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INTEGRATED ACTION PLAN (IAP) CITY OF ZADAR

Zero Carbon Cities

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Content

Part 1 – Context & Process

1 Introduction

The Zero Carbon Cities Action Planning Network will support partner cities to establish science-based carbon reduction targets, policies and action plans, including governance and capacity building to enable them to contribute to the successful implementation of the Paris Agreement and the EU's strategic vision for carbon neutrality by 2050. City of Zadar together with other partners Manchester (Lead), Frankfurt, Tartu, Bistrita, Modena and Vilvoorde joined to the Zero Carbon Cities Action Planning Network to contribute strategic vision for carbon neutrality by 2050.

This Integration Action Plan (IAP) is developed within Zero Carbon Cities project activities which is co-financed by the European programme "URBACT III" – Call for Proposal "Action Planning Networks". IAP promotes and encourages the achievement of zero climate neutrality targets and the testing of Small Scale Action. This document consists of 2 parts – Part 1 Context & Process (baseline introduction of the city, focus of the IAP and description of ZCC activities and Urban Local Group activities) and Part 2 Action Plan (objectives, Small Scale Action description, resourcing, framework and delivery, risk analysis, lessons learnt and next steps). IAP is based on the learning derived from participation in the Urbact Zero Carbon Cities project, the transnational study visits, the capacity building events, and the work of the Zadar's ULG in analysing the local context and defining future objectives.

Within Zero Carbon Cities project as a Small Scale Action City of Zadar installed Air Quality Monitoring Device that measure air quality parameters as well as temperature, air pressure and humidity. By this device the City of Zadar will receive the results of air quality measuring in the Peninsula (center) at the frequent position that is the busiest during the tourist season, and based on all these results the City of Zadar will be able to make decisions to prevent more air pollution. Furthermore, City of Zadar is considering implementation of Solar roof`s web platform (solar potential map) with aim to facilitate citizens to make decisions to start energy renovation with PV system installation.

City of Zadar has a goal to achieve greener and more sustainable town with a high quality of life for its citizens and visitors.

2 City context & definition of the initial policy challenge

ABOUT THE CITY

The city of Zadar (Figure 1) is the administrative, economic and tourist center of Zadar County and the wider area of northern Dalmatia. The administrative area of the City of Zadar includes 15 settlements on a total area of 194.02 km^2. According to the last census from 2021, in the area of City of Zadar live 70,829 inhabitants in 26,713 households, making Zadar the fifth largest city in Croatia.

Figure 1 City of Zadar[1]

Due to its geographical position, equally distant from the northernmost and southernmost point of the Adriatic, Zadar has a comparative advantage over other cities in the Adriatic region due to good transport links with all modes of transport (road, sea, air), which is a very important prerequisite for economic development and tourism. The structure of the economy of Zadar County according to the total income, along with other activities, predominantly consists of: trade, processing industry, tourism, fishing and mariculture, and shipping. Zadar is home to the largest shipping company, which (with its subsidiary) accounts for 40% of the country's merchant fleet capacity, which strongly affects the success of the county's economy as a whole and the living standards of seafarers' families.

According to data from 2021, there are a total of 3,605 unemployed persons of which 56 % are women.[2]

POLICY

On May 28, 2012, the City of Zadar joined one of the most successful initiatives of the European Commission, the Covenant of Mayors. In this way, the City of Zadar formalized its sustainable development policy, which it began to implement through a series of activities. even before the signing of the Covenant of Mayors. In such a way, Zadar is trying to confirm its position as a leader in sustainable development in Dalmatia. Sustainable Energy Action Plan (SEAP) was developed in 2014.

[1]Source:https://scandinaviantraveler.com/en/places/7-sights-you-must-explore-this-summer-in-zadar-in-croatia

[2] Source : https://newbeta.hzz.hr/media/7764/hzz-pu-zadar-mjesecni-statisticki-bilten-1-2021.pdf

According to the monitoring report done in 2018 Zadar reached 19% CO_2 reduction, based on data from 2017. Zadar signed Covenant of Mayors for Climate and Energy in 2019 and developed the Sustainable Energy and Climate Action Plan (SECAP) in 2021.

In 2010, the most carbon intensive sectors were: the building sector with 57%, the transport sector with 42% and the public lighting with only 1%. In 2017, the local CO_2 emissions were summing up to 200.000 tons, showing a 19% reduction (47,214 tons CO_2) between 2010 and 2017. This was mainly due to switching energy supply in buildings from fuel oil to gas and to the use of new more energy efficient cars.

The City of Zadar is constantly actively striving and participating in achieving the highest possible energy efficiency through the development and implementation of various strategic documents. The most important strategic documents developed by the City are the Sustainable Energy (and Climate) Action Plan (SEAP and SECAP), annual energy efficiency plans of the City of Zadar, Regional Action Plan of the city of Zadar (RAP), Local Action Plan for sustainable mobility (LAP), the Energy Efficiency Program in urban transport in the City of Zadar and the Study of Sustainable Urban Logistics on the Zadar Peninsula (SULP).

IMPLEMENTED PROJECTS

City of Zadar implemented EE and climate projects such:

Systematic Energy Management in Cities and Counties in Croatia (SEM project) which main goal was to create local expert capacities and implement process of continuous and systematic energy management, to introduce strategic energy planning and sustainable energy and other resource management at the local and regional level throughout Croatia.

Co-Financing of Energy Renovation of Family Houses within City of Zadar together with the National Environmental Protection and Energy Efficiency Fund co-financed 138 family houses and 158 measures in the period from 2010 to 2020 in a total amount of 405,902 euros.

Reconstruction of the Existing Heating System in the System with Natural Gas in the Headquarter ''Petrići'' within City of Zadar together with the National Environmental Protection and Energy Efficiency Fund co-financed reconstruction of boiler room for the use of natural gas as an energy source for heating in the headquarter Petrići that used heavy fuel oil for heating. Headquarter ''Petrići'' includes 11 residential buildings with a total of 439 flats with 1,500 people. Total amount of co-financing was 56,070.13 euros.

Co-Financing of Energy Audits Implementation and Energy Certifications and Preparation of Project Documentation for the Energy Efficiency Increasing Projects in Residential Buildings within City of Zadar co-financed energy audits implementation and energy certifications as well as the energy renovation project documentation for residential buildings in a total amount of 29,600 euros.

Using the Solar System and Natural Gas into a Single System for Preparing of Domestic Hot Water for the Sport Recreational Center Višnjik were 96 vacuum tube collectors have been installed on the roof of the swimming pool for hot water preparation and existing boiler room was reconstructed to use natural gas as an energy source for heating**.** Total value of the project was 360,804.71 euros and it was co-financed by National Environmental Protection and Energy Efficiency Fund in the amount of 116,708.32 euros.

Energy Renovation of Primary School Smiljevac in Zadar - the aim of the project was a reduction of energy consumption in the building, contribution to the use of natural gas as a source of energy and reduction of CO_2 emissions in the Zadar area.

EnerMO project aimed to identify sites for the exploitation of the energy of the sea on the outer line of the islands which administrative belong to the City of Zadar**.**

EU CITIES ADAPT PROJECT - Adaptation Strategies for European Cities - aim of this project were to provide capacity building and assistance for cities in developing and implementing an adaptation strategy, and technical support to DG CLIMA on the state of play of urban adaptation.

PRO-E-BIKE project aimed at promoting electric bicycles and scooters in the field of delivery and passenger transport in urban areas.

ENPCOM project aimed to create a network of local governments, citizens, industry organizations and associations aimed at strengthening the involvement of European citizens in the fight against climate change.

FIESTA project aimed to save energy in households with children by changing their behavior in a way to use their heating and cooling systems more effectively as well as by supporting and guiding them to purchase more energy efficient products.

CB-GREEN project with overall objective: To protect and preserve the environment and encourage the sustainable use of natural resources in border regions of Zadar County and Herzegovina-Neretva Canton through joint actions and awareness rising campaigns on energy efficiency and renewable energy system utilization in public sector.

CitiZEN project which main focus point was the sustainable mobility in European cities. The project tackled the development and update of the local Sustainable Urban Mobility Plans by the local authorities (LAs) as well as implementation of specific actions, such as: promotion of cycling, car sharing, sustainable mobility in schools (walking buses, awareness campaigns), family contests, public events (e.g. energy days/fairs, European mobility week) allowing citizens to learn about local, national and European experiences in terms of products and services related to sustainable mobility.

Compete4SECAPs project supported the preparation of Zadar's SECAP. Project aimed at helping local authorities put their existing Sustainable Energy Action Plans (SEAPs) into action. The project promoted the adoption of standardized energy management systems in municipalities through the coordination of national competitions and peer-to-peer exchanges which steered the attention and involvement of local to national authorities. The project also helped facilitate the upgrade of SEAPs into Sustainable Energy and Climate Action Plans (SECAPs), as per new planning approaches promoted by the Covenant of Mayors.

The INTENSIFY INTERREG project is focusing on carbon reduction through intense community engagement. This project is currently running and should be linked to the implementation of the URBACT ZCC project.

The EmpowerMed project is concentrating on the mapping of the local energy poverty situation and on empowering vulnerable households, specifically women.

Development of a traffic masterplan for the functional region of North Dalmatia, project implementation period: 01.02.2017. - 30.09.2018. The purpose of developing a transport masterplan for the functional region of North Dalmatia was to enable efficient and sustainable transport development of the region in accordance with European and national strategies and plans. The

transport masterplan of the functional region of North Dalmatia will be the basic strategic document for the long-term development of transport in the mentioned area. The aforementioned masterplan will be a strategic document that will define future interventions in transport and transport infrastructure in the functional region of North Dalmatia, and increase the level of preparedness and the possibility of financing projects from EU funds in the field of transport. The study includes a plan of measures by 2040, which is essential for the development of SUMP.

City of Zadar also implemented bike and electrical scooter sharing system and installed charging stations for electric vehicles.

In 2019 the city bought 28 new buses and has currently 4 charging points for electric cars, 7 bike-sharing points (electric and non-electric), and 8 e-scooters-sharing stations. The national Environmental Protection and Energy Efficiency Fund is co-financing the charging point installation and grants EUR 10,000 per households for buying an electric car. The municipality is actively encouraging citizens and is providing information to households to obtain the grants for electric cars, bikes and scooters and also to use more ecologically means of transport.

3 Focus of the IAP

According to the European Statistical Office (EUROSTAT), urban areas in the European Union (EU) are responsible for 80 % of energy consumption and associated CO2 emissions with an annual growth trend of 1.9 %. For this reason, the European Commission's goal of reducing greenhouse gas emissions can only be achieved if local authorities, local investors, citizens and their associations are involved in the process. Together with national governments, local and regional authorities in the EU Member States share responsibility and actively commit to combating global warming through energy efficiency and renewable energy programs.

According to developed SECAP, the city of Zadar is trying to reduce CO2 emissions (and, where possible, other greenhouse gases) by at least 40% (new goal 55 %) by 2030 by using energy more efficiently and using more renewable energy sources. Until 2050, Zadar will try to be energy independent.

The Integrated Action Plan (IAP) has to be a support for SECAP and sort of template and framework for future implementation of sustainable development energy projects in the City of Zadar. The elaboration of IAP includes the definition of adequate measures related to energy efficiency and climate neutrality which are already defined in the existing strategic documents of the City (e.g. SEAP, SECAP, SULP,…) or represent new measures that are not previously defined.

STRATEGIC GOALS

The strategic goals related to the climate change mitigation defined in different strategic plans in the City of Zadar, and related to IAP are:

- Economic development of the City of Zadar through the improvement of the building, transport and public lighting sector;
- Economic development of the City of Zadar through increased investment in energy efficiency projects, renewable energy sources and sustainable construction;
- Energy development on the principles of sustainability in all sectors of energy consumption in the administrative area of the City of Zadar;
- Energy development based on security and diversification of energy supply of the City of Zadar;
- Reduction of energy consumption and associated CO2 emissions by at least 40% by 2030;
- Significant increase in the share of renewable energy sources;
- Successful transformation of the City of Zadar into an ecologically sustainable city.

The strategic goals related to the climate change adaptation are:

- Assessment of current and future vulnerability to climate change and associated risks in selected sectors;
- Sustainable development of the City of Zadar through the adaptation of the coastal zone, health, electricity system, forests / agriculture, water resources / communal infrastructure, tourism and fisheries measures;
- Reducing the vulnerability of natural systems and society to the negative effects of climate change;
- Increasing the ability to recover from the effects of climate change;
- Exploiting potential positive effects that may also be due to climate change.

EXPECTED ACHIEVEMENTS FROM ZCC

As a result of ZCC project, city of Zadar is expecting to achieve different goals:

- Introduce citizens to the problems regarding CO_2 emissions.
- Involve stakeholders in the action planning
- Get acquainted with examples of good practice from other cities and analyse possibilities to implement it in Zadar
- Create a carbon counting tool. Tool for tracking all of significant CO2 emission sources and their reduction with implementation of different measures.
- Calculate a city carbon budget
- Focus on carbon literacy:
    - Especially linked to already existing and very successful organic local food fair twice a year that could be used as an opportunity to communicate on the climate footprint
    - Develop a carbon tracker in 2023 (small pilot) as a tool for citizens to be able to track their climate impact/footprint potentially via an app
- Finding a way to show what has been achieved as a community (analyse the various projects that decreased GHG emissions and communicate better around them as a whole, and not as individual projects which do not show the overall picture of the transformation of the territories)
- Making the co-benefits of acting against climate change visible by focusing on attractivity, health, local economy, employment, quality of life
- The political commitment to the Covenant of Mayors for Climate and Energy is not an issue, but the challenge is to embed it into the governance of the city council, of the different programmes and into the municipal budget. Therefore, the involvement of all administrative departments is the key.
- Include the Zero Carbon or climate neutrality concept into the strategic documents, such as SECAP revision.
- Focus on a “low carbon tourism approach” with the involvement of the Chamber of Commerce
- Many programmes on environment protection, air protection, sea protection, climate and adaptation exist and the potential to link them to a ZCC strategy is high if the timing is appropriate
- Focus on green spaces via a moratorium on cutting trees could be a commitment from the city council as there are only few parks and the citizens are keen on preserving the trees in the urban area
- Investigate on a future ERASMUS + project as an outcome of the current URBACT ZCC project in order to continue exchange between the local groups of the different cities
- Plan to install more air quality meters on frequent locations

LOCAL CARBON BUDGET

In the framework of the URBACT Zero Carbon Cities project, the city of Zadar will adopt a local carbon budget to help guide strategic decisions on a policy level. Defining a carbon budget emphasizes the sense of urgency of climate action on a science-based method in alignment with targets set under the Paris Agreement. The global carbon budget framework defines the allowable cumulative emissions of carbon dioxide associated with a given level of global warming, since an emission of CO2 has the same effect on global temperature regardless of time of production.

The process of calculating a carbon budget, starts with a global carbon budget. Downscaling the global carbon budget to cities or regions can therefore enable them to take proportionate action in line with

keeping global warming well below 2˚C of change. Doing this is challenging because a number of decisions need to be made in allocating shares of the global budget. This allocation not only needs to determine shares that match the world's agreed climate change target (the Paris Agreement), but also should consider equity and fairness. Equity is a part of the Paris Agreement on climate change which defines common but differentiated responsibility and respective capabilities between participants in the agreement. This acknowledges that countries have made different contributions to global warming so far (historic carbon emissions) and some are at a further stage in economic development than others and are therefore more capable of transitioning to low carbon options more quickly. [3]

Budget for URBACT Zero Carbon Cities based on Anderson et al. was defined as 157 MtCO2 for Croatia. This number is national carbon budget and it has to be downscaled depending on the allocation method to assign a proportion to a city of Zadar. We will use 3 different methods:

- Population data at local and national level.
- Economic activity data (GDP) at local and national level
- CO2 emissions data for energy use and transport at local and national level

Table 1 shows the city of Zadar share in total Croatian population, GDP and CO2 emissions that will be used for downscaling national carbon budget for local purposes.

Table 1 City of Zadar share in total Croatian population, GDP and CO2 emissions

	Population	GDP [mil. EUR][4]	CO2 emissions data [tCO2]
Croatia	3,888,529	46,846.53	20,865,505[5]
City of Zadar	70,829	1,551.33	248,722.46[6]
City of Zadar share	**1,82 %**	**3,31 %**	**1,19 %**

Table 2 shows carbon budget for the City of Zadar according to previous share calculation. Data was shown according to population, GDP and CO2 emissions. As final result, arithmetic mean of 3 different results based on 3 different methods was presented. This result might be the best possible accurate calculation of local carbon budget in the City of Zadar. As we can see, carbon budget is significantly high according to GDP, since Zadar is highly developed in terms of tourism, economy and industry.

Table 2 Carbon budget for the City of Zadar

2020 to 2100 MtCO2 Budget	Carbon budget according to population	Carbon budget according to GDP	Carbon budget according to CO2 emissions
Croatia	157	157	157
City of Zadar share	1,82 %	3,31 %	1,19 %
City of Zadar	**2,86**	**5,20**	**1,87**
Arithmetic mean result	**3,31 MtCO2**		

[3] Source : Guidance for Setting Carbon Budgets for Cities, Dr Christopher Jones (University of Manchester), November 2021

[4] Source: bdp-po-zupanijama-novi5dc00382d399f.pdf (hgk.hr) . Data was taken for 2016 for Zadar County.

[5] Source: Croatia CO2 Emissions - Worldometer (worldometers.info) for 2010

[6] Source: SECAP of the City of Zadar, base year 2010

4 Description of the process

Whole recommended and targeted process of IAP development and implementation is described below (Figure 2).

Figure 2 Targeted IAP development process

ZCC ACTIVITIES

Since Zero Carbon Cities (ZCC) project began, representatives of the City of Zadar have held meetings with project partners and key stakeholders. At these meetings the key subjects of CO_2 emission reduction and decarbonisation have been discussed. Two face-to-face meetings were held, one with our key stakeholder Zadar Public Health Institute regarding the Small Scale Actiopn (SCA) activities and the other with all the members of ULG where very constructive discussions took place. NGO members proposed very interesting measures and also criticized building expansion in Zadar that is currently happening. Joint conclusion was that all the members of the ULG need to make efforts to ensure a healthy environment for our citizens and to take actions for awareness raising and provide a good base for a zero emissions town.

Representatives of the City of Zadar have a better understanding of carbon budgets and how to share this information with local stakeholders. Also with the implemented SCA started by measuring air quality this action will help to gain insight into the current situation and provide more concrete options to take necessary measures.

URBAN LOCAL GROUP (ULG)

City of Zadar has established an Urban local group (ULG) and held three ULG meetings (two online and one face-to-face). Representatives of the Zadar Public Health Institute, City of Zadar's Administrative Department for Communal Activities and Environmental Protection, City of Zadar's Administrative Department for Physical Planning and Construction, City of Zadar's Administrative Department for EU Funds, NGOs, University of Zadar, Public Transport Company, Utility Company, Waste Management Company and Zadar Tourist Board are members of the ULG. At the ULG meetings, all participants discussed topics related to the projects that City of Zadar has implemented so far and their impact on reducing CO_2 emissions and also gave their proposals on how to improve the situation.

For the next ULG meetings the ULG members will submit their proposals and ideas for achieving CO_2 emissions reductions. The main challenge to start ULG activities was the COVID–19 situation in Zadar. The pandemic made it very difficult to organise face-to face meetings.. Organizing meetings online was very difficult because some of the ULG members have limited knowledge about how to use online meeting tools or were working from home and did not have the ICT appropriate infrastructure. In this regard, some ULG activities have been late.

Part 2 – Action Plan

1 Objectives, action & schedule

The objectives of the City of Zadar are to contribute a strategic vision for carbon neutrality by 2050 and to provide its citizens with a high quality of life.

Local self-government units are key drivers of the energy transition and are fighting climate change at the level of government closest to the citizens. Local governments share responsibility for combating climate change with bodies at regional and national level and are ready to act regardless of whether other stakeholders meet their obligations.

Mitigation and adaptation to climate change can have multiple beneficial effects on the environment, society and the economy. When these issues are worked on together, new opportunities are created to promote sustainable local development. These include building inclusive, climate-resilient and energy-efficient communities, improving the quality of life, fostering investment and innovation, growing the local economy and creating new jobs, and strengthening stakeholder participation and cooperation.

Local solutions to energy and climate change provide citizens with safe, sustainable and competitive energy at affordable prices, thus contributing to reducing energy dependence and protecting vulnerable consumers.

Energy efficiency measures shown in IAP are divided into 3 main sectors: buildings, transport and public lighting.

BUILDING SECTOR

	Measure
1.	Implementation of systematic energy management according to ISO 50001: 2018 in the buildings of the City Administration and City institutions / companies
2.	Education and promotion of energy efficiency for citizens
3.	Installation of 10 PV systems up to 30 kW on the roofs of the City institutions
4.	Installation of solar thermal systems on the buildings of City institutions / companies
5.	Energy renovation of multi-apartment buildings
6.	Energy renovation of family houses
7.	Solar potential map for the City of Zadar

TRANSPORT SECTOR

	Measure
8.	Encouraging construction of a new sustainable buildings
9.	Car sharing model
10.	Implementation of EV charging stations
11.	Co-financing the purchase of energy efficient vehicles for city institutions/companies, legal entities and citizens
12.	Implementation of a smart parking space management system
13.	Bus driving monitoring system
14.	Encouraging the use of bicycles, e-bikes , e-scooters and improvement of bicycle traffic
15.	Encouraging the procurement of energy efficient fishing and other vessels
16.	Additional services for the transport of goods in the pedestrian zone of the Peninsula – electric cargo delivery trolley
17.	System for monitoring outdoor air quality

PUBLIC LIGHTING SECTOR

	Measure
18.	Modernization of public lighting system

Measure 1	Name	Implementation of systematic energy management according to ISO 50001: 2018 in the buildings of the City Administration and City institutions / companies
Activity holder		City of Zadar
Duration		2022.–2050.
Cost estimation (EUR)		20,000.00
Type		Long-term
Short description		The measure includes the following activities: - Monitoring of energy consumption through the ISGE system in the buildings of the City Administration and City institutions / companies and the introduction of smart meters (smart metering); - Taking regular and extraordinary energy saving measures; - Organization of educational workshops on ways to save energy; - Production and distribution of educational materials. The aim of educational activities is to achieve the application of the following principles: - Efficient use of energy and materials; - Waste reduction; - Recycling. In addition to educational activities within this measure, it is necessary to introduce an incentive scheme for energy saving (for example, the 50/50 scheme), within which part of the financial resources from energy savings remains available to the individual institution where the savings were realized. The organization of educational and promotional activities does not in itself achieve energy savings. However, any such activity ultimately results in behavior change that can be an important and powerful driver of energy efficiency improvement activities.

Measure 2	Name	Education and promotion of energy efficiency for citizens
Activity holder		City of Zadar
Duration		2022.–2050.
Cost estimation (EUR)		120,000.00
Type		Long-term
Short description		The measure includes the following activities: - Organization of educational workshops on ways to save energy; - Production and distribution of educational materials; - Organization of forums and workshops; - Organization of Energy Efficiency Week. The aim of educational activities is to achieve the application of the following principles: - Efficient use of energy and materials; - E-mobility, shared mobility, cycling - Waste reduction; - Recycling. The organization of educational and promotional activities does not in itself achieve energy savings. However, any such activity ultimately results in behavior change that can be an important and powerful driver of energy efficiency improvement activities.

Measure 3	Name	Installation of 10 PV systems up to 30 kW on the roofs of the City institutions
Activity holder		City of Zadar
Duration		2022.–2030.
Cost estimation (EUR)		370,000.00
Type		Mid-term
Short description		The measure envisages the production of electricity from solar energy through photovoltaic cells for the facility's own needs and for delivery to the distribution network. This reduces the need for electricity generation in a conventional way, which contributes to reducing CO2 emissions.

Measure 4	Name	Installation of solar thermal systems on the buildings of City institutions / companies
Activity holder		City of Zadar
Duration		2022.–2030.
Cost estimation (EUR)		30,000.00
Type		Mid-term
Short description		The goal of installing solar thermal systems is to use the obtained energy to heat domestic hot water in buildings. This measure directly reduces the need to reheat domestic hot water with electricity or fossil fuels, thus reducing CO2 emissions. Installation will be considered in all City administration buildings.

Measure 5	Name	Energy renovation of multi-apartment buildings
Activity holder		Citizens, facility managers
Duration		2022.–2030.
Cost estimation (EUR)		70,000,000.00
Type		Mid-term
Short description		Through this measure, by 2030, it is planned to renovate 30% of the fund of multi-apartment buildings. The measure includes replacement of windows, thermal insulation of the outer shell, replacement of heating and domestic hot water systems with renewable energy sources, replacement of indoor lighting with more efficient one, installation of PV systems, efficient household appliances.

Measure 6	Name	Energy renovation of family houses
Activity holder		Citizens
Duration		2022.–2030.
Cost estimation (EUR)		100,000,000.00
Type		Mid-term
Short description		Through this measure, by 2030, it is planned to renovate 50% of the fund of family houses. The measure includes replacement of windows, thermal insulation of the outer shell, replacement of heating and domestic hot water systems with renewable energy sources, replacement of indoor lighting with more efficient one, installation of PV systems, efficient household appliances.

Measure 7	Name	Solar potential map for the City of Zadar
Activity holder		City of Zadar
Duration		2022.–2025.
Cost estimation (EUR)		50,000.00
Type		Short-term
Short description		Solar Potential Map is an interactive online solution for visualizing the potential of solar energy that allows citizens to assess the potential for the installation of solar panels on buildings. The map helps them save time and money in the decision-making process, which will ultimately result in financial savings and greening of their buildings.

Measure 8	Name	Encouraging construction of a new sustainable buildings
Activity holder		City of Zadar
Duration		2022.–2050.
Cost estimation (EUR)		-
Type		Long-term
Short description		This measure includes a reduction of the utility fee for the construction of new buildings according to a standard higher than nZEB (eg. passive houses, zero energy houses, autonomous houses, houses with surplus energy, etc.) in combination with environmental protection measures (eg construction natural materials, rainwater harvesting, green roofs, biopurifiers, etc.).

Measure 9	Name	Car sharing model
Activity holder		City of Zadar
Duration		2022.–2030.
Cost estimation (EUR)		-
Type		Mid-term
Short description		Activities: - Promotion of car-sharing as a simple, accessible service with a minimum number of forms that only pay for time and mileage (actual use of the vehicle), in which registered users can use the vehicle they want from the location closest to them. Car-sharing service should be functioning 24 hours a day only with registration via web, smartphone or on site; - Implementation of car-sharing system, which enables the creation of additional revenue for the City of Zadar, either through the organization and own offer of vehicles in the car-sharing system, or through available models of implementation.

Measure 10	Name	Implementation of EV charging stations
Activity holder		City of Zadar
Duration		2022.–2030.
Cost estimation (EUR)		150,000.00
Type		Mid-term
Short description		The measure represents the implementation of EV charging infrastructur in the City of Zadar. Mmeasure represents one of basic steps in the development of e-mobility and is crucial for expansion of electric vehicles. A detailed analysis will be needed to implement this measure with possible business models that can include own operation or cooperation with operators.

Measure 11	Name	Co-financing the purchase of energy efficient vehicles for city institutions/companies, legal entities and citizens
Activity holder		City of Zadar, Private micro, small, medium and large private enterprises, companies, citizens, local and regional self-government units, state administration bodies and other budgetary and extra-budgetary users, non-profit organizations.
Duration		2022.–2030.
Cost estimation (EUR)		14,253,600.00
Type		Mid-term
Short description		In accordance with national goals, the implementation of this measure in previous years co-financed the purchase of energy efficient vehicles by the Fund for Environmental Protection and Energy Efficiency (FZOEU), so this measure provides continuation of its implementation.

Measure 12	Name	Implementation of a smart parking space management system
Activity holder		City of Zadar, city company Liburnija d.o.o. Zadar
Duration		2022.–2030.
Cost estimation (EUR)		1,700,000.00
Type		Mid-term
Short description		This measure proposes the introduction of a system of smart management of parking spaces in the administrative area of the City of Zadar with the aim of reducing traffic congestion. The implementation of this measure will result in an increase in the quality of life of citizens.

Measure 13	Name	Bus driving monitoring system
Activity holder		City of Zadar
Duration		2022.–2030.
Cost estimation (EUR)		73,000.00
Type		Mid-term
Short description		Some city and suburban buses have built-in systems for monitoring the way buses run, which has proven to be quite useful. The proposal is to install the same system on the remaining buses in order to save fuel consumption and thus reduce CO2 emissions.

Measure 14	Name	Encouraging the use of bicycles, e-bikes , e-scooters and improvement of bicycle traffic
Activity holder		City of Zadar
Duration		2022.–2050.
Cost estimation (EUR)		300,000.00
Type		Long-term
Short description		The implementation of a public bike sharing system is part of the measures implemented to achieve sustainable mobility. Positive effects on the community are reduction of motorization, reduction of pollution - reduction of CO2 emissions, reduction of noise. There are also some positive effects on the economy: the use of bicycles allows the development of new activities related to cycling. The positive effects on the population consist in achieving recreational and health benefits, and the bicycle is a practical and economical and thus multi-useful choice for transport. This measure also includes the system of public e-bikes and e-scooters, which consists of terminals in the city area with charging stands and e-bikes and e-scooters.

Measure 15	Name	Encouraging the procurement of energy efficient fishing and other vessels
Activity holder		Citizens and legal persons
Duration		2022.–2050.
Cost estimation (EUR)		200,000.00
Type		Long-term
Short description		This measure includes: - Investments in equipment or in a vessel with the aim of reducing emissions of pollutants or greenhouse gases and increasing the energy efficiency of the vessel; - Improving the energy efficiency system; - Studies to assess the contribution of alternative propulsion systems and formwork design and energy efficiency of fishing and other vessels.

Measure 16	Name	Additional services for the transport of goods in the pedestrian zone of the Peninsula – electric cargo delivery trolley
Activity holder		City of Zadar
Duration		2022.–2025.
Cost estimation (EUR)		2,500,000.00
Type		Short-term
Short description		The measure includes the implementation of electric hand trucks for delivery of cargo within the pedestrian zone of the Peninsula in the City of Zadar. The first step in the implementation of this measure has already been implemented, and relates to the formation of transshipment points outside the pedestrian zone. Due to limited delivery time for motor vehicles within the pedestrian zone, this measure will allow delivery 0-24 h.

Measure 17	Name	System for monitoring outdoor air quality
Activity holder		City of Zadar
Duration		2021.–2025.
Cost estimation (EUR)		50,000.00
Type		Short-term
Short description		Due to a huge number of tourists over the summer Zadar suffers from the constant congestion of the roads during the tourist season which has a significant impact on air quality. To have a deeper insight into the extent to which traffic has an impact on air quality, the City of Zadar installed Air Quality Monitoring Devices that measure different air quality parameters. The installed devices provided air quality data that was analysed and gave a wider picture on how tourism influences air quality in the city. Air Quality Monitoring Devices were installed in August 2021 and provided data from September 2021. For the more precise and detailed analysis the City of Zadar plans to install more Air Quality Monitoring Devices at the other strategic locations in the coming years.

Measure 18	Name	Modernization of public lighting system
Activity holder		City of Zadar
Duration		2022.–2025.
Cost estimation (EUR)		2,500,000.00
Type		Short-term
Short description		Existing public lighting consists of outdated and inefficient lighting fixtures equipped with high-pressure mercury and sodium luminaires. Modernization involves the replacement of existing lighting fixtures with energy efficient and environmentally friendly ones. The measure includes the installation of igniters and electronic ballasts, whereby the operating modes are adjusted on each individual luminaire. This measure applies to existing and new lighting fixtures. Luminaires with LED technology will be used.

2 Small Scale Actions (SSA's)

2.1. System for monitoring outdoor air quality

There have been no systematic air quality tests in Zadar since 2008. According to the Environmental Program of the City of Zadar from 2016, traffic is recognized as the greatest possible problem in the quality of the city of Zadar.
Increased concentration of motor-powered vehicles can adversely affect urban air quality by increasing levels of carbon monoxide (CO), carbon dioxide (CO_2), sulfur dioxide (SO2), nitrogen oxides (NO and NO2) and particulate matter (PM1, PM2.5 and PM10).

In this regard, City of Zadar installed Air Quality Monitoring Device that measure air quality parameters: carbon monoxide (CO), carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen oxides (NO and NO_2) and particulate matter (PM1, PM2.5 and PM10) as well as temperature, air pressure and humidity (Figure 3). The measuring station is installed at a specific location (Peninsula – Zadar). It collects data and sends it to the Smart Sense Cloud server. The server application collects and saves measurement data. The data is in the AirQ web application.

Air Quality Monitoring Devices were installed in August 2021 and provided data from September 2021. For the more precise and detailed analysis the City of Zadar plans to install more Air Quality Monitoring Devices at the other strategic locations in the coming years.

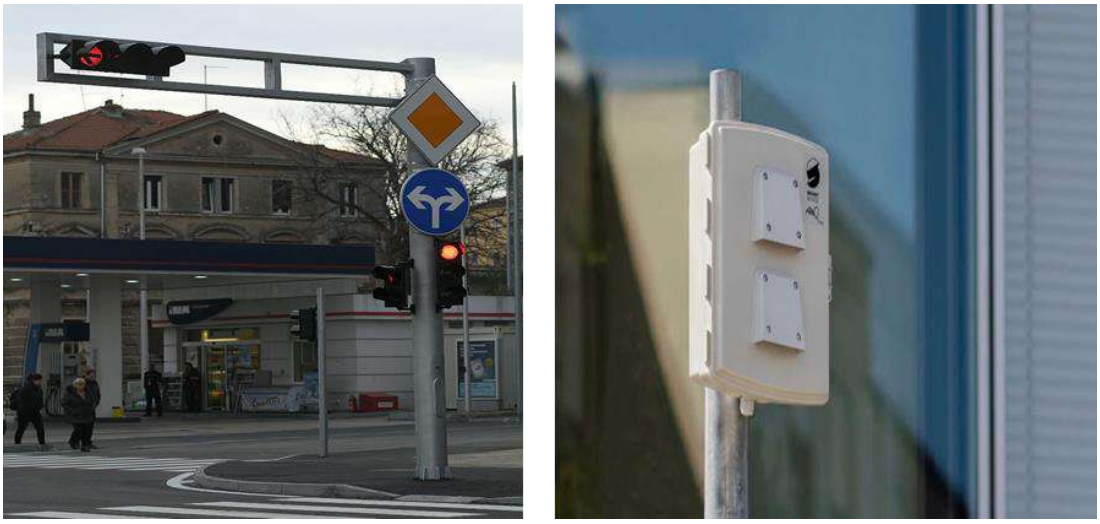

Figure 3 Air Quality Monitoring Device

The system allows remote monitoring and configuration of the measuring station. The station contains very sensitive electrochemical gas sensors. Optical sensors are used to measure suspended particles.

Whole scheme with all its parts needed to have air quality monitoring system is shown below, Figure 4.

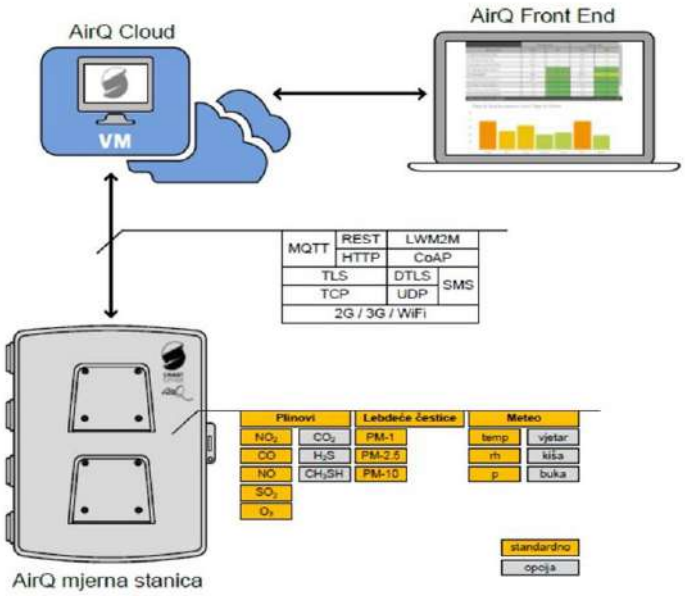

Figure 4 System for monitoring outdoor air quality

As part of the ZCC project, the City of Zadar will receive the results of air quality measuring in the Peninsula at the frequency position that is the busiest during the tourist season, and based on all these results City of Zadar will be able to make decisions to prevent more air pollution.

After the completion of the project, City of Zadar will try to measure the air quality in town, and be able to more easily determine which measures are best in terms of air and environmental protection.

2.2. Solar potential map for the City of Zadar

With aim to facilitate citizens to make decisions to start energy renovation with PV system installation,there is a plan to establish Solar roof`s web platform. Platform will have:

1. Interactive map of solar potential of building roofs of the city of Zadar;
2. Calculator for estimation of technical and financial possibilities for each building and household in Zadar;
3. One-stop shop facilitation model to communicate, raise awareness on benefits and give free-of charge advice to citizens in process of integration of PV system.

This project will stimulate the interest of all local stakeholders in exploiting the potential of solar energy in order to save money and contribute to reducing CO2 emissions. Citizens will first benefit from saving money and time before they start designing, and the actual savings will be tangible immediately after installation.

Through an interactive web application, the map of solar potential has to allow the citizens of Zadar to calculate the recommended power of the solar power plant on their own facilities that can be found on the interactive map. The solar map as a result also has to show the investment costs of installation, energy savings and CO2 emissions through interesting comparisons and most importantly, the profitability of the investment. In addition, the map must be user-friendly, easy to use and provide information related to all the steps that citizens need to go through in the process of implementing a solar power plant.

Example of solar potential map implemented in the City of Varazdin, Croatia is shown below (Figure 5).

Figure 5 Solar potential map example[7]

The goal of creating a map of solar potential is to encourage citizens to produce electricity from renewable sources, using solar power plants that can be installed on the roofs of their buildings. The map of solar potential should be made in 3 phases. Phase 1 is data collection and processing (drone imaging, DOF development, solar potential calculation). In phase 2, an algorithm need to be developed, that connects and displays the collected data. Phase 3 is the preparation of a web platform where the user accesses and receives all relevant information related to the installation of a solar power plant for their own facility.

[7] Source: https://www.solarnamapa.hr/grad-varazdin/

3 Resourcing

Resourcing needed to implement IAP are: financial resources, staff resources, expertise knowledge, political support, a communication plan to engage citizens, promotional and educational activities in cooperation with media, social networking etc., ULG, cooperation with Zadar Public Health Institute, including in other projects with similar themes. Financial resources will be ensured mostly from the City own Budget and EU funds as well as from the national resources and other available funds.
All IAP activities are in relation to the priority of ERDF Operational Programme for 2021-2027, Greener, low-carbon and resilient.

FINANCIAL RESOURCES

The implementation of proposed measures may require significant investment. Every country that is a full member of the European Union, has been allowed to withdraw funds from Structural and Cohesion Funds and increased available funding sources. Besides Structural and Cohesion funds, other funding sources which can contribute to the revitalization of investment activities are the ESCO model, revolving funds, public-private partnership, etc. So far, these models are not currently being used to a significant extent. European funding programs provide direct financial incentives to public bodies to develop profitable projects. Financial products such as guarantees and equity are also used to support the project.

The basic and detailed breakdown of funding sources is shown below in Figure 6 and Figure 7.

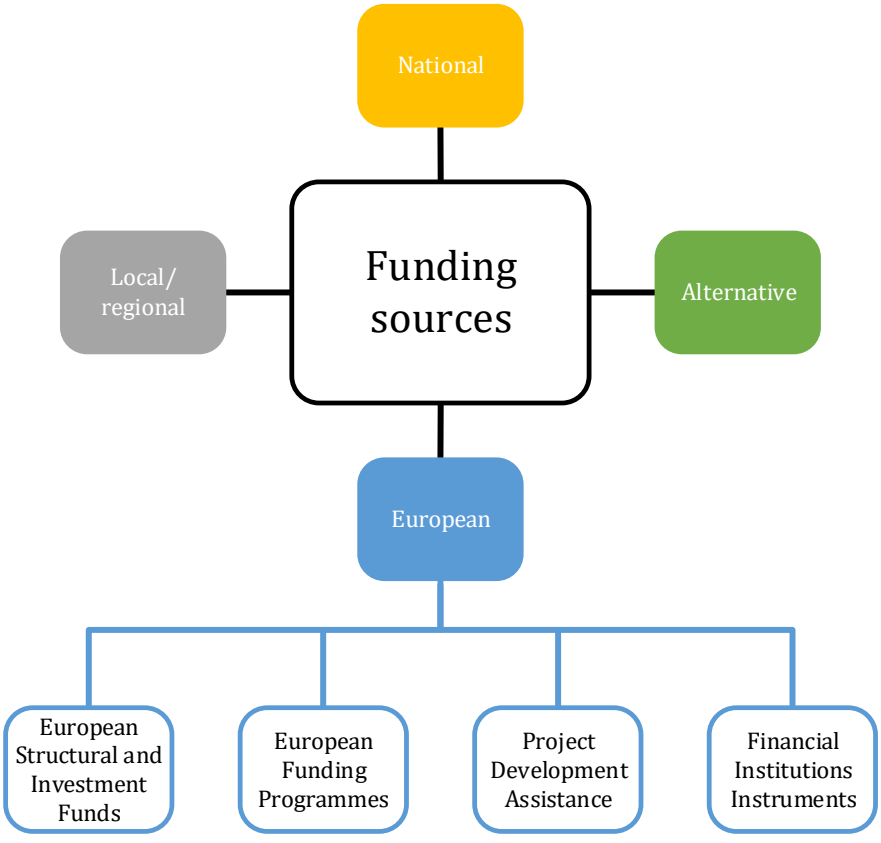

Figure 6 Financial funding sources

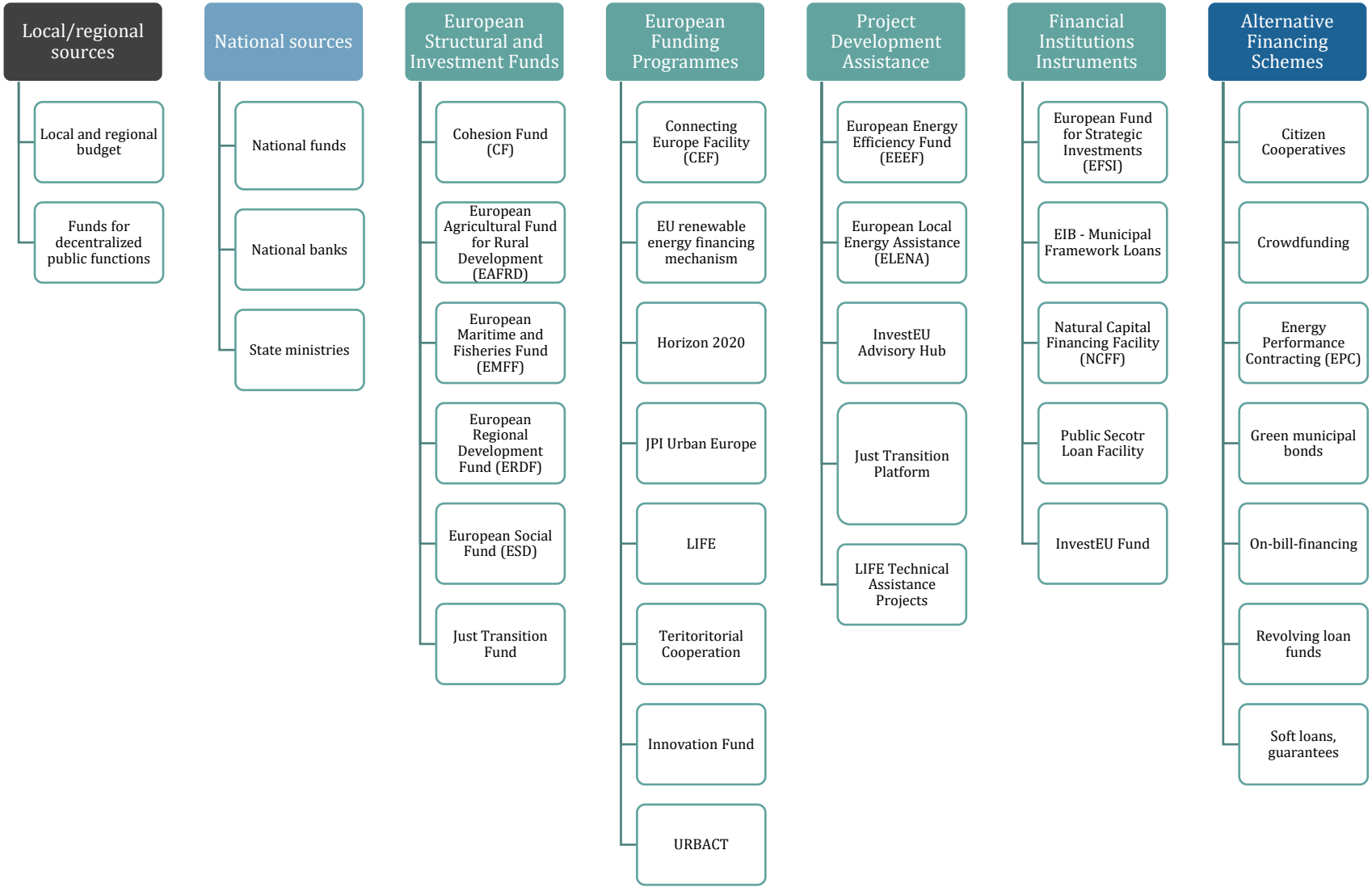

Figure 7 Classification of main funding sources

GUIDE TO SELECTING A RELEVANT FINANCING MODEL

One of the best tools for selecting needed financing model is decision tree. Decision tree represents a flow chart of the most appropriate financing mechanisms to address specific situations faced by municipalities in financing energy efficiency (EE) projects. The scheme is not binding as, in many cases, multiple mechanisms may be combined.

The first thing to address is whether the municipality has sufficient resources to fund the project(s) or not. If the municipality has sufficient financing for the project(s), it can allocate part of its budget for the project(s); by establishing a budget line item for project and carrying out the mechanism of general budget financing. If the municipality does not have enough funds, it should seek any grants available from donors. If there are available grants, the municipality should apply for them. Often this grants do not cover the entire project cost as they represent a mechanism of partial budget financing. It is often possible that funds may also come from the national government; in this case the municipality will capture new budget for financing part of the project(s). If the fund does not come from the national government, it is possible to look for energy efficiency funds; this financing scheme is subject to EE fund eligibility criteria.

Beside this funds, commercial banks can also offer dedicated credit lines and/or risk sharing programmes. In order to take advantages of these opportunities, the municipality must respond for its creditworthiness as well as its collateral and borrowing capacity.

Other financing systems can be found in commercial or financial ESCOs; if there are ESCOs in the market the municipality should develop favourable EPCs by negotiating them with ESCOs. If the ESCO is not an option, leasing or vendor financing programmes can be searched. In such case, when the eligibility criteria are satisfied, similarly to the commercial financing scheme, the municipality should negotiate the leasing or the vendor financing agreement. Finally, if the municipality has the capacity to issue municipal bonds it should create a municipal bond programme by taking into account the transaction costs and market situations.

It is important to state that the larger the project, the greater the need to obtain external funding and private sector engagement. Additionally, the complexity of financing arrangements may increase with project size.

Furthermore, if project has high risks and does not generate sufficient cash flows, it will be challenging to leverage private capital. This is often the case for small-scale projects. The solution may be to bundle multiple small projects in several municipalities into one investment package, but also possibly include crowdfunding options to engage citizens.

The example of choosing relevant financing model for sustainable energy and climate action projects by using a simple decision tree is shown in Figure 8.

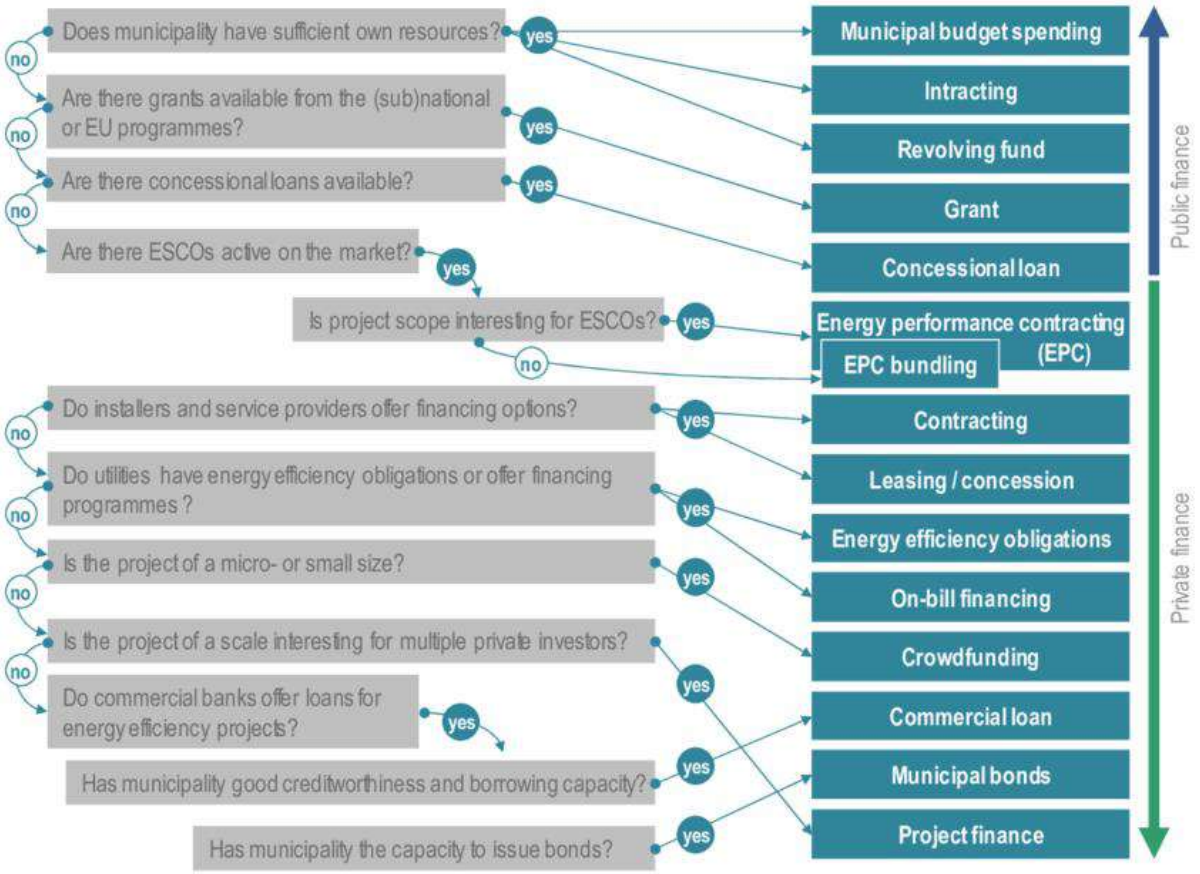

Figure 8 Decision tree model[8]

[8]Source: https://www.researchgate.net/publication/324602836_Guideline_on_finding_a_suitable_financing_model_for_public_lighting_investment#pf13

4 Framework for Delivery

The framework for delivery of this document will be in line with the SECAP of the City of Zadar and also other strategic documents such as the: Development Strategy of the City of Zadar, Urban Area Development Strategy of the City of Zadar, Transport Masterplan of the North Dalmatia Functional Region, Energy Efficiency Action Plan for the 3 years period, SULP, LAP, RAP, and other. Main indicator for monitoring of the progress will be air quality data analysis and maintenance of solar potential map. Stepping from the Integration Action Planning stage to the implementation phase, the City of Zadar acknowledges stakeholders active involvement and engagement as a key pillar in the IAP implementation phase. In this respect, a governance scheme has been proposed to manage and monitor the implementation phase (both during and after the official end of URBACT support).

The current ULG structure gathers representatives from different backgrounds. Based on a mixed background structure, a committee of ULG members will be set up to closely follow the implementation of the roadmap.

The key tasks of the ULG will be based on:

- Managing the group and organising ULG meetings,
- Keeping the record of the ULG members and closely following the implementation,
- Monitoring and be actively involved in the implementation of the pilot programs,
- Monitoring the process (annually) and giving recommendations for actions to be implemented,
- Updating the IAP (by learning from the implemented actions and adapt the medium and longterm objectives, according to that).

However, the governance structure will remain flexible and it will be opened for new members, as well as for the withdrawal of members who are not interested anymore.

Targeted IAP development and delivery process was previously described in Figure 2.

5 Risk Analysis

The current chapter describes the risk analysis by identifying potential risks in connection with the intended objectives, based on the following aspects: types of risks, classification of risks (low, medium, high impact), as well as steps/actions that might be applied to reduce the probability and impact of risks (Table 3).

Table 3 Risk analysis in IAP implementation

Risk	Risk type	Classification of risk	Reduction/Mitigation actions
Lack of political support	Operational	Low	Cooperation with Mayor and City Council (make sure to have good arguments for the activities)
Lack of budget	Financial	Medium	Use available sources of finance (EU, national funds etc.)
Gap in local knowledge	Operational Staffing	Medium	Use of external experts
Lack of staff resources	Operational Staffing	High	New employees planning
Lack of interest ULG members	Operational Staffing	Low	Involving new members and organisations
Delays in the implementation of the actions	Operational Financial	Medium	The ULG will be responsible to closely follow-up and monitor the implementation phase (from a quantitative and qualitative point of view) to ensure a sound implementation of actions; Ensuring financial support for activities implementation; Leave the city enough time to understand, test and accommodate the practice of temporary use into the local planning framework

6 Lessons from URBACT networks and Transnational

The ZCC Masterclasses allowed the team from Zadar to learn how to create carbon budget. At the city governance session two different approaches were introduced which helped to better understand how to start with the creation of a carbon budget and setting science-based targets.

First masterclass was on methodologies which helped to have a better understanding of the science-based approach to carbon budgeting. Second masterclass was on the ''Road to Carbon Neutrality: Current Initiatives and Opportunities Towards Zero Carbon''. Participation at the 3rd ZCC Masterclass – City Delivery Models for Zero Carbon – exchange of good practices with Manchester and Oslo. In this session Manchester City Council and the City of Oslo presented their zero carbon ambitions. Participation at the 4th ZCC Masterclass – Translating the Paris Agreement into Local Action - a session on science-based targets for cities that looked at the key considerations when setting a science-based climate change target for a city, what makes a good target, and going through the Tyndall approach to setting Paris Agreement aligned carbon budgets.

Participation in URBACT e-University meetings held online, Main learnings: Planning actions, Making Results Visible, Final session were learned on how to apply tools presented at the URBACT e-University.

Participation at the good practice exchange event, mobility sub-task ''Changing transport and mobility behaviours of citizens'', main learnings: Barcelona good practice on how they involve citizens in mobility and transport, Overview of Bistrita's work with citizens and transport. Also the City of Zadar presented transport challenges in summer with tourists.

Furthermore, in development of Zadar own IAP, as example of good practice, IAP from different cities were used, such as Manchester, Tartu, Bistrita, Vilvoorde and other Croatian city Varazdin.

NEXT STEPS

Next steps for this project will be further analysis of the carbon budget, completion and revision of IAP, analysis of air quality data, procurement of more Air Quality Monitoring Devices and consideration about development of solar potential map.

Public procurement for external expertise for development of the carbon budget and IAP will be completed in December 2021. After the selection of external expertise it is planned to organize ULG meeting to include proposals from stakeholders into IAP. 1st draft of IAP will be completed in January 2022 and a final version should be completed in April 2022.

City of Zadar installed Air Quality Monitoring Device at the enter to the city peninsula (center) that measuring air quality parameters. The first measurement analysis for 4 months period should be completed in December 2021. The Zadar Public Health Institute will prepare air quality analysis.

In the City of Zadar projections it is planned to purchase more Air Quality Monitoring Devices which should be installed at the other frequent locations which will help determine the air quality in Zadar and make a comparison between air quality during tourist season and out of the tourist season and have a data on tourism influence on air quality.

Also, solar potential map that is a sort of One-stop-shop facilitation model for installation of PV systems on households will be considered for implementation.

2022

VILVOORDE IAP

Moons Pascal

5/16/2022

INTRODUCTION

How can Vilvoorde develop into a pleasurable city by the water where it is good to live and work?
Vilvoorde's ambition is clear:

we already have our past, we can make our own future.

Mayor Hans Bonte:
Despite its heavily polluted historical industrial past, Vilvoorde has a number of unique assets such as its population and location. At the same time, as the fastest growing city in Flanders, Vilvoorde is facing enormous challenges: safety, mobility, quality of life, jobs, energy, diversity and social cohesion. The city has learned from the first climate plan that these are also the challenges that a bold climate policy can help to solve. Energy renovation improves the quality of life and creates jobs, and good cycle paths and neighbourhood renovation increase safety. Climate policy is therefore about much more than CO_2 reduction alone. Although the challenges remain enormous, over the years we have noticed that Vilvoorde's climate policy is becoming increasingly integrated into all policy objectives. Nevertheless, we need a sustainability revolution to respond to all the challenges we are facing.

Deputy Mayor Tine Paredis:
he city has a great responsibility as an example to its inhabitants. With an ambitious and at the same time feasible climate policy 2025, Vilvoorde wants to continue working hard this legislative period with the available resources. One thing is certain: the city organisation cannot do this alone, as is evident from the long-term vision for 2030. The climate objective for 2030 exceeds the capacity of every individual, every company, city service and even the city as a whole. Collaboration therefore becomes the key to success. With every citizen, entrepreneur, government, volunteer, elected official and target group, we must work together.

Deputy Mayor Barbara De Bakker:
An ambitious climate policy is also a story of enormous opportunities for the city. Besides CO_2 reduction, adaptation or preparing the city for tomorrow is an opportunity to continue to grow into a healthy and green city by the water. With quality energy-efficient homes, more sustainable mobility and the strengthening of green and blue networks, we are striving for a city that is better for everyone.

Deputy Mayor Didier Cortois
The participation of all our stakeholders will be crucial in this challenge. Not only our businesses and our associations, but every citizen of Vilvoorde will need to be involved in order to make his or her contribution. As a city, we are already taking the first steps here, but we also hope to learn a lot from other good examples through this Urbact project. Getting everyone on board in this rapidly changing and innovative future will be one of the major challenges of tomorrow.

