, detached strategy, but rather builds on and expands the totality of all of Dortmund's climate protection measures.

As part of the governance process, different approaches are used to address various stakeholders. Those whose support is needed in the initial phase, for example, must be engaged from the outset. These include the city administration, associations and networks, and businesses. Three major kick-off events are planned for these three groups.

- Kick-Off Event City Administration
    - Presentation of Portfolio Action Plan
    - Founding of topic related boards and responsibilities
    - Mapping of Actions (identifying keystone actions)
- Kick-Off Event companies and municipal enterprises
    - Presentation of Portfolio Action Plan
    - Presentation of different membership/roles for companies in the next years
    - Definition of milestones for projects/strategies of the companies to reach climate neutrality
- Kick-Off Event Associations and NGOs
    - Presentation of Portfolio and Action Plan, including keystone activities
    - Survey about current needs and challenges of the associations
    - Definition of milestones for the implementation phase

The results will be published on the homepage for the CCC so interested citizens can already inform themselves. After those three events the approach of citizens will start as well with a variety of different tools and events to reach the people in Dortmund.

Formats and participation opportunities will be set up for all stakeholder groups for the entire implementation phase or implemented through existing strategies and events. The roll-out will be led by the publicity board of the transition team. The City of Dortmund will commission an agency to initially develop a communication strategy for the implementation phase of the CCC, but also to provide support in designing events for the various target groups.

Citizen participation

Citizen participation is a pivotal component of the governance process. The City of Dortmund requires the acceptance of its citizens and their involvement in shaping the implementation of climate neutrality. The many networks in Dortmund, where many people already actively promote climate protection and the environment, are an important multiplier. Besides these individuals who have already demonstrated their commitment, the primary challenge lies in mobilising individuals who do not demonstrate a keen interest in the concept of climate neutrality. The City of Dortmund therefore seeks to demonstrate how the objective of achieving climate neutrality enhances the quality of life for the entire city population. Consequently, participation on the part of citizens is deemed to be a worthwhile endeavour. The communication strategy that the City of Dortmund is seeking to devise for the CCC will concentrate on the challenge of addressing different target groups. A number of these factors are addressed in this section and will form part of the strategy that will be described subsequently.

Table 24: Actions for addressing citizens based on different target groups

Target group	Possible Actions	Involved stakeholders
House Owners	Increase awareness of the free energy consulting service with the dzle and therefore increase the renovation rate	Environment Agency, Climate Agency
Residents in the districts	Presentation of the CCC at different events in the districts • Information events of the energy use plan • Presentation at city festivals (e.g. DortBunt) • Publications in local newspapers • Presentation at district council meetings	
Kindergarten, school and universities	Conducting workshops on climate neutrality and the role of Dortmund for schools and kindergartens	Association Multivision[35], City of Dortmund (Department for Youth Welfare)

[35] Multivision, n. d., Die Multivision e. V.

When addressing citizens, it is particularly important to align with existing processes. There must, of course, be a thematic connection. With the following projects, an integration of the CCC would be very useful.

Municipal heat planning and information events

The City of Dortmund issued a call for tenders for a communication concept for the implementation of municipal heat planning. The topic plays such a central role on the path to climate neutrality, but at the same time is a technically difficult topic for many citizens and is not particularly accessible. The City of Dortmund would therefore like to use a communication concept to ensure that municipal heat planning is communicated to people in Dortmund in a comprehensible and tangible way. The city contract will be integrated as a topic there and should also be communicated, as municipal heat planning is also a very central component for successful implementation.

IGA 2027

The International Garden Exhibition is scheduled to take place in the Ruhr region in 2027. With over 2.6 million visitors expected, a six-month-long exhibition, and a vibrant summer festival, IGA 2027 will transform North Rhine-Westphalia into a hub of innovation, culture, and sustainable development. This region-wide celebration will showcase approaches to urban and regional development, sustainable open space design and green infrastructure, making it a model for liveable and resilient cities of the future. As a part of the international garden exhibition IGA Ruhrgebiet 2027, a large-scale urban development and infrastructure project is being created in the north of Dortmund – the so called Future Garden. Here various partners aim to explore and answer the central question: “How do we want to live tomorrow?”. In 2027, a series of events are scheduled to take place, with a significant number of visitors expected to attend from all the districts within Dortmund. The City of Dortmund has expressed a desire to present the CCC in that location.

Summary

During the implementation phase of the city contract, the city administration's existing resources will be reassessed and utilised as part of the governance process. The intensive cooperation between different departments that took place during the drafting of the contract will intensify at the start of the implementation process. Forming topic-specific working groups will lay the foundation for successfully realising the planned portfolio. Several events tailored to the target groups and their interests and motivations will be planned for the Dortmund urban area, with the help of a communication strategy. Major existing events in Dortmund over the next few years will be used deliberately to present topics from the city contract to the outside world and raise awareness of the goal of climate neutrality.

4.2 Module C-2 Social Innovation Interventions

Social innovations and governance innovations have been addressed together in the following Table C.2.1 because it often was not possible to draw the line between those two approaches.

Table 25: Relations between governance and social innovations, systems and impact pathways

C.2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers/opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
Increase awareness for consultation and funding regarding renovation of households	With a strong communication strategy the existing actions of the city for finding funding and consultation for citizens will be pushed and if possible expanded	Financial and funding gaps Engagement of hard-to-reach groups	Transition team (Board Publicity)	Increases number of consultations and therefore actions of renovation or energy efficiency at private households	Healthy living quality Increasing the value of properties Independence from fossil fuels for energy supplies
Real laboratory KliKs [3]	Create awareness of behaviour and the impact on the climate with an online tool to understand the carbon footprint and how to decrease it	Systemic and process gap Engagement of hard-to-reach groups	Environment Agency, Citizens	Raise awareness for climate neutrality and climate protection, increase of willingness to become an active part of the CCC	Healthy living conditions
Expanding Transition Team and founding of topic related boards	Integrate the different deparments of the city administration through the transition team and the founding of the boards	Administrative and Capacity gaps	Department for Mayoral and City Council´s Affairs	Unifies the measures taken by the city administration regarding climate protection and creates transparency and communicati	Healthy living quality Creation of jobs

				on between the departments.	
Intensify acitivties and exchange in national and internation al networks	Active particitpation at events and exchange possibilities with the stronGER cities and Net zero Cities, especially with the capital hub to adress the financial gap	Financial and funding gap	Departmen t for Mayoral and City Council´s Affairs, City Treasury	Exploration of new funding possibilities to enable the city to implement more actions or to expand existing actions	Healthy living quality
INCLU:DE Project	INCLU:DE aims to support local inclusive transformations and foster dialogue exchanges to generate positive equity outcomes for all citizens involved.	Financial and funding gap Engagement of hard-to-reach groups Socially just transition funding	Environmen t Agency, ICLEI Europe	The project supports fairer climate programmes by offering tailored subsidies that help more citizens contribute to climate neutrality and reduce the city of Dortmund's GHG footprint.	Healthy living quality
Social Innovation Projects	Expand projects and events focussing on social innovation like Innovationssprints and laboratories[36]	Systemic and process gap	Economic Developme nt Agency Dortmund	Build up capacity to face challenges of our community through new ideas and innovation	Healthy living quality Creation of jobs
Climate Agency	The Climate Agency consults citizens on issues relating	Engagement of hard-to-reach groups	Environmen t Agency, Citizens	The advisory and support services provide	Healthy living quality

[36] Economic Development Agency Dortmund, n. d., Gemeinschaftlich mehr erreichen [Achieving more together]

	to climate protection, building modernisation, new buildings and energy saving. It offers free energy advice and provides information through lectures on relevant topics. In addition, subsidy applications can be submitted to the Climate Agency for photovoltaic systems, roof and façade greening and the use of geothermal energy, for example.	Upfront investment needs Socially just transition funding		citizens with information, encouragement and guidance on implementing climate protection measures in the building and energy sectors.	Increasing the value of properties Independence from fossil fuels for energy supplies
Town twinning	Learn from best practice of the many town twinning contacts in Dortmund		Team International Relations		

The goal of climate neutrality also requires a comprehensive transformation and social innovation in society as a whole. This can be understood as a change in awareness in all parts of society. Everyone should be involved. The described barriers of Part A are the key factors where social innovation has to overcome possible challenges and struggles.

Barriers of Part A

In*frastructure and technological gaps*:

In order to tackle the challenges that come with increasing the renovation rate of buildings in particular, the governance process will focus on a transparent and visible external presentation of the existing offers in this context. The City of Dortmund already offers free

energy consultations and supports offers from institutions such as Caritas, which also actively provide information and advice in this area. The city contract will focus on these offers with its events and information campaigns.

In order to increase renewable energies and the adaptation of heating systems, particularly in private households, the implementation phase of the CCC will focus on supporting the existing subsidies that the City of Dortmund already provides for its citizens. But it will also be about applying for further funding opportunities so that the major challenge in the area of building and heating can be tackled.

Administrative and capacity gaps

The transition team and the topic-related boards combine a lot of expertise of the administration and can address the possible lack of personnel or qualification at an early stage. The creation of new necessary positions must then be examined. At the same time, the transition team can make better use of any free capacities through networking in the departments, as the CCC has an insight into various areas of the city administration due to its overarching role. In this way, the available resources can also be better utilised among each other. Overall, this promotes cooperation between the departments and ensures a joint presence.

