AmsTErdam BiLbao cItizen drivEn smaRt cities

Deliverable 2.8: Updated SEAP/SECAP for LHs and FCs

WP2, Task 2.5

Date of document

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DoA	Task 2.5 – Action Plan: Implementing the Vision. A short- or medium-term action plan will be prepared taking into account the Energy City Vision 2050 established in the previous task. These plans prepared by the SCPG of each city can complement existing SEAP/SECAP or produce an updated version of existing ones. The approach in its preparation should follow the same scheme as in Task 2.4 getting a consensus and validation from the participants.		

Date	Version	Author	Comment
12/04/2023	0.1	CARTIF	Table of Content
03/01/2024	0.2	CARTIF	Contribution to sections 1, 2 and 3, guidelines for cities' sections contribution
30/04/2024	0.3	CARTIF	After cities (and other partners) included their inputs, reviewed version and accepted changes
27/05/2024	0.4	Tecnalia & TNO	Review of the deliverable
28/05/2024	1.0	CARTIF	Final version of deliverable

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Abbreviations and Acronyms

Acronym	Description
AP	Action Plan
BaU	Business as Usual
BEI	Baseline Emission Inventory
CCC	Climate City Contract
CNG	Compressed Natural Gas
CoM	Covenant of Mayors
D	Deliverable
DH	District Heating
DHN	District Heating Network
DHW	Domestic Hot Water
EoI	Expression of Interest
ESM	Energy System Modelling
EU	European Union
FC	Fellow City
GDP	Gross Domestic Product
GHG	Greenhouse gas
IP	Investment Plan
JRC	Joint Research Centre (from the European Commission)
LCA	Life Cycle Assessment
LDG	Local Green Deal
LED	Light-Emitting Diode
LH	Lighthouse City
NECP	National Energy and Climate Plan
NGO	Non-Governmental Organisation
PED	Positive Energy District
PV	Photovoltaic
RES	Renewable Energy Sources
RVA	Risk and Vulnerabilities Assessment
SCPG	Smart City Planning Group
SDG	Sustainable Development Goal
SEAP	Sustainable Energy Action Plan
SECAP	Sustainable Energy and Climate Action Plan
SUMP	Sustainable Urban Mobility Plan
SWOT	Strengths, Weaknesses, Opportunities and Threats (analysis)
T	Task
WG	Working Group
WP	Work Package
WS	Workshop

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0. Executive Summary

Work Package 2 aims to develop a **2050 City Vision** for ATELIER cities using the **Cities4ZERO methodology**. This structured approach involves engaging key stakeholders, reviewing planning frameworks, analysing strengths and opportunities, formulating future scenarios, and developing **strategic plans** aligned with the City Vision. At this stage of the project, ATELIER cities have been working for 4 years in developing the city vision and are ready to implement developed vision.

According to the city vision presented in previous steps of WP2, this Deliverable 2.8 presents innovative ideas for developing or updating the **Sustainable Energy and Climate Action Plans (SECAPs) or similar action plans** in ATELIER cities. It highlights the collaborative process of action planning, incorporating the city vision and strategic objectives worked in previous steps of the project, and provides insights into each city's experiences, addressing challenges and showcasing innovative processes. The report emphasises flexibility in integrating the city vision into existing plans and initiatives, such as the EU Mission on Climate-Neutral and Smart Cities, demonstrating **how ATELIER cities translate their city vision into concrete action plans**, contributing to urban and energy transformation aligned with ambitious climate goals.

Amsterdam's Climate Action Plan development is rooted in existing initiatives like the Climate Agreement and the Roadmap Amsterdam Climate Neutral 2050. The approach involves multi-level collaboration and continuous updates through platforms like New Amsterdam Climate, focusing on initiatives across various domains.

Bilbao's Action plan (SECAP) key initiatives include enhancing energy efficiency in building, decarbonizing the transport sector, and promoting renewable energy generation. The plan also emphasises reducing climate risk, increasing response capacity to climatic events, raising public awareness, and strengthening governance frameworks.

Bratislava's Action Plan outlines strategies across sectors to address climate change and promote sustainability. With a focus on reducing emissions and enhancing resilience, priorities include energy efficiency, waste recovery, urban mobility and climate adaptation.

Budapest's vision centres on climate change and energy transition, aiming to extend SECAP from 2030 to 2050 through the Budapest Vision 2050. The process involves city stakeholder engagement, strategic planning and collaboration with EU initiatives like the Cities' Mission and the Climate City Contract.

Copenhagen aims for climate positivity by 2035, going a step further as the city aims to reach climate neutrality by 2025, focusing on emissions energy consumption reduction. The city's climate vision development process includes consultation and cross-municipal workgroups, guiding initiatives and investments.

Krakow's Climate Action Plan focuses on reducing CO_2 emissions and enhancing resilience to climate change. The city's approach involves stakeholder engagement, collaboration with EU projects, and comprehensive strategic planning to achieve climate neutrality.

Matosinhos aims for carbon neutrality by 2030, emphasising stakeholder engagement, innovation and strategic planning. The action plan includes measures across sectors like energy, transportation, waste and industrial processes, monitored through data-driven evaluation.

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Riga's action plan for climate neutrality by 2030 involves comprehensive stakeholder engagement and sector-specific strategies. The plan prioritises six main sectors, including energy production, residential buildings and waste management, with a focus on transparent implementation and collaborative efforts.

Collectively, these efforts by ATELIER cities reflect a profound commitment to achieving **carbon neutrality** and addressing climate change through strategic urban planning and action-oriented initiatives. The collaborative development and implementation of Sustainable Energy and Climate Action Plans (**SECAPs**) have enable these cities to translate their visionary goals into tangible actions. By fostering stakeholder engagement, leveraging existing frameworks, and aligning with broader European initiatives, these cities are not only advancing their local climate agendas but also contributing to the global movement towards sustainable and resilient urban environments. Through their innovative and adaptive approaches, ATELIER cities are paving the way for a carbon-neutral future, demonstrating that strategic planning and community involvement are crucial in making the vision of sustainable cities a reality.

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1. Introduction

WP2 purpose is to develop a 2050 City Vision for the cities of the project. Thus, the flow of the work package is structured according to *Cities4ZERO: The Urban Transformation Strategy for Cities' Decarbonisation* (Urrutia et al, 2020[1]), a step-by-step methodology that guides the cities through the process of developing the most suitable strategies, plans and projects as well as looking for commitment of key local stakeholders for an effective transition; all from an integrated planning approach.

Within Cities4ZERO methodology, WP2 is focused on the Strategic Stage (Figure 1), providing a strategic planning framework which enables the cities to:

- Engage key city stakeholders (institutional analysis and Smart City Planning Groups).
- Review the planning framework of the city.
- Analyse and diagnose the city' strengths and opportunities.
- Formulate the co-visioning process for urban transformation towards energy transition, including potential future scenarios.
- Develop the strategic plans (SECAP in ATELIER case) to deploy that city vision, identifying the key projects for the city.

In the case of D2.8 – *Updated SEAP/SECAP for LHs and FCs,* the work developed in this deliverable corresponds to Step 5 Strategic Planning (Action Plan) of *Cities4ZERO* methodology, where strategic or other action plans are developed taking into account the city vision established in previous steps.

Figure 1. Strategic Stage in Cities4ZERO approach by Tecnalia (Urrutia et al, 2020)

[1] https://doi.org/10.3390/su12093590

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1.1. Purpose and Target Group

The main purpose of this deliverable *"D2.8 Updated SEAP/SECAP for LHs and FCs"* is to report on the updated or new SECAP or other Action Plan in the cities, and provide innovative ideas aligned with PED design and demonstration, considering also the insights acquired during the developments of the new City Vision 2050 (T2.4 "*City Vision 2050*", reported in D2.6 "*City Vision 2050 for LHs and FCs*"). It is the main outcome of Task 2.5 *"Action Plan: Implementing the Vision"*.

The D2.8 is a public report, and thus, it will be available at the project website (https://smartcity-atelier.eu/outcomes/deliverables/). The intention is that it can serve as reference or example from ATELIER cities to other European cities in the development of their Action Plan from their defined City Vision. The eight cities have implemented the methodological approach according to their context and needs, and adapting it to their action planning moment in their city.

The present deliverable is structured as follows:

- **Section 1** introduces the entire WP2, to the methodology carried out in it, as well as to the deliverable and its distribution (by chapters and by partners).
- **Section 2** addresses the objectives of the present document and the approach followed for its development.
- **Section 3** contains the overall approach to the task and deliverable, including the different activities and guides provided within WP2 over the project to strategic planning. It also includes the creation of the city vision concept carried out in the ATELIER Project, which is the basis for the subsequent action planning. Sub-section **3.1** includes the planning of the ATELIER cities throughout WP2, the city vision and strategic objectives and targets, which is the starting point for the action planning activities reported in this deliverable.
- **Section 4** delves into the ATELIER Action Planning and the SECAP process. Firstly, introducing the European framework. Then, section **4.1** describes the SECAP process (as recommended by EC and JRC), section **4.2** summarises the status of the ATELIER Cities with respect to the Covenant of Mayors initiative and SEAP or SECAP development; while section **4.3** informs on the new initiative of the Cities Mission and the Climate City Contract (CCC).
- **Sections 5 to 12** are the ones devoted to each city (both LHs and Fs), where each one reports the main insights from their experience in developing the SECAP or other similar Action Plan. Focusing on how:
    - their set vision and strategic objectives as basis for the action plan development;
    - the document in which they have included this as Action Plan (updated or new SECAP, Climate Action Plan, CCC, or other);
    - the **process** carried out by the city to develop the plan, explaining key different points that have been especially challenging or that could serve to provide innovative ideas to other cities, touching topics such as how the definition of actions has been done (how actions have been prioritised, aligned with vision and objectives, how the implementation details have been defined, as well as co-benefits, barriers, impact estimation have been defined…), how the definition of concrete objectives of pathways has been done (from the more general ones in the city vision), how the PED impact has been assessed at city level, which processes for city consultation have been carried out (taking into

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account citizens and stakeholders' view), how the city has organised the teams and municipal departments to develop the Action Plan, how you took advantage of different projects and initiatives, how the previous city planning and targets have serve the city to develop the new Action Plan (and how the new Action Plan is aligned with other city plans). Finally, cities reported how they have used the inputs and support from ATELIER project in their Action Plan development.

- **Section 13** constitutes the main conclusions on the deliverable.
- **Section 14** includes the references used within the document.

1.2. Contributions of Partners

The following Table 1 depicts the main contributions from project partners in the development of this deliverable.

Table 1. Contributions of Partners

Partner short name	Contributions
CARTIF	Deliverable and Task leader. Developer of initial and final sections (sections 1, 2, 3 and 4, as well as 13 and 14), provide guidance to all cities throughout the task and their sections development.
Tecnalia	Work Package leader. Contribution to initial sections (section 1 and 2, and 4.1) as per the work developed in WP2 context on city vision and Cities4ZERO methodology. Deliverable revision.
TNO	Contribution to section 5 of Amsterdam. Deliverable revision.
AMST	Development of section 5 of Amsterdam
City of Bilbao	Development of section 6 of Bilbao
MunBud	Development of section 8 of Budapest
COP	Development of section 9 of Copenhagen
RIGA EnAg	Development of section 12 of Riga
BRATISLAVA City	Development of section 7 of Bratislava
City of Krakow	Development of section 10 of Krakow
Matosinhos	Development of section 11 of Matosinhos

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2. Objectives and Expected impact

2.1. Objectives

The main objective of this report is to present innovative ideas to complement or update the SECAP or other similar city Action Plan in the cities of ATELIER, considering the PED demonstrations and the insights acquired during the development of the new City Vision 2050 in previous D2.6 "*City vision for LHs and FCs*" report.

The deliverable focuses on the processes that each city followed to develop the Action Plan, which, as in the overall Cities4ZERO methodology is aimed to be a collaborative process, in which the main stakeholders are called to participate in the action planning of the city. Furthermore, the action plan takes as basis for its development the city vision set in previous ATELIER activities to then build the subsequent pathways and concrete objectives and defines the specific actions together with its implementation details.

This deliverable makes the connection between the ATELIER project and the work done in WP2 on city planning and urban and energy transformation, with the SECAPs. It includes an overview of the ATELIER urban planning, the SECAP process guide, the summary of the cities' status with respect to the Covenant of Mayors initiative and SECAP development, as well as some insights to the new initiative on the Cities Mission and the new planning concept for CCCs. Finally, it summarises the city vision, strategic objectives and targets from ATELIER planning.

In order to better adapt the work in ATELIER with the different situations of the cities, flexibility was provided to them in case they already have a SECAP developed and the current planning and objectives of the city are focused on a more ambitious or recently new plan. This can be the case of the launched EU Mission on Climate-Neutral and Smart Cities[2], which selected 6 out of the 8 ATELIER cities as "Mission Cities", and commit to develop a Climate City Contract (CCC) to plan climate neutrality in the city by 2030.

2.2. Expected impact

The present report provides insights on the cities' experience on the development process of an Action Plan. Within the ATELIER project, the objective is to take the city vision and the different scenarios prepared for the cities (with concrete targets in different sectors, and reported in D2.6 "*City Vision 2050 for LHs and FCs"*) and report how they have defined a related Action Plan (SECAP or other), where the concrete actions are detailed and their impact is measured towards the defined targets.

As mentioned, in this deliverable the focus is not only in the SECAP, as given the additional initiatives for action planning from recent years, it was up to each city to decide where to integrate the city vision and strategic objectives if they already have a SECAP developed and the city is currently prioritising other action planning development. After such decision by each city on which action plan they will focus as part of this task, they report, with guided and supported by CARTIF, about the process followed to the action plan development, providing key insights from their experience, focusing on main challenges overcome or other innovative processes they have followed, and how they dealt with the development of the different parts

2 https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

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of the plan. Considering that this is a public report, it is expected that cities interested in developing their action plans according to their city vision find relevance in the content presented in this deliverable.

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3. Overall approach

WP2 City Vision of ATELIER project is entirely based on the Cities4ZERO methodology for City Vision Development. Cities4ZERO methodology provides an overall framework to support an effective strategic planning. After 4 years working on implementing the methodologies, tools and supporting material provided to define a consolidated city vision, ATELIER cities can prepare an updated/new version of their action plans, which is the focus of this deliverable.

In brief, the material that guided the strategic planning content included in this deliverable was proposed and presented in previous WP2 deliverables as follows (text updated from D2.6):

- August 2020 - D2.1 Planning framework: report on each city, encompassing a deep analysis of the plans that affect the city.
- January 2021 - D2.2 Report on Smart City Planning Groups (SCPG): cities defined the governance model that will drive the city vision creation.
- February 2021- D2.3 Common methodological framework for vision development: the Cities4ZERO methodology for city vision creation is described.
- June 2021 - D2.4 Vision co-development roadmap for each city: the process to develop the city vision in each ATELIER city was provided, according to the methodology defined in D2.3 and adapted to each city context.
- December 2021 - D2.5 Prioritization matrix – tool for each city: the energy diagnosis and the business as usual scenario of the cities was provided. Moreover, Bilbao´s city vision was provided as front runner in Cities4ZERO methodology implementation. How to prioritize among energy transition narratives to define the master scenario was explained as well.
- December 2023 – D2.6 City vision 2050 of LHs and FCs: provided the city vision and strategy framework needed in the planning process. Beyond the city vision, Bratislava, Budapest, Krakow, Matosinhos and Riga presented in this deliverable their alternative and master scenarios to drive the city vision. A consolidated version of Bilbao´s master scenario is provided as well.

Based on the work included in D2.4, Figure 2 presents the General Roadmap created for cities´ vision 2050 development. It includes the 6 steps of the Cities4ZERO methodology in the right part (Engage, Analyse, Diagnosis, Envision, Plan and Integrate), the timeline and the main actions that are suggested to the cities to properly achieve a co-creative vision 2050 and the action plan development. The figure shows the interrelation between the steps and how the actions enriched each other. Moreover, the figure includes the timeline of deliverables and the content expected to be reported in each of them.

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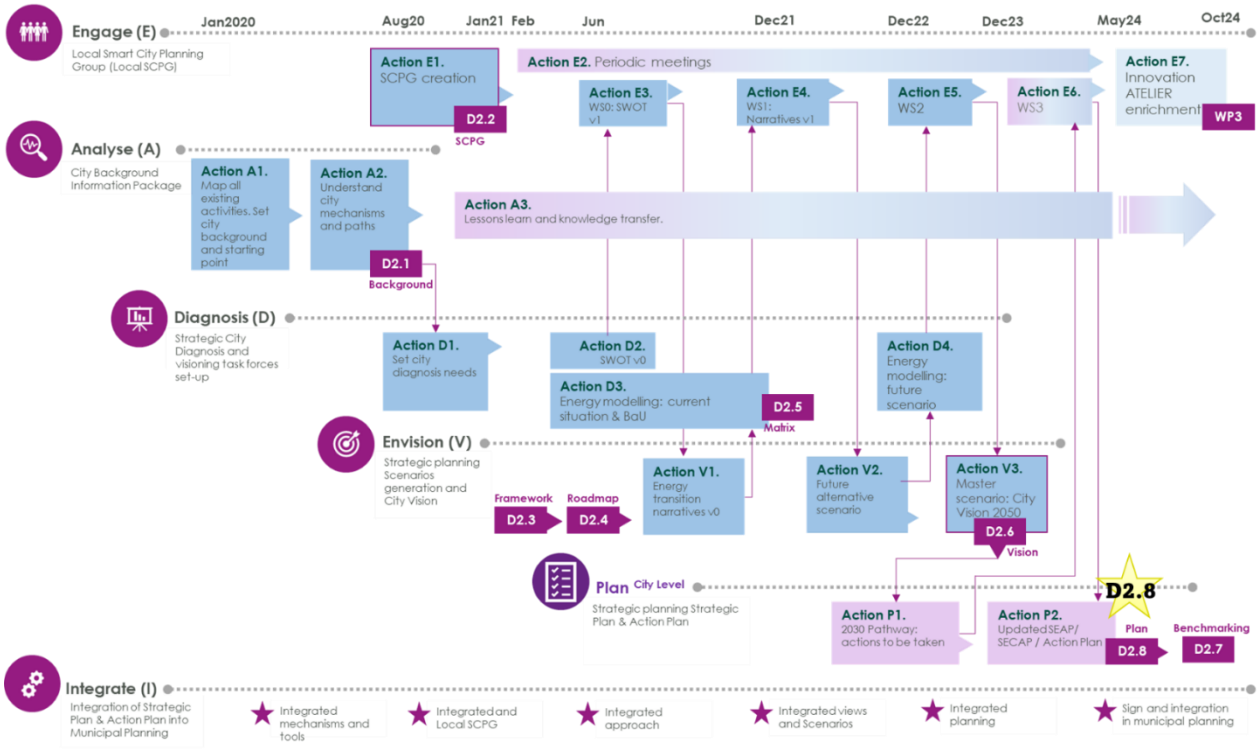

Figure 2. General Roadmap for vision 2050 co-development and strategic planning (Source: Updated from D2.4 and D2.6)

Figure 2 reflects in lilac the actions that were active since the presentation of the last deliverable of WP2. Each city has implemented this general roadmap in a different way, according to the specific city needs. Generally talking, actions active since the last deliverable submission (D2.6 submitted in December 2023) include:

- Action E2. Periodic meetings: The core of the group that leads the city vision creation meets regularly.
- Action E6. WS. Depending on cities' needs, a Workshop to discuss and agree the Action Plan was expected to be held.
- Action A3. Lessons learnt and knowledge transfer. This action was included mainly thinking in the lighthouse cities as front runners in Cities4ZERO methodology implementation (Bilbao) and those cities that are following a different approach (Amsterdam and Copenhagen).
- Action P1. 2030 pathway: actions to be taken. As one of the main activities included in this report.
- Action P2. Updated SEAP/SECAP/Action Plan. As one of the main results presented in this deliverable.

It has to be noted that city vision creation is a living process that does not necessarily match ATELIER project timeline. This means that even though at this stage of the project all the methods and tools that the cities may need to develop their city vision have been provided, the process could be still in progress. Therefore, city vision creation process needs to be adaptive and adjustable to the city momentum. One clear example of the flexibility demanded is the fact that 6 out of 8 ATELIER cities became part of EU Cities Mission initiative "100 Climate-Neutral and Smart Cities by 2030" (depicted in section 0) during the lifetime of the project. Being part of this initiative reinforces the decarbonization objectives and consequently the city vision, the

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master scenario and the action plan. Moreover, the EU Cities Mission initiative demands the development of a Climate City Contract (see section 0), whose requirements are stricter than the ones included in the SEAP/SECAP plans (see section 4.1). Cities4ZERO methodology provides the flexibility needed and has been adapted to each city context.

The ATELIER City Vision concept[3] aims to generate one plausible pathway of cities towards carbon neutrality. The City Vision establishes the city's long-term commitment, sets-up the goals, and describes the actions to be carried out to effectively and fully decarbonise the energy system of the municipality. The creation of the City Vision is based on a participatory process in which local stakeholders engaged by the SCPGs discuss and agree on the future idea of the city. Moreover, the City Vision promotes the alignment and integration of different planning mechanisms (energy, mobility, and urban planning) which take place in the city.

Following the Cities4ZERO foresight methodology[4], the development of the City Vision is supported by the generation and assessment of future energy scenarios which define different alternative contexts that the city can face. Indeed, these scenarios are a powerful instrument to assist the drafting of plans and energy strategies.

Future energy scenarios are the output of urban energy models developed for each city. A model is defined as "*a simplified description of a complex entity or process*"[5]. In this particular case, the "*complex entity"* is the city itself, integrating in fact, the major technical and socio-economic processes which take place within its borders and which result in the production, consumption and exchange of energy flows[6].