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1a. City context

1a1. Location

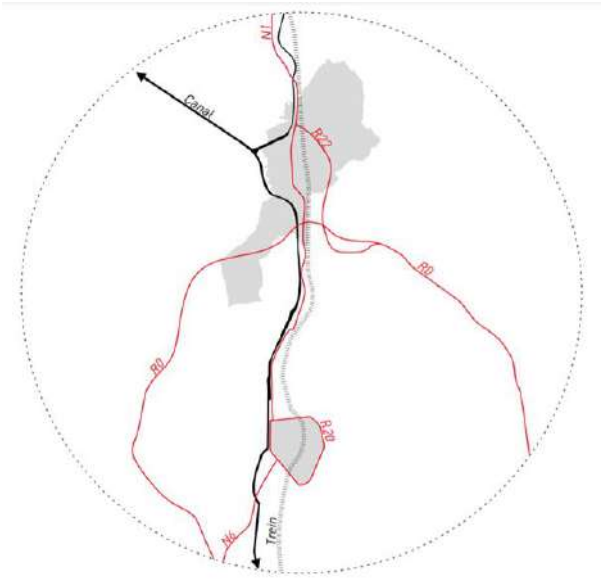


Figure 1: City attached to Brussels

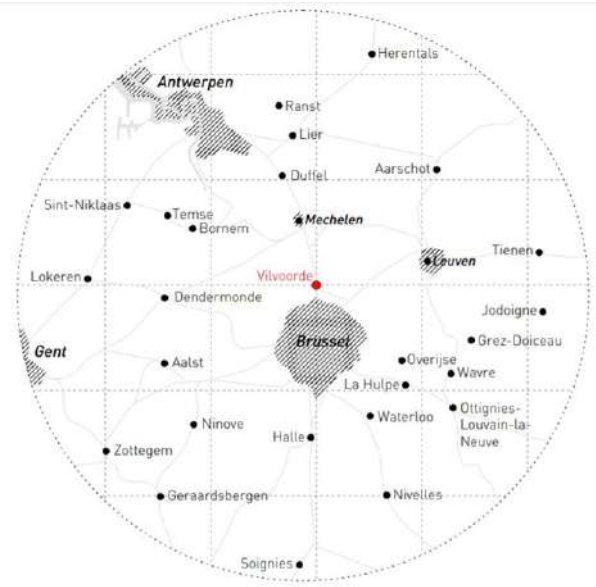


Figure 2: Medium sized city in the region

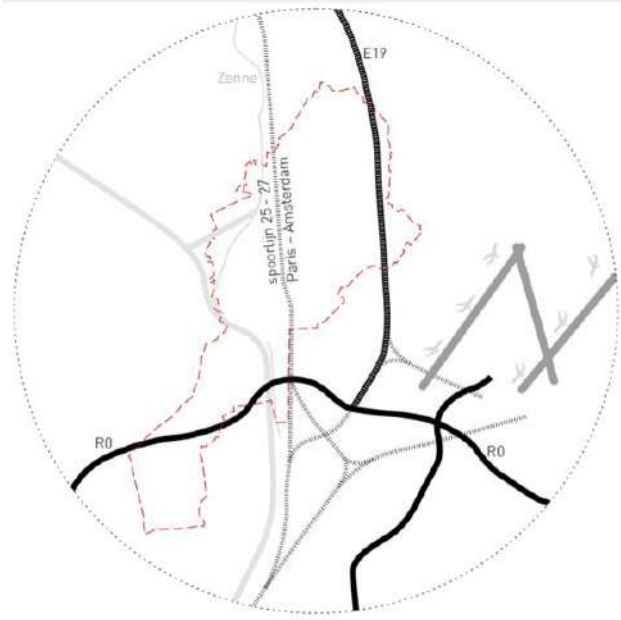


Figure 4: City and the international connectors

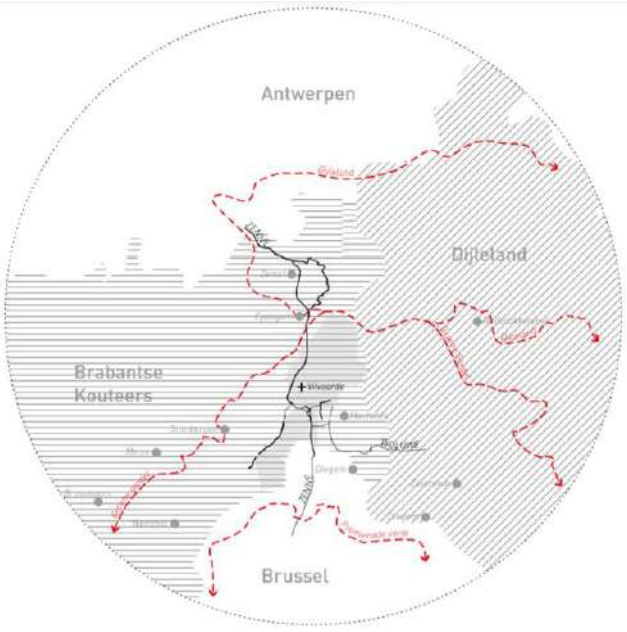


Figure 3: City in the green belt

1a2. Facts and figures

Location:

- Vilvoorde is a Flemish city that is attached to the Belgium capital city of Brussels.
- The city is ideally situated at the crossroads of Belgiums biggest airport and between the two main economic centres of the country (Antwerpen and Brussels); it is both an advantage and a weakness as it is a territory with heavy traffic.
- It is a part of the green belt around Brussels in the Valley of the Zenne along the canal Brussels Willebroek

Population:

- With a population of 45.000 inhabitants it is the fastest growing city of Flanders
- 12% increase of the population is planned between 2016 and 2025.

Economic indicators:

- There is a low unemployment rate, but a lower annual income per person (around EUR 18.000) compared to the Flemish Region (an average of EUR 20.000).
- 54% of the population is not Belgian, representing one of the highest diversity in the country.
- The population is also on average younger than in the region.
- The city has a heavy industry history.

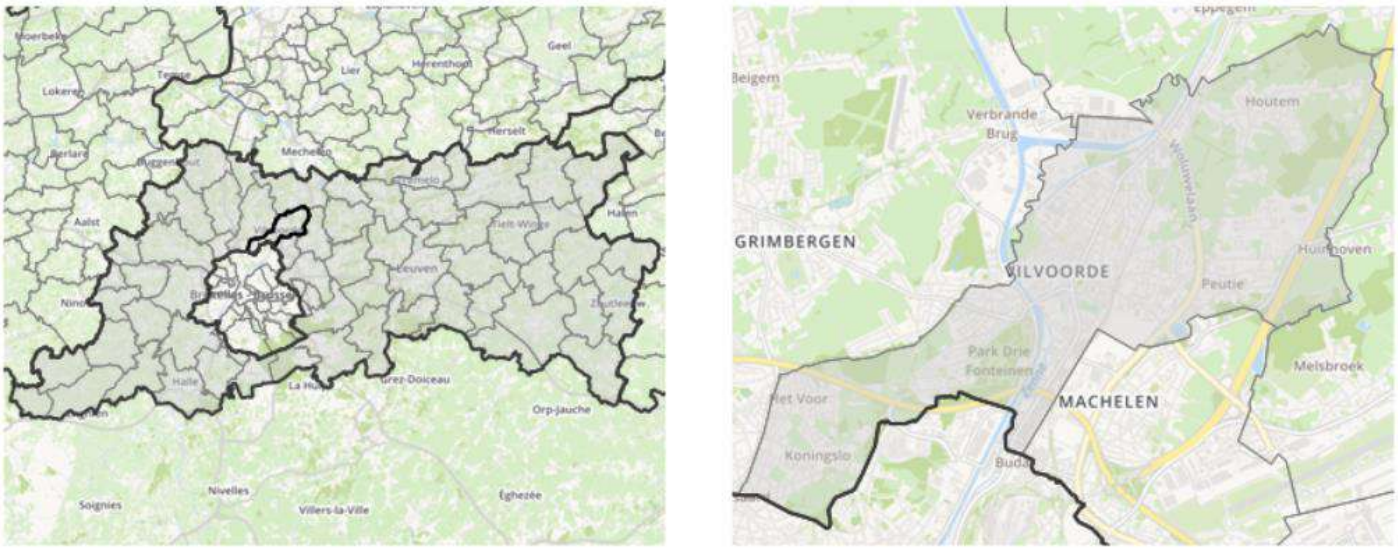


Figure 5: City attached to Brussels in Flanders region

1a3. Long term vision:

General context

The city has a local long-term vision called *"Our Vilvoorde Tomorrow"* and energy and climate aspects are integrated in it. This future plan consists of 4 storylines that the city of Vilvoorde wants to develop and realise together with its inhabitants in the future:

- Vilvoorde is a 'city in the landscape' that uses greenery and space in a sustainable way. Nature provides food, more oxygen and absorbs rainwater. These are all natural advantages that we can enjoy if we reserve enough space for them.

- Vilvoorde remains a 'inhabited city' where everyone can live in a pleasant way. Because Vilvoorde is a city that is growing, we are investing in new sustainable homes in well-situated locations and with attention to public facilities in the neighbourhood.

- Vilvoorde is a 'connected city' in which everyone can live and work in easily accessible places. We strive for a balance between accessibility and quality of life in our city.

- As an 'active city', Vilvoorde remains an attractive place for numerous companies and organisations. By offering opportunities to high-tech, creative and sustainable businesses, we contribute to the creation of local jobs for the low- and high-skilled.

In the next years, the challenge for Vilvoorde is to translate this vision into realistic action plans as a guideline for future developments.

Vilvoorde currently finished on the follow up of the Sustainable Energy Action Plan (SEAP) 2020 via the Sustainable Energy and Climate Action Plan (SECAP) 2030. Vilvoorde is also developing a City Climate Plan 2025 against the needed climate goals for 2030. This is important to have calculated goals in Vilvoorde for the current city council (legislation until 2025).
The local CO_2 emissions can be broken down to the different sectors as follows: households 40%, businesses 30% and mobility 20%. It needs to be mentioned that these emissions do not take into account the highways that cross Vilvoorde: the ring around Brussels and the E19 (Brussels-Antwerp). If the highways are considered, then the break down would be as follows: mobility 46%, households 24% and businesses 20%.

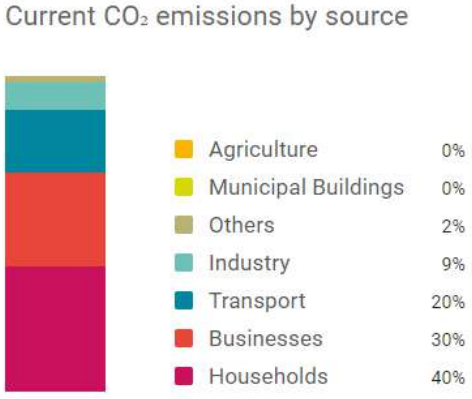


Figure 6: CO_2 emissions Vilvoorde in 2019

In terms of housing, the housing stock is mainly constituted of semi-detached one-family houses and 4% of the housing stock is unhealthy and needs urgent renovation.
In Vilvoorde, 9% of the housing is social housing consisting of mainly private single family homes, of which approximately 10% do not have central heating, but gas convectors.
In Vilvoorde there is 32% rental out of 17.000 housing units. In Flanders, there is an obligation for owners to install double glazing and roof insulation if they want to rent an apartment. It is the municipal housing department that needs to check if this obligation is met, however in Vilvoorde they do not have the required human resources to do so.
In terms of citizen participation, involving the different communities is a real challenge, especially on the climate change issue as it is not a priority for many households. A new city official is been appointed in 2020 to be in charge of participation.

The overall main issue faced by Vilvoorde is that as the city is attached to Brussels, it faces the same problems as a big city, however with a considerably lower municipal budget. In order to be on track with its transition path Vilvoorde would need EUR 1000/inhabitant/year[1] and since the city only has a fraction of that budget it is facing problems with reaching the ambitions.

Institutional context

The advantage of being a rather small administration is that it is possible to have a closer contact with the political level than in bigger cities which enables Vilvoorde to have a creative and structured approach on climate issues. With the SEAP, Vilvoorde tried to involve all departments, however in terms of energy transition the decision making lies more in the hands of higher authorities.

On energy and climate policies

- **Local**

Vilvoorde has an approved 2030 climate plan and has recently signed the COM 2050 commitments. Vilvoorde is currently considering whether to use the Covenant of Mayors "linear approach" with the goal of 40% CO_2 reduction in 2030 or the backcasting approach towards 2050 climate neutrality.

- **Regional**

Because of its geographical location, Vilvoorde is very impacted by decisions taken in the Brussels region, especially in terms of transport, but cannot influence them much. Energy and climate policies are a regional competency in Belgium and recently the regional Government in Flanders has cut a number of subsidies to energy advice, decentralised energy production and energy efficiency measures.

- **National**

The energy mix in Belgium is of 40% of nuclear; 23% of gas; 10% of renewals and the rest are others and imported. Climate issues are not high on the agenda and the discussion about the Nuclear sector at this point is not helping. The provinces are currently trying to bring the cities together and get a group dynamic in place.

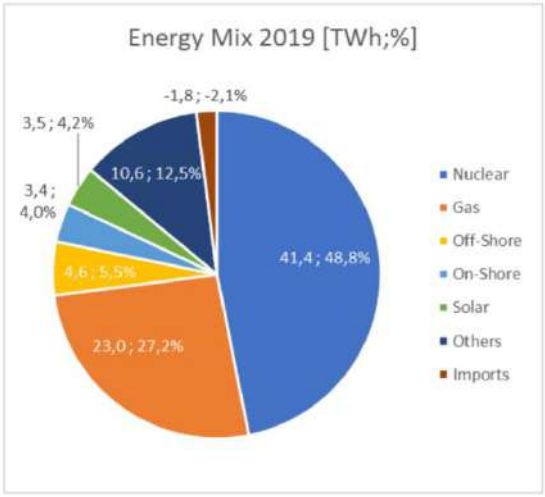


Figure 7: Belgium energy mix 2019

Important aspects of climate and energy planning

In 2017 Vilvoorde started a learning network with the Futureproofed Cities. Initially there were 6 cities and currently the network is counting 200 members.

Signing the Covenant of Mayors is not enough for Vilvoorde as reaching -40% in 2030 would not be in line with reaching carbon neutrality in 2050. In addition, a shorter term action plan and budget by 2025 is proposed by Futureproofed who calculated the impact of Vilvoorde for the next 6 years based on demanded budgets and it is possible to reduce approximately 0,85% of CO_2 emissions. With the inevitable budget cuts still to decide it's fair to say that the impact will be marginal in 2030.

The climate action plan 2025-2030 will be budgeted for the next legislature.

Main achievements in past SEAP

Vilvoorde submitted its SEAP in 2015. Currently, Futureproofed is doing the monitoring report. It seems like Vilvoorde will reach maximum 17% of CO_2 reduction in 2020 instead of 20% in the case all measures planned are delivered which is quite unlikely. Vilvoorde will not reach the energy efficiency, nor the renewables targets.

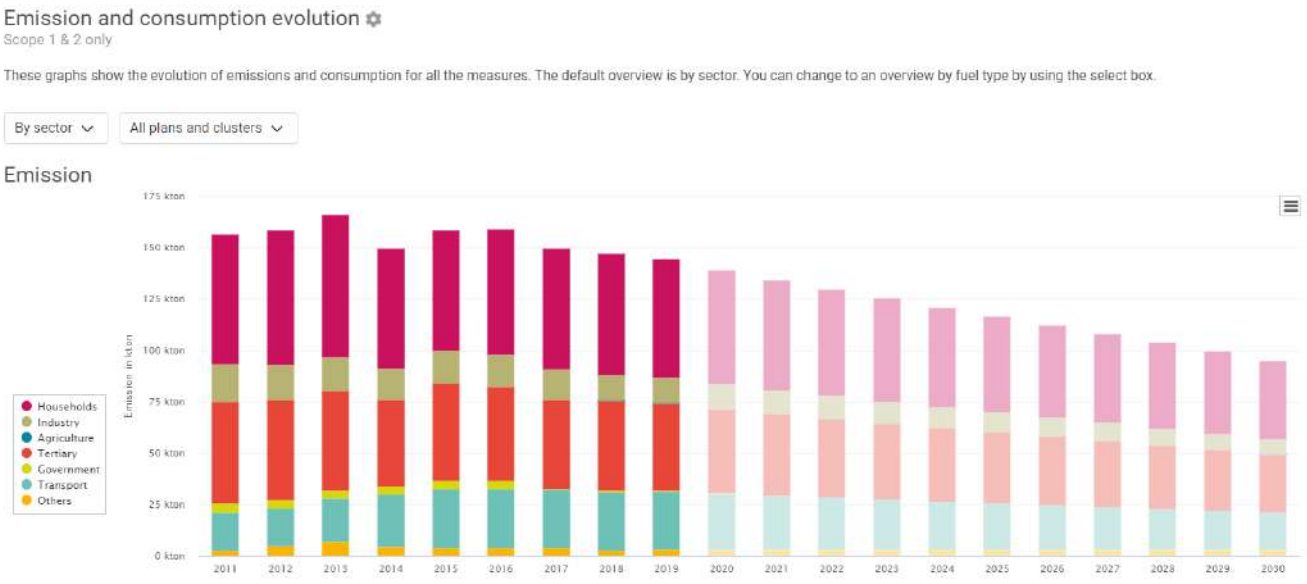


Figure 8: CO_2 emissions evolution FPC

1b Focus: Why an integrated action plan (IAP) after a SECAP 2030?

1b1 Vilvoorde climate plan 2030

The Vilvoorde Climate Plan 2030 consists of the climate policy 2025 and the long-term vision 2030. The Vilvoorde 2030 climate plan builds on the 2020 climate plan. The 2020 climate plan was drawn up through participatory processes and projected to 2050. It is a city-wide view on what needs to happen until 2020 and what measures are needed to achieve the long-term goals.

The scientific calculation of the measures needed for this purpose forms the long-term vision 2030, which extends beyond the legislative period to 2025. This long-term vision, together with the progress report, forms the basis for the biennial report for the covenant of mayors office.

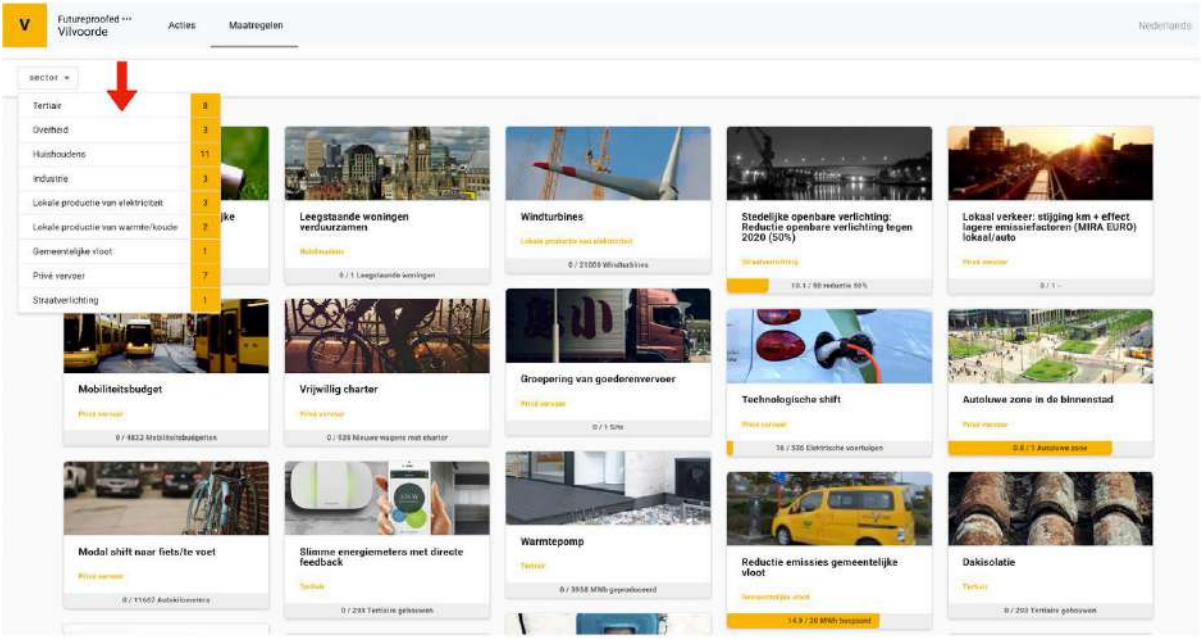


Figure 9: Measures in Futureproofed Cities

In recent years, a lot of work has been done on visible actions and at the same time on the internal organisation of the city. Today, climate policy is not isolated and has seeped into every policy domain of the city organisation. In this way the climate policy facilitates what needs to happen throughout the city.
We have also learned something in recent years. A long-term vision alone is not enough. There is a need for a plan for this period, drawn up on the basis of the local challenges and ambitions of the administrative agreement. For climate, this is the Climate Policy 2025. This policy is attuned to the budgets and deployability of the services for this legislative period with concrete achievable objectives.

1b2. Strategy towards 2030

In other words, in the 2030 climate framework we want to look for long-term leverage, a two-step leverage from three starting points.

The 3 starting blocks are depicted as 3 collections:

1. The first starting block is the city as an organisation that wants to set a good example in various areas: by actively saving energy and by a bicycle leasing programme for its employees, to name but a few. (red collection, see figure below)
2. Secondly, we look at all policy areas of the city through the lens of climate and, from the start of the multianual plan, we have always looked for projects and investments that not only do what is necessary, but also make our city more sustainable and climate-proof. (green collection, see figure below)
3. The third starting block concerns all actors, companies, residents, associations etc, local or European, that can contribute to achieving the objectives. (blue collection, see figure below)

These three starting blocks should allow us to make a strong start in the first step towards 2025 - the core of this Climate Plan. In the second step, knowing that we want to land with 40% CO_2 reduction by 2030, we aim at leveraging the actions we will take between now and 2025.

Finally, all the actions are divided into 5 themes, the 5 main chapters of the Vilvoorde Multiannual Plan 2020-2025:

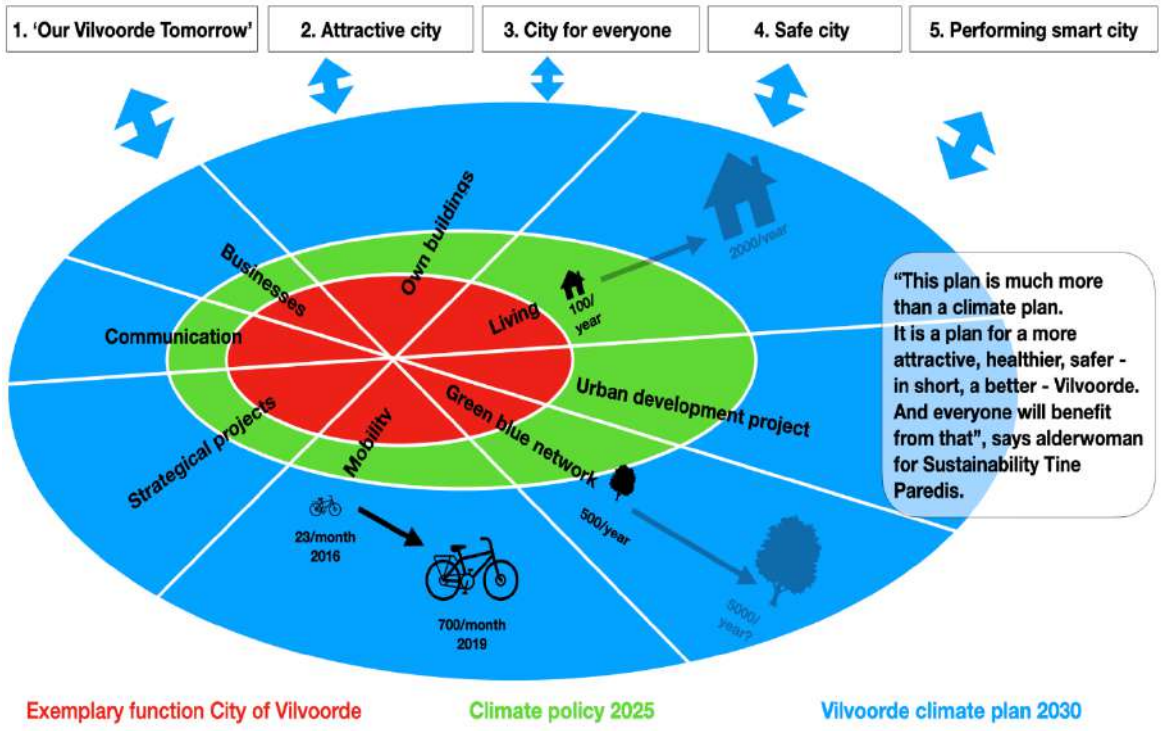


Figure 10: 3 different levels of action planning

1b3. Climate policy 2025

One of the priority policy objectives in the multi-year plan is: "Vilvoorde facilitates a sustainable and socially climate-proof society".
This slogan is the translation of the claimed "sustainability revolution" from the administrative agreement into a clear objective.

This important policy objective comprises 4 action plans:

1. Raising awareness: We work on changing the behavior of the citizens of Vilvoorde in order to combat climate change and reduce CO_2.

2. Urban space and mobility: we deploy instruments that contribute to sustainable urban development and carry out actions that contribute to a modal shift.

3. Energy transition: we facilitate the transition to a fossil-free energy supply and achieve energy reduction in homes and businesses.

4. Leading by example: we develop an internal sustainability policy and set an example in the field of sustainability with the city services.

1b4. Climate plan 2030: the path to 2030

In most municipalities and smaller towns in Flanders, 'the climate plan' is still disconnected from the general policy. The climate plan usually ends up in the corner of 'environmental policy'. This, whereas in large cities and some municipalities in Flanders (and beyond), we are seeing that local challenges are being tackled thanks to climate plans.
These cities and towns are now the attractive places that inspire others. Climate policy must be interwoven with the other policy areas. The climate policy is the perfect place to allow “Vilvoorde to develop into a pleasant city by the water where it is good to live and work", as the administrative agreement puts it.

In the meantime, Vilvoorde has definitely understood that a climate policy can help to bring solutions for various challenges in different policy areas. We are therefore seeing a change; the various policy areas and objectives are becoming increasingly interwoven with the Vilvoorde climate plan, and vice versa.

The start was made with an initial climate plan in 2014 with 36 measures that were calculated through to 2020. Today, the challenge remains the same, if not greater: we still need to radically insulate more houses, generate more renewable energy and reduce emissions from our traffic. The challenges remain broadly the same, the urgency is greater and we have less time to achieve our goals.

1b5. Long-term vision: up to 50 measures for 2030

More than 10,000 mayors in Europe are committed to work on their climate plans. Commitment requires a plan. Within the framework of the Covenant of Mayors requires a plan of measures that has been scientifically calculated for the longer term up to 2030. Based on the best quality data, these measures were calculated to 2030. This set of 36 CO_2 reduction measures indicates in broad and concrete terms what the challenge for the city of Vilvoorde is to reduce CO_2 emissions by 40% by 2030. To give an indication of the scale of this challenge: we would need to insulate more than 2,000 housing units per year or install 2500 solar panels per year.

Whenever the scientific data set changes, the measures can also be adjusted. For example, the CO_2 emission factor for electricity production changes every year. It usually decreases, so the efforts to reduce reduction efforts are also reduced. These adjustments are done online on the monitoring tool FutureproofedCities. Next to the CO_2 reduction we also know the best possible estimation of the investment and revenues of the measures. This allows city government to focus on the right measures that are the most economically and sustainably interesting for citizens, businesses and governments.

All these measures, their progress and related actions are accessible to everyone. You can choose the sector and consult each measure. Vilvoorde is part of a network of 200 cities and municipalities in Europe and the world that are using this tool. In this way, the city is connected to other good examples and successes of fellow cities and municipalities.

Along the mitigation measures the adaptation measures are added in the tool so that we also prepare the city for the risks of climate change that are coming in the next years.

1b6. Scaling up with the help of Europe

We indicated earlier: Vilvoorde's city organization cannot do this alone.
With its Green Deal, Europe has a great program for making the economy sustainable. The goal: no net CO_2 emissions in 2050, economic growth decoupled from fossil energy and no person or region left behind.

The city of Vilvoorde is seizing the opportunity via the European URBACT 'Zero Carbon cities' program to sit at the table, work together and mutually learn from six other cities: Bistrita (RO), Frankfurt am Main (DE), Manchester (UK), Modena (IT) , Tartu (EE) and Zadar (HR). This Zero Carbon Cities project runs until 2022 and aims to help organize and build capacity to implement actions. By participating in this project, Vilvoorde does not want to miss any opportunities at European level.

1b7. Sense of urgency: Carbon budget

Context

In the framework of the URBACT Zero Carbon Cities project, the city of Vilvoorde will adopt a local carbon budget to help guide strategic decisions on a policy level. Defining a carbon budget emphasizes the sense of urgency of climate action on a science-based method in alignment with targets set under the Paris Agreement. The global carbon budget framework defines the allowable cumulative emissions of carbon dioxide associated with a given level of global warming, since an emission of CO_2 has the same effect on global temperature regardless of time of production.[1]

Methodology: Grandfathering approach

The process of calculating a carbon budget, starts with a global carbon budget. The global carbon budget used here, has a likely (66%-100% probability) chance of reaching 2°C and about as likely as not (33%-66%) for 1.5°C. It is a global Paris-compliant carbon budget, starting from 2020 of 716 Gt CO_2. From this global carbon budget, the national carbon budgets for the countries are sub-allocated through grandfathering, following the method of Anderson *et al*.[2] The city of Manchester took a lead in the calculations of the national carbon budgets and proposed methods to further calculate the local carbon budget.[3]

For the sub-allocation of the Belgian carbon budget to Vilvoorde, a choice of approach needed to be made between population-based, equity based or grandfathering. Population-based approach is not preferred, it only considers population size, doesn't consider carbon intensity or history of carbon activities and more specific data is available for Vilvoorde. The equity-based method, although accounting for economic activity, does not consider the carbon intensity of those economic activities. Grandfathering does consider historic and current emissions and thus was prefered.

The principle of grandfathering states that the size of a nation's budget should be calculated based on the nation's current share of global emissions.[4] For this allocation method we need at least 5 years of historic data covering energy usage and transport (scope 1&2). This is needed to even out data anomalies. These local data are made easily accessible for the period 2011-2019 through the platform of FutureproofedCities, which is used as a monitoring and communication tool on climate action. FutureproofedCities obtains this data from VITO emission inventories.[5] We highlight that emissions from aviation and highways are excluded, as these are a national responsibility and the city of Vilvoorde has little to no impact on this. The Covenant of Mayors allows to exclude these aviation and highway

[1] Renaud Gignac and H Damon Matthews (2015). Allocating a 2°C cumulative carbon budget to countries. *Environ. Res. Lett.* 10 075004

[2] Kevin Anderson, John F. Broderick & Isak Stoddard (2020) A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways, Climate Policy, 20:10, 1290-1304

[3] Dr Christopher Jones (November 2021). Guidance for Setting Carbon Budgets for Cities

[4] Anderson et al. (2018). A Guide for a fair implementation of the Paris Agreement within Swedish Municipalities and Regional Governments. Climate Change Leadership Node, Uppsala University, Sweden.

[5] https://burgemeestersconvenant.be/ CO_2-inventarissen

emissions. For policy reasons Vilvoorde has adopted a linear reduction strategy, which is also reflected in the carbon budget strategy below.

The allocation from the Belgian (BE) carbon budget to Vilvoorde's (V) carbon budget, is based on the Vilvoorde's share of average emissions over the period 2011-2019 in the average emissions of Belgium over the period 2011-2019.[6] To calculate Vilvoorde's carbon budget, this percentual share is multiplied with the Belgian carbon budget. The following formula is used:

$$Carbon\ budget_V = Carbon\ budget_{BE} * \frac{Average\ emissions_V\ ('11-'19)}{Average\ emissions_{BE}\ ('11-'19)}$$

The aim of this carbon budget is to implicate the sense of urgency and to use this as a tool/asset to show the responsibility of the different stakeholders. The next step will be: 'How to translate this carbon budget towards the different stakeholders?'.

Results: Vilvoorde's Carbon Budget

Table 1 shows a summary of the most important factors calculated based on the grandfathering approach described above. The carbon budget for Vilvoorde is 1.145,20 kton CO_2.

Table 1: Summary of factors used for carbon budget calculations.
(: number calculated by the city of Manchester)*

National carbon budget Belgium in kton CO2 (2020-2100)*	870.000,00
Share Vilvoorde of Belgian emissions ('11-'19)	0,1316%
Carbon budget Vilvoorde ('11-'19) in kton CO2	1.145,20

Figure 1 represents the evolution of the emissions of Vilvoorde, starting from 2011. This graph shows Vilvoorde's current ambition to reduce emissions by 40% (since 2011) in 2030, according to the Covenant of Mayors.[7] The dark blue bars indicate verified data, according to VITO inventories. The light blue bars are the projected emissions based on the ambition to reduce emissions with 40% by 2030 compared to 2011. This ambition results in an emission of 83,52 kton CO_2 in 2030. Assuming a linear decrease over the years, the carbon budget of 1.145,20 kton CO_2 is already exceeded in the year 2029 (red bar in Figure 1). This is a clear sign that climate action and reducing emissions is of utmost importance. Ambitions should be set as high as possible. However, we note that actual resources of Vilvoorde are strongly insufficient. Currently, a budget of €6,65/citizen/year is operational to implement the climate plan. The estimated budget necessary to transition is around €1.000/citizen/year.[8] The latter indicating that more resources and support should become available on regional, national, and international level.

[6] https://klimaat.be/doc/nir-2021-150421.pdf
[7] https://www.eumayors.eu
[8] Climate Plan Vilvoorde 2030

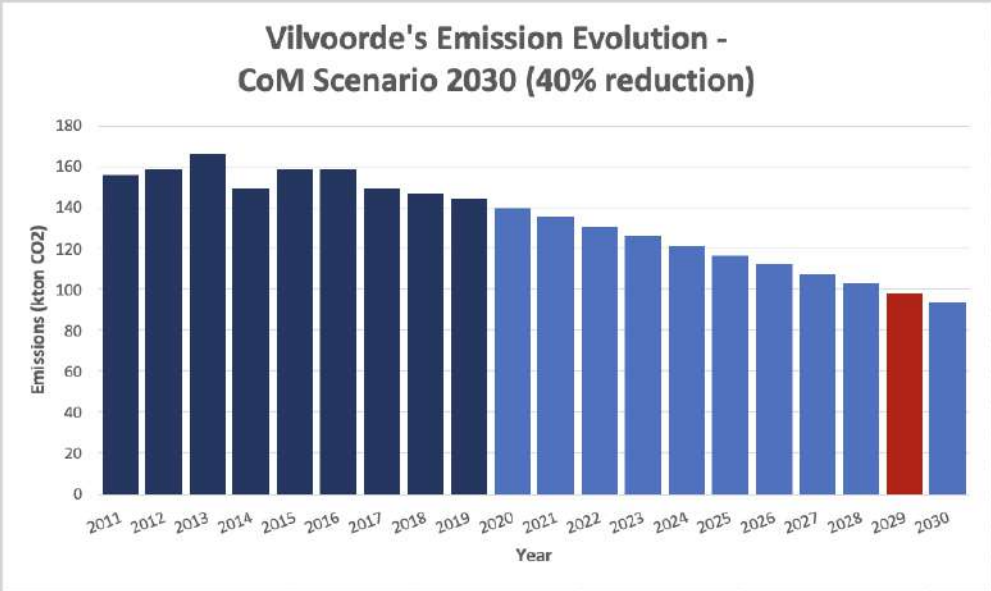


Figure 11: Emission evolution of Vilvoorde, with the ambition to reduce with 40% (since 2011) by 2030.

Figure 2 shows the evolution of the emissions of Vilvoorde when keeping within their carbon budget. This shows that to follow the carbon budget, Vilvoorde has 15,85 years (since 2019) left to reduce their emissions with a linear strategy. With a yearly reduction of 9,12 kton CO_2 the carbon budget will be exhausted in the year 2035.

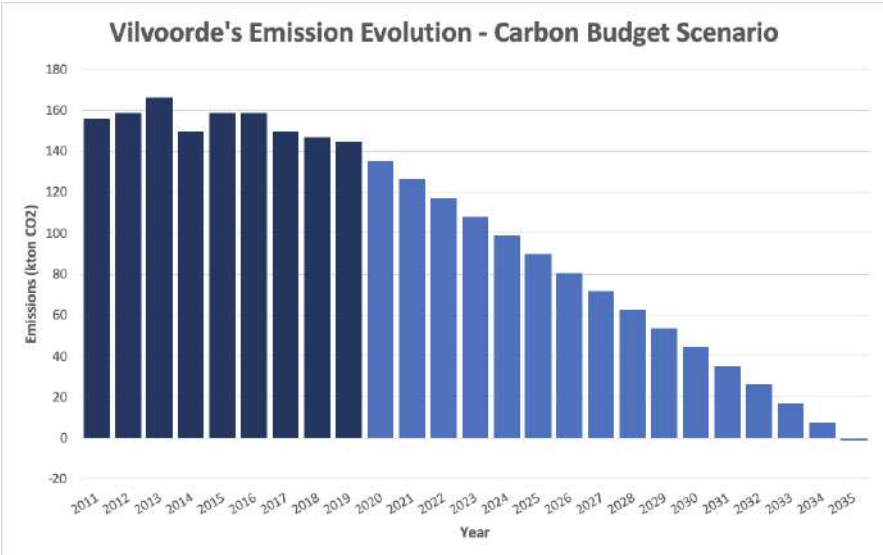


Figure 12: Emission evolution Vilvoorde following the carbon budget (grandfathering).

The effect of a different carbon budget calculation methodology

FutureproofedCities shows the effect of a different calculation method for a carbon budget.[9] In the monitoring tool a 1,5°C alignment target shows whether a city/municipality is on track to keep global warming below 1,5°C by 2100 in alignment with the goals set by the United Nations (see Figure 3; blue dotted line). Figure 3 also shows the projected emissions in

[9] https://www.futureproofed.com/cities

Vilvoorde based on a current climate plan (under development) uploaded in FutureproofedCities.

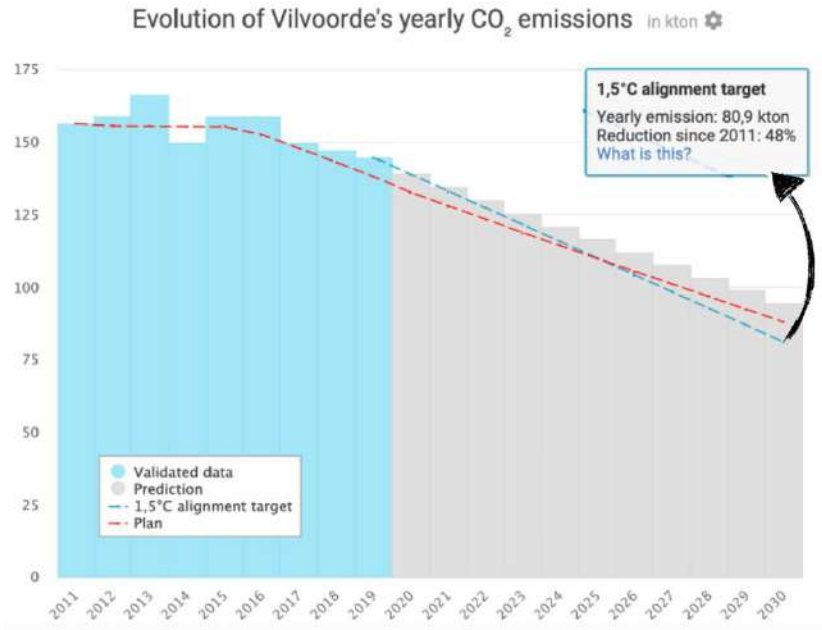


Figure 13: Evolution of Vilvoorde's emission with 1,5°C alignment target (blue dotted line).

Identical to the grandfathering approach, this target is based on a carbon budget for Vilvoorde. However, a different result is obtained (see Figure 14). This difference is due to a different calculation methodology and its assumptions. In FutureproofedCities the target is based on the OPCC approach from WWF.[10] This difference implicates that a carbon budget should be adopted with caution. But the message is clear for both carbon budgets: it's time to act drastically.

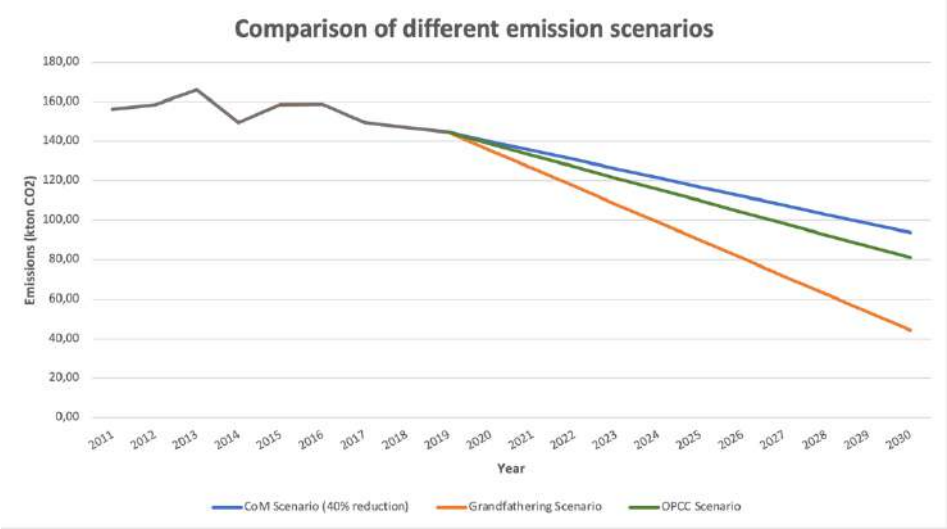


Figure 14: Comparison of different emission scenarios for Vilvoorde. The grey line shows validated data.

Table 2 shows the emissions in 2030 and the linked reduction compared to 2011 of three different scenario's. The Covenant of Mayors Scenario, where Vilvoorde pledges to reduce its emissions with 40% in 2030 compared to 2011. The second scenario is according to the

[10] Science-based climate targets: A guide for Cities

carbon budget calculated through the allocation method of grandfathering based on research of Anderson et al.[11] According to this method Vilvoorde should reduce its emissions by 71,69% in 2030 compared to 2011. The third scenario is the OPCC approach from WWF, which FutureproofedCities used for their 1,5°C alignment target. Which results in a reduction of 48,21% in 2030 for Vilvoorde compared to 2011. The last two scenario's result in a difference of 23,48%, despite both being science-based targets that adopt a carbon budget. Before we continue on discussing this difference and its implications, let's take a look at the two different calculation methods in more detail.

Table 2: Emission targets for 2030 in Vilvoorde for three different scenarios.

	CoM scenario	Grandfathering	OPCC approach
Emissions in 2030 (kt CO2)	93,72	44,22	80,90
Reduction 2011-2030	40,00%	71,69%	48,21%

The grandfathering method

The grandfathering method has already shortly been described above, but below you can find more details to better understand the calculation methodology differences.

The grandfathering method is an allocation method, which determines the budget shares of a specific region based on the global climate change target, which was determined in the Paris agreement, aiming to keep global warming well below 2°C. As all allocation methods it includes equity and fairness according to the principle of "common but differentiated responsibilities and respective capabilities" or CBDR-RC.[12] Considering that countries have different contributions to global warming, the emission peak of developing countries will take longer, and some can transition more quickly to low carbon options considering their economic development.

The method consists of two key steps, first going from a global carbon budget to national carbon budgets and next going from the national carbon budget to a local carbon budget. The starting point of this method is the global carbon budget as identified in the Special Report of IPCC, thus what the whole world can still emit between 2020-2100 to stay on track with keeping global warming well below 2°C, preferably 1,5°C.[13] This budget specifically focuses on CO_2 emissions arising from energy consumption. It excludes process emissions (for example fossil fuel and cement processing) and emissions from LULUCF (for example deforestation), because these are 'global overhead'. They are seen as a common responsibility amongst all nations. An eventual global carbon budget of 716 $GtCO_2$ was used to allocate to national carbon budgets. The global carbon budget was first divided over the developing and developed countries taking into account that pathways for developing countries will peak longer.

[11] Kevin Anderson, John F. Broderick & Isak Stoddard (2020) A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways, Climate Policy, 20:10, 1290-1304
[12] United Nations Framework Convention on Climate Change
[13] IPCC Special Report – Global Warming of 1,5°C

The national carbon budget is used to allocate a local carbon budget. The Belgian carbon budget of 870 Mt CO_2 (2020-2100) was calculated based on Anderson et al. for the URBACT Zero Carbon Cities.[14,15] This step was already explained in the section above.

OPCC approach from WWF

The One Planet City Challenge approach from WWF is very different.[16] Unlike the grandfathering method, it doesn't start from a global carbon budget but from the target that emissions should be halved by 2030, as mentioned in the Special Report of IPCC. This science-based climate target is in line with the goals of the Paris Agreement. To incorporate equity and fairness, a correction factor based on the Human Development Index (HDI) is used.[17] The assumption here is that a higher HDI equals more resources and thus a higher contribution to the rising emissions.

This methodology builds upon the Deadline 2020 (D2020) methodology, which is based on GDP and per capita emissions. [18] The OPCC approach integrates new considerations of fair emissions budget allocation compatible with the 1,5°C goal. It is a very accessible methodology because the necessary data points are limited; HDI scores, population data and emissions baseline (Scope 1&2) as close to 2018 as possible. The HDI is currently only available up until 2030, explaining why we can only compare up until 2030 (see Figure 4).

The calculation follows 4 steps:

1. Gather 2018 Scope 1 and Scope 2 city-wide GHG emissions and divide by 2018 population to obtain the '*baseline per capita emissions*'.
2. Use the Human Development Index (HDI) to estimate a reduction target from 2018 levels, that reflects a fair share of the 50% global emissions reduction by 2030 identified in the IPCC Special Report on Global Warming of 1,5°C

$$Reduction\ target = 1 - [0{,}5x(HDI\ correction\ factor)]$$

$$HDI\ correction\ factor = 1 - \frac{HDI_{Country} - HDI_{Global\ average}}{HDI_{Global\ average}}$$

3. Translate the 2030 target to a '*per capita emission reduction*' value. Multiply the '*baseline per capita emissions*' value (step 1) with [1 - the reduction target (step 2)].

$$Per\ capita\ emission\ reduction = baseline\ per\ capita\ emission\ x\ (1 - reduction\ targe)$$

Type equation here.

[14] Dr Christopher Jones (November 2021). Guidance for Setting Carbon Budgets for Cities.
[15] This Belgian carbon budget has not been adjusted for international aviation and shipping emissions.
[16] Science-based climate targets: A guide for Cities
[17] https://hdr.undp.org/en/countries
[18] Deadline 2020 – How Cities will get the job done (C40, Arup)

4. Translate the 2030 '*per capita emission reduction*' value to an absolute emissions value. Multiply the 2030 '*per capita emission reduction*' value by the forecasted 2030 population of the city.[19,20]

Differences & Implications

Now that we have discussed the two methodologies separately, let's look at some factors playing a role in the observed difference.

Grandfathering methodology	OPCC methodology
Allocation method: it downscales the global budget to a national budget, to a local carbon budget.	A global climate target is set as a local climate target.
It starts from an adjusted global carbon budget (716 $GtCO_2$).	It starts from the target to reduce emissions by half by 2030 (50% reduction).
For equity/fairness, the allocation is based on historic emissions.	For equity/fairness, a correction factor based on HDI is used.

This demonstrates that the calculation methodology strongly impacts the carbon budget or 1,5°C trajectory. Besides these two methodologies multiple other methods exist. It should also be noted that all the data used has a certain error margin. In the research of Anderson et al. the following is stated; "When considering mitigation strategies, it is important to be aware that carbon budgets, although offering a scientifically robust framework, are necessarily the product of a range of evolving assumptions."[21] Even the most ambitious mitigation strategies transfer a significant proportion of the responsibility on to future generations and require an immediate increase in mitigation rates by a factor of two to over 10%. Whether the reduction for Vilvoorde by 2030 should be 48,21% or 71,69%, the main message is clear: the challenge we are facing is big and it's time to act as quick as possible to minimize devastating climate impacts.

[19] Official UN forecasts from the Department of Economics and Social Affairs

[20] The average growth rate r ('20-'30) is applied from the latest population data available (P_0). The following formula was used: Population 2030 = $P_0(1+r)^n$

[21] Kevin Anderson, John F. Broderick & Isak Stoddard (2020) A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways, Climate Policy, 20:10, 1290-1304

1c The process: Setting up a local stakeholder groups at different levels

1c1. SEAP participation

The participatory approach to projects is increasingly becoming a focus of attention within the city. Various departments are looking at how participatory processes can be started up and provide added value. However, participation with citizens and other stakeholders is still in its infancy and is becoming more and more structurally anchored within the city's policy.

When building up the SEAP, this was already tested via different participation channels. Both the internal services and the citizens and companies worked on climate objectives for the first time. This gave a good result in terms of capturing ideas, but remained limited in terms of responsibility and ownership. There was still too much focus on the city to start and carry out all these actions.

Figure 15: Participation SEAP

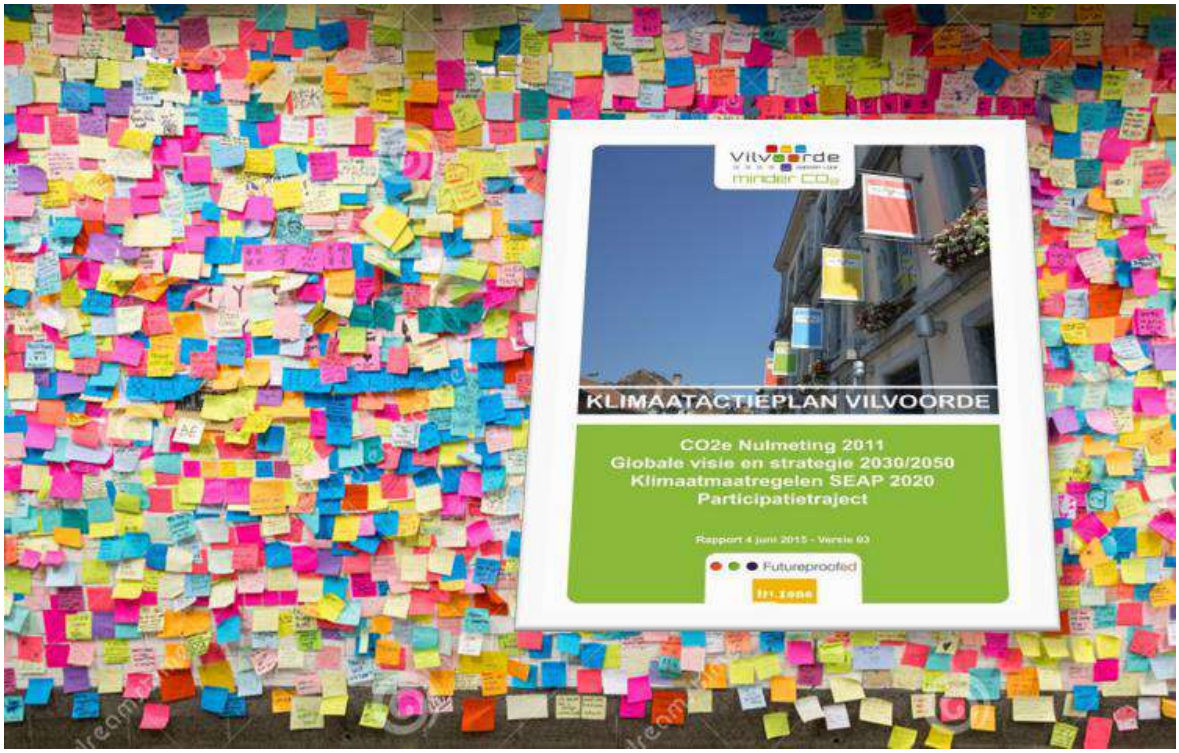


Figure 16: Capturing ideas

1c2. Our Vilvoorde Tomorrow

Participatory processes were also used in other urban projects. For example, when drawing up the long-term vision "Ons Vilvoorde Morgen", a panel of local experts was used to reflect on the future vision of the city. Citizens were asked to help think about the future images of the city on the basis of their expertise.

Ons Vilvoorde Morgen

Figure 17: Ons Vilvoorde Morgen

1c3. Urban development Asiat-Darse

The vision of the mixed urban district Asiat Darse is being determined with stakeholders. By means of participation meetings live and online, visions and ideas were captured that will be further elaborated by the city. The participatory approach not only ensures more involvement but also provides a support base for the further development of a complex district.

Parallel to this vision creation, a participation process was rolled out for a temporary alternative use of the site in the form of a call for city makers. This resulted in all kinds of temporary activities on the site, with the Horst Festival combining art and music at this experimental location as the eye-catcher.

Vilvoorde Stadsmakers

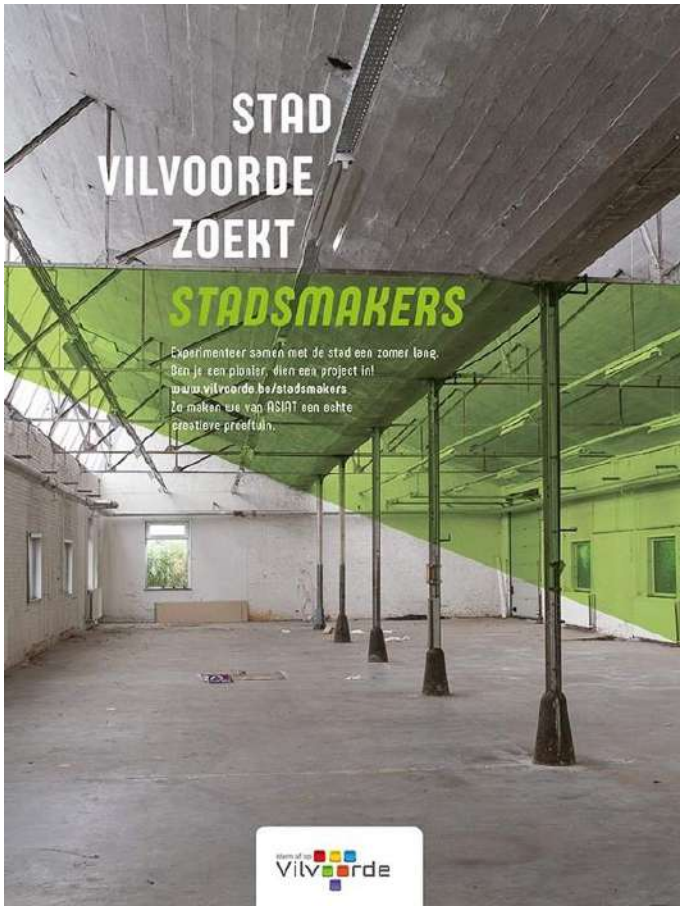


Figure 18: Vilvoorde Citymakers

https://www.facebook.com/watch/?v=864533080666206

1c4. Neighbourhood contracts

Since the start of the Urbact project, the city has also recruited a participation officer to embed participatory processes more and more in different urban projects. A first roll-out of the participation approach is the process of the district contracts. Here, for three years, all the different districts are visited with a participatory approach to mobility and the public domain. Citizens are questioned in their neighbourhood about the needs and wishes regarding mobility problems and improvements in the public domain. These are targeted neighbourhood visits in the form of idea markets where one-on-one conversations are held between the city and the citizens. This is combined with an online survey via the citizenlab platform, where citizens can propose their ideas and where other local residents can vote for the best ideas. The city will then work with the best ideas to realise them together with the residents.

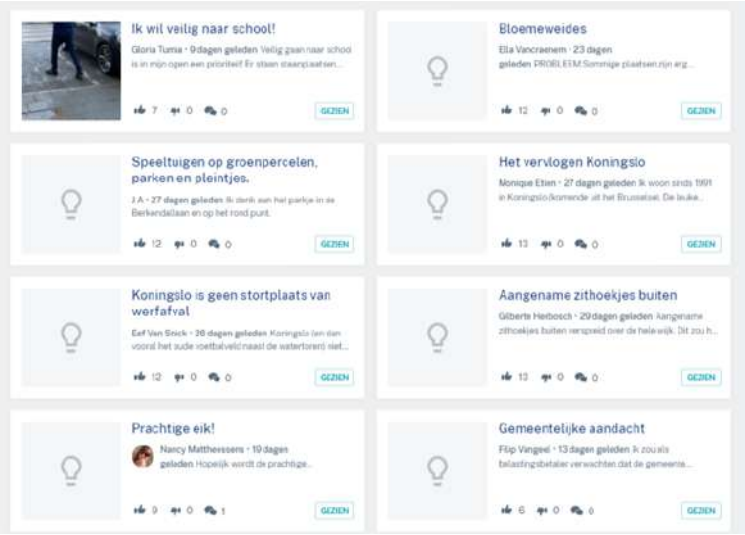


Figure 19: Citizenlab Vilvoorde

Figure 20: Vilvoorde is yours!

This is a real call to action: Vilvoorde is yours, make something of it!

1c5. Companies

In addition to citizen participation, the city wants to strengthen the dialogue with companies. In the past, cooperation with companies was non-existent and they only came into contact with the city in the case of permits or complaints.
By appointing the city's weaving coach, this missing link will be solved. The city's weaving coach will be the link between the companies and the city and must help to further develop the constructive cooperation with companies.

Figure 21: Presentation Urbact at Cargovil+ reception

1c6. Organic growth of a local stakeholder group

Starting up a local stakeholder group is not easy for small cities because of a lack of time and capacity. To overcome this, several projects try to build up a stakeholder network through participatory processes. These are stakeholders who engage with the city on different fronts and in time can grow into a diverse mix of different perspectives.
In this way, we strive for longterm sustainable cooperation that can lead to concrete results and actions.

By working with subgroups on different themes and projects, we get an ever-growing cooperation between the different city departments and local, regional and national stakeholders. With this approach, we avoid the think tank method and move much faster to concrete problems and hands on solutions and responsibilities.

List of city departments involved in the action plans

Climate policy expert	**KLIM**
Department for education	**OND**
Communication department	**COM**
Buildings department	**GEB**
Social House	**SH**
Department of strategic projects & urban development	**SPSO**
Department of equal opportunities	**GK**
Leisure department	**VT**
Environmental department	**OMG**
Public domain and mobility department	**ODM**
Department of housing and enterprise	**WO**
Logistics department	**LOG**
Urban and community maintenance department	**SWO**
Property management department	**VG**
HR department	**PER**

List of stakeholders involved in multiple subgroups and actions

The Middle Men	Communication
Beplanet	project management
Matexi	Property developer
Acasa	Property developer
Chamber of quality and sustainability	Urban experts
VITO	Flemish institute for technological research
VOKA	Flemish network of entrepreneurs
Avansa	Social cultural organisation
Huis van de mens	Flemish liberal humanist associations in Flanders and Brussels
The Hedge	Nature and education
Fluvius	Flemish grid operator
Vectris	Mobility research office
De Werkvennootschap	Mobility agency Flemish government
VLAIO	Flemish agency for innovation and entrepreneurship
3WPlus	Intercommunial organisation for living, work and healthcare
SAAMO	Regional social organisation
OVAM	Flemish environmental organisation
INCOVO	Regional waste company
De Lijn	Flemish public transport company
AWV	Flemish agency mobility
EVR	architecture and sustainability office
Aquafin	Flemish wastewater agency
ENGIE	Energy company
ANB	Flemish nature agency
Goodplanet	Belgian environment organisation
Citizenlab	Online participation platform
VVSG	Organisation of Flemish cities and municipalities
Factor 4	Energy research office
Kelvin solutions	Energy research office
Local social associations	

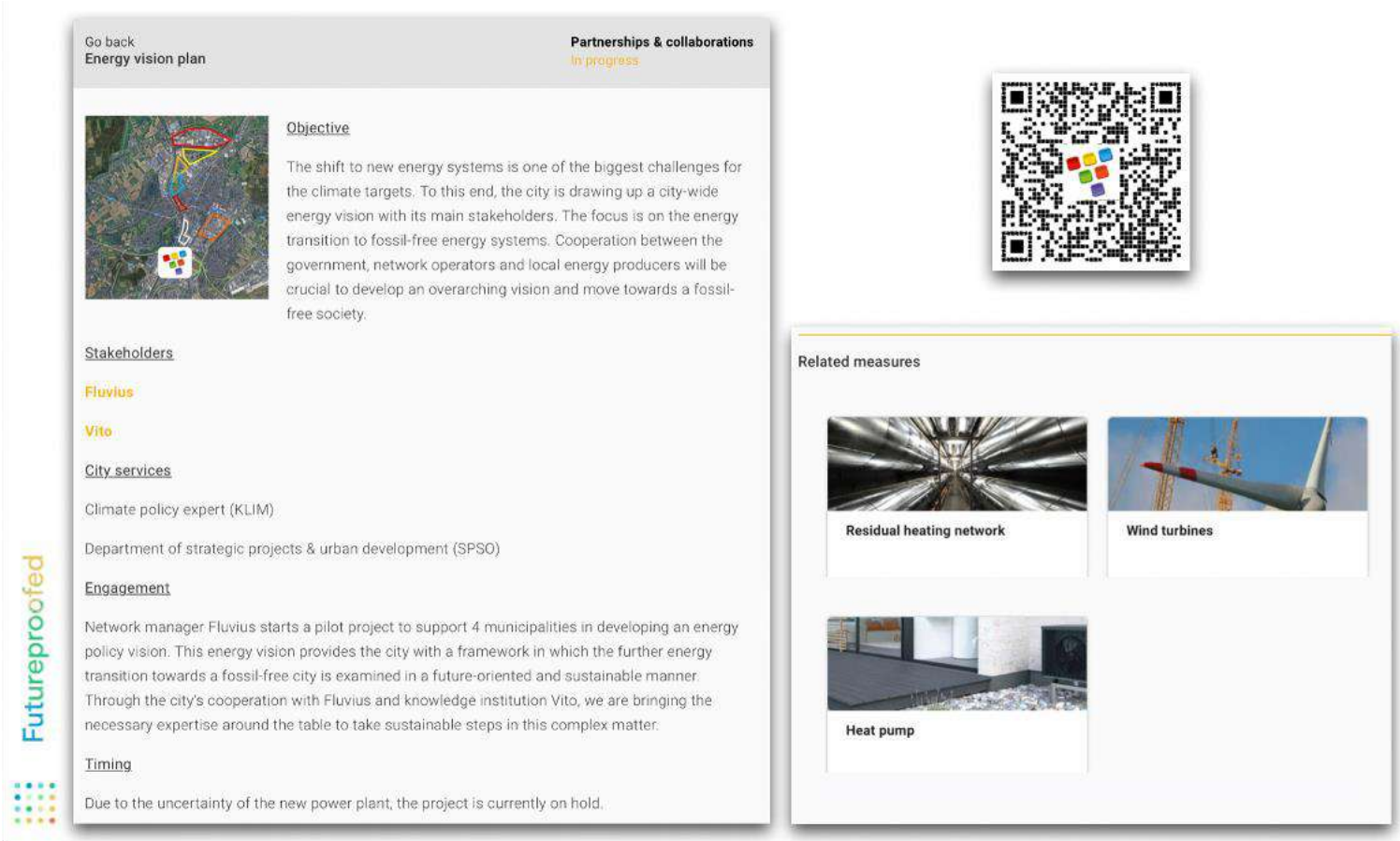
2a Objectives, actions and schedule

When drawing up a concrete, practicable action plan, it is important to keep the focus on all topics within climate policy. Even if there are few or no ongoing actions, it is useful to start pilot projects. Experience shows that pilot projects can be a starting point for learning and for creating leverage so that they can grow into structural and sustainable projects of co creation. In this action plan, we give an overview of these different sectors, each with a number of projects and/or actions. This overview also shows in which areas the city has already taken initiatives and in which areas the first pilot projects are being launched. The partnerships with various city departments and with local stakeholders will be further developed in order to take further sustainable steps in all areas to realise this transition.