Financial and funding gaps

The city contract shows what a path to climate neutrality in 2030 could look like. The financial investments behind this are a major challenge in the process. Through close collaboration with the business community and multipliers in the city, financing models are to be promoted and driven forward. For example, a climate fund for financing projects in the private sector is to be set up.

Some of the subsidy programmes that the city provides for its citizens are based on a certain income limit. For example, there is an income limit for heat pump subsidies that citizens can claim. The aim is to encourage households to replace their heating systems that would otherwise not have the means to do so.

Dortmund's participation in the mission and the associated networks at national level (StronGER Cities) or the Capital HUB can bring innovative financing approaches to the city.

Systemic and process gaps

Addressing specific target groups is the focus of the city contract and the new governance process set up for this purpose. Existing formats and networks will receive further important support from the transition team and will be complemented with new formats and impulses to reach even more people.

The planned communication strategy will focus on reaching target groups that are often more difficult to involve, such as vulnerable and low-income groups. These are usually particularly affected by the challenges of climate change and must definitely be part of the approach.

Climate awareness: it is crucial that climate-friendly behaviour is equally enabled and promoted in all parts of society. Determining factors for the penetration of the population can be, for example, age, level of education, language skills and economic opportunities. The risk of poverty in Dortmund is particularly high compared to other cities in North Rhine-Westphalia. Creating a just climate protection is therefore a necessity for the implementation of the CCC. For example, it may be helpful to reduce the barriers to financial support for climate protection measures. Many people are unaware of the financial subsidies they are entitled to. Furthermore, a social climate fund is currently discussed by the City of Dortmund and the local bank (Sparkasse Dortmund) to empower people with no (or little) financial possibilities but good ideas for more climate protection to go through with their projects.

Improving the quality of life especially while already facing the impacts of climate change (heat waves, flooding etc.) should be the main argument to raise awareness for climate neutrality. Some small activities can underline the fact that in the end everyone in Dortmund will profit from climate protection.

With the living lab KliX³ the awareness of how the own behaviour affects the climate, and the environment is rising.[37] The KliX³ project is the first real-world laboratory with a nationwide long-term study on the carbon footprint of private households. The data collected will be used to research how climate-neutral living can be achieved, which climate protection measures are typically implemented, and which obstacles and successes can be seen in everyday life. Dortmund is one of the 30 partner municipalities of this project.

5 Outlook and next steps

The Climate City Contract (CCC) Action Plan is not designed to replace Dortmund's existing climate policies and strategies, but rather to bring them together under a unified and accelerated framework. The CCC serves as an instrument to strengthen, integrate, and elevate all current and future climate actions in the city, aligning them with the more ambitious target of climate neutrality by 2030 under the EU Mission. The CCC is also an ongoing process and "living" document, which will be submitted to the European Commission for review every two years. During this period, measures can be monitored and adapted to new findings.

Dortmund already has a robust foundation of climate-related plans, including the *Climate-Air 2030 Action Plan*, the *Integrated Climate Adaptation Master Plan (MiKaDo)*, the *Dynamic Heat Action Plan*, and the *Masterplan Mobility 2030*. Each of these frameworks addresses key sectors such as energy, buildings, mobility, and climate adaptation. The CCC does not replace these plans. Instead, it functions as an umbrella strategy that incorporates measures

[37] klix3, n. d., Wege zum klimaneutralen Leben, Heute für morgen [Ways to climate-neutral living, today for tomorrow]

from these documents, aligns them with the Mission's goals, and fills existing gaps in ambition and scope.

By adopting the CCC, Dortmund can strengthen and prioritise projects that deliver the greatest impact on emissions reduction. It creates an opportunity to accelerate existing efforts, mobilise additional resources, and ensure that climate neutrality becomes the city's overarching policy priority.

The next major step is to establish the transition team, which will be composed of staff from the Department for Mayoral and City Council Affairs and the Environmental Agency.

The transition team will facilitate and support cooperation between the various stakeholders and will also be responsible for building accountability, fostering innovation, ensuring continuity, bridging sectors and supporting implementation. In the next steps, the transition team will work with stakeholders such as the Climate Council, citizens, CCC signatories and other stakeholders, as well as with various actors from local government, such as directorates and departments, municipal enterprises, committees and the city council. Various activities take place between the transition team and stakeholders or local government, such as providing information, participating and reporting. Furthermore, there will be regular meetings and workshops, further implementation of actions, monitoring and controlling, interim reporting and addressing gaps.

In addition to further dismantling systemic barriers, efforts must continue to be made in climate change adaptation and more must be achieved regarding the circular economy.

In addition to the goal of climate neutrality, however, infrastructure and the population must also adapt to the effects and damage caused by climate change. To this end, further measures from the *Master Plan Integrated Climate Impact Adaptation* will be implemented and consolidated in the coming years, such as prevention and defence against the health risks resulting from climate change, especially for vulnerable groups of people, or maintaining and improving the quality of life in the city in conflict between space requirements and climate change. The city of Dortmund is already benefiting from measures implemented as part of the master plan, such as the 'cool places' map,[38] the installation of drinking fountains and the publication of the 'heat helpers' information brochure.

Furthermore, more knowledge about the circular economy is to be acquired to be able to pursue new paths to climate neutrality in this field of action.

The circular economy makes companies less vulnerable to crises, as they become less dependent on raw material supplies such as oil, gas and rare earths. The circular economy also helps to prevent resource scarcity and environmental problems. That is why the City of Dortmund's Economic Development Agency supports a crisis-proof and future-proof economy with projects such as 'DoZirkulär2030: circular and public welfare-oriented

[38] City of Dortmund, n. d., Kühle-Orte-Karte [Cool Places Map]

businesses. We hope that these projects will provide us with new insights towards climate neutrality.

The CCC process also strengthens cooperation with stakeholders, e.g. because the City of Dortmund relies on stakeholder data for the indicators. Additionally, the CCC iterations will also examine whether new indicators can be developed for areas such as the circular economy, social climate justice or co-benefits of climate protection measures such as air pollution reduction. In this context, the transition team will collaborate closely with the environmental agency to plan the implementation of the recently published DIN SPEC 91637, *'Impact measurement of measures for municipal, regional and national climate protection'*,[39] using it to evaluate the effectiveness of various climate action initiatives. Any adjustments to the DIN SPEC standard will also be considered in the ongoing process. The detailed assessment is expected to be carried out using the existing climate dashboard.

To further strengthen local biodiversity and improve the microclimate, reduce heating energy requirements and support the CO_2 balance, further measures for climate neutrality are planned in the green infrastructure. The proportion of green space in the urban area already accounts for 50 % in the form of parks, forests, agricultural land and open spaces, but further projects are planned to further expand the proportion of green space. These include roof and façade greening as well as the greening concept "Green Wall – Green City".

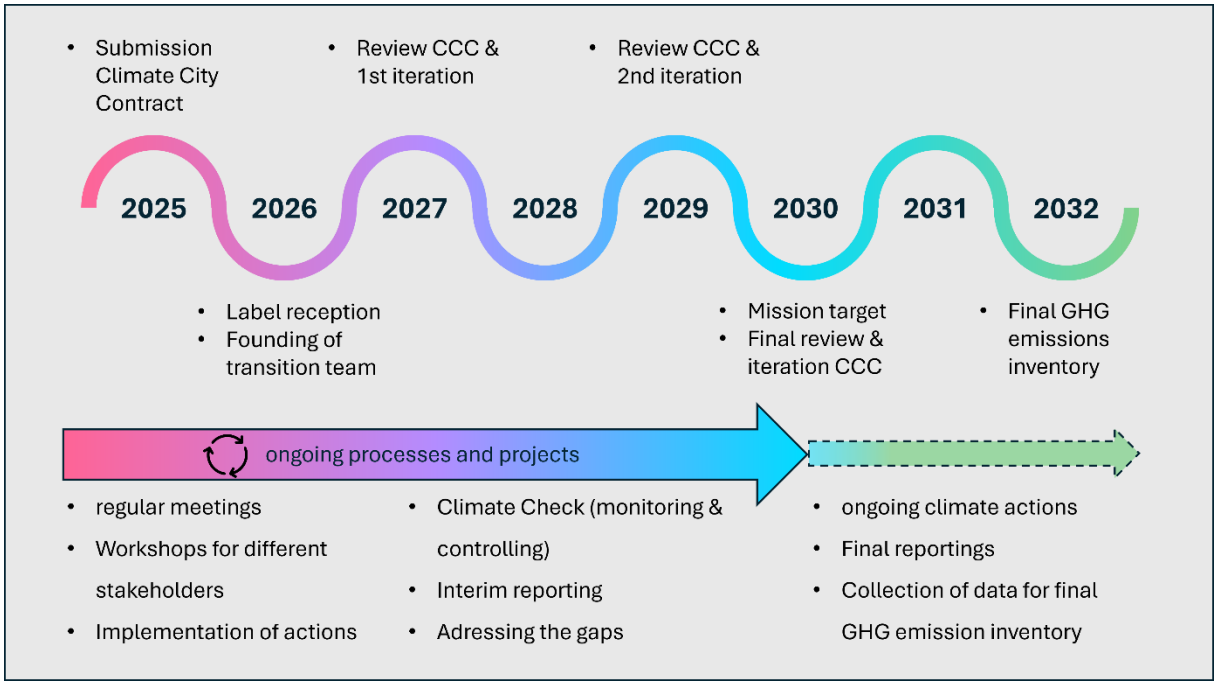

Figure 8: Timeline for the CCC until 2032

[39] DIN Media, 2025, DIN SPEC 91637:2025-09

6 Annexes

Annex 1 – Additional information on greenhouse gas accounting using the BISKO method.