Urban energy models produce helpful information giving policymakers and urban planners a better understanding on how the energy is currently consumed and supplied to the city, while also providing insights on the future development of its use[7]. Energy modelling reveals itself then as a powerful tool supporting the elaboration of energy policies and strategies. Through the development of future visions of cities, urban energy models support municipalities in the decision-making and urban energy planning processes which should head towards their full decarbonization.

In the particular case of the ATELIER project, urban energy modelling helps in the definition of the City Vision through the generation of plausible energy scenarios towards decarbonization which are discussed in a participatory process. The discussion and different contributions of local stakeholders serve as input to the energy models and to refine the scenarios. The discussion ends with the generation of the Master Scenario that serves the municipality as the roadmap towards its 2030/2050 vision.

[3] Further explained in Deliverable 2.3 (https://smartcity-atelier.eu/outcomes/deliverables/d2-3/) and D2.5.
[4] See Deliverable 2.3: https://smartcity-atelier.eu/outcomes/deliverables/d2-3/
[5] Bhattacharyya, S.C., Timilsina, G.R., 2009. Energy demand models for policy formulation: A comparative study of energy demand models, The World Bank Development Research Group. Environment and Energy Team. https://doi.org/10.1596/1813-9450-4866
[6] Facchini, A., Kennedy, C., Stewart, I., Mele, R., 2017. The energy metabolism of megacities. Appl. Energy 186, 86–95. https://doi.org/10.1016/j.apenergy.2016.09.025
[7] Hong, T., Chen, Y., Luo, X., Luo, N., Lee, S.H., 2020. Ten questions on urban building energy modeling. Build. Environ. 168, 106508. https://doi.org/10.1016/j.buildenv.2019.106508

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The Energy System Modelling (ESM) approach adopted in the ATELIER project focus on the representation of the city as a whole, including all the end-use sectors (buildings, transport, industry, and other sectors) and supply systems (power plants, DHs, other transformation and distribution infrastructures) within the city borders. An Energy System Model allows to assess the energy performance of the city, describing the current energy situation of the city as well as its future development as a result of socioeconomic and technological changes. These models can integrate top-down and bottom-up approaches, using both macro (e.g. number of buildings/vehicles, population, GDP, etc…) and micro-level data (e.g. sectoral consumption disaggregated by use and fuel, efficiencies, mileages for vehicles, etc…). In the case of the ATELIER project, LEAP software was used for this Energy System Modelling approach. Cities as a whole were modelled using this tool and the master scenarios were defined after several iterations between city practitioners and modelling experts. Figure 3 summarizes the master scenario creation process, which involves the discussion in series of Workshops, both quantitative (energy diagnosis, Business as usual scenario and alternative scenarios) and qualitative (SWOT analysis and City vision) information (see D2.5 for further information). .

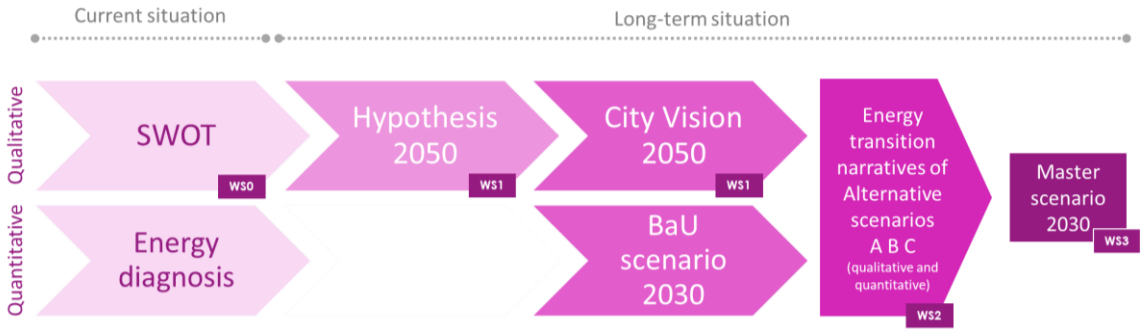

Figure 3. Master scenario prioritization process (Source: D2.5 Prioritization matrix)

The city Vision and the master scenario are the basis to develop a well-supported action plan.

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3.1. ATELIER Cities: City Vision and objectives

Deliverable 2.6 "*City Vision 2050 for LHs and FCs*" reports the city vision of ATELIER cities and presents the results of the cities after more than three years working on implementing and developing the methodologies, tools and supporting materials provided to define a consolidated city vision.

The following Table 2 to Table 9 summarise the city vision, objectives and planning reported by the ATELIER cities in D2.6, which is taken as the basis for the current deliverable on Action Plan development.

Table 2. Amsterdam city vision, objectives and planning (from D2.6)

AMSTERDAM City Vision, objectives and planning (D2.6)	
Action Plan	**Amsterdam Climate Neutral Roadmap 2050** (energy transition from 2020 towards 2050, which includes the actions on the short term to achieve that ambition). However, Amsterdam is not on track for its 2050 goals and in 2023 the city published "Our City of Tomorrow". This vision is equipped with a climate action plan. Amsterdam's Climate City Contract, part of the 100 Climate Neutral and Smart Cities Mission, bridges the Climate Neutral Roadmap and the "Our City of Tomorrow" action plan towards 2030.
City Vision	Cut CO_2 emissions by 95% compared to 1990 levels in 2050, by reducing energy consumption as much as possible, generating renewable energy and working towards a circular economy. Transition away from fossil fuels and towards sustainable alternatives. *"We want Amsterdam to be a green, healthy, prosperous and future-proof city, where everyone can benefit maximally from the opportunities brought by this social transformation".*
Strategic objectives	Amsterdam Climate Neutral Roadmap 2050 (key strategic objectives): – Phase out fossil fuels rapidly. – Cut CO_2 emissions by 95% compared to 1990 levels in 2050. – Intermediate goal of 55% reduced CO_2 emissions in 2030. – Reuse of raw materials – Natural gas-free neighbourhoods – Generation of sustainable energy – Structurally rethinking the use of energy – Emission-free traffic Our City of Tomorrow (key strategic objectives): – Confidence, courage and perseverance. Despite all efforts, Amsterdam in not on track to achieve its climate goals, A fresh approach is needed, phasing out old non-sustainable ways of working, – Inclusive prosperity is the starting point of the approach, building upon the Donut Economy, a model which has been embraced by Amsterdam. – Unequal investment for equal opportunities is always the guiding principle, this entails: o The strongest shoulders bear the heaviest burden and the benefits reach vulnerable groups with the aim of ending energy poverty by 2030; o Open access to the decision-making process for all Amsterdammers; o Fair opportunities in a changing labour market; o Helping citizens to organise services at community level.
Transition Paths / Sectors	**Amsterdam Climate Neutral Roadmap 2050**

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AMSTERDAM City Vision, objectives and planning (D2.6)	
	– **Built environment**: entire city should be natural gas-free by 2040, all buildings in the city must be heated in a sustainable way by 2050. – **Mobility**: minimise the amount of polluting kilometres by making the switch towards more sustainable form of transportation. An intermediate goal to stimulate this development is that all traffic in the built environment must be emission-free by 2030. – **Electricity**: maximise the generation of sustainable electricity. The presence of electricity infrastructure with sufficient capacity is a precondition to achieve this and realize the ambition to become a climate-neutral city. – **Harbour & industry**: vision of future harbour with few or zero carbon emissions and lots of space for generating, storing and distributing renewable energy to end-users on an industrial scale. Efforts to save energy in the industry, develop a green hydrogen economy and phase out the use of fossil fuels completely. **Our City of Tomorrow, expands from the energy transition sectors above with:** – The **circular transition** addressing the reduction in use of non-renewable raw materials in the city. – The **green transition** towards a green, biodiverse, healthy and climate adaptive city.

Table 3. Bilbao city vision, objectives and planning (from D2.6)

BILBAO City Vision, objectives and planning (D2.6)	
Action Plan	**Bilbao Master Scenario, SECAP**
City Vision	Climate neutrality by 2050
Strategic objectives	– 32% energy savings by 2030 compared with 2018 levels, and 62% by 2050. – 57% GHG savings by 2030 compared with 2018 levels, and 100% by 2050.
Transition Paths / Sectors	– **Residential buildings**: 15% of residential building stock renovated by 2030, and 67% by 2050. Deep high efficiency electrification of heat (high efficiency heat pumps). Increase of the contribution of solar thermal for DHW. Complete phase out of natural gas, and full decarbonisation of the natural power grid to achieve a carbon-free residential stock by 2050. – **Private tertiary buildings**: 20% gross floor area renovated by 2030, and 82% by 2050. Same other elements as in the residential buildings. – **Municipal buildings**: 35% of gross floor area renovated by 2030, full renovation of this sector by 2045. Same other elements as in the residential buildings. – **Street lighting**: electricity supplied to municipal assets is carbon-free since 2020. – **Cleaning services**: full decarbonisation of cleaning services achieved by 2030, they are electrified since 2020 (electricity used for municipal assets is green-labelled). – **Municipal fleet**: all municipal fleet vehicles electrified by 2030. – **Public transport**: whole bus fleet electric by 2040. – **Private transport**: drastic reduction of traffic and increase of public transport. Measures such as access restrictions and modal changes. Switch between fuels used by the different vehicles. – **Local energy production**: 50% of city total PV potential capacity installed by 2030, and 100% by 2050. By 2050, 16% of the total city electricity consumption will be produced in the city, the remaining will be imported from the national grid (fully decarbonised by 2050).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864374.

Table 4. Bratislava city vision, objectives and planning (from D2.6)

BRATISLAVA City Vision, objectives and planning (D2.6)	
Action Plan	**Bratislava 2030. City Development Plan 2022-2030.** Under development: SECAP (Summer 2024)

City Vision	*"Bratislava is aware of the impacts of activities in the city on the climate. In its development and improvement of the quality of life of its inhabitants and visitors, Bratislava will take an active and responsible approach to reduce greenhouse gas emissions in its territory in order to contribute to the preservation and improvement of the environment in the city as well as in neighbouring areas."*
	
	Bratislava 2030 structure:
	- MADE FOR PEOPLE: A CITY FOR ALL WHO CHOOSE TO LIVE IN IT
	  ○ ***A caring city for a dignified life for all*** *(Affordable housing for a basic quality of life, Quality education, A safe city that cares for the weak and disadvantaged)*
	  ○ ***Cooperation as a principle*** *(Involving people in city-making)*
	- ONE CITY, MANY NEIGHBOURHOODS: A HEALTHY AND VIBRANT CITY WITH SCALE
	  ○ ***Accessible city*** *(Affordably designed metropolis, Safe and sustainable urban mobility)*
	  ○ ***A city that offers quality culture and cohesive neighbourhoods*** *(Vibrant public space and neighbourhoods, Diverse cultural life)*
	  ○ ***A green and healthy city*** *(Protecting the environment and ecosystem services, Opportunities for exercise, recreation and a healthy lifestyle)*
	- PREPARING FOR THE FUTURE: A PROACTIVELY MANAGED METROPOLIS READY TO FACE THE CHALLENGES OF THE FUTURE
	  ○ ***Bratislava, a recognised European metropolis*** *(Bratislava as a strong metropolis, Competitive city, Bratislava as a recognised brand)*
	  ○ ***A modern and efficient city*** *(Strategic management, prioritisation and cooperation, A digital and confident city, An aligned technical network for the future)*
	  ○ ***A city ready to face climate change*** *(Engaging in the fight for climate resilience, A sustainable approach to resource use and recovery)*
	- THE RELATIONSHIP OF THE BRATISLAVA 2030 STRATEGY TO THE CITY DISTRICTS

Strategic objectives	- Engaging in the fight for climate resilience - A sustainable approach to resource use and recovery - Environmental protection and ecosystem services - Safe and sustainable urban mobility
Transition Paths / Sectors	- Engaging in the fight for climate resilience - A sustainable approach to resource use and recovery - Environmental protection and ecosystem services - Safe and sustainable urban mobility

Table 5. Budapest city vision, objectives and planning (from D2.6)

BUDAPEST City Vision, objectives and planning (D2.6)	
Action Plan	**Climate Strategy. SECAP**

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BUDAPEST City Vision, objectives and planning (D2.6)	
City Vision	Extending the SECAP 2030 to a SECAP 2050 through the co-creation of the Budapest Vision 2050. 40% reduction of emissions by 2030 updated to climate neutrality by 2030 (according to Cities' Mission). *"In a climate-neutral Budapest, majority of both renovated and new households will be powered by district heating, electricity and renewables.* *90-100% of newly constructed buildings are nZEBs, and all of the renovated or retrofitted buildings fulfil with nZEB requirements."*
Strategic objectives	– 100% of the old building stock will be retrofitted by 2050. Retrofitting must be done through a nearly zero CO_2 footprint construction with a primary reuse of existing building parts and use of recycled materials, aside of providing nearly zero energy use. – Residential energy efficiency is the primary objective, as this sector is responsible for the largest carbon and PM pollution emission. – Revision of the e-mobility points. – Reducing GHG emissions from transport is the second most important overarching objective. – Increase the share of public transport, cycling and walking, encourage the use of electric and other low or zero-emission vehicles and micro-mobility; which can be promoted by implementing emission-reducing traffic regulations and designating climate protection zones.
Transition Paths / Sectors	– **Residential buildings**: whole household stock renovated by 2050 (achieving a 60% energy reduction), 1/3 by 2030. – **Private tertiary buildings**: significant reduction of energy use already observed in BaU scenario. Substitution of natural gas by heat from DH is considered to achieve a full decarbonisation of the sector. – **Municipal buildings**: significant reduction of energy use already observed in BaU scenario. Liquid fossil fuels are phased out by 2030, and natural gas subsequently removed from 2030 to 2050. All fuels are replaced by biomass systems and mostly by heat from DH. Solar thermal systems are also contemplated but to a lesser extent, as well as slight electrification of heat demand. – **Street lighting**: by 2030 almost 60% of the lamps are LED technology, reaching a 100% LED stock by 2050. – **Industry**: reduction of energy use (1% from 2030 to 2050). Natural gas progressively replaced by heat from DH and hydrogen. – **Municipal fleet**: all municipal vehicles are assumed to be electrified by 2030. – **Public transport**: increase number of buses (by 5% in 2030 and by 10% in 2050). 30% of the bus fleet electrified by 2030. Whole bus fleet electrified by 2050. – **Private transport**: decrease of the use of private passenger vehicles. – **Local energy production**: 1500 MW of solar PV panels can potentially be installed in 2030 in the city. By 2050, reaching a total installed capacity of 4500 MW. 50% of the heat and electricity produced within the city come from renewable sources by 2030, reaching 100% by 2050.

Table 6. Copenhagen city vision, objectives and planning (from D2.6)

COPENHAGEN City Vision, objectives and planning (D2.6)	
Action Plan	**Copenhagen Climate Plan 2021-2025**. Under development: Copenhagen Climate Plan 2035.
City Vision	CO_2 neutrality target in 2025.

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COPENHAGEN City Vision, objectives and planning (D2.6)	
	Copenhagen expects to set as target to become climate positive in 2035: – 50% reduction in emissions from citizens' consumption in 2035. – Maintaining and sharpening of climate neutrality to climate positivity in 2035. – 50% reduction in emissions from public purchases in 2030. Images of the Future: – A capital based on green electricity, – Sustainable heating for all; – Energy efficient buildings; – Mobility without emissions.
Strategic objectives	Climate Plan 2025: – Reduction of energy consumption (20% reduction in heat consumption, 20% reduction in power consumption in commercial and service companies, 10% reduction in power consumption in households), – Increasing energy production based on wind and biomass, installing photovoltaic systems equivalent to 1% of energy consumption, increasing green mobility (carbon neutral public transport and 75% of all journeys takes place on foot, by bicycle or by public transport), and – 40% reduction of energy consumption in city administration buildings. (Strategic objectives for Climate Plan 2035 have not yet been decided)
Transition Paths / Sectors	**Topical tracks:** – The energy system of the future with a focus on holistic strategic energy planning, and new technologies; – Energy consumption in buildings – taking energy efficient operation and service of buildings to the next level; – How do we want to live and build in the future – Energy refurbishment, sustainability, and ”the new city”; – Local and citizens-close energy solutions – Decentral energy solutions, flexible energy consumption, and energy communities; – Green mobility in a living city; – Transition to zero emission vehicles.

Table 7. Krakow city vision, objectives and planning (from D2.6)

KRAKOW City Vision, objectives and planning (D2.6)	
Action Plan	**Krakow Master Scenario**
City Vision	Main recommendation from Krakow Climate Panel in 2020-2021: Achieve a 30% reduction in greenhouse gas emissions by 2030 relative to 2018, and at least an 80% reduction in emissions by 2040, and to achieve climate neutrality no later than 2050. – *"In 2050 Krakow is a climate-neutral and green city. Comfortable to live in and friendly, also for people with special needs. Vibrant with residents' activity, thriving thanks to innovative and competitive entrepreneurs. Krakow is a leader in the energy transition and a model for other cities."* – *"Residents are open to new solutions, have a sense of responsibility and agency, and all these translate into the implementation of ambitious individual initiatives for the environment."* – *"Krakow has become an attractive place to live for highly-skilled professionals."* – *"All energy consumed in the city comes from zero-emission sources."* – *"In 2050, most buildings are near-zero-energy buildings."* – *"Most of the unused parking areas have been transformed into green spaces."*

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KRAKOW City Vision, objectives and planning (D2.6)	
	– *"Increased access to green spaces has improved the quality of residents' life."*
Strategic objectives	– Krakow is a city of dialogue and cooperation. – Krakow is a city of innovation and entrepreneurship. – Krakow as a Scientific Centre. – Krakow as an advocate for society. – Krakow as a zero-emission city, as pioneer of decarbonisation among Central and Eastern European cities. – Krakow as an electromobility city. – Krakow as a zero-waste city. – Krakow as a green city. – Krakow as a city comfortable to live in. – Krakow is a safe and smart city, where many activities are automated, and this leads to achieving significant energy savings, as well as maximum efficiency and stability of operations. – Krakow is a model for many European cities on how to implement plans and strategies to achieve architectural, social, economic, community, cultural, technological and environmental balance.
Transition Paths / Sectors	– Residential buildings: residential building stock should be renovated at a 3% yearly rate, reaching a 87% renovated stock by 2050. Renovation considers both the renovation of the building's envelope and the renovation of heating systems. – Private tertiary buildings: renovated at a 2.5% yearly rate, reaching a 72% renovated stock by 2050. – Municipal buildings: renovated at a 3.5% yearly rate, reaching a 100% renovated stock by 2050. – Street lighting: 60% of the city street lamps stock replaced by LED technology by 2030, reaching 100% by 2050. – Industry: implementation of energy efficiency measures in the industry sector, 3% and 15% energy reduction by 2030 and 2050. Also, shift in the fuel mix of the sector has been considered with the gradual replacement of natural gas by cleaner fuels like biomass and H2. Sector also further electrified considering solar PV technologies too. – Municipal fleet: optimisation in the operation of municipal vehicles fleet, a 0.5% yearly reduction in the consumption. Share of electric vehicles in municipal fleet reaches 30% and 100% of the municipal vehicle stock by 2030 and 2050. – Passenger transport: implementation of low-emission zones and other restrictions to decrease the use of private vehicles. Electrification of public transport by 2050 (full decarbonisation). – Freight transport: decrease as a result of mobility policies. 5% of freight vehicles electric by 2030, and 30% achieved by 2050. – Local energy generation: local electricity generation represents a little share compared to the imported electricity from the national grid. Replacement of coal by cleaner fuels. Carbon-free DH by 2050.

Table 8. Matosinhos city vision, objectives and planning (from D2.6)

MATOSINHOS City Vision, objectives and planning (D2.6)	
Action Plan	**Matosinhos Carbon Neutrality 2030**. Matosinhos Carbon Neutrality 2030 Roadmap under development.
City Vision	SECAP decarbonisation targets for 2030 were achieved by 2021. So, Matosinhos established a new objective: carbon neutrality by 2030. Reduce carbon emissions by 85% by 2030 (with 2009 baseline).

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MATOSINHOS City Vision, objectives and planning (D2.6)	
	"By 2030, Matosinhos aims to be a smart, sustainable, inclusive, accessible and carbon-neutral territory."
Strategic objectives	– Energy, urban and economic development: existing public and private building stock renovated. – Municipal action, incentives and financing. – Governance and Public Participation: co-creation activities focused on the social and economic development. – Sustainable Mobility. Areas of critical intervention: – energy renovation of municipal buildings, housing complexes and public lighting; – electrification of the municipal fleet; – installation of electric chargers; – advice on incentives for the renovation of buildings and the production of renewable energy; – promotion of electric mobility; – incentives to the use of public transport.
Transition Paths / Sectors	– **Residential buildings**: 90% of household stock renovated by 2030 (50% energy savings). – **Private tertiary buildings**: renovation of 90% of the private tertiary buildings stock. – **Public administration buildings**: 90% of public administration buildings are renovated by 2030. – **Street lighting**: whole stock of street lamps is renovated with LED lamps by 2030. – **Industry**: reduce its energy use a 15% by 2030 thanks to efficiency measures. Drastic reduction of natural gas that is replaced by electricity technologies. – **Agriculture**: 30% energy consumption reduction by 2030 is assumed through the implementation of energy efficiency measures. Cleaner fuels replace fossil fuels achieving a partial decarbonisation of the sector. – **Municipal fleet**: full electrification of the fleet. – **Public transport**: number of buses increase by 15% in 2030, assuming a shift from private transport towards this public transport mode. Whole bus fleet is electrified by 2030. – **Private transport**: assumed to decrease as final outcome of the deployment of active mobility measures, the increase in the use of public transport, and other mobility measures (e.g. low emission zones, parking policies, car sharing...). – **Other sectors**: waste and wastewater treatment with 50% reduction of solid waste and wastewater generation by 2030. – **Local energy generation**: increase in the consumption of electricity from solar PV in all end-use sectors.