Below you can find the actions as they appear on the communication page of FutureproofedCities. This will allow us to further monitor these actions and in a later phase follow-up on our network in a digital way. For every action a QR-code is added that redirects to the action on the communication page of FutureproofedCities.

2a1. Energy

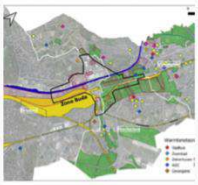
In the field of energy policy, a number of pilot projects have been launched and partnerships have been established with a number of important stakeholders.



Go back

Heat grid screening BUDA+

research
Done



1
warmtenetscreening

Objective

BUDA+ is the southern industrial site of the city where a heat network screening was done. This was performed by energy specialist Kelvin Solutions in collaboration with the province of Flemish Brabant and the neighbour municipalities of Machelen and Brussels. A number of potential sources of residual heat have been investigated and a first step towards potential cooperation has been checked and reported within this project.

Stakeholders

Province of Flemish Brabant

Kelvin Solutions

City of Brussels

Municipality of Machelen

City services

Climate policy expert (KLIM)

Department of strategic projects & urban development (SPSO)

Engagement

A first inter-municipal cooperation was started to facilitate inter-city energy systems. With this screening potentials of sources and consumers were mapped.

Timing

The heat network screening for BUDA+ has been completed and will be further incorporated into the city's overall energy vision.

Related measures

Residual heating network

Futureproofed

Go back

Development power plant

Partnerships & collaborations
Paused

Objective

In the energy transition of Belgium, back-up systems for renewable energy will be necessary. The owner of the current (outdated) gas plant has an application pending to build a new CCGT on the site. This should become one of the most advanced gas plants in Europe.

Stakeholders

ENGIE

VITO

City services

Climate policy expert (KLIM)

Department of strategic projects & urban development (SPSO)

Engagement

First contacts with the energy producer have been made but due to the uncertainty of the power station, the project is currently on hold. Further clarification is needed to be able to take further steps here. These are decisions that need to be taken by higher authorities. Possible cooperation with the city is possible if the gas plant is part of the country's sustainable energy transition.

Timing

2025 ?

Related measures

Residual heating network

Photovoltaic solar panels in businesses

Futureproofed

Go back
SPRINT track

Partnerships & collaborations
Paused

Objective

The city organises a 2-day workshop with different stakeholders (companies, knowledge institutions, policy, ...) on energy transition. We map everything in the Cargovil zone to then see, under the guidance of Vito, whether opportunities and partnerships can be found for renewable energy.

Stakeholders

VITO

VOKA

Cargovil+

City services

Climate policy expert (KLIM)

Department of strategic projects & urban development (SPSO)

Engagement

Knowledge institution VITO brings expertise to the city to look for innovative ideas in the field of energy by bringing the right stakeholders around the table. The uncertainty surrounding the development of the power plant makes it impossible to continue. Thanks to the collaboration with Cargovil+, the neighbouring municipalities of Grimbergen and Zemst are also around the table.

Timing

For the time being, the project is on hold but will be resumed as soon as there is clarity about the power plant.

Related measures

Residual heating network

Futureproofed

Go back
Inspiration card Heat

research
Done

1
Inspiration card Heat

Objective

To accelerate the transition to renewable heat, the VVSG developed the inspiration heatmap. On this map, future prognoses can be studied in order to switch more quickly to collective heat systems.

Stakeholders

VVSG

VITO

City services

Climate policy expert (KLIM)

Department of strategic projects & urban development (SPSO)

Buildings department (GEB)

Engagement

The VVSG supports cities and municipalities in researching new heat supply systems. This tool can provide additional information and better calculated insights into a complex matter.

Timing

The tool is online and can be consulted

Related measures

Reduction emissions of municipal buildings

Residual heating network

Heat pump

Heat pump instead of gas boiler

Futureproofed

Go back

Rolling capacity fund

research
In progress

Objective

A rolling capacity fund was set up by the VVSG as a pilot project for making its own urban patrimony more sustainable. A potential screening is done with 5 buildings to check and calculate if there is enough potential to hire an internal energy expert.

Stakeholders

Faktor4

VVSG

City services

Buildings department (GEB)

Climate policy expert (KLIM)

Engagement

The research has started with 4 municipalities and in this learning network we are looking for possible quick wins through monitoring and steering. A start is also being made on the launch of an urban real estate strategy.

Timing

This study will be completed in less than a year

Related measures

Reduction emissions of municipal buildings

Reductie emissies stedelijke diensten

Futureproofed

Go back

Energy expert for city buildings

Other
Paused

Objective

The city will recruit an in-house energy expert to monitor and control the energy consumption of the city's assets.

Stakeholders

VVSG

City services

Buildings department (GEB)

HR department (PER)

Climate policy expert (KLIM)

Engagement

Energy monitoring is an important item within the city services. Despite years of structural work on energy and renovation projects within its own patrimony, the city lacks internally qualified personnel who are specifically and principally concerned with energy monitoring. In the framework of the Flemish energy and climate pact, part of the financial resources are provided for the recruitment of an internal energy expert. In theory, this should ensure that the reduction in energy consumption can offset the additional salary cost of the energy expert. In addition to energy monitoring, awareness-raising and guidance of building users will also be an important part of the task.

Timing

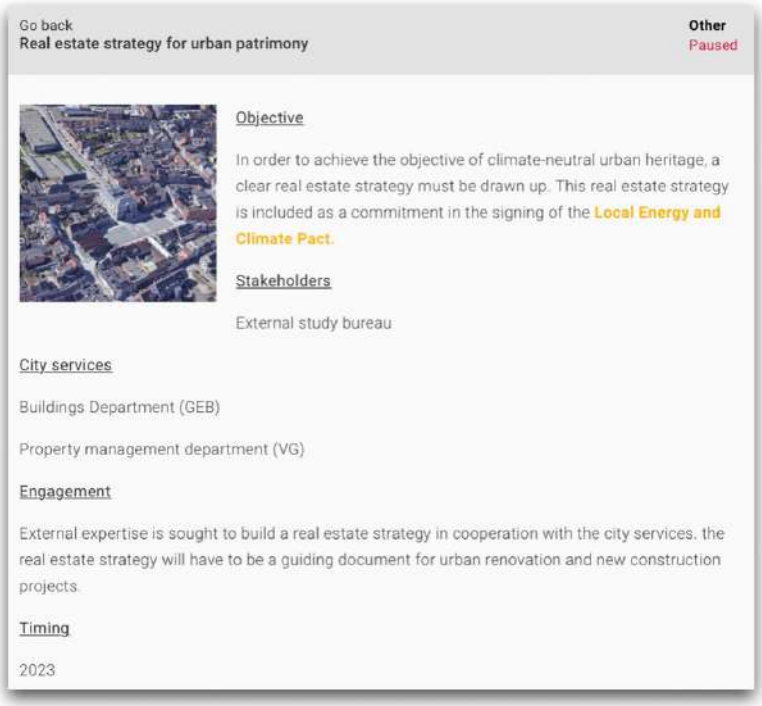
Recruitment will take place in the autumn of 2022

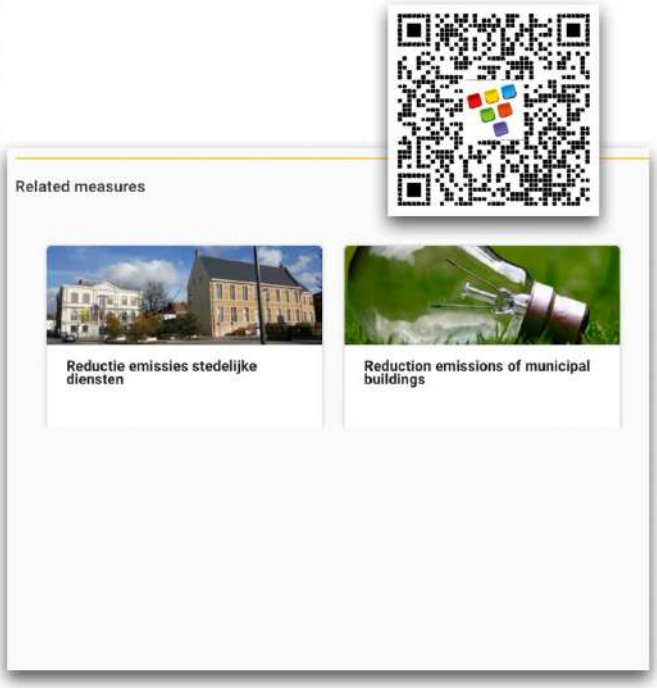
Related measures

Reduction emissions of municipal buildings

Reductie emissies stedelijke diensten

Futureproofed

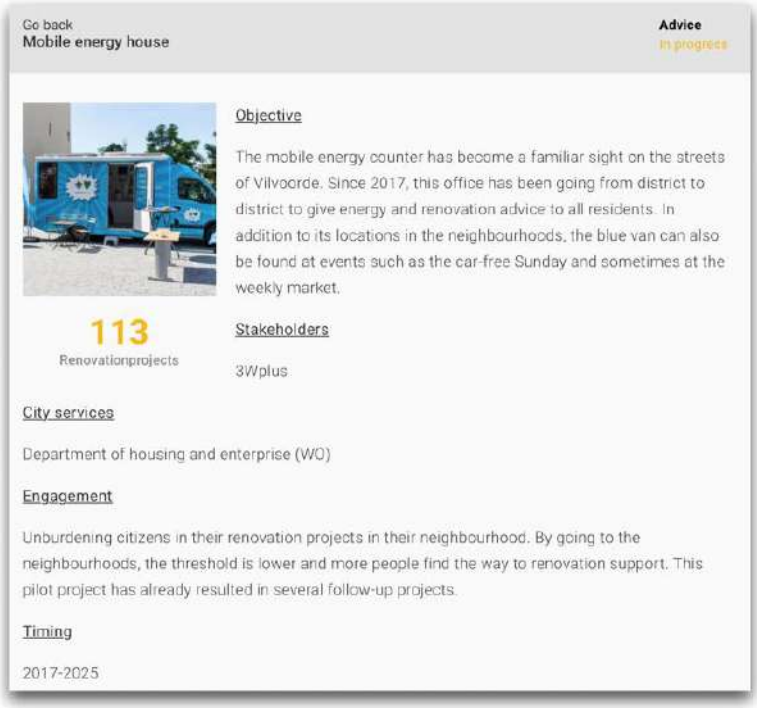


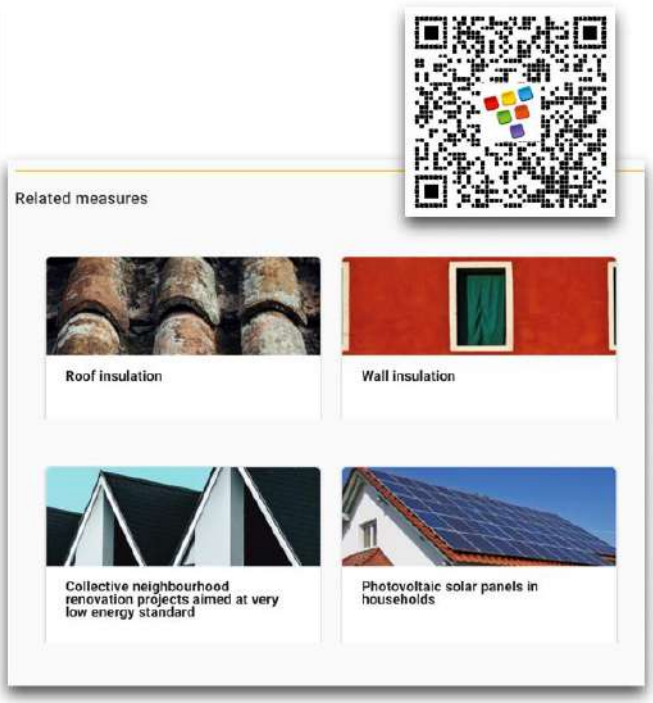


Despite the lack of a city energy policy, a number of initiatives are being launched to determine what the role of the city will be in the coming energy transition.

2a2. Renovation

If we want to meet the energy targets, the renovation rate of the existing patrimony will be of great importance. In 2017, the city launched a first pilot project to provide renovation guidance for households. In the meantime, this success has already grown into several renovation projects in cooperation with external partners.





Go back

Renovation support for multifamily houses

Other

In progress

Objective

New regulations impose stricter requirements on landlords with regard to renovation measures. By actively involving the co-owners' associations, we help them to comply with the legislation by offering them a guidance path. This not only leads to better living quality and lower energy bills for the tenants, but also to added value for the renovated buildings.

Stakeholders

3Wplus

City services

Department of Housing and Enterprise (WO)

Engagement

Enforcing the legislation and at the same time offering solutions are the strengths of this cooperation. The involvement of building managers requires an adapted approach. The expertise of 3Wplus is adapted to this.

Timing

2020-2025

Related measures

Roof insulation

High-efficiency glazing instead of single glazing

Wall insulation

Reduction of average energy usage in households for heating and electricity through behavioural intervention

Futureproofed

Go back

Buildingblock renovations

Other

In progress

71

Renovations

Objective

Together with the city of Vilvoorde and 3Wplus, SAAMO Vlaams-Brabant supports participants in their application and in the granting of the subsidies. We explain the renovation process, we unburden, we bring up concerns and we support people. Our focus is on social guidance, not on technical construction. We work closely as trusted figures for the owners concerned and pass on their signals to contractors and technical supervisors. In this way, we can respond more quickly to thresholds and needs experienced by owners.

Stakeholders

SAAMO

3Wplus

City services

Department of housing and enterprise (WO)

Social house (SH)

Engagement

The social support of vulnerable groups ensures renovation projects where everyone is helped with extra attention paid to citizens who do not have the means to renovate themselves.

Timing

2016-2025

Related measures

Roof insulation

1141 / 10000 households

Wall insulation

300 / 5000 households

Improved glazing

1027 / 5000 huishoudens

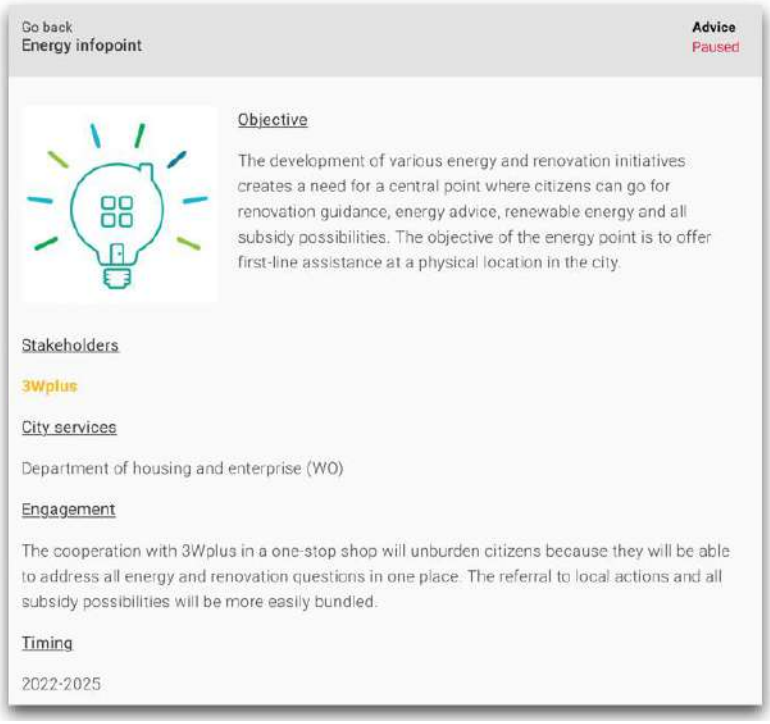
Energy scans

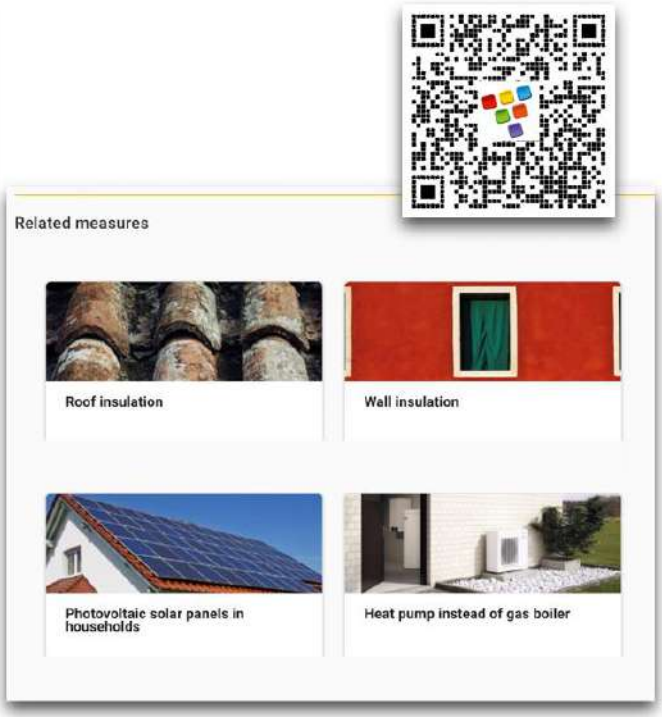
280 / 6000 energy scans

Reduction of average energy usage in households for heating and electricity through behavioural intervention

Reduction of electricity consumption by more energy-efficient appliances

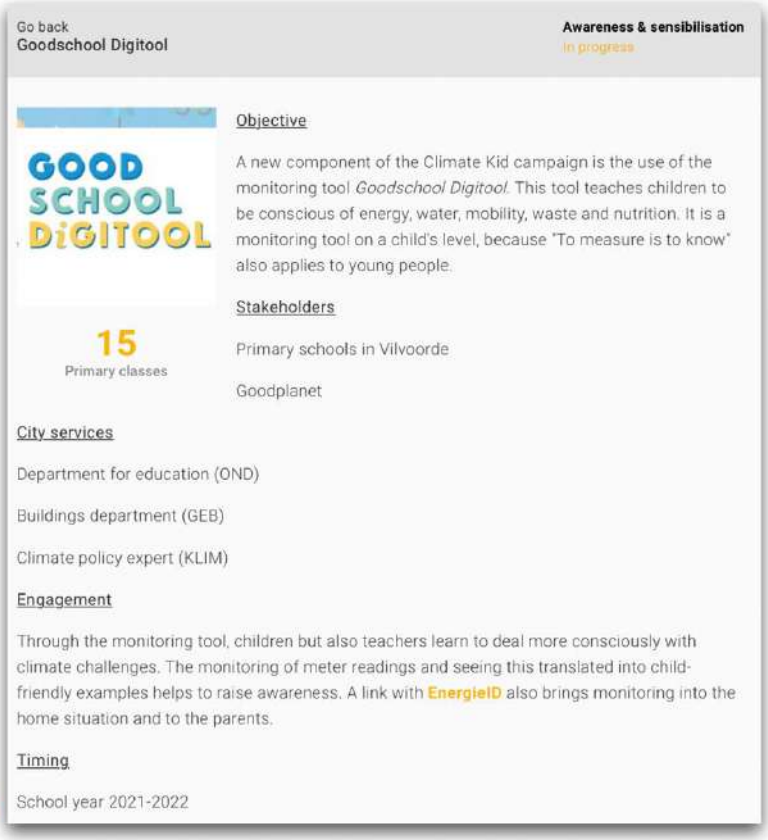
Futureproofed

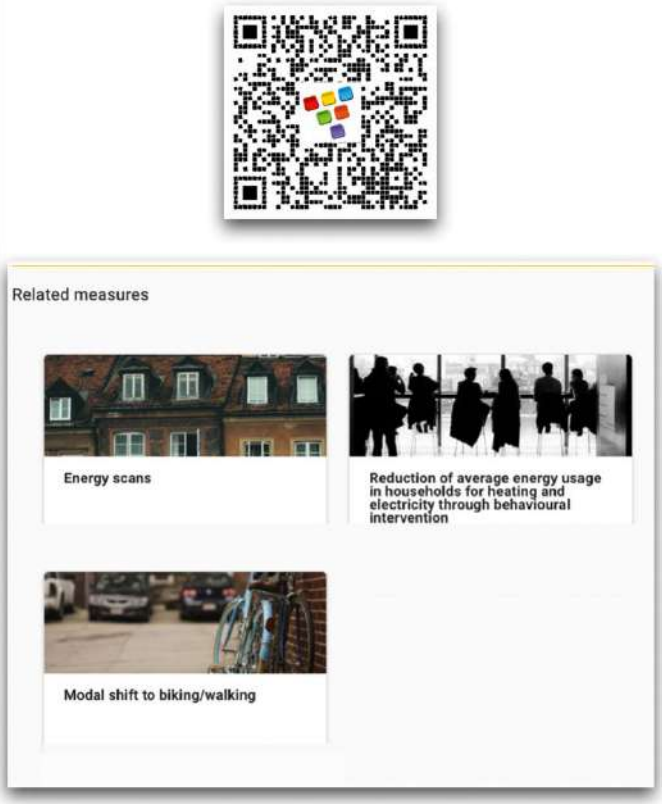




2a3. Education

Climate awareness makes citizens change their behaviour. To achieve this, we must continue to raise awareness and teach a healthy climate reflex.





Go back
Education @ the Hedge

Awareness & sensibilisation
In progress

Objective

The Hedge is a citizens' initiative started by a family from Vilvoorde. The Hedge stands for House - Educational, Sustainable, Green and Energetic. With The HEDGE they organise varied activities where people meet and get closer to nature. They pay special attention to children and young people, introducing them to urban biodiversity through nature camps.

They also want to start up networks - together with their partners - where sustainability, environment and technology go hand in hand.

Stakeholders

Natuurpunt

Proximity

City services

Climate policy expert (KLIM)

Engagement

This citizens' initiative builds a network with local partners to bring urban nature to the attention. With their nature camps for young people, they won the proximity competition of Zero Carbon Cities, receiving a budget of € 8.200 to further develop their operation.

Timing

2022-...

Futureproofed

Go back
Ready for tomorrow

Awareness & sensibilisation
Paused

Objective

To show where the city is going with solutions that are more sustainable and climate proof, Vilvoorde is launching the "ready for tomorrow" label. Everywhere this label appears, Vilvoorde is working on a city where it is nice to live, today and tomorrow. You will see the label popping up on all the city's channels.

But the city cannot combat climate change alone. For each label we also post an action that Vilvoorde residents themselves can do to make the city more sustainable, less polluting or more climate proof. Because only with all the residents together can we build a Vilvoorde that is truly ready for tomorrow.

2
Stakeholderlabels

Stakeholders

The Middle Men

City services

Climate policy expert (KLIM)

Communication department (COM)

Engagement

Via the labels, we involve as many stakeholders in the city as possible. By linking up different actions and initiatives, the diversity of actions and possibilities to contribute to the climate becomes clearer.

Timing

2022-2025

Futureproofed

Go back
Natural Vilvoorde

Other
In progress

17
Workshops

Objective

With the festival of ecology, the House of Man and **Avansa** bring together various committed citizens in different workshops and information moments on different sustainable themes. A first successful edition took place in autumn 2021 and the next series is already being prepared.

Stakeholders

Huis van de mens

City services

Climate policy expert (KLIM)

Communication department (COM)

Engagement

Avansa Halle-Vilvoorde brings the inhabitants of Halle-Vilvoorde together for instructive activities and innovative projects. They make people stronger and better at what they themselves find beneficial, necessary or important. To achieve this, they go out with very different people and often end up in surprising places.

Timing

2021 - 2022 - ...

Related measures

Domestic waste reduction

Preventing food waste at the city level

Reducing soil sealing

Promotion of urban gardens

Go back
Climate Kid

Awareness & sensibilisation
In progress

15
Participating classes

Objective

Do you remember the Climate Kid? This likeable hero from the future visited various primary schools in Vilvoorde in 2018 to raise awareness among children about climate change and to think together about a climate-friendly city. He is back again this school year and will go one step further ...

Besides the usual workshops, the kids also get to visit the mobility kiosk and learn to measure with the monitoring tool Goodschool Digitool: a monitoring tool on a child's scale.

By participating, the school becomes a real climate kid school, thus propagating its climate commitment.

Stakeholders

Goodplanet

Vilvoorde primary schools

City services

Education department (OND)

Climate policy expert (KLIM)

Engagement

Through the educational packages, we teach schoolchildren about the climate objectives. Especially in the field of energy, they learn to deal with this consciously. We involve the schools and the teachers to incorporate this in their lessons.

Timing

school year 2021-2022

Related measures

Energy scans

Reductie emissies stedelijke diensten

Reduction of electricity consumption by more energy-efficient appliances

Reduction of average energy usage in households for heating and electricity through behavioural intervention

2a4. Green and blue networks

Go back
Rainwater and Drought Plan

Other
In progress

Objective

A rainwater and drought plan is drawn up for the entire territory and provides a basis for an integrated water and spatial policy in a municipality and an important stepping stone for the climate-proof design of the public space and the private space.

The potential for designing public space differently is great. Adaptive measures can range from small-scale interventions to limit the damage of flooding to the development of large-scale green-blue networks in our city. Such projects also have added value in creating a pleasant living environment, cooling, greenery, recreational use of water, mobility, etc. Rainwater and drought plans will facilitate this new way of designing and increase support among clients, policy makers and citizens.

Stakeholders

Aquafin

City services

Climate policy expert (KLIM)

Public domain and mobility department (ODM)

Engagement

The Aquafin project manager will draw up the rainwater and drought plan in cooperation with the city and external stakeholders.

Timing

2022-2023

Related measures

Rain water tanks

Water-permeable soils

Wadis

Go back
Asiat Landscape Park

Investments
Paused

Objective

With various stakeholders, the city wants to maximise the natural value of the ASIAT site. Because of the 10 years of vacancy, nature has partly taken back the site. The challenge is now to perpetuate and optimise this natural value, paying attention to the balance between experience, leisure and the carrying capacity of the ecosystem.

Stakeholders

ENGIE

ANB

DVW

City services

Department of strategic projects & urban development (SPSO)

Public domain and mobility department (ODM)

Leisure department (VT)

Engagement

With regard to climate adaptation, the greening and softening of the site will be crucial in the further development. Cooperation with experts in the field of green space and water must guarantee a balance between exploitation and nature.

Timing

2022-2024

Related measures

Ecological corridors

Reducing soil sealing

Promotion of urban gardens

Rain water tanks

Water-permeable soils

Wadis

2a5. Urban development

Go back
Project Guide for urban development

Advice
In progress

Objective

A clear, appealing and practical instrument that has a regulatory effect, but which at the same time indicates what good spatial planning is, and which 10 core qualities are central to it. Developers and designers of larger developments are given the Spatial Planning Guide as a guideline for their design. This framework defines the 10 core qualities that good spatial planning must satisfy.

Stakeholders

Developers

Design agencies

City services

Department of strategic projects & urban development (SPSO)

Environmental department (OMG)

Engagement

As a "flexible" instrument, the project guide on urban development was drawn up. This does not reflect the complexity and quantification of the sustainability meter for neighbourhoods, but it does indicate the themes that are necessary to be included from the start of new developments. This improves the dialogue on sustainability with the stakeholders.

Timing

2021-...

Related measures

Green roofs (extensive)

Ecological corridors

Reducing soil sealing

Rain water tanks

Water-permeable soils

Wadis

Go back
Sustainability coach

Other
In progress

1
Projects

Objective

Because of Matexi's initiatives with the sustainability meter within 4 Fonteinen, but also because of the sustainability ambitions of the sustainable district of Groenloo, the city opted for the appointment of Luc Eeckhout (EVR Architects) as sustainability coach within the chamber of quality and sustainability. In its new composition, the chamber of quality has been expanded to the chamber of quality and sustainability (GKDK). The role of the sustainability coach (DC) was initially to provide guidance on sustainability within the PPP agreements of both projects and, in addition, to draw up a "methodology" together with the city services to guide other development projects in a similar way.

Stakeholders

Matexi

Acasa

EVR architects

City services

Environmental department (OMG)

Department of strategic projects & urban development (SPSO)

Engagement

Both for the coaching of important developers in the city and for the city services themselves, the cooperation with EVR architects and Luc Eeckhout as an expert is an added value in future-oriented thinking in urban development.

Timing

2019-2025

Related measures

Green roofs (extensive)

Reducing soil sealing

Rain water tanks

Water-permeable soils

Wadis

Planting trees

Go back
Chamber of Quality and Sustainability

Advice
In progress

2
Pilots

Objective

Ambitious sustainability ambitions are being formulated in the 4 Fonteinen and Groenloo urban development projects. The City of Vilvoorde is appointing a sustainability coach to strengthen the sustainability expertise in the quality chamber. The Municipal Quality and Sustainability Chamber (GKDK) will enter into dialogue with the project developers in order to help guide these projects from the initial phase of the design processes. Each building application will be tested against the predetermined sustainability ambitions and is by definition the result of a constructive sustainable cooperation with all partners.

Stakeholders

GKDK (experts)

Matexi

Acasa

City services

Environmental department (OMG)

Department of strategic projects & urban development (SPSO)

Climate policy expert (KLIM)

Engagement

For both the city services and the developers, extra support in sustainable design processes is an added value. In a very rapidly changing society, the supportive nature of achieving sustainable urban development is instructive and innovative for all parties around the table.

Timing

2018-2025

Related measures

Reducing soil sealing

Water-permeable soils

Wadis

Planting trees

Residual heating network

Car-free zone in the city centre

Modal shift to biking/walking

Fuel shift: electric vehicles

Futureproofed

2a6. Mobility

Go back
Hoppin Points

Investments
Done

Objective

With Werken aan de Ring (Working on the Ring), we are fully committed to sustainable and smooth mobility for every road user. That is why we are building a lot of Hoppin points around the Ring. These are places where you can easily switch from one mode of transport to another. Convenient, because by combining modes of transport it is easier to reach your destination. In this way, we offer road users a worthy alternative to the car and gradually reduce the number of cars on the Ring. The construction of **Hoppinpunt Kassei** is in line with this ambition.

Stakeholders

De Werkvennootschap

EFRO

AWV

City services

Public domain and mobility department (ODM)

Engagement

Cooperation with the work society helps the city with combination points of different means of transport.

Timing

opening 03-2022

Related measures

Modal shift to biking/walking

Go back
Ringtrambus

Investments
In progress

1
Adapted streets

Objective

The Ringtrambus is a high-quality public transport connection. Measures will be taken along the route to ensure a sufficiently rapid and reliable service. Where necessary, the tram bus will be given a separate bed and the traffic light arrangements will be optimised. In addition, all stops will be constructed with attention to integral accessibility and a high degree of comfort for passengers. The bicycle infrastructure will also be renewed in each street that is being constructed as part of the **Ringtrambus** project. This way, a safe and comfortable bicycle connection between the different sub-centres will be realised at the same time. The new cycling infrastructure will also ensure that the stops of the Ringtrambus will be easily and comfortably accessible for cyclists. All stops will have bicycle parking facilities covered by an awning.

Stakeholders

De Werkvennootschap

De Lijn

City services

Public domain and mobility department (ODM)

Engagement

The separate bedding and the adaptation of several streets mean that, in addition to a new tram bus connection, there will also be many more cycle paths, which will help to make the modal shift. It is also a new connection to neighbouring municipalities, offering an alternative to the car.

Go back

New and improved cycle paths

Investments
In progress

Objective

With Werken aan de Ring (Working on the Ring), we are fully committed to more and better bicycle infrastructure. We are building safe cycling paths and comfortable cycling bridges and tunnels. That way, you can cycle quickly and smoothly along and across the Ring Road. This way, we offer road users a worthy alternative to the car and gradually reduce the number of cars on the Ring. The construction of the Ring cycle path between bicycle highway F28 and bicycle highway F23 is in line with this ambition. But the FRO is also part of the bicycle infrastructure in Vilvoorde.

Stakeholders

Vectris

De Werkvennootschap

City services

Public domain and mobility department (ODM)

Department of strategic projects & urban development (SPSO)

Engagement

Supra-local projects such as works on the ring road provide additional cycling infrastructure and investments that would be too heavy for a city. Bicycle highways should be tackled across cities

Timing

2020-2026

Related measures

Modal shift to biking/walking

Go back

Public charging stations

Investments
In progress

68
Charging points

Objective

Contributing to a climate-neutral city is also done by driving energy efficiently. Preferably by bike or public transport. But by car? Then choose electric.

The city of Vilvoorde has high climate ambitions. That is why 68 public charging points have now been installed on Vilvoorde territory. By 2025, this number should even increase to 261 charging points.

You can find a charging point in your neighbourhood via the SMOOV app or website.

Stakeholders

Fluvius

Fastned

City services

Public Domain and Mobility Department (ODM)

Engagement

network manager Fluvius determines in cooperation with the city where the public charging stations will be installed and implements them.

Along the E19, the first two fast charging stations in Flanders were opened by Fastned.

Timing

...-2025

Related measures

Fuel shift: electric vehicles

Go back
Bicycle hub Broek

Other
In progress

Objective

The bicycle hub is a project through which we want to provide an accessible range of cycling activities for socially vulnerable groups. The bicycle hub is located in the old working-class neighbourhood of Broek, a neighbourhood that is part of the urban renewal project 'Watersite' of the city of Vilvoorde. Mobility is a theme that receives a lot of attention within urban renewal. Urban renewal assumes that the bicycle will become an important means of transport for the residents of the neighbourhood. Many residents of the old working-class neighbourhood, however, are still far removed from this modal shift and still regard the car as the primary means of transport. With the bicycle hub, we bundle activities to make bike ownership and bike use more accessible.

Stakeholders

VEJO

De Kringwinkel

City services

Department of strategic projects & urban development (SPSC)

Department of equal opportunities (GK)

Leisure department (VT)

Engagement

They work together with VEJO, a professional bicycle repairer who provides the necessary materials, but also trains the volunteers in how to supervise bicycle repairs. They also work together with the Leisure and Equal Opportunities Services of the City of Vilvoorde, which organises cycling lessons for adults and the Cycling Friends project. The City of Vilvoorde is the driving force behind both projects. They take care of the organisation, pay the teacher, take care of the registrations of participants,... They give training to the volunteers of the cycling friends project. The Kringwinkel (recycling shop) provides second-hand bicycles.

Timing

2022-2025

Related measures

Modal shift to biking/walking

0 / 42000 Autokilometers

2a7. Participation

Go back
Proximity

Participation
In progress

5
Projects

Objective

Proximity stands for bringing together the citizens of Vilvoorde, associations, companies, schools, and organisations in order to support innovative and positive initiatives and to actually implement them.

Proximity is a project call for participative ideas which add value to the sustainable development of the city. An independent jury of experts and citizens selects the laureates, who receive financial support from the city and the Proximity partners. The laureates are supported by Proximity during the mobilization campaign.

Proximity stands for support by companies, entrepreneurs, and merchants. They are very welcome to join this new collaboration and can support concrete actions by sharing their experience and skills or by taking initiatives themselves. Proximity is a large local mobilization campaign to bundle financial resources, equipment, competencies, and volunteers in order to realize beautiful projects together that contribute to the Vilvoorde of tomorrow.

Stakeholders

City ambassadors Proximity

Beplanet

City services

Climate policy expert (KLIM)

Communication department (COM)

Engagement

The European method of facilitating participation by means of a ULG (Urbact Local Group) is very labour-intensive and too large-scale for a small city like Vilvoorde. By means of the competition format, the first steps are being taken in the start-up of a **local stakeholder network.**

Timing

2021-2023

Related measures

Ecological corridors

Modal shift to biking/walking

Go back

Vilvoorde is yours!

Participation

In progress

Objective

The City of Vilvoorde wants to work with you to make Vilvoorde more beautiful, greener and safer for traffic. That is why on 16 September 2021 the city launched "Vilvoorde is yours. Make something of it". The theme of this project is improving mobility and public space in the 8 districts of the city. Sustainability also plays an important role. The city is setting aside a substantial budget to work on this over the next three years.

We repeat: together with you. We are counting on the ideas of the real experts: the people of Vilvoorde! We will come to each neighbourhood, listen to all ideas and respond to each one. So don't hesitate, give us your ideas and help shape the future of your neighbourhood. Vilvoorde is yours. Make something of it.

Stakeholders

The Middle Men

Citizenlab

City Services

Communication department (COM)

Engagement

By combining an online platform with physical idea markets in the neighbourhoods, as many citizens as possible become involved in their neighbourhood. The ideas are then evaluated and discussed by citizen panels, after which the city implements the best and most supported projects. By not rolling out this idea city-wide, but involving it intensively district by district, the involvement of citizens increases.

Timing

2021-2024

Related measures

Modal shift to biking/walking

Reducing soil sealing

Ecological corridors

2a8. Waste and consumption

Go back
Food surplus platform

Partnerships & collaborations
Paused

Objective

Reducing food waste is essential to making the city carbon neutral. According to FoodWIN, eliminating all avoidable food waste would reduce greenhouse gas emissions in Europe by an estimated 12%.

A regional distribution platform that collects and redistributes surplus food to social organisations and food banks in the city can reduce food waste, provide people in need with a varied, fresh and healthy diet and create social jobs. Why wait? Organisations are already at work in several European cities.

Stakeholders

Zee Na Es

Warmkracht

Uit het niets

Hart voor mensen

Local supermarkets

City services

Social House (SH)

Engagement

Several non-profit organisations have great initiatives of their own to support food avoidance. Cooperation at local level can bring these initiatives to a structural improvement. An umbrella platform can help and support this.

Timing

2023

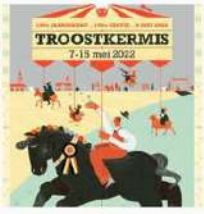
Related measures

Voeding

Preventing food waste at the city level

Go back
Sustainable events

Other
Paused



Objective

By focussing on reusable catering material, city events are systematically made more sustainable with less waste.

Stakeholders

OVAM

Incovo

City services

Leisure department (VT)

logistics department (LOG)

Urban and community maintenance department (SWO)

Engagement

Both by offering reusable cups and by embedding sustainable solutions in the regulations, the city's events will gradually become more sustainable. Cooperation and coordination between different city services will be a crucial factor here and will contribute to the example set by the city.

Timing

2023-2025

Related measures

Domestic waste reduction

0 / 17070 ton/year

2b. Small Scale Actions (SSA): Proximity

In spite of many participative initiatives by the city and the involvement of engaged citizens in the policy by means of advisory councils, the city lacks structural cooperation between different stakeholders. Due to a lack of capacity, it is extremely difficult to achieve this in a short period of time.
That is why the small-scale action was chosen to try to bring a number of local stakeholders closer together through the competition campaign Proximity, in order to carry out concrete innovative projects and ideas through cooperation.

2b1. Proximity

- Proximity stands for bringing together citizens of Vilvoorde, associations, companies, schools, and organizations in order to support innovative and positive initiatives and also to implement them effectively.
- Proximity is a project call for participatory ideas which add value to the sustainable development of the city. An independent jury of experts and citizens selects the laureates, who receive financial support from the city and the Proximity partners. The laureates are supported by Proximity during the mobilization campaign.
- Proximity stands for support by companies, entrepreneurs, and merchants. They are welcome to join this new collaboration and can support concrete actions by sharing their experience and skills or by taking initiatives themselves. Proximity is a large local mobilization campaign to bundle financial resources, equipment, skills, and volunteers in order to realize together beautiful projects that contribute to the Vilvoorde of tomorrow.

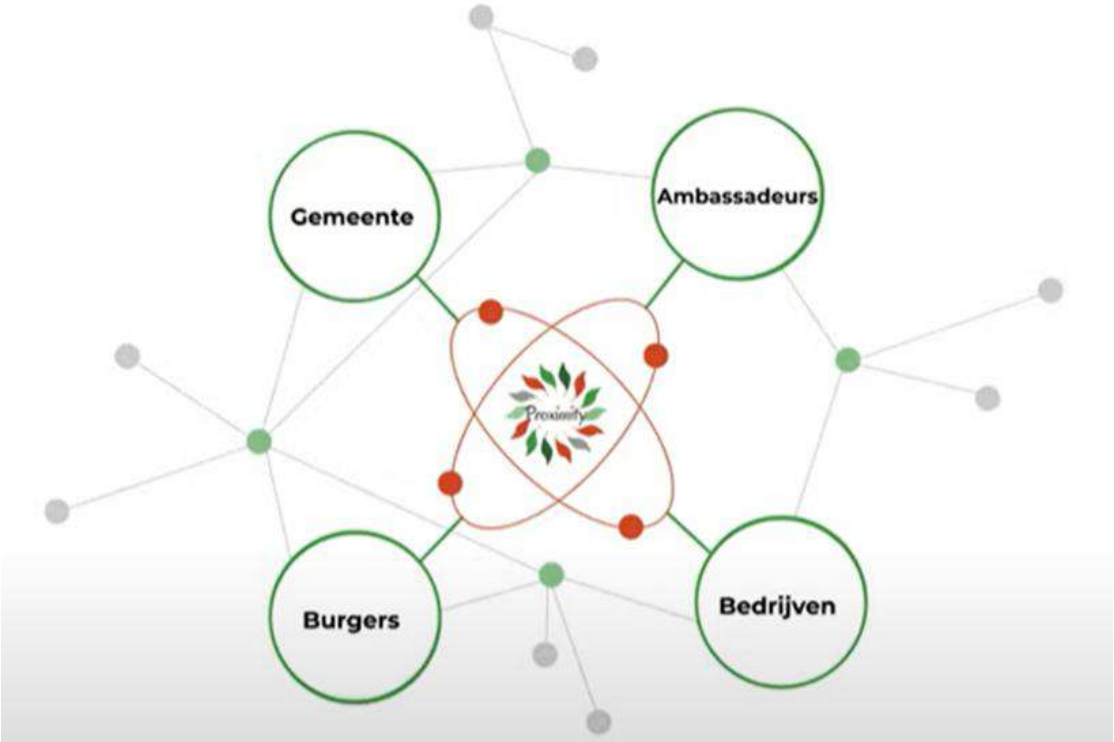


Figure 22: Ecosystem Proximity

2b2. Campaign in 4 stages

1. Search for ambassadors

WHAT IS THE ROLE OF AN AMBASSADOR?

An ambassador is a person or an organization who likes to promote the campaign and support the accompaniment of the different local projects.

In this way, an ambassador becomes a real partner of Proximity who, on the one hand, guides & supports the project leaders and, on the other hand, contributes by actively participating in the different stages. The ambassador's role is also to stimulate the relationships between the selected projects and to ensure the momentum throughout the mobilization campaign with the aim of raising additional funds from citizens and businesses.

Figure 23: Ambassadors proximity

2. Project call

Citizens are invited to submit projects through an association. This can be an existing organisation or association or it can be a temporary association (e.g. a neighbourhood or a street or a group of friends). Individual projects are not accepted.

The call for projects is launched through the mediachannels of the city but also through the channels and network of the ambassadors. During the event of the car-free Sunday this was also promoted live in cooperation with Beplanet and alderman Paredis also made an appeal with a motivation video.
https://www.facebook.com/proximitybelgique/videos/922063772063875

The deadline for submitting projects was 6 December 2021.

Figure 24: Campaign launch at Carfree sunday

3. Selection of laureates

In January 2022, all projects were screened and judged by an independent jury of experts. The selected projects could receive a financial support between €2,500 and €10,000.

The winners were officially announced during the Urbact study visit in Vilvoorde. The two laureates received their pricemoney from the council and will now start the implementation with the guidance of Beplanet and the city.

Two projects were selected as winners: SAAMO who have set up a bicycle lab in the Broek district and want to develop it further, and the Hedge who organise nature camps to help the local city youth take care of plants and animals in an urban context.

Bicycle lab
In the warehouse of the Zennelab in the Broek district, SAAMO established a bicycle repair and lending point. Thanks to the subsidy from the Proximity project, they now have the opportunity to expand this point so that all the residents of the neighbourhood and beyond will soon have access to a sustainable means of transport on two wheels. Moreover, the local residents also learn how to repair and maintain their own bicycles so that they can continue to ride their steel horses in the future.

Education @ the Hedge
The Hedge organises all kinds of activities in Vilvoorde about experiencing nature. During their camps they specifically target children and young people and want to make them aware of the relationship between nature and sustainability. For this purpose, they needed extra material in order to reach even more young people with their activities.

Figure 25: Pressrelease winners of small scale action Proximity

4. Mobilisation campaign and implementation of the projects

The mobilisation campaign calls on everyone to participate in the implementation of the projects. This can be done by means of extra financial support, but also by actively participating or by sharing knowledge and know-how. The laureates will be guided by Beplanet in the execution of the project.
In this way, we not only achieve realisations but in the process we also bring all stakeholders closer together so that a real local stakeholder network can develop.

Not only they receive the price money but they also receive the first climate labels of the city to be ambassadors and active participating stakeholders.

2c Resourcing

By dividing the Vilvoorde SECAP into a scientifically based long-term vision for 2030 and 2050 and an urban climate plan for 2025 for this legislature, we show the limited capacity of small cities to act. However, we also show the enormous climate and transition challenges facing our entire society.

This reality check is, on the one hand, a call for help for higher authorities, but on the other hand, it is also a mirror for our own organisation with regard to the efforts and resources that are already put into place for this. There are on a federal and regional level a number of fundings but the city often misses those applications because of timing and lack of expertise. This is still a big challenge for the city to get some financial expertise that can help with finding the right fundings at the right time.

We may rightly be proud and ambitious for the efforts we have made so far, but on the other hand, as an organisation, we must constantly ask ourselves whether we can achieve the ambitions we are pursuing ourselves and who are necessary for the transition into something new.

It is quite easy to point to the lack of financial resources and the lack of staff capacity and then say that we are doing what we can. However, it is our responsibility to the next generations to ensure that our city enjoys a pleasant future and therefore has to make the necessary and difficult transitions at all levels: living, housing, working and moving.

2c1. Climate pact

Thanks to the Flemish government, from 2021 there will be climate support through the Flemish Energy and Climate Pact. Since October 2021, Vilvoorde has also been affiliated with this climate pact. However, the extra funding that comes with it is only a small part compared to what is really needed to get to the desired and necessary transition path.

It is not enough to provide sufficient financial resources if cities and municipalities do not have enough staff capacity available to translate all these challenges into concrete objectives and achievements.

The Flemish Energy and Climate Pact focuses on 4 themes.

Figure 26: Flemish Energy and Climatepact

Theme 1: Let's plant a tree
Theme 2: Enrich your neighbourhood
Theme 3: Water is the new gold
Theme 4: Every neighbourhood shares and is sustainably accessible

Hopefully, these objectives can be a lever to act on the themes that were already included in the long-term vision of our Vilvoorde tomorrow.

2d Framework for delivery

We continue to focus on the existing partnerships in various domains and work from there towards a more structured network.
From the existing advisory councils, we are working towards a more action-oriented stakeholder group where representatives from different sectors can find and strengthen each other, starting from the ecosystem that was started with Proximity. In the advisory boards of urban development, mobility and environment we already find different climate related topics on the agenda. We should built on the expertise that we have with engaging different departments in our own city organization and create the same dynamic with our local stakeholders. By adding energy and adaptation topics we can enlarge the stakeholder group with new members and create synergies between different themes.

The search for the right people and organisations to support and draw on will have to be a permanent, organically growing system within the limited means that the city can deploy for this. Strengthening greater involvement and participation in various initiatives must provide a breeding ground for this.

To avoid another thinktank on climate topics, it is crucial to really think out a good and solid structure that can keep on growing in time. The participation projects with the citizen budgets can help finding the most engaged citizens who will really start to act and not only start to think.

Within the already existing advisory groups there is already a lot of expertise available on different topics but a number of important stakeholders are not consulted yet. It is going to be a challenge to build a solid structured ULG with the limited capacity in the city but the first steps in participation are a fact.

2e Risk analysis: Underfunding of climate policy of cities and municipalities

The efforts to implement the long-term measures of the Vilvoorde 2030 climate plan exceed the means and capacity of the city organisation. Today, the city of Vilvoorde has an operational budget for the implementation of the 2025 climate policy of approximately €6-7 per citizen per year.
Then there is the city's investment budget, which sometimes has a direct (e.g. energy renovation of own buildings) or indirect (e.g. construction of cycle paths) impact on CO_2 reduction in Vilvoorde.

That €7 per citizen per year is compared to a well-founded estimate that says that we need to mobilise in the order of €1,000 per citizen per year to get on transition paths towards 80-95% CO_2 reduction by 2050.

Part of that €1,000 is existing available budget of citizens, companies, investors and governments: if, for example, a family invests in a new car tomorrow from its existing household budget - and an electric car is chosen - then that budget is part of that €1,000 per citizen per year. Or if a developer builds low-energy houses tomorrow, then that budget is part of that €1,000 per citizen per year.

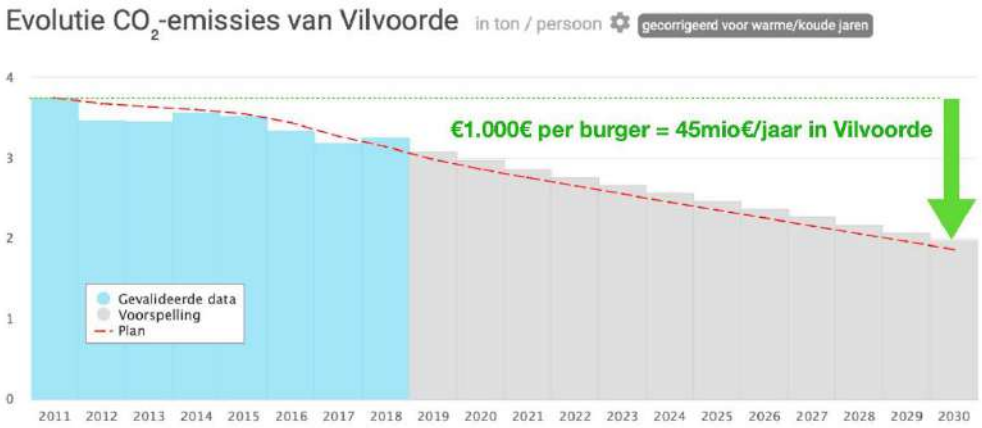


Figure 27: Climatebudget

As with European subsidy projects (cfr. Horizon 2020), funding for cities and municipalities with an operational budget of €100 per citizen per year could be a lever to mobilise city-wide funding of €1,000 per citizen per year for city-wide climate plans.

If the city wanted to scale up energy renovation projects at neighbourhood level in the context of the 2030 target (2,500 house renovations per year), it would have to use drastically more resources.

With those resources, city employees or other organisations could identify, finance and start up quality projects.

Despite the fact that the Flemish government in its Energy and Climate Plan 2021-2030 counts on the local governments, we find that there is a large gap with the resources that are made available to local governments.

The harsh reality is that if local authorities really want to help realise the ambitions of the climate plans, they will have to look for extra funding.

3. Lessons from URBACT networks:

Vertical integration

Due to the limited capacity of a small city, we lack structured cooperation with local stakeholders. The international cooperation within Urbact taught us the success stories of stakeholder cooperation and gave us the opportunity to put this in Vilvoorde on the agenda. The time of the Zero Carbon Cities project was just not enough to achieve further results here, but thanks to the small scale action, the first steps have been taken to continue working on this locally. The importance of stakeholder engagement in climate targeting is getting more and more concrete, which automatically leads to a shift from advisory boards and ideas to real, concrete cooperation models.

Horizontal integration

From the start of the climate policy in Vilvoorde, a great deal of effort has been put into anchoring and distributing the responsibilities in each policy domain and in all departments.

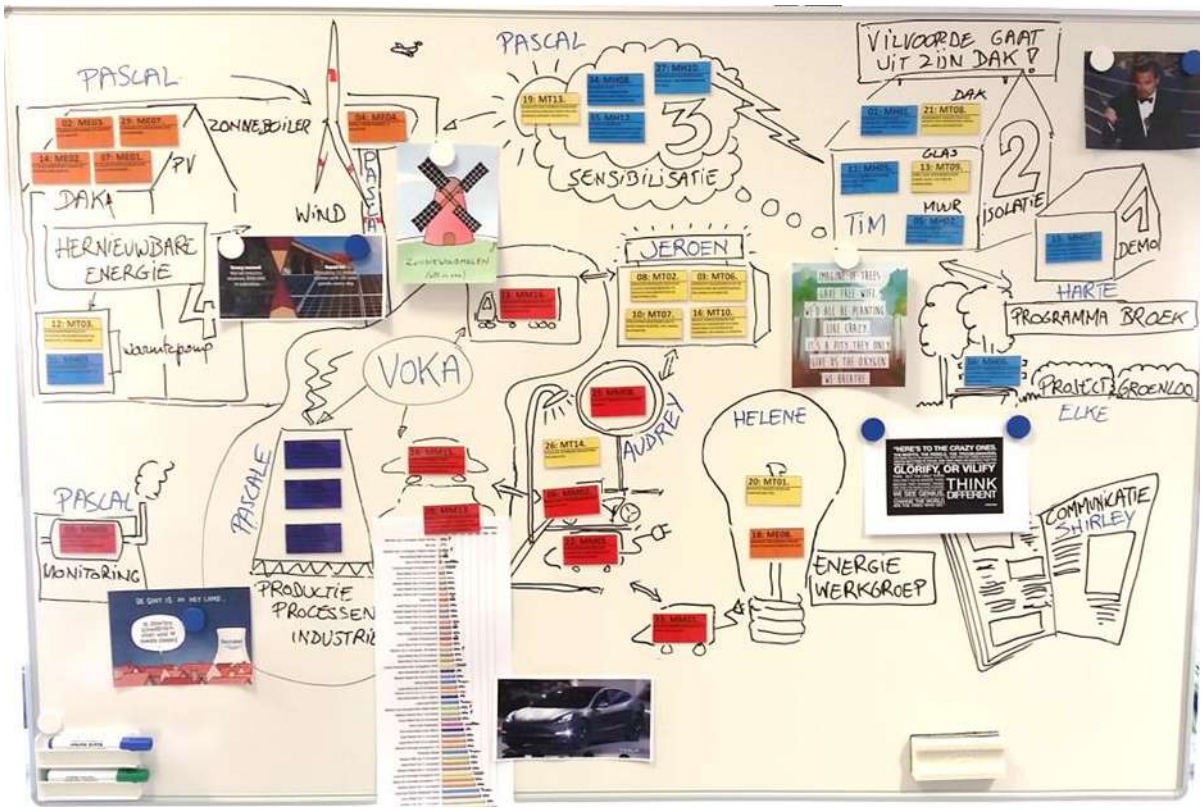


Figure 28: Climate responsibles organisation

This resulted in a great deal of awareness among the various services, but also among policymakers. The cooperation between the different departments is one of the great strengths and achievements of our organisation and can serve as an example for other cities in Europe. The climate steering group, our 3-monthly consultative body with the mayor, members of the council and management and experts, is a permanent structure within the

organisation where climate themes and climate challenges in various policy areas are discussed.
Normally, these are very animated discussions in the town hall about the sustainable future of the city, but also online these remain fascinating and inspiring meetings.

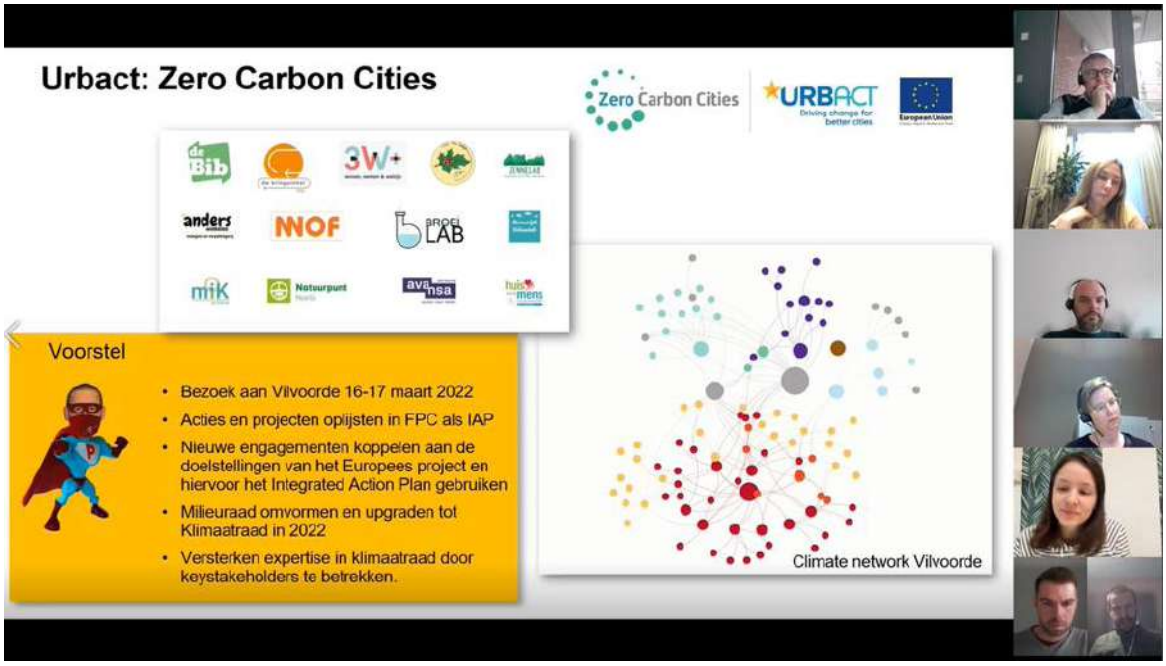


Figure 29: Presenting Zero Carbon Cities to the steering group Climate


Figure 30: Online discussions with the city council


Figure 31: management and experts


Figure 32: meeting with the climate team and Manchester

FPC network

Since 2017 Vilvoorde has joined the FutureproofedCities (FPC) network, which has grown to a community of 150 cities and municipalities across Belgium, France, and Sweden. This FutureproofedCities community expands the network of Vilvoorde, not only on a regional scale, but also national and even international. And it keeps on expanding, with soon 50 big cities all over the world joining through the 'One Planet City Challenge' project of WWF[22].

Figure 33: Online City talk 9

Over the years Vilvoorde joined multiple (networking) events from smaller networking events between Flemish cities/municipalities and webinars to FPC talks, big events where the whole community is united. Together with other climate officials or related positions, different topics on climate policy and action are addressed. Experiences are shared, challenges are addressed, and inspiration is given.