The city of Dortmund has established a system of monitoring its progress towards achieving climate neutrality. This system is based on the nationwide BISKO standard (Bilanzierungs-System Kommunal), which provides a uniform framework for municipal greenhouse gas (GHG) accounting in Germany[40]. The BISKO model is predicated on the territorial principle, whereby all final energy consumption is recorded within municipal boundaries. The report includes a life-cycle assessment of energy sources, encompassing extraction, conversion, transport, and utilisation. It also provides a comprehensive greenhouse gas (GHG) balance. This approach ensures transparency and comparability across German cities and accounts for emissions from households, commerce, industry, and transport. Emissions are expressed in CO_2 equivalents (CO_2e), which include CO_2, CH_4, and N_2O. The Global Warming Potential (GWP) of these gases is as follows: CO_2 is assigned a GWP of 1, while CH_4 is assigned a GWP of 25 and N_2O a GWP of 298 (IPCC methodology). It is important to note that other gases, including hydrofluorocarbons (HFCs), perfluorocarbon (PFCs), sulphur hexafluoride (SF6) and nitrogen fluoride (NF3), are excluded from the method. The reason for this exclusion is that these gases represent less than 2 % of Germany's total emissions and are difficult to measure at the municipal scale. Moreover, for reasons of consistency, the national electricity mix is applied, meaning that local renewable generation only affects the balance indirectly via changes in the German grid mix.

Comprehensive inventories are subject to regular updates; however, a two-year reporting delay is in effect, as data from utilities, including electricity, gas, and district heating, is released only after auditing. Since 2003, the City of Dortmund has maintained inventories of greenhouse gases (GHG), thereby ensuring a highly comparable database for long-term monitoring. Since 2009, the City of Dortmund has been undertaking biennial compilations of its greenhouse gas (GHG) balances. Moreover, as a part of the Ruhr Metropolis, the City of Dortmund contributes to and benefits from regional greenhouse gas inventories compiled by the Ruhr Regional Association (RVR)[41]. The most recent inventory covers the years 2012–2022, with data updates for 2023 and 2024 expected by late 2026[42].

The Climate City Contract (CCC) is based on the 2019 climate inventory of the city, which was developed using the 'Klimaschutzplaner' tool in accordance with the BISKO methodology. For the purpose of ensuring consistency across the relevant reporting

[40] Agentur für kommunalen Klimaschutz am Deutschen Institut für Urbanistik gGmbH (Difu) (ed.), 2025, BISKO Bilanzierungssystematik Kommunal, Methoden und Daten für die kommunale Energie- und Treibhausgasbilanzierung [BISKO municipal accounting system, methods and data for municipal energy and greenhouse gas accounting]

[41] Regional Association Ruhr, n. d., Energy and greenhouse gas balance 2022

[42] City of Dortmund, 2025, Energie- und Treibhausgasbilanz 2022 [Energy and greenhouse gas balance report 2022]

frameworks, the year 2019 was selected as the baseline year for the CCC, thus ensuring coherence between inventories and target scenarios. In order to align with the Cities Mission Info Kit and the Global Protocol for Community-Scale GHG Emission Inventories (GPC), the BISKO data were partly recalculated and restructured. This process introduced minor rounding errors but maintained statistical validity. It is important to note that these inventories and scenarios are based on modelled and aggregated data as opposed to direct measurements. Consequently, they should be interpreted as indicative of emission trends and priority sectors rather than exact values.

In the forthcoming iterations of the CCC, the most recent calculation bases for the BISKO method will be employed to recalculate the GHG inventory and statistically validate the evaluations. In the event of any substantial amendments to the BISKO method, the data set presented in the CCC will be supplemented with the adjusted method. Further information on the BISKO municipal accounting system can be found on the website of the German Federal Environment Agency (Umweltbundesamt, UBA).

Emission Factors City of Dortmund												
Emission factors		2012	2013	2014	2015	2016	2017	2018	*2019*	2020	2021	2022
Emission factors in the heat sector	natural gas	250	250	250	250	247	247	247	*247*	247	247	257
	district heating	287	293	289	287	287	285	157	*156*	156	156	142
	local heating	150	150	150	150	150	150	150	*150*	150	150	150
	night storage electricity	645	633	620	600	581	554	544	*478*	429	472	505
	heating oil	320	320	320	320	318	318	318	*318*	318	318	313
	liquefied petroleum gas (LPG)	267	267	267	267	276	276	276	*276*	276	276	276
	lignite	439	439	439	439	411	411	411	*411*	443	445	445
	hard coal	444	444	444	444	438	438	438	*438*	429	433	433
	biomass	27	27	27	27	22	22	22	*22*	22	22	22
	ambient heat	202	198	194	188	182	173	170	*150*	134	148	158
	solar thermal energy	25	25	25	25	25	25	25	*25*	19	23	23
	biogas	121	121	121	121	121	121	121	*121*	121	121	121
Emission factors in the electricity sector	electricity	645	633	620	600	581	554	544	*478*	429	472	505
	wind energy	11	11	11	11	10	10	10	*10*	18	18	18
	hydroelectric power	3	3	3	3	3	3	3	*3*	3	3	4
	photovoltaics	63	63	63	63	40	40	40	*40*	56	56	57
	sewer gas, landfill gas, mine gas	26	26	26	26	51	51	51	*51*	144	144	144
	solid biomass	25	25	25	25	25	21	25	*25*	69	69	69
	liquid biomass	316	316	316	316	116	116	116	*116*	544	544	544
	geothermal energy	228	228	228	228	89	89	89	*89*	145	162	166
Emission factors in the	petrol	314	314	314	322	323	323	322	*322*	322	322	347
	bio-petrol	185	184	186	199	196	215	181	*114*	104	98	108
	bio CNG	34	34	34	34	34	34	34	*77*	88	81	74

transport sector	fossil CNG	254	253	252	252	251	250	249	*257*	264	270	278
	diesel	325	325	325	326	326	326	326	*327*	327	327	354
	biodiesel	141	134	137	143	121	117	112	*118*	113	111	132
	kerosene	322	322	322	322	322	322	322	*322*	322	322	322
	LPG	287	287	287	291	291	290	290	*291*	291	291	290
local emission factor for district heating	federal distric heating mix	260	260	260	260	260	260	260	*260*	260	260	260
	local emission factor	287	293	289	287	287	285	157	*156*	156	156	142
	district heating	287	293	289	287	287	285	157	*156*	156	156	142
local emission factor for local heating	federal local heating mix	150	150	150	150	150	150	150	*150*	150	150	150
	local emission factor	150	150	150	150	150	150	150	*150*	150	150	150
	local heating	150	150	150	150	150	150	150	*150*	150	150	150
local emission factor for electricity	federal electricity mix (BISKO)	645	633	620	600	581	554	544	*478*	429	472	505
	local emission factor	616	600	585	566	546	520	511	*447*	404	442	467
	factor used in the GHG balance (BISKO)	645	633	620	600	581	554	544	*478*	429	472	505
Transport - specific emission factor [s.e f.]	s.e.f. for light commercial vehicles on motorways	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for light commercial vehicles out of town	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for light commercial vehicles in urban areas	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for public buses on motorways	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for public buses out of town	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for public buses in urban areas	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for lorries on motorways	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for lorries out of town	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for lorries in urban areas	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for motorised two-wheelers on motorways	0,3	0,3	0,3	0,3	0,3	0,3	0,3	*0,3*	0,3	0,3	0,3
	s.e.f. for motorised two-wheelers out of town	0,3	0,3	0,3	0,3	0,3	0,3	0,3	*0,3*	0,3	0,3	0,3
	s.e.f. for motorised two-wheelers in urban areas	0,3	0,3	0,3	0,3	0,3	0,3	0,3	*0,3*	0,3	0,3	0,3
	s.e.f. for cars on motorways	0,3	0,3	0,3	0,3	0,3	0,3	0,3	*0,3*	0,3	0,3	0,3
	s.e.f. for cars out of town	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29

	s.e.f. for cars in urban areas	0,29	0,29	0,29	0,29	0,29	0,29	0,29	*0,29*	0,29	0,29	0,29
	s.e.f. for coaches on motorways	0,24	0,24	0,24	0,24	0,24	0,24	0,24	*0,24*	0,24	0,24	0,24
	s.e.f. for coaches out of town	0,24	0,24	0,24	0,24	0,24	0,24	0,24	*0,24*	0,24	0,24	0,24
	s.e.f. for coaches in urban areas	0,24	0,24	0,24	0,24	0,24	0,24	0,24	*0,24*	0,24	0,24	0,24

Annex 2 – Relevant documents and background information.

(1) City of Dortmund, 2022, EU-Mission: "100 klimaneutrale und intelligente Städte bis 2030" [EU mission: '100 climate-neutral and smart cities by 2030']

(2) City of Dortmund (ed.), 2021, Handlungsprogramm Klima-Luft 2030 [Climate-air 2030 Action Plan]

(3) City of Dortmund, 2023, Anpassung des Handlungsprogramms Klima-Luft 2030 an das Ziel Klimaneutralität 2035 [Adaptation of the Climate-air 2030 action plan to the goal of climate neutrality by 2035]

(4) City of Dortmund, n. d., Climate barometer of the city of Dortmund

(5) City of Dortmund, 2025, Energie- und Treibhausgasbilanz 2022 [Energy and greenhouse gas balance report 2022]

(6) City of Dortmund, n. d., Master Plan Integrated Climate Impact Adaptation

(7) City of Dortmund, n. d., Heat and health

(8) City of Dortmund, n. d., Mobility 2030 Master Plan

(9) City of Dortmund, n. d., Heat transition for Dortmund

(10) City of Dortmund, 2024, Vom Energienutzungsplan zur kommunalen Wärmeplanung [From energy utilisation plan to municipal heating planning]

NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Commitments

City of Dortmund

The content of this document reflects only the author's view. The European Commission is not responsible for any use that may be made of the information it contains.