Table 9. Riga city vision, objectives and planning (from D2.6)

RIGA City Vision, objectives and planning (D2.6)	
Action Plan	**Riga SECAP 2030**: a climate-neutral municipality by 2030.
City Vision	Climate-neutral and resilient municipality, including such goals as a gradual shift from private cars to more sustainable transport modes, significant improvements in the field of waste management, ensuring sustainability of city's nature capital, achieving better environmental quality, shift to circular economy model, and many other measures.

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RIGA City Vision, objectives and planning (D2.6)	
Strategic objectives	– Climate-neutral municipal buildings using 100% RES as the heat energy source. – Decrease of energy consumption in municipal buildings - 20% reduction compared to 2019. – Decrease energy consumption in centralised district heating - 20% reduction compared to 2019. – Comprehensive energy renovation of multi-apartment residential housing - 2000 buildings refurbished. – Climate-neutral municipal lighting and traffic lights infrastructure using 100% RES. – Climate-neutral municipal transportation fleet: zero-emission vehicles using 100% RES, and other targets.
Transition Paths / Sectors	– **Residential buildings**: renovation of 2000 apartment buildings (around 10% of residential building stock) by 2030 in SECAP scenario, while full stock renovated by 2030 in Riga Carbon Neutral Scenario. Replace fossil-based heating systems (mainly natural gas and coal) by DH and electric heating systems. – **Private tertiary buildings**: Carbon Neutral Scenario assumes a 40% energy reduction due to a bolder implementation of energy efficiency measures. – **Municipal buildings**: SECAP scenario 20% considers energy reduction objective by 2030, whereas Riga Carbon Neutral scenario aims for a 50% abatement by the same year. – **Street lighting**: full replacement of the city street lamps stock by LED lamps by 2030. – **Water supply and sewage system**: 20% energy consumption reduction with regard 2019 in the SECAP scenario, and 50% reduction with regard 2019 in the Riga Carbon Neutral scenario. – **Industry**: same evolution as BaU scenario. – **Municipal fleet**: whole municipal fleet electrified. Energy reduction thanks to efficiency improvement related to the shift in vehicles powertrains. – **Public transport**: assumed to increase, partial and full electrification of the public transport fleet in the SECAP and Carbon Neutral scenarios respectively. – **Private transport**: use of private transport is assumed to be reduced 10% with regard the base year in the SECAP scenario, and 20% in the Riga Carbon Neutral scenario. – **Local energy generation**: 66% of local heat generation will be based on RES by 2030 in the SECAP scenario. In the Carbon Neutral scenario, a 100% biomass-based DH network is assumed (full decarbonisation).

Thus, deliverable 2.6 “City Vision 2050 for LHs and FCs” is the starting point for this deliverable, as it summarises the long-term city vision, objectives and planning efforts of ATELIER cities after four years of implementing and developing methodologies, tools and materials for a consolidated vision. Previous tables highlight the key elements from these visions, including ambitious CO_2 reduction targets, transition to renewable energy, sustainable urban mobility, energy-efficient buildings and inclusive social strategies. Each city outlines specific action plans, strategic objectives and sectoral transition paths to achieve climate neutrality by 2050. These plans form the basis for current action plan development in the ATELIER project.

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4. ATELIER Action Planning and SECAP

Plans establish the priorities and articulate the public policy so that programmes translate those priorities into concrete actions and determined deadlines. The competences for spatial planning lie on national, or even sub-national, or local level. While policy-making competences are usually concentrated in higher administrative levels (e.g. national government or federal states), plan and decision-making competences are mostly shared between all levels of government.

At the European level, policies are aligned with global targets, setting own and more ambitious targets. At global level, the Paris Agreement[89] main goal is to limit global warming to well below 2ºC, preferably below 1.5ºC, compared to pre-industrial levels. To achieve this long-term temperature goal, countries aim to reach global peaking of GHG emissions as soon as possible to achieve a climate neutral world by mid-century. Thus, European policies has been aligned with that and progressively setting more ambitious targets: 55% GHG emissions reduction by 2030 proposed in the **2030 Climate Target Plan** (September 2020)[10] compared to 1990 levels, to enable the **EU to become the first climate-neutral continent by 2050**.

Key targets (updated from 2020 ones) of this **2030 climate and energy framework** are:

- GHG emissions reduction: from 40% to at least 55% reduction (compared to 1990 levels).
- Renewable energy: from 32% to 42.5% share.
- Energy efficiency: final energy consumption target from 32.5% to 36%.
- Energy efficiency target for primary energy consumption 39%.

In the **2050 long-term strategy**[11], as anticipated by the 2030 framework, the target is that the EU becomes climate-neutral by 2050, with an economy with net-zero greenhouse gas emissions. The vision, set in November 2018 emphasises also a socially-fair transition in a cost-efficient manner, and underlines the opportunities that this transformation offers to European citizens and its economy, whilst identifying challenges ahead. This strategy is aligned with the 2030 one, and only intends to revise its targets towards the long-term.

At the national level, each European country has different resources and energy markets, and they have to follow different paths when it comes to meeting their obligations under the overall European targets. Besides their own energy transition plans, the National Energy and Climate Plans (NECPs)[12] were introduced by the Regulation on the governance of the energy union and climate action, agreed as part of the Clean energy for all Europeans package[13] (adopted in 2019).

These NECPs cover five main areas: energy efficiency, renewables, GHG emissions reductions, interconnections and research and innovation. This approach requires coordination across all government departments, while provides a level of planning that will ease public and private investment.

[8] https://www.un.org/en/climatechange/paris-agreement
[9] https://unfccc.int/process-and-meetings/the-paris-agreement
[10] https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2030-climate-energy-framework_en
[11] https://climate.ec.europa.eu/eu-action/climate-strategies-targets/2050-long-term-strategy_en
[12] https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_en
[13] https://energy.ec.europa.eu/topics/energy-strategy/clean-energy-all-europeans-package_en

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At the local level, cities have to consider all the frameworks, strategies and plans above, and set their one vision, objectives and targets. As explained in the "Overall approach" in section 3, ATELIER has brought support in the development of City Vision and the generation of Master Scenarios as basis to set coherent and achievable objectives and targets in different sectors.

The guided process set by the JRC to develop a SECAP is also explained in section 4.1. The Covenant of Mayors is a key initiative for cities to respond to the pressing global challenges posed by climate change and the need for sustainable urban development. By joining the initiative, cities and municipalities commit to reduce greenhouse gas emissions, enhance energy efficiency and increase their use of renewable energy sources. The guidebook developed by the JRC is a comprehensive document that provides cities with a set of methodological principle, procedures and best practices to develop their SECAP. The status of the ATELIER cities as signatories of CoM is included in section 4.2.

The new initiative of the EU Cities Mission, which includes action planning towards 2030 climate neutrality, within the Climate-neutral City Contract, is introduced in section 0.

Finally, the City Vision and master scenario or other strategic objectives of the ATELIER Cities (reported in D2.6 *City Vision in LHs and FCs*) are summarised in section 3.1, as starting point of the subsequent city sections (0-12) that provides their experience and insights in the development processes of different Action Plans (included SECAP).

4.1. Sustainable Energy and Climate Action Plan (SECAP) process

The Covenant of Mayors initiative (CoM)[14] is the world's largest movement for local climate and energy actions. It was launched in 2008 by the European Commission, aimed to engage and support mayors to commit reach the EU climate and energy targets. As can be seen in the Figure 4, the CoM framework is structured around the three pillars: Mitigation, Adaptation and Energy Poverty. The framing policies of these pillars are the Paris Agreement and 2030 sustainability Agenda, and the European Green Deal, with a range of cross-sectorial policies, from the Renovation Wave, sustainable mobility, food system sustainability, to nature-based solutions and adaptation, just transition and circular economy. Accompanying cities' efforts are the EU Climate Law, EU Climate Target Plan, the EU Climate Pact, Horizon Europe, NextGenerationEU and the Multiannual Financial Framework (MFF).

[14] https://eu-mayors.ec.europa.eu/en/home

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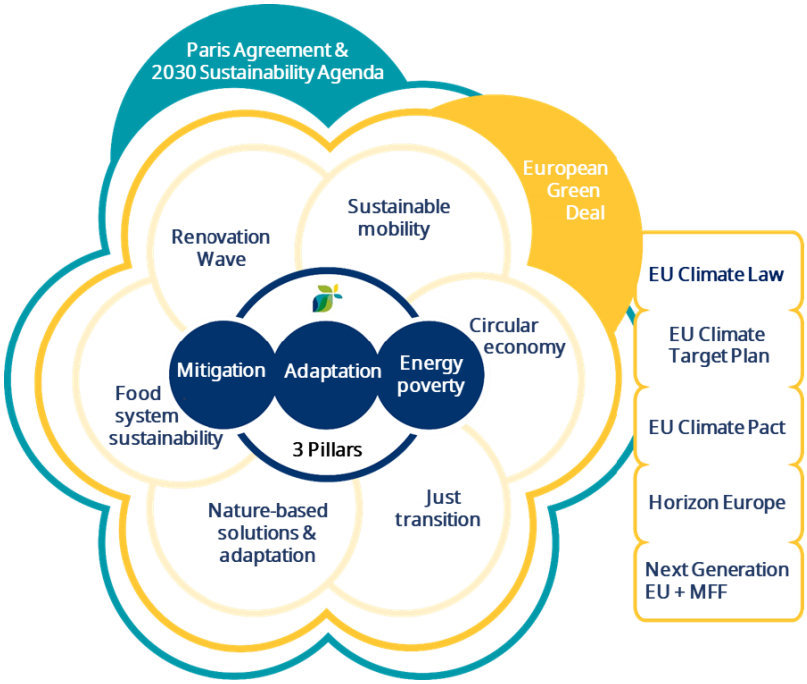

Figure 4. Covenant of Mayors framework (Source: Covenant of Mayors, https://eu-mayors.ec.europa.eu/en/about)

The Covenant of Mayors has updated their objectives to 2030 to include also a vision 2050 (Figure 5) towards a fairer, climate-neutral Europe for all. Mayors commit to step up the climate ambitions and commit to delivering action at the pace that science dictates, in a joint effort to keep global temperature rise below 1.5ºC, which is the highest ambition of the Paris Agreements. By 2050, cities will be decarbonised and resilient, with access to affordable, secure and sustainable energy, continuing with the reduction of GHG emissions, increasing resilience and preparing for the adverse impacts of climate change, and tackle energy poverty as one key action to ensure a just transition. This ambition is structured under three pillars: reducing GHG emissions by 55% by 2030, strengthening resilience and alleviating energy poverty.

Figure 5. Covenant of Mayors pathway to 2050 (Source: Covenant of Mayors, https://eu-mayors.ec.europa.eu/en/about/objectives-and-key-pillars)

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For the reporting and monitoring, the Covenant of Mayors counts also with a developed framework that supports the development of the Sustainable Energy and Climate Action Plans (SECAPs). It counts on different resources[15], such as the SECAP Guidebook, developed by the JRC that consists of three key parts, an Excel version of the SECAP template, an Excel template for the GHG emissions reporting, as well as the Urban Adaptation Support Tool (from Climate ADAPT)[16] within the Adaptation Resources.

The Part 1 "The SECAP process, step-by-step towards low carbon and climate resilient cities by 2030" of the Guidebook "How to develop a Sustainable Energy and Climate Action Plan (SECAP)"[17] provides signatories with a set of methodological principle related to the overall SECAP process, from the initiation to the monitoring phase. Including detailed description of SECAP requirements, options, timelines and template, the benefits local authorities can obtain when supporting SECAP implementation, an overview of the role of the key actors involved and suggestions on how to organise the administrative structures.

Thus, the different parts of the SECAP are summarised below, according to the Guide.

Scope

The main target sectors for Climate Change **mitigation** are **buildings, equipment/facilities and urban transport**. It may also include actions related to **local electricity production, and local heating/cooling generation**. The industrial sector is not a key target of the Covenant of Mayors, so the local authority may choose to include actions in this sector or not.

For **adaptation** to the impacts of Climate Change, the SECAP should include actions in the sectors and areas, which are likely to be most vulnerable to Climate Change in a city (hotspots).

Time horizon

The time horizon of the Covenant of Mayors is **2030**. Therefore, the SECAP has to contain a clear outline of the strategic actions that the local authority intends to take in order to reach its commitments by 2030. It may cover a longer period, but in this case, it should contain intermediate values and objectives for the year 2030.

As it is not always possible to plan in detail concrete measures and budgets for such a long-time span, the local authority may distinguish between:

- A **vision, with long-term strategy and goals until 2030** and/or beyond, including firm commitments in areas like land-use planning, transport and mobility, public procurement, standards for new/renovated buildings, etc.
- **Detailed measures for the next 3-5 years,** which translate the long-term strategy and goals into real actions.

SECAP process

The following are the key steps for elaborating and implementing a successful SECAP.

[15] https://eu-mayors.ec.europa.eu/en/resources/reporting
[16] https://climate-adapt.eea.europa.eu/en/knowledge/tools/urban-ast/step-0-0
[17] Bertoldi P. (editor), *Guidebook 'How to develop a Sustainable Energy and Climate Action Plan (SECAP) – Part 1 - The SECAP process, step-by-step towards low carbon and climate resilient cities by 2030,* EUR 29412 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-96847-1, doi:10.2760/223399, JRC112986

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Table 10. SECAP process: main steps (source: JRC SECAP guideline, Part 1)

PHASE	STEP
Initiation	Political commitment and signing of the Covenant
	Mobilize all municipal departments involved
	Build support from stakeholders
Planning phase	Assessment of the current framework: Where are we?
	Establishment of the vision: Where to we want to go?
	Elaboration of the plan: How do we get there?
	Plan approval and submission
Implementation phase	Implementation
Monitoring and reporting phase	Monitoring
	Reporting and submission of the implementation report. Review

Next, we are going to delve into the first two steps, which are the ones related to the methodology part.

Initiation

- **Political commitment and signing of the Covenant**

It is essential that sufficient empowerment and support is provided at the highest political level. More concretely, the signature of the Covenant of Mayors by the municipal council (or equivalent decision-making body) should be a clear and visible sign of commitment. The key decision-makers of the local authority should further support the process by allocating adequate human resources with clear mandate and sufficient time and budget to prepare and implement the SECAP.

- **Mobilize all municipal departments involved**

Collaboration and coordination needed between various departments in the administration, such as environmental protection, land use and spatial planning, economic and social affairs, buildings and infrastructure management, mobility and transport, budget and finance, procurement, etc. Where organisational structures have already been created for other related policies, they may be used in the context of the Covenant of Mayors.

- **Build support from stakeholders**

Citizens and other stakeholders should be involved in key stages of the SECAP elaboration process: building the vision, defining the objectives and targets, setting the priorities. To make a successful SECAP, it is recommended to seek the highest level of participation of stakeholders and citizens in the process.

Planning

- **Assessment of the current framework: Where are we?**
  - Analysis of relevant regulations

Identification of the existing municipal, regional and national policies, plans, procedures and regulations that affect energy and climate issues within the local authority. Identification of existing national risk and vulnerability assessment, and available climate projections. Then, go

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through, check and compare objectives and goals in the identified documents with the ones for a sustainable energy policy and resilient sectoral development. Establish whether these objectives and goals are supporting or conflicting.

- Baseline review: Baseline Emission Inventory (BEI). *Detailed in the Part 2 A of the JRC guidebook on SECAP guideline*

The main purpose of this is to establish a clear picture of "where we are", a description of the city's current situation in terms of energy and Climate Change. It needs to be based on existing data and should map relevant legislations, existing policies, plans, instruments and all departments/stakeholders involved. It should cover both quantitative (e.g. evolution of energy consumption) or qualitative (e.g. energy management, implementation of measures, awareness…) aspects.

The most demanding element is to build a complete CO_2 emission inventory, based on actual energy consumption data. To build a Business as Usual (BaU) scenario, to forecast the level of energy consumption and CO_2 emissions at the target tear(s) in a scenario without SECAP.

To elaborate the Emission Inventory, it is needed to select a baseline year, as the reference year against which the emissions reduction target shall be compared with, emission inventory approach (activity-based approach or LCA approach). Within the GHGs, it should be included CO_2, CH_4 and N_2O. And per the emission factors, it can be either used local emission factors or default (national/EU/global) emissions factors.

- Baseline review: Climate Change Risk and Vulnerability Assessment (RVA). *Detailed in the Part 2 B of the JRC guidebook on SECAP guideline*

The RVA determined the nature and extent of a risk by analysing potential hazards and assessing the vulnerability that could pose a potential threat to harm to people, property, livelihoods and the environment on which they depend. This can take the form of a single assessment or various assessment undertaken per sector, for example. It can also be different types of assessment, such as institutional risk assessment, a hazard assessment, a retrospective assessment of vulnerabilities to extreme weather such as a Local Climate Impacts Profile, for example. The methodological approaches for larger cities could be spatial impact models, while for small to mid-size cities could be an indicator-based vulnerability assessment. The abovementioned Urban Adaptation Support Tool[18] could be of help.

- SWOT analysis

It is a common and powerful planning tool of strategic planning, to work with stakeholders involved. It stands for: Strengths, Weaknesses, Opportunities and Threats, which are all core elements to improve a holistic knowledge of the territory and to identify sectors of interventions. It allows to determine the Strengths and Weaknesses of the local authority in terms of energy and climate management, as well as the Opportunities and Threats that could affect the SECAP. This analysis could help the definition of priorities when devising and selecting SECAP actions and measures.

- **Establishment of the vision: Where do we want to go?**

In this part, both the long-term vision and the objectives and targets should be established. The vision for a sustainable future should be the guiding principle of the local authority's

[18] https://climate-adapt.eea.europa.eu/en/knowledge/tools/urban-ast/step-0-0

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SECAP work. It needs to be compatible with the CoM's commitments (i.e. it should imply that the 40% of GHG emission reduction in the 2030 target will be reached, at the minimum, and that the city will gradually become resilient and adapted to the impacts of Climate Change). It could also be more ambitious than that, as setting a longer-term target (e.g. become carbon neutral) is considered a key success factor of SECAPs, as it clearly shows the local authority's political commitment and gives a strong message to citizens and stakeholders. The vision should be realistic but still ambitious.

The objectives and targets should be then established to support the vision, translating the vision into more specific objectives and targets, for the different sectors in which the local authority intends to drive action. The targets and objectives should be specific (well-defined, focused, detailed and concrete), measurable (kWh, time, money, %, etc.), achievable (feasible, actionable), realistic (in the context of the resources that can be made available), and time-bound (defined deadline or schedule). The nature of the adaptation makes the setting of objectives more challenging. Successful adaptation may mean that adverse impacts are avoided, which could be difficult to measure. Specific measures also reduce outcomes.

- **Elaboration of the plan: How do we get there?** *Could be supported by Part 3 of the JRC guidebook on SECAP guideline, to select and devise adequate policies and technical measures.*

It is about to define policies and measures that will allow reaching the objectives that have been previously set. It recommends a series of steps for drafting a successful SECAP:

- Make a prospective of good practices.
- Set priorities and select key actions/ measures. To facilitate the selection of measures, rank the potential measures by importance in a table summarising the main characteristics of each action could be useful: duration, level of required resources, expected results, associated risks, etc.
- Carry out a risk analysis. The selection of the actions and measures should also be based on the careful estimation of risks associated with their implementation.
- Specify timing, clear responsibilities, budget and financing sources of each action. It is necessary to plan each action carefully, so that it become a reality, specifying for each action:
  - the timing,
  - the body responsible for implementation,
  - the stakeholder involved (only for adaptation actions),
  - the risk and/or vulnerability tackled (only for adaptation actions),
  - the estimated costs, the modality of financing,
  - the estimated impacts in terms of energy savings, energy production, CO_2 emission reduction (for mitigation actions),
  - the modality of monitoring.
- Draft the Action Plan.
- Approve the Action Plan and its associated budget.
- Perform regular SECAP reviews: continuous monitoring is needed to follow SECAP implementation and progresses towards the defined targets in terms of energy and CO_2 savings, and/or climate vulnerability and risk reductions, and eventually to make corrections.

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4.2. ATELIER Cities status in the Covenant of Mayors

Local planning processes are city-specific. However common plans are found in the framework of the European Covenant of Mayors[19] (Covenant of Mayors for Climate & Energy), that are: Sustainable Energy Action Plan (SEAP) and Sustainable Energy and Climate Action Plan (SECAP).

The signatories of the Covenant of Mayors endorse a shared vision for 2050: accelerating the decarbonisation in their territories, strengthening the capacity to adapt the unavoidable climate change impacts, and allowing their citizens to access secure, sustainable and affordable energy. In addition, signatory cities pledge action to support implementation of the EU 40% greenhouse gas reduction target by 2030 and the adoption of a joint approach to tackling mitigation and adaptation to climate change.

The eight cities of ATELIER have all joined (and signed) the Covenant of Mayors, the last one was Krakow, who did so during ATELIER project (in 2022). Out of them, seven of them have developed their Action Plan, either a SEAP or a SECAP. Krakow is the one whose SECAP is still ongoing, mainly because it was the last city in joining and they are still in the two-year timeframe to develop it. This is proof that the CoM is a successful initiative and that cities are joining in and fulfilling their commitments to develop and implement the required plans.

The SECAP outlines the key actions the city plans to undertake, in order to translate the political commitment into practical measures and objectives. The plan features a Baseline Emission Inventory to track mitigation actions and a Climate Risks and Vulnerability Assessment. The adaptation strategy can either be part of the SECAP or developed and mainstreamed in a separate document. This bold political commitment marks the beginning of a long-term process with cities committed to report every two years on the implementation progress of their plans.

The Table 11 summarises the current status of the ATELIER cities in relation to the Covenant of Mayors[20].