During the last FPC Talk, in November 2021, the general topic was 'Reach out to boost your climate plan', which was all about how to engage with different stakeholders. Experiences

[22] https://wwf.panda.org/projects/one_planet_cities/one_planet_city_challenge/

were shared on how to tackle energy poverty and reduce pollution of light. Open debates and interactive workshops were proposed on how to involve the tertiary sector in your climate plan and how to start tackling scope 3 emissions.

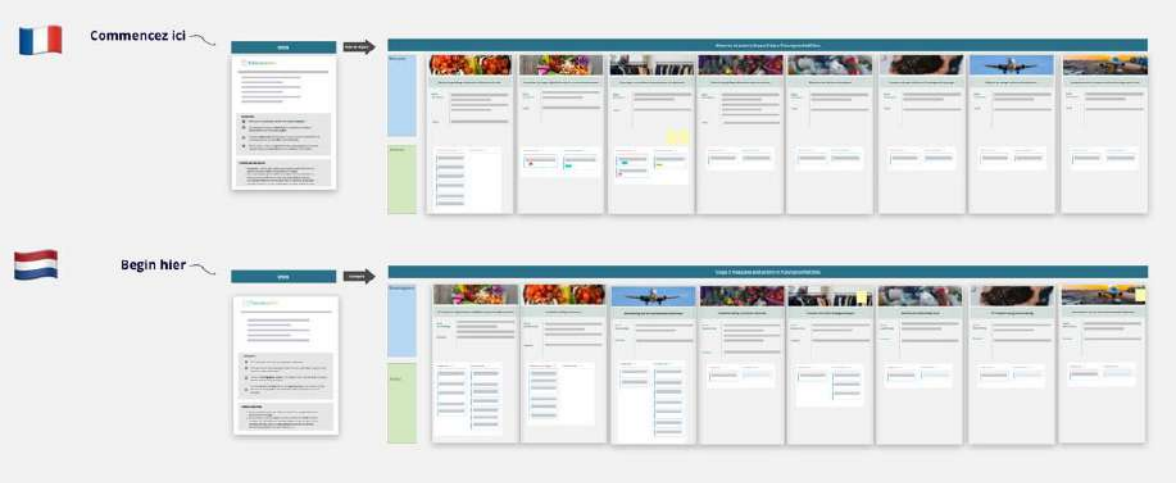


Figure 34: Snapshot of a brainstorming session on tackling scope 3 emissions.

The added value of this FPC network is to stop re-inventing the wheel, as a lot of cities/municipalities are facing similar challenges despite differences in political alignment. It is a place where we can learn from each other's successes and failures, look for possible collaborations and most importantly to realize that we are not alone in the climate challenge. The bigger the community grows, the more value this will provide for progress on climate action in the city of Vilvoorde.

One of the first great results was the testimonial by Bruno Moens at one of the first city talks, where he told the success story of his Kyoto mobile, a mobile counter where he provided renovation guidance in various districts. His know-how and experience helped us to start our own mobile energy house in a short time. In the meantime, this mobile energy house has grown into a substantial offering of renovation support in Vilvoorde.

One of the most recent spin-offs was the cooperation with our 2 neighbouring municipalities Machelen and Zaventem (both also members of the FPC network) with whom, together with local stakeholder VOKA (Flemish association of entrepreneurs), we organised a mobility event for companies in our region. This cooperation has since grown into an intermunicipal mobility group to tackle mobility challenges in the Brussels periphery together.

Figure 35: Mobility event VOKA

Conclusion

The City of Vilvoorde 2030 climate plan shows ambition by focusing on the right goals. Both for its own organisation and city-wide. The SECAP 2030 kicks off in 3 ways:

- The 2025 climate policy with 4 budgeted concrete action plans for the coming legislature.
- With the climate in mind, all policy areas are looking for projects and investments which not only do what is necessary, but also make our city more sustainable and climate proof.
- Together with companies, residents and associations, we are looking for a long-term leverage effect, both locally and with the help of European initiatives.

The SECAP clearly indicates the long-term objectives, but also the challenges and the need for cooperation and participation. It was a starting document for targeted and science-based work.

The Urbact Zero Carbon Cities project has accelerated some of these objectives.

We know from the calculation of our carbon budget that the sense of urgency is very high if we are to move towards a sustainable and livable city, but we also know that we cannot possibly do this alone, and that we need to maximise cooperation with our local stakeholders.

We notice that it is not easy with the limited capacity and financial resources the city has to involve all stakeholders but some initiatives that can be leveraged are already in place. The integrated action plan will hopefully continue to grow in the coming years so that together with all stakeholders we continue to build on an innovative city in transition and that we are ready for the changes and challenges that lie ahead.

Adequate funding and support from higher governments will be crucial to be able to to realize these ambitions. We stand up for a livable, sustainable and healthy city. With this slogan:

The climate is changing, and so is Vilvoorde!

Vilvoorde

Zero Carbon Cities

URBACT
Driving change for better cities

European Union
European Regional Development Fund

2022

TARTU DRAFT IAP

1/31/2022

Contents

1. INTRODUCTION

According to the estimation of the International Panel on Climate Change (IPCC), human activity has raised the average temperature of the climate by 1 °C compared to the time before the industrial revolution. It is highly likely that in 2023–2052, there will be another 1.5 °C increase in global temperature as a result of human activity. Climate warming has a negative effect on the health and livelihood of people, availability of fresh water, food security, the economy, and biodiversity.

One of the greatest values of Tartu City is its clean, human-friendly, and natural living environment. Human-induced climate change is one of the greatest hazards to the living environment and current living arrangement of Tartu. Mitigating climate change and decreasing the consequences of the environmental impact caused by humans is one of the most important activities for preserving Tartu's values and retaining the current living environment.

In 2014, Tartu joined the Covenant of Mayors. In 2015, the city government prepared the document Tartu Linna Säästva Energiamajanduse Tegevuskava 2015–2020 (Tartu City Sustainable Energy Management Action Plan for 2015–2020) which laid down the goals of reducing energy consumption and carbon emission by 20% compared to 2021 and consuming at least 20% of energy from renewable sources. The sustainable energy management plan was valid until the end of 2020. The 2017 interim evaluation of the plan revealed that although the municipal sector managed to reach the goals set in the plan, the emission of greenhouse gases in the city as a whole increased. The main causes are increase in emissions in private transport and electricity consumption in the private sector. On the one hand, it refers to growth in economic activity, which is of course positive, on the other, it clearly highlights those groups of the community that require more cooperation to achieve the common goals. In must be born in mind that the activities designed in the sustainable energy management action plan were addressed to the municipal sector and there were no activities aimed at the private sector. The 2015–2020 action plan can be assessed fully once the follow-up evaluation has been conducted.

2018 marked the beginning of preparing the Tartu City sustainable energy and climate plan (SECAP), Tartu Energy 2030. Following the Covenant of Mayors, Tartu aims to reduce carbon emissions in the city by 40% by 2030 compared to 2010. Resulting from the European Green Deal, Tartu aims to achieve climate neutrality by no later than 2050.

Tartu climate neutrality integrated action Plan (IAP) is a revision of the current SECAP in order to achieve the EU mission of 100 Climate Neutral Cities by 2030. The IAP summarises activities from various fields: government, energy management, building management, power consumption, housing, production and distribution of thermal energy, and production of renewable energy. Co-funding and results of the URBACT programme project Zero Carbon Cities were used in preparing the action plan.

The action plan was prepared by the Tartu City Government in cooperation with the URBACT Local Group set up specifically for compiling the IAP.

2. CITY CONTEXT and METHODOLOGY

City Context

With a population of around 100,000 inhabitants, Tartu is the second largest city in Estonia and the education capital of Estonia. Tartu is the third most influential political power in Estonia with the state being first and city of Tallinn being the second.

Tartu has a very young demography also known locally as the "university town of Estonia". Back in the XVII century, the University was created and played a great role in Tartu's development.

PHOTO 1: TARTU CITY CENTER DURING SUNDOWN BY RAGNAR VUTT

Tartu is proud of its cosmopolitan residents and vibrant cultural heritage which is embedded in the city. It has 20 museums and one national museum. Tartu is very proud to be the European Capital of Culture in 2024 with the theme: "the art of survival".

The biggest and only urban centre of southeast Estonia, Tartu is located 80km from the Russian border and 70km from Latvian border. In a land of forest and lakes, nature is vibrant and also plays a great role in the image of the city and its quality of life.

With a very low unemployment rate, the economy of Tartu is focused mainly on the education and services sector, retail sector and tertiary activities. The city has 15 higher education institutions, including Tartu University with its buildings and the University Hospital. Half of the city's annual budget is dedicated to education.

As in other cities in Eastern Europe, the carbon footprint has been increasing in recent decades, especially from the late 1990s highlighted by the fact that more than a third of transport was done on foot yet today it only makes up 21%. One of the main issues is the national energy mix, with 70% of this consumption of shale oil (2017 figure). The advantage

of Tartu is that it can count on a very large recently modernized district heating system and that Structural Funds are used to set up large scale refurbishment Programmes for housing cooperatives.

Legal context

The City of Tartu is a legal entity that is formed by the Estonian law of local governments. Tartu City Council is the legislative branch of the local municipality consisting of elected members of the city. Tartu City Government is the executive branch of the local municipality. The city government consists of The Mayor and 5 Deputy Mayors responsible for managing 16 departments. The city government is responsible for executing the regulations and decisions made by Tartu City Council.

The Estonian law of local city government does not state climate goals as a responsibility for local governments. It gives the right to local governments to decide what issues to deal with and manage in addition to tasks set in the law. The City of Tartu has decided to make climate an integral issue of local life and the Sustainable Energy and Climate Action Plan is one of the city's core action plans and a legally binding document.

Background information on inventories

A detailed baseline inventory has been done in the City of Tartu in 2017 as part of the process of the Covenant of Mayors'(CoM) Sustainable Energy and Climate Action Plan (SECAP) "Tartu Energia 2030" development. Prior to the 2017 inventory, an analysis of city's carbon emissions was also compiled in 2010.

According to the SECAP methodology only carbon emissions (namely CO_2) were in focus. However, when regarding that Tartu city does not have significant emissions from industries then the difference of CO_2 vs CO_2e (e=equivalents) is quite insignificant. Only in terms of locally consumed transport fuels other Kyoto gases are emitted. However, as by IPCC default emissions tables the difference is below 0,4% (under 500 tons), there is no broad impact on the overall baseline inventory.

Tartu is currently aggregating information for the inventory of 2021, this is to be completed in the 2nd half of 2022.

Territorial scale of the inventories

FIGURE 1 DARK BLUE BORDER, FORMER BORDERS OF TARTU CITY FOR WHICH THE 2010 AND 2017 CARBON EMISSION INVENTORIES WERE CARRIED OUT. LIGHT BLUE IS THE BORDER OF TARTU CITY AFTER TERRITORIAL-ADMINISTRATIVE REFORM CARRIED OUT IN 2017.

Concise sector breakdown

In 2017 the overall energy consumption in the City of Tartu was 1500 GWh and CO_2 (CO_2e) emissions were 709 thousand tons, broken down to energy sources and to sectors:

Energy source	GWh	1000tCO_2
District heating	514	61
Fossil fuels	521	124
Electricity	464	524

Sector	Total emissions (tCO_2e)				
Stationary energy	*612000*		*Electricity*	*District heating*	*Fossil fuels*
		Municipalities buildings	*16300*	*4600*	*200*
		Street lighting	*5700*		
		Residential sector	*135500*	*30200*	*17800*
		Business sector	*362800*	*25800*	*17600*
Transport	*88800*	*Private transport*			*84600*
		Public transport			*4200*
Waste/wastewater)	*8800*				*8800*

SECAP methodology

Tartu City joined the Covenant of Mayors and with that has assumed the obligation to reduce the emission of greenhouse gases in the city's territory and regularly report on its activities for reducing greenhouse gas emissions and climate change adaptation. An important part of reporting is conducting inventories of greenhouse gas emissions. The objective of the Covenant of Mayors is that calculations are carried out based on a shared methodology and it recommends using the IPCC (Intergovernmental Panel on Climate Change) methodology to calculate emissions. Using the same methodology ensures that the outcomes can be compared to other European cities. Based on this methodology, this plan uses standard emission factors and considers biomass and biofuels to have a neutral carbon balance. Environmental impact can also be evaluated through Life Cycle Assessment (LCA). According to this approach, the total environmental impact of a product/service or activity is evaluated throughout its life cycle. The main downside of conducting life cycle assessment is the excessive use of data, funds, and time. There is currently no common methodology to implement life cycle assessments in energy and climate plans.

Pursuant to the voluntary obligations of the Covenant of Mayors, the baseline emission inventory (BEI) has been carried out concerning CO_2 emissions in Tartu City in 2010 (baseline year) for the Tartu City SEAP (2015–2020) and data on energy consumption in 2017 were collected and used to calculate the emissions of the relevant year for the intermediary inventory.

Area of intervention	Data source
Stationary energy: Administrative buildings of Tartu City	Energy consumption in administrative buildings is based on a list of buildings confirmed by Tartu City. The Tartu Regional Energy Agency shall provide annual overviews of energy consumption for these buildings. The general information of buildings has been specified based on the building register and information from the city government. Source of energy consumption data: Elering, Elektrilevi, Eesti Gaas, Fortum Tartu. Consumption data is requested from service providers based on relevant lists and identification codes.
Stationary energy: Buildings and facilities	Location-specific (Tartu City) data on electricity consumption and production were received from the Elering database through Elektrilevi. Information on the sale (consumption) of district heating, fuel use and electricity production were received from the contact person of Fortum Tartu. Information on natural gas consumption in Tartu City was received from the Statistical Office. As no distinction had been made, natural gas consumption was divided equally between private and commercial consumers.
Stationary energy: Street lighting in Tartu	Information on the energy consumption of streetlights and number and type of lights has been acquired with the help of the street lighting specialists of the city government based on an extract from the electricity database and description of the situation.

Transportation Public transport	Data on route kilometres of public transport based on fuel type used by buses were received from providers of the transport service through the Tartu City Government. Fuel consumption, energy consumption and emission factor values received from the lipasto.vtt.fi database were used based on the EURO class of the buses (EURO IV) (total mass of the vehicle 18 t, capacity 6 t, automatic transmission, urban).
Transportation Private transport	The mileage of passenger cars in Tartu City was obtained from the summary Car Fleet Mileage 2017 issued by the Estonian Road Administration. Pursuant to the distribution based on age and fuel types provided in the passenger car register of the Estonian Road Administration (as at 31/12/2017), the mileage was divided into EURO classes. The energy consumption of the relevant EURO class and fuel type was calculated based on the database of average energy consumption of each EURO class lipasto.vtt.fi (urban).
Other: Water treatment	Information on imported thermal energy and electricity, produced biogas and electricity, and use of the cogeneration plant was received from the representative of Tartu Veevärk.

The following table provides emission factors used throughout the IAP.

Energy source materials	Emission factor, $kgCO_2/kWh$	Reference
Electricity	1.147	Elering residual mix 2017[1]
District heating (Tartu Fortum, efficient)	0.118	Environmental report emission[2]
Natural gas	0.202	CoM, IPCC[3], Ministry of the Environment regulation[4]
LPG	0.227	CoM, IPCC[3], Ministry of the Environment regulation[4]
Heavy fuel oil	0.278	CoM, IPCC[3], Ministry of the Environment regulation[4]
Light fuel oil	0.259	CoM, IPCC[3], Ministry of the Environment regulation[4]
Diesel fuel	0.266	CoM, IPCC[3], Ministry of the Environment regulation[4]
Motor gasoline	0.249	CoM, IPCC[3], Ministry of the Environment regulation[4]
Oil shale oil	0.278	Ministry of the Environment regulation4
Peat	0.381	CoM, IPCC[3], Ministry of the Environment regulation[4]

Carbon budgeting

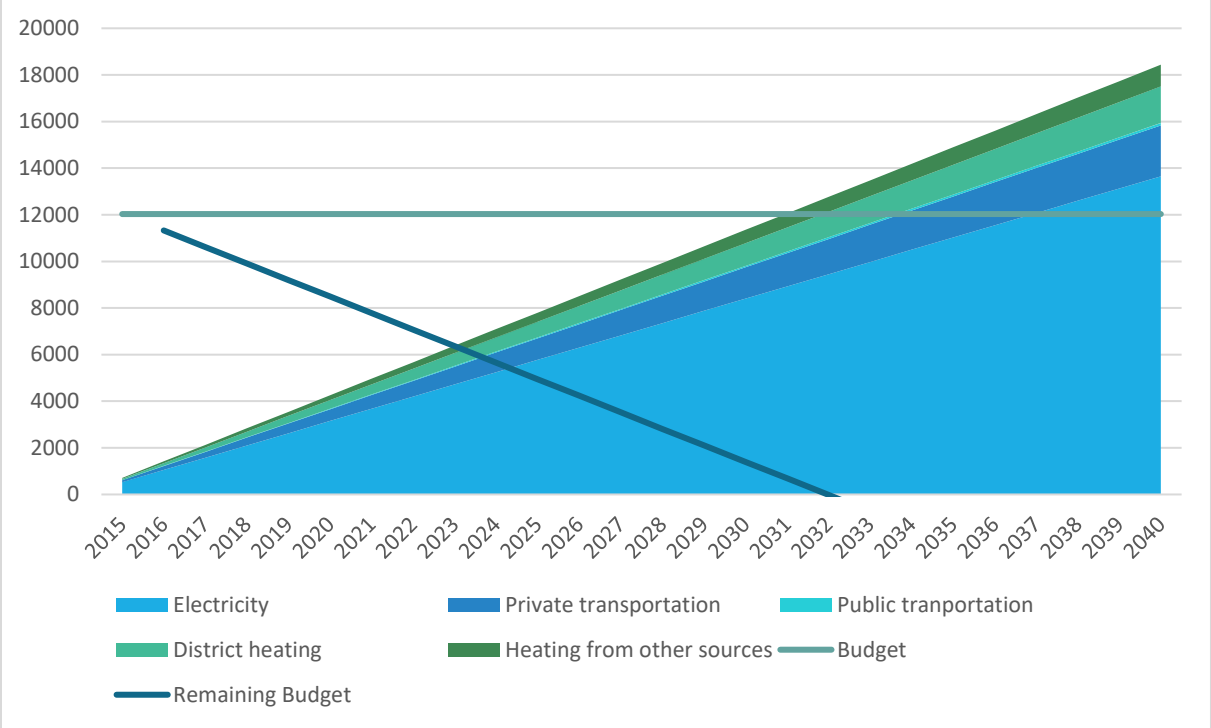
The Estonian calculated budget for CO_2 to comply with Paris agreements is 160 MtCO2.

The Tartu share according to population is 12,0370 MtCO2.

Scenario 1 – business as usual

Tartu is emitting over 700 000 tons of CO_2e per year since 2015 without showing any reduction in emissions.

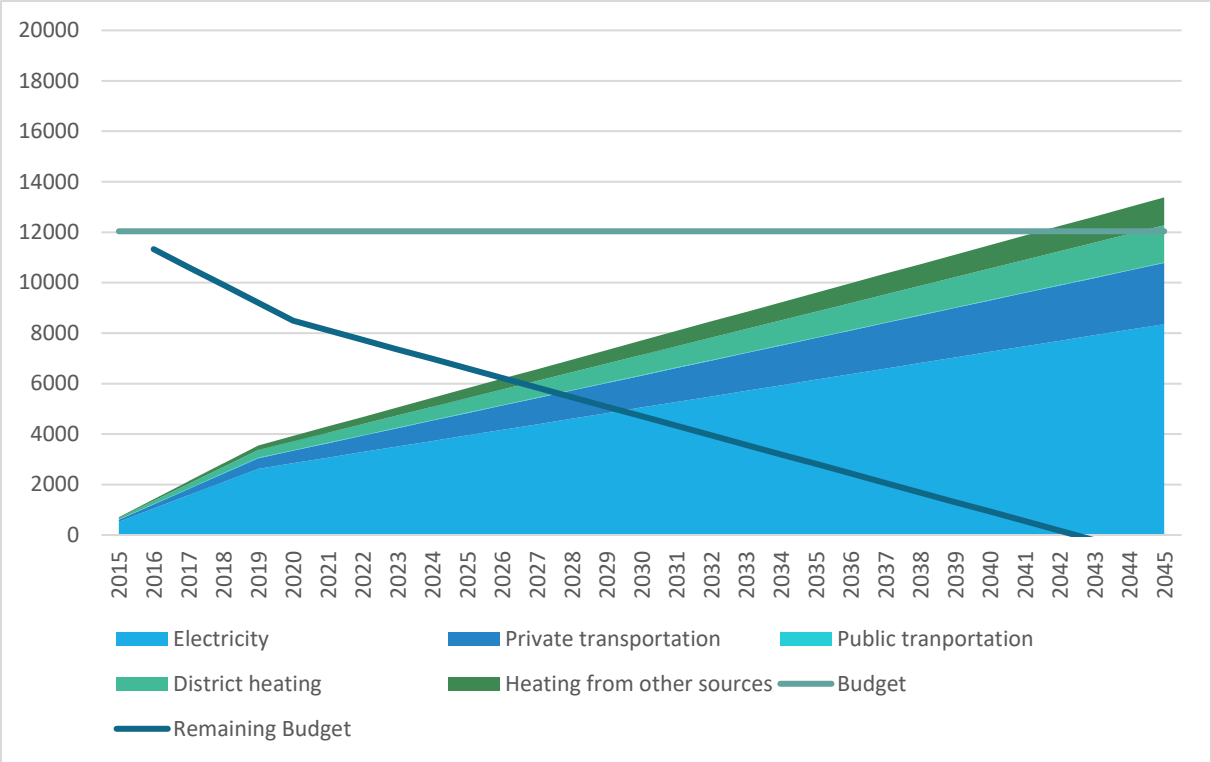
In this case Tartu would run out of historical budget by the end of year 2032 as indicated of following chart:



Taking into account carbon sinks of around 140 tCO2e per year available in Tartu administrative area the budget would last until 2037

Scenario 2 – only national impact

Taking into account that latest emissions calculations from 2020. Statistics show a significant reduction in CO_2 emissions of national electricity mix. If Tartu continues in business as usual fashion and relies only on national climate goals, then Tartu would run out of GHG budget by the year 2043 as indicated on the following chart:



Taking into account carbon sinks of around 140 tCO_2e per year available in Tartu administrative area the budget would last until 2037

Conclusion

Tartu is setting itself the more ambitious and urgent goal to reaching climate neutrality by 2030 and reach NetZero emissions in all sectors.

3. FOCUS

According to the goal set in the European mission of 100 climate neutral cities by 2030, Tartu strives to become energy neutral by 2030. The action plan provides the vision and strategic goals and activities for achieving the goals. In addition to activities by the city government, residents of the city, companies, and other organisations also play an important role.

The following is the vision formulated in Tartu Energy 2030:

Tartu is a smartly developing community with good energy, and a green pioneer.

Strategic goals:

- Reach climate neutral emission balance by 2030.
- Stop the use of non-renewable energy sources in city's energy production.
- Reach a new level of production and consumption of renewable energy.
- Use the mission and ambition to increase livability and social cohesion in the city

Reaching a community agreement is the most important activity for achieving the goals of the action plan. All residents of Tartu, organisations that operate in or are connected to Tartu, and apartment associations can join the agreement.

The Tartu City Government is the leader and role model for the agreement, committing to terminating the use of all non-renewable energy sources (buildings owned by the city, street lighting, public transport, means of transportation). In addition, the Tartu City Government aims to transition to renewable energy and emission-free transport fuels through the public services the city provides.

The main activities of the action plan for reducing emissions from private transport are aimed at increasing pedestrian and bicycle traffic inside the city, reducing car transport that crosses the city border, and decreasing the number of cars in the city. The underlying principle for designing mobility in the city is that the following modes of travel are preferred in the respective order: walking, cycling (including e-mobility), public transport, private transport.

Cancelling all GHG emissions from human activities in Tartu by 2030 is nearly impossible. At least 20% of current emissions according to GHG baseline study will remain. Emissions coming mainly from private transportation and national electricity mix will remain. The emissions will be neutralized by local existing carbon sinks and new sinks established along the way.

4. DESCRIPTION OF PROCESS

Input and influence of URBACT on Tartu IAP

URBACT networking and Zero Carbon Cities network has given an important input and a boost to Tartu's climate ambitions. The masterclass framework of creating an integrated climate action plan has raised the quality of the action plan and the qualification of city administration dealing with the issues regarding climate planning and climate implementation.

The partners involved in ZCC project have had great experiences, information, and knowledge to share with other partner cities to boost climate ambitions. Energy Cities has been sharing the vision of EU, it's climate ambitions, policies and actions. The resulting IAPs can be aligned and takes into account the opportunities from EU policies. Physical and virtual meetings with Energy Cities representatives and Tartu's policy makers in the framework of ZCC has resulted in prioritizing climate neutrality as a goal for Tartu and an intermediate objective in future becoming a zero emissions city.

The science-based targets methodology used in the project has resulted in Tartu implementing more ambitious climate goals. Tartu's current goals is to reduce GHG emissions by 50% compared to 2017 and become climate neutral by 2050. The new goal is to become climate neutral by 2030 and to align Tartu with EU mission 100 climate neutral cities by 2030.

One of the largest impacts of the ZCC project and new transnational connections is the example set by City of Manchester with the participative approach to climate change mitigation. One of the most important actions in Tartu's climate action plan so far is Tartu's climate community agreement. A voluntary agreement where participants set themselves the goal to reach climate action plan goals. In more technical terms Tartu city will create new public services to supporting Tartu's stakeholders in climate ambitions and creating accountability and motivations packages along the way.

PHOTO 12: TEAM ULG ON THE 17TH OF DECEMBER BY TIINA PITK

The current IAP is the result from the URBACT local group (ULG) connecting the knowledge and experience of over 40 people from all sectors. Setting the goals for cooperation with ULG members was set up in June 2021. The main effort in finalizing current IAP was made in the period from September 2021 to January 2022.

IAP process took place as an input to Tartu's participation in the EU mission 100 Climate Neutral and Smart Cities by 2030. The ULG met every Friday morning to give to the IAP and validate progress since the previous meeting.

September 2021 concentrated on data gathering and emission calculation.

October 2021 concentrated on meeting with stakeholders of the mission. Meetings were held with the European Commissioner for Energy Kadri Simmson head of office Karlis Goldstein. The team met with Anne Sulling, former minister of Foreign Trade and Entrepreneurship and one of the mission preparation team members. Another meeting took place with the head of the mission, Mathew Baldwin.

November and December concentrated on developing the action plan to reaching climate neutrality by 2030. The actions are divided into mobility, residential sector, municipal sector and energy production and more specifically electricity and heat.

January 2022 were dedicated to the topics of resourcing, risk assessment and overall finalizing of the IAP.

Tartu ULG will continue working in the implementation phase of the EU mission “100 climate neutral and smart cities”. The exact form is yet to be decided and depends on mission parameters. All the institutions will play a crucial part in mission implementation.

ULG consisted of regular and non-regular representatives of following organizations:

- Tartu City government
    - City Architect Tõnis Arjus
    - Deputy Mayor Raimond Tamm
    - Deputy Mayor Gea Kangilaski
    - Head of the dept. of Culture Marleen Viidul
    - Head of Smart City Roomer Tarajev
    - Deputy Head of dept of Communal Services Andres Pool
    - Mobility specialist Aksel Part
    - City Designer Anna-Liisa Unt
- Tartu University
    - Prof Siiri Silm
    - Prof Age Poom
- Tallinn Technical University
    - Prof Targo Kalamees
    - Prof Jarek Kurnitski
    - Project manager Murel Truu
    - Dean of Sustainable Development Helen Sooväli Seping
- Estonian Academy of Arts
    - Dean Toomas Tammist
    - Prof Andres Ojari
- KredEx
    - Head of renovation Kalle Kuusk
- Ministry of Economy and Communication
    - Science Advisor Siret Talve
- Ministry of Environment
    - Head of renovation Lauri suu
- Environmental Investment Centre
    - Head of innovation Helen sulg
- Institute of Baltic Studies
    - Member of board Merit Tatar
    - Project manager Andra Asser
- Tartu Nature House
    - Director Janika Ruusma
- Tartu Regional Energy Agency
    - Director Martin Kikas
    - Project manager Marten Saareoks
- Foundation for Tartu 2024 the European Capital of Culture
    - Head of sustainability Triin Pikk

- City of Tampere
    - Climate officer Kari Kankanpää
- City of Aarhus
    - Head of Sustainability Soren Lundby

5. OBJECTIVES, ACTIONS ANS SCHEDULE

5.1 Community agreement

The Tartu City Government's and the municipal sector's GHG emissions account for less than 4% of overall emissions. There is no national policy stating that local governments are responsible for reducing GHG emissions in the administrative borders of the municipality. Therefore, there is the lack of policy instruments and financial means to directly influence the sectors outside the municipality's direct control.

Most of the reduction in GHG must come from the stakeholders in the respective sectors whether it's national institutions, property owners, businesses, producers, service providers and the local citizens themselves.

Therefore, one of the most important activities and main engagement tools of Tartu Energy 2030 and in the Climate Neutrality Action Plan is the community agreement, which are obligated to contribute to achieving the goals set in the energy and climate plan. The leader and role model for the agreement is the Tartu City Government and will reach climate neutrality by 2024.

PHOTO 2: TARTU CITY HALL BY RAGNAR VUTT

In order to preparare the community agreement the Tartu City Government will create two new public services directed at the business and residential sectors in Tartu;

The first step is to design a public service for supporting the potential members of the community agreement. The service will provide the members with tools and know-how on how to find a path to climate neutrality. The service will help understand the positive sides and competitive advantage in becoming climate neutrality. The service will be a kind of 'one-stop-shop' by providing a free of charge guidance on where to find capable consultants to map and create climate neutrality plan, how to find best technology and financial partners and how to communicate ambitions and success stories to existing and potential clients and business partners. The service will also provide a communication and empowerment platform.

The second step to run in parallel is to create a one-stop-shop for residential sector stakeholders in order to reach the renovation goals. The service is better explained in residential sector chapter.

The community agreement will be created in cooperation with public and private sectors, citizens, NGO-s using service design principles. The goal is to turn the community agreement to a service to all the city's sectors to assist and aide them into reaching the climate neutrality goal of 2030.

No.	Activity	Responsible party	Year
1.1	The municipal sector transitions to climate neutrality	Tartu City Government	2024
1.2	Design of climate neutrality public service for the business sector	Tartu City Government	2022
1.3	Design of climate neutrality public service for the residential sector	Tartu City Government	2022
1.4	The private and public sector transition to climate neutrality	Tartu City Government, TREA, parties to the agreement	2030
1.5	The housing sector transitions to climate neutrality	Tartu City Government, TREA, parties to the agreement	2030
1.6	Design of Positive energy District concept	Tartu City Government, TREA, TalTech	2024

5.2 District heating and district cooling

The district heating areas of Tartu have been established in the Tartu City Comprehensive Plan to 2040 (2021). Approximately 1,700 buildings consume heat from district heating in Tartu. 50% of the consumers are in the housing sector, 8% municipal authorities, and 42% other authorities and undertakings.

The energy group GREN supplies consumers in Tartu City with district heating and district cooling. The highest percentage of fuels used in producing heat are biofuels (wood chips, over 75%), followed by natural gas (18.5%) and to a lesser extent peat (5.5%). Fortum Tartu is the first in the Baltic States to provide the service of district cooling.

PHOTO3: TARTU CO-CREATION PLANT BY GREN

The goals of Tartu in heating and cooling buildings owned by the city:

- fossil fuel-free district heating and cooling by 2030;
- as from 2024, buildings of the Tartu municipal sector no longer consume energy produced by fossil fuels (except for district heating that will be free of fossil fuels by 2030)
- expansion of the district heating network primarily in the city districts Karlova and Supilinn.

Furthermore, only low-value timber that has been certified accordingly will be used in the district heating of Tartu City. It must be ensured for the timber used that cutting does not damage nature conservation values (e.g. key habitats). By increased use of waste heat, storing energy, low-temperature district heating and applying alternative technologies for producing heat, the volume of wood used in district heating in Tartu is declining.

Priority activities in district heating

No.	Activity	Responsible party	Year

2.1	Cooperation agreement between the City of Tartu and energy producers to achieve carbon neutrality in district heating	Tartu City Government, energy producers	2021
2.2	The use of fossil fuels in district heating and cooling is terminated	Energy producers	2030
2.3	Increased use of waste heat in the city's district heating	Energy producers	2030

Supporting activities in district heating

No.	Activity	Responsible	Year
2.3	Expanding the area of district heating	Tartu City Government	2021
2.4	Introduction of energy storage in the production and distribution of district heating energy	Energy producers	2030
2.5	Reduction of network losses in district heating	Energy producers	continuous
2.6	Use of low-temperature district heating and waste and residual heat in the district heating network	Energy producers	continuous
2.7	Gradually joining buildings in Karlova and Supilinn with the district heating network	Tartu City Government, energy producers	continuous
2.8	Residual heat from wastewater	Tartu City Government, energy producers	2024

The existing cooling market is dominated by traditional building-specific electrical air conditioning devices with low energy efficiency. District cooling decreases CO_2 emissions by 50–70% compared to the regular solutions, considering the current primary energy use.

5.3 Electricity and fuels

The Estonian Development Plan of the Energy Sector until 2030 provides national goals in the energy sector until 2030:

- Final energy consumption in 2020 and 2030 is at the same level as in 2010 (~32 TWh).
- In 2030, renewable energy accounts for at least 50% of final energy consumption.

Based on the data from the past decade, we are facing a great challenge. In Tartu City, electricity consumption in 2010–2017 increased by 36% and carbon emissions from electricity consumption increased even more – by 42%. The increase has been stable and mainly resulted

from increased use of electricity in the private sector. Consumption of electricity in the municipal sector has been largely on the same level in Tartu over that period.

Electricity has by far the greatest impact on carbon emissions in Tartu City out of all the types of energy. While in 2017, electricity amounted to 31% of the entire city's energy consumption, it made up 74% of the city's carbon emissions. Therefore, it is very important for the whole city to achieve efficiency gains in electricity consumption and decrease consumption in general and mainly to increase the share of electricity from renewable sources in the total energy consumption.

PHOTO4: NEWLY RENOVATED TIIGI 19 AND TIIGI 21 APARTMENT BUILDINGS WITH SOLAR PANELS BY SILVER SIILAK

Due to oil shale energy, Estonia's electricity emission factor has been among the highest in Europe. The emission factor (special emission factor) of electricity consumption used in this energy plan is the 2017 factor 1.147 kgCO2/kWh calculated using the residual mix calculation methodology of Elering AS.

Carbon emissions are reduced significantly through production of renewable energy. The load on transmission lines and substations is decreased by consuming locally produced energy.

Goals for 2030

- GHG emissions from consumption of electricity by the Tartu municipal sector (excluding water treatment) is 0 tonnes.
- GHG emissions from consumption of electricity by the public and private sector is below 80 000 tonnes of CO2 per year.

- Inspiring the housing sector (private and apartment buildings) i.e., households to use 30 GWh of renewable energy that helps to decrease annual CO2 emissions by 32 000 tonnes.

Priority activities in electricity

No.	Activity	Responsible party	Year
3.1	Solar energy plants with a total capacity of at least **2** MW will be established for buildings owned by	Tartu City Government, TREA	2030
3.2	Developing a local consumption scheme and business model for renewable energy produced in the Tartu area	TREA, Tartu City Government	2024

Supporting activities in electricity

No.	Activity	Responsible party	Year
3.3	Motivating the private and public sector to increase own production of energy with a capacity of at least 125 MW	TREA, Tartu City Government	2028
3.4	Increasing the production of renewable energy through association activity. Achieving the establishment of renewable energy plants owned by energy associations with a capacity of at least 10 MW by 2028	TREA	2028
3.5	Conducting a research regarding the potential of producing solar energy with buildings owned by the local government	Tartu City Government	2022
3.6	Development and enabling of flexibility services in housing and public sector in cooperation with energy sector	Tartu City Government, TREA, Elering, elektrilevi	2024

5.4 Mobility

The energy consumption and environmental impact of transport in Tartu has increased by a third compared to 2010, whereas energy use in the private sector has undergone the most

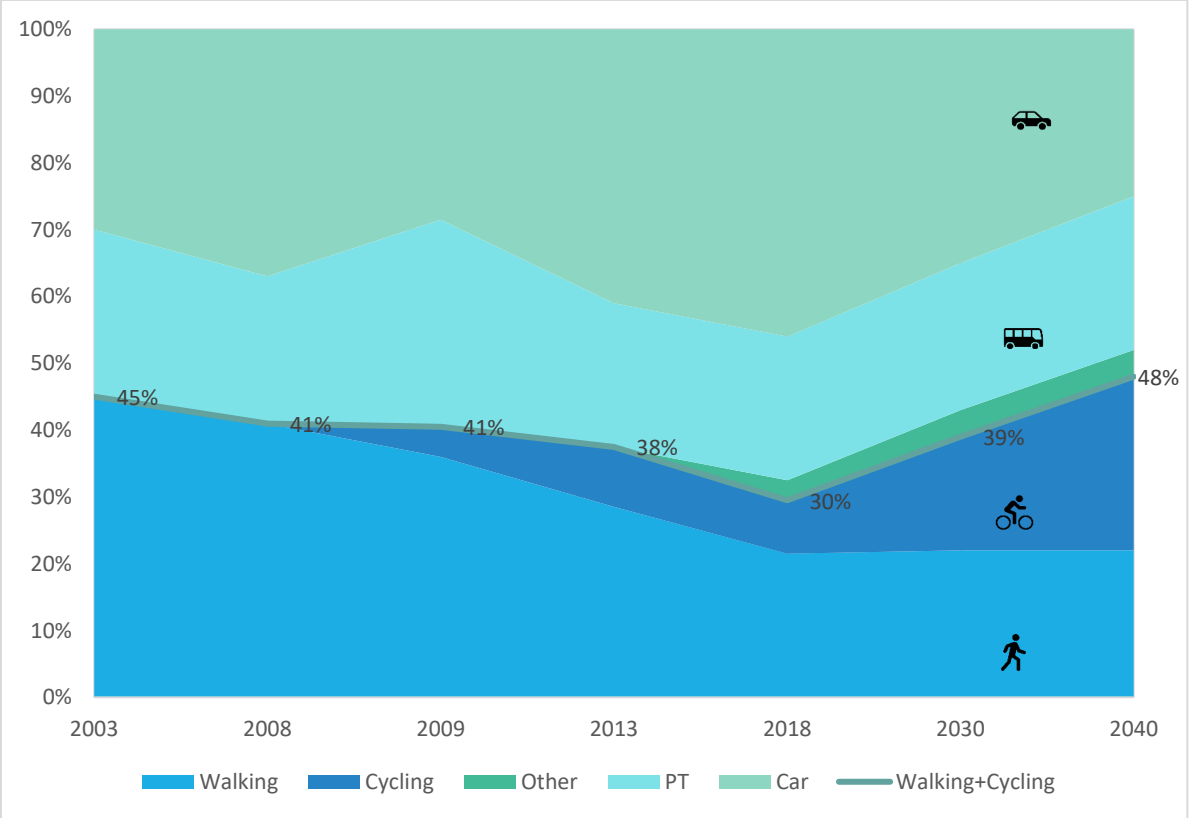
rapid growth. The number of private vehicles in Tartu has increased consistently in the past decades.

Tartu Commuting Master Plan (CMP) is a response to the growing dominance of light duty motorized vehicles and the previous targeted efforts of the city to support use of public transportation and pedestrian conveyance modes. The compilation of the strategy was built on the experiences gained in various cooperation projects (eg cities.multimodal, SUMBA etc).

The CMP establishes a vision, defines strategic aims and proposes a roadmap of actions that need to be reached to achieved goals. However, the strategy is approved by the City Council as an Annex of the Tartu SECAP, it is also usable as a separate workplan.

The transport objectives of the Tartu City energy and climate plan are as follows:

- increase the percentage of sustainable modes of transport in all travels;
- reduce the use of private vehicles in city traffic;
- establish an infrastructure required for active mobility;
- ensure safety of mobility;
- develop public transport that is separated from the rest of traffic, is fast, and has minimal environmental impact;
- better coherence of modes of transport;
- bring services closer to the people;
- innovative development of services.



	2003	2008	2009	2013	2018	*2030*	2040
	45%	41%	36%	28.5%	**21.5%**	22%	22%
	-	-	4.5%	9%	**8%**	17%	26%
	25%	22%	31%	21.5%	**21.5%**	22%	23%
	30%	37%	28.5%	41%	**46%**	35%	25%
	-	-	-	-	**3%**	4%	4%
+	45%	41%	40.5%	37.5%	**29.5%**	39%	48%

PHOTO 5: THE OPENING OF TARTU'S ELECTRIC BIKE SHARE SYSTEM IN 2019.

Priority activities in transport

No.	Activity	Responsible party	Year
1.1	The municipal sector transitions to renewable energy (community agreement)	Tartu City Government	2024
4.1	Pursuant to the comprehensive plan, designing new and existing streets shall ensure a high-level network of pedestrian and bike paths, even if this means developing carriageways on a lower baseline level.	Tartu City Government	Continuous

4.2	Planning and development of infrastructure is based on the principle of improving connections of sustainable modes of travel in cross-border mobility	Tartu City Government	Continuous
4.3	Local mobility centres are created in the remote regions of the city to improve transport connections (at least two centres will be created in the most important locations on the city's	Tartu City Government	Continuous
4.4	Seek opportunities to create public transport lanes on the main streets of public transport.	Tartu City Government	Continuous
4.5	The city's public transport services are expanded into surrounding areas	Tartu City Government, neighbouring local	Continuous
4.6	Combine the public transport systems of the city and county	Tartu City Government, Tartumaa ühistranspordikeskus,	Continuous
4.7	Establish a comprehensive network of bike paths. Step 1: The Emajõgi River region, Kroonuaia Bridge, Näituse Street, port railway	Tartu City Government	2024
4.8	Establish a comprehensive network of bike paths. Step 2: the rest of the city	Tartu City Government	2028
4.9	Expand the bike share service to the areas surrounding the city	Tartu City Government, neighbouring local governments	Continuous
4.10	Widen the network of parking areas for the shared bikes in the city	Tartu City Government	Continuous

Activities to support transport

No.	Activity	Responsible party	Year
4.11	Organisation of traffic monitoring and data collection	Tartu City Government	Continuous
4.12	Cooperation with providers of mobility services to use renewable energy in the city's transport (taxi, share service, transport-on-demand, rental service, etc.)	Tartu City Government	Continuous
4.14	Joint ticket system and journey planning solution for public mobility services	Tartu City Government	Continuous

4.15	A mobility centre is established in the city centre	Tartu City Government	2028
4.16	Support new transport solutions (e.g., school bus, transport-on-demand, car share, community ride sharing)	Tartu City Government, private sector	Continuous
4.17	Create an area that favours light transport and can be accessed by car in the city centre (area: Soola, Lai, Narva mnt and Ülikooli Streets)	Tartu City Government	2030
4.18	Change the parking arrangement in areas where it restricts foot and bike traffic	Tartu City Government	Continuous
4.19	Create an environment that favours walking and biking in areas surrounding educational institutions	Tartu City Government, TREA	Continuous
4.20	The real-time public transport information system covers most of the city and is extended to the nearest rural municipalities	Tartu City Government	Continuous
4.21	The design of the cityscape is based on enabling fast public transport connections (e.g., rail transport), considering other sustainable modes of travel	Tartu City Government	Continuous
4.22	Support the development of mobility plans in institutions	Tartu City Government	Continuous
4.23	Increase the speed and frequency of railway connections in the Tartu area	Ministries, Estonian Railways Ltd, Elron Tartu City Government	Continuous
4.24	Prepare proposals for the state to stimulate the transition to electric transport both in the public and private sector.	Tartu City Government	2022

5.5 Residential sector

One of the main initiatives of the European Green Deal is the Renovation Wave that aims to double the number of energy-efficient renovations over the next decade. To achieve these goals and make maximum use of the allocated resources, the Tartu City Government and the Tartu Regional Energy Agency play an important role in supporting apartment and private house owners in Tartu.

The goals for Tartu in residential sector are:

- Renovate at least 50% of all multi-apartment buildings
- Renovate at least 40% of all single-family houses

A renovation support centre based in the Tartu Regional Energy Agency will be established to boost renovation activity in Tartu. Its task is to mainly support the renovation of buildings in

the residential sector from planning to post-renovation fine-tuning and consultation of residents.

Priority activities in the residential sector

No.	Activity	Responsible party	Year
1.3	The housing sector transitions to renewable electricity and thermal energy (community agreement)	Tartu City Government, TREA, TarKül	2024
5.1	Develop financing opportunities and schemes for renovating residences	TREA, KredEx, Tartu City Government	2021
5.2	Renovate 50% of apartment buildings (980,000 m^2)	Apartment associations	2030
5.3	Renovate 40% of private houses (412,000 m^2)	Owners of private houses	2030

PHOTO6: ANNEMÕISA STREET APARTMENT BUILDINGS BY TIINA PITK

Supporting activities in the residential sector

No.	Activity	Responsible party	Year
5.4	Establish renovation support centres based on TREA	TREA	2021

5.5	Map application for production options of and limitations to renewable energy (specifying the data and conducting additional research, if necessary, including analysis of potential use of geothermal heat pumps)	Tartu City Government	2023

5.6 Municipal Sector

Tartu City Government and the municipal sector play a crucial role in reaching climate neutrality by 2030. Tartu City is the local leader and role model in transitioning to carbon neutral economy.

Therefore, Tartu City Government's goal is to become carbon neutral by 2024 when Tartu is the European Capital of Culture.

Priority activities in the municipal sector

No.	Activity	Responsible party	Year
1.1	The municipal sector transitions to renewable energy sources (community agreement)	Tartu City Government, TREA	2024
3.1	Solar energy plants with a total capacity of at least 1.5 MW will be established for buildings owned by the local government	Tartu City Government, TREA	2030
6.1	Transition to 100% economical LED lights in street lighting and introduce a modern system of controlling street lighting	Tartu City Government	continuous

Activities to support the municipal sector

No.	Activity	Responsible party	Year
6.3	Establish an energy management system for Tartu	Tartu City Government	2023
6.4	Renovation of municipal buildings	Tartu City Government	continuous
6.5	Share data collected in the course of implementing the climate action plan and grant research institutions access to it	Tartu City Government	continuous
6.6	Participation in research and development projects in cooperation with research institutions and companies in Tartu and Estonia	Tartu City Government	continuous

6. INDICATORS

Energy indicators

Indicator	Unit	Period	Base level	Target level	Source
Energy consumption of district heating	GWh	year	522	580	Energy producers
Emissions from district heating	t/ CO_2	year	61	0	Energy producers
Emissions of fossil fuels	t/ CO_2	year	124,000	79,000	TREA
Emissions from the municipal sector	t/ CO_2	year	35,000	0	TREA, Tartu City Government
Emissions from the residential sector	t/ CO_2	year	184,000	77,000	TREA
Emissions from the private and public sector	t/ CO_2	year	406,000	191,000	TREA
Energy consumption in the transport sector	GWh/mln km	year	0.842	0.723	TREA, Tartu City Government
Emissions from the transport sector	Kg CO_2 /km	year	0.214	0.178	TREA, Tartu City Government
Electricity emission factor	kg CO_2 /kWh	year	1.147	0.7	The Ministry of Economic Affairs and Communications
CO_2 emission per resident	t/ CO_2	year	7.3	3.2	Tartu City Government
Percentage of renewable energy from total energy consumption in the municipal sector	%	year	30	100	Tartu City Government, Elering
Consumption of renewable energy in the residential sector	GWh	year	0	15	TREA
Percentage of renewable energy from total energy consumption in Tartu	%	year	0	50	TREA, Tartu City Government

Mobility indicators

Indicator	Unit	Period	Target level	Source
Number of cars in Tartu per 1,000 residents	pcs	year	< 300	Transport Administration (registered vehicles), Statistical Office (population size)

Number of cars arriving in / departing from the city daily	pcs	24 hours	60,450	Tartu City Government
Energy use in the transport sector per resident	kWh	year	2,140	Transport Administration, Statistical Office
Emissions in the transport sector per resident	kg CO_2	year	530	Transport Administration, Statistical Office
Door-to-door travel time by sustainable transport	km, minute	year	< 20	Tartu City Government (test drives)
Door-to-door travel time by car	km, minute	year	> 20	Tartu City Government (test drives)
Volume and share of walking from all the modes of travel in the city (modal distribution)	km, %	year	23%	Tartu City Government
Volume and share of bus trips from all the modes of travel in the city (modal distribution)	km, %	year	24%	Tartu City Government
Volume and share of biking from all the modes of travel in the city (modal distribution)	km, %	year	17%	Tartu City Government
Volume and share of car trips from all the modes of travel in the city (modal distribution)	km, %	year	30%	Tartu City Government

Volume of serious road traffic accidents and number of road deaths	pcs, pcs	year	0	Southern precinct of the Police and Border Guard Board
Energy use in transport by sectors (private and public transport)	GWh	4 years	214	Transport Administration, Tartu City Government
Emissions in transport by sectors	1,000 tCO_2	4 years	53	Transport Administration, Tartu City Government

7. SMALL SCALE ACTIONS

The actions in previous sub-chapters are large and highly impactful tasks forming a comprehensive plan, when realized will help reaching the climate neutrality goal. Tartu's experience is that small scale actions (SSA) that help activate and engage citizens to learn and experience the positive effects of climate change mitigation, will help reach the goals more easily. Small scale actions provide an excellent tool for climate goal communication and citizen engagement.

Car Free Avenue (CFA)

CFA is a multi-stakeholder initiative curated by Tartu City Government and the foundation for Tartu 2024 European Capital of Culture. The initiative closed one of the largest car avenues for traffic for at least a month and created a quality urban space for leisure and entertainment. CFA is a platform for all types of culture, sports and entertainment activities.

PHOTO8: CAR FREE AVENUE FROM BIRD'S EYE VIEW IN 2020

All citizens and organizations are actively invited to organize events and happenings. CFA has taken place in July of 2020 and 2021. CFA was chosen as among the 100 best green destinations of the world in 2021: https://greendestinations.org/wp-content/uploads/2021/09/Tartu-Estonia-Car-Free-Avenue-2020-2021-in-Tartu.pdf

Tartu organized 3 SSA-s financed with the URBACT Zero Carbon Cities planning network to further boost the impact of CFA.

Green Solutions 2021

The city invited citizens and Tartu's organizations to come up with ideas for SSA-s. The call for ideas was called "Rohelahendused 2021" or "Green Solutions 2021"

SSA had to:

- Help promote or reach the goals of Tartu Sustainable Energy and Climate action plan "Tartu Energia 2030"

- Take place in Tartu public space between the dates of 9th of July and 20th of August 2021

- Be free to access, join and experience for all guests

- Be safe to all guests

The call was opened on the 12th of May and deadline for ideas was 10th of June. Ideas were asked to be sent in through Tartu website: https://tartu.ee/et/form/rohelahendused

Results can be seen here: https://tartu.ee/et/rohelahendused

16 ideas were submitted for the call. 8 were events and 8 were public space experiments or installations.

The evaluation committee gathered on the 18th of June having familiarised themselves with the ideas first.

The committee chose the following 3 ideas:

Safe Cycling ABC – a professionally guided cycling course organized by MTÜ Spordihullu (NGO Mad for Sport) that took place every Thursday during Tartu's Car Free Avenue (CFA) event. Events were promoted in CFA channels and on Social Media (https://fb.me/e/HgT7wG0w). Every event concentrated on a different route around Tartu, guiding participants on how to navigate it safely. The series of events culminated with a group ride with over 100 participants (https://www.facebook.com/events/1684982418362723/?ref=newsfeed).

PHOTO 9: COURSE IN ACTION BY TIINA PITK

Mending Bus Stop – a series of events that took place during and after CFA promoting mending and repairing skills, re-use and reduction of waste. The events took place every Tuesday, Wednesday and Thursday from 9th July to 20th August. Tuesdays were for mending clothes and sewing. Wednesdays concentrated on electronics. Thursdays were about overall repair including bicycles. The organizer was MTÜ Paranduskelder (https://fb.watch/8uCzhJsaiK/). Events were promoted in CFA channels and in Social Media

(https://www.facebook.com/events/352658866471536/?ref=newsfeed).

PHOTO 10: PEPER GRINDER IN NEED OF MENDING

Greenwashing – a practical installation that was supposed to pump water from the river using renewable energy – solar power and wind. Unfortunately, the author of the idea was not able to finish the idea. Events were promoted in CFA channels and in Social Media (https://www.facebook.com/events/352658866471536/?ref=newsfeed).

Food Sharing

Parallel to the Green Solutions competition another SSA was organised by directly approaching volunteers that deal with food saving and food sharing.

Volunteers that have do not have access to an organisation have access to a Facebook group to share their activities - https://www.facebook.com/foodsharingtartu

The volunteers have set up 4 food sharing cabinets across Tartu. The food cabinets were well received with volunteers also filling them with edible food that they had salvaged from dumpsters around Tartu's grocery stores and supermarkets.

The volunteers were approached by ZCC project manager Kaspar Alev and Tartu 2024 sustainability manager Triin Pikk. The idea was to install a 5th food share cabinet on CFA and by doing so promote the issue of food waste in Tartu, Estonia and the world.

The materials for the construction of the cabinet were supplied by Tartu City Government. The fridge in the cabinet was provided by Tartu beer factory 'A Le Coq'. A notepad was kept

in the cabinet to log the food donations. Since the end of CFA the cabinet was moved next to Tartu Food Market and serves it purpose there.

PHOTO 11: DEBATING ABOUT SAVING FOOD ON THE 16TH OF JULY BY TIINA PITK

On the 16th July a moderated conversation between different actors was held on CFA and promoted by Tartu 2024: https://fb.me/e/4EsTyEFrS. It included volunteers from the Tartu Food Sharing community, Tartu deputy mayor Raimond Tamm, COOP supermarket chain development manager, Tartu Food Bank representative.

Car Free Avenue Measuring

One of ZCC's small scale actions (SSA) was monitoring and measuring the Car Freedom Avenue (CFA) – number of visitors and effect on traffic.

The monitoring was carried out by a novel service by Estonian AI Company Fyma. The company carried out the analysis, using AI, the live camera feed to count specific objects or events. The CFA area was covered with 4 live cameras by local security Company Securer. The cameras did not record any video, but streamed it directly to Fyma's server for AI analysis, where it was analyzed but not stored.

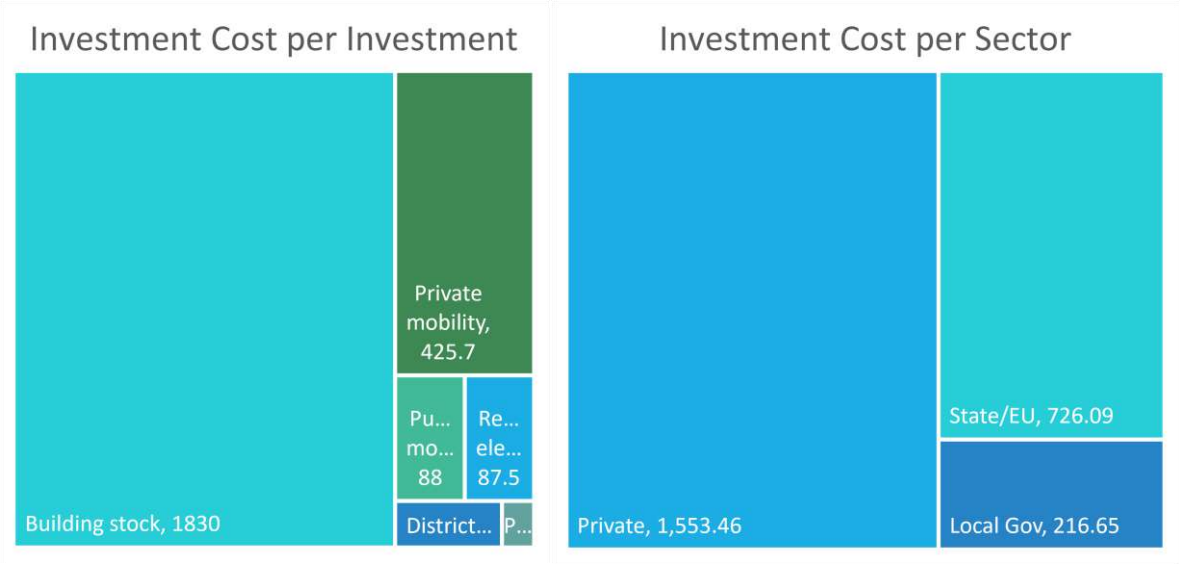
The measurements showed that over 175 000 visits were made to the CFA. The overall report of the results is available.

The second measurement was done using a Google Maps API. An agent was set up to ask Google's prediction of travel time every 15 minutes through and around CFA. The agent stored the results in Tartu IoT platform for later analysis. Result show that exciting the city centre by the shortest detour was on average 30 seconds longer then going directly.

Entering the city took on average 60 seconds longer than direct route. So the CFA had no significant effect on the travel times and created no congestion. The analysis is used to debunk the fears that CFA creates congestion in the city.

8. RESOURCING

The total estimated cost for Tartu to reach its targets as estimated by Tartu Regional Energy Agency is just under 2,5 billion EUR. This investment includes all sectors of energy consumption in the city and all sectors of investors. The largest investment goal is the renovation of building stock with total investment need of over 1,8 billion EUR. Largest investment has to come from private sector to reach climate neutrality in non-residential buildings, private transportation and renewable electricity production. The size of building stock investments and private sector investments in overall investment need is visualized on the following chart.



Specific investment needs per sector and investor is described in following table (unit mEUR):

	Private	Local Gov	State/EU	TOTAL
Renewable electricity	87.50	0.00	0.00	87.50
District heating	42.50	0.00	7.50	50.00
Building stock	1,082.90	141.50	605.60	1,830.00
Public mobility	0.00	66.00	22.00	88.00
Private mobility	340.56	0.00	85.14	425.70
Public services	0.00	9.15	5.85	15.00
TOTAL	1,553.46	216.65	726.09	2,496.20

9. FRAMEWORK FOR DELIVERY

Governance

Tartu's latest climate action plan was finalized in Tartu city council on the 1st of April 2021. In June 2021 Tartu created a department of strategic spatial planning within its own budget to manage horizontal issues regarding urban development including climate mitigation and climate adaption. The department is responsible for coordinating the implementation on Tartu's climate action plan. A new position of Climate Specialist was created for the purpose of coordinating climate actions in the city. The positions is the first and only position among Estonian local authorities.

The implementation of climate action plan and setting higher climate neutrality goals for Tartu are specific action points in Tartu's new coalition agreement signed in November 2021. Tartu's coalition agreement deadline is October 2025.

10. RISK ANALYSIS

Risk	Yes/No	Explanation
Slow/disaggregated authorisation process	Y	Risk level: Medium Tartu is a small and dynamic regional authority. The structure of the city government is wide and low. Meaning that management and implementation levels are close and management agile. It's important to improve cooperation between City Government and the elected City Council to coordinate long-term and strategic values of the city
Insufficient administrative and/or operational capacity	Y	Risk level: High High personnel turnover. Strategic level of the city government is undermanned. Current administrative personnel are burdened with short term public services leaving little capacity for strategic view.
Regulatory red tape	Y	Risk/effect: medium to high. National administrative reform is not finished. Neighbouring local governments rival for resources and citizens and lack coordination on strategic level. National legislation doesn't empower local governments enough to manage horizontal and strategic topics like climate change mitigation.
Lack of digitalisation	N	Risk: very low.