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1 Introduction

The City of Dortmund is committed to taking responsibility for substantially reducing greenhouse gas emissions. In order to do so, the City Council agreed on a target for climate neutrality that is even more ambitious than Germany's national target. By joining the EU Cities Mission, the City of Dortmund aims to accelerate the reduction of greenhouse gas emissions and encourage other cities and regions to follow our example. The urgency to take action now and accept the vast challenge – but also opportunity – of becoming climate neutral is particularly pressing at present.

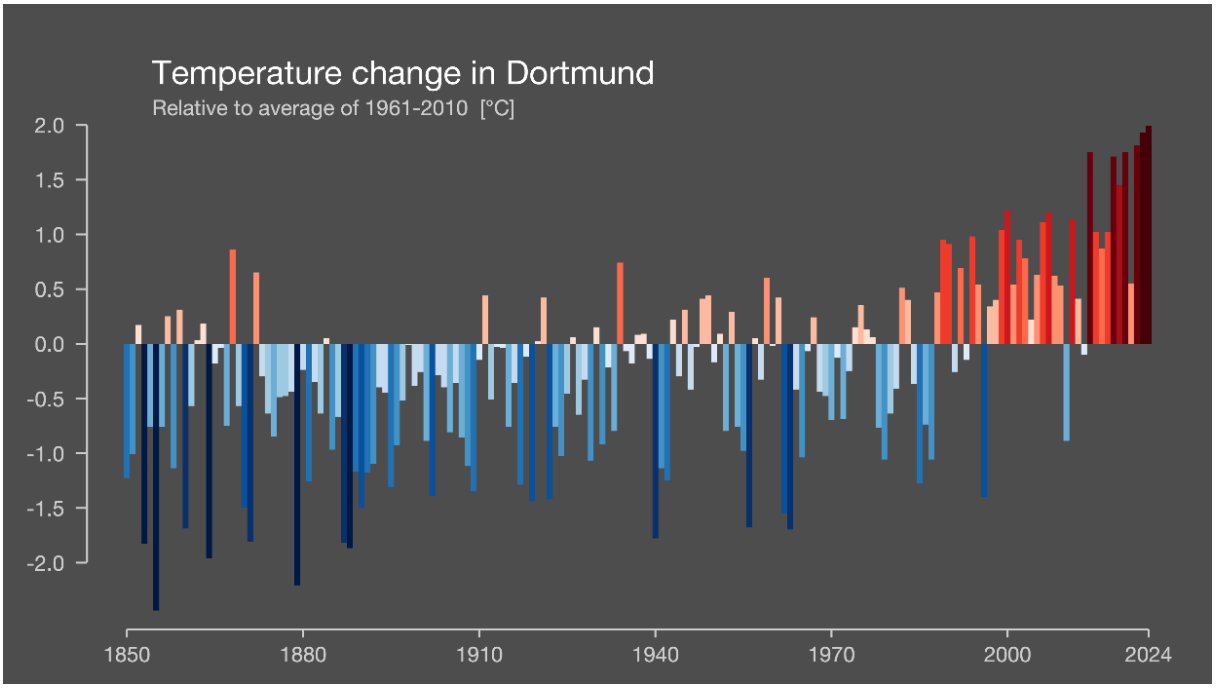


Figure 1 Temperature Change in Dortmund (Source: Prof. Ed Hawkins, University of Reading; #ShowYouStripes)

In Dortmund, we pursue several strategies to work towards the mission's goal. The existing heating network will be expanded and diversified, with heat being supplied from carbon-neutral sources as soon as possible. Roof surfaces of municipal buildings, including administrative buildings and schools, will be fitted with photovoltaic systems to increase the share of renewable energy and to set an example for private property owners. Alongside renewable energy, green hydrogen will play a key role in the future energy system. The City of Dortmund is therefore developing strategies for hydrogen transport into the city, prioritising its use and simultaneously promoting local value chains.

Innovation in Dortmund

Transforming an entire city to become climate neutral requires not only a great deal of commitment and discipline, but also innovative skills. Dortmund is already well positioned in this regard and is seen as a dynamic German innovation hub in the heart of Europe, with a

coherent and mature innovation network that encompasses social, cultural, and technological pioneers – an ecosystem built on trust and solidarity.

In 2021, Dortmund was awarded with the title "iCapital - European Capital of Innovation", becoming the first and only German city to receive this distinction from the European Innovation Council. The city is now an active member of the iCapital alumni network and alliance programme. "Innovation next door" is the motto of Dortmund's innovation approach. Neighbourhood values such as strong relationships, trustworthy communication, and active participation characterise the city's innovation ecosystem: a strong network of reliable partners from diverse backgrounds, working together locally towards a joint vision. Good ideas arise in neighbourhoods, backyards, living rooms, laboratories, and workshops. Citizens, scientists, students, entrepreneurs, city planners, and administrators collaborate within ecosystems that foster innovation through cooperation.

Dortmund has undergone a massive transformation, reinventing itself repeatedly. For example, the city converted an industrial wasteland into Lake Phoenix and transformed an old brewery tower into the Dortmund U — a vibrant centre for culture, education, and digital art. This includes the kiu Storylab at FH Dortmund University of Applied Sciences and Arts, where groundbreaking new methods of digital storytelling are developed.

As a young university and science location, Dortmund literally "started from scratch" and has successfully created one of the largest technology parks in Europe (TZDO) with specialised competence centres. The city has established seven universities, attracted around 50,000 students, and has built a strong support system for start-ups – including the Centre for Entrepreneurship and Transfer at TU Dortmund University (ranked among the top five in Germany) and the start2grow business plan competition, which has engaged more than 14,000 participants in over 40 rounds, supported by 600 voluntary coaches, resulting in 1,500 actual business foundations.

Pioneering research centres such as the Lamarr Institute for Machine Learning and Artificial Intelligence and the German Rescue Robotics Centre (DRZ), are based in Dortmund. In addition, the social entrepreneurship incubator greenhouse.ruhr supports innovative projects focused on social and sustainable impact.

Climate Mitigation in the Municipality

Climate protection is an important field of action for German local authorities, even though it is not yet a mandatory task. Together with successful climate protection, local authorities ensure long-term quality of life for their residents. The actions of local authorities are always linked to other framework conditions, like national and international targets.

National Context

The German government amended the Climate Change Act in May 2021 (in force since August 31, 2021), setting the following climate protection targets:

- 65 % reduction of GHG emissions by 2030 (previously 55 %)

- 88 % reduction of GHG emissions by 2040 (based on 1990 levels)
- Climate neutrality by 2045 (previously 2050).

To achieve these targets and remain on the 1.5 degree Celsius (°C) pathway, the German government passed the new Renewable Energy Sources Act (EEG) 2023 in April 2022. This act focuses on expanding wind and solar energy, accelerating planning and approval processes, and granting municipalities a greater share of the revenues from wind energy, solar energy and biomass plants.

The Climate and Transformation Fund (KTF) will finance the necessary energy transition and climate protection, providing around €177.5 billion from 2023 to 2026. Major funding areas include:

- Federal Funding for Efficient Buildings (BEG)
- Development of electromobility and charging infrastructure
- Expansion of the hydrogen industry
- Promotion of energy efficiency

As a special fund, the KTF is primarily financed through national emissions trading and CO_2 pricing. The relief granted to particularly energy-intensive companies, as well as any further relief for consumers, is also guaranteed to be provided from this federal government's special fund.

Local Perspective

In December 2021, the City Council of Dortmund decided to bring forward the target date for achieving climate neutrality to 2035. Consequently, the Climate-Air Action Plan was adapted to the new target year (Climate-Air 2030 Action Plan). During the same council meeting, several operational measures were adopted, including the implementation of an immediate climate protection programme for 2022, the transformation of the Service Center for Energy Efficiency and Climate Protection (dlze, now Climate Agency) into a municipal climate protection agency with expanded competences and resources, and the establishment of a Climate Council. All measures have to be socially balanced according to the council.

Climate City Contract in Dortmund

The Climate City Contract (CCC) as an instrument of the EU mission 100 climate neutral and intelligent cities serves as a strategic plan to achieve climate neutrality by 2030. It consists of three documents. Firstly, the commitment, in which the city describes its participation and motivation and lists supporters from within the city. The action plan, which forms the strategic basis and outlines all measures to be implemented during the implementation phase. It particularly incorporates measures from other strategies such as the Climate-Air 2030 Action Plan, the Mobility 2030 Master Plan or the Energy Use Plan. And finally, the investment plan, which outlines the initial financial situation and financing options for measures.

Since climate neutrality can only be achieved collectively, companies, associations, educational institutions, and other stakeholders are invited to contribute their own climate

protection measures to the Climate City Contract. These commitments will be expanded over the next months and years. Citizens are also actively involved in the process.

It has been recognised by the City Council of Dortmund that efforts to achieve climate neutrality must be further intensified if an environment worth living in is to be preserved for citizens and future generations. Therefore, in 2022 the Council confirmed Dortmund's participation in the mission and instructed the administration to draw up the CCC. To achieve climate neutrality by 2030, the entire urban community is needed and will be part of the implementation.