Table 11. ATELIER cities status in relation to the Covenant of Mayors

CITY	Adhesion year to CoM	Action Plan (AP)	AP approval year	AP submission year	Baseline Emission Inventory (BEI) year	GHG reduction target
Amsterdam[21]	2009	Sustainable Amsterdam	2015	2010	2008	-
Bilbao[22]	2010	Sustainable Energy Action Plan of Bilbao	2010 2024	2012	2005	40% by 2030
Bratislava[23]	2012	Sustainable Energy Action Plan of the Capital City of Slovakia Bratislava	2014	2014	2005	-

19 https://eu-mayors.ec.europa.eu/en/home
20 https://eu-mayors.ec.europa.eu/en/signatories
21 https://eu-mayors.ec.europa.eu/en/signatory/11850
22 https://eu-mayors.ec.europa.eu/en/signatory/12908
23 https://eu-mayors.ec.europa.eu/en/signatory/15678

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CITY	Adhesion year to CoM	Action Plan (AP)	AP approval year	AP submission year	Baseline Emission Inventory (BEI) year	GHG reduction target
Budapest[24]	2008	Sustainable Energy Action Plan of Budapest Sustainable Energy and Climate Action Plan of Budapest	2011 2021	2011 2021	2005 2015	40% by 2030
Copenhagen[25]	2009	Copenhagen Climate Plan	2009	2011	2005	Carbon neutrality by 2025-
Krakow[26]	2022	-	-	-	-	30% by 2030 40% by 2040
Matosinhos[27]	2010	Matosinhos Sustainable Energy Action Plan Matosinhos Sustainable Energy and Climate Action Plan	2012 2021	2012 2021	-	40% by 2030
Riga[28]	2008	Riga City SUSTAINABLE ENERGY ACTION PLAN (SEAP) for 2014-2020 Riga Sustainable Energy and Climate Action Plan 2022-2030	2014 2022	2010	1990	80% by 2030

4.3. New key initiative: the Cities Mission and the Climate-neutral City Contract (CCC)

In 2019, five Missions[29] were launched by the EU as a new way to bring concrete solutions to some of the greatest climate challenges. They have ambitious goals and will deliver concrete results by 2030. They are also part of the Horizon Europe research and innovation programme for the years 2021-2027.

The Climate-Neutral and Smart Cities EU Mission[30] stems from the pivotal role that cities play in achieving climate neutrality by 2050, the goal of the European Green Deal. Even if cities take up only 4% of the EU's land area, they are home of the 75% of EU citizens and, what's

[24] https://eu-mayors.ec.europa.eu/en/signatory/11938
[25] https://eu-mayors.ec.europa.eu/en/signatory/12109
[26] https://eu-mayors.ec.europa.eu/en/signatory/13003
[27] https://eu-mayors.ec.europa.eu/en/signatory/13395
[28] https://eu-mayors.ec.europa.eu/en/signatory/11849
[29] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe_en
[30] https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

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more, they consume over 65% of world's energy, and account for more than 70% of global CO_2 emissions.

The aim of the Cities Mission is twofold:

- Deliver 100 Climate-Neutral and Smart Cities by 2030.
- Ensure that these cities act as experimentation and innovation hubs to enable all European cities to follow suit by 2050.

It selected 100 EU cities (and 12 more from associated countries to the EU) from those that presented an Expression of Interest (EoI), which was announced on 25 November 2021. From them, six out of the eight cities of ATELIER (Amsterdam, Bratislava, Budapest, Copenhagen, Krakow and Riga).

In the journey to become the first cities to reach climate-neutrality by 2030, only a new type of collective effort will be set up to the task: a transformative approach accelerating decarbonisation. In this journey, the Climate City Contract (CCC) is the key instrument for Mission Cities to launch and accelerate this approach. They are key themes along this journey (see Figure 6 with the Climate Transition Map) that demonstrate that technical solutions alone are not enough to an approach achieving this transition. Governance structures, democratic participation, finance, learning capabilities and use of social innovation are needed to be improved and renew. Together, these enable a so-called systemic transformation, a transformation across domains and sectors with sufficient coherence and impact to shift society toward climate neutrality.

Figure 6. Climate Transition Map (Source: NetZeroCities Portal, https://netzerocities.app/ClimateTransitionMap)

The 2030 Climate City Contract (CCC) is both an ongoing process and a "living" document. The CCC process aims to co-create new ways of working together with local, regional, and national stakeholders to reach climate neutrality in the city by 2030. The process will be

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different for every city, but the Climate Transition Map captures a view of essential steps. The CCC document presents the outcomes of this co-creation process, including three key elements:

- **2030 Climate Neutrality Commitments**, it is the "Core Contract" and the central component of the CCC, supported and strengthened by the annexed 2030 Climate Neutrality Action Plan and a 2030 Climate Neutrality Investment Plan. It brings together the shared vision, the high-level commitments and a strategic plan to reach 2030 climate neutrality that were co-created by the city government and various local, regional and national stakeholders. The Commitment document consists of two main parts, divided in turn in different sections:
  - Part A or 'Core Contract':
    - Introduction
    - Goal: 2030 climate neutrality
    - Key priorities
    - Principles and process
    - Signatories
    - Contract with signatures
  - Part B – Appendix: Individual commitments of signatories, including specific agreements to deliver concrete transformative action(s) between the city administration and individual stakeholders, like businesses, research institutes and universities, civic society organisations and more.
- **2030 Climate Neutrality Action Plan**, it is an integral part of the CCC and serves as an instrument for Mission Cities to navigate and operationalize the climate-neutrality ambition using a systemic approach. It identifies, connects and helps implement a city-wide portfolio of transformative actions necessary to bridge current gaps in policy, regulation, project planning, funding, finance, social, behavioural and implementation to achieve climate neutrality by 2030. The Action Plan builds on existing plans and practices, and reorients them to the 2030 ambition (such as e.g. within the Covenant of Mayors or work related to the Local Green Deals – LDGs). It should articulate a strategic climate neutrality pathway, and bring together a portfolio of interventions to reach 2030 climate neutrality. It is composed by three key parts, divided into different sections:
  - Introduction
  - Part A – Current State of Climate Action
    - Module A-1 Greenhouse Gas Emissions Baseline Inventory
    - Module A-2 Current Policies and Strategies Assessment
    - Module A-3 Systemic Barriers and Opportunities to 2030 Climate Neutrality
  - Part B – Pathways towards Climate Neutrality by 2030
    - Module B-1 Climate Neutrality Scenarios and Impact Pathways
    - Module B-2 Climate Neutrality Portfolio Design
    - Module B-3 Indicators for Monitoring, Evaluation and Learning
  - Part C – Enabling Climate Neutrality by 2030
    - Module C-1 Governance Innovation Interventions
    - Module C-2 Social Innovation Interventions
  - Outlook and next steps
- **2030 Climate Neutrality Investment Plan**, it serves as an instrument for Mission Cities to develop a comprehensive long-term economic and financial strategy aimed at

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achieving climate neutrality by 2030. The Investment Plan helps cities to map out cost and capital needed to reach ambitious climate targets, assess current "financing gaps" and strategically organize public resources. It also supports in mobilizing public and private capital and accessing funding from EU and national sources. The Investment Plan requires cities to engage with a variety of local stakeholders, both public and private actors across the city's key emitting sectors, in order to raise the required level of funding to generate the action and impact as outlined in the Mission Action Plan. It is structured in a very similar way as the Action Plan:

- Part A – Current State of Climate Investment
  - Module IP-A1 Existing Climate Action Funding and Financing
  - Module IP-A2 Strategic Funding and Financing Evaluation
  - Module IP-A3 Barriers to Climate Investment
- Part B – Investment Pathways towards Climate Neutrality by 2030
  - Module IP-B1 Cost Scenarios for Climate Neutrality
  - Module IP-B2 Capital Planning for Climate Neutrality
  - Module IP-B3 Economic and Financial Indicators for Monitoring, Evaluation and Learning
- Part C – Enabling Financial Conditions for Climate Neutrality by 2030
  - Module IP-C1 Climate Policies for Capital Formation and Deployment
  - Module IP-C2 Identification and Mitigation of Risks
  - Module IP-C3 Capacity Building and Stakeholder Engagement for Capital and Investment Planning

The final outputs of the process should be consistent with the documentation guidance provided so that the 2030 Climate City Contract can be submitted and evaluated by the European Commission to receive the "Mission Label".

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5. Action Plan of Amsterdam

This section focuses on the development process of the Climate Action Plan as part of the Climate City Contract that the city of Amsterdam has been drawing up in light of the Climate-Neutral and Smart Cities EU Mission[31]. These results are work in progress and cannot be reported in detail yet.

The Amsterdam Climate City Contract

Amsterdam has a rich history of commitment to counteracting climate change. An important mark was made in 2019 when the Amsterdam Climate Agreement was introduced by the municipality, based on input from more than 1000 conversations with actors in the city. Subsequently, the Roadmap Amsterdam Climate Neutral 2050 was launched in 2020 to enhance the implementation of climate actions. In various ways, for example through the platform New Amsterdam Climate, what happens in the field of sustainability is continuously being updated so new opportunities are easily spotted.

Despite the ongoing climate efforts, Amsterdam is not on track to achieve its climate goals. To accelerate the transition in an inclusive manner the policy document **Our City Of Tomorrow** was published in September of 2023. In Our City of Tomorrow, which includes an revamped climate action plan, the entire city board committed to the Amsterdam climate policy. Sustainability is no longer considered to be a separate domain but as the responsibility of the entire municipal organisation. To this end the municipality follows the 'Sustainable, unless' principle in the ongoing journey to towards new ways of working and phasing out of non-sustainability.

To support and reinforce Amsterdam's climate actions, the municipality of Amsterdam has committed to the European mission 100 Climate Neutral and Smart Cities. The goal is to accelerate the transition towards climate neutrality through collaboration between cities, actors within the cities, and between different levels of government. Both barriers, that hamper the road towards climate neutrality, and opportunities are identified on a local, national and European level. In the Climate Neutral Roadmap it is reported that the municipality has an estimated direct impact on 42% of Amsterdam's total (scope 1 and 2) emissions. The remaining 58% of the emissions requires (policy) action from other government levels or other external developments, such as faster development of cost-effective solar panels. The collaboration between government levels and other actors is prerequisite, and includes the National Support Structure (NSS – set up between the Dutch mission cities and the national government) amongst others. Moreover, obtaining the European mission label is expected to contribute to the financial feasibility of the sustainability transitions. Through improved collaboration, and joint innovation and scalability, Amsterdam aims for an accelerated implementation of existing strategies, both in Amsterdam and elsewhere. Furthermore, lessons that are learned in the process will be shared with others, so that other municipalities' transitions can benefit.

31 https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/eu-missions-horizon-europe/climate-neutral-and-smart-cities_en

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The Amsterdam Climate City Contract exists of three elements:

a) The commitment document contains the city's ambitions and shared efforts with actors in the city, emphasizing what the sustainability transitions will look like;
b) The action plan consists of strategies, policy measures, actions and levers of change that, together, show the impact pathways towards climate neutrality. The action plan consolidates and builds upon the previously mentioned Climate Neutral Roadmap 2050, Our City of Tomorrow, along with new policies pertaining to the port and industry, mobility, the heat transition, the electricity transition, the protein transition, the circular transition and the municipal organization.
c) The investment plan clarifies how resources from the municipality and city actors are deployed to finance the climate transition. Municipal means alone, however, are not sufficient to reach Amsterdam's ambitious goals. Therefore, the investment plan will open the conversation on how to equitably divide the costs of the climate transition, with different levels of government, partners and (private sector) investors.

The Climate Action Plan process

Zooming in on the process of developing the Amsterdam Climate Action Plan, the following steps have been taken:

1. Establish buy-in broad within the organization
2. Interviews throughout the municipality
3. Policy coherence analysis
4. Identifying new opportunities
5. Formulating impact pathways

1. Buy-in from the organization

The process of forming the Amsterdam Climate Action Plan started in September of 2023 with a kick-off session held by the municipality of Amsterdam. Colleagues working on a variety of sustainability topics at different parts of the organisation joined in. This meeting mainly focused on how to incorporate all of the sustainability goals and actions that are already incorporated in existing policies, and how to find gaps in the existing action portfolio to enhance and accelerate the transition towards climate neutrality.

2. Create common knowledge base on the challenge, policies, challenges and opportunities

Key colleagues within the organization and key policy documents were identified to follow up with/on. By interviewing over 30 colleagues working on sustainability, an overview was created for the whole municipality. The interviews focused on what the sustainability goals in their specific domain are for scopes 1 through 3. Following that, the interviews explored what is being done to achieve those goals in set in place policies and budget programmes; what actions are in place and how they are being financed. Existing gaps in climate action were addressed, as well as challenges and barriers currently hindering or slowing down the path towards climate neutrality.

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To find out more about sustainability coalitions and how different actors within the city are working together to achieve (joint) sustainability goals, the interviews also explored the different collaborations that already exist and opportunities for more collaborations.

From these insights, new actions can be formulated to overcome the challenges and barriers and engage on the opportunities hidden within the networks of city actors. In conclusion, the interviews combined creating an overview of all climate ambitions and actions that are already in place or planned in the city of Amsterdam, with gaining insights in gaps, challenges, barriers and opportunities for further enhancing the path towards climate neutrality.

3. Policy coherence analysis

Supported by the insights from the interviews, local policy documents were examined, including budget plans, agreements, roadmaps, strategies, vision documents, implementation agendas, and action plans on specific sustainability topics. The Greenhouse Gas Emissions Baseline Inventory, existing climate and sustainability ambitions, and in place or planned goals and actions were distilled from these documents. The policy documents, alongside the interview results, were employed for a policy analysis to consolidate policies to be able to formulate one overarching Climate Action Plan. Moreover, the policy analysis consisted of coherence assessment both vertical and horizontal. Vertical coherence assesses the (mis)match between policy objectives, actions and outcome between the EU, national, regional and local level. Horizontal coherence assessment encompasses the (mis)match between policy objectives, actions and outcomes between different domains (e.g. energy and mobility) on the same geographic level (i.e. city, district, neighbourhood).

4. Identifying new opportunities

Following the interviews and policy analysis, new opportunities for enhancing climate neutrality could be identified. All new ideas and efforts that accelerate current climate strategies or address gaps in current policies, are drawn up in the Climate Action Plan for further exploration. As the Climate City Contract is an iterative product, it is expected to be updated every two years, which allows for development and innovation of actions.

5. Formulating impact pathways

All actions are part of larger impact pathways, which form the trajectories to be followed towards climate neutrality. For the city of Amsterdam, three main sustainability transitions are distinguished, namely the energy transition, the circular transition, and the transition towards a green and healthy city. For each transition, a number of impact pathways were identified. Key milestones were identified for the intermediate outcomes and for the results by 2030. Furthermore, for each pathway, levers of change have been determined that can be mobilized and form the basis of the actions.

The Amsterdam impact pathways are presented in Figure 7.

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Figure 7. Amsterdam impact pathways in the CCC Action Plan

Processes for city consultation

As mentioned earlier, New Amsterdam Climate was the result of a series of more than 1,000 conversations that we held with citizens in 2019. This 'conversation with the city' was announced in the first Amsterdam Climate Neutral Roadmap, which was published in early 2019 with the subtitle "an invitation to the city". These conversations were held across the

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whole extent of Amsterdam society: shopkeepers, residents, owner-occupier associations, large and small businesses, sports associations, museums, hospitals, industry, energy cooperatives, churches, neighbourhood associations, and many more. It became clear that the energy transition from below was already well underway.

The conversations resulted in the Amsterdam Climate Agreement of June 2019: a city-wide alliance to work together towards a climate-neutral Amsterdam. The New Amsterdam Climate online platform was launched at the same time. In the Climate Agreement, residents, businesses, institutes and the municipality show what they are doing and want to do to make the city climate-neutral. The initiatives contribute to reducing carbon emissions by saving energy and generating clean energy, and increasing support for greening the city.

Also, within different policy fields, various participation processes were established. Examples are:

- For the development of the local environmental vision, the people of Amsterdam were involved in discussions on sustainability, accessibility, affordability, and meeting spots. This is important, because all plans and interventions within the city are based on this vision document.
- The Food Strategy was established in cooperation with a variety of partners from the field (including initiatives, societal organisations, entrepreneurs, knowledge institutes and networks), the province of North Holland, the Metropolitan Region of Amsterdam Food Council and Voedsel Verbindt.
- In 2024, a civil consultation will be held on waste, in which citizens and entrepreneurs, together with experts and civil servants, will discuss about the waste challenges Amsterdam faces.
- More than 918.000 people of Amsterdam are involved with shaping the circular transition. A variety of participation processes are established to do so, through for example conversations, a civil consultation, an innovation estafette with events, and development of support schemes.

The role of Atelier

The Amsterdam Climate City Contract is established as a joined effort between the City of Amsterdam and TNO. The City of Amsterdam and TNO found each other as collaborating partners on PEDs in the Atelier project and this collaboration was extended to the context of the Smart and Climate Neutral Cities Mission. A joint project team between TNO and Amsterdam was set-up to define and conduct the four steps mentioned above, resulting in the Climate City Contract.

In addition, the Atelier partner cities proofed to be valuable sparring partners for the city of Amsterdam. Since six of the eight Atelier cities pledged commitment to the Climate Neutral and Smart Cities Mission, a reflexive learning could be created.

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6. Action Plan of Bilbao

The City Vision developed in the ATELIER project is completely aligned with the Sustainable Energy Action Plan the city recently submitted on the framework of Covenant of Mayors. Additionally, Bilbao decided also to embark as part of the 100 Climate Neutral Cities project as a follower city to benefit from the knowledge and expertise of the consortium and fine-tune its energy transition roadmap. Previously, Bilbao published in 2012 an Action Plan for Sustainable Energy which laid down city's commitment to sustainability from there on. Results were successful in terms of mitigation of GHG emissions and that was a driver to reinforce its commitment and upscale its actions.

The definition of the action lines in the SECAP has been based on an arduous and mature process. ATELIER Project methodology has really supported it. As explained in Deliverable 2.6 the constitution of the Smart City Planning Group set a crucial milestone to improve the strategic planning process of the city and integrate also relevant key stakeholders of the entrepreneurial, educational and technological ecosystem. Within the municipality, representatives from different municipal departments have been involved in the development of that common city-oriented vision. Several Workshops and internal meetings have been arranged considering both municipal technicians and deputies but also external actors. That comprehensive debate leads to a final Master Scenario with three main sectorial lines: Building stock and its configuration, Mobility and Environment and Energy production.

On the basis of these strategic lines, an external consulting company has been responsible for determining more concrete actions with specific deadlines and budgeting them. As a result, the SECAP has been elaborated and approved on April 2024.The Action Plan aims to reduce at least 40% GHG emissions, in addition to the emissions inventory, the analysis of risks and vulnerability and the package of measures in the field of energy and adaptation to climate change. At a higher level, the entire strategy to combat climate change is channelled through two areas of action: one that focuses on mitigating climate change and another that seeks to adapt our environment to its effects. Thus, the plan includes actions to mitigate and adapt to climate change, maintaining a special fight against energy poverty.

The main action lines are distributed into seven axes:

AXIS 0: Energy Sustainability of the City Council: The Sustainability Energy Law of the Basque Country defines some specific territorial policies for municipal assets.

In detail:

- Reduction of 35% of energy consumption
- Achievement of a 32% of electric and thermal consumption
- 100% of vehicles must be of alternative fuels.

These objectives need to take rehabilitation measures and replacement of energy systems in already identified municipal buildings and facilities, reduction of street lighting of 51% by the substitution by LED or a more effective management with IoT technology. The aim is also to reduce the use of fossil fuels for vehicle fleet for the municipal fleet, public transport and subcontracting. The increase of onsite renewable generation through PV panels or thermal renewable equipment (solar thermal, biomass, AHP or connection to geothermal boreholes).

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AXIS 1: IMPROVE THE ENERGY EFFICIENCY OF BUILDINGS

The city aims to increase the rate of energy rehabilitation of residential buildings in order to reduce consumption, decarbonise the sector and reduce energy vulnerability, as well as to increase savings in energy costs for citizens.

AXIS 2: DECARBONISING THE TRANSPORT SECTOR

Transport is the most emitting sector of the municipality and specific measures need to be promoted to tackle that issue. The decarbonisation process is achieved by providing incentives for mobility through public transport, the electrification of the vehicle fleet in line with the urban transformation and the implementation of Low Emission Zones together with an increase in pedestrianisation.

AXIS 3: PROMOTING ENERGY GENERATION

Boost the municipality's capacity in the use of renewable energies for the decarbonisation of energy consumption either through local or external production, activating energy communities and achieving a decrease in energy dependence. The main target is to increase the installation of photovoltaic panels in private and public buildings, achieving the deployment of 35% maximum solar potential.

The current and potential of renewables needs to be assessed more in detail and define standardised regulations for the implementation of renewables in the city. Besides PV, nowadays Bilbao also took advantage of the management of a nearby hydroelectric power plant and a waste treatment plant. The evaluation of potential District Heating areas, considering technical but also urbanistic criteria is a significant next step.

The encouragement of the energy transition and decarbonisation will be based on a programme of economic aid, tax measures and technical advice with the aim of influencing the different levers of renewable energy generation.

AXIS 4: REDUCING CLIMATE RISK

Reducing climate risk is a growing need for a robust response. The aim is that as climate change increases the risks of floods and heat waves in the municipality, the municipality will have the adaptive capacity to neutralise the increase in risk. the Bilbao Environmental Strategy already set the main action lines considering specifically naturalisation criteria for building works and urban planning.

AXIS 5: INCREASING RESPONSE CAPACITY

Dealing with climate change requires a coordinated response based on knowledge, data collection and management of key actors in order to be able to act appropriately to adverse climatic events such as floods and heat waves. The monitoring and management of information is key, as well as the correct understanding and anticipation of the succession of events through warning systems, monitoring, the development of protocols and knowledge of the environment. More specifically, the upgrades in the sewage network and the hydrological management of the city are key topics.