Lack of circularity	N	
Lack of consolidated monitoring, reporting and verification procedures	Y	Risk: medium Climate goal monitoring is not yep up to desired standard. Reporting is not automated and is labor intensive. Issues are addressed with climate action plan. Data acquisition is difficult and insufficient requiring national coordination and data sharing and aggregation requirements.
Lack of industrial support in providing the necessary service.	Y	Risk: medium Energy industry is not up to bar in providing green energy. Electricity network operators are not open to small-scale RES innovation. Construction industry is undermanned. Industry is most interested in new building construction due to higher profitability and simpler construction process. Renovation industry is of lower quality and current capacities do not respond to the national demand.
Lack of market competition	Y	Risk: high Due to small nation and small market large corporations or institutions don't turn attention to Estonia.
Lack of citizen participation and proactiveness	N	Risk: low Current research and experience show citizen openness to improvements and changes to fight climate change. Recent feedback to climate action plan and city masterplan show high willingness of engagement and Interest to give feedback. Tartu's participative budgeting is a success story since 2011.
Lack of effective and sustainable policy at local level	N	Risk: Low Tartu is the leader in high level sustainable policy in Estonia. International rise in populism is a concern and risk to climate actions, but acceptance and support to current climate plan has been positive from all sides of Tartu's political spectrum

Lack of enabling policy at Member State level	N	
Lack of enabling policy at EU level	N	
Lack of available technologies to eliminate Greenhouse Gas emissions in certain sectors or applications	N	No significant sectors in Tartu lack technologies to eliminate GHG from their processes.
Fragmentation of responsibilities	Y	Risk: medium Municipality level not too high due to low and wide structure. Most of GHG is emitted in private sector by large number of small to medium size energy consumers. Consolidation and coordination is the key and a market deficiency where municipality can help.
Difficulties in building collaborations between public and private sectors	N	Tartu is good at public participation and collaboration projects with private sectors
Uncertainty about regulation and taxation	Y	Risk: low to medium. Mainly uncertainty about energy sources like biomass and bio/natural gas. Where are they in energy source taxonomy? How are emissions counted? How long will they remain out from emissions trading? Fluctuation in energy and transportation fuel taxation policy'spolicies can have a significant impact in climate investments by changing profitability and pay-back periods.
Prohibitive investment costs	Y	High: medium. Risk mainly from urban infrastructure investment costs. Largest investments come from redistribution of street space and intersection redesign. Other investments include mobility points. Municipal budget is not able to manage all the investments. If national and EU coordination in mobility infrastructure investments is lacking, then reaching mobility goals is under risk. Energy efficient home renovation is currently too expensive without national financial

		support. Regularity and increase of funds is essential for reaching renovation goals.
Geomorphic/topographic limitations/challenges	N	Wind power not feasible
Growth schemes limitations/challenges		
Climatic limitations/challenges	Y	Warm summers and cold winters
Lack of funding/financing schemes	Y	Risk medium: Renovation – currently only one viable and regular renovation funding scheme. There are no alternatives for national renovation support. Innovative or alternative solutions are underdeveloped and not strong enough.
Lack of technical or commercial skills and information		

City of Tartu would like to thank all the members of local ULG, partners from project Zero Carbon Cities and all good and caring people who participated in a way other in delivering the climate neutrality ambition.

2022

Manchester Integrated Action Plan

Sean Morris

5/16/2022

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Part 1 – Context and Process

Part 2 -Action Plan

1. Statement on Manchester's Integrated Action Plan in the Zero Carbon Cities project

Councillor Tracy Rawlins, Executive Member for the Environment
Manchester City Council

As one of the first cities to lead the Industrial Revolution of the 19th and 20th century, Manchester was powered by carbon at a time when understanding of climate change remained low, if not non-existent.

Over the past 15 years, the city has led the way in understanding the impacts of carbon, climate change and the pressing need for urgent decarbonisation, mitigation and adaptation. This has included creating a dynamic, creative, wide and innovative climate coalition of supporting organisations to drive decarbonisation and support the new green economy of the 21st century.

This process has included:

- In 2009, a 'Call to Action' to all sectors of the city to work together to tackle climate change and reduce the city's carbon emissions.
- This led to a high-level Manchester Climate Strategy 2010 – 2020.
- The positive collaborative work that this strategy developed inspired the creation of the Manchester Climate Change Agency in 2015, one of the first to be created in the UK.
- In 2016, Manchester City Council published the 'Our Manchester Strategy' with tackling climate change one of the core components within it.
- In early 2018, the first meeting of the Manchester Climate Change Partnership was held. The Partnership brings together all the major players in the city to the common aim of reducing carbon emissions. One of its first tasks was to agree to a science-based zero carbon target and the creation of carbon budgets for the city from 2018 – 2100.
- In 2019, Manchester City Council, following on from a decade of positive climate action, formally declared a 'climate emergency' and embedded the work to create a zero carbon Manchester by 2038.
- In 2020, a Manchester Climate Change Framework for 2020 – 2025 was published, and it is currently being refreshed. The Zero Carbon Cities project which Manchester leads has been a fantastic opportunity to bring extensive detail to the city understanding its carbon footprint and work to deliver its science-based target. The refresh document will be published in 2022.

Manchester was one of the first cities in Europe to establish both a science-based zero carbon target and a series of carbon budgets to challenge the city to work with in its drive for decarbonisation.

As an international, outward-facing city that is fully aware of the impacts of climate change, Manchester has led the Zero Carbon Cities project not just to assist it in developing more detail to delivering on its science-based target, but to encourage other cities to undertake the same process, with all the detailed and complex challenges it brings.

The data that has arisen from this project has greatly assisted Manchester understand what scale of action is urgently needed in meeting its carbon targets. It has also provided renewed emphasis on accelerated actions that it must do to keep within its budget, whilst understanding the parallel need for embedding it with a climate adaptation and resilience strategy. Manchester City Council and Manchester Climate Change Partnership will continue to work closely together in the next critical years in delivering on our target and I commend this approach to cities across Europe and beyond.

PART 1: CONTEXT AND PROCESS

2. Introduction to Manchester and City Context:

Population and history: With a fast-growing population of 547,000 (a 5.8% increase since 2011), Manchester has been transformed from its key role as a pioneering city of the Industrial Revolution to a modern city based on a vibrant, predominantly service-based knowledge economy today. Manchester has always been a city of innovation and seeks to be one of the frontrunners in the green energy revolution within its challenging aim to become a 'zero-carbon' city by 2038.

Location: Manchester is a prominent European city and the largest borough (in population size) of the Greater Manchester Combined Authority city region, which is situated in the Northwest of England. It is the fastest growing city in the UK outside of London, with recent rapid growth of high-density housing development especially in the city centre. Manchester is the third most visited city in the UK, after London and Edinburgh. Manchester's strategic planning policies seek to encourage the regeneration and repopulation of the core of the city and to prevent urban sprawl.

Manchester's location in NW England

The 10 local authorities that make up Greater Manchester Combined Authority

Governance structure and economic indicators: Manchester is one of ten local authorities which make up the Greater Manchester conurbation. Manchester City Council is responsible for delivering core services such as housing, highways, social services, education, planning, leisure and cultural services. It works closely with the Greater Manchester Combined Authority, which is led by an elected Mayor (the Leaders of the 10 GM local authorities act as Deputy Mayors with portfolio leads supporting the Mayor), and it has strategic control over regional transport, spatial planning, economic development, health, and the emergency services. It produces a five yearly Environment Plan which provides strategic underpinning of climate change policy and engagement with the UK Government, with the City Council also involved in operational delivery of it. Both bodies have a 2038 zero carbon target and align closely their carbon mitigation, adaptation and resilience policies and strategies.

Greater Manchester is the second largest sub-regional economy in the UK. Manchester City Council is at the centre of that sub-regional economy. In 2017, Manchester's Gross Value Added (measure of the value of goods and service produced by an area) was £19.7 billion. Between 2016 and 2017, Manchester's overall GVA grew by 4.3%, compared to 3.6% for the UK, and is the third-highest growth of all the UK Core Cities. In March 2019 there were 22,630 enterprises in Manchester[1].

Climate and Energy: The city has a temperate and generally mild climate. It does not generally endure extreme levels of temperature. While it has experienced some incidents of flooding, these have not generally been as severe as in some other UK towns and cities. However, surface water flooding has increased tenfold in the UK between 1945 and 2008 and is predicted to increase further with climate change. There was some small-scale flooding in the city in 2020, and significant 'near-miss' flooding incidents in early 2021 and again in early 2022 in the south of the city. In its policy vision for the future, Manchester has the ambition to become a fully climate resilient zero carbon city by 2038. Manchester signed up to the Global Covenant of Mayors initiative as early as 2009. Within the current updating of the Manchester Climate Change Framework there is a renewed focus on adaptation and resilience issues.

In winter 2015, Manchester City Council formally determined that 'Manchester being a liveable and low-carbon city' should be a core part of its City Strategy, known as its 'Our Manchester' approach.[2] In July 2019, Manchester City Council also formally declared a 'Climate Emergency' and agreed to continue working with its partners to seek to become a zero carbon city by 2038.[3] The City Council has developed this work from its inception with a wide range of partner organisations and the Greater Manchester Combined Authority, seeing it as critical not just to reduce its own carbon emissions, but that of other core organisations across the city.

Energy policy is undertaken by central government mandate through the National Grid, energy utility companies and suppliers. GMCA and Manchester City Council have some role in encouraging the development of local renewable energy schemes, and both have collaborated in the creation of a Local Area Energy Plan for Manchester.

Like towns and cities across the world, Manchester has been impacted by the Covid-19 pandemic, which has affected its economy while having a short-term positive impact on its carbon emissions. Whilst early figures suggest there was a 11% cut in carbon emissions due to the pandemic in 2020/21[4], emissions are likely to be rebound as economic activity has restarted in 2021. In November 2020, Manchester City Council published an Economic Recovery and Investment Plan[5]. The Plan reaffirmed the city's climate commitments and outlined specific zero-carbon programmes around housing retrofit and city centre transport and mobility as strategic investment propositions.

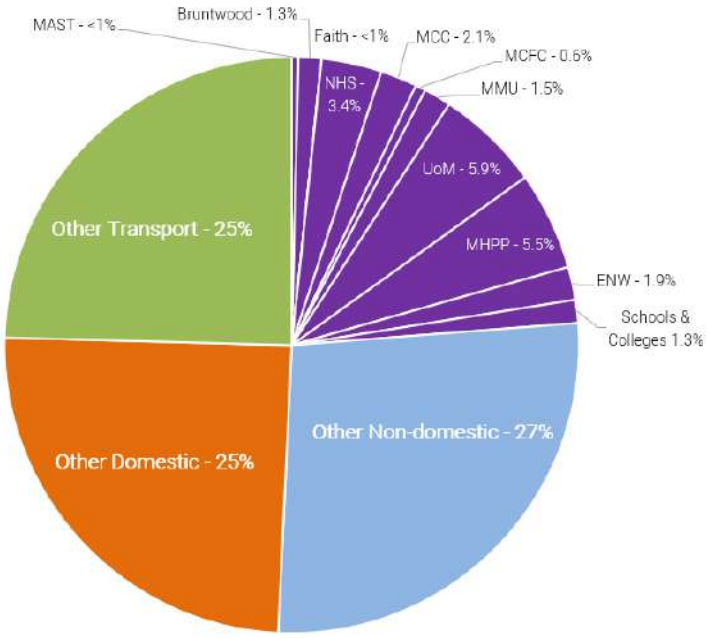
Manchester City Council, Manchester Climate Change Agency and the Manchester Climate Change Partnership: Manchester City Council works with an independent agency, Manchester Climate Change Agency (MCCA, and known as the Agency throughout this document), which is responsible for co-ordinating and advising on the city's response to the climate crisis. The City Council was instrumental in the establishment of the Agency, building on a long-standing collaborative

[1] https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/2162/economy
[2] https://www.manchester.gov.uk/downloads/download/6426/the_manchester_strategy
[3] https://democracy.manchester.gov.uk/mgAi.aspx?ID=2803
[4] https://www.manchesterclimate.com/sites/default/files/MCCA%20Annual%20Report%202021%20Final.pdf
[5] https://secure.manchester.gov.uk/info/500113/city_centre_regeneration/8063/powering_recovery_manchester_s_recovery_and_investment_plan

partnership approach with many core organisations through an initiative called 'Manchester – A Certain Future'. The Agency also works closely with the Greater Manchester Combined Authority.

The Agency's key role is to bring together the major sectors of the city and advise it on climate change policy. In 2018 it formally established the Manchester Climate Change Partnership (MCCP and known as the Partnership throughout this document) as the principal leadership mechanism for engaging on climate change in the city. An important consideration for the Agency and the Partnership has been to ensure that action on climate change is an issue not just for those already engaged, but to actively engage those businesses, residents and communities that haven't previously seen the relevance of the issue within their everyday business or lives. Therefore, active programmes of engagement with communities and with young and older people has been a feature of the Manchester approach.

For the Zero Carbon Cities project, the Partnership is Manchester's Urbact Local Group (ULG), and it meets every two months. The Partnership currently has around 60 members, across 12 sectors, ***with responsibility for over 20% of Manchester's direct CO2 emissions*** (with recent engagement through the Manchester Arts Sustainability Team and Manchester Airport Group, this figure is rising towards 25%, but further research is taking place on the exact number). Its members also have reach into the remaining 80% through their staff, students, customers, tenants, football fans, theatregoers, worshippers, and others. By working with their supply chains members are also helping to reduce the city's indirect consumption-based CO2 emissions. This chart summarises the Partnership's carbon emissions breakdown:



Members of the Partnership:

1. **Arts & culture partnership**
2. **Bruntwood (property), other businesses and core business networks**
3. **Faith & Planet Partnership**
4. **Health Partnership**
5. **Manchester City Council**
6. **Manchester City Football Club**
7. **Manchester Met University**
8. **University of Manchester**
9. **Manchester Housing Providers**
10. **Electricity Northwest**
11. **Educational providers**
12. **Manchester Airport (joined later and their onsite emissions are part of transport – flight emissions are part of UK national carbon budget)**

Real effort has also been made by the Agency to encourage representation in the Partnership and its sub-groups from women, young people and those demographic groups under-represented. Additionally, a diverse demographic profile has been adopted for recruitment of citizen representatives to the Community Assembly noted in Section 2 below. Although work in this area had been delayed due to Covid-19, the Agency is seeking to take a more robust approach to diversity

and inclusion and determine whether it is appropriate to establish an advisory group on diversity related issues, or to continue to mainstream diverse representation at each level.

In February 2020, the Agency published the Manchester Climate Change Framework 2020-25 Version 1.0 (Framework 1.0). Framework 1.0 sets out Manchester's latest science-based targets and the high-level strategy for achieving them. The Agency is currently developing an updated Framework 2.0 to provide the city with a more detailed evidence base and targeted actions to deliver on its original high-level strategy. The Framework refresh is intended to play a pivotal role in moving Manchester forward in actively reducing its carbon emissions, whilst providing a complementary and detailed structure of integrating climate adaptation and resilience projects.

3. Focus of the IAP:

a) Aim: Refresh Manchester's SECAP (the Manchester Climate Change Framework 2020-25). By September 2022 the city will have in place an updated and refreshed version of Manchester's SECAP / Climate Change Framework 1.0 for 2020-25. This will update the Framework to provide more detail on Manchester's science-based targets approach. The key focus is to put in place a plan designed to identify the key cross-sectoral actions required to deliver the scale of carbon reduction to ensure that Manchester plays its full part in limiting global temperature rise to 1.5 Celsius (as outlined in the Paris Climate Change Agreement and reiterated in the Glasgow Climate Action Pact). If it is to achieve this, the city will need its direct carbon emissions between 2018 and 2100 to be limited to ***15.17 million tonnes***.

In addition, Framework 2.0 will:

- provide more detail on the city's approach to reducing indirect carbon emissions,
- consider its local engagement in reductions to national aviation emissions,
- create new activity on the impacts of climate change on health and wellbeing,
- create additional activity in ensuring Manchester has a sustainable, inclusive economy,
- and detail the work the city needs to do to put in place adaptation plans and improved resilience to climate change.

It is felt important to include detail on such matters so that the city is cognisant with the wider challenges that climate change will bring.

Science-Based Targets and Carbon Budget: It has become increasingly well-recognised that cities need to set local 'science-based targets' to provide a more accurate picture of the level of CO2 reduction required. Science-based targets work on the basis that there is a finite amount of carbon that society can emit until 2100 if the world is to stay within a safe and manageable increase of global warming. This finite amount is typically described as a 'carbon budget' and can be calculated at different levels, from global/UN, to EU, to individual Member States, to regions, to cities, to business sectors or communities, even to individual businesses or citizens. Manchester has followed this approach and was one of the first cities in Europe to set a science-based carbon budget.

To do this, the Agency and the Partnership cooperated closely with the Tyndall Centre (a specialist unit researching and calculating global carbon emissions data, based in the University of Manchester) to set science-based targets designed to ensure that the city plays its full part in global efforts to reduce carbon emissions. These were published in November 2018 and:

- outlined a maximum 15.17m tonne carbon budget for Manchester between 2018 and 2100,
-

- in 2018, this required on average 13% annual CO2 reductions in the first five-year period of the city's carbon budget,
- and to be zero carbon by 2038.

This was highlighted in Framework 1.0 like this:

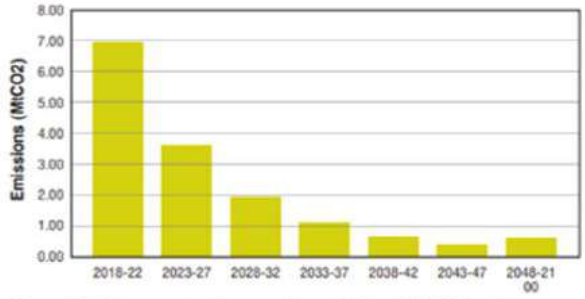
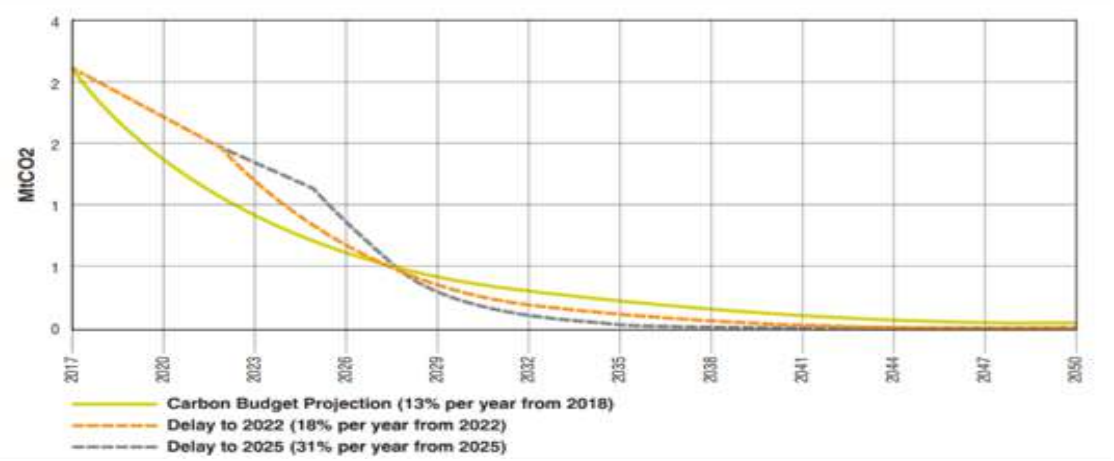


Figure 4: Emissions projections consistent with the 15 $MtCO_2$ budget – starting from common year (2017)

Time Period	CO_2 budget ($MtCO_2$)
2018-22	6.93
2023-27	3.59
2028-32	1.95
2033-37	1.10
2038-42	0.64
2043-47	0.38
2048-2100	0.59
Total	**15.17**

Table 2: Manchester's 15 $MtCO_2$ budget by time period

By undertaking this, Manchester is committing to a target for 2038 that requires an 83% carbon reduction (from 2015 levels), rather than the 40% currently required by the Global Covenant of Mayors. Manchester City Council has fully committed to the reductions outlined by the Tyndall Centre in a 'climate emergency' resolution in 2019[6]. In Framework 1.0 mention was also made by the Agency that if the city did not keep to its carbon targets it would have to increase its annual direct carbon emissions accordingly, as outlined in this graph:



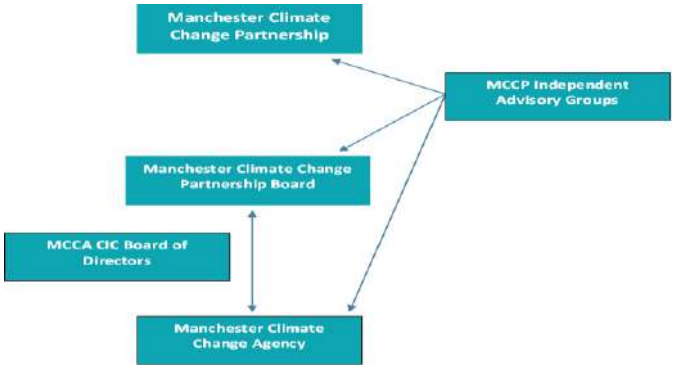
The Framework 2.0 document is focusing on documenting what a 50% in carbon emission cuts would mean across sector of activity.

b) Manchester's ULG – the Manchester Climate Change Partnership

6 https://secure.manchester.gov.uk/info/500002/council_policies_and_strategies/3833/zero_carbon_manchester

In Manchester, the Partnership acts as the city's URBACT Local Group (ULG) and it works to an agreed terms of reference. [7] The ULG is supported by the Agency, which acts as the ULG co-ordinator, and it works closely with the Zero Carbon team at Manchester City Council in developing the Manchester Climate Change Framework 2.0. The Agency are active participants in the ZCC URBACT transnational programme and have attended and helped to facilitate its core meetings and workshops. There is also direct engagement on the project through Manchester's ZCC Coordination Group, and officers attend Agency team meetings on a regular basis to oversee governance of the project and close engagement with the Council. The structure diagram below shows its interactions.

c) MCCA and MCCP Structure –



4. Description of the Process

In 2020, the Agency disseminated its Climate Change Framework 1.0 and engaged with the other member cities of the ZCC. It also established its plans for commissioning data that would provide real detail and move forward actions with its high-level objectives. This is the focus of the Framework 2.0 Refresh document. Following the commissioning of Anthesis to undertake this data delivery the core parts of moving this plan forward have been discussed and agreed upon with the Partnership – ULG.

As noted in more detail in the Framework for Delivery below, this process has five key stages to it:

Stage 1	**Stage 2**	**Stage 3**	**Stage 4**	**Stage 5**
Connecting new carbon data to Framework 2.0	Development of evidence base	Analysing carbon data and setting actions	Outlining potential place-based actions and investment priorities	Implementing change
Spring – Summer 2021	Autumn 2021	Winter 2021/22	Spring 2022	Summer – autumn 2022 onwards

The Partnership / ULG have had oversight of each stage and have inputted their views and advice. The Agency has coordinated this project with several ULG members, particularly Manchester City Council and the public health sector, in cooperation with GMCA and key carbon data advisors

7 https://www.manchesterclimate.com/sites/default/files/MCCP%20Terms%20of%20Reference%20Approved%20March%202021.pdf

including Anthesis and the Tyndall Centre. Specialist Advisory Groups organised by the Agency have also provided detailed input in addition to this process.

PART 2: ACTION PLAN

5. Objectives, Actions and Schedule

Key elements -

a) Role of the ULG in delivering the Manchester Climate Change Framework Refresh

The Partnership, as Manchester's ULG for the ZCC project, meets every two months. In liaison with the Agency, it is the group that has overseen both the creation of the first Climate Change Framework published in February 2020, and in determining the scope of a refresh of that document.

The Partnership steers the activity of the Agency and has consistently remained a forum to share good practice and to debate some of the key challenges that the city faces as it continues its journey to a net zero carbon future.

In spring 2021 the Partnership approved for the Agency to move forward with an Action Plan that would provide more specific carbon data in order to understand how the city was decarbonising and what action would be required to keep it to its science-based target and carbon budgets.

The activity of the Partnership and of individual Partnership members in this process included:

i) On the endorsement of the Partnership, Manchester City Council and the Agency commissioned the environmental consultancy group Anthesis to develop a detailed evidence base of what a 50% reduction in direct emissions would look like.

In looking at the four key objectives set down in Framework 1.0, the core objective the Agency commissioned Anthesis to research is how Manchester can stay within its carbon budget.

It particularly focused on asking Anthesis to consider the following four questions:

1. Where does Manchester need to get to?
2. What needs to happen to get there?
3. Who needs to be involved?
4. How can this be achieved?

Within that, additional elements of Framework 2 included in the remit for the Anthesis evidence base report were:

- Providing targets and analysis for the Framework's six core thematic action areas – buildings, renewable energy, transport, food, things we buy and throw away, and green infrastructure and nature-base solutions.
- A Strategy Table which sets out the actions necessary for the city to meet its headline and thematic objectives and targets.
- Consideration of a new 7th thematic area of action: "Supporting and enabling residents and business organisations to act".

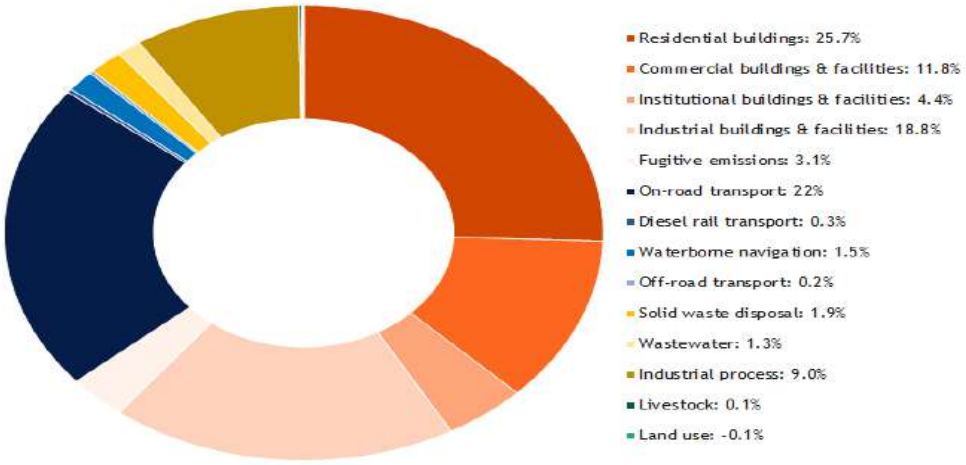
The core principles underlying the evidence base come very much out of the discussion being held throughout the ZCC project and the common view of the ULG – that Manchester needs a greater

level of evidence to move forward with its actions, that collaboration across the city was fundamental, that Manchester needed to be aware of national and international best practice, and to maximise a wider level of benefits beyond carbon reduction (such as improving the resilience, health and economy of Manchester).

Anthesis provided an evidence base and inventory of carbon emissions based on the latest figures for the city, using an online tool it has developed called SCATTER (which is used by 302 UK local authorities). This uses UK Government and other figures to calculate what each part of Manchester's economy generates in carbon. SCATTER stands for 'Setting Cities Area Targets and Trajectories for Emissions Reduction'.

Using this model, for the most up-to-date figures from 2018, Manchester was responsible for net emissions totalling ***2,461 ktCO2e***. The majority resulted from buildings & facilities (63.8%) and transport (24%). The full distribution of emissions across the city is as follows:

Inventory of Manchester carbon emissions by sector



Additional analysis from Manchester's Direct Emissions Report (developed by Dr Christopher Jones of the Tyndall Centre, but not yet published) indicates that ***86% of Manchester's 2018 - 2022 carbon budget has already been used by the end of March 2021, despite a provisional estimate of an 11% drop in emissions due to COVID-19 restrictions***. This means that Manchester must look at developing faster reduction rates in the future to keep within its overall carbon budget. This has engaged the Agency to look at ways to scale-up action to bring the city back on track.

Anthesis's SCATTER carbon data programme has also provided the Agency with indicative information on what a 50% reduction in Manchester's carbon emissions would look like for the city – which was a core action from the original Framework document. Some of the numbers and detail being provided are challenging for the city. This detail needs to be reviewed by the City's governance and scrutiny structures before publication in September. This graphic from Anthesis is useful for highlighting some of what that detail will look like:

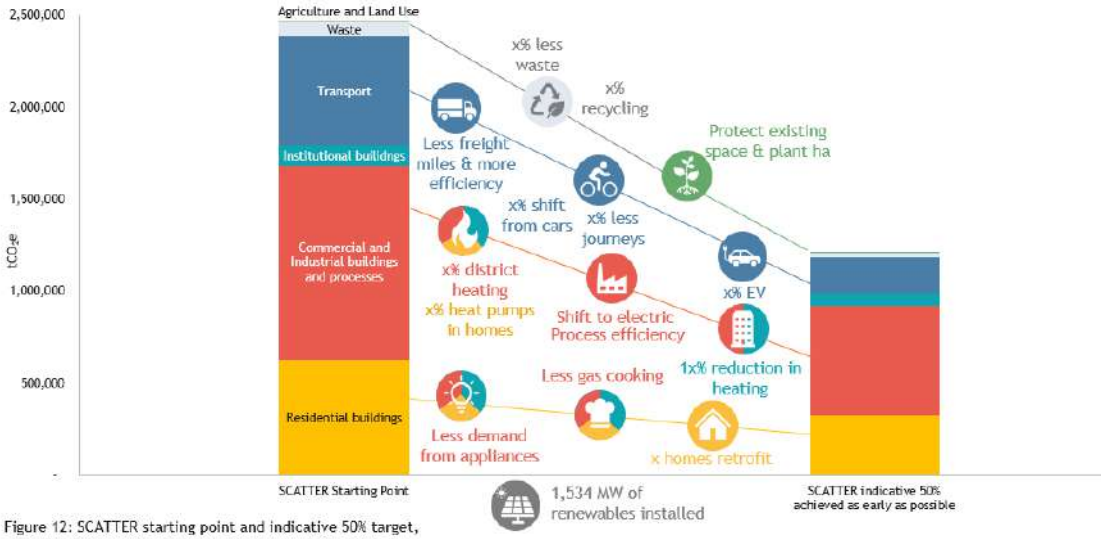


Figure 12: SCATTER starting point and indicative 50% target, alongside interventions from the Higher Ambition Pathway

This action table will provide specific data on interventions, carbon savings and budget required for each action area when the Framework Refresh is published in September 2022:

ACTION AREA	INTERVENTION	ULG MEMBERS / STAKEHOLD-ERS INVOLVED	INDICATORS	TIMESCALE
1. BUILDINGS				
1.1 **IMPROVE ENERGY EFFICIENCY**	• Build new houses with all having an average annual energy consumption of 1,020 kWh. • X households need to have received medium retrofit measures, X households have additionally received deep external wall insulation • Domestic energy demand for heating water demand has decreased by X% • Commercial heating, cooling and hot water demand has decreased by X%	Manchester City Council (MCC) Greater Manchester Combined Authority (GMCA) Manchester Housing Providers Partnership (MHPP) Private landlords' partnership Housing developers Manchester businesses	Number of new houses with low energy consumption Number of households with medium retrofit measures Number of househilds with deep external wall insulation % reduction in domestic energy demand % reduction in commercial heating, cooling and hot water	**To reach agreed annual targets 2022 – 2025** **Expand further 2026 - 2038**

1.2 **SHIFT OFF GAS SYSTEMS**	• X% of non-domestic heating systems are district heating • X% of domestic heating systems are electric heat pumps	MCC GMCA / GMHP MHPP Electricity Northwest / Cadent Gas Systems	% of non-domestic systems that are district heating % of domestic heating that are using electric heat pumps	**Annual reporting 2022 – 2030 as per government policy** **Expand further 2030 – 2038**
1.3 **LOW CARBON AND ENERGY EFFICIENT COOKING LIGHTING AND APPLIANCES**	• Domestic lighting & appliance energy demand decreases X% • Commercial lighting & appliance energy demand decreases X1% • X% increase in domestic electric fuel use for cooking, use of fuel reduced by X% • X% increase in non-domestic electric fuel use for cooking, use of fuel reduced by X%	MCC GMCA MHPP Developers Businesses	% decrease in domestic lighting and energy demand % decrease in commercial lighting and energy demand % increase in domestic and non-domestic electric fuel use % decrease in domestic and non-domestic fuel	**Agree annual target 2022 – 2038**
2. RENEWABLE ENERGY				
2.1 **RENEWABLE ENERGY – INCREASE SOLAR PV CAPACITY**	• Local PV: X MW installed capacity • Large-scale PV: X MW installed capacity	MCC / MHPP GMCA / GMHP Educational providers (for work and skills)	No of MW installed of local and large-scale PV	**Set targets for 2025, 2030, 2035, 2038**
2.2 **RENEWABLE ENERGY – INCREASE WIND CAPACITY**	• Local wind: X MW installed capacity • Large-scale onshore wind: X MW installed capacity • Large-scale offshore wind: X MW installed capacity	MCC GMCA Electricity Northwest Community renewable groups Government policy / utility companies	No of MW of local wind No of MW of large-scale onshore wind No of MW large-scale offshore wind	**Set targets for 2025, 2030, 2035, 2038**
2.3 **RENEWABLE ENERGY – EXPLORE**	▪ X MW local hydro ▪ Declining usage of biomass having displaced	Manchester City Council GMCA	No of MW local hydro No of MW biomass fuel generated	**Set targets for 2025, 2030, 2035, 2038**

OTHER RENEWABLE TECHNOLO-GIES	fossil fuel sources in power stations	Electricity Northwest Community renewable groups		
3. TRANSPORT				
3.1 **ACTIVE TRAVEL**	• X% reduction in the use of private vehicles for road transport • X% increase in rail and tram transport • X% increase in cycling and walking	TFGM / GMCA Manchester City Council / Schools Businesses Transport Companies / Metrolink Cycling UK	% reduction of cars / freight % increase in public transport % increase in cycling and walking	**TFGM have set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
3.2 **TRAVEL SHORTER DISTANCES**	• X% reduction in total distance travelled per person	TFGM / GMCA MCC Businesses	% reduction in average travel distance	**TFGM have set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
3.3 **SWITCH TO ELECTRIC VEHICLES**	• X% of cars are EV or HEV • X% of buses, trams and trains are electric	TFGM / GMCA MCC Private installers Transport companies	% EV or HEV cars % of electric buses, trams and trains	**TFGM and MCC have been set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
3.4 **REDUCE FREIGHT EMISSIONS**	• X% reduction in road freight mileage • X% reduction in energy used per mile travelled	TFGM / GMCA MCC Haulage associations	% freight mileage reduction % energy reduction per mile	**TFGM have set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
4. FOOD				
4.1 **PROMOTE SUSTAINABLE DIETS**	• Reduce the amount of meat and dairy in council-supplied food by X%	MCC Food Board Schools Food businesses	% reduction in meat and dairy in Council supplied food	**Annual review 2022 - 2038**

4.2 **FOOD – REDUCE PER CAPITA FOOD WASTE**	• X% reduction in food waste	MCC Food Board Schools Food charities	% reduction in food waste	**Annual review 2022 - 2038**
4.3 **FOOD – IMPROVE THE SUSTAIN-ABILITY OF FOOD SUPPLY CHAINS**	▪ Engage with a minimum of X% of council food suppliers (by spend)	MCC GMCA Food Board Food businesses Lobby government	% engagement with food suppliers	**Annual review 2022 - 2038**
4.4 **FOOD – IMPROVE FOOD SECURITY**	• Increase allotment coverage by X%	MCC / GMCA Private developers with land	% allotments increase	**Annual review 2022 – 2038**
5. THINGS WE BUY AND THINGS WE THROW AWAY (CONSUMPTION)				
5.1 **REDUCE THE QUANTITY OF WASTE**	• X% reduction in the volume of waste	GMCA MCC Educational providers Businesses Community groups	% waste volume reduction	**GMCA have local targets and bound by national targets annually 2022 – 2050**
5.2 **INCREASE RECYCLING RATES**	• X% increase in recycling rate	GMCA MCC Educational providers Businesses Community groups	% recycling rate increase	**MCC and GMCA have local targets and bound by national targets annually 2022 – 2050**
5.3 **SHIFT FROM FOSSIL FUELS & DE-CARBONISE INDUSTRIAL PROCESSES**	• Electricity consumption is X% of total industrial energy consumption by 2030 • Process emissions reduced: X% for chemicals; X% for metals;	GMCA / GMBSP MCC MCCP Businesses	% electricity used by industry	**Industry bound by national targets annually 2022 – 2050**

	X% for minerals; X% other industries			
6. GREEN INFRASTRUCTURE AND NATURE-BASED SOLUTIONS				
6.1 **INCREASE TREE COVERAGE AND TREE PLANTING**	• X% increase in forest coverage • Tree planting outside of woodlands increases by X% from 2019, equivalent to X hectares	MCC GMCA – Nature GM City of Trees Educational and health providers Businesses Environmental groups	% increase in forest coverage % increase in tree planting	**MCC / GMCA have annual targets 2022 – 2038**
6.2 **LAND USE MANAGE-MENT**	• Maintaining existing green spaces	MCC GMCA Environmental groups Businesses	Analysis of existing maintenance programme	**MCC / GMCA have annual mainten-ance reports**

ii) A workshop was held in September 2021 to bring together core members of Manchester City Council's Zero Carbon Team with the Agency, Anthesis and the Tyndall Centre from Manchester University. This workshop sought to understand the process that was required to deliver this Integrated Action Plan and its role in creating Framework 2.0.

The topics discussed at the workshop were:

- How to strengthen the ULG / MCCP (the key Stakeholders) to deliver the IAP.
- What the city needs to do to improve its carbon emissions data and implement science-based targets and carbon budgeting.
- The role of the MCC zero carbon coordination group in delivering the City Council's Climate Action Plan and align it with Framework 2.0.
- Developing community engagement to consider how citizens are participating in climate action plans, as well as supporting the Small-Scale Action within the project.

The key points that came out of the workshop included:

- Some big organisations and carbon emitters are still missing from the ULG, but they are involved in other carbon reduction groups. They need to be encouraged to join it.
- Smaller organisations need to be liaised with through a structured engagement plan.
- Some of the gaps in engagement can be reduced by building on what is already being done and expanding funding and capacity to them.
- The core carbon budget targets are not easily translatable to the public – visible actions and a communications strategy are necessary within Framework 2.0 to improve that.

- It is important to emphasise in Framework 2.0 that the targets put forward are achievable, and what would need to be advocated from government where they are not.
- Seek closer engagement with climate action experts who are currently not readily accessible within MCC or MCCA – this could be important within the Framework refresh.
- Retain targets already publicised in previous core MCCA documents to avoid confusion.
- Sharing best practice and showing real progress can promote positive change.
- Breakdown what are huge targets into 'bite size' achievable actions to promote progress.
- Use political influence to engage organisations and assist with communications in local communities.
- Reduce silo working and encourage cross-departmental decision making on this agenda.

The workshop was very useful to Agency staff and a report on it was brought to the Partnership / ULG for a full discussion. Further detail on it can be found in the Basecamp directory.

iii) After understanding the core research undertaken by Anthesis, MCCA undertook a series of sectoral workshops with core agencies to discuss this evidence base and what can be delivered by 2025 at the city and city region level, as well as what type of additional scaled-up action and innovative new projects need to be considered.

Some of the figures provided by the Anthesis evidence base report created an issue for the Partnership / ULG and the Agency in that they are more generic in nature and do not necessarily conform to local action or national government policy. For example, the figures around the large uptake of electric vehicles (EV) do not adequately consider the city and city region's push for active travel solutions, such as walking, cycling and an increased use of public transport.

To analyse these figures and what they mean for scaling-up action, the Agency organised a series of workshops and meetings with core partners in Manchester City Council, Transport for Greater Manchester, Greater Manchester Combined Authority Low Carbon Team, and external policy experts to understand what climate actions are likely to be taking place in the next few years and what new innovative projects, strategies and policies are needed to supplement them.

iv) Both the workshops and the Anthesis document identified the real need to conduct some further detailed analysis on Manchester's carbon emissions across all activities of the city as it tries to localise its targets from a generic to a more specific context. The need for this more granular understanding of the characteristics of Manchester's emissions inventory, and the need to develop specific actions to reduce them, has become more apparent as the project has progressed, and it has been discussed carefully with the Partnership.

The workshops devised and agreed four 'buckets' of action allocated into the following agencies:

- What existing and new actions the city can do to scale up activity in reaching that 50% target as swiftly as it can, such as through the renewed City Housing Strategy, the City Centre Transport Strategy and the Manchester Work and Skills Strategy.
- What collaborative projects the city can undertake with the GMCA City Region, such as through its new Energy Innovation Agency.
- The areas of advocacy and lobbying the city / city region needs to take to the UK Government to provide more powers, funding and support to scale-up action, such as through the new Low Carbon Regional Hubs being established by the government.
-

- Innovative new projects and investment that can assist in this process, such as the full implementation of the Manchester Local Area Energy Plan and Manchester's involvement in the UKCCIC project noted above.

This additional analysis has outlined the type of specific actions required to meet a 50% reduction in direct carbon emissions based on 2020 figures. Substantial research has also taken place to on which agency can develop place-based actions to scale-up carbon reduction – within the city, in cooperation with the Greater Manchester Combined Authority, in advocacy to the UK Government and in innovative projects that could unlock new investment to meet Manchester's carbon targets.

v) The Framework 2.0 document will be fully written up in the first half of 2022. A first consultation on what should be in the refreshed Framework took place in Summer 2021. A second public consultation on the draft Framework 2.0 will take place in late May / June 2022. Detailed progress on the project has been regularly outlined to each Partnership meeting and to the Partnership Board to comment on all aspects of the project.

An outline final document will go through a series of approvals including the Partnership / ULG, as well as through Manchester City Council's governance processes, including its Environment and Climate Change Scrutiny Committee, Strategic Management Team and Executive Board. These are set for the end of July. Following any comments on the document being incorporated, it will be published in September 2022.

The Partnership has also agreed the importance of creating shared messaging for clear, consistent communication when the Framework is published. It acknowledges that it is important that all sectors of the city need to do more, both as individual organisations and more collectively as a city under the Partnership. As such this will require a gearing up of capacity, systems, delivery models, governance and pipeline of opportunities on climate action for the city. Such information will be a core part of the narrative within Framework 2.0.

vi) The Partnership -ULG has also commissioned the Agency to undertake a number of parallel actions that will embed the work of Framework 2.0 and strengthen its wider governance and effectiveness.

These include:

- To develop a detailed questionnaire and direct engagement with MCCP members to understand their carbon literacy, activity and reporting. It will set this work in the findings of the Framework so that all members of the Partnership – ULG are engaged in upscaling their own activity. The Agency will also help in looking at ways at expanding the membership of the Partnership to cover more of the major carbon emitters in the city, and on the influencing role the Partnership can play to the rest of the city.
- A major funding bid has gone into the National Lottery to build on the community engagement work of the 'In Our Nature' programme. Subject to this bid being successful, this work will significantly expand and aid the city in enhancing the important influencing role of local residents and businesses.
- In conjunction with the Health and Wellbeing Advisory Group, the Agency is currently involved in a 'deep dive' process of understanding climate change health and wellbeing needs and assessing inequalities in the city that will form part of the city's implementation

of actions required from the local 'Marmot' report process. (Sir Michael Marmot was asked to produce a report on health inequalities and core actions to address them for both the GMCA and Manchester City Council.)

- The agency to help encourage the development of a risk and vulnerability assessment for Manchester, to understand adaptation and resilience needs, with the City Council. Advice is also being provided on this with the Meteorological Office and in other projects that are being developed by the Agency with a range of academic advisors.
- Progress further business engagement through the support provided to Manchester by the City Business Climate Alliance (CBCA), the Core Cities network, the C40 Global Covenant of Mayors, UK100, existing business networks and the 'Bee Net Zero' website that engages with business on climate action.

Much of this work is taking place due to understanding the climate data that comes out of taking a science-based approach to targets and carbon budgets.

b) Delivering on the other core objectives of the Climate Change Framework 2.0

Whilst a clear and obvious focus is taking place on how the city can stay within its carbon budget for 2025 and onwards, consideration is also being given to the other three core objectives from Framework 1.0, that are also being developed to a greater level of detail.

- **Climate adaptation and resilience –** Framework 1.0 acknowledged that a greater level of activity is required on climate adaptation and resilience. The Agency has collaborated closely on this matter with the city's two universities, and throughout 2021 Dr Paul O'Hare of Manchester Metropolitan University was seconded to it to help deliver increased understanding of the risks and vulnerabilities in the city. Dr O'Hare developed a Vulnerability Framework for Manchester[8] and recommendations to take this forward. This work is being developed further by the Agency as it engages with the Council and GMCA in improving adaptation and resilience in the city. This includes close liaison with the Environment Agency (for adaptation to severe flooding), the Meteorological Office (for information on extreme weather events) and Resilience Officers at the city region level.
- **Health and wellbeing –** Under the auspices of the Partnership, staff from the Agency and the cities Manchester Health and Wellbeing Advisory Group has been taking place to deliver an action plan on climate change impacts on health and wellbeing. This work had been delayed due to the extensive pressure placed on the health sector from the Covid-19 pandemic. The new Advisory Group is taking stock of existing arrangements and activity and seeking to develop processes for more detailed action. This work is closely aligning with the development of Manchester's Marmot plan detailing ways the city will tackle systemic health, social and economic inequalities.
- **Inclusive, zero carbon and climate resilient economy –** The ZCC project in Manchester has coincided with the global Covid-19 pandemic, which has had a damaging effect on the global, national and local economy. The Partnership has formally recommended to Manchester City Council to prioritise a 'green recovery' that focuses on low-carbon projects and a detailed refresh of Manchester work and skills strategy so that it focuses on training in areas which deliver zero carbon jobs. In response, Manchester City Council's Economic

8 https://www.manchesterclimate.com/sites/default/files/Manchester%20Climate%20Risk_A%20Framework%20For%20Understanding%20Hazards%20and%20Vulnerability.pdf

Recovery and Investment Plan[9] includes the city moving forward with the first phase of a Zero Carbon Housing Retrofit Programme. It also recognises that the city's economic success must be built on clean growth, green innovation and the development of green skills. It sets out the city's commitment to create good green jobs, to support socially responsible businesses to thrive, to secure investment for zero carbon and climate resilient infrastructure, and to establish the products, services and business models that support the city's transition to zero carbon. The Agency has also recently commented in detail to the Council's refresh of its Work and Skills Strategy to ensure climate action is embedded at the heart of it.

c) Process for engaging communities and businesses (Questionnaires, desk-based information, Community Assembly)

As a key part of developing the evidence base, the Partnership approved the creation of specific engagement with communities and businesses. This benefited from the learning points provided by URBACT reports and its E-university and discussions through the ZCC project.

- For communities, which formed a core part of Manchester's URBACT Small-Scale Action, the Agency in partnership with the environmental education charity 'Envirolution' (with support from Manchester City Council, Anthesis and Tyndall) developed a 'Community Assembly' with resident and community representatives from across the city to discuss the issues around climate change. A dedicated engagement hub and website called 'Commonplace' was also developed as part of this project (this is outlined in more detail in the Small-Scale Action section below).
- An online survey asking individuals what actions they were already taking, and what actions they would like to take but where they require further support from agencies.
- Manchester's Youth Climate Change Board were also engaged with to take forward climate action. They presented the Manchester Youth Climate Manifesto to the Agency as their contribution to engaged members of the youth community
- For businesses, a survey was developed and sent through Manchester business networks seeking views on their knowledge of climate change, how businesses have developed climate action plans, what assistance do they require and what barriers remain in delivering such plans. Other work was also undertaken with existing business networks and through the creation of the 'Bee Net Zero' business climate change website.

d) MCCP Advisory Groups

As the ULG, the Partnership has delegated to the Agency to organise a series of advisory and task and finish groups that deliver specific policy advice and action to it.

These include:

- A ***Zero Carbon Advisory Group*** of academic advisors that provide advice on how the city should meet its interim and 2038 targets. This is providing advice on the process for delivering Framework 2.0 and has considered in detail the information provided by Anthesis. It contains advisors from the Tyndall Centre, the University of Manchester and Manchester Metropolitan University.

9 https://www.manchester.gov.uk/downloads/download/7313/powering_recovery_manchester_s_recovery_and_investment_plan

- An ***Adaptation and Resilience Advisory Group***, which is advising the Agency and the Partnership how to develop a more detailed climate change adaptation and resilience strategy, as part of Framework 2.0.
- A ***Health and Wellbeing Advisory Group***, made up of public health experts from different disciplines, some academic advisors and Manchester City Council policy staff is engaging with the Agency to deliver a comprehensive package of action and indicators that look at short, medium and long-term impacts to health and wellbeing from climate change. It reports to a Manchester Health and Wellbeing statutory Board.
- A ***Communities Board*** which considers strategies to engage local communities and the wider public on climate change action.
- ***Manchester Food Board*** which considers ways to improve food availability, diets and reduce food miles of food consumed in the city.
- A ***Zero Carbon Business Task Group*** to engage with the Manchester business community on climate change action.
- A ***Youth Climate Change Board*** to engage with young people representatives on climate change action.

e) Sub-Regional engagement (GMCA)

Whilst Manchester has its own climate emergency targets and plans, it also liaises closely and aligns its targets with the Greater Manchester Combined Authority (GMCA). The GMCA has a Low Carbon Hub which drives low carbon action across the city region and assists each of the 10 districts with specific projects and reports. It is governed through a Low Carbon Hub Board to deliver on its agreed 2025 target of a 48% carbon reduction cut and its 2038 100% Zero Carbon target.[10]

Both Manchester and Greater Manchester submit their plans for assessment through the CDP assessment process. CDP is a not-for-profit charity that runs a global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.[11] Over the past 20 years it has created a system that has resulted in extensive engagement on environmental issues worldwide. Manchester City Council and MCCA also engage and collaborate with the GMCA on providing information for the city region climate change targets.

GMCA have commissioned the environmental consultancy Energy Systems Catapult to deliver a Local Area Energy Plan (LAEP) for Manchester. The LAEP outlines a detailed strategy for developing energy and low carbon heating initiatives in the city over the next two decades. It will be one of the appendices to Framework 2.0.

f) Learning from network and other city approaches

Outlined in Section 10 below, some of the learning benefits we have received from case studies from the ZCC partners are noted. These include some of the 'green schools' work undertaken by Modena and Bistrita, a workshop organised by Modena on communicating climate change messages, the initiative to create car-free days in Tartu and the 'Proximity' competition of Vilvoorde, which innovatively engages with residents to encourage climate action.

[10] https://www.greatermanchester-ca.gov.uk/media/1349/low_carbon_hub_board_tor.pdf
[11] https://www.cdp.net/en

A useful part of the evidence base being delivered for the Agency by Anthesis includes a consideration of national and international examples of best practice. Manchester is also an active member of the Global Covenant of Mayors for Climate & Energy. The Agency and the GMCA actively engages in the UK100 group which represents cities and counties developing best practice in local climate action delivery. The Agency has undertaken extensive research as well to understand placed-based climate change approaches and new forms of dynamic climate innovation projects.

Manchester City Council is a member of the UK Core Cities Network. This brings together all the large city councils in the UK outside London as a joint advocacy body. One of the subgroups of this network considers environmental and climate change issues, which the Agency also attends. One practical and highly relevant report it has produced in summer 2021, under the auspices of the UK Cities Climate Investment Commission (UKCCIC) calculates the level of public and private investment that will be required to deliver on zero carbon targets[12]. This report will also be placed as an Appendix of Framework 2.0 and is seen as essential in unlocking significant amounts of new climate investment to deliver scaled-up action.

6. Small Scale Action (SSA)

The aim of Manchester's Small-Scale Action was to support the direct delivery of the IAP and Manchester's Climate Change Framework 2.0 Refresh, and provide an opportunity to pilot a new, innovative, and citizen-led method of community consultation.

Manchester launched a new community engagement programme on climate change in May 2021, called "In Our Nature" and has been piloting different and innovative ways to engage with communities in the city over a year communication, engagement, and support programme for an initial 12-month period to May 2022.

A vital part of the programme is to enable people to "have your say" on climate action across the city, including participation in a Community Assembly on Climate change and through an online and face to face Consultation on the Refreshed Framework. Both directly feed into the development of the Framework 2.0. by providing a narrative and a "Mandate" of climate actions, developed by residents that call upon the city leaders to act upon.
In Manchester a Community Assembly on Climate Change was held over 7 weeks in summer 2021, using the funding provided by ZCC, Manchester City Council and separate funding from the National Lottery. The URBACT funding was essential to deliver this project.

a) Community Assembly: summary and outcomes

The Manchester Community Assembly was organised by Bob Walley from the local environmental charity 'Envirolution' and the Agency with other local partners including Manchester City Council.

Following an extensive recruitment drive via the Partnership-ULG, community groups and social media, 100 residents were identified from across the city who expressed an interest in participating. This was narrowed down to 65 people through an application process and to ensure a diverse range of people from across the local community. Over summer 2021 these residents came together to learn about climate action at a city level from a panel of experts, debate, and vote on the actions for the city to create a "Mandate on Climate Action" for Manchester.

[12] https://cp.catapult.org.uk/project/uk-cities-climate-investment-commission/

Residents heard from a range of experts including the Tyndall Centre for Climate Change Research at the University of Manchester, the Climate Psychology Alliance, Anthesis, Manchester Food Board, Red Cooperative, Manchester Fashion Movement, Walk Ride Greater Manchester, and many others. Together the participants and expert facilitators created action plans for their areas, which explore what is most relevant and appropriate action for individuals and community groups to take. Each area then brought these together to see what could be achieved at a city-wide level and developed their own bespoke Climate Action Plans. Below is a copy of the Levenshulme action plan.

Levenshulme and East

Action plan

Transport

What things can be done readily in my community, especially if people team up?

- Create proposals for walking or cycling improvements in your community
- Organise community schemes - bike delivery, bike to school rides or walk to school weeks, wheels for all rides
- Create a neighbourhood forum to discuss issues
- Hold regular temporary School Streets - parents & kids to walk/cycle with street closures at drop off and pick up

There is funding, support or "free stuff" available for:

- **Bike access** - Bike, e-bike & e-cargo bike hire & loans
- **Car share clubs** (Manchester discounts)
- **Public electric vehicle charging points**
- **Daily Mile tool kit**, maps etc. to encourage walking & cycling
- **Events**, groups or schemes to encourage walking and cycling
- **Bike beginner training**, family, women-only, kids & trainer training
- **Group ride rewards & incentives**
- **Bike schemes** focused on reaching certain groups who walk or cycle less (TfGM)

Other thoughts:

- Organise walking buses to schools
- Subsidise households for not having a car
- Grants to businesses to increase cycle infrastructure and decrease parking
- Meet with headteachers re. low carbon travel plan
- Create local advocacy groups to meet with council re priorities
- Work from home more
- Group ride rewards and incentives

Fashion and retail

- **Local textile production**
- **Second hand markets** and swap shops / repair shops
- **Online jumbles**
- **Cost effective clothing**
- **Charities "subscribe" to a list**
- **Source textile raw materials** from other industries
- **Explore eco-friendly textile from food waste** (local)
- **Add eco-value to fabric** and clothes
- **Teach repair skills locally** or Garment alteration shops
- **More widely could there be a resource – hub** to facilitate shared use of e.g. lawn mowers and items that are only used occasionally
- **Promote 'repairing'** mending, altering or buying less
- **Shops that combine new and used** as the norm
- **Skills education** for clothes

Food

- Encourage more **plant based** and **seasonal diet**
- Reduce food waste
- Encourage **organic food** and farming
- Educate on **benefits of healthy eating**
- **Cooking classes using local and seasonal products**
- Introduce local **neighbourhood growing clubs** with expert advice and a bit of competition! Review use of parks and women's involvement
- **Tax on food waste**
- **Each park to have support network**, space and staff to teach people to grow food
- Grow at home/Community allotments
- Shares in **coop farms**
- Reduce resources 'air freighted'
- **Education – less meat consumption** – with NHS IDS? (Red meat)
- More urban farms and community orchards
- Huge **financial incentives** for local food growth and eaten locally

Buildings and energy

Retrofitting

- Create appropriate **funding for all to access retrofit** – based on ability to pay and demand and supply side optimisation (demand is part of energy grid)
- Push for **Government grants to retrofit every house** (means tested based on savings and benefits)
- **Retrofit all Manchester council buildings** and partner organisations like social housing
- **Apprentice courses** on retrofitting and encourage entrepreneurs in this area
- Prioritise Community Energy schemes in street communities (Solar PV lights and batteries)

Energy

- **Solar/renewable subsidies** – bring this back
- Q: Why is no one allowed to have wind turbines?
- **All new-builds to be ambient** – no heating required and with rainwater collection
- **LG and put more pressure in BEIS to re-regulate** and make National Grid move to local grids
- **Distributed Renewable energy** – less loss in grid – can operate all UK electricity with 35% of current grid
- **VAT for carbon reduction** improvement wards
- Force Air Svc and Ground Svc **heat pump**
- **Prevent mis-selling and (dumping) gas boilers** ("free") to people on benefits and landlords
- **Work from home** – don't need to heat higher vol office, computer heat contributions

Advice and sharing information

- **Advice platforms** to help residents choose optimal energy options
- Council to show its **ground source heat technology** and the benefits
- Planning department to start **publicising no-gas replacement of heating** and cooling for all new developments and re-furbs
- Test bed a Greater Manchester low carbon manufacture kitemark (in consultation with manufacturers)
- MCC invest in Department/staff to advise residents on how to reduce carbon consumption in their houses

Most importantly, the residents identified what actions they were unable to take, and where they need others to act to reduce the barriers to action, including Manchester City Council, National Government, Transport for Greater Manchester, utility companies and local businesses to make the infrastructure and policy changes needed for the city to achieve the 50% carbon reduction targets and tackle the climate emergency.

Photo of the Community Assembly event, September 2021

b) Climate Change Mandate and the Green Bee

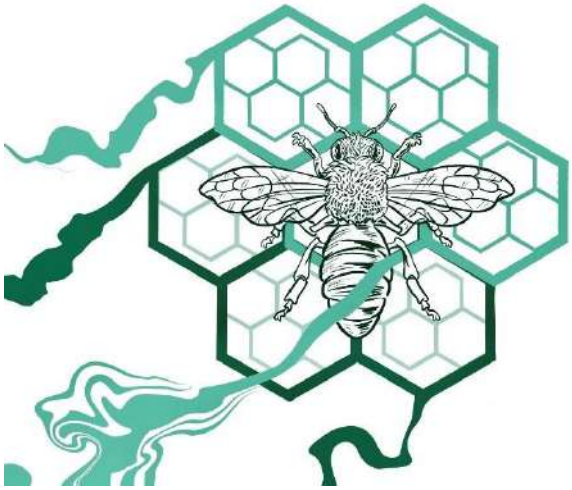
All materials from all the workshops, as well as films from each speaker were made available as open source to anyone on this Commonplace link: https://zerocarbonmanchester.commonplace.is/proposals/in-our-nature-community-assembly/step1

For the final 2 events we invited all the participants together to develop the final "Mandate on Climate Action"; all actions in the Climate Change Mandate can be found here: https://res.cloudinary.com/commonplace-digital-limited/image/upload/v1633687544/projects/zerocarbonmanchester/workshops/Mandate_Upload.pdf

Specific actions advocated through the Climate Change Community Assembly included:

- A rapid push towards locally generated renewable energy with storage batteries for things like electric cars,
- A climate friendly labelling scheme for our food,
- Advocating for Manchester to be a 'Palm Oil free city',
- Increased pedestrianisation of Manchester City Centre,
- Local hub energy efficiency advice and information on financing retrofitting,
- A green jobs scheme to train local people to support the retrofit programme for our homes,
- More initiatives that encourage greener and more connected neighbourhoods, where people are happier to walk or cycle and feel safe and supported to do so.

Finally, the residents voted on what the artistic representation of the Mandate would be – which was a Manchester Green Bee, symbolising the same industrious city but with our zero carbon aims and resilience at its heart.



The Green Bee design, representing the hard work of our communities in designing and creating the Mandate

In November the Mandate was taken to the international COP26 Climate Change Conference in Glasgow along with a Community Assembly film capturing the process, where it was presented to delegates and groups from across the world with the help of the COP26 Coalition. Following the success of this event, and the wider 'In Our Nature' project, the Agency has put in a detailed funding request to the National Lottery for continuation of this work through an extensive community engagement programme over the period 2022-25.

7. Resourcing

a) Budget required for public facing activities.

This table explains the core elements of budget used for public facing activities in this project, and some of the key areas of 'in kind' staffing support that has also gone into the Manchester project.