2 Goal: Climate neutrality by 2030

Dortmund's 2030 Climate Neutrality Target and Scope

Dortmund has set itself an ambitious climate policy agenda in line with national, European, and global climate goals. Under Germany's commitment to the Paris Agreement, the overarching objective is to limit global warming to well below 2 °C, with efforts to remain within 1.5 °C. Within this framework, Dortmund has committed to achieving climate neutrality no later than 2035. However, through its participation in the European Union's Mission for 100 Climate-Neutral and Smart Cities, Dortmund has chosen to adopt an even more ambitious intermediate target: reaching climate neutrality, as defined by the Mission, by 2030.

This Mission-aligned target translates into an 80 % reduction in greenhouse gas emissions by 2030, compared to the 2019 baseline. Achieving this will require the acceleration of existing measures, the implementation of new initiatives, and the mobilisation of additional resources. The existing Climate-Air 2030 Action Plan of the City of Dortmund currently projects a 55 % reduction in emissions by 2030, leaving a significant gap between current forecasts and the Mission target. The primary objective of this Climate City Contract (CCC) is to close this gap by identifying and implementing transformative actions across all sectors.

Alignment of the CCC with existing climate strategies and planning frameworks

Dortmund's CCC Action Plan builds on a strong foundation of existing climate policies and urban strategies. Rather than replacing current frameworks, the CCC serves as an overarching accelerator and integrator, aligning and scaling up efforts to meet the more ambitious 2030 Mission target. Key existing frameworks include:

- Climate-Air 2030 Action Plan

  Adopted by the City Council in December 2021, this programme provides Dortmund's strategic roadmap for emission reduction. It includes measures in renewable energy, energy-efficient building refurbishment, sustainable mobility, air quality improvement, and district heating optimisation.

- Integrated Climate Adaptation Master Plan (MiKaDo)

  MiKaDo emphasises climate resilience and integrating adaptation measures into urban planning to safeguard quality of life. Key actions include flood risk management, green-blue infrastructure, the renaturation of water bodies, and the greening of facades and rooftops.

- Mobility Master Plan 2030

  Addressing emissions from the transport sector, this plan promotes sustainable mobility through expanded public transit, cycling infrastructure, car-free zones, and the transition to electric buses and light rail systems. Emission-free zones in the city centre are also part of the strategy.

- Energy Use Plan (ENP)

  The Dortmund Energy Use Plan (ENP) is a central strategic planning instrument of the City of Dortmund, which was initiated even before the nationwide mandate for municipal heat planning (KWP). It is based on the City Council's resolution on the Climate-Air 2030 Action Plan.

Exclusions for the CCC

The city's climate neutrality target covers its entire administrative territory. However, two specific sources of emissions are excluded from the Mission target due to limited municipal control and systemic constraints:

1. Dortmund Airport

   Emissions from air travel are excluded from Dortmund's greenhouse gas inventory, as these fall under national and international aviation frameworks beyond the city's direct influence. Nevertheless, the airport operator pursues its own climate neutrality objectives, focusing on ground operations and infrastructure.

2. Deutsche Gasrußwerke Industrial Complex

   Emissions from this major industrial facility are similarly excluded, as decarbonisation depends on technological innovation and national-level policy incentives. The city maintains regular dialogue with the company to explore future solutions and synergies, but direct control over emissions pathways is limited.

While these two exclusions are recognised in the scope of the 2030 target, Dortmund remains committed to engaging with both stakeholders to develop long-term decarbonisation strategies. Communication and coordination mechanisms will ensure that these emissions are addressed as part of the broader climate neutrality ambition, even if they are not formally counted within the Mission target timeframe.

Methodology climate neutrality

A key challenge for municipalities in achieving greenhouse gas neutrality is the methodological basis of the BISKO method. For example, the national electricity mix in Germany — and its corresponding emission factor — is used to calculate the greenhouse gas intensity of local electricity demand. Even if a municipality generates more renewable energy (with an emission factor of zero) than it consumes, it must still calculate consumption using the national emission factor. Local or regional renewable energy generation can only be reported separately for informational purposes.

The rationale behind the BISKO method is to prioritise the avoidance of emissions. Expansion of local renewable energy systems is therefore treated analogously to compensation measures in developing countries, in order not to obscure the need for direct avoidance efforts. This creates a disadvantage for municipalities that are particularly committed to promoting renewable generation, even though their contributions improve the national electricity mix.

Climate impact adaptation

The MiKaDo concept demonstrates how climate change adaptation issues can be integrated into current and future planning processes. It provides microclimate maps for the urban area, offering localised information on risks and vulnerabilities to overheating, flooding, drought, and storm events. In the future, the location of necessary adaptation measures could be linked with the Energy Use Plan, so that adaptation and mitigation efforts (efficiency, renewables) can be addressed through a single tool and integrated into the planning considerations of citizens, businesses, and the city administration.

Additional guidance is given on how adaptation concerns can be embedded in ongoing planning processes (including land use planning). Many adaptation measures – such as building orientation in urban planning or maintenance/expansion of green corridors – have direct co-benefits for climate protection.

[1]For future updates of adaptation concepts or the creation of new neighbourhood-level concepts, integrated analyses covering both adaptation and mitigation would be desirable.

Land use planning and urban development

According to Section 1 of the German Federal Building Code (BauGB), the land use plan is the preparatory urban development plan laying the groundwork for construction and other uses of land within the municipality.[2] Paragraph 5 of the first section specifies in particular:

"The urban land use plans are intended to safeguard sustainable urban development that reconciles social, economic and environmental protection requirements, also with a responsibility to future generations, and socially equitable utilisation of land for the general

[1] See the measure EE1 "Energy Use Plan" in the Climate-Air 2030 Action Plan
[2] Federal Building Code (BauGB) Sections 1(1) and 1(2)

good of the community, taking into account the housing requirements of the population. They shall contribute to securing a more humane environment and to protecting and developing the basic conditions for natural life and promote climate protection and adaptation, particularly in urban development, as well as preserve and develop the urban design and the town- and landscape in terms of building culture. To this end, urban development should be carried out primarily through internal development measures."

The current land use plan and the associated explanatory report of the City of Dortmund are from 2004.[3] In the latter, environmental protection considerations as well as climate protection and energy issues are adressed (in the chapters "Sectoral framework conditions" and "Explanations of the figures")[4], however, without reference to the current climate protection targets.

The perspective of integrated urban development concepts (INSEKTs) ranges from the consideration of city-wide land use planning to district framework and development plans. These serve as informal urban development plans at the district level. [5] Since 2018, "INSEKT 2030+" plans have been developed for each of Dortmund's twelve districts, the first of which was completed for the district of Aplerbeck in 2020. The plans include, for example, information on the climate impact adaptation concept (MiKaDo) with specific recommendations for action, such as fresh air corridors. In addition, information on the expansion of the walking and cycling infrastructure is provided under the topic of mobility. In this case as well, there are many overlapping topics that can be further developed in a coordinated manner in the future.[6]

Mobility planning

The topic of mobility is addressed in the Mobility Master Plan 2030 and the Emission-Free City Center project. The Mobility Master Plan 2030 has included a target concept since 2018 designed to form the basis for future transport planning decisions made by the decision-makers in the City of Dortmund. The target concept is intended to address the following eight target areas on an equal footing:

a. Mobility for all – equal participation
b. Securing and improving Dortmund's accessibility
c. Further developing Dortmund as a city of short distances
d. Reducing the negative environmental impact of traffic
e. Promotion of walking, cycling and public transport
f. Increasing road safety and the perception of road safety
g. Improvement of freight and commercial traffic

[3] City of Dortmund, (ed.), 2022, Neufassung des Flächennutzungsplans von 2004 [Revised version of the 2004 land use plan]
[4] See sections 6.4 and 7.4 at: City of Dortmund (ed.), 2004, Flächennutzungsplan [land use plan]
[5] City of Dortmund, n. d., Integrated urban district development concepts
[6] City of Dortmund (ed.), 2020, Integriertes Stadtbezirksentwicklungskonzept, Aplerbeck 2030+ [Integrated urban district development concept, Aplerbeck 2030+]

h. Upgrading and making streets and squares more attractive[7]

Based on these objectives, six strategies were developed in 2022:[8]

- Road safety strategy
- Pedestrian traffic strategy
- Accessibility strategy
- Public space strategy
- Strategy for stationary traffic

At the same time, the Mobility Master Plan 2030 is intended to provide links to transportation-specific planning as well as to other concepts such as urban development planning, noise action planning, clean air planning and climate protection.

The Emission-free City Center project is the implementation strategy of a funding programme of the European Regional Development Fund "Investment in Growth and Employment" (OP ERDF NRW). Construction measures, planning projects, mobility management and electromobility measures as well as public participation are being implemented through a total of 16 individual measures covering four main themes (City, Wall, Axes and Neighborhood).[9]

Energy Transition and Energy Use Plan

The Dortmund Energy Use Plan (ENP) is a central strategic planning instrument of the City of Dortmund, which was initiated even before the nationwide mandate for municipal heat planning (KWP). It is based on the city council's resolution on the Climate-Air 2030 Action Plan 2030. Due to the great impact the energy transition has on the reduction of emissions the ENP and the following KWP are key elements for Dortmunds strategy towards climate neutrality.