AXIS 6: RAISING AWARENESS AND TRAINING

The aim is to ensure that the citizens of Bilbao are aware of the effects of climate change in the municipality and know how to assess its importance, have the information available and

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know how to interpret it to be able to respond accordingly. Municipality is focus on launching several campaigns linked to the rehabilitation of buildings, renewable energy source and mobility. An example is the option of promoting the energy contracts with renewable energy source certificates in private dwellings.

AXIS 7: STRENGTHENING GOVERNANCE

The objective is to formulate an interdepartmental framework with management and coordination protocols and specific governance instruments to ensure the correct implementation, measurement and control of the PACES in order to execute the programmes and ensure the achievement of the objectives set out in the Plan, in line with the different policies, plans and programmes of the Municipality, while strengthening alliances and dialogue between agents. BilbaoEner, which is the recently constituted energy agency in the municipality, will play an active role on the energy transition promotion.

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7. Action Plan of Bratislava

Since Slovakia joined the EU in 2004, Bratislava has experienced a period of economic success in all areas. Not only has the population grown by tens of thousands, but also the number of flats and houses, companies and their office and production premises, and the number of cars. However, despite this significant growth, Bratislava has managed to reduce its greenhouse gas emissions by **30% in 17 years compared to 2005**. This has been mainly due to residents who have significantly reduced their energy consumption, mainly by insulating their homes.

The capital city of the Slovak Republic, Bratislava, acceded to the Covenant of Mayors in 2012. Following this, it adopted two strategic documents, the **Sustainable Energy Development Action Plan of the Capital City of the Slovak Republic of Bratislava** – SEAP (2013) and the **Action Plan for Adaptation to the Adverse Impacts of Climate Change** (2017). With the submission of the new Action Plan (SECAP), planned during 2024, Bratislava renews its active membership in this initiative and subscribes to the current commitment of the European Union and the Slovak Republic to reduce greenhouse gas emissions by 55%.

In 2022 Bratislava published the strategic document **Bratislava 2030** (based on the Programme of economic and social development of the capital city Bratislava, 2010) and decided to process a **SECAP**.

Bratislava 2030 is a city's strategic plan, which was approved by the city council in June 2022. It consists of three main parts:

- Vision of Bratislava
- Analytical part
- Strategic part

The Bratislava Vision describes the overall vision of the city's development and also talks about what strategic planning is. It describes how the plan will be implemented or realised and how it will be financed. It consists of three main thematic units:

- **Bratislava is a city made for people.**

It is a caring city that creates and ensures the conditions for a dignified life for all who choose to live there, regardless of their living situation or background. The city is guided by the principle of cooperation and communicates with its inhabitants. The city promotes equality, inclusion and access to opportunity.

- **Bratislava is a healthy and vibrant city with scale.**

It is developing as a city of short distances to multiple centres, where services, amenities and culture are available within individual neighbourhoods and neighbourhoods. The City is responsible with its natural resources. It offers quality public space, diverse culture, and accessible opportunities for exercise, recreation, and healthy lifestyles.

- **Bratislava is a city ready to meet the challenges of the future.**

It is a resilient and self-confident city that is successfully asserting itself in the context of Central Europe. It is a strategically, professionally and efficiently managed city with modern institutions and a digital, data and technical infrastructure that meets the needs of the future. It is successfully reducing the impact of the climate crisis.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864374.

The strategic objectives of the Bratislava 2030 are:

Engaging in the fight for climate resilience

- Bratislava is a climate resilient city thanks to adaptation measures resulting from modern regulatory instruments (eco-index)
- Bratislava is a city that mitigates the climate crisis by reducing greenhouse gas emissions and changing energy mix in favour of renewable energy sources (RES). Bratislava increases its resilience to environmental threats.
- The City of Bratislava is a city that creates space for joint planning of sustainable development and promotion of environmental awareness of its inhabitants.
- Bratislava is a well-informed city using modern technology to continuously monitor the state of the environment, helping it to meet its goals and policies and improve quality of life.

A sustainable approach to resource use and recovery

- The City of Bratislava has energy-efficient buildings to reduce its carbon footprint as well as the costs of their management.
- The City of Bratislava energy recovers as much as possible of the mixed waste generated in order to minimise the negative environmental impacts of living in the city.
- The City of Bratislava has the necessary infrastructure in place to minimise landfilling, to maximise material and energy recovery of waste and to collect waste collection and disposal fees efficiently and fairly.
- The City of Bratislava minimises waste generation by its organisations and at its events.

Environmental protection and ecosystem services

- The city of Bratislava has a clean environment (air, water, soil, noise level) with minimal levels of total and local pollution. The City of Bratislava has a high quality and distributed infrastructure that continuously collects the information needed to consistently assess the state of the environment in the city.
- The City of Bratislava has sufficient supplies of potable water and provides high quality and consistent drinking water production, delivery and wastewater treatment services available to every resident of Bratislava. Water is an available but scarce resource that is not wasted.
- Bratislava is a city with the conditions for the creation of quality urban greenery and green infrastructure outside the built-up area of the city. The City of Bratislava is continuously expanding and improving the green areas in its territory. The City of Bratislava has a complete and comprehensive overview of the green and blue infrastructure on its territory and uses modern regulatory tools for its protection.

Safe and sustainable urban mobility

- The city of Bratislava provides comfortable, environmentally friendly and sustainable movement in the city primarily for pedestrians, cyclists, users of public transport, but does not forget about car drivers.
- The City of Bratislava supports and builds infrastructure for sustainable and accessible urban and regional mobility with an emphasis on the development of public passenger transport.
- The City of Bratislava prioritises pedestrians in the public space through calm roads and accessible public spaces.
- The City of Bratislava develops cycling as a fully-fledged alternative to other modes of transport.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864374.

- The City of Bratislava actively promotes a higher share of low-emission and shared mobility in the total transport in the city.
- The City of Bratislava is preparing the construction of important linear structures that will help to divert mainly transit traffic and thus create space for sustainable forms of mobility.

The Action Plan Bratislava 2030 also includes the detailed transition paths with a set of concrete actions to each key objective:

Engaging in the fight for climate resilience

- Defining the eco-index as a regulatory tool for spatial planning, ensuring sufficient quality and quantity of adaptation and mitigation measures and measures to promote biodiversity.
- Environmental quality monitoring programme - noise map, monitoring the occurrence of heat islands, monitoring of traffic intensity.
- Creation of an urban integrated information system on environmental quality.
- Creation of environmental centres.
- Implementation of activities in year-round environmental campaigns to raise environmental awareness.
- Action plan for sustainable energy development of the city and adaptation to climate change (SECAP).
- Implementation of various nature-based adaptation measures on areas and buildings owned by the city, municipal organisations and city districts.
- Creating climate-resilient public spaces by planting and reducing the area of water-permeable artificial surfaces.
- Adapting existing transport infrastructure to changes in rainfall intensity due to climate change.
- Climate Resilient Bratislava Programme.
- Warning system for extreme weather events due to climate change.

A sustainable approach to resource use and recovery

- Creating a portfolio property policy.
- Reducing the energy consumption of buildings by implementing energy efficiency measures.
- Implementation of an energy management system with continuous evaluation of energy consumption and regular optimisation.
- Modernisation and greening of the energy recovery facilities for waste
- Completion of the infrastructure for sorted waste collection.
- Introduction of a kitchen waste collection system.
- Establishment of a municipal composting plant.
- Building reuse centres.
- Building new accessible collection yards.
- Electronic waste registration and fair charges.
- Digitisation of collection and processes in collection and disposal of waste.
- Implementation of the "Municipality without waste" concept for other municipal companies.

Environmental protection and ecosystem services

- Feasibility study of low emission zones.
- Implementation of the Integrated Programme for the improvement of air quality in the Bratislava agglomeration for pollutants NO_2 and O_3.

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- Ensuring the regular procurement of a new strategic noise map and the implementation of an action plan for noise protection based on it.
- Creation of a city information system for the assessment of the level of pollution by various environmental burdens on city-owned land and the status of remediation of these burdens (as part of the environmental quality monitoring programme).
- Programme for the provision of quality drinking water supply and wastewater collection and treatment services.
- Recultivation measures against erosion in a close to nature way aimed at improving the quality and protection of urban floors against water erosion.
- Programme of transformation of areas of green space in and around housing estates into climate-resistant and biodiversity-supportive areas.
- Introduction of a quality information passporting system recording the number, size, location and condition of the city's green infrastructure.
- Preparation of a land master plan for green spaces in the territory of the capital city.
- Programme for the creation of parks of citywide and local importance - implementation of projects - planting of trees and increasing the proportion of greenery also with the help of planting in overgrowths, gardens, islands, popinavych plants in the streets.
- Programme for the creation of parks of citywide and local importance.
- 25 Thousand Trees Programme: Implementation of tree and shrub planting, implementation of post-planting care.
- Procurement and approval of the so-called Landscape Plan (landscape-ecological plan).
- Establishment and implementation of local land-based ecological stability systems.
- Creation and implementation of a green-blue infrastructure concept.

Safe and sustainable urban mobility

- Development of pedestrian routes throughout the city with emphasis on public transport accessibility.
- Implementation of measures aimed at pedestrian safety (continuous pavements, intersections raised to pavement level, etc.).
- Construction and modernisation of tram lines.
- Modernisation of intersection IT systems (traffic controllers, traffic lights, etc.).
- Change of traffic organisation (dedication of an existing lane at the expense of individual car traffic) or construction of a new dedicated lane for public transport.
- Renewal of the public transport fleet.
- Making public transport vehicles accessible to people with specific mobility and orientation needs.
- Modernisation and debarring of public transport stops.

Bratislava 2030 became the basis for the SECAP. In those areas where the two plans overlap to a greater or lesser extent (transport, green infrastructure or spatial planning), measures from Bratislava 2030 were taken into the SECAP to ensure synergy in the implementation of both plans. The SECAP also contains adaptation measures and replaces the Climate Change Adaptation Action Plan.

During the processing of this part of the project, **SECAP Bratislava was still in the process of drafting**, internal and external comments on the draft were being made. For this reason, there may be minor deviations from the final approved version.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864374.

The timeline of SECAP development is included in the Table 12:

Table 12. Timeline of Bratislava SECAP development (between 2022 and 2024)

Timeline of Bratislava SECAP development	
2022 Initiative	- **Risk analysis** - **SECAP Working Groups** Creation of internal working groups (WG) with the following focus: Quality of Life and Health, Green-Blue Infrastructure, Sustainable Energy and Urbanism, Mobility, Circular Economy. WG held 20 working group meetings, 1 conference + 3 workshops, 20 consultations with other departments, 45 coordination meetings. - **Baselines for adaptation** The project activities in 2022: WG meetings (municipality representatives, external experts), Workshops with city districts and key stakeholders, Consultations with departments and city leaders in the elaboration of the action plan, Public opinion survey, Communication with the public (internal, organized and wider) through the website and planned activities, Study trip / visit of partners (abroad, Slovakia), Final conference.
2023 Analytical part	Procurement of a supplier**,** Obtaining data**,** Discussions with stakeholders**,** Analysis of project preparation processes.
2023 Drafting part	Mitigation measures**,** Adaptation measures**,** Energy poverty**,** Method of participation.
March 2024	**Submission for comments** (City Departments**,** Public**,** Commissions)
April 2024	**Planned approval at City Council**
Summer 2024	**Planned Final submission**

Key areas and strategic priorities of the Action Plan and corresponding actions. The priority actions of the Action Plan are listed in **green**. Prioritisation of measures: highest contribution to CO_2 savings and possibility of payback, high impact in terms of communication to the public, or a combination of impact and confirmed coverage by financial resources.

THE CITY LEADS BY EXAMPLE

- **Bratislava will save at least 35% of energy through comprehensive energy savings in buildings**
  1. **Introduction of energy management**
  2. Improving the thermal-technical performance of urban buildings
  3. Preparation of investment plan for building renovation based on data and outputs from the energy management system
  4. Standard for the renovation of buildings of municipal property
- **Install renewable energy sources (RES) that will cover at least 20% of the annual electricity consumption of the city's assets**
  5. **Photovoltaic power plants on buildings owned by the city, including municipal companies**
- **As part of the comprehensive renewal of public lighting, we will ensure 100 % coverage with luminaires with LED technology with the possibility of intensity control**

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6. **Completion of the process of reconstruction and modernisation of public lighting**
7. Supervision and control system of public lighting

- **We will reduce the energy intensity of urban businesses by 20%, with an emphasis on maximising the use of renewables**
  8. Implementation of energy efficiency measures in municipal companies

WASTE RECOVERY

- **Recover maximum waste as an energy source**
  9. Project for the construction of the third line of the waste-to-energy plant
  10. Project of composting plant and biogas plant with CNG production
  11. Utilisation of residual wastewater heat from building level, through neighbourhood level to BVS (Bratislava Water Company) wastewater treatment plants

SUSTAINABLE MOBILITY

- **We will increase the share of public, walking and cycling transport to 70%**
  12. Traffic surveys and analyses, traffic model calibration
  13. Active participation in the construction of at least 2 Terminals of Integrated Passenger Transport and in the reconstruction of the Main Railway Station in Bratislava
  14. Construction of 2300 new P+R parking spaces
  15. Improving the fluidity of public passenger transport through public transport preference
  16. Functional MaaS application with a link to shared micro-mobility
  17. Reconstruction and construction of at least 42 km of cycling infrastructure, including the installation of new bike racks in Bratislava or support for shared bike infrastructure
  18. Establishing new transport and packing point standards
  19. Expansion of traffic calmed zones (zone 30 and residential zones)
  20. Active cooperation with the Old Town to regulate the entry of vehicles into the pedestrian zone
  21. Promoting the development of pedestrian transport by improving safety and barrier-free accessibility
- **Build and upgrade 10 km of tram lines**
  22. **Construction of new tram lines**
  23. **Modernisation of existing tram lines**
- **We will increase the proportion of zero-emission public transport and city vehicles to 50%**
  24. Construction of new trolleybus lines
  25. Purchase of trams and trolleybuses for the Bratislava Transport Company
  26. Replacement of the fleet with zero-emission and low-emission vehicles
- **Support the development of electromobility in the city**
  27. **Building 400 new charging stations for passenger electric vehicles**
  28. Introduction of emission-free shared mobility – car sharing

RESIDENTS OF BRATISLAVA

- **Reduce household energy consumption by 23%**

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29. Improvement of thermal-technical properties of residential buildings
30. Replacement of lighting with LED in households and replacement of household appliances
31. Replacement of direct-fired heating by heat pumps
32. Cooperation, education and support
33. Regular data collection and analysis on energy poverty

- **Increase of energy production from RES by 226 000 MWh**
  34. Electricity generation from photovoltaic power plants
  35. Displacement of remaining coal from households
  36. Replacement of old gas boilers in households
  37. Establishing an urban energy community and encouraging the emergence of independent citizens' communities

RESPONSIBLE COMPANIES

- **Reduce energy consumption in the tertiary sector by 38%**
  38. Advanced heating control systems
  39. Replacement of lighting with LED luminaires
  40. Improving the thermal-technical performance of buildings
  41. Ventilation and air conditioning system control
  42. Replacement of non-compliant natural gas boilers
  43. Business Climate Challenge
- **Increase of energy production from RES by 380 000 MWh**
  44. Electricity generation from photovoltaic power plants
  45. Displacing coke burning from the tertiary sector
  46. Replacement of heat sources (natural gas) with heat pumps
- **Spatial planning and regulation with a focus on decarbonisation**
  47. Low emission measures for new urban districts
  48. Change of the Development Concept of the Capital City of the Slovak Republic Bratislava in the field of thermal energy
  49. Adjustment of urban regulation and support for legislative changes to achieve decarbonisation and installation of adaptation measures in the city
  50. Implementation of innovative measures in city management to support the implementation of decarbonisation in Bratislava

ADAPTING TO CLIMATE CHANGE

- **We will actively develop green and blue infrastructure and strengthen biodiversity in the city**
  51. Revitalisation of public parks - Living Places programme
  52. Improvement and extension of green areas
  53. Planting 25000 trees and shrubs by 2030
  54. Protection of the Bratislava City Forest Park in cooperation with citizens and companies
  55. Involving residents and communities
  56. Developing urban policies and tools to support green infrastructure
- **Increase the protection of the health of the population in hot weather**
  57. Additional thermal and waterproofing measures on buildings (green roofs, light roofs)

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58. Renovation of sports grounds, swimming areas and revitalisation of school yards
59. **Installation of 80 drinking fountains in the city**

- **Improve the city's crisis management**
  60. Regular updates and publication of vulnerability assessments
  61. Preparation of crisis plans for emergencies
- **Improve rainwater retention**
  62. Water retention from the roofs of urban buildings
  63. Water retention measures around roads at risk of flooding, including vegetation islands
  64. Systemic water retention measures to reduce the volume of rainwater in the sewerage system
  65. Water retention measures in urban forests

The SECAP was developed with the participation of various stakeholders who were involved in both the drafting and commenting phases. Target groups for communication and cooperation:

The city leads by example (City property):

- Government of the Slovak Republic and relevant ministries and their institutions, in particular the Ministry of Environment of the Slovak Republic, the Ministry of Economy of the Slovak Republic and the Slovak Energy and Innovation Agency
- Employees of the Municipality of the Capital City of the Slovak Republic Bratislava and budgetary and contributory organisations of the city
- Commercial companies of the city
- Bratislava self-governing region
- NGOs and civic associations
- Residents of Bratislava
- Energy supply companies and energy service providers

Waste recovery (Municipal solid waste and wastewater)

- OLO, a.s. (Waste removal and disposal company)
- BVS, a.s. (Bratislava water company)
- Heat and electricity suppliers
- Development companies
- Residents of Bratislava

Sustainable mobility (Transport sector)

- Government of the Slovak Republic and relevant ministries and their institutions, in particular the Ministry of Transport of the Slovak Republic
- Bratislava self-governing region
- Residents of Bratislava
- Transport company Bratislava
- Commercial companies of the city
- NGOs and civic associations
- Private companies operating on the territory of the city in the field of passenger transport and logistics

Residents of Bratislava (Residential sector)

- Residents of Bratislava
- Volunteers and non-profit organisations
- Energy supply companies

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- Government of the Slovak Republic and relevant ministries and their institutions, in particular the Ministry of Environment of the Slovak Republic, the Ministry of Economy of the Slovak Republic and the Slovak Energy and Innovation Agency
- Bratislava self-governing region
- City districts of Bratislava

Responsible companies (Tertiary sector)

- Persons doing business in the territory of Bratislava
- Firms focused on the provision of services
- Development companies
- Bratislava city districts
- Commercial companies of the city
- NGOs and civic associations

Adapting to climate change

- Residents of Bratislava
- Urban forests
- Bratislava water company
- Administration of sports and physical education facilities
- Volunteers and non-profit organisations
- Bratislava Region, Government of the Slovak Republic
- City districts of Bratislava
- Schools of all levels

Definition of barriers:

Slovak cities face significant budgetary challenges, particularly as it relates to funding for climate action.

Slovakia is one of the most centralized countries in the Central and Eastern Europe region (IMF Country Report No 19/330), which is reflected in regional and local government powers and funding. While largely independent in terms of fiscal planning, Slovak regions and municipalities only receive central government funding in the form of personal income taxes. Tax receipts from personal income tax are redistributed among all municipal and regional governments based on their respective number of inhabitants; the level of economic activity on the city territory playing no role in the city funding. The impact of local taxes on total revenues is insignificant, while both regions and municipalities have limited revenue-raising power and must run on balanced budgets.

As a result, Slovak cities have significantly constrained financial revenue on a per-resident basis. This is particularly evident in comparison to other cities in the region; per-resident financial revenue is 59% higher in Prague and 198% higher in Vienna (Bratislava 2030). These constraints have been exacerbated as the Slovak government has repeatedly reduced cities' revenues in 2022 and 2023 to fund financial assistance through tax cuts on personal income to help address increasing energy and living costs.

Consequently:

- Slovak cities continue to be dependent upon EU funding to implement infrastructure investments, including climate-related interventions. This funding is subject to stringent and frequently inflexible requirements limiting its potential impact and availability to address priority needs.

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- Innovative approaches to climate action, including to energy efficiency, are avoided by the cities as they involve higher rates of financial and capacity risks.

City building stock has significant deferred maintenance and modernization needs. This is particularly acute for energy-intensive buildings including heritage protected buildings or sports facilities (stadiums, ice rinks, swimming pools and similar). High upfront costs to retrofit such buildings discourages municipalities from undertaking deep retrofit projects. Instead, partial solutions are repeatedly chosen to address immediate problems through repairs. This approach perpetuates a vicious cycle where short-term, affordable solutions fail to address the underlying inefficiencies. As a result, buildings and facilities continue to consume excessive energy, while they function sub optimally for users and deteriorate at a pace that necessitates further maintenance and repairs.

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8. Action Plan of Budapest

VISION AND STRATEGIC OBJECTIVE

Budapest has set ambitious goals to tackle climate change and, in the effort, to advance the city's and country's energy transition. In Budapest, the municipality already has a Sustainable Energy and Climate Action Plan, SECAP 2030 (adopted in 2018 and updated in 2021) which they intend to extend to a SECAP 2050 through the co-generation of the Budapest Vision 2050. This approach is unique among ATELIER cities, extending the strategic planning approach of SECAPs from 2030 to 2050.