Project Area	Partner	Budget / In kind contribution	Output
Commissioning carbon data & actions report	Manchester City Council / URBACT / MCCA / Anthesis / some advice provided by Tyndall Centre	£30k URBACT £19K MCC • Worked on by Anthesis with MCCA / MCC oversight	Production of detailed report – Started summer 2021 and concluded Winter 2021
Additional localised data and infographics	Manchester City Council / URBACT / MCCA / Anthesis	£20k URBACT / MCC • Worked on by Anthesis with MCCA / MCC oversight	Production of graphs, infographics and localised carbon data – Spring 2022
Climate change assembly and associated events	Manchester City Council / Urbact / MCCA / Envirolution / Anthesis / Tyndall Centre /	£10k was allocated to this project - the Entire In Our Nature project £209k from	Production of summer assembly and mandate – Summer 2021

	Groundwork / Hubbub / UK National Lottery	National Lottery / additional funding from MCC • Worked on by MCC / MCCA and other partners	
Local consultations	MCCA / Manchester City Council / Anthesis	Part of carbon data budget noted above • Worked on by MCCA / MCC / Anthesis	1st consultation produced autumn 2021 2nd consultation spring 2022
Questionnaire and interviews with ULG members	Manchester City Council / URBACT / MCCA	£25k URBACT / MCC • Worked on by MCCA with MCC oversight	Started spring 2022 for summer 2022 conclusion
Additional projects in the 'In Our Nature' project	National Lottery / Manchester City Council / MCCA / Groundwork / Hubbub	Entire In Our Nature project £209k from National Lottery / additional funding from MCC • Further £2.5million bid into National Lottery – expected to know approval in June 2022	Started in mid-2020 and concluded spring 2022 New bid went in spring 2022 to start autumn 2022 – would be a 3 year project
Bee Net Zero website	GMCA / GC Business Growth Hub / GM Local Enterprise Partnership / GM Chamber of Commerce / MCCA / TFGM / GM Energy Innovation Agency / SME Climate Hub / Electricity Northwest / Together for our Planet / ERDF / Northern Powerhouse	Website funded by the ERDF and hosted by Business Growth Hub with in-kind support from named partners	Launched at GM Green Summit autumn 2021
MCCA new adaptation and resilience website	UKERC / MCCA / Creative Concern	£10k website funded by NERC, developed by Creative Concern and hosted by MCCA	Launching with Framework Refresh summer 2022

The table above outlines the different strands to this project, which included the creation of a detailed refresh of the Manchester Climate Change Framework and the first Manchester Climate Change Assembly. URBACT and Manchester City Council match-funding were provided for these component parts of the Integrated Action Plan. To help develop the Partnership / ULG further with delivering on these process, additional support has been provided through URBACT and Manchester City Council match-funding.

A few other parallel projects are also outlined as playing a role in Manchester's work to understand its science-based target and carbon budgets, and develop projects, strategies, and policies to deliver on them.

These include:

- The 'In Our Nature' project was funded by the National Lottery with some match-funding by Manchester City Council. As well as supporting the Climate Change Assembly, it has supported a number of other nature-based solutions as outlined in the Small-Scale Action section above. Further information on the breadth of the project is at: https://zerocarbonmanchester.commonplace.is/
- The 'Bee Net Zero' website, which provides local businesses with information to develop their own net zero plans was developed through financial support of the European Regional Development Fund and the Northern Powerhouse Partnership. It has formal support within it from a number of core partners including GMCA and the Agency and is formally hosted by the GM Growth Company.
- As part of the funding project that brought Dr Paul O'Hare from Manchester Metropolitan University to a one-year secondment with the Agency, Natural Environment Research Council (NERC) and the UK Climate Resilience Programme provided financial support to develop 'Manchester Climate Ready (MCR) – a website which outlines best practice and local case studies in climate adaptation and resilience. It will launch at the same time as the Climate Change Framework Refresh. The website has been developed by Creative Concern.

b) Communications / dissemination to communities and businesses

URBACT funding and the UK National Lottery grant has also been used to provide communications and dissemination of key messages to both communities and businesses. This is outlined in detail in the Small-Scale Action section above. A full and detailed impact assessment of all the communication and dissemination held within the Community Assembly event and online surveys is available if required from MCCA.

The websites for the In Our Nature, Bee Net Zero and MCCA adaptation and resilience projects both include important public information and signposts to community and business action. They have, or are being planned, to be launched at specific public events, such as the GM Green Summit, the Climate Change Assembly and through the Commonplace web platform.

A communications plan is being developed for the formal launch of the Framework Refresh in the summer.

8. Framework for Delivery – collaboration to develop more dynamic climate action

a) Chronology of milestones within the project

Governance mechanism	Date
2018 – 2020	
Establishing the Manchester Climate Change Partnership (ULG) and commissioning a science-based target from the Tyndall Centre	Summer 2018
Partnership agreed to Manchester's carbon budgets for 2018 – 2100	Summer 2018
2020	

Publish Framework 1.0 with high level carbon reduction targets and disseminate widely, discussing with all members of the MCCP	Spring 2020
2021	
Commencing major refresh of the Climate Change Framework to understand progress with its 2020 – 25 carbon budget targets	Spring 2021
Establishing Framework 2.0 Working Group as a subgroup of the MCCP	Spring 2021
Commissioning an evidence base from Anthesis for 2025 carbon budget targets	Spring - summer 2021
Commissioning the environmental consultancy group 'Envirolution' to assist MCCA in developing a Community Climate Assembly and bespoke local consultations with residents and businesses as part of the Small-Scale Action of the ZCC project	Spring 2021
Holding a Council workshop, with the Tyndall Centre and Anthesis, to understand its carbon budget and targets for 2025 under the ZCC process	Late Summer 2021
Holding a series of 7 workshops within the Community Assembly in three areas of Manchester to engage on knowledge of climate change, needs of the city	Summer / Autumn 2021
MCCA reviewing the evidence base with Anthesis	Winter 2021
Presenting the core findings of the Anthesis report to the ULG and the Framework refresh Steering Group	Winter 2021
Sectoral workshops with core partners – Transport for Greater Manchester, Manchester City Council, Greater Manchester Combined Authority, MCCP, health sector partners / NHS – to present Anthesis report and understand local projects in the pipeline to 2025 and beyond	Winter 2021 / 22
Data sharing with core partners to characterise and compare information provided by the Anthesis SCATTER model	Winter 2021 / 22
Supporting processes to broaden and expand the MCCP to bring into it more organisations responsible for the city's carbon emissions	Winter – spring 2022
2022	
MCCA writing the Framework 2.0 document	Jan – May 2022
Initiating formal consultation and bringing in consultations undertaken by other members of the Partnership as part of their own zero carbon work	May 2022
Taking Framework 2.0 to Partnership and Agency sub-groups for comment and approval	March – May 2022
Taking Framework 2.0 document to the full MCCP for discussion and full approval	July 2022
Taking Framework 2.0 document through Manchester City Council governance processes to seek political approval of the city	June – July 2022
Agree detailed response to the UK Government and other agencies on the level of additional resource and powers required to meet 2025 targets	July 2022
Publishing Framework 2.0 refresh on the MCCA website and holding events to disseminate it to core partners, businesses and residents	September 2022
Putting in place processes to ensure ongoing monitoring of city carbon targets and a developing transition plan to scale-up action	July – September 2022
Interviewing MCCP – ULG members to outline membership climate action for a new MCCP Partnership report	June – September 2022

b) Collaborative delivery through five core stages

Collaborative action	Outcomes	Delivery partner(s)
STAGE 1 - ZCC workshop connecting carbon data reporting to Framework 2.0		
Understand role of agencies and detail of SCATTER data and explain the Climate Change Assembly	• Clarified roles of agencies • Data showed scale of action • Encourage more community engagement • Bring learning points to ULG	Manchester City Council MCCA Tyndall Centre Anthesis MCCP / ULG oversight
STAGE 2 – Full development of evidence base by Anthesis		
• Set inventory for Manchester emissions • Outlining the actions required for a 50% carbon reduction cut • Actions to reach these targets	• Detail provided for all Manchester direct emissions • Carbon savings and revenue costs outlined • Recommendation table provided to meet targets	MCCA Anthesis ULG oversight
STAGE 3 - Analysing carbon data with key agencies		
Present carbon data to MCCP	MCCP members given regular opportunity for comment and to approve progress	MCCA / MCCP – ULG
Analyse data with current and anticipated action with: • Transport sector • Housing sector • Planning sector • Environmental sector • Regeneration sector • Energy utilities • GMCA Low Carbon Unit • MCCA Zero Carbon Advisory Gp • MCCA Adaptation Advisory Gp • MCCA Health Advisory Group • MCCP – ULG Board	• Agree scale of action for presentation in Framework 2 • Embed actions into existing and developing policies and strategies • Align city and city region climate policies and strategies • Provide academic challenge and approval of data • Agree to develop a range of new climate indicators	MCCA and core partners of the ULG
STAGE 4 - Outlining potential place-based activity and new innovation / investment projects		
Investigating scaled-up action at following levels: • City level • City region level • Advocacy to government • New innovation and investment	Developed detailed Excel-based spreadsheet across these areas: • Buildings • Transport • Energy • Consumption and food • Nature-based solutions	MCCA engagement with specific ULG members
STAGE 5 – Incorporating change in the ULG to embed strategy to scale-up action		
Prepare transition plan for actions: • Engagement with MCCP members to improve carbon literacy, activity and reporting • Expand community engagement with next stage of In Our Nature programme	Develop scaled-up transition plan that engages: • All sectors of the city through the MCCP-ULG • Updates and enhances Manchester City Council Climate Change Action Plan • Aligns with parallel activity at GMCA / TFGM level	MCCA MCCP - ULG Manchester City Council GMCA / TFGM Net Zero Local Forum

• Implement climate change health and wellbeing needs from the Marmot Manchester plan • Develop risk and vulnerability assessment for Manchester to understand adaptation and resilience needs • Progress further business engagement through CBCA, business networks and Bee Net Zero approach	• Provides greater advocacy to the UK Government • Works with other Core Cities to unlock resources through the UK Climate Change Investment Commission • Deepens activity with residents and businesses	

9. Risk Analysis

a) Risk analysis table for the IAP process

What are the key risks? What could go wrong?	Mitigation – how are you going to mitigate them?
Delays to consultation process due to a delay in consultant's procurement.	Length and timing of consultations were adjusted and approved by Partnership – ULG and Manchester City Council.
Need to take on board more input from sectoral experts to refine actions, along with Government policy announcements and COP 26 outcomes.	Timescale adjusted to allow for more time to take these inputs into account.
Consider changes to the UK Government carbon emissions methodology to adjust baseline data for 2020.	Adjusted baseline to come up with a more accurate demonstration of a 50% emissions cut and amended pathway graph.
The need to get additional information from core partners to scale-up action.	Tight deadlines were provided to get timely information.
Advisory Groups do not agree to pathways and carbon data provided by Anthesis / Agency.	Additional meetings held of the Zero Carbon Advisory Group and with Anthesis to take through the amended information and gain approval.
Delays in the governance processes preventing publication of the Framework Refresh.	Early discussion with responsible officers in Manchester City Council and with the Partnership – ULG. Creation of a Gantt chart outlining carefully all the approvals that are needed.
Funding bids to take parts of the project together are not successful.	Close liaison with funding partners to understand their requests and needs for a successful bid.
The political and public challenge in explaining the data that the city needs to upscale action.	Have a well-considered and fully Partnership / MCC communications strategy to give a clear and concise message of the core data.
Members of the Partnership / core partners in the process disagree with the direction of travel that the data calls for.	Close discussions within the Partnership and with core partners to agree a strategy that all are aligned to.
UK Government does not have the same sense of urgency / working to a different timescale on carbon mitigation, adaptation and resilience.	Agency, Council and GMCA have a joint strategy for lobbying the Government through all appropriate forums.

The challenges of constructing new green finance models that allow for scaled-up action.	Agency, Council and GMCA work closely together and through the Core Cities and UK100 on findings of the UKCCIC report.

b) Wider risk analysis of the challenge for Manchester to become a zero-carbon city by 2038

Through the Core Cities Network (Manchester is an active member of this group), a detailed report has been developed by Energy Systems Catapult under the UK Climate Change Investment Commission (UKCCIC). This is seeking to ascertain the level of investment from either the UK Government or private investment (perhaps through Council owned Pension Funds or private investment firms) that is required to deliver on zero carbon targets in the 9 cities and across Greater London. This research has been given financial support from the UK Government.

This report, developed for the Core Cities by Eunomia Research and Consulting in association with the group Bankers without Borders can be seen through this weblink https://cp.catapult.org.uk/project/uk-cities-climate-investment-commission/

The report notes that the up-front investment needed to address the Core Cities' & London Councils' Net Zero pledges is unprecedented and daunting from multiple perspectives:

- **Scale:** This report estimates that approximately £200 billion (in a range of £125bn- £416bn) must be spent to achieve Net Zero across these cities. This falls well beyond the financing capacity of the public sector.
- **Urgency:** Implementation must accelerate as soon as possible to meet Net Zero deadlines and mitigate temperature increases.
- **Complexity:** The systemic transitions required within cities are complex and interlinking and are unlikely to be achieved successfully through individual decision making.
- **Just Transition:** Already stretched social inequalities will be risk being exacerbated if the outcomes of policy changes are not appropriately considered.

It is important to note that the budget of Manchester City Council and GMCA has been under considerable financial pressure for over a decade now, due to reductions in its block grant from the UK Government (as part of a wider austerity programme commenced in 2010), which has been exacerbated by the Covid-19 pandemic. For example, in the financial year 2021/22 Manchester City Council had to make budget cuts of over £40 million. Despite this, both the Council and GMCA have sought to prioritise low carbon policy as one of its core activity and substantially increased funding to the MCCA and to specific low carbon projects despite these serious financial challenges.

The sectoral workshops that are were organised by the Agency included specific focus on what resources and powers are required in advocacy to the UK Government and private investors. If they are not met, there is a clear and obvious risk to whether the city can meet all its climate action ambitions and the targets it has set. There is a combined risk in this activity in that the UK Government is working to a later target of 2050 to deliver 'net zero' policies, considerably later than Manchester's 2038 target. This often means a mismatch in ambition between the city / city region and central government. Manchester is working with organisations like the GMCA, the Core Cities Network, APSE Energy and UK100 to provide a common strategy to the government of the need for greater urgency on climate change, and to provide additional assistance, resource and powers to help cities achieve their aims.

10. Lessons from URBACT Networks and Transnational

a) Lessons learned from some of the ZCC member cities

Manchester has significantly benefited from its involvement in the Zero Carbon Cities project and direct engagement with URBACT. This includes:

- The joint workshops and additional events held with the other partner cities has provided some excellent examples of action that have fed into our own plans. For example, Modena presented some excellent local best practice of how it has developed a wide network of eco-schools, which has not just engaged the pupils, but also actively worked with their parents.
- Modena presented two informative webinars in association with the local university and its energy service on how cities can communicate climate change messages and on how to develop zero carbon houses. MCCA and Manchester City Council are considering the communication messages they will need to use to promote a public consultation and the Framework document when it is ready for publication, and there were some excellent ideas shown from Iceland and Italy that are influencing us as we develop that communications strategy.
- Similarly, the video messages that Bistrita showed of their climate activity provided an excellent public-facing and accessible story of how the city was developing its climate action plans which Manchester certainly has learnt a lot from. Seeing the real benefit in explaining climate action through videos and animation, MCCA have recently developed a short animation video on climate adaptation and resilience, to simply set out its importance, and why cooperation through the likes of the MCCP is beneficial – it can be watched at: https://www.youtube.com/watch?v=c7KD6upEBSQ.

b) Lessons from URBACT baseline study and E-university

The URBACT baseline study and the URBACT E-university providing additional information on the necessity of developing science-based targets, climate proofing municipal budgets, case studies and examples of engaging residents and businesses gave Manchester an important structure with which it has used as it updates its original climate change strategy.

URBACT have also provided Manchester with a greater level of focus on the importance of inclusiveness and digitization in putting together climate change action plans. There has been a conscious move to develop a more diverse MCCP over the period of this project, with a subgroup established to address not just this within the Partnership, but also in how the city seeks to engage with all parts of the community. This was particularly relevant for Manchester's Small-Scale Action where Community Assemblies were held in two quite different parts of the city – one in the more prosperous parts of the city and one in the most deprived – to ensure it could consider the different needs on climate action, climate justice and on the greater challenges these changes could put on more vulnerable communities and residents. In terms of digitization, an accessible website was developed as part of the Small-Scale Action to encourage comments from residents and Neighbourhood Climate Change Officers, as well as provide an easy-to-use online survey for both residents and businesses in commenting on the barriers to developing robust climate change action.

c) Lessons from transnational bodies Manchester / GMCA engages with

As already noted, Manchester and GMCA are heavily involved in a considerable number of transnational bodies seeking to focus on climate change. These include Eurocities, the Global Covenant of Mayors for Climate and Energy and the global climate change assessment body, CDP. When Manchester started this project, it had a CDP rating of 'C', but by focusing greater detail on its partnership work, updated plans on carbon budgets, creating a more detailed evidence base and focusing on new targets; as well as outlining in more detail on adaptation and resilience work, it has

been upgraded in 2021 to a 'B'. With a detailed adaptation and resilience plan and more detailed Framework 2.0 being delivered in 2022, the Agency are working on outlining its actions with CDP this summer. We are also pleased to note, that with the collaborative support we receive from the GMCA, that Greater Manchester's extensive engagement and activity has seen it awarded an 'A' from the CDP process.

11. Conclusion and next steps

The ZCC project has been essential for Manchester in focusing its climate change activity on working towards a faster carbon reduction trajectory. It has instilled a greater sense of urgency that, whilst the City Council may be broadly on track with its carbon reduction targets, the wider city is not. Scaled-up action is the core learning point from this project. The project has also helped in moving the city's climate change strategy from a series of high-level objectives into a much more detailed and evidence-based series of targets that will assist it in attempting to get back on track within its carbon budgets. The science-based target approach which is at the heart of this process has also ensured Manchester is working from a detailed evidence base that puts considerable pressure on all sectors of the city to scale-up action and be heavily involved in decarbonisation projects.

The project has assisted Manchester in engaging further with the Tyndall Centre over its carbon budget analysis, as well as in commissioning Anthesis to provide MCCA with a series of challenging metrics on the level of ambition Manchester needs to provide across all areas of its economy. Our Small-Scale Action allowed for an effective and very useful engagement exercise with community groups and businesses, which has created new opportunities for the future.

The cooperation and engagement with a wide range of other European partner cities has been of high value in putting Manchester's work into a sharper context, comparing how we are doing with those other cities and sharing useful information, best practice and learning between each other. The Masterclasses facilitated through URBACT has helped our own learning and reinforced that the direction taken in developing a science-based target with carbon budgets was the right one to make. This has placed Manchester, and all the other partner cities, in a better position than previously to ensure we all play our full part in helping to limit the global temperature rise.

Above all, the project has made the city aware of how important its ULG – the MCCP – is in driving change, innovation and collaboration on climate change action so that the city is more broadly focussed on carbon reduction, mitigation, adaptation and resilience. The MCCP has widened in its participation and its structure has improved bringing both an expert academic independence through its Advisory Groups, as well as a greater sense of activity through various task and finish groups. The anticipated creation of a health and wellbeing advisory group and increased activity on an inclusive economy and 'Just Transition' will enhance this further. The Agency will continue to work with the Partnership to strengthen its role, increase its diversity and aim for its representatives to be from a wider range of organisations responsible for an increasing share of the city's overall carbon budget.

Next steps –

- Conclude and publish the Manchester Climate Change Framework Refresh.
- Work closely with the Partnership – ULG to develop improved Annual Reports for both the Agency and, for the first time, a specific Partnership Annual Report.
- If successful with funding bids, plans are in place to further develop the work delivered in the 'In Our Nature Programme' and in supporting the Manchester Youth Climate Manifesto.
- A number of other academic programmes to enhance this work are currently being discussed by the Agency, on behalf of the Partnership, with the Meteorological Office, Advisory Groups, the local universities, the University of Leeds and the University of Exeter.

2022

Manchester Integrated Action Plan

Sean Morris

5/16/2022

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Part 1 – Context and Process

Part 2 -Action Plan

1. Statement on Manchester's Integrated Action Plan in the Zero Carbon Cities project

Councillor Tracy Rawlins, Executive Member for the Environment
Manchester City Council

As one of the first cities to lead the Industrial Revolution of the 19th and 20th century, Manchester was powered by carbon at a time when understanding of climate change remained low, if not non-existent.

Over the past 15 years, the city has led the way in understanding the impacts of carbon, climate change and the pressing need for urgent decarbonisation, mitigation and adaptation. This has included creating a dynamic, creative, wide and innovative climate coalition of supporting organisations to drive decarbonisation and support the new green economy of the 21st century.

This process has included:

- In 2009, a 'Call to Action' to all sectors of the city to work together to tackle climate change and reduce the city's carbon emissions.
- This led to a high-level Manchester Climate Strategy 2010 – 2020.
- The positive collaborative work that this strategy developed inspired the creation of the Manchester Climate Change Agency in 2015, one of the first to be created in the UK.
- In 2016, Manchester City Council published the 'Our Manchester Strategy' with tackling climate change one of the core components within it.
- In early 2018, the first meeting of the Manchester Climate Change Partnership was held. The Partnership brings together all the major players in the city to the common aim of reducing carbon emissions. One of its first tasks was to agree to a science-based zero carbon target and the creation of carbon budgets for the city from 2018 – 2100.
- In 2019, Manchester City Council, following on from a decade of positive climate action, formally declared a 'climate emergency' and embedded the work to create a zero carbon Manchester by 2038.
- In 2020, a Manchester Climate Change Framework for 2020 – 2025 was published, and it is currently being refreshed. The Zero Carbon Cities project which Manchester leads has been a fantastic opportunity to bring extensive detail to the city understanding its carbon footprint and work to deliver its science-based target. The refresh document will be published in 2022.

Manchester was one of the first cities in Europe to establish both a science-based zero carbon target and a series of carbon budgets to challenge the city to work with in its drive for decarbonisation.

As an international, outward-facing city that is fully aware of the impacts of climate change, Manchester has led the Zero Carbon Cities project not just to assist it in developing more detail to delivering on its science-based target, but to encourage other cities to undertake the same process, with all the detailed and complex challenges it brings.

The data that has arisen from this project has greatly assisted Manchester understand what scale of action is urgently needed in meeting its carbon targets. It has also provided renewed emphasis on accelerated actions that it must do to keep within its budget, whilst understanding the parallel need for embedding it with a climate adaptation and resilience strategy. Manchester City Council and Manchester Climate Change Partnership will continue to work closely together in the next critical years in delivering on our target and I commend this approach to cities across Europe and beyond.

PART 1: CONTEXT AND PROCESS

2. Introduction to Manchester and City Context:

Population and history: With a fast-growing population of 547,000 (a 5.8% increase since 2011), Manchester has been transformed from its key role as a pioneering city of the Industrial Revolution to a modern city based on a vibrant, predominantly service-based knowledge economy today. Manchester has always been a city of innovation and seeks to be one of the frontrunners in the green energy revolution within its challenging aim to become a 'zero-carbon' city by 2038.

Location: Manchester is a prominent European city and the largest borough (in population size) of the Greater Manchester Combined Authority city region, which is situated in the Northwest of England. It is the fastest growing city in the UK outside of London, with recent rapid growth of high-density housing development especially in the city centre. Manchester is the third most visited city in the UK, after London and Edinburgh. Manchester's strategic planning policies seek to encourage the regeneration and repopulation of the core of the city and to prevent urban sprawl.

Manchester's location in NW England

The 10 local authorities that make up Greater Manchester Combined Authority

Governance structure and economic indicators: Manchester is one of ten local authorities which make up the Greater Manchester conurbation. Manchester City Council is responsible for delivering core services such as housing, highways, social services, education, planning, leisure and cultural services. It works closely with the Greater Manchester Combined Authority, which is led by an elected Mayor (the Leaders of the 10 GM local authorities act as Deputy Mayors with portfolio leads supporting the Mayor), and it has strategic control over regional transport, spatial planning, economic development, health, and the emergency services. It produces a five yearly Environment Plan which provides strategic underpinning of climate change policy and engagement with the UK Government, with the City Council also involved in operational delivery of it. Both bodies have a 2038 zero carbon target and align closely their carbon mitigation, adaptation and resilience policies and strategies.

Greater Manchester is the second largest sub-regional economy in the UK. Manchester City Council is at the centre of that sub-regional economy. In 2017, Manchester's Gross Value Added (measure of the value of goods and service produced by an area) was £19.7 billion. Between 2016 and 2017, Manchester's overall GVA grew by 4.3%, compared to 3.6% for the UK, and is the third-highest growth of all the UK Core Cities. In March 2019 there were 22,630 enterprises in Manchester[1].

Climate and Energy: The city has a temperate and generally mild climate. It does not generally endure extreme levels of temperature. While it has experienced some incidents of flooding, these have not generally been as severe as in some other UK towns and cities. However, surface water flooding has increased tenfold in the UK between 1945 and 2008 and is predicted to increase further with climate change. There was some small-scale flooding in the city in 2020, and significant 'near-miss' flooding incidents in early 2021 and again in early 2022 in the south of the city. In its policy vision for the future, Manchester has the ambition to become a fully climate resilient zero carbon city by 2038. Manchester signed up to the Global Covenant of Mayors initiative as early as 2009. Within the current updating of the Manchester Climate Change Framework there is a renewed focus on adaptation and resilience issues.

In winter 2015, Manchester City Council formally determined that 'Manchester being a liveable and low-carbon city' should be a core part of its City Strategy, known as its 'Our Manchester' approach.[2] In July 2019, Manchester City Council also formally declared a 'Climate Emergency' and agreed to continue working with its partners to seek to become a zero carbon city by 2038.[3] The City Council has developed this work from its inception with a wide range of partner organisations and the Greater Manchester Combined Authority, seeing it as critical not just to reduce its own carbon emissions, but that of other core organisations across the city.

Energy policy is undertaken by central government mandate through the National Grid, energy utility companies and suppliers. GMCA and Manchester City Council have some role in encouraging the development of local renewable energy schemes, and both have collaborated in the creation of a Local Area Energy Plan for Manchester.

Like towns and cities across the world, Manchester has been impacted by the Covid-19 pandemic, which has affected its economy while having a short-term positive impact on its carbon emissions. Whilst early figures suggest there was a 11% cut in carbon emissions due to the pandemic in 2020/21[4], emissions are likely to be rebound as economic activity has restarted in 2021. In November 2020, Manchester City Council published an Economic Recovery and Investment Plan[5]. The Plan reaffirmed the city's climate commitments and outlined specific zero-carbon programmes around housing retrofit and city centre transport and mobility as strategic investment propositions.

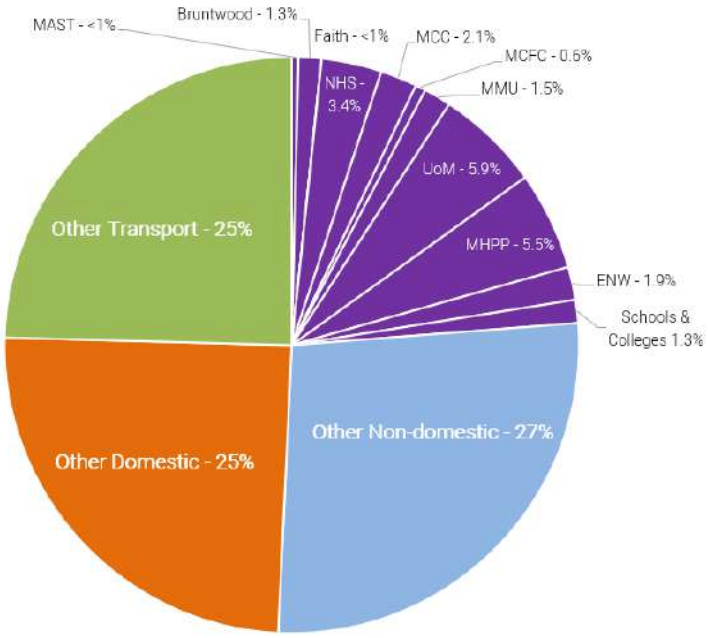
Manchester City Council, Manchester Climate Change Agency and the Manchester Climate Change Partnership: Manchester City Council works with an independent agency, Manchester Climate Change Agency (MCCA, and known as the Agency throughout this document), which is responsible for co-ordinating and advising on the city's response to the climate crisis. The City Council was instrumental in the establishment of the Agency, building on a long-standing collaborative

[1] https://secure.manchester.gov.uk/info/200088/statistics_and_intelligence/2162/economy
[2] https://www.manchester.gov.uk/downloads/download/6426/the_manchester_strategy
[3] https://democracy.manchester.gov.uk/mgAi.aspx?ID=2803
[4] https://www.manchesterclimate.com/sites/default/files/MCCA%20Annual%20Report%202021%20Final.pdf
[5] https://secure.manchester.gov.uk/info/500113/city_centre_regeneration/8063/powering_recovery_manchester_s_recovery_and_investment_plan

partnership approach with many core organisations through an initiative called 'Manchester – A Certain Future'. The Agency also works closely with the Greater Manchester Combined Authority.

The Agency's key role is to bring together the major sectors of the city and advise it on climate change policy. In 2018 it formally established the Manchester Climate Change Partnership (MCCP and known as the Partnership throughout this document) as the principal leadership mechanism for engaging on climate change in the city. An important consideration for the Agency and the Partnership has been to ensure that action on climate change is an issue not just for those already engaged, but to actively engage those businesses, residents and communities that haven't previously seen the relevance of the issue within their everyday business or lives. Therefore, active programmes of engagement with communities and with young and older people has been a feature of the Manchester approach.

For the Zero Carbon Cities project, the Partnership is Manchester's Urbact Local Group (ULG), and it meets every two months. The Partnership currently has around 60 members, across 12 sectors, ***with responsibility for over 20% of Manchester's direct CO2 emissions*** (with recent engagement through the Manchester Arts Sustainability Team and Manchester Airport Group, this figure is rising towards 25%, but further research is taking place on the exact number). Its members also have reach into the remaining 80% through their staff, students, customers, tenants, football fans, theatregoers, worshippers, and others. By working with their supply chains members are also helping to reduce the city's indirect consumption-based CO2 emissions. This chart summarises the Partnership's carbon emissions breakdown:



Members of the Partnership:

1. **Arts & culture partnership**
2. **Bruntwood (property), other businesses and core business networks**
3. **Faith & Planet Partnership**
4. **Health Partnership**
5. **Manchester City Council**
6. **Manchester City Football Club**
7. **Manchester Met University**
8. **University of Manchester**
9. **Manchester Housing Providers**
10. **Electricity Northwest**
11. **Educational providers**
12. **Manchester Airport (joined later and their onsite emissions are part of transport – flight emissions are part of UK national carbon budget)**

Real effort has also been made by the Agency to encourage representation in the Partnership and its sub-groups from women, young people and those demographic groups under-represented. Additionally, a diverse demographic profile has been adopted for recruitment of citizen representatives to the Community Assembly noted in Section 2 below. Although work in this area had been delayed due to Covid-19, the Agency is seeking to take a more robust approach to diversity

and inclusion and determine whether it is appropriate to establish an advisory group on diversity related issues, or to continue to mainstream diverse representation at each level.

In February 2020, the Agency published the Manchester Climate Change Framework 2020-25 Version 1.0 (Framework 1.0). Framework 1.0 sets out Manchester's latest science-based targets and the high-level strategy for achieving them. The Agency is currently developing an updated Framework 2.0 to provide the city with a more detailed evidence base and targeted actions to deliver on its original high-level strategy. The Framework refresh is intended to play a pivotal role in moving Manchester forward in actively reducing its carbon emissions, whilst providing a complementary and detailed structure of integrating climate adaptation and resilience projects.

3. Focus of the IAP:

a) Aim: Refresh Manchester's SECAP (the Manchester Climate Change Framework 2020-25). By September 2022 the city will have in place an updated and refreshed version of Manchester's SECAP / Climate Change Framework 1.0 for 2020-25. This will update the Framework to provide more detail on Manchester's science-based targets approach. The key focus is to put in place a plan designed to identify the key cross-sectoral actions required to deliver the scale of carbon reduction to ensure that Manchester plays its full part in limiting global temperature rise to 1.5 Celsius (as outlined in the Paris Climate Change Agreement and reiterated in the Glasgow Climate Action Pact). If it is to achieve this, the city will need its direct carbon emissions between 2018 and 2100 to be limited to ***15.17 million tonnes***.

In addition, Framework 2.0 will:

- provide more detail on the city's approach to reducing indirect carbon emissions,
- consider its local engagement in reductions to national aviation emissions,
- create new activity on the impacts of climate change on health and wellbeing,
- create additional activity in ensuring Manchester has a sustainable, inclusive economy,
- and detail the work the city needs to do to put in place adaptation plans and improved resilience to climate change.

It is felt important to include detail on such matters so that the city is cognisant with the wider challenges that climate change will bring.

Science-Based Targets and Carbon Budget: It has become increasingly well-recognised that cities need to set local 'science-based targets' to provide a more accurate picture of the level of CO2 reduction required. Science-based targets work on the basis that there is a finite amount of carbon that society can emit until 2100 if the world is to stay within a safe and manageable increase of global warming. This finite amount is typically described as a 'carbon budget' and can be calculated at different levels, from global/UN, to EU, to individual Member States, to regions, to cities, to business sectors or communities, even to individual businesses or citizens. Manchester has followed this approach and was one of the first cities in Europe to set a science-based carbon budget.

To do this, the Agency and the Partnership cooperated closely with the Tyndall Centre (a specialist unit researching and calculating global carbon emissions data, based in the University of Manchester) to set science-based targets designed to ensure that the city plays its full part in global efforts to reduce carbon emissions. These were published in November 2018 and:

- outlined a maximum 15.17m tonne carbon budget for Manchester between 2018 and 2100,
-

- in 2018, this required on average 13% annual CO2 reductions in the first five-year period of the city's carbon budget,
- and to be zero carbon by 2038.

This was highlighted in Framework 1.0 like this:

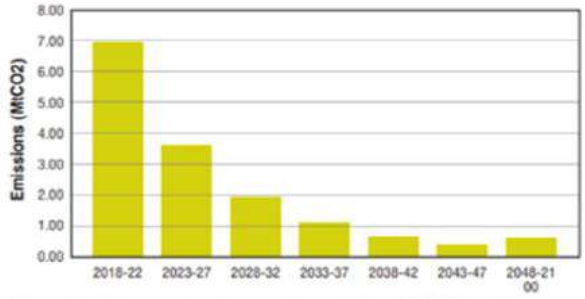
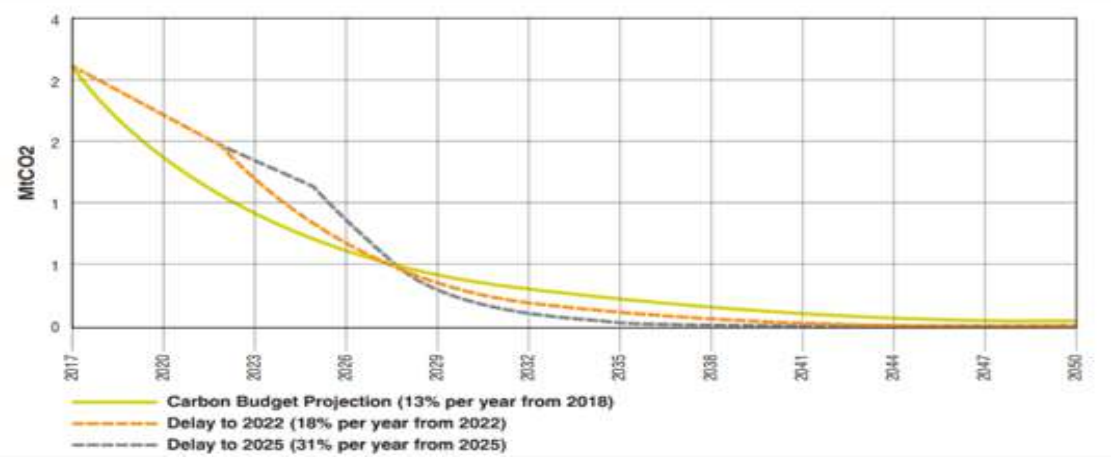


Figure 4: Emissions projections consistent with the 15 $MtCO_2$ budget – starting from common year (2017)

Time Period	CO_2 budget ($MtCO_2$)
2018-22	6.93
2023-27	3.59
2028-32	1.95
2033-37	1.10
2038-42	0.64
2043-47	0.38
2048-2100	0.59
Total	**15.17**

Table 2: Manchester's 15 $MtCO_2$ budget by time period

By undertaking this, Manchester is committing to a target for 2038 that requires an 83% carbon reduction (from 2015 levels), rather than the 40% currently required by the Global Covenant of Mayors. Manchester City Council has fully committed to the reductions outlined by the Tyndall Centre in a 'climate emergency' resolution in 2019[6]. In Framework 1.0 mention was also made by the Agency that if the city did not keep to its carbon targets it would have to increase its annual direct carbon emissions accordingly, as outlined in this graph:



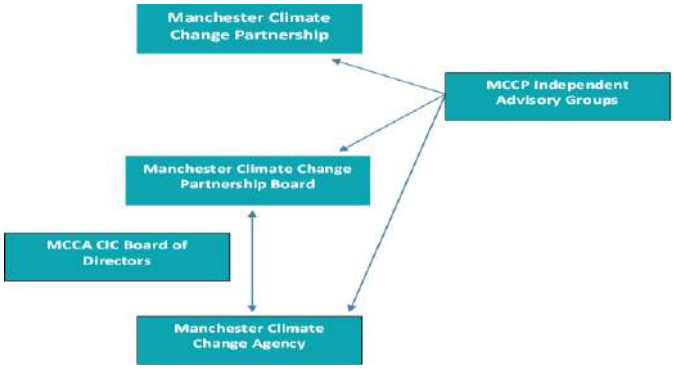
The Framework 2.0 document is focusing on documenting what a 50% in carbon emission cuts would mean across sector of activity.

b) Manchester's ULG – the Manchester Climate Change Partnership

6 https://secure.manchester.gov.uk/info/500002/council_policies_and_strategies/3833/zero_carbon_manchester

In Manchester, the Partnership acts as the city's URBACT Local Group (ULG) and it works to an agreed terms of reference. [7] The ULG is supported by the Agency, which acts as the ULG co-ordinator, and it works closely with the Zero Carbon team at Manchester City Council in developing the Manchester Climate Change Framework 2.0. The Agency are active participants in the ZCC URBACT transnational programme and have attended and helped to facilitate its core meetings and workshops. There is also direct engagement on the project through Manchester's ZCC Coordination Group, and officers attend Agency team meetings on a regular basis to oversee governance of the project and close engagement with the Council. The structure diagram below shows its interactions.

c) MCCA and MCCP Structure –



4. Description of the Process

In 2020, the Agency disseminated its Climate Change Framework 1.0 and engaged with the other member cities of the ZCC. It also established its plans for commissioning data that would provide real detail and move forward actions with its high-level objectives. This is the focus of the Framework 2.0 Refresh document. Following the commissioning of Anthesis to undertake this data delivery the core parts of moving this plan forward have been discussed and agreed upon with the Partnership – ULG.

As noted in more detail in the Framework for Delivery below, this process has five key stages to it:

Stage 1	**Stage 2**	**Stage 3**	**Stage 4**	**Stage 5**
Connecting new carbon data to Framework 2.0	Development of evidence base	Analysing carbon data and setting actions	Outlining potential place-based actions and investment priorities	Implementing change
Spring – Summer 2021	Autumn 2021	Winter 2021/22	Spring 2022	Summer – autumn 2022 onwards

The Partnership / ULG have had oversight of each stage and have inputted their views and advice. The Agency has coordinated this project with several ULG members, particularly Manchester City Council and the public health sector, in cooperation with GMCA and key carbon data advisors

7 https://www.manchesterclimate.com/sites/default/files/MCCP%20Terms%20of%20Reference%20Approved%20March%202021.pdf

including Anthesis and the Tyndall Centre. Specialist Advisory Groups organised by the Agency have also provided detailed input in addition to this process.

PART 2: ACTION PLAN

5. Objectives, Actions and Schedule

Key elements -

a) Role of the ULG in delivering the Manchester Climate Change Framework Refresh

The Partnership, as Manchester's ULG for the ZCC project, meets every two months. In liaison with the Agency, it is the group that has overseen both the creation of the first Climate Change Framework published in February 2020, and in determining the scope of a refresh of that document.

The Partnership steers the activity of the Agency and has consistently remained a forum to share good practice and to debate some of the key challenges that the city faces as it continues its journey to a net zero carbon future.

In spring 2021 the Partnership approved for the Agency to move forward with an Action Plan that would provide more specific carbon data in order to understand how the city was decarbonising and what action would be required to keep it to its science-based target and carbon budgets.

The activity of the Partnership and of individual Partnership members in this process included:

i) On the endorsement of the Partnership, Manchester City Council and the Agency commissioned the environmental consultancy group Anthesis to develop a detailed evidence base of what a 50% reduction in direct emissions would look like.

In looking at the four key objectives set down in Framework 1.0, the core objective the Agency commissioned Anthesis to research is how Manchester can stay within its carbon budget.

It particularly focused on asking Anthesis to consider the following four questions:

1. Where does Manchester need to get to?
2. What needs to happen to get there?
3. Who needs to be involved?
4. How can this be achieved?

Within that, additional elements of Framework 2 included in the remit for the Anthesis evidence base report were:

- Providing targets and analysis for the Framework's six core thematic action areas – buildings, renewable energy, transport, food, things we buy and throw away, and green infrastructure and nature-base solutions.
- A Strategy Table which sets out the actions necessary for the city to meet its headline and thematic objectives and targets.
- Consideration of a new 7th thematic area of action: "Supporting and enabling residents and business organisations to act".

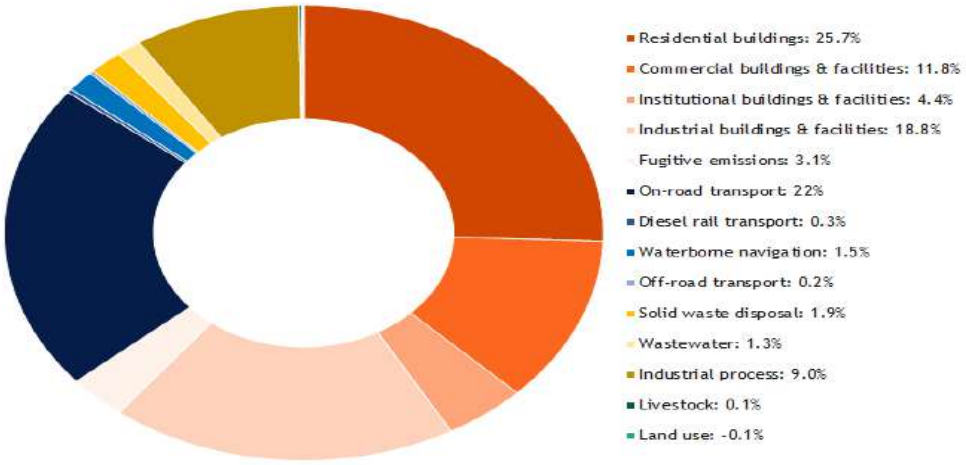
The core principles underlying the evidence base come very much out of the discussion being held throughout the ZCC project and the common view of the ULG – that Manchester needs a greater

level of evidence to move forward with its actions, that collaboration across the city was fundamental, that Manchester needed to be aware of national and international best practice, and to maximise a wider level of benefits beyond carbon reduction (such as improving the resilience, health and economy of Manchester).

Anthesis provided an evidence base and inventory of carbon emissions based on the latest figures for the city, using an online tool it has developed called SCATTER (which is used by 302 UK local authorities). This uses UK Government and other figures to calculate what each part of Manchester's economy generates in carbon. SCATTER stands for 'Setting Cities Area Targets and Trajectories for Emissions Reduction'.

Using this model, for the most up-to-date figures from 2018, Manchester was responsible for net emissions totalling ***2,461 ktCO2e***. The majority resulted from buildings & facilities (63.8%) and transport (24%). The full distribution of emissions across the city is as follows:

Inventory of Manchester carbon emissions by sector



Additional analysis from Manchester's Direct Emissions Report (developed by Dr Christopher Jones of the Tyndall Centre, but not yet published) indicates that ***86% of Manchester's 2018 - 2022 carbon budget has already been used by the end of March 2021, despite a provisional estimate of an 11% drop in emissions due to COVID-19 restrictions***. This means that Manchester must look at developing faster reduction rates in the future to keep within its overall carbon budget. This has engaged the Agency to look at ways to scale-up action to bring the city back on track.

Anthesis's SCATTER carbon data programme has also provided the Agency with indicative information on what a 50% reduction in Manchester's carbon emissions would look like for the city – which was a core action from the original Framework document. Some of the numbers and detail being provided are challenging for the city. This detail needs to be reviewed by the City's governance and scrutiny structures before publication in September. This graphic from Anthesis is useful for highlighting some of what that detail will look like:

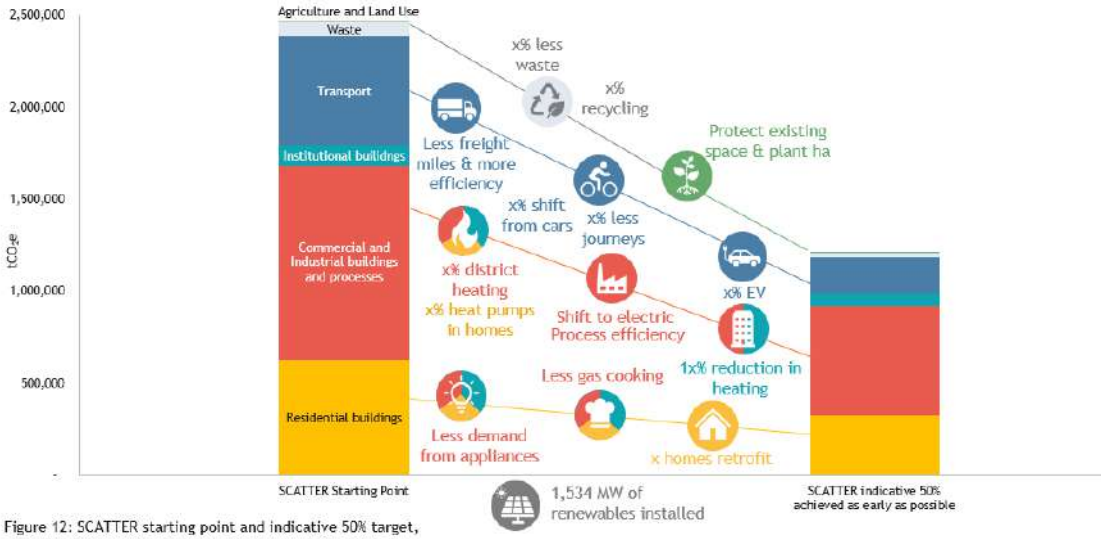


Figure 12: SCATTER starting point and indicative 50% target, alongside interventions from the Higher Ambition Pathway

This action table will provide specific data on interventions, carbon savings and budget required for each action area when the Framework Refresh is published in September 2022:

ACTION AREA	INTERVENTION	ULG MEMBERS / STAKEHOLD-ERS INVOLVED	INDICATORS	TIMESCALE
1. BUILDINGS				
1.1 **IMPROVE ENERGY EFFICIENCY**	• Build new houses with all having an average annual energy consumption of 1,020 kWh. • X households need to have received medium retrofit measures, X households have additionally received deep external wall insulation • Domestic energy demand for heating water demand has decreased by X% • Commercial heating, cooling and hot water demand has decreased by X%	Manchester City Council (MCC) Greater Manchester Combined Authority (GMCA) Manchester Housing Providers Partnership (MHPP) Private landlords' partnership Housing developers Manchester businesses	Number of new houses with low energy consumption Number of households with medium retrofit measures Number of househilds with deep external wall insulation % reduction in domestic energy demand % reduction in commercial heating, cooling and hot water	**To reach agreed annual targets 2022 – 2025** **Expand further 2026 - 2038**

1.2 **SHIFT OFF GAS SYSTEMS**	• X% of non-domestic heating systems are district heating • X% of domestic heating systems are electric heat pumps	MCC GMCA / GMHP MHPP Electricity Northwest / Cadent Gas Systems	% of non-domestic systems that are district heating % of domestic heating that are using electric heat pumps	**Annual reporting 2022 – 2030 as per government policy** **Expand further 2030 – 2038**
1.3 **LOW CARBON AND ENERGY EFFICIENT COOKING LIGHTING AND APPLIANCES**	• Domestic lighting & appliance energy demand decreases X% • Commercial lighting & appliance energy demand decreases X1% • X% increase in domestic electric fuel use for cooking, use of fuel reduced by X% • X% increase in non-domestic electric fuel use for cooking, use of fuel reduced by X%	MCC GMCA MHPP Developers Businesses	% decrease in domestic lighting and energy demand % decrease in commercial lighting and energy demand % increase in domestic and non-domestic electric fuel use % decrease in domestic and non-domestic fuel	**Agree annual target 2022 – 2038**
2. RENEWABLE ENERGY				
2.1 **RENEWABLE ENERGY – INCREASE SOLAR PV CAPACITY**	• Local PV: X MW installed capacity • Large-scale PV: X MW installed capacity	MCC / MHPP GMCA / GMHP Educational providers (for work and skills)	No of MW installed of local and large-scale PV	**Set targets for 2025, 2030, 2035, 2038**
2.2 **RENEWABLE ENERGY – INCREASE WIND CAPACITY**	• Local wind: X MW installed capacity • Large-scale onshore wind: X MW installed capacity • Large-scale offshore wind: X MW installed capacity	MCC GMCA Electricity Northwest Community renewable groups Government policy / utility companies	No of MW of local wind No of MW of large-scale onshore wind No of MW large-scale offshore wind	**Set targets for 2025, 2030, 2035, 2038**
2.3 **RENEWABLE ENERGY – EXPLORE**	▪ X MW local hydro ▪ Declining usage of biomass having displaced	Manchester City Council GMCA	No of MW local hydro No of MW biomass fuel generated	**Set targets for 2025, 2030, 2035, 2038**

OTHER RENEWABLE TECHNOLO-GIES	fossil fuel sources in power stations	Electricity Northwest Community renewable groups		
3. TRANSPORT				
3.1 **ACTIVE TRAVEL**	• X% reduction in the use of private vehicles for road transport • X% increase in rail and tram transport • X% increase in cycling and walking	TFGM / GMCA Manchester City Council / Schools Businesses Transport Companies / Metrolink Cycling UK	% reduction of cars / freight % increase in public transport % increase in cycling and walking	**TFGM have set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
3.2 **TRAVEL SHORTER DISTANCES**	• X% reduction in total distance travelled per person	TFGM / GMCA MCC Businesses	% reduction in average travel distance	**TFGM have set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
3.3 **SWITCH TO ELECTRIC VEHICLES**	• X% of cars are EV or HEV • X% of buses, trams and trains are electric	TFGM / GMCA MCC Private installers Transport companies	% EV or HEV cars % of electric buses, trams and trains	**TFGM and MCC have been set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
3.4 **REDUCE FREIGHT EMISSIONS**	• X% reduction in road freight mileage • X% reduction in energy used per mile travelled	TFGM / GMCA MCC Haulage associations	% freight mileage reduction % energy reduction per mile	**TFGM have set annual and five yearly targets 2020, 2025, 2030, 2035 & 2040**
4. FOOD				
4.1 **PROMOTE SUSTAINABLE DIETS**	• Reduce the amount of meat and dairy in council-supplied food by X%	MCC Food Board Schools Food businesses	% reduction in meat and dairy in Council supplied food	**Annual review 2022 - 2038**

4.2 **FOOD – REDUCE PER CAPITA FOOD WASTE**	• X% reduction in food waste	MCC Food Board Schools Food charities	% reduction in food waste	**Annual review 2022 - 2038**
4.3 **FOOD – IMPROVE THE SUSTAIN-ABILITY OF FOOD SUPPLY CHAINS**	▪ Engage with a minimum of X% of council food suppliers (by spend)	MCC GMCA Food Board Food businesses Lobby government	% engagement with food suppliers	**Annual review 2022 - 2038**
4.4 **FOOD – IMPROVE FOOD SECURITY**	• Increase allotment coverage by X%	MCC / GMCA Private developers with land	% allotments increase	**Annual review 2022 – 2038**
5. THINGS WE BUY AND THINGS WE THROW AWAY (CONSUMPTION)				
5.1 **REDUCE THE QUANTITY OF WASTE**	• X% reduction in the volume of waste	GMCA MCC Educational providers Businesses Community groups	% waste volume reduction	**GMCA have local targets and bound by national targets annually 2022 – 2050**
5.2 **INCREASE RECYCLING RATES**	• X% increase in recycling rate	GMCA MCC Educational providers Businesses Community groups	% recycling rate increase	**MCC and GMCA have local targets and bound by national targets annually 2022 – 2050**
5.3 **SHIFT FROM FOSSIL FUELS & DE-CARBONISE INDUSTRIAL PROCESSES**	• Electricity consumption is X% of total industrial energy consumption by 2030 • Process emissions reduced: X% for chemicals; X% for metals;	GMCA / GMBSP MCC MCCP Businesses	% electricity used by industry	**Industry bound by national targets annually 2022 – 2050**

	X% for minerals; X% other industries			
6. GREEN INFRASTRUCTURE AND NATURE-BASED SOLUTIONS				
6.1 **INCREASE TREE COVERAGE AND TREE PLANTING**	• X% increase in forest coverage • Tree planting outside of woodlands increases by X% from 2019, equivalent to X hectares	MCC GMCA – Nature GM City of Trees Educational and health providers Businesses Environmental groups	% increase in forest coverage % increase in tree planting	**MCC / GMCA have annual targets 2022 – 2038**
6.2 **LAND USE MANAGE-MENT**	• Maintaining existing green spaces	MCC GMCA Environmental groups Businesses	Analysis of existing maintenance programme	**MCC / GMCA have annual mainten-ance reports**

ii) A workshop was held in September 2021 to bring together core members of Manchester City Council's Zero Carbon Team with the Agency, Anthesis and the Tyndall Centre from Manchester University. This workshop sought to understand the process that was required to deliver this Integrated Action Plan and its role in creating Framework 2.0.

The topics discussed at the workshop were:

- How to strengthen the ULG / MCCP (the key Stakeholders) to deliver the IAP.
- What the city needs to do to improve its carbon emissions data and implement science-based targets and carbon budgeting.
- The role of the MCC zero carbon coordination group in delivering the City Council's Climate Action Plan and align it with Framework 2.0.
- Developing community engagement to consider how citizens are participating in climate action plans, as well as supporting the Small-Scale Action within the project.

The key points that came out of the workshop included:

- Some big organisations and carbon emitters are still missing from the ULG, but they are involved in other carbon reduction groups. They need to be encouraged to join it.
- Smaller organisations need to be liaised with through a structured engagement plan.
- Some of the gaps in engagement can be reduced by building on what is already being done and expanding funding and capacity to them.
- The core carbon budget targets are not easily translatable to the public – visible actions and a communications strategy are necessary within Framework 2.0 to improve that.

- It is important to emphasise in Framework 2.0 that the targets put forward are achievable, and what would need to be advocated from government where they are not.
- Seek closer engagement with climate action experts who are currently not readily accessible within MCC or MCCA – this could be important within the Framework refresh.
- Retain targets already publicised in previous core MCCA documents to avoid confusion.
- Sharing best practice and showing real progress can promote positive change.
- Breakdown what are huge targets into 'bite size' achievable actions to promote progress.
- Use political influence to engage organisations and assist with communications in local communities.
- Reduce silo working and encourage cross-departmental decision making on this agenda.

The workshop was very useful to Agency staff and a report on it was brought to the Partnership / ULG for a full discussion. Further detail on it can be found in the Basecamp directory.

iii) After understanding the core research undertaken by Anthesis, MCCA undertook a series of sectoral workshops with core agencies to discuss this evidence base and what can be delivered by 2025 at the city and city region level, as well as what type of additional scaled-up action and innovative new projects need to be considered.

Some of the figures provided by the Anthesis evidence base report created an issue for the Partnership / ULG and the Agency in that they are more generic in nature and do not necessarily conform to local action or national government policy. For example, the figures around the large uptake of electric vehicles (EV) do not adequately consider the city and city region's push for active travel solutions, such as walking, cycling and an increased use of public transport.

To analyse these figures and what they mean for scaling-up action, the Agency organised a series of workshops and meetings with core partners in Manchester City Council, Transport for Greater Manchester, Greater Manchester Combined Authority Low Carbon Team, and external policy experts to understand what climate actions are likely to be taking place in the next few years and what new innovative projects, strategies and policies are needed to supplement them.

iv) Both the workshops and the Anthesis document identified the real need to conduct some further detailed analysis on Manchester's carbon emissions across all activities of the city as it tries to localise its targets from a generic to a more specific context. The need for this more granular understanding of the characteristics of Manchester's emissions inventory, and the need to develop specific actions to reduce them, has become more apparent as the project has progressed, and it has been discussed carefully with the Partnership.

The workshops devised and agreed four 'buckets' of action allocated into the following agencies:

- What existing and new actions the city can do to scale up activity in reaching that 50% target as swiftly as it can, such as through the renewed City Housing Strategy, the City Centre Transport Strategy and the Manchester Work and Skills Strategy.
- What collaborative projects the city can undertake with the GMCA City Region, such as through its new Energy Innovation Agency.
- The areas of advocacy and lobbying the city / city region needs to take to the UK Government to provide more powers, funding and support to scale-up action, such as through the new Low Carbon Regional Hubs being established by the government.
-

- Innovative new projects and investment that can assist in this process, such as the full implementation of the Manchester Local Area Energy Plan and Manchester's involvement in the UKCCIC project noted above.

This additional analysis has outlined the type of specific actions required to meet a 50% reduction in direct carbon emissions based on 2020 figures. Substantial research has also taken place to on which agency can develop place-based actions to scale-up carbon reduction – within the city, in cooperation with the Greater Manchester Combined Authority, in advocacy to the UK Government and in innovative projects that could unlock new investment to meet Manchester's carbon targets.

v) The Framework 2.0 document will be fully written up in the first half of 2022. A first consultation on what should be in the refreshed Framework took place in Summer 2021. A second public consultation on the draft Framework 2.0 will take place in late May / June 2022. Detailed progress on the project has been regularly outlined to each Partnership meeting and to the Partnership Board to comment on all aspects of the project.

An outline final document will go through a series of approvals including the Partnership / ULG, as well as through Manchester City Council's governance processes, including its Environment and Climate Change Scrutiny Committee, Strategic Management Team and Executive Board. These are set for the end of July. Following any comments on the document being incorporated, it will be published in September 2022.

The Partnership has also agreed the importance of creating shared messaging for clear, consistent communication when the Framework is published. It acknowledges that it is important that all sectors of the city need to do more, both as individual organisations and more collectively as a city under the Partnership. As such this will require a gearing up of capacity, systems, delivery models, governance and pipeline of opportunities on climate action for the city. Such information will be a core part of the narrative within Framework 2.0.

vi) The Partnership -ULG has also commissioned the Agency to undertake a number of parallel actions that will embed the work of Framework 2.0 and strengthen its wider governance and effectiveness.

These include:

- To develop a detailed questionnaire and direct engagement with MCCP members to understand their carbon literacy, activity and reporting. It will set this work in the findings of the Framework so that all members of the Partnership – ULG are engaged in upscaling their own activity. The Agency will also help in looking at ways at expanding the membership of the Partnership to cover more of the major carbon emitters in the city, and on the influencing role the Partnership can play to the rest of the city.
- A major funding bid has gone into the National Lottery to build on the community engagement work of the 'In Our Nature' programme. Subject to this bid being successful, this work will significantly expand and aid the city in enhancing the important influencing role of local residents and businesses.
- In conjunction with the Health and Wellbeing Advisory Group, the Agency is currently involved in a 'deep dive' process of understanding climate change health and wellbeing needs and assessing inequalities in the city that will form part of the city's implementation

of actions required from the local 'Marmot' report process. (Sir Michael Marmot was asked to produce a report on health inequalities and core actions to address them for both the GMCA and Manchester City Council.)

- The agency to help encourage the development of a risk and vulnerability assessment for Manchester, to understand adaptation and resilience needs, with the City Council. Advice is also being provided on this with the Meteorological Office and in other projects that are being developed by the Agency with a range of academic advisors.
- Progress further business engagement through the support provided to Manchester by the City Business Climate Alliance (CBCA), the Core Cities network, the C40 Global Covenant of Mayors, UK100, existing business networks and the 'Bee Net Zero' website that engages with business on climate action.