The ENP/KWP serves as a data-driven and georeferenced basis for decision-making for all stakeholders in Dortmund's energy transition – from the city administration and energy supply companies to private and commercial building owners. The first version of the ENP focuses on the heating sector, as heat provision accounts for more than half of the energy-related greenhouse gas emissions in Dortmund, but will be expanded on electricity and other energy sources.

Role of the CCC

As shown in the illustration below, the CCC does not stand apart from the aforementioned efforts; rather, it consolidates them under a unified ambition, providing sharper focus and an accelerated timeline. By integrating measures from existing plans such as the Mobility 2030

[7] City of Dortmund, n. d., Target concept
[8] City of Dortmund, n. d., Mobility 2030 Master Plan
[9] City of Dortmund, n. d., Emission-free city center

Master Plan and Climate-Air Action Programme into the CCC framework, Dortmund ensures that all associated emission reductions are counted toward closing the 2030 gap.

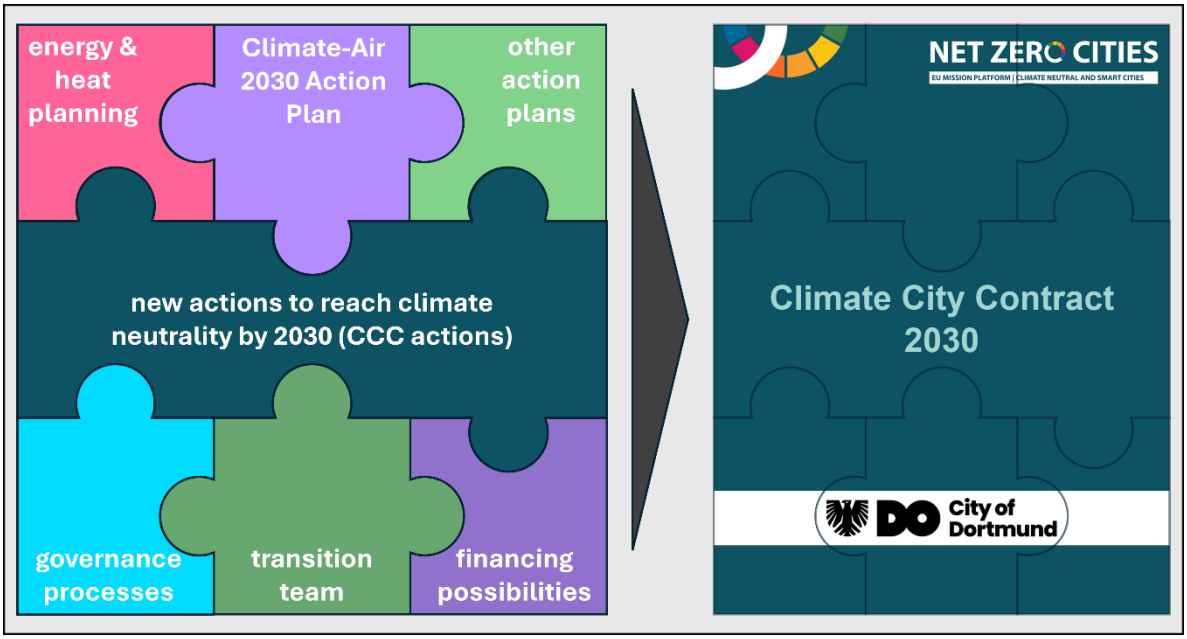


Figure 2 Role of the CCC in the Administration (City of Dortmund 2025)

Through the CCC, new structures and governance processes are outlined to support climate neutrality activities. The CCC acts as a catalyst to elevate current projects, prioritise investments, and channel national and EU resources into projects with the highest impact. It provides a unique opportunity to coordinate across sectors, break down silos, and ensure that climate action becomes the overarching priority in all areas of urban development. Thereby the CCC will become a living document and an adoptive strategy that comprehends new developments and knowledge.

From Dortmund's perspective, measures in the context of the CCC also generate significant co-benefits. These include healthier living and working conditions, clean air, reduced noise and greater road safety. At the same time, property values and the quality of stay in public spaces increase. Further positive effects arise through regional value creation, new jobs – including in public transport – and the strengthening of the local economy. In addition, fair use of resources, reduced dependency on fossil fuels, and effective pollution control contribute to sustainable urban development.

3 Strategic priorities

The City of Dortmund has defined the following fields of action, based on the strategy Climate-Air 2030 Action Plan, the Mobility 2030 Master Plan and the Energy Use Plan, in order to achieve climate neutrality in 2030 (80 % CO_2 reduction compared to 2019):

Renewable energy and energy efficiency

The "Renewable energies and energy efficiency" field of action has always been the central pillar of climate protection in Germany. It was also a key focus of the municipal Climate Protection 2020 action programme, in which numerous measures were developed and implemented. Significant GHG reduction contributions have been achieved in particular through the expansion of photovoltaics, the increased use of district heating and the use of wood as an energy source for heating. The expansion targets for renewable energies were nearly met. In contrast, progress in energy efficiency has been limited.

Dortmund holds a considerable potential for further expansion in renewable energies. For example, in the heating sector, substantial untapped opportunities exist for using renewable energy sources such as bioenergy, geothermal energy, and solar thermal energy. Additional potential is also likely to be found in improving energy efficiency.

Overall, it can be assumed that measures with a GHG reduction potential of around 600,000 t CO_2 per year can be economically and technically realised in Dortmund in the period up to 2030.

Sustainable construction

The "Sustainable construction" field of action complements the "Renewable energies and energy efficiency" field of action. Due to its great relevance for energy efficiency in the heating sector, it has already been given high priority in the City of Dortmund's 2020 action programme.

The implementation of measures in the "Energy efficiency in existing buildings" field of action has not yet been satisfactory. On the one hand, too few measures have been carried out; on the other hand, those implemented – which mostly rely on the insight and motivation of private building owners to save energy and GHGs (e. g. through proactive advice) – have not reached the goals set in the Climate Protection 2020 action programme. In contrast, measures that are based on additional external incentives and address a limited target group, such as the "100 EnergyPlusHouses for Dortmund" campaign, were well received and successfully executed.

The potential in this area is correspondingly high. Significant GHG savings can be achieved by improving the energy efficiency of existing buildings, including municipal, residential, and commercial properties. In total, these measures could save around 800,000 t of CO_2 per year by 2030.

Agriculture and nutrition

The topic of "agriculture and nutrition" has increasingly become a relevant aspect of climate protection in recent years. The City of Dortmund has therefore decided to include it for the first time as a distinct field of action in the Climate-Air 2030 Action Plan. Nationwide, agriculture already accounts for about 7 % of all GHG emissions, although this figure does not consider imported animal feed, the production of equipment, or land use changes such as deforestation and the drainage of peatland. Further, non-energy emissions from agriculture (particularly the greenhouse gases methane and nitrous oxide, both of which have a particularly strong impact on the climate) pose a major problem for achieving complete climate neutrality. Therefore it is crucial to identify effective ways and means of reducing GHG emissions in this sector. GHG emissions related to nutrition can be measured based on the CO_2 footprints of foods or on various consumer behaviours.

Agricultural land accounts for 23 % of Dortmund's area. Silage and green maize cultivation and livestock farming are the main contributors to GHG emissions. However, the dietary habits of Dortmund's population have a much greater influence on the GHG balance. Switching to a flexitarian diet could reduce food-related greenhouse gas emissions in Dortmund by 10 %, while a vegetarian or vegan diet could reduce them by 30 % or even 43 %, respectively.

Measures in agriculture, changes in eating habits as part of nationwide development trends and the reduction of food waste can save over 200,000 t of CO_2 per year by 2030 in this field of action.

Sustainable mobility

Reducing emissions in the transport sector has been a key goal in Dortmund's urban and transport planning for many years. The reduction of air pollutants (NO_2 and particulate matter) has been at the forefront – not least due to EU limits being exceeded in the city. However, the transport sector has also become increasingly important for climate protection efforts due to the Climate Protection 2020 action programme. The City of Dortmund has developed a comprehensive strategy for sustainable mobility with the Mobility 2030 Master Plan in addition to the implementation strategy "City air is (emission) free - Dortmund's entry into an emission-free city centre from 2019.

Due to the numerous strategies and measures already prepared as part of the aforementioned activities, no further measures will be developed as part of the Climate-Air 2030 Action Plan. Instead, the sub-concepts and measures of the Mobility 2030 Master Plan have been integrated into the Action Plan.

If these concepts are implemented, it is assumed that almost 300,000 t of CO_2 per year can be saved in the transport sector by 2030, due to the increase in electromobility in the transport sector and changes in the modal split.

Air

The "Air" field of action is addressed in a separate technical report within the Climate-Air 2030 Action Plan. It sets out the fundamental principles for assessing air quality in Dortmund. Accordingly, "healthy air" in the Climate-Air 2030 Action Plan is defined as all material and physical conditions of the local atmosphere that do not objectively have a negative impact on the health or well-being of people.

Based on the identified health effects of various pollutants, the technical report concludes that the topic of "air" must continue to be dealt with ambitiously. Regarding the impact of heat on human health, the forecasts predict a further increase in heat stress and a higher number of citizens affected.

The technical report outlines which measures can be taken by the Dortmund city administration to obtain further information on air quality in Dortmund and, in cooperation with the citizens of Dortmund, achieve effective improvements in air quality in the city.