The City Vision development process

The City Vision development process began with the establishment of the Smart Cities Planning Group (SCPG) by the municipality in February 2021, building on a strong foundation of climate neutrality governance (climate change platform), as evidenced by the development of the SECAP 2030 and the Climate Plan 2050. The process continued with the gathering of city information, utilizing data from the SECAP 2030 and awaiting new data from the Central Statistical Office (KSH). This was followed by a strategic City Diagnosis, where the existing SWOT analysis was expanded by the ATELIER team to focus on the city vision for 2050. Strategic planning was the next step, with Tecnalia drawing up potential narratives or scenarios aimed at achieving the 2050 vision goals. The current plan is a comprehensive revision of SECAP 2030, to align it with the 2050 objectives. However, due to the large extent of the task, within ATELIER the scope and focus will be put on the SECAP mobility section where more ambitious goals and targets will be set.

The success of the City Vision development process is largely attributed to three main factors. Firstly, **stakeholder involvement from multiple sources**, including the consortium, municipality, municipal companies, and the SCPG, has been instrumental in formulating a multidisciplinary vision. Secondly, the **commitment of the municipality**, with leadership dedicated in both ATELIER and ASCEND[32] projects, has been a driving force in decision making and work progress. Lastly, the **attachment of multiple projects to the topic of PED development** in Budapest has enriched the process. These projects focus on local development, pilot sites, and the social aspects of energy communities, among others.

However, the process also faces significant barriers. A primary challenge is the lack of data, which forms the basis for any task within the development of PEDs and energy communities. Additionally, the implementation of results in the planned time and manner presents a hurdle. The outcome of these challenges remains to be seen as the process unfolds. Despite these barriers, the City Vision development process continues to strive towards its 2050 objectives.

As a relevant related initiative affecting Budapest's city vision, in 2022, Budapest and two other Hungarian cities were selected by the "100 Climate Neutral and Smart Cities Mission", and set the goal to become climate neutral by 2030. The selected cities are primarily experimental and innovation centres, where solutions for urban decarbonization efforts are sought in a holistic approach. All three Hungarian cities put the improvement of residential energy efficiency as their primary objective, as this sector is responsible for the largest carbon and airborne dust pollution emission.

[32] https://www.ascend-project.eu/

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864374.

The CCC (Climate City Contract) development process looks as follows:

1. Setting up so-called transition teams, multi actor coalitions involving the public and private sector, civil society, and academia
2. Updating the city's emissions inventory
3. Creating an action plan by re-designing goals and actions towards a net zero vision with the help of our transition teams
4. Creating an investment plan to strategically mobilise and organise public resources and to address how the city can attract private capital.
5. Submitting the CCC to the European Commission (September 2024)

ACTION PLAN DEVELOPMENT

As an effort to set more ambitious goals and formulate an action plan within the scope of the ATELIER project, Budapest set to revise the e-mobility related actions of its SECAP and aim to set more ambitious goals with more concrete steps and objectives. However, due to unforeseen issues, the process of SECAP revision has been greatly delayed. Therefore instead, the plans of the revision process are described. In addition, during this time Budapest has joined the 100 Climate Neutral Cities Mission initiative, and we are preparing our Climate City Contract, which also sets more ambitious goals than our current SECAP. Therefore, we will share our progress since it directly relates to our City Vision.

Current mobility objectives of SECAP

Budapest's SECAP places significant emphasis on enhancing public transport and different ways of mobility while promoting sustainability. Budapest has also adopted its revised SUMP (Sustainable Urban Mobility Plan) last year (2023), and the objectives of both documents are coordinated. The dedicated chapter in SECAP titled "Increasing Energy Efficiency of Mobility Infrastructures and Supporting Environmentally Friendly Modes of Transport" outlines the city's strategic goals in this domain. The five overarching goals are as follows:

- **M8**: **Development of Public Transport**: Budapest aims to transform its public transport system. By introducing attractive vehicles, enhancing services, and improving infrastructure, the city seeks to encourage greater use of public transit.
- **M9**: **Cycling and Pedestrian Infrastructure**: focuses on creating safe and efficient cycling and pedestrian networks. Investing in well-designed pathways and amenities will promote active transportation and reduce reliance on motor vehicles.
- **M10**: **Promotion of Low-Emission Vehicles**: Budapest is committed to goal M10, which advocates for the adoption of electric and low-emission vehicles. Encouraging cleaner modes of transportation contributes to air quality improvement and reduced greenhouse gas emissions.
- **M11**: **Public Cars and Carpooling**: emphasizes the promotion of public cars and carpooling systems. By incentivizing shared rides and efficient vehicle use, Budapest aims to alleviate traffic congestion and enhance overall mobility.
- **M12**: **Emission-Reducing Traffic Measures**: involves implementing traffic regulations that reduce emissions. This includes designating low-emission zones and constructing related infrastructure, such as park-and-ride (P+R) parking lots.

As Budapest revises its SECAP, these points are being assessed to ensure a greener, more sustainable urban landscape. The revision will make use of all the data gathered from related projects of the past years (and currently running ones).

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Current revision status

The SECAP revision in Budapest is currently underway, as part of the mandatory bi-annual review. However, the city faces challenges in the process due to limited staff and time. Proactive steps are being taken to address this. The recruitment of new employees specifically dedicated to the SECAP revision process is in progress. Meanwhile, the team is diligently gathering relevant data from related EU projects. This collaborative effort ensures that Budapest remains committed to its sustainable energy and climate goals.

Gathering data from related EU project

The municipality already participates in and leads a demo element of an e-mobility project called USER-CHI. USER-CHI is a research and innovation project within the Horizon 2020 program. The goal of the project is to formulate innovative solutions which are adapted to user needs, thus promoting the use of electric vehicles. In Budapest, the set task is to learn about user needs in relation to the design, use and habits of the charging infrastructure. Knowledge and expertise gained through the project will be tunnelled into the creation of the more ambitious SECAP goals. Potential relevant data will come from integrating carsharing in the public transport system, placing e-mobility points around the city, promoting intermodality, and encourage the development of shared- and micro-mobility solutions.

Another source of input is the Budapest's Integrated E-Mobility Concept (2016), a strategic document, which is currently undergoing revision as part of the USER-CHI project. Building upon this foundation, Budapest is developing a comprehensive E-Mobility Strategy. This strategic initiative will facilitate the integration of e-mobility objectives into the Sustainable Energy and Climate Action Plan (SECAP), aligning with AFIR (European Union's Agricultural Fund for Rural Development) regulations.

The SUMP, Budapest Mobility Plan (BMT), crafted by BKK, serves as a comprehensive development strategy for the city's mobility infrastructure. It outlines the future vision for Budapest, emphasizing climate neutrality, environmental friendliness, and urban liveability. The strategic initiatives delineated in this document play a pivotal role in achieving these objectives. Recently, the BMT underwent revision in alignment with our SECAP, resulting in the 2023 BMT—a forward-looking roadmap aimed at 2030. This updated document now contributes valuable insights to inform the forthcoming SECAP revision.

Drawing insights from the introduced projects, along with input from other documents and expert perspectives, the upcoming SECAP revision can embrace a more ambitious and forward-looking approach, particularly in the realm of new mobility initiatives.

Climate City Contract

As another relevant and related initiative, the municipality has already hired new employees to form an expert group to manage Budapest's involvement in the 100 Climate-Neutral and Smart Cities Mission initiative. Based on the implementation plans, a core document of the Mission is the "Climate City Contract" (CCC). The CCC is emphatically not a legally binding, but a political document. First and foremost, it is the revelation of political intent and commitment. Although the project does not set a specific deadline for the completion of the CCC, it sets 'windows of opportunities' to hand the document in. Due the local elections falling on the same period of the hand-in, the municipality decided to aim for the next opportunity, in Autumn of 2024.

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Team and departmental organization in the city to develop the Plan

Within the municipality, the ATELIER group, comprising three critical departments —project management, urban planning, and climate & environmental— formed a robust foundation of experts. Their collective expertise ensured effective task (and project) execution and comprehensive coverage of relevant aspects. The Climate and Environmental Affairs Department has direct responsibility for the SECAP revision. However, recognizing the limitations posed by a shortage of workforce, the city plans to expand the team by enlisting additional expert(s). This augmentation allows for a more thorough and efficient revision process. Moreover, the city fostered collaboration beyond its immediate departments. For example, working closely with the municipal urban development company, they tapped into external resources, shared knowledge, and aligned efforts.

INPUTS AND SUPPORT BY ATELIER

The consortium of the ATELIER EU Horizon2020 project played a pivotal role in our project's success. It served as a rich source of information, providing us with access to a network of professionals and experts whose insights were invaluable. We were able to connect with technical consultancies, which offered specialized knowledge in various subjects. These included energy models and scenarios, as well as the validation of Positive Energy District (PED) calculations and scenarios. This collaboration not only enhanced our technical understanding but also introduced us to new concepts such as PEDs and energy communities. These concepts have since become integral to our project, shaping our approach and outcomes. The consortium's support was instrumental in navigating the complexities of the subjects and project, ultimately contributing to its successful execution.

The experience and knowledge gained from the ATELIER project consortium is already proving beneficial for us, particularly in our ongoing ASCEND project[33]. As we develop our own Positive Energy District (PED), the insights into energy models, scenarios, and PED calculations will guide our strategic and technical decisions. The exposure to the concept of energy communities will also enable us to foster a more inclusive and participatory approach. This will not only enhance the effectiveness of our PED but also ensure its alignment with the broader goals of our municipality. Moreover, the ATELIER and ASCEND projects have sparked the necessity to initiate additional 'supplementary' projects. These new endeavours aim to gather more comprehensive information and facilitate further interventions, thereby enriching our understanding and enhancing our impact. The consortium's influence thus extends beyond the immediate project, shaping our future initiatives and contributing to our vision of sustainable urban development.

[33] Horizon Europe Project, focused on the implementation of positive, clean energy districts (PCED), in which Budapest is involved as multiplier city and is joining forces and inputs from both projects to make the most of them. https://www.ascend-project.eu/

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864374.

9. Action Plan of Copenhagen

Copenhagen's Climate Action Plan 2035 is currently being developed and with it also the first road map of actions. It is therefore not possible to report on the exact content here in this report. Since the organisation and development process has been described in report D2.6, in the present section only the main insights of the process from the city vision creation to the action plan development are outlined, for the consistency and independence of the current report.

Current status

Copenhagen City is currently in the process of developing the climate plan for the period after 2025, when the current climate plan expires.

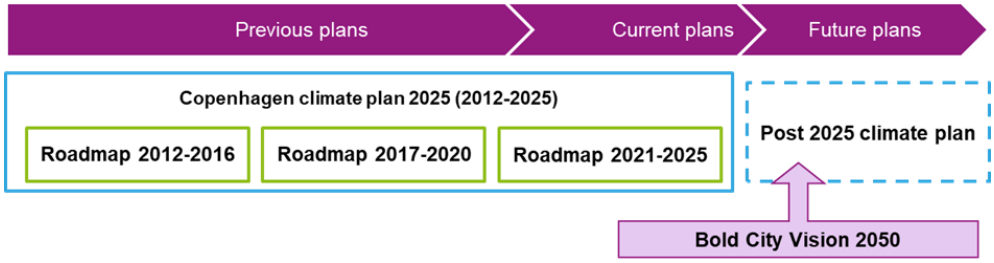

Figure 8: The Climate Plan 2035 will be the next in a succession of climate plans

The city vision for the next 10 years period is sustainable and responsible city. The mission is climate positivity by 2035 with regard to geographical carbon emissions (carbon emissions from biomass included). In comparison approximately 700,000 tCO_2e i.e. 1 tCO_2e/capita geographical emissions were emitted in 2021. The main sources of the geographical emissions were road transport (353,500 tCO_2e), energy production (182,000 tCO_2e), and non-road machinery (67,0 00 tCO_2e).

And as something completely new, an ambition for reducing emissions stemming from consumption of goods and services has been included in the city vision. The ambition is to halve the current emissions thus reaching 5 tCO_2e/capita related to consumption of goods and services in 2035.

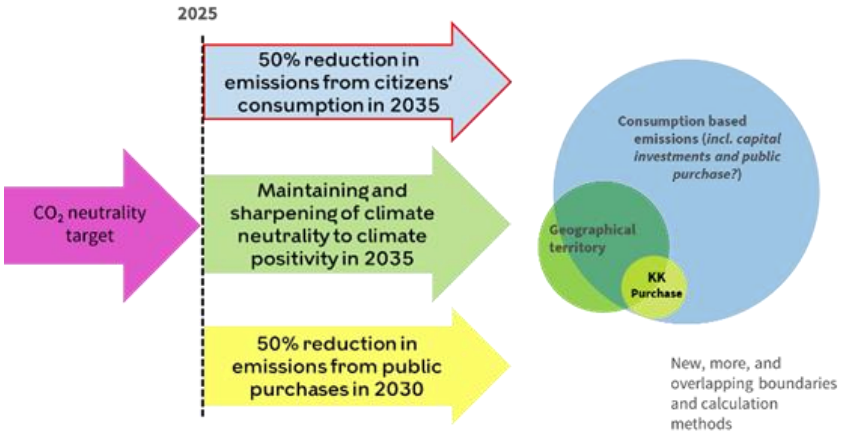

Figure 9: Copenhagen's carbon reduction ambitions for 2035

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Timeline

The city vision development process has been divided in to two phases – A prior loosely explorative phase and then the main development phase. In the first phase, professionals were on a number of occasions invited to discuss energy challenges while the second phase marks the actual collaborative work of developing the Climate Plan 2035. Phase one consisted to two main activities, namely:

- Kick-off seminar for the consultation process for the Climate Plan 2026-2035 (more than 100 participants)
- Topical consultation workshops leading to “Future Images” – a narrative describing main challenges and opportunities within traditional climate plan topics.

For more detail on phase one, please see D2.6.

The development of the Climate Plan 2035 that includes both traditional and new topics is designed as a continuous consultation process aimed to last up to two years, that will address all the Cities4Zero process steps Engage, Analyse, Diagnose, Envision, Plan. The ambition levels were decided by the City Council in 2021.

In parallel to the development of the Climate Plan 2035, Copenhagen is also preparing for a Climate City Contract with the EU.

Organisation of the Climate Plan development

The organisational set-up of the second phase of the Climate Plan Vision development is quite complex, as can be seen in the figure below. The Climate Secretariat under the Technical and Environmental Administration (TMF) acts as project manager and facilitates the work processes. The City Council has commissioned the Climate Plan and agreed the three guide marks for the ambition level of the Climate Plan 2035. Cross municipal work groups containing also external stakeholders carry out the work and report to the Board of directors. Key administrations in the work are the Technical and Environmental Administration (TMF) and the Financial Administration (ØKF).

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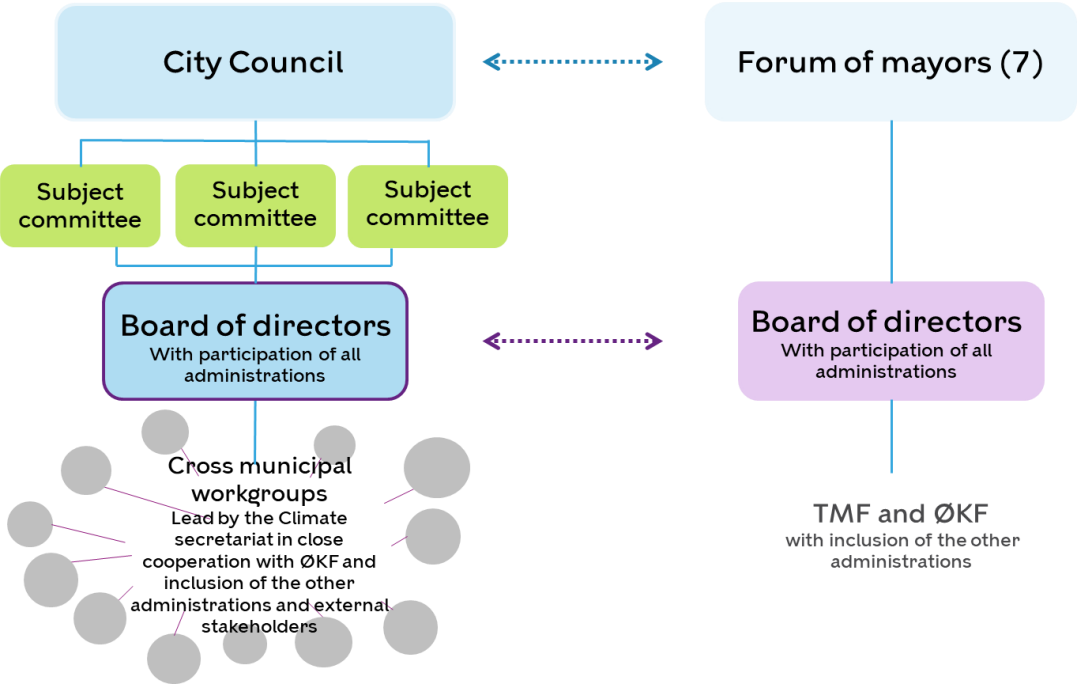

Figure 10: Organisation of Copenhagen's Climate plan 2035 work (Note: Copenhagen has seven mayors – one Lord Mayor and six subject specific mayors and they may represent different political parties)

On April 24th, 2023, a full day Climate Plan Seminar for municipal employees from all city administrative areas of expertise kick-started the internal networking and brainstorming on how the municipal administration impacts the climate and how we can contribute to the transformation. More than 100 employees participated, and 10 cross municipal workgroups were formed each with their separate core topic. The topics included climate education, energy strategy, green competences, mobility, construction, travel & experiences, physical planning, food, consumables, and public purchase.

Each work group is headed by a representative from the Climate Secretariat who also assists in facilitation. Each group consists of a smaller or larger number of cross city administration representatives and selected external stakeholders.

The work group for Energy Strategy 2035 consists of several smaller sub-groups. These sub-groups submit their work to an Energy Strategic Forum consisting of leaders of the key energy stakeholders – HOFOR (district heating company), Radius Elnet (electricity network operator), CTR (heat production, Ørsted (heat and power production), ARC (waste incineration), and Energinet (electricity transmission system operator) as well as the Technical and Environmental Administration (TMF) and the Financial Administration (ØKF).

The Energy Strategy will show the direction for the development of the energy system in Copenhagen at least 10 years into the future and indicate perspectives for the period until 2050. The Energy Strategy will provide the strategic base principles for how we together pro-actively and in an agile manner can ensure a holistic development of the energy system for the common good and how to prioritise between the different interests and dilemmas which Copenhagen expects to face. The principles will thus guide the development of specific

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initiatives and investments that will be prioritised over the next 10 years and further. The subgroups are shown below.

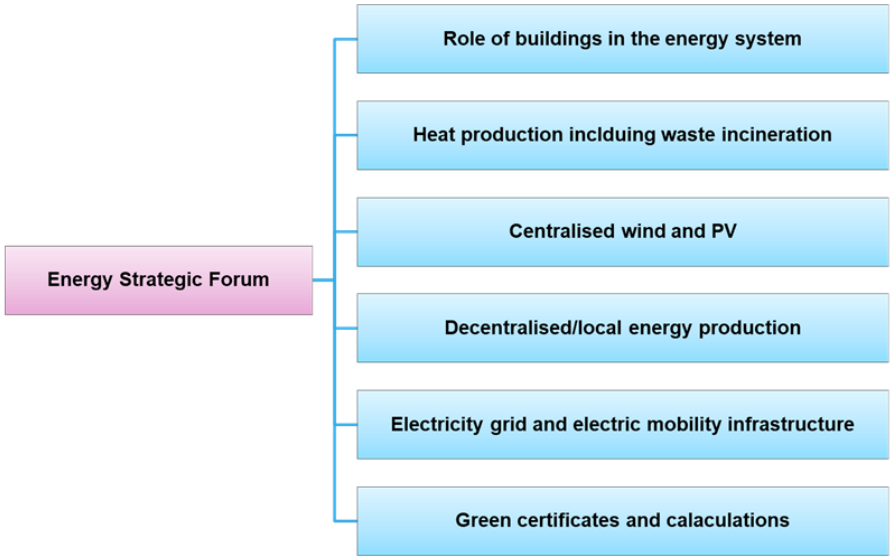

Figure 11: The energy strategy work is organised in six subgroups, which report to an Energy Strategic Forum

The task of the energy strategy sub-groups is to describe their topic and the associated dilemmas, as well as assess the need for additional data and analyses (and association required budget). Next the subgroups will develop guidelines for how to develop initiatives and handle the potential dilemmas in trade-offs. Finally, the sub-groups will identify and describe possible initiatives that will help achieve the new climate targets of Copenhagen and their potential impact.

In parallel, the energy and carbon baselines for the development towards 2035 (and on to 2050) will be developed as well as relevant sub-targets and suitable indicators. Then scenarios on the impact of different portfolios of initiatives can be modelled and analysed.

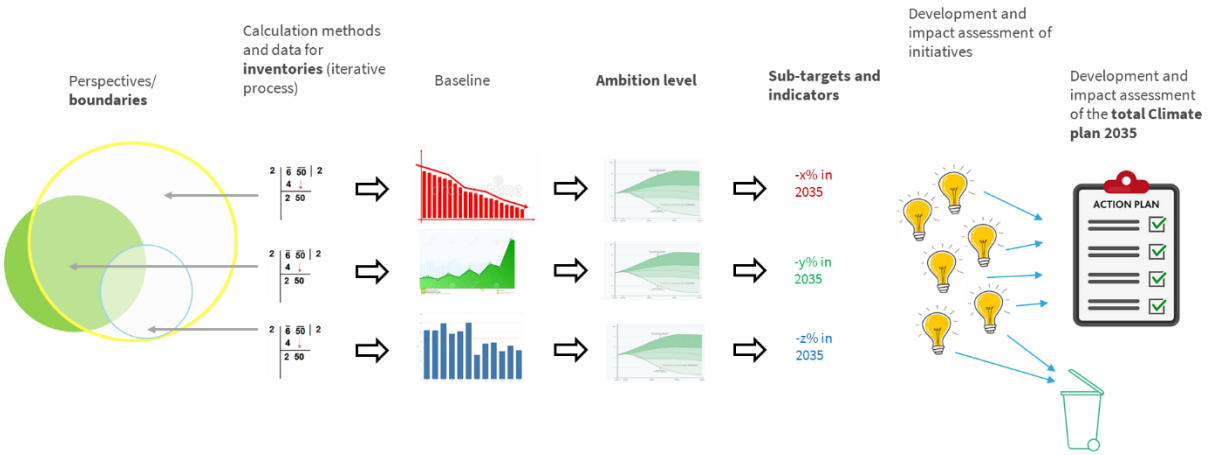

Figure 12: Illustration of baseline and indicator development

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It is expected that a draft Energy Strategy 2035 will be submitted to the City Council for approval in the second half of 2024 and a public hearing will take place in the first half of 2025. Input may also be provided from the Citizens Climate Assembly and local Climate Summits charged with providing input for the entire Climate Plan.