Much of this work is taking place due to understanding the climate data that comes out of taking a science-based approach to targets and carbon budgets.

b) Delivering on the other core objectives of the Climate Change Framework 2.0

Whilst a clear and obvious focus is taking place on how the city can stay within its carbon budget for 2025 and onwards, consideration is also being given to the other three core objectives from Framework 1.0, that are also being developed to a greater level of detail.

- **Climate adaptation and resilience –** Framework 1.0 acknowledged that a greater level of activity is required on climate adaptation and resilience. The Agency has collaborated closely on this matter with the city's two universities, and throughout 2021 Dr Paul O'Hare of Manchester Metropolitan University was seconded to it to help deliver increased understanding of the risks and vulnerabilities in the city. Dr O'Hare developed a Vulnerability Framework for Manchester[8] and recommendations to take this forward. This work is being developed further by the Agency as it engages with the Council and GMCA in improving adaptation and resilience in the city. This includes close liaison with the Environment Agency (for adaptation to severe flooding), the Meteorological Office (for information on extreme weather events) and Resilience Officers at the city region level.
- **Health and wellbeing –** Under the auspices of the Partnership, staff from the Agency and the cities Manchester Health and Wellbeing Advisory Group has been taking place to deliver an action plan on climate change impacts on health and wellbeing. This work had been delayed due to the extensive pressure placed on the health sector from the Covid-19 pandemic. The new Advisory Group is taking stock of existing arrangements and activity and seeking to develop processes for more detailed action. This work is closely aligning with the development of Manchester's Marmot plan detailing ways the city will tackle systemic health, social and economic inequalities.
- **Inclusive, zero carbon and climate resilient economy –** The ZCC project in Manchester has coincided with the global Covid-19 pandemic, which has had a damaging effect on the global, national and local economy. The Partnership has formally recommended to Manchester City Council to prioritise a 'green recovery' that focuses on low-carbon projects and a detailed refresh of Manchester work and skills strategy so that it focuses on training in areas which deliver zero carbon jobs. In response, Manchester City Council's Economic

8 https://www.manchesterclimate.com/sites/default/files/Manchester%20Climate%20Risk_A%20Framework%20For%20Understanding%20Hazards%20and%20Vulnerability.pdf

Recovery and Investment Plan[9] includes the city moving forward with the first phase of a Zero Carbon Housing Retrofit Programme. It also recognises that the city's economic success must be built on clean growth, green innovation and the development of green skills. It sets out the city's commitment to create good green jobs, to support socially responsible businesses to thrive, to secure investment for zero carbon and climate resilient infrastructure, and to establish the products, services and business models that support the city's transition to zero carbon. The Agency has also recently commented in detail to the Council's refresh of its Work and Skills Strategy to ensure climate action is embedded at the heart of it.

c) Process for engaging communities and businesses (Questionnaires, desk-based information, Community Assembly)

As a key part of developing the evidence base, the Partnership approved the creation of specific engagement with communities and businesses. This benefited from the learning points provided by URBACT reports and its E-university and discussions through the ZCC project.

- For communities, which formed a core part of Manchester's URBACT Small-Scale Action, the Agency in partnership with the environmental education charity 'Envirolution' (with support from Manchester City Council, Anthesis and Tyndall) developed a 'Community Assembly' with resident and community representatives from across the city to discuss the issues around climate change. A dedicated engagement hub and website called 'Commonplace' was also developed as part of this project (this is outlined in more detail in the Small-Scale Action section below).
- An online survey asking individuals what actions they were already taking, and what actions they would like to take but where they require further support from agencies.
- Manchester's Youth Climate Change Board were also engaged with to take forward climate action. They presented the Manchester Youth Climate Manifesto to the Agency as their contribution to engaged members of the youth community
- For businesses, a survey was developed and sent through Manchester business networks seeking views on their knowledge of climate change, how businesses have developed climate action plans, what assistance do they require and what barriers remain in delivering such plans. Other work was also undertaken with existing business networks and through the creation of the 'Bee Net Zero' business climate change website.

d) MCCP Advisory Groups

As the ULG, the Partnership has delegated to the Agency to organise a series of advisory and task and finish groups that deliver specific policy advice and action to it.

These include:

- A ***Zero Carbon Advisory Group*** of academic advisors that provide advice on how the city should meet its interim and 2038 targets. This is providing advice on the process for delivering Framework 2.0 and has considered in detail the information provided by Anthesis. It contains advisors from the Tyndall Centre, the University of Manchester and Manchester Metropolitan University.

9 https://www.manchester.gov.uk/downloads/download/7313/powering_recovery_manchester_s_recovery_and_investment_plan

- An ***Adaptation and Resilience Advisory Group***, which is advising the Agency and the Partnership how to develop a more detailed climate change adaptation and resilience strategy, as part of Framework 2.0.
- A ***Health and Wellbeing Advisory Group***, made up of public health experts from different disciplines, some academic advisors and Manchester City Council policy staff is engaging with the Agency to deliver a comprehensive package of action and indicators that look at short, medium and long-term impacts to health and wellbeing from climate change. It reports to a Manchester Health and Wellbeing statutory Board.
- A ***Communities Board*** which considers strategies to engage local communities and the wider public on climate change action.
- ***Manchester Food Board*** which considers ways to improve food availability, diets and reduce food miles of food consumed in the city.
- A ***Zero Carbon Business Task Group*** to engage with the Manchester business community on climate change action.
- A ***Youth Climate Change Board*** to engage with young people representatives on climate change action.

e) Sub-Regional engagement (GMCA)

Whilst Manchester has its own climate emergency targets and plans, it also liaises closely and aligns its targets with the Greater Manchester Combined Authority (GMCA). The GMCA has a Low Carbon Hub which drives low carbon action across the city region and assists each of the 10 districts with specific projects and reports. It is governed through a Low Carbon Hub Board to deliver on its agreed 2025 target of a 48% carbon reduction cut and its 2038 100% Zero Carbon target.[10]

Both Manchester and Greater Manchester submit their plans for assessment through the CDP assessment process. CDP is a not-for-profit charity that runs a global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.[11] Over the past 20 years it has created a system that has resulted in extensive engagement on environmental issues worldwide. Manchester City Council and MCCA also engage and collaborate with the GMCA on providing information for the city region climate change targets.

GMCA have commissioned the environmental consultancy Energy Systems Catapult to deliver a Local Area Energy Plan (LAEP) for Manchester. The LAEP outlines a detailed strategy for developing energy and low carbon heating initiatives in the city over the next two decades. It will be one of the appendices to Framework 2.0.

f) Learning from network and other city approaches

Outlined in Section 10 below, some of the learning benefits we have received from case studies from the ZCC partners are noted. These include some of the 'green schools' work undertaken by Modena and Bistrita, a workshop organised by Modena on communicating climate change messages, the initiative to create car-free days in Tartu and the 'Proximity' competition of Vilvoorde, which innovatively engages with residents to encourage climate action.

[10] https://www.greatermanchester-ca.gov.uk/media/1349/low_carbon_hub_board_tor.pdf
[11] https://www.cdp.net/en

A useful part of the evidence base being delivered for the Agency by Anthesis includes a consideration of national and international examples of best practice. Manchester is also an active member of the Global Covenant of Mayors for Climate & Energy. The Agency and the GMCA actively engages in the UK100 group which represents cities and counties developing best practice in local climate action delivery. The Agency has undertaken extensive research as well to understand placed-based climate change approaches and new forms of dynamic climate innovation projects.

Manchester City Council is a member of the UK Core Cities Network. This brings together all the large city councils in the UK outside London as a joint advocacy body. One of the subgroups of this network considers environmental and climate change issues, which the Agency also attends. One practical and highly relevant report it has produced in summer 2021, under the auspices of the UK Cities Climate Investment Commission (UKCCIC) calculates the level of public and private investment that will be required to deliver on zero carbon targets[12]. This report will also be placed as an Appendix of Framework 2.0 and is seen as essential in unlocking significant amounts of new climate investment to deliver scaled-up action.

6. Small Scale Action (SSA)

The aim of Manchester's Small-Scale Action was to support the direct delivery of the IAP and Manchester's Climate Change Framework 2.0 Refresh, and provide an opportunity to pilot a new, innovative, and citizen-led method of community consultation.

Manchester launched a new community engagement programme on climate change in May 2021, called "In Our Nature" and has been piloting different and innovative ways to engage with communities in the city over a year communication, engagement, and support programme for an initial 12-month period to May 2022.

A vital part of the programme is to enable people to "have your say" on climate action across the city, including participation in a Community Assembly on Climate change and through an online and face to face Consultation on the Refreshed Framework. Both directly feed into the development of the Framework 2.0. by providing a narrative and a "Mandate" of climate actions, developed by residents that call upon the city leaders to act upon.
In Manchester a Community Assembly on Climate Change was held over 7 weeks in summer 2021, using the funding provided by ZCC, Manchester City Council and separate funding from the National Lottery. The URBACT funding was essential to deliver this project.

a) Community Assembly: summary and outcomes

The Manchester Community Assembly was organised by Bob Walley from the local environmental charity 'Envirolution' and the Agency with other local partners including Manchester City Council.

Following an extensive recruitment drive via the Partnership-ULG, community groups and social media, 100 residents were identified from across the city who expressed an interest in participating. This was narrowed down to 65 people through an application process and to ensure a diverse range of people from across the local community. Over summer 2021 these residents came together to learn about climate action at a city level from a panel of experts, debate, and vote on the actions for the city to create a "Mandate on Climate Action" for Manchester.

[12] https://cp.catapult.org.uk/project/uk-cities-climate-investment-commission/

Residents heard from a range of experts including the Tyndall Centre for Climate Change Research at the University of Manchester, the Climate Psychology Alliance, Anthesis, Manchester Food Board, Red Cooperative, Manchester Fashion Movement, Walk Ride Greater Manchester, and many others. Together the participants and expert facilitators created action plans for their areas, which explore what is most relevant and appropriate action for individuals and community groups to take. Each area then brought these together to see what could be achieved at a city-wide level and developed their own bespoke Climate Action Plans. Below is a copy of the Levenshulme action plan.

Most importantly, the residents identified what actions they were unable to take, and where they need others to act to reduce the barriers to action, including Manchester City Council, National Government, Transport for Greater Manchester, utility companies and local businesses to make the infrastructure and policy changes needed for the city to achieve the 50% carbon reduction targets and tackle the climate emergency.

Photo of the Community Assembly event, September 2021

b) Climate Change Mandate and the Green Bee

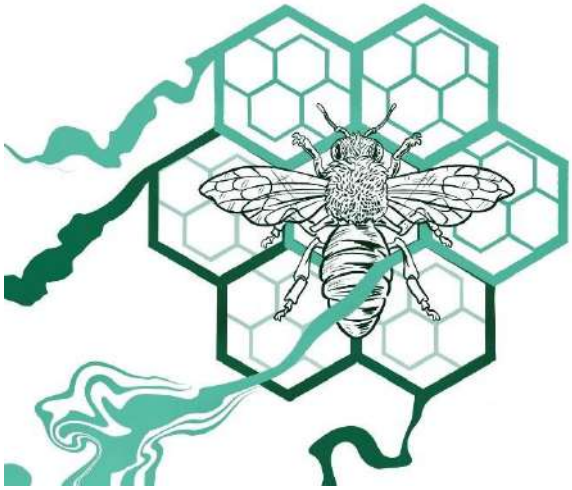
All materials from all the workshops, as well as films from each speaker were made available as open source to anyone on this Commonplace link: https://zerocarbonmanchester.commonplace.is/proposals/in-our-nature-community-assembly/step1

For the final 2 events we invited all the participants together to develop the final "Mandate on Climate Action"; all actions in the Climate Change Mandate can be found here: https://res.cloudinary.com/commonplace-digital-limited/image/upload/v1633687544/projects/zerocarbonmanchester/workshops/Mandate_Upload.pdf

Specific actions advocated through the Climate Change Community Assembly included:

- A rapid push towards locally generated renewable energy with storage batteries for things like electric cars,
- A climate friendly labelling scheme for our food,
- Advocating for Manchester to be a 'Palm Oil free city',
- Increased pedestrianisation of Manchester City Centre,
- Local hub energy efficiency advice and information on financing retrofitting,
- A green jobs scheme to train local people to support the retrofit programme for our homes,
- More initiatives that encourage greener and more connected neighbourhoods, where people are happier to walk or cycle and feel safe and supported to do so.

Finally, the residents voted on what the artistic representation of the Mandate would be – which was a Manchester Green Bee, symbolising the same industrious city but with our zero carbon aims and resilience at its heart.



The Green Bee design, representing the hard work of our communities in designing and creating the Mandate

In November the Mandate was taken to the international COP26 Climate Change Conference in Glasgow along with a Community Assembly film capturing the process, where it was presented to delegates and groups from across the world with the help of the COP26 Coalition. Following the success of this event, and the wider 'In Our Nature' project, the Agency has put in a detailed funding request to the National Lottery for continuation of this work through an extensive community engagement programme over the period 2022-25.

7. Resourcing

a) Budget required for public facing activities.

This table explains the core elements of budget used for public facing activities in this project, and some of the key areas of 'in kind' staffing support that has also gone into the Manchester project.

Project Area	Partner	Budget / In kind contribution	Output
Commissioning carbon data & actions report	Manchester City Council / URBACT / MCCA / Anthesis / some advice provided by Tyndall Centre	£30k URBACT £19K MCC • Worked on by Anthesis with MCCA / MCC oversight	Production of detailed report – Started summer 2021 and concluded Winter 2021
Additional localised data and infographics	Manchester City Council / URBACT / MCCA / Anthesis	£20k URBACT / MCC • Worked on by Anthesis with MCCA / MCC oversight	Production of graphs, infographics and localised carbon data – Spring 2022
Climate change assembly and associated events	Manchester City Council / Urbact / MCCA / Envirolution / Anthesis / Tyndall Centre /	£10k was allocated to this project - the Entire In Our Nature project £209k from	Production of summer assembly and mandate – Summer 2021

	Groundwork / Hubbub / UK National Lottery	National Lottery / additional funding from MCC • Worked on by MCC / MCCA and other partners	
Local consultations	MCCA / Manchester City Council / Anthesis	Part of carbon data budget noted above • Worked on by MCCA / MCC / Anthesis	1st consultation produced autumn 2021 2nd consultation spring 2022
Questionnaire and interviews with ULG members	Manchester City Council / URBACT / MCCA	£25k URBACT / MCC • Worked on by MCCA with MCC oversight	Started spring 2022 for summer 2022 conclusion
Additional projects in the 'In Our Nature' project	National Lottery / Manchester City Council / MCCA / Groundwork / Hubbub	Entire In Our Nature project £209k from National Lottery / additional funding from MCC • Further £2.5million bid into National Lottery – expected to know approval in June 2022	Started in mid-2020 and concluded spring 2022 New bid went in spring 2022 to start autumn 2022 – would be a 3 year project
Bee Net Zero website	GMCA / GC Business Growth Hub / GM Local Enterprise Partnership / GM Chamber of Commerce / MCCA / TFGM / GM Energy Innovation Agency / SME Climate Hub / Electricity Northwest / Together for our Planet / ERDF / Northern Powerhouse	Website funded by the ERDF and hosted by Business Growth Hub with in-kind support from named partners	Launched at GM Green Summit autumn 2021
MCCA new adaptation and resilience website	UKERC / MCCA / Creative Concern	£10k website funded by NERC, developed by Creative Concern and hosted by MCCA	Launching with Framework Refresh summer 2022

The table above outlines the different strands to this project, which included the creation of a detailed refresh of the Manchester Climate Change Framework and the first Manchester Climate Change Assembly. URBACT and Manchester City Council match-funding were provided for these component parts of the Integrated Action Plan. To help develop the Partnership / ULG further with delivering on these process, additional support has been provided through URBACT and Manchester City Council match-funding.

A few other parallel projects are also outlined as playing a role in Manchester's work to understand its science-based target and carbon budgets, and develop projects, strategies, and policies to deliver on them.

These include:

- The 'In Our Nature' project was funded by the National Lottery with some match-funding by Manchester City Council. As well as supporting the Climate Change Assembly, it has supported a number of other nature-based solutions as outlined in the Small-Scale Action section above. Further information on the breadth of the project is at: https://zerocarbonmanchester.commonplace.is/
- The 'Bee Net Zero' website, which provides local businesses with information to develop their own net zero plans was developed through financial support of the European Regional Development Fund and the Northern Powerhouse Partnership. It has formal support within it from a number of core partners including GMCA and the Agency and is formally hosted by the GM Growth Company.
- As part of the funding project that brought Dr Paul O'Hare from Manchester Metropolitan University to a one-year secondment with the Agency, Natural Environment Research Council (NERC) and the UK Climate Resilience Programme provided financial support to develop 'Manchester Climate Ready (MCR) – a website which outlines best practice and local case studies in climate adaptation and resilience. It will launch at the same time as the Climate Change Framework Refresh. The website has been developed by Creative Concern.

b) Communications / dissemination to communities and businesses

URBACT funding and the UK National Lottery grant has also been used to provide communications and dissemination of key messages to both communities and businesses. This is outlined in detail in the Small-Scale Action section above. A full and detailed impact assessment of all the communication and dissemination held within the Community Assembly event and online surveys is available if required from MCCA.

The websites for the In Our Nature, Bee Net Zero and MCCA adaptation and resilience projects both include important public information and signposts to community and business action. They have, or are being planned, to be launched at specific public events, such as the GM Green Summit, the Climate Change Assembly and through the Commonplace web platform.

A communications plan is being developed for the formal launch of the Framework Refresh in the summer.

8. Framework for Delivery – collaboration to develop more dynamic climate action

a) Chronology of milestones within the project

Governance mechanism	Date
2018 – 2020	
Establishing the Manchester Climate Change Partnership (ULG) and commissioning a science-based target from the Tyndall Centre	Summer 2018
Partnership agreed to Manchester's carbon budgets for 2018 – 2100	Summer 2018
2020	

Publish Framework 1.0 with high level carbon reduction targets and disseminate widely, discussing with all members of the MCCP	Spring 2020
2021	
Commencing major refresh of the Climate Change Framework to understand progress with its 2020 – 25 carbon budget targets	Spring 2021
Establishing Framework 2.0 Working Group as a subgroup of the MCCP	Spring 2021
Commissioning an evidence base from Anthesis for 2025 carbon budget targets	Spring - summer 2021
Commissioning the environmental consultancy group 'Envirolution' to assist MCCA in developing a Community Climate Assembly and bespoke local consultations with residents and businesses as part of the Small-Scale Action of the ZCC project	Spring 2021
Holding a Council workshop, with the Tyndall Centre and Anthesis, to understand its carbon budget and targets for 2025 under the ZCC process	Late Summer 2021
Holding a series of 7 workshops within the Community Assembly in three areas of Manchester to engage on knowledge of climate change, needs of the city	Summer / Autumn 2021
MCCA reviewing the evidence base with Anthesis	Winter 2021
Presenting the core findings of the Anthesis report to the ULG and the Framework refresh Steering Group	Winter 2021
Sectoral workshops with core partners – Transport for Greater Manchester, Manchester City Council, Greater Manchester Combined Authority, MCCP, health sector partners / NHS – to present Anthesis report and understand local projects in the pipeline to 2025 and beyond	Winter 2021 / 22
Data sharing with core partners to characterise and compare information provided by the Anthesis SCATTER model	Winter 2021 / 22
Supporting processes to broaden and expand the MCCP to bring into it more organisations responsible for the city's carbon emissions	Winter – spring 2022
2022	
MCCA writing the Framework 2.0 document	Jan – May 2022
Initiating formal consultation and bringing in consultations undertaken by other members of the Partnership as part of their own zero carbon work	May 2022
Taking Framework 2.0 to Partnership and Agency sub-groups for comment and approval	March – May 2022
Taking Framework 2.0 document to the full MCCP for discussion and full approval	July 2022
Taking Framework 2.0 document through Manchester City Council governance processes to seek political approval of the city	June – July 2022
Agree detailed response to the UK Government and other agencies on the level of additional resource and powers required to meet 2025 targets	July 2022
Publishing Framework 2.0 refresh on the MCCA website and holding events to disseminate it to core partners, businesses and residents	September 2022
Putting in place processes to ensure ongoing monitoring of city carbon targets and a developing transition plan to scale-up action	July – September 2022
Interviewing MCCP – ULG members to outline membership climate action for a new MCCP Partnership report	June – September 2022

b) Collaborative delivery through five core stages

Collaborative action	Outcomes	Delivery partner(s)
STAGE 1 - ZCC workshop connecting carbon data reporting to Framework 2.0		
Understand role of agencies and detail of SCATTER data and explain the Climate Change Assembly	• Clarified roles of agencies • Data showed scale of action • Encourage more community engagement • Bring learning points to ULG	Manchester City Council MCCA Tyndall Centre Anthesis MCCP / ULG oversight
STAGE 2 – Full development of evidence base by Anthesis		
• Set inventory for Manchester emissions • Outlining the actions required for a 50% carbon reduction cut • Actions to reach these targets	• Detail provided for all Manchester direct emissions • Carbon savings and revenue costs outlined • Recommendation table provided to meet targets	MCCA Anthesis ULG oversight
STAGE 3 - Analysing carbon data with key agencies		
Present carbon data to MCCP	MCCP members given regular opportunity for comment and to approve progress	MCCA / MCCP – ULG
Analyse data with current and anticipated action with: • Transport sector • Housing sector • Planning sector • Environmental sector • Regeneration sector • Energy utilities • GMCA Low Carbon Unit • MCCA Zero Carbon Advisory Gp • MCCA Adaptation Advisory Gp • MCCA Health Advisory Group • MCCP – ULG Board	• Agree scale of action for presentation in Framework 2 • Embed actions into existing and developing policies and strategies • Align city and city region climate policies and strategies • Provide academic challenge and approval of data • Agree to develop a range of new climate indicators	MCCA and core partners of the ULG
STAGE 4 - Outlining potential place-based activity and new innovation / investment projects		
Investigating scaled-up action at following levels: • City level • City region level • Advocacy to government • New innovation and investment	Developed detailed Excel-based spreadsheet across these areas: • Buildings • Transport • Energy • Consumption and food • Nature-based solutions	MCCA engagement with specific ULG members
STAGE 5 – Incorporating change in the ULG to embed strategy to scale-up action		
Prepare transition plan for actions: • Engagement with MCCP members to improve carbon literacy, activity and reporting • Expand community engagement with next stage of In Our Nature programme	Develop scaled-up transition plan that engages: • All sectors of the city through the MCCP-ULG • Updates and enhances Manchester City Council Climate Change Action Plan • Aligns with parallel activity at GMCA / TFGM level	MCCA MCCP - ULG Manchester City Council GMCA / TFGM Net Zero Local Forum

• Implement climate change health and wellbeing needs from the Marmot Manchester plan • Develop risk and vulnerability assessment for Manchester to understand adaptation and resilience needs • Progress further business engagement through CBCA, business networks and Bee Net Zero approach	• Provides greater advocacy to the UK Government • Works with other Core Cities to unlock resources through the UK Climate Change Investment Commission • Deepens activity with residents and businesses	

9. Risk Analysis

a) Risk analysis table for the IAP process

What are the key risks? What could go wrong?	Mitigation – how are you going to mitigate them?
Delays to consultation process due to a delay in consultant's procurement.	Length and timing of consultations were adjusted and approved by Partnership – ULG and Manchester City Council.
Need to take on board more input from sectoral experts to refine actions, along with Government policy announcements and COP 26 outcomes.	Timescale adjusted to allow for more time to take these inputs into account.
Consider changes to the UK Government carbon emissions methodology to adjust baseline data for 2020.	Adjusted baseline to come up with a more accurate demonstration of a 50% emissions cut and amended pathway graph.
The need to get additional information from core partners to scale-up action.	Tight deadlines were provided to get timely information.
Advisory Groups do not agree to pathways and carbon data provided by Anthesis / Agency.	Additional meetings held of the Zero Carbon Advisory Group and with Anthesis to take through the amended information and gain approval.
Delays in the governance processes preventing publication of the Framework Refresh.	Early discussion with responsible officers in Manchester City Council and with the Partnership – ULG. Creation of a Gantt chart outlining carefully all the approvals that are needed.
Funding bids to take parts of the project together are not successful.	Close liaison with funding partners to understand their requests and needs for a successful bid.
The political and public challenge in explaining the data that the city needs to upscale action.	Have a well-considered and fully Partnership / MCC communications strategy to give a clear and concise message of the core data.
Members of the Partnership / core partners in the process disagree with the direction of travel that the data calls for.	Close discussions within the Partnership and with core partners to agree a strategy that all are aligned to.
UK Government does not have the same sense of urgency / working to a different timescale on carbon mitigation, adaptation and resilience.	Agency, Council and GMCA have a joint strategy for lobbying the Government through all appropriate forums.

The challenges of constructing new green finance models that allow for scaled-up action.	Agency, Council and GMCA work closely together and through the Core Cities and UK100 on findings of the UKCCIC report.

b) Wider risk analysis of the challenge for Manchester to become a zero-carbon city by 2038

Through the Core Cities Network (Manchester is an active member of this group), a detailed report has been developed by Energy Systems Catapult under the UK Climate Change Investment Commission (UKCCIC). This is seeking to ascertain the level of investment from either the UK Government or private investment (perhaps through Council owned Pension Funds or private investment firms) that is required to deliver on zero carbon targets in the 9 cities and across Greater London. This research has been given financial support from the UK Government.

This report, developed for the Core Cities by Eunomia Research and Consulting in association with the group Bankers without Borders can be seen through this weblink https://cp.catapult.org.uk/project/uk-cities-climate-investment-commission/

The report notes that the up-front investment needed to address the Core Cities' & London Councils' Net Zero pledges is unprecedented and daunting from multiple perspectives:

- **Scale:** This report estimates that approximately £200 billion (in a range of £125bn- £416bn) must be spent to achieve Net Zero across these cities. This falls well beyond the financing capacity of the public sector.
- **Urgency:** Implementation must accelerate as soon as possible to meet Net Zero deadlines and mitigate temperature increases.
- **Complexity:** The systemic transitions required within cities are complex and interlinking and are unlikely to be achieved successfully through individual decision making.
- **Just Transition:** Already stretched social inequalities will be risk being exacerbated if the outcomes of policy changes are not appropriately considered.

It is important to note that the budget of Manchester City Council and GMCA has been under considerable financial pressure for over a decade now, due to reductions in its block grant from the UK Government (as part of a wider austerity programme commenced in 2010), which has been exacerbated by the Covid-19 pandemic. For example, in the financial year 2021/22 Manchester City Council had to make budget cuts of over £40 million. Despite this, both the Council and GMCA have sought to prioritise low carbon policy as one of its core activity and substantially increased funding to the MCCA and to specific low carbon projects despite these serious financial challenges.

The sectoral workshops that are were organised by the Agency included specific focus on what resources and powers are required in advocacy to the UK Government and private investors. If they are not met, there is a clear and obvious risk to whether the city can meet all its climate action ambitions and the targets it has set. There is a combined risk in this activity in that the UK Government is working to a later target of 2050 to deliver 'net zero' policies, considerably later than Manchester's 2038 target. This often means a mismatch in ambition between the city / city region and central government. Manchester is working with organisations like the GMCA, the Core Cities Network, APSE Energy and UK100 to provide a common strategy to the government of the need for greater urgency on climate change, and to provide additional assistance, resource and powers to help cities achieve their aims.

10. Lessons from URBACT Networks and Transnational

a) Lessons learned from some of the ZCC member cities

Manchester has significantly benefited from its involvement in the Zero Carbon Cities project and direct engagement with URBACT. This includes:

- The joint workshops and additional events held with the other partner cities has provided some excellent examples of action that have fed into our own plans. For example, Modena presented some excellent local best practice of how it has developed a wide network of eco-schools, which has not just engaged the pupils, but also actively worked with their parents.
- Modena presented two informative webinars in association with the local university and its energy service on how cities can communicate climate change messages and on how to develop zero carbon houses. MCCA and Manchester City Council are considering the communication messages they will need to use to promote a public consultation and the Framework document when it is ready for publication, and there were some excellent ideas shown from Iceland and Italy that are influencing us as we develop that communications strategy.
- Similarly, the video messages that Bistrita showed of their climate activity provided an excellent public-facing and accessible story of how the city was developing its climate action plans which Manchester certainly has learnt a lot from. Seeing the real benefit in explaining climate action through videos and animation, MCCA have recently developed a short animation video on climate adaptation and resilience, to simply set out its importance, and why cooperation through the likes of the MCCP is beneficial – it can be watched at: https://www.youtube.com/watch?v=c7KD6upEBSQ.

b) Lessons from URBACT baseline study and E-university

The URBACT baseline study and the URBACT E-university providing additional information on the necessity of developing science-based targets, climate proofing municipal budgets, case studies and examples of engaging residents and businesses gave Manchester an important structure with which it has used as it updates its original climate change strategy.

URBACT have also provided Manchester with a greater level of focus on the importance of inclusiveness and digitization in putting together climate change action plans. There has been a conscious move to develop a more diverse MCCP over the period of this project, with a subgroup established to address not just this within the Partnership, but also in how the city seeks to engage with all parts of the community. This was particularly relevant for Manchester's Small-Scale Action where Community Assemblies were held in two quite different parts of the city – one in the more prosperous parts of the city and one in the most deprived – to ensure it could consider the different needs on climate action, climate justice and on the greater challenges these changes could put on more vulnerable communities and residents. In terms of digitization, an accessible website was developed as part of the Small-Scale Action to encourage comments from residents and Neighbourhood Climate Change Officers, as well as provide an easy-to-use online survey for both residents and businesses in commenting on the barriers to developing robust climate change action.

c) Lessons from transnational bodies Manchester / GMCA engages with

As already noted, Manchester and GMCA are heavily involved in a considerable number of transnational bodies seeking to focus on climate change. These include Eurocities, the Global Covenant of Mayors for Climate and Energy and the global climate change assessment body, CDP. When Manchester started this project, it had a CDP rating of 'C', but by focusing greater detail on its partnership work, updated plans on carbon budgets, creating a more detailed evidence base and focusing on new targets; as well as outlining in more detail on adaptation and resilience work, it has

been upgraded in 2021 to a 'B'. With a detailed adaptation and resilience plan and more detailed Framework 2.0 being delivered in 2022, the Agency are working on outlining its actions with CDP this summer. We are also pleased to note, that with the collaborative support we receive from the GMCA, that Greater Manchester's extensive engagement and activity has seen it awarded an 'A' from the CDP process.

11. Conclusion and next steps

The ZCC project has been essential for Manchester in focusing its climate change activity on working towards a faster carbon reduction trajectory. It has instilled a greater sense of urgency that, whilst the City Council may be broadly on track with its carbon reduction targets, the wider city is not. Scaled-up action is the core learning point from this project. The project has also helped in moving the city's climate change strategy from a series of high-level objectives into a much more detailed and evidence-based series of targets that will assist it in attempting to get back on track within its carbon budgets. The science-based target approach which is at the heart of this process has also ensured Manchester is working from a detailed evidence base that puts considerable pressure on all sectors of the city to scale-up action and be heavily involved in decarbonisation projects.

The project has assisted Manchester in engaging further with the Tyndall Centre over its carbon budget analysis, as well as in commissioning Anthesis to provide MCCA with a series of challenging metrics on the level of ambition Manchester needs to provide across all areas of its economy. Our Small-Scale Action allowed for an effective and very useful engagement exercise with community groups and businesses, which has created new opportunities for the future.

The cooperation and engagement with a wide range of other European partner cities has been of high value in putting Manchester's work into a sharper context, comparing how we are doing with those other cities and sharing useful information, best practice and learning between each other. The Masterclasses facilitated through URBACT has helped our own learning and reinforced that the direction taken in developing a science-based target with carbon budgets was the right one to make. This has placed Manchester, and all the other partner cities, in a better position than previously to ensure we all play our full part in helping to limit the global temperature rise.

Above all, the project has made the city aware of how important its ULG – the MCCP – is in driving change, innovation and collaboration on climate change action so that the city is more broadly focussed on carbon reduction, mitigation, adaptation and resilience. The MCCP has widened in its participation and its structure has improved bringing both an expert academic independence through its Advisory Groups, as well as a greater sense of activity through various task and finish groups. The anticipated creation of a health and wellbeing advisory group and increased activity on an inclusive economy and 'Just Transition' will enhance this further. The Agency will continue to work with the Partnership to strengthen its role, increase its diversity and aim for its representatives to be from a wider range of organisations responsible for an increasing share of the city's overall carbon budget.

Next steps –

- Conclude and publish the Manchester Climate Change Framework Refresh.
- Work closely with the Partnership – ULG to develop improved Annual Reports for both the Agency and, for the first time, a specific Partnership Annual Report.
- If successful with funding bids, plans are in place to further develop the work delivered in the 'In Our Nature Programme' and in supporting the Manchester Youth Climate Manifesto.
- A number of other academic programmes to enhance this work are currently being discussed by the Agency, on behalf of the Partnership, with the Meteorological Office, Advisory Groups, the local universities, the University of Leeds and the University of Exeter.

2022

BISTRIȚA Integrated Action Plan

5/16/2022

Contents

Chapter 1. Context and process

1.1. Introduction

The "Zero Carbon Cities" (ZCC) project carried out under the URBACT III Program brings together 7 cities to better understand how to use science-based targets in local context and support them in developing meaningful actions, leading to Integrated Action Plans.

Bistrita is one of these 7 cities, alongside Frankfurt (Germany), Manchester (United Kingdom), Modena (Italy), Tartu (Estonia), Vilvoorde (Belgium) and Zadar(Croatia). As a Project Partner in the ZCC Network, the municipality addresses the challenge to apply a data-based approach to improve its SECAP targets and actions in line with the Paris Agreement and the EU's goal of carbon neutrality by 2050.

Achieving climate neutrality by 2050 is not an easy task for the city of Bistrita, as this entails various challenges, ranging from lack of data from the private sector to low engagement and awareness of the relevant local stakeholders. Nonetheless, the Integrated Action Plan (IAP), as the main output of the "Zero Carbon Cities" project, shows the main steps for the municipality to achieve its goal of carbon neutrality.

1.2. URBACT'S influence and input on Bistrita's IAP

Bistrita municipality has significantly benefited from its involvement as partner in the Zero Carbon Cities project and from the engagement with the URBACT program. The transnational meetings bringing together project partners, the workshops, masterclass sessions, ULG meetings and other events held within the Zero Carbon Cities network provided valuable opportunities to exchange experience and to build knowledge on climate-related actions, as well as to engage local stakeholders in the mission towards climate neutrality.

The experience of Manchester (the lead partner) on developing carbon budgets and using science-based targets clarified how to elaborate and to implement a carbon budget at local level. This will support the adjustment and design of Bistrița's development plans and actions in such a way that the city can achieve its targets on CO2 emission reduction. In this regard, the project Masterclass sessions were very useful, as there were many topics with good examples and theoretical knowledge regarding:

- recent works on science-based methodologies and why are they useful for cities;
- zero carbon up-to-date policy and current initiatives and opportunities towards zero carbon;
- best practices on planning towards the transition to carbon neutrality (examples from Manchester and Oslo);
- key considerations when setting a science-based climate change target for a city – the use of Tyndall approach for setting Paris Agreement aligned carbon budgets.

Good practice examples were uptaken from Tartu (Estonia) with the event "Car freedom boulevard'', from Modena (Italy) - developing a wide network of eco-schools, and from Barcelona with its specific SUMP actions and how they involve citizens in mobility and transport. Zadar (Croatia) presented their idea on monitoring air quality in the city, especially during the tourist season – by installing, as part of the SSA, an air quality monitoring station. Based on this idea, Bistrița developed a pilot

network of 18 air quality monitoring sensors (indoor and outdoor). The aim of this action was to raise awareness among citizens about air pollution within Bistrita, especially in areas with intense traffic, so that they would take action and slowly change their daily behaviours (e.g., choosing public transport over their private car for daily mobility).

The URBACT baseline study developed in the framework of the first phase of the ZCC project gave the municipality an important starting point in the elaboration of the Zero Carbon Integrated Action Plan for Bistrita. The study presented information on the necessity of developing science-based targets, municipal carbon budgets, case studies and examples of engaging residents and businesses.

Through URBACT events such as URBACT e-University, URBACT City Festival, URBACT webinars like "Hints and tips for Online working", "Digital Friday Breakfasts" sessions, "Creating Effective Digital Study Visits", URBACT provided Bistrita municipality with a greater level of focus on municipal capacity building, digital transformation, gender equality and inclusiveness. The main learnings were: the methods for identifying relevant stakeholders and building a collaborative group, how to correctly diagnose a problem and develop integrated solutions, how to co-create ideas and a shared vision in the stakeholders' group, how to plan actions, to assess the progress and to share results of an action, how to run and facilitate interactive digital ULG meetings and how to run a creative digital workshop with the local ULG.

The newly-learned methodologies and digital tools were used for better planning, organising and facilitating the ULG meetings and for the elaboration of the Bistrita's Integrated Action Plan. Also, this knowledge will be used in the future, even after the end of the ZCC project, in order to continue collaborating with the ULG and for the implementation of the proposed actions.

Vertical Integration

The URBACT tools and the transnational experience within the ZCC project helped the municipality lay the foundations of a local working group with representation both at local level and at higher level of governance – Bistrița-Năsăud County. The list of ULG members is open and constantly being updated with new members, but in regard to long-term collaboration with the local group of stakeholders, the municipality aims to continue implementing actions even after the end of the project.

Horizontal integration

The approach and involvement of as many city hall departments as possible in the various stages of the IAP development has been and remains a challenge as one of the key elements for creating higher-level impact through projects is interdepartmental collaboration. From the ZCC project partners Bistrita Municipality has learned that as people in these departments understand the importance and complexity of climate change issues, their participation is likely to be more substantial.

1.3. Context

Bistrita is located in the north-eastern part of the Transylvanian Plateau in Romania, and it is crossed by the river with the same name. The main access road is the European road E58 (DN17) connecting Transylvania and Moldova. The city is located on flat ground, at an altitude of 356 m and is surrounded by hills covered with extensive orchards (predominantly apples) and forests.

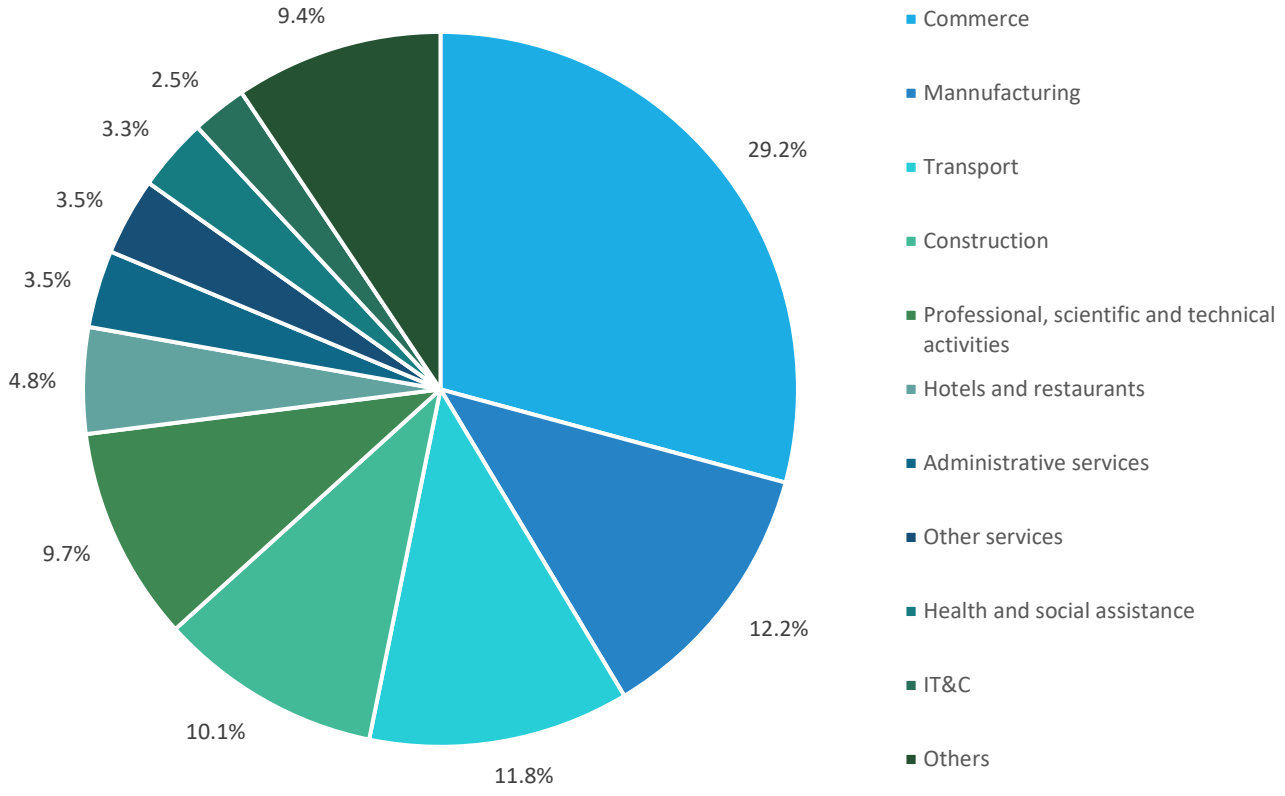
The city's administrative unit covers an area of 145.47 km^2 and has developed in recent years as an attractive economic and educational centre at county level, recording an increase of its residential population to approximately 94,600 inhabitants, a rapid spread of residential areas and an intensified economic activity. The city has seen an increase of approximately 9,000 inhabitants in the past 30 years and aims to achieve the 100,000 inhabitants mark in the coming decade, as the main social and economic activities at county level become more concentrated in Bistrita.

Although the city has recorded an accelerated development during the last decade and the quality of life from an economical point of view has increased for its residents, there are other aspects of its urban development which have not coped at the same speed. As an example, the increased attractiveness of the city conducted to a higher demand for housing which in term led to a rapid sprawl of residential areas close to the core part of the city and the industrial area. This type of urban development led to other problems such as areas with high population density, traffic congestion, increased demand for proximity facilities (schools, pharmacies etc.) and others. As a result, one of the most serious issues in recent years has been the increase of air pollution as CO_2 emissions grew by almost 5% since 2008, to a record level of over 350,000 tonnes in 2021. The community's expenditure of electricity, natural gas and gasoline (as a whole) for daily activities has overgrown the savings achieved by changing appliances or cars with less energy consumption (as national programmes have been continuously developed and implemented in these matters).

A good indicator of the intensifying activity of the city's population is its economic development, which has recorded a 22% increase in the local companies' turnover. Also, during the past 6 years the number of local active companies grew by 18.6%. Over half of the active companies from Bistrita-Nasaud county are located in Bistrita. The average number of employees in 2019 in the city was of over 40,000 people, thus leading to a low share of unemployed in total labour resources as the city attracts workers form other neighbouring municipalities.

Energy consumption of a city and thus emission levels are directly related to its economic activity and the population's behaviours. According to national statistics, the top 3 economic sectors in Bistrita are Trade/Commerce (29.2%), Manufacturing (12.2%) and Construction (11.8%), all of them requiring large amounts of energy for production, delivering or operation. The large number of active companies in trade can be explained by the fact that purchasing power has increased in recent years, generating demand for different types of products, but also by the fact that setting up a business in this field does not require capital and advanced specialized knowledge. This increases the attractiveness of many social groups who want to become entrepreneurs, compared to, for example, professional, scientific and technical services, where the marketed service is usually based on a higher scientific specialization. Manufacturing has been an omnipresent sector in all Romanian cities, including Bistrita, as during communism this was the main focus of urban development. Nowadays, large industrial companies in the city focus on production of PVC articles (pipes, fittings, extruded profiles etc.), manufacture of wiring, electrical installations and accesories for automobiles, metal structures for industrial equipment, hydraulic and pneumatic equipment, cables and production of car batteries.

FIGURE 1 DISTRIBUTION BY SECTOR OF ACTIVE COMPANIES IN BISTRITA, 2019



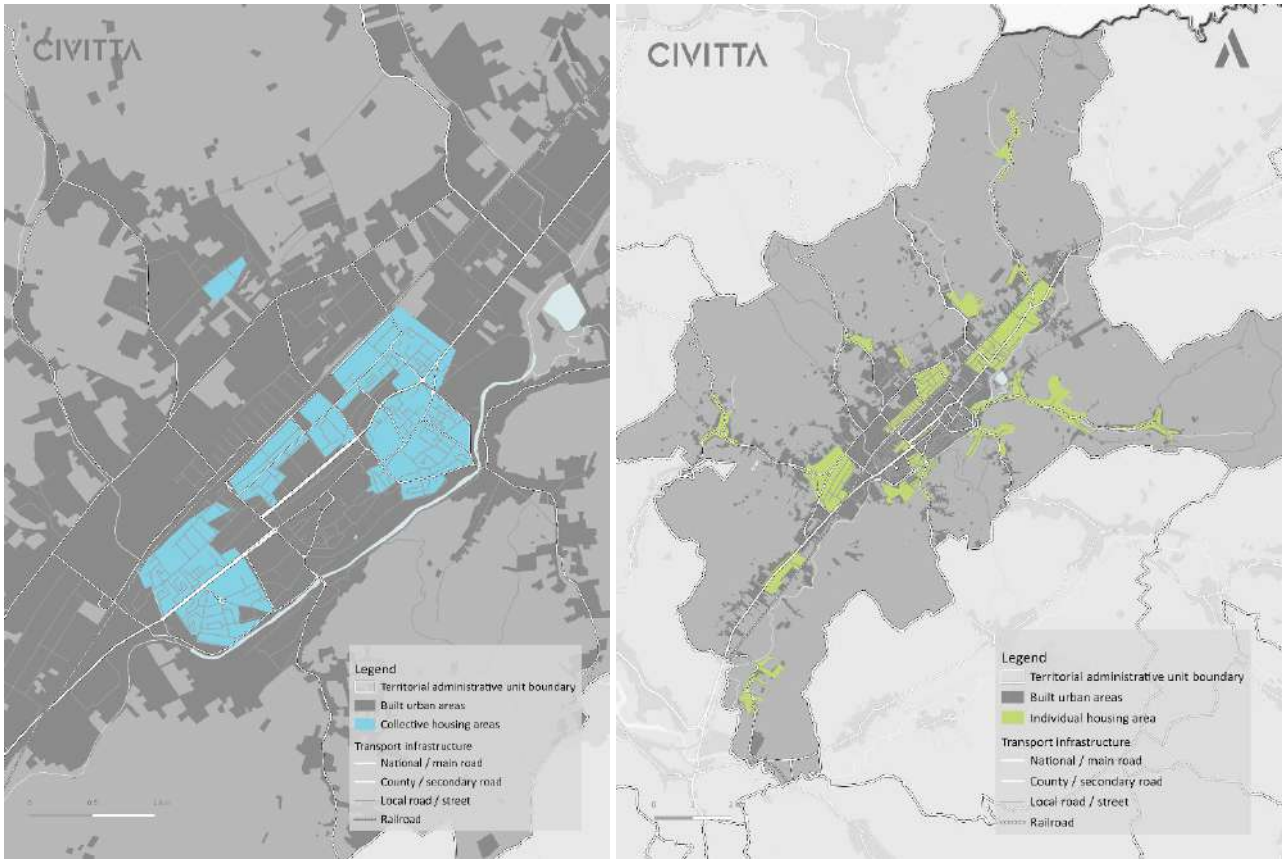
Besides the economic development, Bistrita had to deal also with the population inflow and expand its residential quarters in order to accommodate both old and new residents. In this matter, the city has developed before 1990 through the construction of large collective housing complexes, most of which were constructed using prefabricated concrete slabs with low heat transfer protection or treatment. Nowadays, one of the main challenges Bistrita is facing in terms of CO_2 emissions is modernizing these collective housing complexes dating back from 1960-1980. Out of the existing 487 block of flats in the city only 130 have undergone interventions for improving energy efficiency (74 during 2014-2020). These constructions are located in the pericentral area and have between 4 and 10 levels, thus creating high areas of heat loss and therefore requiring higher energy consumption especially during the winter season.

Moreover, besides the collective housing, Bistrita has a wide residential area with individual housing buildings spread across the city, totalling over 8000 constructions. Many of these houses require even more energy in order to maintain indoor temperature compared to apartments and are not equipped with renewable energy production sources. These products have been further developed in recent years but the population did not show a high interest for them due to high installation costs (until recently) or high administrative burden.

The reduced number of rehabilitation projects for residential buildings led, alongside the urban development of the city, to the increase of electrical and natural gas consumption of household clients by approximately 20% between 2014 and 2021 (over 500,000 MWh in 2021). As a result, the housing sector has the highest share in the overall CO_2 emission levels, of over 58% (200,000 tonnes).

Nonetheless, another small contribution to the high demand for electricity and natural gas are the public buildings in the city, for which the local administration did not implement between 2014 and 2020 modernization projects. Currently, in Bistrita there are 127 public buildings (with an estimated 4700 tons of CO_2 emitted), all of which are included in the renovation plan of the municipality for 2021-2050. This plan proposes a set of interventions on the buildings' envelope and replacement of their utility systems, but also suggests implementing alternative electricity and / or heat generation systems from renewable resources and integrated energy management systems.[1]

FIGURE 2 1 TERRITORIAL DISTRIBUTION OF COLLECTIVE (LEFT) AND INDIVIDUAL HOUSING (RIGHT) AREAS IN BISTRITA, 2021



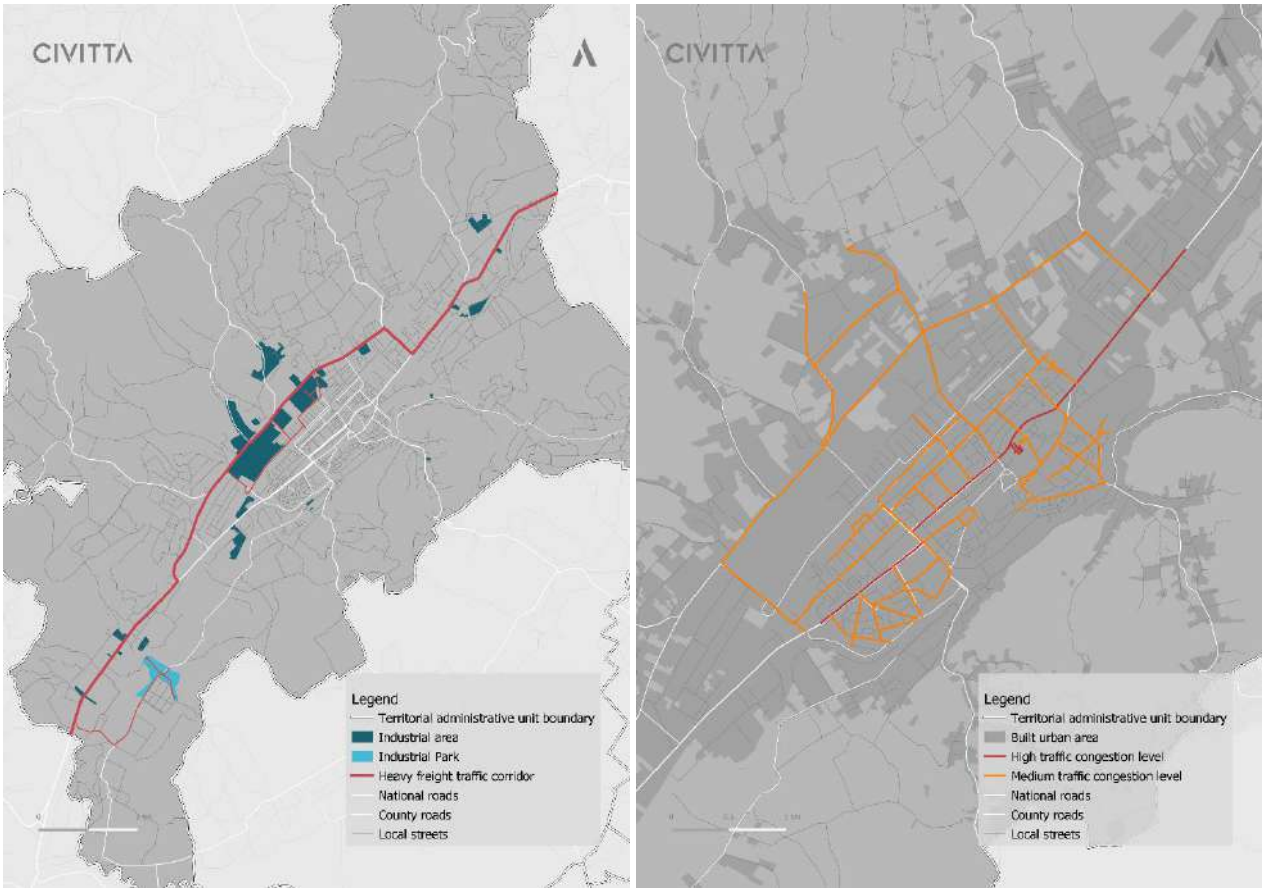
Apart from the issues with old unrehabilitated buildings, Bistrita is also facing several challenges in the field of mobility and transport, namely reducing intensive use of private automobiles and heavy freight transport inside the city, which amassed over 100.000 tonnes of CO_2 emissions in 2021 (according to the municipality's data). To tackle the first mobility challenge, the municipality has implemented several projects to improve its local transport fleet and bike infrastructure. However, these interventions are recent or even under development, and therefore mobility patterns and behaviours haven't evolved yet towards a more sustainable direction. As for the second challenge, Bistrita does not yet have a ring road for the freight transport to bypass the city. Currently, freight transit is done on a secondary route, parallel to the main NE-SW axis of the city, which crosses the main industrial area and several residential areas. Overall, the current road infrastructure cannot accommodate the transport needs of the city at peak hours, which leads to daily traffic congestion of the city centre and secondary transit route and air pollution due to the high level of CO_2 and other particles emitted.

[1] Long-Term Renovation Plan of the Public Buildings Stock in Bistrita 2021 - 2050

In order to monitor and tackle air pollution within urban areas, the National Environment Protection Agency has developed a network of urban monitoring stations, one of which is located in Bistrita.

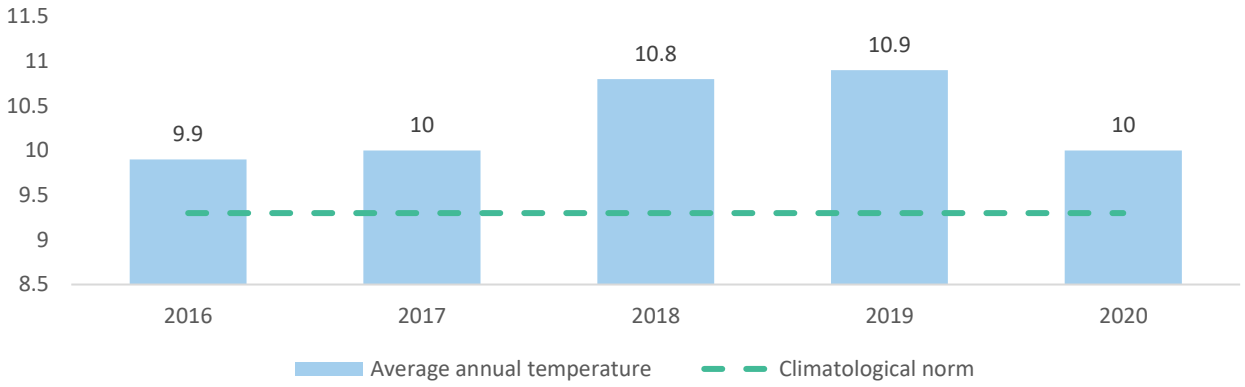
Until 2020 the city relied mainly on data provided by the previously mentioned agency through its local monitoring station, which still helps to provide various air pollution data (sulphur dioxide, nitrogen oxides, carbon monoxide, ozone, particulate matter (PM10) and benzene). In addition to high levels of CO_2 emissions, the provided historical data shows an increase in daily emitted values of PM10 particles. This supports the conclusion that in recent years the population has increased its daily utilisation rate of personal automobiles and therefore the emitted quantity of CO_2 (and other pollutants) within the city.

FIGURE 3 MAIN ROAD FREIGHT CORRIDOR IN USE (LEFT) AND THE DAILY TRAFFIC CONGESTION LEVEL (RIGHT) IN BISTRITA, 2021



Moreover, the increased values of CO_2 emissions have contributed to an increase of the average annual temperatures in the city, reaching over 10°C yearly in the past 5 years, while the climatological norm for Bistrita in terms of average temperature is set at approximately 9.3°C according to the Environment Protection Agency. Thus, in 2018 and 2019 Bistrita stood close to the 2°C threshold between present and pre-industrial temperatures set by the Intergovernmental Panel on Climate Change and through the Paris Agreement to be the upper limit for global warming.

FIGURE 4 EVOLUTION OF THE AVERAGE ANNUAL TEMPERATURE FOR BISTRITA METEOROLOGICAL STATION



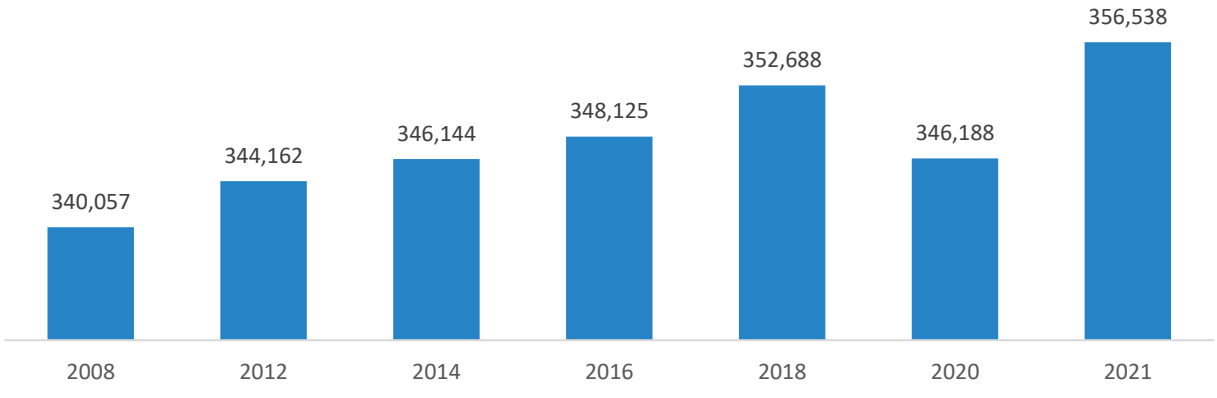
On the plus side, Bistrita has over 249 ha of green spaces (according to the Local Register for Green Spaces), which translates to over 26 sqm of green space per inhabitant. Nonetheless, the municipality has already planned certain projects with the aim of improving and increasing green urban spaces, by creating more green areas for the citizen, increasing the number of trees (higher tree numbers help convert more CO_2 into oxygen) and organising urban spaces for both leisure and sustainable urban mobility. Furthermore, Bistrita has 2 important forests (Codrișor and Schullerward – with an area of 33.6 ha) with hiking trails, bike paths and recreational areas, and a project to transform the Codrișor area into an urban forest for recreational activities.

1.3.1. Carbon footprint

Unlike other EU cities (Ljubljana, Warsaw, Hjørring and others), Bistrita's climate footprint was less than 2 tons of CO_2 per inhabitant two decades ago. Likewise, Romania and Bulgaria are the only EU countries which were allowed through the 2013-2020 Effort-Sharing Decision (ESD) to increase their non-ETS GHG emissions until 2020 compared to 2005 levels. This decision has been made based the so called "Burden-sharing" directive which divided the effort of EU countries to include fairness between the less and the most developed regions.

At local level, Bistrita committed to decrease by 40% its GHG emissions between 2008 and 2030 through the Covenant of Mayors for Climate & Energy. This ambitious target presents several challenges for the city, as the emitted levels have recorded an increase since 2008, reaching over 350,000 tons of CO_2 emissions in 2021. The data underlying this statement has been recorded by the local administration, who started monitoring CO_2 emissions every two years since 2008 following the city's previously mentioned commitment.