Field of actions and measures of the CCC Action Plan

While writing the Action Plan for the CCC to develop its climate neutrality strategy, the City of Dortmund worked with the NetZeroPlanner tool, provided by the NetZeroCity platform. For the calculation of the baseline emissions in 2019 and the assumptions the NetZeroPlanner divides the emissions in five fields of actions (Buildings & Heating, Electricity, Transport, Waste and Other). Measures form the Climate-Air 2030 Action Plan and other strategies were matched with those fields of actions.

For the Action Plan of the CCC, the following measures are defined for the implementation phase aimed at achieving climate neutrality by 2030.

Field of action	Core activities	
Buildings & Heating	BH 01	Climate-neutral building stock of municipal buildings
	BH 02	Efficient buildings initiative
	BH 03	Increase of sustainable construction
	BH 04	Expansion of renewable local heating networks
	BH 05	Climate neutral district heating 2035
	BH 06	‚we.do' - Hydrogen electrolysis Dortmund
	BH 07	Transformation of the property portfolio towards a climate-neutral portfolio
	BH 08	Optimisation of building energy control (Airport)
	BH 09	Replacement of inefficient heating systems (Hospital)
	BH 10	Preparation of municipal heat planning
	BH 11	Consultation on energy-efficient refurbishment for private stakeholders by Climate Agency
	BH 12	Introduction of cross-location energy management in the older existing buildings with successive conversion to new technologies

	BH 13	Creation of an Energy Use Plan for the City of Dortmund (focus on heat supply)
	BH 14	Location development at WILO SE – Construction of the Wilopark
Electricity	EE 01	Campaign for the use of photovoltaics
	EE 02	Installation of intelligent streetlights
	EE 03	Exchange of lighting in streetlights to LED
	EE 04	LED conversion of apron lighting (Airport)
	EE 05	PV Installation Aircraft Hangar
	EE 06	PV Installation Administration Building Airport
	EE 07	PV Installation on municipal buildings and tram stations (DSW21)
	EE 08	PV Installation at property EDG
	EE 09	PV Installation at property EDG
	EE 10	PV Installation at property EDG
	EE 11	PV Installation at property EDG
	EE 12	Ground-mounted photovoltaic system
	EE 13	CO_2 Emissions of the City of Dortmund through the Emschergenossenschaft and Lippeverband for the Concerns of the (Wastewater) Industry
	EE 14	Photovoltaic system expansion
	EE 15	Photovoltaic system at Dortmund North Hospital
	EE 16	Photovoltaic system Dortmund Hospital gGmbH
	EE 17	Second-life PV system at the Dortmund Concert Hall - a sustainable energy project in cooperation with scientific partners
	EE 18	LED conversion of sound sails at the Dortmund Concert hall
	EE 19	LED conversion of spotlights at the Dortmund Concert Hall
	EE 20	Installation of photovoltaic systems at the head office in Dortmund (VOLKSWOHLBUND Insurance Company)
	EE 21	Energy Cooperation - Making the energy transition easy
Transport	TA 01	Bicycle network priorities
	TA 02	Bicycle parking priorities
	TA 03	Parking space management by space category
	TA 04	Special parking spaces and disabled parking spaces
	TA 05	Speed limit of 30 on main streets
	TA 06	Green traffic lights for cyclists
	TA 07	Green Charging Lanterns
	TA 08	Conversion of the vehicle fleet to alternative drive systems (primarily electric) (DSW21)
	TA 09	B-car project
	TA 10	Operational mobility management
	TA 11	Conversion of the bus fleet to emission-free drives
	TA 12	EDgo2 / Acquisition of four battery-powered small sweepers
	TA 13	Low-emission mobility / purchase of three battery-electric light lorries <3.5 Mg.

	TA 14	Low-emission mobility / purchase of battery-electric commercial vehicles in classes N1, N2 & N3
	TA 15	Local and Sustainable Electricity Generation as a Prerequisite for Electrifying the Commercial Fleet by 2030
	TA 16	Development of 15 locations into mobility hubs with approx. 300 intelligent charging points in 3 years (by 2027) to realise CO_2-neutral commuting and digitalisation of fleet processes
	TA 17	Charging stations for e-mobility
	TA 18	Bicycle shelters with charging stations
	TA 19	Bicycle shelter at Dortmund Central Hospital
	TA 20	Microdepots for delivery services – Emission-free delivery
	TA 21	Increasing the availability of car sharing
	TA 22	North connection KV II plant
Waste	W 01	DO-zirkulär
	W 02	Smart Waste Bins
	W 03	Study on the use of reusable solutions at events in Dortmund
	W 04	Local recycling cycle in Dortmund - Utilisation of by-products from mushroom cultivation
	W 05	Energy saving campaign and waste campaign - sufficiency strategies in the professional and university environment
Other (AFOLU)	O 01	Activation of citizens for climate protection
	O 02	Activation of private capital for climate protection
	O 03	Dortmund network for climate protection
	O 04	Climate protection in Dortmund´s economy
	O 05	Information portal 'Air Quality' & Information Gathering - Measurement Network for Air Quality and Bioclimatic Parameters & Analysis and Forecasting of Air Pollution in Urban Areas
	O 06	Local and regional production and marketing
	O 07	Climate-friendly, healthy food in municipal facilities
	O 08	Sustainable agriculture
	O 09	Education for climate-friendly, sustainable nutrition
	O 10	The Dortmund CO_2 calculator (Klix^3)
	O 11	Support for the Schulte-Tigges educational farm - planting an agroforestry system with subsequent permaculture
	O 12	Print Green - Ecological printing with inkjet systems
	O 13	supraraum – details are the city
	O 14	Network in the harbour area

Residual Emissions

Based upon 2019 emissions of 3,670 kt CO_2eq and the NetZeroCities economic model with an 80 % reduction scenario, approximately 752 kt CO_2eq/year of residual emissions would remain unavoidable by 2030 (including Scope 3 emissions, according to NetZeroPlanner).

Compensation is considered only as a last resort, with clear priority given to energy efficiency, expanding renewable energy, and energy savings.

By 2030, residual emissions are projected to represent 20 % of the total, with 15 % coming from transport, 52 % from buildings and heating, 22 % from electricity generation, 3 % from waste, and 8 % from other sources (including IPPU and AFOLU).

Despite its ambitious climate protection measures, the City of Dortmund intends to offset any remaining emissions after 2030. Since achieving complete emissions freedom quickly is not possible, the city relies on a combination of technological solutions, such as capturing CO_2 in large municipal facilities, and, above all, nature-based measures. Direct air capture of CO_2 is considered unsuitable due to the high costs and energy demand, while the infrastructure for CO_2 storage is too expensive to implement quickly.

The city places great emphasis on expanding natural carbon sinks, primarily by maintaining and developing the urban forest (2,526 hectares), consisting mainly of native deciduous trees. This forest is set to grow in the long term through sustainable forestry. Every year, 5,000 new trees are planted to increase carbon sequestration and biodiversity. Other small carbon sinks include green spaces, parks, and cemeteries (2,368 hectares), which are being improved through measures such as roof and façade greening.

To offset unavoidable residual emissions, Dortmund plans to use high-quality CO_2 certificates, preferably from EU projects. A comprehensive strategy for dealing with residual emissions is currently being developed, involving private companies that will contribute through innovation and their own climate targets.

4 Process and principles

Process Climate City Contract

A key part of the CCC is to involve urban society in the climate protection process in an even more committed way than before. To this end, the City Administration will continuously optimise framework conditions for successful implementation. The Climate City Contract will be regularly updated and submitted to the European Commission for review every two years to ensure transparency in progress and measures in climate protection.

Priorities for the implementation of climate protection strategies and measures are set by the City Council and the Executive Board of the City Administration – the Transition Team for the CCC. To support decision-making, the City of Dortmund is developing various formats to ensure that the climate neutrality targets are closely linked to budget planning. This guarantees that financial and strategic decisions are consistent with the climate targets.

The transition team organises regular meetings to evaluate and monitor the project.

During the creation of the CCC, the transition team consisted of colleagues from the Department for Mayoral and City Council´s Affairs and the Environment Agency. For the

implementation phase following the award of the label, the transition team will be expanded to include colleagues from various departments: mobility, urban planning, finance, and economic development.

At the beginning of the implementation process, it is important for the transition team to set well-defined objectives and milestones. To this end, the transition team is collaborating with the Net ZeroCities (NZC)platform to create a process for mapping all measures in the Action Plan portfolio.

It is therefore necessary to establish topic-related boards in the city administration covering areas such as mobility, renewable energies and energy efficiency, publicity, sustainable building, agriculture and nutrition, and the circular economy. The actions of the CCC Action Plan already name responsible bodies in the administration for the implementation phase. This will be an orientation for founding the boards.

A separate board will be responsible for the overall coordination and monitoring of the process. This task will be carried out by a team consisting of a colleague from the Department for Mayoral and City Council Affairs and a colleague from the Environment Agency. Since they are not part of the topic-related boards, they can take on a management role.

The progress of climate protection strategies and measures is regularly reviewed internally. A detailed reporting system enables continuous evaluation of the city's energy and greenhouse gas balance, thus recording Dortmund's progress towards climate neutrality by 2030.

Previous analyses show that, in addition to the state actors – federal, state and municipal – market actors such as citizens, households, companies and local institutions also play a key role in achieving climate neutrality. The City of Dortmund has been involving these stakeholders in its climate protection work for a long time. This is not just about technical measures only, but also about social climate protection and cultural transformation of the entire urban society. Dortmund is striving to create an environment that promotes climate-friendly decisions in areas such as mobility, housing, energy, consumption and nutrition. The Dortmund Climate City Contract is the central instrument for consistently pursuing this path and intensifying climate protection efforts. The overall aim is to shape a sustainable and environmentally friendly future for all Dortmund residents.