The development of a gross list of climate initiatives for the action plan will be developed in the course of the first half of 2024 – i.e. in parallel with the Energy Strategy. Specific targets and sub-target will most likely be decided in May 2024 together with selecting a preliminary list of actions to be launched. Overall, the Climate Plan 2035 (including the Energy Strategy) is expected complete and adopted by the City Council by mid/end 2025 after the public hearing.

Benefits of ATELIER

Some of the benefits of being part of the ATELIER project and the focus on the ideas behind the concept of PED have so far been:

- A continued focus on innovation with key stakeholders in the form of an Innovation Atelier during COVID lock-down.
- An attention to finding space for renewable energy production locally.
- An attention to integration of energy demand and supply through flexibility.
- Inspiration for a district-based approach which Copenhagen is considering applying more widely with regard to not only energy but also any topic of sustainability.

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10. Action Plan of Krakow

Krakow's climate and energy goals are aligned with those of the European Union and the whole country. For many years, the city has been implementing various activities and initiatives aimed at both reducing CO_2 emissions and adapting to the ongoing climate change.

One of the initiatives that **Krakow joined in June 2022 was the European Covenant of Mayors** by resolution (Resolution of the City Council No. LXXXVII/2430/22 of June 8, 2022). It is a bottom-up initiative of thousands of local governments that have committed to implementing the EU's climate and energy goals in line with the Paris Agreement. Each signatory city is required to submit a Sustainable Energy and Climate Action Plan (SECAP), which should include a plan of action to reduce CO_2 emissions by at least 30% by 2030 and 80% by 2040 compared to the reference year (2018).

By signing the Covenant of Mayors, local governments commit to:

- Strengthening their actions to adapt to climate change
- Accelerating the decarbonization process
- Ensuring that their citizens have access to sustainable, secure and affordable energy.

The following are some of the scope of actions included in Krakow's SECAP:

- Increasing energy efficiency
- Increasing the use of RES
- Increasing resilience and preparing for the adverse effects of climate change
- Combating energy poverty.

SECAP for Krakow is being developed by the Polish Foundation for Energy Efficiency (as a subcontractor) based on the guidelines "How to develop a Sustainable Energy and Climate Action Plan (SECAP)".

The "Krakow City Adaptation Plan to Climate Change by 2030 (MPA)" Plan Adaptacji Miasta Krakowa do zmian klimatu do roku 2030 (MPA) – adopted by resolution on February 26, 2020 – is one of the steps in the implementation of SECAP.

A series of meetings with stakeholders, including energy companies, academia, NGOs, city units and other stakeholders, is taking place in March 2024. In March, a consultation with a conservator of historic buildings was also held in order to prepare a plan of action for improving the energy efficiency of historic buildings. Currently, a stakeholder survey is being conducted. The next step will be an analysis of multi-annual financial plans.

Public consultations are scheduled for the fourth quarter of 2024. The first draft version of the SECAP document is scheduled for June 2024. The final version SECAP for Krakow is expected to be submitted in 2025.

Sustainable Energy and Climate Action Plan for Krakow will consist of the following chapters, among others:

- Linking SECAP with strategic and planning documents (contains 4 subchapters)
- Strategy (contains 6 subchapters)
- Baseline Emission Inventory (BEI) (contains 6 subchapters)
- Risk Assessment and Vulnerability to Climate Change (RVA) (contains 3 subchapters)

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- Actions to mitigate the impact on the environment and climate change (contains 8 subchapters)
- Forecast of final energy demand and emissions in 2030 (contains 2 subchapters)
- Level of achievement of SECAP goals in 2030 (contains 2 subchapters)
- SECAP Implementation Monitoring System (contains 2 subchapters)
- Annexes
  - Annex 1. SECAP Main Table
  - Annex 2. Description of activities
  - Annex 3. Inventory tables
  - Annex 4. International, national, regional and local legal conditions affecting the implementation of SECAP objectives – tables.

In 2022, Krakow also joined the new EU initiative "European Mission 100 Climate-Neutral and Smart Cities by 2030"[34][35]. The aim of this initiative is to support and promote 100 European cities in their systemic transformation towards climate neutrality and to turn them into centres of research and innovation. The research and innovation activities will focus on:

- Sustainable mobility.
- Energy efficiency.
- Revitalization of urban spaces.
- Implementing new methods of involving citizens in the activities carried out.
- Opportunities for building joint initiatives and developing cooperation in synergy with other EU programmes.

Cities participating in the mission will develop **Climate City Contracts (CCCs).** These contracts will outline a comprehensive plan for achieving climate neutrality in the following sectors: energy, buildings, waste management, transport. The Climate City Contract is a governance innovation tool to help cities collaboratively address their barriers to reaching climate neutrality by 2030. The CCC is the documented result of an iterative co-creation process.

The process of developing the Climate City Contracts will involve a wide range of stakeholders, including: citizens, research organizations, businesses, investors, regional and national authorities.

The preparation and implementation of the CCC will enable Krakow's energy transformation to be carried out in a planned, organized, and effective manner. The CCC will be signed by the Mayor of Krakow and those stakeholders who wish to support its provisions, and then adopted by a resolution of the Krakow City Council. The approved CCC's will receive special EU Label, confirming Krakow engagement and attracting funds necessary for the process of energy transformation. It will also influence Krakow Development Strategy and be tool for implementing portfolio of projects "**Zero emission Krakow**".

In **March 2023 Krakow** as one from fifty-three **Pilot Cities** have been invited to embark upon unprecedented climate action, through the NetZeroCities Pilot Cities Programme managed by the Mission Platform of the EU Mission on Climate-Neutral and Smart Cities (EU Cities

[34] https://www.krakow.pl/klimat/269512,artykul,misja_100_miast.html
[35] https://netzerocities.eu/mission-cities/ , https://op.europa.eu/en/publication-detail/-/publication/822ee360-c9bf-11ec-b6f4-01aa75ed71a1/language-en/format-PDF/source-256649647

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Mission). These Pilot Cities are setting the urban climate transition on a new trajectory. They will implement systemic and locally designed innovative actions that span multiple areas, from buildings to waste, and levers of change, including governance, finance and policy. The project will be least two years and during this period, cities will reflect and learn as they go, providing opportunities for other cities to follow in their footsteps, replicating and/or scaling approaches and solutions relevant to their context.

Within the framework of the Cities Mission and NetZero Cities, the **NEEST (NetZero Emission and Environmentally Sustainable Territories)**[36][37] project is being implemented. The NEEST project in which Krakow actively participate encompasses a wide array of measures, including organisational, financial, legislative and social aspects, alongside monitoring systems, evaluation and a strong focus on continuous learning. The project will provide valuable insights for the application of modernisation techniques and innovative technological solutions. Most of the buildings in Poland do not meet energy efficiency standards. Therefore, residential and service buildings require intervention in the first place. These are new challenges need for actions leading to systemic change, social inclusion, innovations in the area of management, financing, citizen community.

There are three major objectives of the NEEST project:

- Buildings/energy efficiency
- Understanding of the barriers/fostering energy transition
- Systemic change + mandate for change.

The activities carried out within the NEEST project will include: creating a knowledge base and tools for managing emission reduction, technical and organizational solutions for building modernization, revitalization schemes for spaces between buildings, exemplary models of engaging the local community, financing models, and policy recommendations at the regional and national levels.

In each city, typical urban quarters have been selected, diverse in terms of building types, with features that allow for replicating solutions in other locations. In the case of Krakow, a quarter encompassing a part of the Złoty Wiek neighbourhood in the Mistrzejowice district has been chosen, representing typical multi-family housing in Krakow's neighbourhoods. Throughout the work, the opinions and needs of residents will be taken into account to improve their quality of life and support the building of local community.

Additionally, Krakow actively participates in shaping policies and solutions conducive to systemic changes, which includes: analysing and developing recommendations for legal changes at the national and local levels, seeking sources of funding (including EU funds), and preparing recommendations for policy changes at the local, regional, and national levels. The actions undertaken by Krakow within the NEEST project will contribute to effectively supporting changes towards energy transformation and greenhouse gas emission reduction, serving as a model or inspiration for other regions and urban agglomerations.

Others strategic objectives set towards the Vision

[36] https://www.krakow.pl/klimat/277418,artykul,projekt_neest.html

[37] https://netzerocities.eu/polands-pilot-activity-neest-netzero-emission-and-environmentally-sustainable-territories/

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The **Krakow Climate Panel** engaged many social groups of the city of Krakow in order to develop common goals for the city to achieve. The Climate Panel finally developed 32 recommendations related to the transformation of the city of Krakow, defining planning and infrastructure goals that are binding for the city authorities to implement. The Krakow Climate Panel was held in 2021 and was dedicated to climate change and climate neutrality of the city. Its participants analysed how the authorities and residents can reduce energy consumption and increase the use of renewable energy. The recommendations cover many areas of the city's functioning. They are often interdisciplinary and cross-sectional, which is why many departments of the Krakow City Hall and city teams and units are involved in their implementation. Their scope and subject matter are diverse, hence each requires an individual approach and planning, as well as securing financial resources for their implementation.

The Atelier project involved the development of long-term visions for the city "**Future City – Krakow in 2050**". The vision of the Future City – Krakow in 2050 – was developed by specialists from various fields and representatives of many stakeholder groups. The process involved representatives of universities, district councils, local government and independent non-governmental organizations. The experience of the European projects EIT Climate-KIC Deep Demonstration Healthy Clean Cities[38], EU Mission 100 Climate-Neutral and Smart Cities by 2030 and ATELIER was used. The concepts developed in European metropolises with ambitious sustainable development plans were also taken into account. The consultations were conducted by project teams and external facilitators.

The climate goals of the city of Krakow are based on strategic city management documents: "**The Krakow Development Strategy. This is where I want to live. Krakow 2030**" and "**The Study of Conditions and Directions of Spatial Development**". They are also based on key city policies on environmental protection and climate change adaptation, such as: "**The Environmental Protection Program for the City of Krakow for the years 2020-2030**" (Program Ochrony Środowiska dla Miasta Krakowa na lata 2020-2030) and "The Krakow City Adaptation Plan to Climate Change by 2030" (Plan Adaptacji Miasta Krakowa do zmian klimatu do roku 2030 (MPA)).

In order to address contemporary development challenges, including systemic barriers to achieving climate neutrality, Krakow is introducing changes to its budget task management system, implementing them using project methodologies, and recently also as project portfolios. The portfolio aims to aggregate pro-climate initiatives (tasks, projects, programs) implemented by the City of Krakow and to manage them efficiently, which will allow the achievement of climate-related strategic goals set out in the "**Krakow Development Strategy. This is where I want to live. Krakow 2030**" (Strategia Rozwoju Krakowa. Tu chcę żyć. Kraków 2030) strategy adopted by Resolution No. XCIV/2449/18 of the Krakow City Council on February 7, 2018. The implementation of the Portfolio will make Krakow a city that develops in a sustainable way, striving for economic prosperity and the health of its inhabitants in harmony with the environment and taking into account the needs of future generations, resistant to extreme weather phenomena, coping with the effects of these phenomena, and economical and friendly to its inhabitants and visitors. The Portfolio Council, a strategic body overseeing the implementation of the portfolio, includes over a dozen directors of key city departments, units and municipal companies. The Portfolio Council makes key decisions for the portfolio during its meetings.

38 https://www.climate-kic.org/programmes/place-based-transformations/healthy-clean-cities/publications/

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11. Action Plan of Matosinhos

Matosinhos placed the Climate Change and Energy Transition subject as a city priority, shaping it in the **Matosinhos 2030 SECAP**. In this document, the Municipality committed to a reduction of at least 40% of its GHG emissions by 2030 (compared to 2009). By 2021, in its annual GHG emissions inventory, the Municipality achieved a 53% reduction in its GHG emissions. By having surpassed the 2030 goal almost a decade in advance, Matosinhos is now heading towards a more ambitious goal: the anticipation of carbon neutrality by 2030.

Framework and Synergies

The update of the SECAP and the idea behind the **Roadmap for Carbon Neutrality Matosinhos 2030**[39] comes as a natural consequence of the positive evolution that the municipality has been going through in terms of climate action and its participation in different national and international initiatives aimed at creating resilient, sustainable and carbon-neutral cities. In this context, it should be highlighted that Matosinhos has a municipal coordination group dealing with energy and decarbonization topics. This group has been constant over time and has had several agents involved since the early implementation stages. These agents are mainly from CEiiA (Centre of Engineering and Product Development), but other stakeholders are involved as well, and the Municipality is closely advised and supported by AdEPorto – the Regional Energy Agency. This group established the basis for the creation of the Smart City Planning Group (SCPG) of the city.

Matosinhos formally began its participation in climate initiatives when it signed the Covenant of Mayors in 2010, strengthening this link in 2015 with the adhesion to the Global Covenant of Mayors for Climate. This political commitment leveraged some projects such as the requalification of the banks of the water lines of the Leça River known as the "Leça Green Corridor" with 7 km of bike path and pedestrian paths, as well as the "ClimACT" Project[40] with action in the transition to a low carbon economy in schools. This ambition was also boosted by the EU Mission for 100 Climate-Neutral and Smart Cities by 2030, which emerged at the end of 2021, an initiative in which the Municipality showed interest in participating and is now part of the Twinning programme, paired with Diron Pilot city in its Pilot “FAASST-NZ: Facilitate trAnsition Actions maSSification Towards Net Zero”[41].

Participation in innovation programmes together with other cities is a key part of this effort. Besides participation in the ATELIER project, which complements the actions started in 2018 at the Living Lab in Matosinhos (providing a space of experimentation and innovation in the city), Matosinhos currently participates in the "ProLight – Progressive Lighthouse Districts“ Project[42], funded under the Horizon Europe program, through the Porto Energy Agency (AdEPorto). This initiative aims to explore the potential of citizen engagement in the transition to greener and more sustainable societies and economies through the implementation of six demonstrators in Europe. One of the demonstrators will take place in the Carcavelos social house neighbourhood, in Matosinhos. It is in this area that, with the support of ProLight, a renewable energy community will be implemented, associated with both demand management

[39] https://www.cm-matosinhos.pt/servicos-municipais/ambiente/neutralidade-carbonica-2030
[40] https://www.climact.net/
[41] https://netzerocities.eu/dijons-pilot-city-activity-faasst-nz-facilitate-transition-actions-massification-towards-net-zero/
[42] https://cordis.europa.eu/project/id/101079902

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and storage solutions for electricity and mobility solutions. The involvement of the municipality in such projects not only provides an innovative framework for the implementation of technological and social solutions towards decarbonization but also allows for specialized technical support. For example, in the case of ATELIER, ENERKAD and LEAP simulations performed regarding the master scenario were decisive in diagnosing the key steps for city vision creation, providing the needed information and data to support decision-making processes and prioritising strategic action within the scope of Matosinhos energy development plan. The conclusions from those simulations have been crucial in supporting both PED's implementation planning and integrated solutions feeding into the development of the **Carbon Neutrality Roadmap.**

Matosinhos also participates in the Climate Change Adaptation Mission, having signed the Mission Charter, thus committing to fight for climate resilience by 2030, and boosting efforts to achieve its adaptation goals. To directly support citizens to implement energy efficiency measures in their homes and improve their living conditions, Matosinhos has been providing, since November 2022, a digital and physical one-stop-shop called **Matosinhos Energy Hub**[43]. This desk, developed within the scope of the Porto Energy ElevatoR (PEER) project[44], funded by the Horizon 2020 programme and coordinated by the Porto Energy Agency, includes advice on energy efficiency and renewable energy solutions, applicable legislation, identification of opportunities and support for funding applications.

Matosinhos has been developing other strategies with a strong impact on decarbonization. In addition to these participations, Matosinhos has been developing other strategies with a strong impact on decarbonization. As an example, the Biodiversity, Ecosystems & Natural Capital Strategy was presented on 30 October, inspired by the Sustainable Development Goals of the 2030 Agenda - "**Life on Land**" and "**Life Below Water**". This Strategy is part of the European Union's Biodiversity Strategy for 2030[45] and the Green City Accord[46] movement, which Matosinhos signed two years ago. This document aims to design strategies to protect nature and reverse the process of ecosystem degradation, putting Europe's biodiversity on a recovery path by 2030. Also noteworthy is the development of the Municipal Ecological Structure (EEM), the Municipal Green Structure (EVM), the Matosinhos Proximity Charter (CPM) and the Municipal Housing Charter (CMH). These are just some of the work fronts of the Planning Division that advocate the alignment of the municipality with the goals of the updated SECAP.

More recently, Matosinhos also collaborated with the National Council for Environment and Sustainable Development (CNADS)[47] on the local SDG Project, which contributes to the establishment of partnerships and cooperates in the collection, sharing and dissemination of relevant information related to the SDG Indicators (Sustainable Development Goals). Through an online platform, the local SDG project makes it possible to disseminate and visualize what is being done throughout the municipality of Matosinhos to achieve the 17 SDGs proposed by the United Nations.

The convergence of all these projects, as well as the measures (under implementation and to be implemented) set out in this Roadmap, as well as their holistic integration, is based on the

[43] https://matosinhosenergyhub.pt/, https://www.cm-matosinhos.pt/servicos-municipais/ambiente/matosinhos-energy-hub
[44] https://cordis.europa.eu/project/id/101033708
[45] https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en
[46] https://environment.ec.europa.eu/topics/urban-environment/green-city-accord_en
[47] https://www.cnads.pt/en/

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search to ensure a collective and participatory development of the territory, based on innovative, inclusive and intelligent solutions.

Stakeholder Engagement and Innovation Atelier Kick-off event

Early in the process of planning for the necessary transition, the city recognised that carbon neutrality can only be achieved with the action of all parties involved, regardless of their dimension or previous action towards sustainability. Therefore, local stakeholders have been involved in the common goal of city decarbonization by 2030. For this purpose, the city developed the **"2030 Matosinhos Carbon Neutrality"** initiative, publicly announced in November 2022 which establishes the goal of reducing carbon emissions by 85% by 2030. This initiative, which will remain active, intends to embody municipal objectives through the creation of an organised and multifaceted structure that aims, on the one hand, to think about the city's strategy in an integrated way, analyse the different activities underway and, on the other, to promote greater proximity with local actors. In that sense and with the specific purpose of developing the early design of the plan, a set of collaborative sessions involving strategic stakeholders was rolled-out.

The various participatory actions included a working session in January 2023, which involved different levels of governance in the municipality, including some of the city departments working on the subject, parishes, municipal companies, as well as local services. This session was particularly important in the sense that, not only marked the starting point of the stakeholders' engagement but was also key in terms of the outputs regarding measures and actions to be implemented being suggested by the participants through a series of thematic group discussions. The second action, in May 2023, aimed to involve the younger population (secondary schools and university students) namely regarding innovative pathways for achieving carbon neutrality by 2030. Results from these sessions were central for developing the preliminary calculations regarding the discussed measures and actions. Finally, integrated into this engagement effort and under the scope of the kick-off of the Innovation Atelier initiative (more detailed reported in D3.8 "PED Innovation Ateliers in the Fellow Cities") in Matosinhos, a third session was realized in November 2023. In this session, several industry stakeholders were involved in the discussion in the form of focus groups, where the preliminary results were discussed and analysed.

Notably, Matosinhos is developing the first **Citizenship for Climate Transition Laboratory** in Portugal, in partnership with the University of Aveiro. This initiative consists of a collaborative space, open to all citizens, with the participation of experts in the field and where prototypes of solutions will be tested, through the implementation of low-cost measures and quick visibility.

Strategic establishment of the Action Plan

An established emissions inventory was used as a base for defining initial goals and reduction objectives. This approach was also useful to understand the size of the challenge, the areas with the highest potential to tackle the problem and the historical trends. A very important point addressed was the consideration of the natural evolution of the socio-economic conditions of the country and the territory, as well as the foreseen transformation of the electrical production, transport and distribution systems, taking into account what is projected in two important national strategic documents – the National Energy and Climate Plan 2030 (PNEC2030) and

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the Roadmap for Carbon Neutrality of Portugal 2050 (RNC2050). Combined with an expected decarbonisation of the production system, and despite the economic growth and increase in demand, an increase in efficiency is foreseen, allowing a consumption reduction of final energy of 25% to 28% compared to 2015.

To comply with the most recent national legislation – Climate Basic Law (Lei de Bases do Clima), the city should demonstrate the reduction of emissions by at least, 55% by 2030, between 65% and 75% by 2040 and 90% by 2050 compared to 2005. The initiative embraced by the municipality of Matosinhos is far more ambitious since it aims at achieving carbon neutrality by 2030 (a reduction of 85% by 2030 compared to 2009). The updated plan for the decarbonization of the city considers these two pathways. By consolidating diverse plans within a unified document, redundancy of effort and document ambiguity are mitigated, while effective coordination of actions and synergy exploitation across various initiatives are facilitated. Matosinhos holds the conviction that an integrated document enhances communication and comprehension of proposed measures among diverse stakeholders, encompassing municipal authorities, the community, and other local actors.