Process Climate-Air 2030 Action Plan

The Climate-Air 2030 Action Plan pursues an integrative approach. Numerous projects and measures have been developed and launched in Dortmund in recent years. The partially overlapping development strategies are interconnected within this concept. With the "Agriculture and Nutrition" field of action, a further element with influence on climate factors has been included in the Action Plan. The connection to the "Air" field of action has revealed further synergies, particularly with the "Sustainable Mobility" field of action. The integration of

these fields of action and measures is intended to accelerate climate protection in Dortmund.

Another important feature of the Climate-Air 2030 Action Plan is the participation process which was initiated at a very early stage. The climate protection targets can only be achieved if all citizens and local businesses participate. Social groups and people active in climate protection were therefore involved in the development of the Action Plan through interviews and workshops.

The political factions on the Dortmund City Council were regularly informed of the interim results, as their resolutions are intended to pave the way for the implementation of the 2030 Action Plan.

The participation process has shown that the need for swift action in Dortmund has been recognised by all those involved. In addition, the will to work together enables climate neutrality by 2030 in the next few years was evident.

"Climate Check" monitoring tool

As part of the Dortmund Climate City Contract, a structured process called the "Climate Check" is being introduced to identify and address deviations from the climate neutrality target at an early stage. This process is designed to ensure that Dortmund meets its climate targets by systematically evaluating and adapting measures.

The first step in the "Climate Check" process is the gap analysis. Here, the Dortmund Climate Dashboard is used as an early warning system to identify significant deviations from the planned target path. This is followed by a detailed analysis of the causes of these deviations, such as insufficient implementation or changed framework conditions. The result of this analysis provides a clear overview of the nature and extent of the existing gap between the current status and the desired targets.

Based on the analysis, the evaluation of measures is carried out in the next step, the planning phase. The evaluation team focuses on the measures with the greatest impact on the identified gap. The interdisciplinary team, formed specifically for this purpose, combines the expertise and perspectives of various stakeholders. The evaluation is carried out using various methods, including document analysis of planning documents and implementation reports, interviews and workshops with those responsible, and comprehensive data analysis. The results of this phase provide a sound assessment of the effectiveness of existing measures and help identify potential for improvement.

In the subsequent implementation phase, specific courses of action are developed to optimize the measures. This may involve adjusting the objectives, modifying the implementation approach, or introducing additional measures. The most promising options for action are selected by the evaluation team and political decision-makers. A detailed implementation plan is then drawn up, outlining responsibilities, timetables, and required resources.

The progress of the adapted measures is continuously monitored, with the Dortmund Climate Dashboard serving as a tool for monitoring. Regular reviews of the effectiveness of adjustments ensure that the “Climate Check” is initiated again if necessary in order to make additional corrections.

The final step in the “Climate Check” process is learning and improvement. This is where all findings from the process are documented, including root cause analyses, evaluation results, options for action, and implementation measures. These findings are then passed on to relevant stakeholders and integrated into future planning. Based on the experience gained, the “Climate Check” process is continuously adapted and optimised.

Stakeholder involvement plays a central role in the “Climate Check” process. All relevant players such as specialist departments, political bodies, civil society, and companies are identified at an early stage and actively involved. They participate through workshops, surveys, and advisory boards. Transparency is a top priority, as the process, the results, and the decisions are communicated openly.

Key success factors for the “Climate Check” process are clear responsibilities, interdisciplinary cooperation, flexibility, and political support. The definition of roles and responsibilities ensures clarity in the process, while interdisciplinary cooperation promotes exchange between different specialist areas and stakeholders. The flexibility of the process makes it possible to react to changing framework conditions, and political support ensures the necessary backing for the implementation of the measures.

This framework concept for the “Climate Check” serves as a guideline that can be adapted according to the specific circumstances and framework conditions of the individual measures in order to successfully achieve Dortmund's climate targets.

5 Signatories

The table below enlists the signatories[10] who are committing to this CCC, and thereby to help the city achieve its goal to reach climate neutrality by 2030. Specific agreements that articulate the details of the climate action(s) between the municipality and signatories are added to the individual contracts in Appendix 1 (see sample in section 6). The number and relevance of signatories' commitments is likely to increase over time.

Name of the signatory (organisation)	Sector / Domain / Level of operation[11]	Legal form	Name of the responsible person	Position of the responsible person
AGERE. Agentur für Nachhaltigkeit GbR	Business/ Sustainability consulting/ Regional	Company under civil law (GbR)	Laura Grotenrath	Managing director
Art des Hauses	Business/ creative agency, stakeholder engagement/ Local	-	Dr. Martin Kiel, André Maaßen	Managing director
Borussia Dortmund GmbH & Co. KGaA	Business/ Professional Football Club, renewable energies, stakeholder engagement/ International	Limited Partnership with Limited Company as General Partner (GmbH & Co. KGaA)	Thomas Treß	Managing director
BürgerEnergie Dortmund eG	Cooperative	eG (registered cooperative)	Ulrike Guba, Thomas Orban	Board of directors
DEW21 - Dortmunder Energie- und Wasserversorgung GmbH	Municipal company/ Heating network, energy/ Local, regional	Ltd. (GmbH)	Dr. Gerhard Holtmeier	Managing director

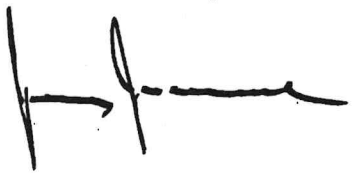
[10] Climate City Contract signatories may be individuals or organisations. They ideally include national and/or regional governments, for example concrete agreements/ commitments made through the multi-level governance engagement processes supported by NetZeroCities, CapaCities, and other emerging national level initiatives.
[11] Please mention if the organisation is active at local, regional, national, or international level.

DSW21 - Dortmunder Stadtwerke AG	Municipal company/ Mobility, transportation/ Local, regional	Public limited company (AG)	Jörg Jacoby	Managing director
DOGEWO - Dortmunder Gesellschaft für Wohnen mbH	Municipal company/ Housing/ Local	Ltd. (GmbH)	Ocke Christoph Mildner	Corporate and process management
Flughafen Dortmund GmbH	Municipal company/ Transportation, airport/ Local	Ltd. (GmbH)	Heike Helmboldt	Sustainability & aircraft noise protection officer
Dortmunder Hafen AG	Municipal company/ Logistic/ Local	Public limited company (AG)	Bettina Brennenstuhl	Managing director
EDG Entsorgung Dortmund GmbH	Municipal company/ Waste management/ Local	Ltd. (GmbH)	Prof. Dr.-Ing. Rainer Wallmann	Managing director
Emschergenossenschaft	Municipal company/ / Local	Corporation under public law	Dr. Anika Grübel	Central membership and sponsorship management
Fachhochschule Dortmund	Business and academia/ Organisational and perspective management, Applied Social Sciences, Economics/ Local, regional	Corporation under public law	Sebastian Kreimer	Organisational and perspective management, Applied Social Sciences, Economics
GREEN IT Das Systemhaus GmbH	Business/ IT Services/ Local, regional, national	Ltd. (GmbH)	Thomas Lesser	Managing director
IMAGO- Institut für Marketing und Unternehmenskommunikation Thomas Heine GmbH	Business/ Stakeholder engagement/ Local	Ltd. (GmbH)	Thomas Heine	Managing director
KIS Antriebstechnik GmbH & Co. KG	Business/ drive technology/ Local	Limited Partnership with Limited Company as	Tim Kohlhaas	Managing director

		General Partner (GmbH & Co. KGaA)		
Klinikum Dortmund gGmbH	Local hospital	Ltd. (GmbH)	Pierre Brandt	Energy manager
Konzerthaus Dortmund GmbH	Business/ Culture/ Local, regional, national	Ltd. (GmbH)	Dr. Harriet Oelers	Development
netz NRW – Verbund für Ökologie und soziales Wirtschaften e. V.	Business/ Association for ecology and social economy/ Local, regional	Registered association	Svenja Noltemeyer	Managing director
Pädagogisch Soziales Zentrum Dortmund e.V.	Business/ Stakeholder engagement/ Local	Registered association	Christa-Maria Walberer	Board member
SIGNAL IDUNA AG	Business/ Insurance/ Local, regional, national	Public limited company (AG)	Ulrich Leitermann	Chairman of the Management Board
Sparkasse Dortmund	Business/ Building, mobility, funding/ Local, regional	Public law institution	Ann-Kristin Vollmer	Head of Corporate Development
VOLKSWOHL BUND AG	Business/ Insurance/ Local, regional, national	Public limited company (AG)	Dr. Gerrit Böhm	Chairman of the Management Board
WILO SE	Business/Industry	Societas Europaea	Moritz Peschke	Global Location Management – Site Management Dortmund

6 Contract with signatures

We, the undersigned, hereby commit to help make the City of Dortmund climate neutral by 2030. We agree to the shared goals, strategies, and measures as outlined in the present Climate City Contract.



17.09.2025

Thomas Westphal, Mayor of the City of Dortmund — Date

7 Annexes

Council Proposal EU-Mission:
https://rathaus.dortmund.de/dosys/doRat.nsf/DrucksacheXP.xsp?drucksache=25156-22

This document contains the resolution by the Dortmund City Council to participate in the EU Mission. It includes the letter of intent from the City Council of Dortmund.