The selection of actions to be implemented was based on the measures outlined in the previous Matosinhos Sustainable Energy Action Plan (SECAP) – 27% of the measures included in this plan (18 out of a total of 67) draw inspiration from the measures listed and have been reinforced – and grounded in the areas of greatest direct action by local authorities. For this exercise, besides the stakeholder engagement sessions previously presented, various meetings were convened and a consultation with the municipal structure was conducted to gather and characterize information regarding projects implemented, ongoing, and in the pipeline for the horizons of 2030, 2040, and 2050. National and international best practices were also considered, as well as mitigation strategies outlined in the National Energy and Climate Plan 2030 (PNEC) and the National Carbon Neutrality Roadmap 2050 (RNC), aiming for an integrated vision of the effects and co-benefits of the different measures and their (positive) impact on other actions, since the quantification of the impact of measures takes into account their integrated effect, not just their effect as individual measures.

Apart from the measures inspired by the previous plans, complementary measures include the following sectors:

- **Energy** – encompassing all measures focused on energy efficiency in resource utilisation as well as initiatives promoting the production or use of energy from renewable sources;
- **Transportation** – including all measures that contemplate and influence the mobility within the municipality;
- **Waste** – taking into account all actions associated with the production and management of solid waste and wastewater generated within the municipality and treated within and/or beyond the geographical boundaries of Matosinhos;
- **Industrial Processes**;
- **Land Use** – including agricultural activity;
- **Carbon Sequestration Capacity**.

The choice of mitigation measures considered in the roadmap was based on a preliminary identification of the sectors with higher consumption levels, the potential for reduction and the vision of the municipality informed by the local stakeholders on how the territory should evolve in terms of energy and emissions. It also considers ongoing activities and measures, namely regarding the municipal building stock renovation, the replacement of public lighting, the electrification of the municipal fleet, the installation of electric vehicle chargers, the creation of a one-stop-shop to advice on home renovation and renewable energy production, the

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promotion of electric mobility and the incentivisation of the use of public transport, among others.

These measures were grouped by lines of action, which correspond to the main sectors where there was the greatest reduction potential. In this way, a special focus was placed on the identification of measures at the level of Stationary Energy - largely due to the set of subsectors it aggregates; Transport – due to the strong use of fossil fuels, and Industry and Industrial Processes. However, measures for the remaining sectors were also foreseen in an attempt to look at the territory as a whole.

In the following Table 13, the mitigation measures included in the Climate Neutrality Roadmap of Matosinhos in the different clusters are depicted.

Table 13. Mitigation measures of the Matosinhos Climate Neutrality Roadmap per Cluster

 **Efficient Matosinhos**	• **Energy efficiency in municipal buildings:** Renovation of social housing stock and public buildings. • **Energy efficiency in residential buildings**: Renovation of the residential building stock; replacement of electrical equipment, lighting, DHW and air conditioning systems. • **Energy efficiency in commercial buildings**: Replacement of equipment (electrical, DHW and air conditioning) and lighting; Renovation of the building stock allocated to the tertiary sector. • **Street lighting**: Eco.AP Procedure for replacing 20,000 luminaires with LED technology
 **Solar Matosinhos**	• Installation of photovoltaic capacity in **institutional buildings**, including municipal **social housing**. • Installation of photovoltaic capacity in **industrial facilities** and buildings intended for commercial activity. • Installation of photovoltaic capacity in **residential buildings**, water treatment plants and agricultural facilities. • Support for the creation of **Renewable Energy Communities** and **Positive Energy Districts (PEDs).** • Incorporation of solar thermal technology in residential and commercial buildings for the production of **hot water** (DHW).
 **Sustainable industry Matosinhos**	• Energy Efficiency in **industrial facilities and processes** (replacement of motors, control losses mechanisms, intervention in ventilation systems and electronic speed variators) • Incorporation of **biofuels in industrial processes**, replacing conventional fossil fuels, as well as new energy carriers, such as green hydrogen, in addition to natural gas. • Elimination of the use of heavy synthetic chemicals.
 **Green and waste-free Matosinhos**	• Reduction of **solid waste** production at source by 50%. • 50% increase in the **organic waste collection** rate. • Increased the amount of **waste recycled** by 50%. • Increased energy efficiency of the **wastewater treatment** process. • Expansion of **green infrastructure** in the city and the municipal forest area. • Increased energy efficiency in **agricultural facilities** (lighting, pumping systems, etc.). • Optimization of **biological processes**. • Renovation of agricultural machinery.

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 **Mobile Matosinhos**	• Transfer of pkm from private individual transport to **Metro** • Transfer of pkm from private individual transport to **Soft Modes**: Promotion and reinforcement of soft and shared modes infrastructure and platforms. • Transfer of pkm from private individual transport to **bus**: Electrification and incorporation of green hydrogen in the fleet of buses serving the Municipality • Promotion of **light mobility**, electric road transport, private and public • Electrification and decarbonisation (hydrogen incorporation) of heavy goods transport • Creation of **Low Emission Zones**

The concept of **Positive Energy Districts** is underlined in several of the measures indicated in the roadmap since PED's are considered to be a key instrument for introducing new technological solutions and integrating existing ones towards the challenges of energy transition and energy poverty in the territory:

a) PEDs can incorporate renewable energy production systems such as solar panels, hydroelectric systems, and other clean energy technologies, reducing carbon emissions. It is foreseen the installation of 100 MWp of photovoltaic capacity in commercial buildings per decade until 2050, of which around 1200kWp will be installed in municipal infrastructures.

b) PEDs prioritize energy efficiency through the integration of renewable energy sources, energy-efficient technologies, and sustainable design principles. It is foreseen the installation of 490 kWp of photovoltaic capacity in social housing neighbourhoods, a deep renovation programme of the overall 674 dwellings in the existing social municipal buildings and the replacement of large electrical equipment by others with greater efficiency (energy class A+ or higher) in all municipal dwellings with potential savings of 14.2 GWh, are some of the measures that will contribute to a more environmentally friendly and resource-efficient urban development.

c) Smart grids are often implemented in PEDs to optimize energy distribution and consumption. It is expected to broadly install smart electricity and natural gas metering infrastructures with the aim of informing consumers, in real-time, about usage patterns and inducing effective behavioural changes and at the same time unlock mechanisms to enable efficient management of energy resources, that can support the integration of decentralized energy sources, and enhance overall energy resilience.

d) PEDs often involve innovative urban planning and design that prioritize walkability, green spaces, and sustainable architecture. This approach creates a more liveable and attractive urban environment for residents.

e) PEDs emphasize community engagement in the planning and development process. Inclusivity and participation from local residents contribute to a sense of ownership and well-being, fostering a strong community fabric.

f) PEDs have an important role in finding effective communication channels to promote good practices in energy use. consumption patterns and the adoption of more rational behaviours in energy consumption. This strategy can be developed through initiatives promoted at the school level, but also among the general population through cultural events, educational programs, and public awareness campaigns.

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Overall, the development of Matosinhos Positive Energy District in the context of the ATELIER project shall serve as an experimental case of developing distributed renewable energy generation and addressing energy poverty by promoting clean energy technologies, fostering community engagement and ensuring the equitable distribution of benefits. As models for sustainable urban development, Matosinhos aims to demonstrate how innovative and community-driven approaches can positively impact both the environment and the well-being of residents/citizens.

Follow-up and monitoring

Given the need to involve a wide variety of actors in its implementation and the priority of building a strategic approach to guide and encourage multilevel and integrated governance capable of responding effectively and efficiently to the challenges of the energy transition, the management function is the responsibility of the municipality. As the entity responsible for the preparation and execution of the Roadmap and for the regular articulation with other public administration bodies, the municipality will be responsible for a) Leading the implementation of the priority measures and other actions recommended in the Plan that fall within its responsibilities and attributions; b) Ensure regular monitoring of the plan implementation, sharing relevant information and encouraging consultation between actors; c) Carry out the process of monitoring and evaluating the Plan; d) Promote institutional communication actions (dissemination and articulation) and participatory communication (involvement and awareness). The management by the municipality will be accompanied by the Smart City Planning Group, constituted by several entities, as previously explained, which will also be responsible for its promotion, follow-up and monitoring.

Given the demanding goals set and the short time horizon for their implementation, action is urgent and monitoring progress is essential as a way to assess the effectiveness of the process. The definition of the monitoring model includes the evaluation, revision and possible introduction of new measures that may appear to be useful. This monitoring, namely that about spatial planning, urban planning and management, is planned to be based on a multi-scalar, transdisciplinary and interdependent approach duly supported by data from and for the municipality. Also, in terms of transport, energy efficiency, circular economy, urban metabolism, decarbonisation of built environments, new ways of inhabiting the urban environment, and afforestation of urban spaces, among others, access to data that allow a characterisation of social, and environmental and economic impacts is preponderant. In this way, the sensorisation of the energy systems spread throughout the territory is relevant in the pursuit and monitoring of the effect of the proposed measures.

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12. Action Plan of Riga

Strategic Objectives

In 2022, the City of Riga was selected as one of the participants of the EU Cities Mission initiative "100 Climate-Neutral and Smart Cities by 2030" and subsequently, in 2023 the city launched the elaboration of its Climate City Contract (CCC), more information provided in ATELIER D2.6.

Considering that Riga City Municipality had already developed and approved the "Sustainable Energy and Climate Action Plan 2022-2030" (further – Riga SECAP 2030), an ambitious, goal-oriented, integrated policy framework for a smart urban decarbonisation transition, inspired by the *Cities4ZERO* methodology, applied in ATELIER, **Riga CCC is taking forward the transition path defined by Riga SECAP 2030**, however, the boundaries and emission calculation methodology were expanded by including waste and wastewater management, forestry and urban greening sectors.

Also, the goals defined by Riga SECAP 2030 were updated, based on the objectives of Riga Master Scenario developed within the ATELIER project. **The new, updated goal is to achieve a 53% reduction in CO_2 emissions compared to 2019, which simultaneously means reducing CO_2 emissions in the city by 80% compared to 1990** and achieving climate-neutrality in the municipal infrastructure. In addition, with the help of forest areas of Riga city, it is planned to ensure constant capture of CO_2 until 2030 – approximately 300 $ktCO_2$/year. This will result in a 16% reduction in CO_2 emissions from the total emissions of 2019.

Stakeholder Engagement

During the summer 2023 the City of Riga organized a marketing campaign and received applications from 72 external stakeholders – institutions willing to collaborate with the City of Riga on its CCC development. In result, the Smart City Planning Group (SCPG), established within the ATELIER project in 2020 for the purpose of "Bold City Vision 2050" co-development, was considerably enlarged involving in SCPG's work also the stakeholders from National government institutions, research, academia and private sector, e.g., industry, energy producers and suppliers, financial institutions, businesses situated in Riga, innovation think-tanks, NGOs and many other stakeholders who expressed their will to take part in Riga CCC development.

Riga CCC was elaborated during June 2023 – March 2024, applying highly participatory planning approach (see also ATELIER D2.6) and currently is ongoing the public hearings and approval phase. Sectorial co-creation workshops and expert working groups were held with the involvement of municipal institutions and relevant local stakeholders from the enlarged SCPG. Through such participatory process, **over 200 stakeholders were involved** in co-creation of pathways and actions within each CCC sector, addressing the following sectors:

- Energy production
- Multi-apartment residential buildings
- Municipal Infrastructure
- Transport & Mobility
- Urban Greening & Forestry
- Waste & Circular Economy

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Figure 13: Co-creation Workshops in Riga, December 2023

Definition of Pathways and Portfolios of Actions

Being aware of the gap between the current policies outlined in Riga SECAP 2030 and what is needed to achieve the goals of transition towards climate-neutrality, through facilitated brainstorms held at focus groups' meetings, sectorial experts defined strategic climate-neutrality pathways and agreed on the following potential portfolios of actions towards radical emission reductions in each of CCC sectors:

Energy production:

- E1: Promotion of RES in DH
- E2: Connecting new customers to DHN of Riga
- E3: Increasing the efficiency of heat energy production and management, fostering digitization of the heat supply system
- E4: Gradual transition to the 4th generation DH
- E5: Deployment of innovations in energy production sector
- E6: Promoting and prioritising the use of RES in decentralized heat supply
- E7: Promoting the use of RES in the production of electricity

Multi-apartment residential buildings:

- Dz1: Improving the availability of information and data on the energy efficiency of multi-apartment buildings
- Dz2: Revision of regulatory framework for increasing the pace of renovation of multi-apartment buildings in Riga
- Dz3: Involvement of residents in energy renovation of multi-apartment buildings
- Dz4: Establishment of the "Riga Energy Efficiency Fund" – a municipal funding scheme to support energy retrofits and RES integration
- Dz5: Research and implementation of new standardized solutions for building renovation, reducing building renovation costs

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Municipal infrastructure:

- P1: Continuous improvement of the energy management system
- P2: 100% renewable thermal energy in municipal buildings
- P3: 100% renewable electricity in municipal buildings
- P4: Development of the municipal building renovation plan until 2030 and systematic renovation of buildings
- P5: Modernization of street lighting by concluding energy efficiency service contracts
- P6: Installation of street lighting in areas not yet illuminated
- P7: 100% renewable electricity for powering streetlights, traffic lights and urban clocks
- P8: Establishment of a data accounting system for the municipal vehicle fleet and increasing the efficiency of vehicle use
- P9: Promotion of the use of public transport for among employees of the Riga City Municipality
- P10: Transition to low-emission/zero-emission vehicles in municipal enterprises and municipal institutions

Transport & Mobility

- T1: Urban planning aimed to create a city whose residents and visitors are less dependent on private cars
- T2: Measures to promote remote work and increase the availability of e-services
- T3: Promotion of an active lifestyle and the use of bicycles
- T4: Increasing the proportion of passenger trips made by public transport on a daily basis
- T5: Restrictions on private transport
- T6: Other measures to reduce the use of cars
- T7: Promotion of the use of RES technologies in private transport and service provision
- T8: Gradual transition of vehicles providing municipal functions to clean technologies
- T9: Collection of mobility data and monitoring of implemented measures

Urban Greening & Forestry

- ZM1: Purposeful creation of continuous forest coverage, sustainable selection of planting material for forestry surrounding Riga
- ZM2: Development of research and innovation, promotion of CO_2 sequestration in the urban environment
- ZM3: Sharing knowledge about new forest management methods
- ZM4: Develop and improve the data accounting system and emissions calculation
- ZM5: Compliance with the conditions of forest certification regarding the limitations of the long-term afforested area
- ZM6: Improving the assessment of the forestry risks by evaluating the risks and opportunities of forest stand development
- ZM7: Study of recultivation of developed peat bogs and other management options of these areas and implementation of measures
- ZM8: Greening of the city of Riga

Waste & Circular Economy

- A1: Develop and improve the data accounting system and waste management infrastructure mapping

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- A2: Prevention of waste generation
- A3: Improving the volume and quality of household waste sorting
- A4: Development of infrastructure for separate collection of waste
- A5: Waste recovery, measures promoting it
- A6: Sustainable waste disposal
- A7: Informing, educating, raising awareness of waste generation

Refining Pathways and Planning Actions

Further, the City of Riga launched a round of facilitated co-creation workshops addressing all CCC sectors through sectorial workshops held for each CCC sector. These workshops focused on identifying and detailing specific measures for each portfolio of actions, as well as assessing how these measures contribute to reach net zero. Local experts from each CCC sector presented top-down needs for the sector and during each sectorial session, top-down and bottom-up approaches were reconciliated.

In order to achieve climate-neutrality, the following **horizontal aspects** were taken into account and **integrated in the CCC planning & implementation process**:

- **Stakeholder Involvement**: in order to maximise involvement of various stakeholders in the implementation of the identified CCC measures and in the planning of new CCC measures, responsible institutions of each CCC sector have identified and have committed to involve the key stakeholders in the implementation of CCC measures.
- **Social Innovation**: maximise opportunities, such as support for the creation of Innovation think-tanks/incubators will be further evaluated/developed; strengthening cooperation with research institutions; establishment of climate innovation funds; new educational programs; regular networking events, etc.

In order to ensure the effective and transparent implementation of the agreed portfolios of actions and proposed measures to be included in the Riga CCC Action plan, detailed organizational charts have been prepared for each CCC sector, taking into account the main stakeholders involved in the implementation of proposed measures and their interactions.

In order to achieve the goals of climate-neutrality, the City of Riga will place the greatest emphasis on the above-described 6 main CCC sectors in the future. Their interaction and impact are visually represented in Figure 13 below.

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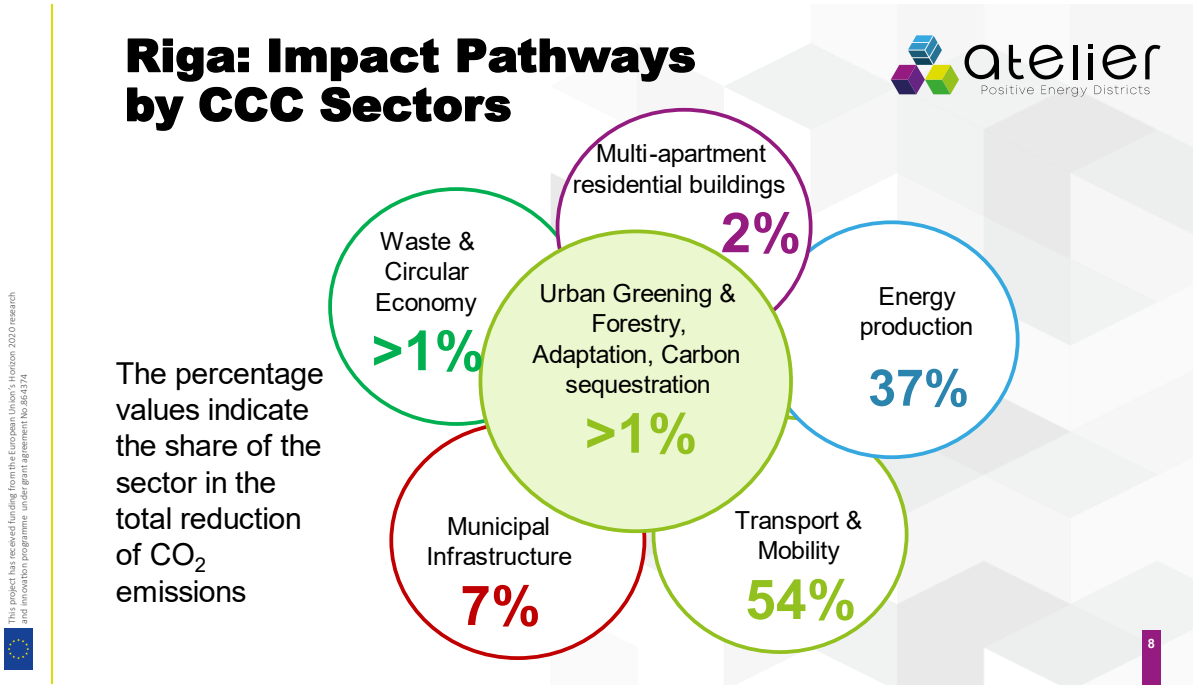

Figure 14: Impact Pathways by CCC sectors

13. Conclusions

WP2 successfully developed a 2050 City Vision for ATELIER cities using the Cities4ZERO methodology, engaging stakeholders and aligning strategic plans with the City Vision. The present report D2.8 focused on presenting innovative ideas for developing or updating SECAPs and other Climate Action Plans in the cities, showcasing collaborative action planning processes.

The report emphasises the alignment of local, national and European policies with climate global targets, such as those from the Paris Agreement. At the European level, the ambitious targets have been set to achieve climate neutrality by 2050, with intermediate goals for 2030. National Energy and Climate Plans (NECPs) provide a framework for countries to meet these targets, while cities develop their own visions and plans, often supported by initiatives like the Covenant of Mayors and the EU Cities Mission. ATELIER cities have leveraged these frameworks, as well as the ATELIER activities and technical support from transversal partners, to develop coherent and achievable objectives, as outline in their City Vision and subsequent Action Plans.

The report highlights each city's unique experience and demonstrates the flexibility of integrating their vision into existing plans and initiatives. Examples from Amsterdam, Bilbao and Bratislava emphasise collaboration, strategic objectives and resilience-building measures in climate action planning. Similarly, the cities of Budapest, Copenhagen, Krakow, Matosinhos and Riga showcase proactive efforts, stakeholder engagement and sector-specific strategies in their pursuit of climate neutrality through action planning. These examples highlight the significance of collaborative efforts and strategic planning in urban and energy transformation aligned with ambitious climate goals. Additionally, the action plans illustrate the diverse approaches and innovative measures undertaken by each city, emphasising the importance of stakeholder engagement, strategic planning and transparent implementation processes in achieving climate targets and fostering sustainable urban development.

The relevance of Positive Energy Districts is also highlighted, as pivotal strategies within cities' action plans for climate targets and sustainable urban development, leveraging energy efficiency and production to reduce greenhouse gas emissions. While not always explicitly mentioned, PED principles are integrated into cities' frameworks, tailored to local conditions and sustainability goals. Embedding PEDs into municipal policies facilitates collaboration and knowledge-sharing, addressing technical and socio-political challenges. Overcoming regularity and economic barriers requires community involvement and innovative financing models. PEDs offer scalable solutions for sustainable urban development, promoting energy independence and resilience. Community engagement remains central, fostering innovation and collaboration. As integral components of pathways towards climate neutrality, PEDs exemplify cities' commitment to sustainable urban environments.

Action Plans in ATELIER are rooted in the master scenarios strategically developed to achieve each city's vision. These plans translate strategic goals into tangible actions and implementations aimed at achieving climate neutrality. Cities will continuously update and refine their visions and action plans, integrating new learnings to enhance and promote their sustainability goals.

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