FIGURE 5 EVOLUTION OF ANNUAL CO_2 EMISSIONS IN BISTRITA (TONS)



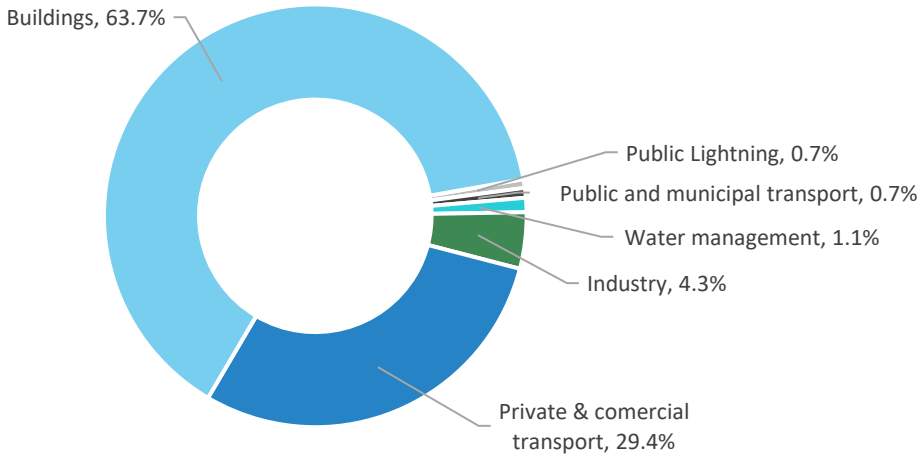
1.3.2. Background information on CO_2 inventories

In order harmonise data with other members of The Covenant of Mayors, Bistrita uses The Emission Monitoring Inventory, an energy assessment tool based on proper measurement and observation of real energy performance in a certain territory. This common framework has been developed with the help of the European Commission's Joint Research Centre (JRC) in order to collect and analyse data in a structured and systematic manner. Moreover, the collected data together with the proposed SECAP template serve as a basis for further climate and energy management and planning.

The Emission Monitoring Inventory comprises of specific sectors with relevant energy use at city level and helps to identify areas for improving energy performance and opportunities that can lead to significant reductions in energy consumption or the use of renewable energy sources. With the help of the Inventory, Bistrita managed to identify the main sectors which generate high CO_2 emissions, namely residential buildings and the tertiary sector.

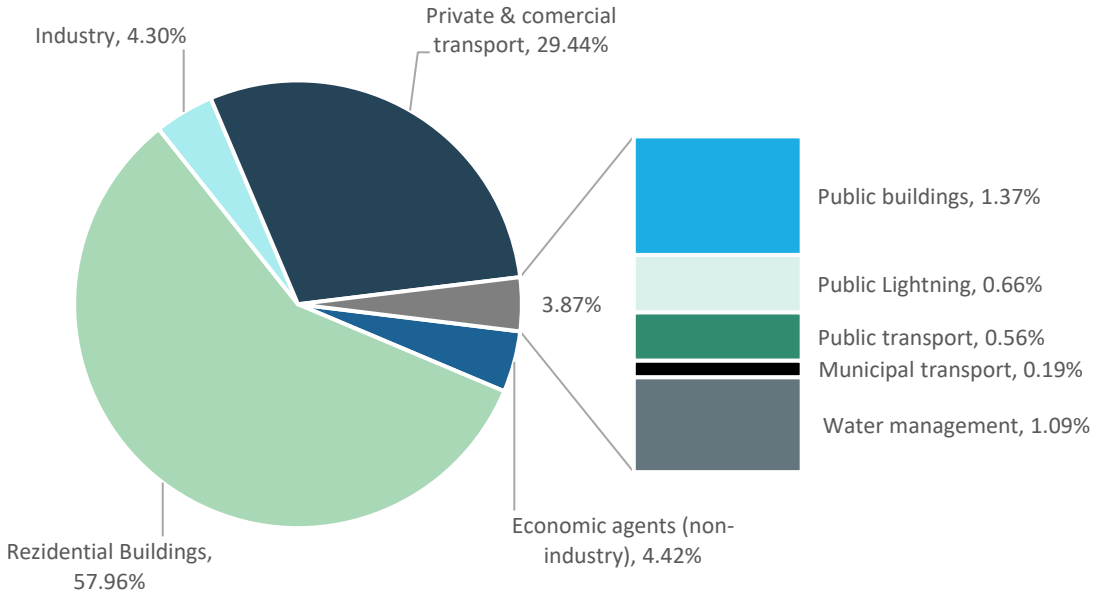
A detailed baseline inventory has been done in Bistrita until 2020 during the preparation of the present IAP. Prior to the 2020 inventory, an analysis of the city's carbon emissions was also compiled in 2008, 2012, 2014 and 2018 by the local administration through aggregation of available data for the city. Based on all collected data, in 2020 the residential buildings and private and commercial transport account for 93% of Bistrita's CO_2 emissions, while the industry amasses just 4,3% of the annual level of CO_2 emissions.

FIGURE 6 DISTRIBUTION OF CO_2 EMISSIONS IN BISTRITA, 2020



A more detailed data representation of the city's emitted CO_2 shows that the residential sector is responsible for almost 58% of the registered 2020 annual CO_2 emissions while almost 30% came from private and commercial transport. The small share of emissions of the industry sector in the present calculation represent an approximation based on the scarce specific data from energy distributors. Even so, available data shows economic agents' activity in the city sum up to 8,7% of the total emitted CO_2, but in this regard many of the small active companies within the city operate within the existing buildings stock in Bistrita. As a result, proposed interventions done in the buildings' sector would generate an impact also for emitted CO_2 by economic agents

FIGURE 7 DETAILED DISTRIBUTION OF CO_2 EMISSIONS IN BISTRITA, 2020



As a conclusion, besides the necessity of the public administration to start working with local companies, the building stock and transport sectors should be the main focus of the municipality in the coming years for implementing projects aiming at reducing energy consumption and GHG emissions. Nonetheless, thriving towards a greener city, with more parks, trees and green urban spaces could enhance Bistrita's urban environment capacity of converting emitted CO_2 (one mature tree can help convert yearly between 10 and 40 kg of CO_2 into oxygen). In this matter, the city can make great use of its river to create green and blue infrastructure which not only helps reduce some of its emitted CO_2, but also creates an eco-friendlier environment for its citizens.

1.3.3. Climate-fight related progress

Starting with 2021, Bistrița municipality is a signatory of the "Green City Accord", thus committing itself to implement public policies and programs in an integrated manner, so as to achieve the ambitious goals that will be set for each of the 5 areas of environmental management: air, water, nature and biodiversity, circular economy and waste, and noise.

Also in 2021, Bistrița completed the Long-Term Renovation Plan of the Public Buildings stock in Bistrița for 2021-2050 which is in accordance with the objectives of the National Long-Term Renovation Strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private. This document describes in detail how the city will gradually transform its buildings into a highly energy efficient and decarbonized stock by 2050.

The municipality did a good prioritization of Structural Funds in the fight towards reducing energy consumption, as 30% of the collective housing stock older than 1990 was refurbished, reaching the best renovation rate in Romania. Bistrita managed to mobilize its local buildings' associations in taking action, however the driver for this change was the citizens' wish for improved comfort, not climate change fight.

Moreover, in 2020 Bistrita developed a strategy for the city's heating and cooling system on medium and long term. Since 95% of the fuel used to heat buildings in Bistrita is natural gas and most houses

have individual boilers, it is necessary to consider the transition to renewable individual heating systems. Although cooling was not a problem for Bistrita, the summertime high temperatures are raising more and more questions related to the need and choices for cooling systems, particularly for non-residential buildings.

Also, in 2021 Bistrița has become a member of the European CIVITAS network, one of the representative programs that helps the European Commission achieve its ambitious mobility and transport goals, namely those of the European Green Deal. The city has started to use the ERDF funds for mobility issues like the Green Line project, which is a pilot project establishing a new local public transport line across Bistrița using a dedicated priority lane for electric buses, and also for planning the construction of 45 km of bike lanes until 2023.

In addition, Bistrita is also active on citizen engagement as in 2004 the municipality set up the Green School, an Ecological Education and Information Centre for pre-schoolers, pupils and students. This centre thrives to further develop children's knowledge and specific behaviour on supporting sustainable energy and climate change.

The city was also offered the Earth Hour Award by the WWF (World Wide Fund for Nature) Association. Indeed, each year the municipality turns off the public lighting for an hour to raise awareness about the exaggerated consumption of energy produced from non-renewable resources, which in term produces more GHG emissions. Even so, the local administration is aware that more action is needed and that is why existing plans (besides the present IAP) take into consideration projects related to developing a sustainable urban community and tackling climate change.

1.3.4. Strategic documents and projects

At local level, Bistrita's commitment to reduce its energy consumption and carbon footprint has been underlined through several strategic documents (which already propose actions further described in the present Action Plan):

- The Sustainable Energy and Climate Action Plan (SECAP);
- The local Integrated Strategy for Urban Development (ISUD);
- The Sustainable Urban Mobility Plan (SUMP) 2015-2030;
- The Long-term renovation plan for the public buildings stock in Bistrița for 2021 – 2050.

The above-mentioned plans have been developed in accordance with the existing national legislation and also create synergies with existing national, regional and county level strategies related to reducing GHG emission levels and energy consumption:

- Romania's Sustainable Development Strategy 2030;
- Integrated National Plan for Energy and Climate Change 2021-2030;
- NW Regional Development Plan for 2021-2027;
- County Plan for Maintaining Air Quality, 2018-2022.

Apart from these documents, there were some initial projects already implemented at local level by the municipality or other actors in regard to GHG emissions and public awareness:

- IMAGINE INTERREG project which finished in 2014 with a roadmap towards 2050 for a "low carbon city with high quality of life"
- Bistrita was a partner of the HotMaps project (H2020) through which wasted heat was identified and a local heating and cooling strategy should be drafted. Bistrita is using the Hotmaps tool to understand better a large part of their energy demand and to develop future scenarios.
- The chamber of Commerce was also involved in an INTERREG funded project focusing on the transition to circular economy.

- Two URBACT projects focusing on retaining retail market in the city centre and on active citizens.

1.3.5. SWOT analysis

Bistrita's main strengths and weaknesses in tackling challenges posed by high energy consumption and CO_2 emission levels are summarized in the following SWOT analysis.

Strengths	Weaknesses
The local administration is constantly monitoring annual energy consumption and CO_2 emission levels at the city level. The local administration has implemented a series of air monitoring sensors in key areas of the city The public transport system has undergone an extensive modernization project in order to renew the fleet in use and extend the operation lines within the city Most of the city's population is less than a 15-minute walk away from a bus stop. The municipality is developing a bike paths network of approximately 26 km, as well as a bike-sharing system. 74 collective residential buildings have undergone investments between 2014 and 2020 in order to improve their energy efficiency. Over 26 sqm of green areas within the city per inhabitant (more green areas help convert CO_2, thus diminishing emission levels).	High levels of annual energy consumption and CO_2 emissions at city level. Bistrita does not have a ring road which can be used by freight transport operators. Therefore, the heavy transport of goods is done through residential areas of the city, thus increasing air pollution. The main industrial areas are located near the city center and the motorization index for the city is high (439 cars/1000 inhabitants), thus high traffic levels are constantly registered within the city In the last 5 years, the average annual temperature has always been in Bistrita above the climatological norm of the last 3 decades. Most sectors saw an increase in CO_2 emissions between 2008 and 2018, with the largest increases occurring in the building sector. During the 2014-2020 period too few investments were made for improving the energy efficiency of public buildings in the city.
Opportunities	**Threats**
Bistrita is located in an area with a medium potential for use of photovoltaic energy. Existence of financing opportunities for the implementation of urban regeneration projects of residential areas with collective housing (NW Regional Operational Program), to increase the quality of housing and improve the urban image. Implementation of the large infrastructure project regarding Bistrita's ring road proposed by the Investment Plan for the development of transport infrastructure for the period 2020-2030 will lead to a decrease in heavy traffic inside the city.	Increasing living standards at national level are leading to an upward trend of the motorization index, which implies a higher demand for transport infrastructure and parking space. The Covid-19 restrictions have reset the citizens' main choice for daily mobility, thus conducting to an increase of private automobiles use and GHG emissions. Therefore, changing the population's behavior may be more challenging than before the pandemic. The extensive list of necessary investments for modernizing collective residential buildings at regional and national level may pose a challenge in terms of funds' availability for these types of actions. Reduced level of interest from the economic sector in decreasing energy consumption and GHG emissions.

1.4. Bistrita's carbon budget and science-based targets

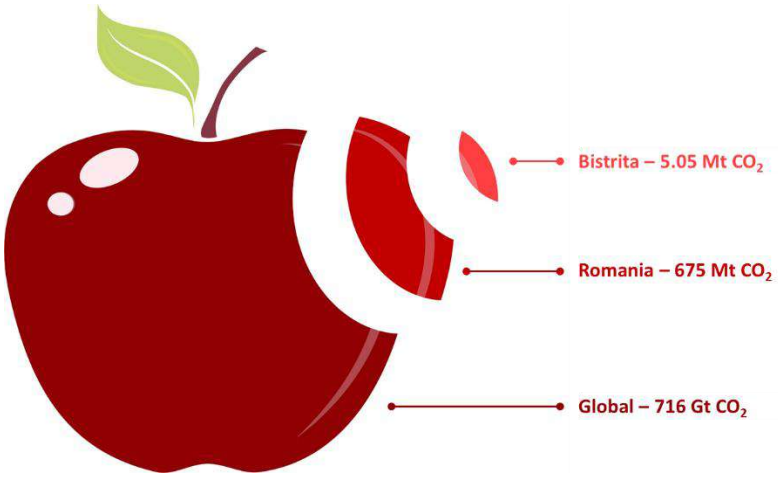
In the process of elaborating the Integrated Zero Carbon Action Plan of Bistrița -2050, the provisions of the URBACT Guide for the Development of an Integrated Action Plan and the tools provided by the URBACT III program were used, as well as the documents provided within the Zero Carbon project.

Areas of intervention and climate change mitigation and adaptation measures were identified and addressed in accordance with the Paris Agreement, the Green Deal and the EU Strategic Vision for Climate Neutrality by 2050. The CO_2 reduction targets for Bistrita were calculated on a scientific basis starting from the carbon budget, according to the Tyndall methodology, enabling the city hall to set out clear planned actions.

In the framework of the URBACT Zero Carbon Cities project, the city of Bistrita will adopt a local carbon budget to help guide strategic decisions on a policy level. Defining a carbon budget emphasizes the sense of urgency of climate action on a science-based method in alignment with targets set under the Paris Agreement. The global carbon budget framework defines the allowable cumulative emissions of carbon dioxide associated with a given level of global warming, since emissions of CO_2 have the same effect on global temperature regardless of time of production.

Concentrations of CO_2 in our atmosphere are around 415 ppm (parts per million) and when they reach around 430 ppm there is a good chance the earth will be 1.5˚C warmer than it was back in the 1800s when the concentration was just 280 ppm. The process of calculating a city's carbon budget starts with a global carbon budget, calculated to have a 66%-100% likelihood chance of raising by 2°C and about a 33%-66% chance of increasing by 1.5°C the average annual temperature. It is a global Paris-compliant carbon budget, starting from 716 Gt CO_2 in 2020. From this global carbon budget, the national carbon budgets for the countries are sub-allocated through grandfathering, following the method of Anderson et al[2]. The city of Manchester took the lead in the calculations of the national carbon budgets and proposed methods to further calculate the local carbon budget, for Romania the total calculated value summing up to 675 Mt of CO_2 until 2100.

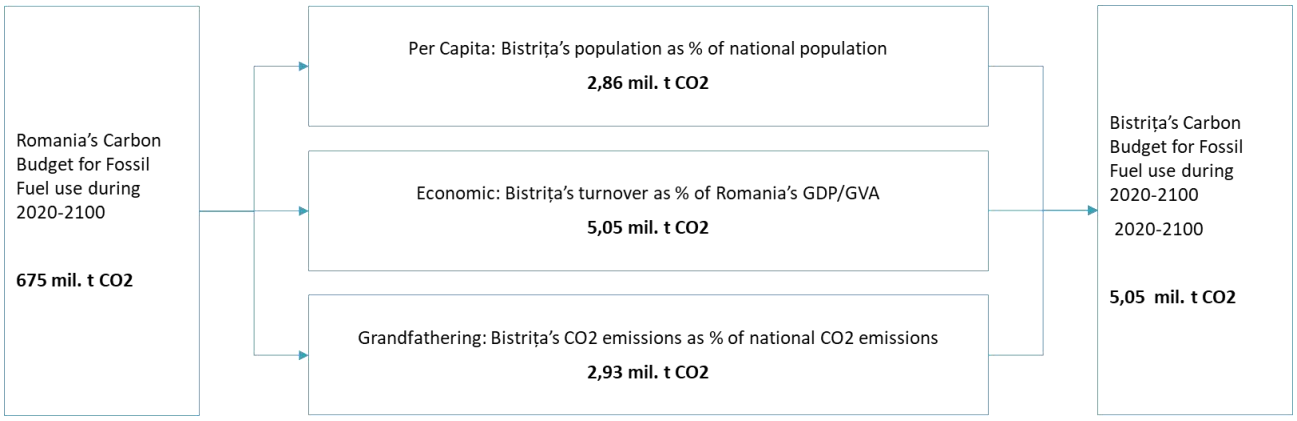
FIGURE 8 REMAINING CARBON BUDGETS AT GLOBAL LEVEL, FOR ROMANIA AND BISTRITA, 2020



[2] Anderson et al, A factor of two: how the mitigation plans of 'climate progressive' nations fall far short of Paris-compliant pathways, 2020.
https://www.tandfonline.com/doi/full/10.1080/14693062.2020.1728209?scroll=top&needAccess=true

For the sub-allocation of the Romanian carbon budget to Bistrita, a choice of approach needed to be made between the population-based, economic based or grandfathering methods depending on the availability of data.

FIGURE 9 BISTRITA'S CARBON BUDGET FOR 2020-2100



For 2020 the per-capita and economic carbon budgets, 2020 was the baseline year. For the two allocation measures a 6-year average between 2015 and 2020 (inclusive) datasets was used to calculate the carbon budget for the city.

A 5-6-year average would have been particularly important for the grandfathering allocation approach, which is more affected by factors such as weather (i.e. heating and cooling demand), important meteorological events etc. In Bistrita, CO_2 inventory calculations were previously done for 2008, 2012, 2014, 2018 and 2020, thus not enabling a consecutive 5-year average. For the calculation of the grandfathering method, Bistrita's 2020 CO_2 emissions as % of Romania's 2020 CO_2 emissions was calculated.

Population-based approach is not preferred as it only considers population size and doesn't consider carbon intensity or history of carbon activities. Moreover, the latest Population and Housing Census related data are expected to be made public earliest in late 2022, for the time being the calculus being based on statistically calculated data by the National Institute for Statistics.

For the purpose of this study the economic methodology was used as it represents the highest value of the 3 methods described by the Tyndall methodology, thus enabling the city to have a greater carbon budget and have the chance of fitting within it based on its current high CO2 levels. Moreover, choosing the economical method allows to approximate CO_2 emissions per NACE code, thus serving as a topic opener and discussion starter with the local companies in the future.

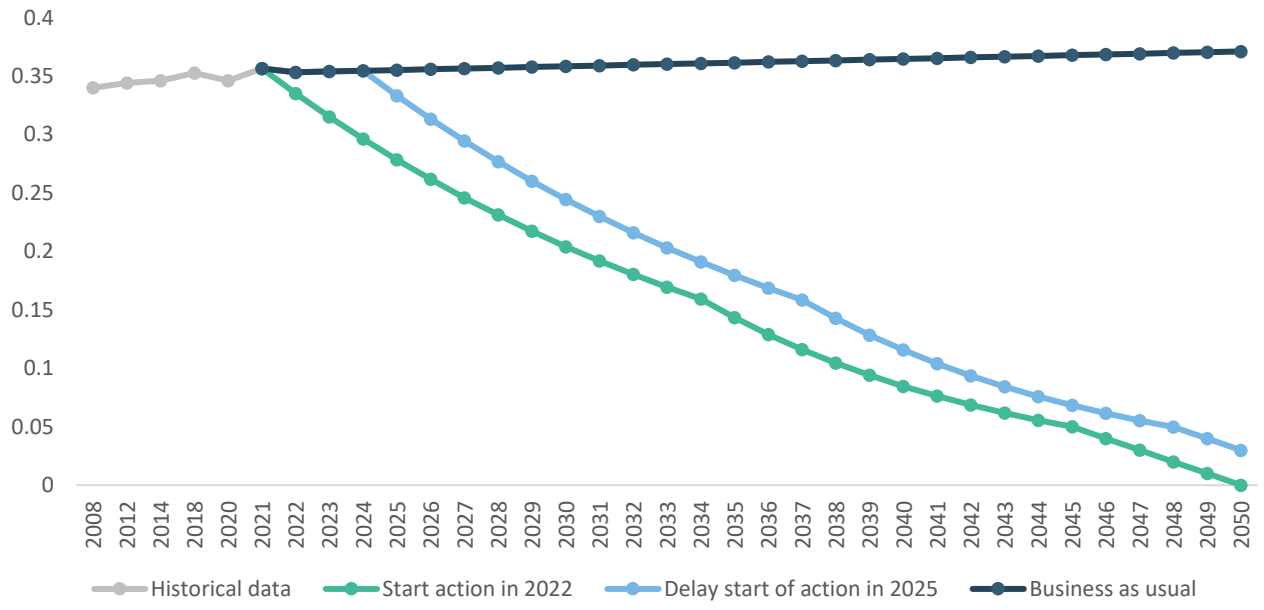
The results of the calculations for Bistrita's carbon budget are the following:

- Through the per capita method, a 0,423% weight in the national population data was calculated, which therefore led to 2.86 Mt of CO_2 left until the century's end;
- Through the economic method, GDP and GVA weights calculus resulted in 0,71% and 0,79% respectively, thus resulting in a 0.75% coefficient and the final output of 5,05 Mt of CO_2 emissions was calculated using GVA data;
- For the grandfathering method, available data from 2018 documents produced a weight of 0,30%, but in this matter the previous calculus for the GHG emissions was also done

through certain approximations, therefore the final result of 2.05 Mt of CO_2 is not a strongly dependable value.

The carbon budget is the total amount of fossil fuel generated carbon dioxide that Bistrita can release within the city from 2020 until the end of the 21st Century, amounting to 5.05 Mt. How the budget is used is a policy decision depending on the pathway for transition to low carbon. Doing so entails the trade-offs between using more of the budget in the near term and having less of it available in subsequent years. The figure below gives an illustration of possible scenarios for Bistrita's carbon budget expenditure scenarios.

FIGURE 10 BISTRITA CARBON BUDGET USE SCENARIOS (MT OF CO_2 EMMITED PER YEAR)



The figure above gives not only the evolution of Bistrita's emissions starting with 2008, but also indicates the ambition set by the convention of mayors of reducing 40% of its CO_2 emissions by 2030 in the best outcome scenario and the differences between currently started, delayed and no actions models:

- The grey line indicates data collected by the municipality between 2008 and 2020 for its CO2 emissions.
- The navy line indicates the business-as-usual scenario, in which no action towards GHG emissions reduction is taken, thus considering the last 3 available years growth rate and resulting in a continuous increase of CO_2 emissions. Also, in this scenario, Bistrita is estimated to consume its carbon budget by 2033.
- The green line (best outcome scenario) indicates the evolution of Bistrita's CO_2 emissions in the case of immediate implementation of its actions towards reducing CO_2 emissions by 40% until 2030, and achieving climate neutrality by 2050. For this calculus, a 6% annual decrease in CO_2 emissions was proposed between 2022 and 2030 as to give the opportunity for pilot actions to be implemented and tested while keeping in mind the 2030 target, and after 2032 a linear more rapid decrease was assumed towards 2050 climate neutrality. By comparison, this path concludes with 0.81 Mt less CO_2 emissions between 2020 and 2030 than the business-as-usual scenario.

- The light blue line indicates the same proportional decrease of CO_2 emissions as the best outcome scenario, but with a 3-year delay. This therefore translates to failure of meeting the municipality's goals set for 2030 and 2050, while also concluding with the consumption of Bistrita's carbon budget in 2041.

The carbon budget is used to follow up and steer progress towards the local, national and global targets. Without meeting these targets Bistrita is driving apart from the EU climate neutrality objective. Moreover, as the carbon neutrality can be easily understood by teenagers as a quality-of-life indicator, Bistrita's failure to meet this climate neutrality target may have consequences related to the disadvantages that come along with not undertaking GHG reducing actions, such as an increase in youth migration.

The higher aim of this study is to provide an action plan with measurable actions that can be tracked in order to oversee the climate related problems Bistrita is facing and enforce taking actions. The urgency of actions is represented via the carbon budget. As depicted in the calculus above, the municipality has little time to delay its actions if it strives to achieve climate neutrality by 2050 and not consume its carbon budget until then. Understanding the carbon budget and the urgency of the climate related actions Bistrita had to understand the local context, the local drivers of CO_2 emissions and thus create the action plan in order to meet its targets.

1.5. Intervention of the IAP

1.5.1. IAP strategic vision

The long-term vision for Bistrita is to become a "zero carbon city" by 2050 through intelligent use of energy resources in order to have a low energy consumption and, at the same time, a high level of quality of life.

The municipality wants the 3 tags: "zero carbon city" / "climate neutrality" / "city carbon budget" and the related best practices to become a priority area in the administration's communication policies with the general public and in its relations with the citizens.

1.5.2. IAP strategic objectives

Bistrita shall focus on 3 main objectives in order to achieve its vision of becoming a climate-neutral city:

- **O1. Increased capacity and involvement of local actors to prevent and mitigate the effects of climate change**

This objective focuses on the governance of the actions set within Bistrita's IAP and on the increase of local stakeholders' awareness and involvement in delivering projects together with the municipality in order to achieve climate neutrality.

- **O2. Data-driven local public decisions and policies, by relying on indicators and targets based on the carbon budget**

This objective refers to identifying a set of specific indicators and the continuous monitoring of these indicators throughout the implementation of the IAP. This process will assist decision making and policy creation at local level.

- **O3. Reduce carbon emissions in priority sectors and increase the city's resilience to climate change**

This objective implies a horizontal approach, with green and sustainable development as a cross-cutting principle in all future actions implemented or designed. Therefore, identifying and prioritizing synergies between low-carbon actions and urban development projects will enable the systematic monitoring of the final target (climate neutrality).

1.6. Main areas of intervention

Bistrita municipality has an important role to play in combating climate change, the role of setting an example in the community by adopting policies and plans to achieve change, encouraging and supporting the community and its partners to take action, to lobby and to push for change in policy, legislation and funding in order to achieve climate neutrality. A total of 9 priority areas have been identified, each area having a set of ambitious targets that will lead to achieving the climate neutrality goal in 2050.

- **O1. Increased capacity and involvement of local actors to prevent and mitigate the effects of climate change**
  - Citizens and stakeholders' involvement;
  - Local administrative capacity.
- **O2. Data-driven local public decisions and policies, by relying on indicators and targets based on the carbon budget**
  - Data collection, monitoring and evaluation
- **O3. Reduce carbon emissions in priority sectors and increase the city's resilience to climate change**
  - Energy efficiency (buildings and public lighting);
  - Transport;
  - Energy production;
  - Environment and biodiversity;
  - Spatial planning;
  - Complementary actions (waste management, water management etc.).

Citizens and stakeholders' involvement

The actions proposed in the IAP aim to promote events and trainings throughout the community in order to improve the level of information citizens receive and increase their participation in local decision-making on topics related to environmental protection, climate change, sustainability and energy issues.

Actions will be implemented taking into account the critical points and difficulties the municipality has observed over the years in regard to effective participation. The access to scientific information will allow a broader perspective over the sustainable environmental development principles,

enabling citizens to become more aware of irrational use of energy and to correct their consumption habits accordingly.

Moreover, the municipality will develop a city database with CO_2 emissions from all sectors in order to carefully monitor the situation in Bistrita for GHG reduction.

Administrative capacity.

The municipality will create and train a specialized team dedicated to monitoring the Climate Neutrality Action Plan of Bistrița and carrying out activities on topics related to environmental protection, climate change, sustainable development and energy issues. Also, the team will be responsible of creating, editing and publishing the detailed annual database of the CO_2 emissions from all sectors. Nonetheless, the team will be coordinated by a dedicated sustainable energy manager (new position within the City Hall), whose responsibilities will involve not only management of the team, but also the coordination with other departments and projects related to the IAP target.

In order to create the database, the team dedicated to energy management will carry out a series of partnerships and events to attract partners from Bistrita in order to monitor and implement the Action Plan.

Data collection, monitoring and evaluation

The energy management team will be responsible of conducting necessary activities to collect, monitor and evaluate energy consumption and CO_2 emissions within the city. For this purpose, the team's aim is to build up partnerships and increase data coverage and availability, transparency and participative governance being set as standards in managing the implementation of the IAP. The team's work will be vital for substantiating local public policies and the decision-making process within the city hall.

Energy efficiency (buildings and public lighting)

As one of the sectors with the highest CO_2 emissions in Bistrita, the buildings stock presents one of the highest potentials for energy saving actions. In this area, the measures to improve energy efficiency will address both new and existing buildings. Specifically, the measures to be taken for new buildings will aim to increase the number of energy-efficient buildings, while the measures to be taken for existing buildings refer to a larger and more diversified number of interventions designed to meet the requirements of different categories of buildings: public, commercial, social and private housing, hospitals, schools, etc.

Unlike the residential sector where the natural gas is the most widely used source of energy, the tertiary sector specifically uses the largest amount of electricity, which clearly proves the high potential of actions to renew and/or improve heating and lighting systems. The introduction of innovative building automation systems will be a necessity in order to optimize the management of heating and air conditioning systems.

Transport

The city administration intends to promote important actions in order to improve mobility and access to Bistrita by expanding and increasing the quality of public transport and developing the infrastructure for bikes and pedestrians. These actions will be implemented not only as a solution

for reducing GHG emissions, but also will seek to improve the safety and efficiency of non-motorized mobility throughout the city and encourage citizens to change their habits in favour of sustainable means of transport.

Energy production

In addition to the already considerable environmental benefits, the exploitation of renewable energy sources (RES) allows the efficient reduction of greenhouse gas emissions. Consequently, there is a strong need to implement local energy policies in order to encourage and increase the use of available energy from local renewable sources.

The critical factor in this regard is the limited availability of appropriate land areas available for the production of energy from renewable sources. The potential for ground installation of solar and wind systems of any kind is limited, but the major potential for capitalization of solar energy in Bistrita is the installation of such systems on artificial structures or roofs.

Environment and biodiversity

The municipality will monitor and constantly seek to identify within the city areas which can increase the speed of climate changes, such as heat islands, weather data, availability of water resources and overcrowding or air pollution.

The main focus in this matter will be to monitor environmental factors and prevent any natural or artificial pollution while ensuring an appropriate development, conservation and regeneration of biodiversity (native, non-invasive species, which should lead to the establishment of natural ecosystems). For this purpose, increasing areas of green urban spaces and the number of trees will be vital, as these actions help convert CO_2 and create an eco-friendlier environment.

Spatial planning

The municipality will go through a rigorous assessment of the areas with deficient green spaces in order to extend its planted areas and parks so that there is at least one park within a maximum radius of one km away from any house. These green spaces will be complementary with new planted or green patches in industrial and service areas so that the potential for natural CO_2 conversion will be maximized.

These actions will take place according to all existing strategic documents at the municipal level, which in turn will be updated beforehand in line with the latest objectives of the public administration set by the present document.

Complementary actions

Waste management | The total waste collected in recent years by the public authorities from the city grew constantly until it reached in 2020 over 22.000 tonnes or a total of 236 kg per inhabitant. Besides these record numbers, only about 12% of the collected waste have been recycled or capitalized, therefore the authorities needed to store a lot more waste which on the long run conducts to higher GHG emissions. In this regard the municipality aims to conduct more campaigns to raise awareness about selective collection, recycling and waste reuse. Besides this, throughout the city “ecological islands” with special collection bins will be constructed as the municipality’s main goal is to accelerate its transition to circular economy.

Water management | Bistrita municipality aims to extend its water and sewer infrastructure in order to give access to all inhabitants to running tap water and also ensure a proper unloading of meteoric water from the network. This in term will ensure a safer environment for citizens as it reduces the risk of floods and increases the safety that people use in their homes.

Chapter 2. Integrated action plan (IAP)

1.7. Large scale actions for decreasing the impact of climate change

To prioritize resources, the plan was divided into short, medium and long-term actions (2025, 2035 and 2050 respectively). The impact on CO_2 emission levels will be estimated for each project during the development phase of each intervention, which will require continuous commitment and effort. At this stage, it has not been possible to fully quantify the impact of CO_2 emissions of each action included in the plan, therefore the 2020 shares of CO_2 emitted values by sector were used as a proxy to distribute the remaining carbon budget between the proposed measures (where feasible).

Obj	Action	Type	Timeline	Budget (mil EUR)	Responsible
O1	**Citizens and stakeholders' involvement**				
	Organize campaigns on how to reduce CO_2 emissions (promoting travel by public transport, cycling or walking) - SSA	short-term	2025	1.5	BM, PE
	Organize community level contests for energy reduction solutions and results	medium-term	2030	0.5	BM
	Increase media coverage of Bistriţa Municipality's actions aimed towards achieving climate neutrality	short-term	2025	1.5	BM
	Implement CO_2 emissions monitoring systems and sustainability strategies in local companies	medium-term	2030	1	PE
	Implementation of tax exemptions for private and legal entities when installing electricity production facilities from renewable resources	short-term	2025	-	BM
	Organize competitions / awards for companies active in reducing energy consumption and sustainability	medium-term	2030	1	BM
	Create a public platform for monitoring municipal energy consumption and climate neutrality targets (carbon budget)	medium-term	2030	0.2	PE, BM

	Propose an online & offline guide for local actors with actions to reduce energy consumption and CO_2 emissions		medium-term	2030	0.05	BM
	Involve pupils and students in activities and projects (incl. research) on sustainability issues		medium-term	2030	1	PE, schools, universities
	Administrative capacity					
	Development of an energy management team at city level		medium-term	2035	2	BM
	Hire an energy management specialist to lead the team responsible for implementing the IAP for Bistrita		short-term	2025	0.5	BM
O2	**Data collection, monitoring and evaluation**					
	Implement air quality monitoring systems in administrative buildings		short-term	2025	1.3	BM
	Develop a municipal database on CO_2 emissions in all sectors		short-term	2025	0.5	BM, PE
	Carry out regular evaluations and reports in order to monitor the implementation of the Action Plan		long-term	2050	0.3	BM
	Develop partnerships for the expansion of the municipal database on energy consumption (service providers, private environment, etc.)		long-term	2050	-	BM
O3	**Energy efficiency (buildings and lightning)** – 64.4% of the city carbon budget					
	Long-term renovation of the public buildings stock in Bistrita - 127 buildings (124,551 m2)	55	long-term	2030	85	BM
		44		2040		
		28		2050		
	Increase energy efficiency of 357 blocks of flats in Bistriţa built before 1990	150	long-term	2030	120	BM, OA
		130		2040		
		77		2050		
	Implement nature-inspired solutions in building's construction (green facade / green garden, green roofs)		long-term	2050	2	BM, OA
	Increase energy efficiency and smart energy management in public lighting infrastructure		medium-term	2030	12	BM
	Transport – 30.2% of the city carbon budget					

	Replacement of the administrative current car park with electric cars	long-term	2040	5	BM
	Purchase of low-polluting / electric urban buses	medium term	2030	20	BM, PTC
	Implementing a "green line" public transport	short-term	2023	14	BM, PTC
	Integrating a centralized dispatching unit for the public transport	short-term	2022	5	BM, PTC
	Construction of park&ride facilities in the north-east and south-west areas of the city	short-term	2025	4	BM
	Reorganizing traffic priority in order to facilitate public transport on the main transport routes	short-term	2025	2	BM, PTC
	Implementing a metropolitan train for daily commuters to the city	medium term	2030	30	BM, CFR
	Development of the cycling and pedestrian infrastructure in Bistrita	medium term	2030	10	BM
	Construction of an alternative route for transit vehicles	medium term	2035	116	BM, CNAIR
	Implementing a free bike-sharing system at municipal level	medium term	2030	5	BM
	Replacement of traffic lights with roundabouts on main streets within the city	medium term	2030		BM
	Integrate photovoltaic panels as power supply for road signaling systems	short-term	2025	5	BM
	Reducing vehicle access in the historic center, except for electric vehicles	long-term	2050	-	BM
	Construction of an underground road passage between Garii and and Tarpiului streets for improved mobility	medium term	2030	5	BM
	Implementing an air quality monitoring system on main roads within the city	short-term	2025	2	BM
	Energy production				
	Construction of a solar power plant for electricity production	medium term	2035	1	PE
	Installation of solar panels on residential buildings for the production of electricity	long-term	2050	40	BM, PE

	from renewable sources (capacities up to 10 kw)				
	Construction of electricity or heat micro-power plants from bio-mass / bio-gas resources (recycled organic / vegetable waste) within Bistrita's neighborhoods	long-term	2040	2	BM, PE
	Construction of a power plant using the biogas from the wastewater treatment plant	medium term	2030	0.5	BM
	Environment and biodiversity				
	Rehabilitation of the 2 contaminated sites in Bistrita (thermal production plant and slag heap)	medium term	2030	5	BM
	Study for the identification and transformation of the city areas which currently support climate change (heat islands, meteorological data, availability of water resources and population agglomeration from specific areas)	short-term	2025	0.5	BM
	Regulation of tree species to be planted in order to maximize pollution resistance and ensure biodiversity conservation and regeneration	short-term	2025		BM
	Regeneration of public urban spaces (organizing green spaces, planting trees, urban furniture etc.)	medium term	2030	10	BM, PE
	Annual campaigns for tree planting	long-term	2050	0.5	BM, PE, OA, citizens
	Elaboration of the local biodiversity audit	short-term	2025	0.1	BM
	Organize green spaces (including trees' planting) along main streets	medium term	2030	0.5	BM, citizens
	Development of a dendrological park	medium term	2030	1.2	BM
	Development of Codrișor urban forest and connections between the main green urban spaces	medium term	2030	2	BM
	Afforestation and slope stabilization works in landslide-prone areas	medium term	2030	2	
	Organizing ecological corridors - landscaping river valleys (tributaries of the Bistrița river and Bistrita river itself)	medium term	2030	11	

	and carrying out hydrotechnical works (reduce flood risk)				
	Spatial planning				
	Elaboration of the medium- and long-term strategy for the development of green spaces	short-term	2025	0.1	BM
	Continuous development of the green areas within the city	short-term	2025	10	BM
	Development of green protective areas around industrial and services areas	short-term	2025	5	BM
	Update the General City Plan (PUG) and urban database according to "climate neutrality" principles and goals	short-term	2025	0.5	BM
	Complementary actions – 5.4% of the city carbon budget				
	Organize campaigns to promote selective waste collection, recycling and reuse	short-term	2025	2	BM
	Development of "ecological islands" in Bistrita municipality (for the selective collection of waste)	medium term	2030	10	BM
	Development of the processing capabilities of the municipal waste system	medium term	2030	15	BM
	Implement a system for unloading rainwater from social housing areas	short-term	2025	5	BM
	Expand the running water and sewer networks in the missing city areas	short-term	2025	5	BM
	*Bistrița Municipality (BM) *Owners' associations (OA) *Public transport company (PTC) *Public Railroad Company (CFR) *National Road Infrastructure Management Company (CNAIR) *Private entities (PE)				

In reference to the remaining carbon budget for the city, the building sector will continue to consume the largest part of the budget as interventions in this domain require time and high financial support in order to be implemented. Alongside it, transport will be the next biggest budget consumer for Bistrita, as the population's behaviour may only change over a broad period of time. Therefore, the annual levels of emitted CO_2 in Bistrita will decrease slowly in the next 10 to 15 years, while still consuming significant shares of the remaining carbon budget.

FIGURE 11 DISTRIBUTION PLAN OF THE REMAINING CARBON BUDGET FOR BISTRITA

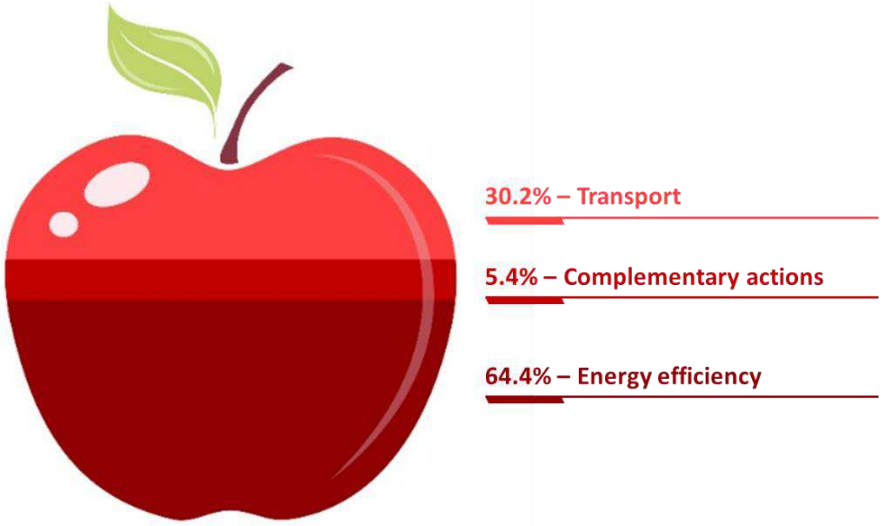
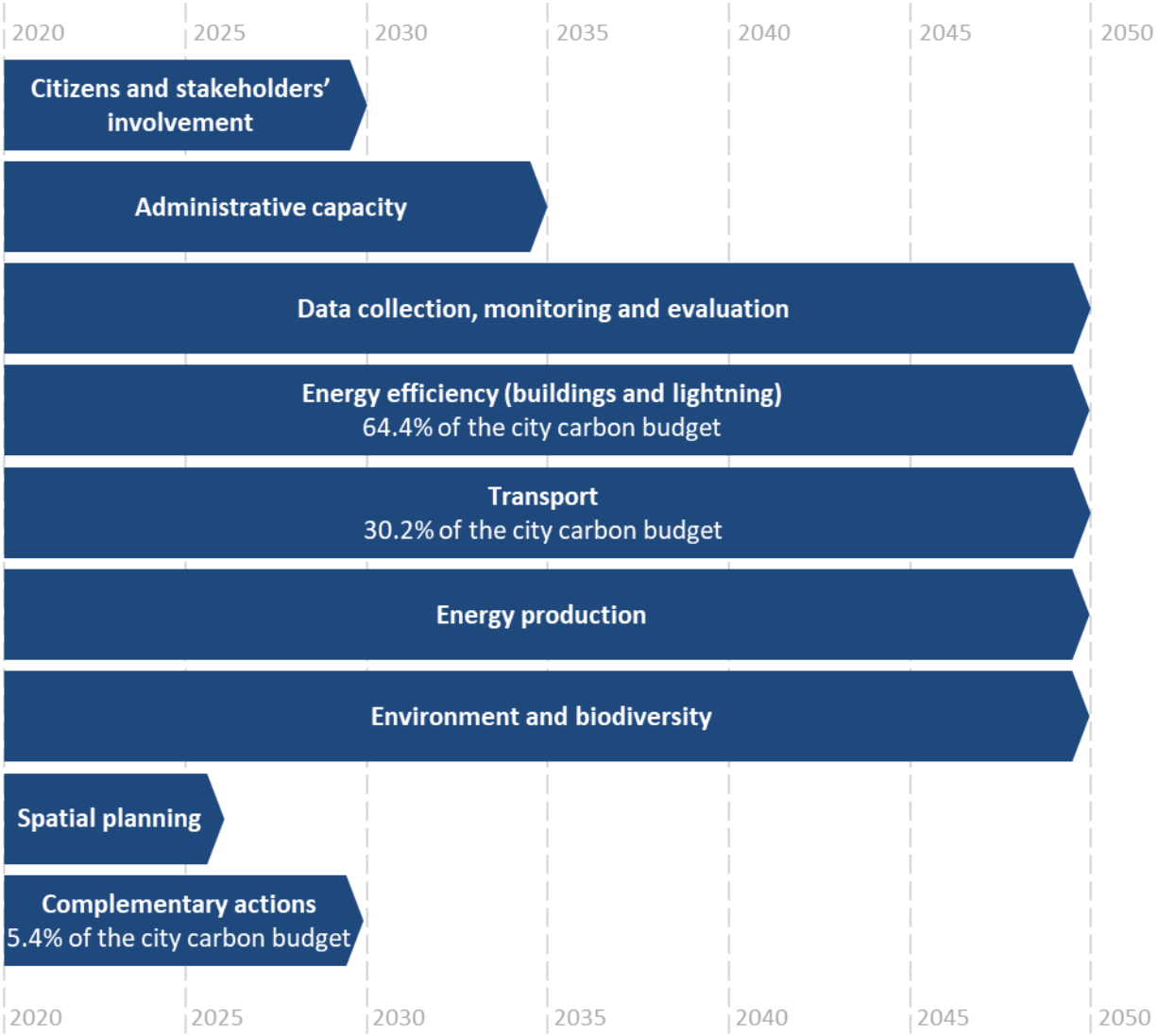


FIGURE 12 GANTT CHART FOR LARGE SCALE ACTION SECTORS



1.8. Indicators

In order to monitor the implementation of the IAP, the municipality can rely at the moment on existing data within the City Hall, on provided data by utility distributors and the air pollution monitoring sensors located within the city. For consistency, the local administration can start monitoring the implementation of the present plan using the following list of indicators:

Class of indicator	Indicator	2020	Target
Energy consumption by sector (MWh)	Energy consumption in residential buildings	481,233	240,617
	Energy consumption in public buildings	19,576	9,788
	Energy consumption in transport	402,679	201,339
	Energy consumption in industry	646,264	323,132
	Energy consumption in public lightning	3,279	1,640
	Energy consumption in water management	5,355	2,677
Energy production	% of renewable energy from the total energy distributed by the main gas provider	44	100
	% of renewable energy from the total energy distributed by the main electricity provider	31	100
	Houses with renewable energy production systems	0	8,000
	Number of local renewable energy production powerplants	0	1
CO_2 conversion	Number of trees within the city	-	10,000
Buildings	Public buildings with improved thermal efficiency (over 50%)	0	127
	Collective housing buildings with improved thermal efficiency (over 50%)	130	487
Transport	Share of non-polluting vehicles in the public transport fleet	0	100
	Share of non-polluting vehicles in the municipal transport fleet	0	100

1.9. Small Scale Actions – SSA

Small scale actions provide an excellent tool for climate goal communication and citizen engagement in Bistrita.

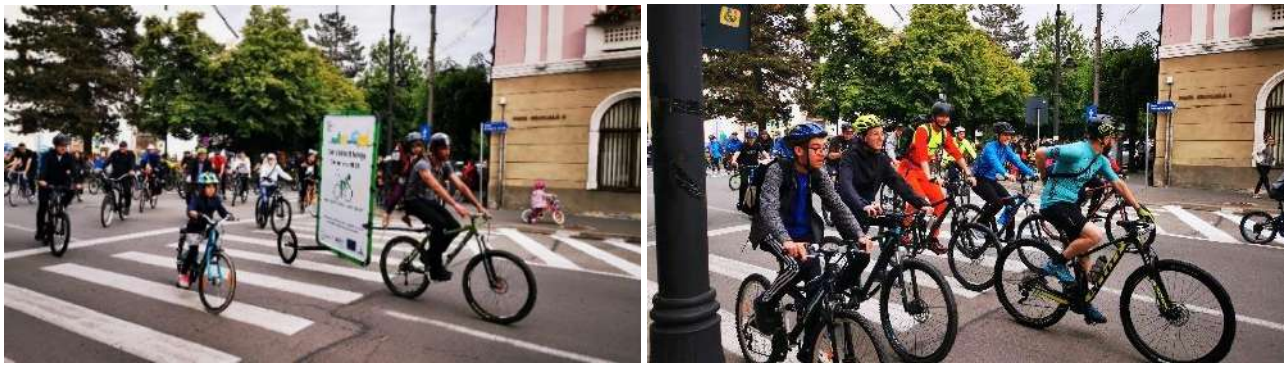
Despite the fact that the projects listed in the previous sub-chapters are the most impactful and are laying the foundation for Bistrita to reach the climate neutrality goal, Bistrita's experience is that of small-scale actions (SSA) which help to increase awareness about the topic and to engage citizens directly in the matters of climate change mitigation, will help reach the goals more easily.

One Small-Scale Action within the ZCC project which was carried out by the Municipality of Bistrita refers to a "Sustainable Urban Mobility Campaign", through which citizens are encouraged to use

sustainable alternative means of transport and to foster cycling culture. Also, the municipality is concerned with protecting the environment, reducing CO_2, thus carrying out in the framework of the SSA a series of education, information and awareness actions.

A first activity was the **Zero Carbon Bike tour** - that took place on June 3, 2021. The objective was to promote an ecological transport behaviour, a neutral urban environment in terms of carbon emissions, to provide citizens with access to zero-carbon urban transport but also to promote the project and its objectives.

FIGURE 13 ZERO CARBON BIKE TOUR



This cycling tour was attended by about 150 people, who cycled through the streets of the city, on a predetermined route, smiling and pedalling together, for a green city, with zero carbon emissions, with cleaner air, less polluted.

Another activity involved the volunteers from the Hight school of art - they made a mural painting on the courtyard wall of one of Bistrita s Kindergarten, with the role of promoting the concept of "Zero Carbon Cities" among young children. Through artistic painting the pre-schoolers learn in a fun way more about the sustainable means of transport and the air pollution.

Under the title "Fun games of intelligent mobility" and in collaboration with one of our ULG member- the Public Health Department-, pre-schoolers also learned through games about eco-friendly means of travel, but also about those that pollute the air of cities.

FIGURE 14 MURAL PAINTING FOR PROMOTING ZERO CARBON CITIES

The children were receptive to the importance of keeping the air clean in the city and expressed their joy in walking or using the bicycle when they come to kindergarten, respectively in using the train and the bus on family trips.

During 27th and 28th of September 2021, about 200 students from the primary schools in Bistrița participated in traffic safety lesson. We know that children like to walk or ride their bikes, because it allows them to gain experience, to gain autonomy as they develop, but at the same time, both they and their parents want to feel safe in traffic. Thus, in order to refresh their knowledge regarding traveling in traffic as pedestrians, cyclists, bus users or as passengers in family cars, students from different schools in Bistrita participated in interactive road safety lessons under the careful guidance of the representatives from the specialized departments of the Police Inspectorate.

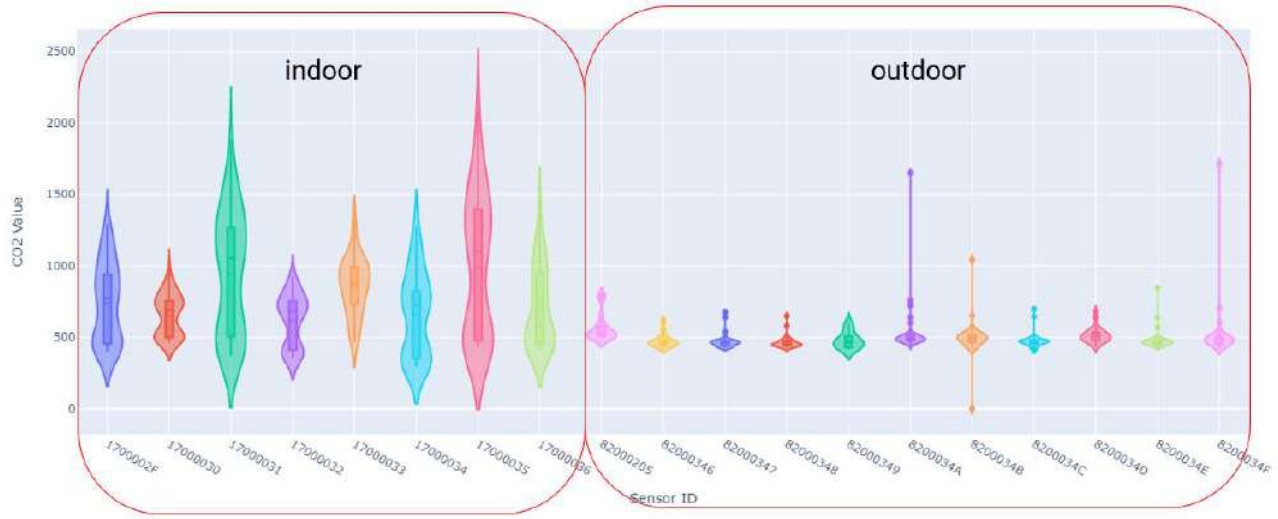
FIGURE 15 PUPILS FROM PRIMARY SCHOOL DURING TRAFFIC SAFETY LESSONS

Also, as people become more responsible and more aware when they have access to transparent, real-time data, Bistrita continued their campaign with the purchase and installation of 18 air pollution sensors, set outdoor in traffic areas of the city, but also indoor, in a few schools. The data from the sensors will be available on mobile application and also on a specific online platform, so each member of the community can be involved in monitoring air quality. Having this data people and students understand the cause and effect of becoming themselves part of the mechanism for combating pollution through individual consumption decisions: transport, energy, expenses, products with harmful impact etc.

FIGURE 16 LOCATION OF THE AIR QUALITY MONITORING SENSORS IN BISTRIȚA

As for results of the air pollution monitoring sensors, the present data shows that CO_2 levels (registered in ppm) registered by indoor sensors have reached higher values (highest value of 2500 ppm) probably due to the lack of proper ventilation of work spaces. Outdoor sensors show a median level of 500 ppm of CO_2, with some higher concentrations in the city centre due to high social and economic activity and intensive use of personal automobiles (peaks of over 1500 ppm). The CO_2 registered levels vary show seasonality, due to meteorological conditions, but also night-day fluctuations, dependent of the activity within the city.

FIGURE 17 QUANTITATIVE ANALYSIS OF CO_2 VALUES DISTRIBUTION IN BISTRITA FOR THE AIR POLLUTION MONITORING SENSORS



The municipality hopes that such activities will resonate among the citizens and contribute, through small gestures, to the transition towards "Bistrita, Zero Carbon City".

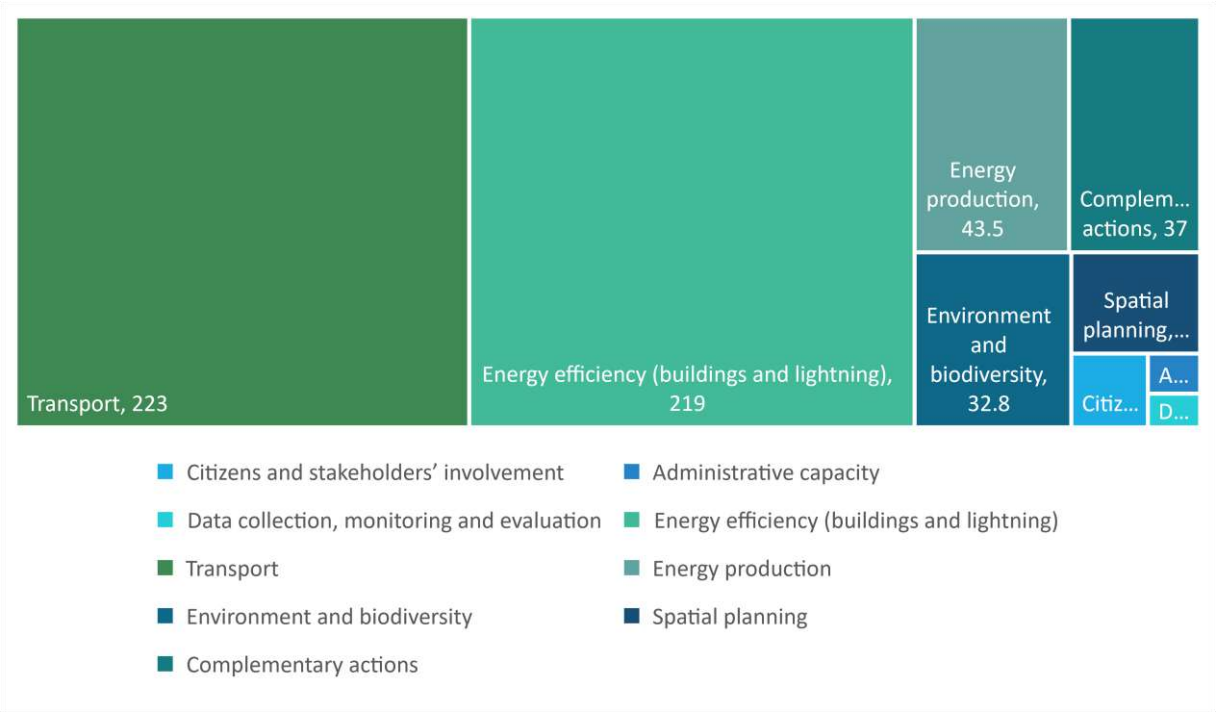
In the implementation of the SSA, Bistrita municipality has taken into account the gender equality principle. It is also worth mentioning that in the SSA activities all age groups were involved. For example, the youngest participant in the organised bike tour was just 4 years old. He accompanied his father on a bicycle specially equipped for this event.

1.10. Resources

Bistrita Municipality is set to develop a core team (Energy Management Team), with a specialised coordinator, who will be responsible for implementing the projects proposed through the present IAP. Nonetheless, they will have to plan in advance all relevant activities, including the search and onboarding of new stakeholders from the city area in order to increase the projects' impact. Furthermore, the team will have to coordinate with other departments within the municipality so that proper funding and results are achieved.

The total estimated cost for Bistrita to reach climate neutrality based on the list of actions is approximately 582 million EUR. Largest investment goals are set in the mobility sector, with total investment need of over 223 million EUR, and for energy efficiency, with 219 million EUR, these sectors being the most urgent to tackle. The size of the overall investment needs per sectors can be visualised on the chart below.

FIGURE 18 FINANCIAL RESOURCES FOR IAP BISTRITA



Also, the chart below presents an easy-to-understand picture of the possible financing opportunities for Bistrita from multiple sources (and for multiple stakeholders). In addition to the national operational programs or funds under direct European management, the actions can be financed from the national budget, the local budget, private funds and/or other sources, such as loans, crowdfunding etc.

FIGURE 19 CHART OF AVAILABLE FINANCINNG OOPORTUNITIES FOR CITIES[3]

Shared management funds	European Funding Programmes	Technical assistance and advisory support	Financial Institutions Instruments	Alternative Financing Schemes	Government funds
Cohesion Fund	Connecting Europe Facility	Eeef TA	Municipal loans	Citizen Cooperatives	Environmental Fund Administration
EAFRD	EREFM	InvestEU Advisory Hub	InvestEU Fund	Crowdfunding	Modernization fund
EMFAF	Horizon Europe	Just Transition Platform	Public Sector Loan Facility	Energy Performance Contracting (EPC)	ELECTRIC-UP Grants
ERDF	Innovation Fund	LIFE Technical Assistance Projects		Green municipal bonds	Urban Microenterprises
ESF+	LIFE			On-bill-financing	Urban Enterprises
Just Transition Fund	Territorial Cooperation			Revolving loan funds	
	URBACT			Soft loans, guarantees	
	National recovery and resilience plan				

At regional level, the Municipality has already focused on attracting funding through the North-West Operational Programme, which is one of the main investment guidance documents in the North-West Development Region and, implicitly, in Bistrița-Năsăud County and Bistrița, for

[3] https://www.covenantofmayors.eu/support/funding.html

2021-2027 period. Out of the main priorities of the programme, 3 of them present the opportunity for the city to fund its actions in the coming period:

- PO2: A greener Europe, transition to a carbon-free and more resilient economy by promoting a clean and fair energy transition, green and blue investments, the circular economy, climate change mitigation and adaptation, risk prevention and management and also sustainable urban mobility.
- PO3: A more connected Europe, through the development of mobility
- PO5: A Europe closer to its citizens by promoting the sustainable and integrated development of all types of territories and local initiatives.

Other sources of funding for projects of the local administration and other stakeholders may rely on:

- Funding provided by national governmental programs - Environmental Administration Fund (AFM)

It is a public fund which supports financing for 26 categories of national projects and programs in order to develop Romania's sustainable development. The areas in which AFM finances projects are: clean transport, renewable energy in buildings, green spaces, energy efficient appliances, public lighting etc.

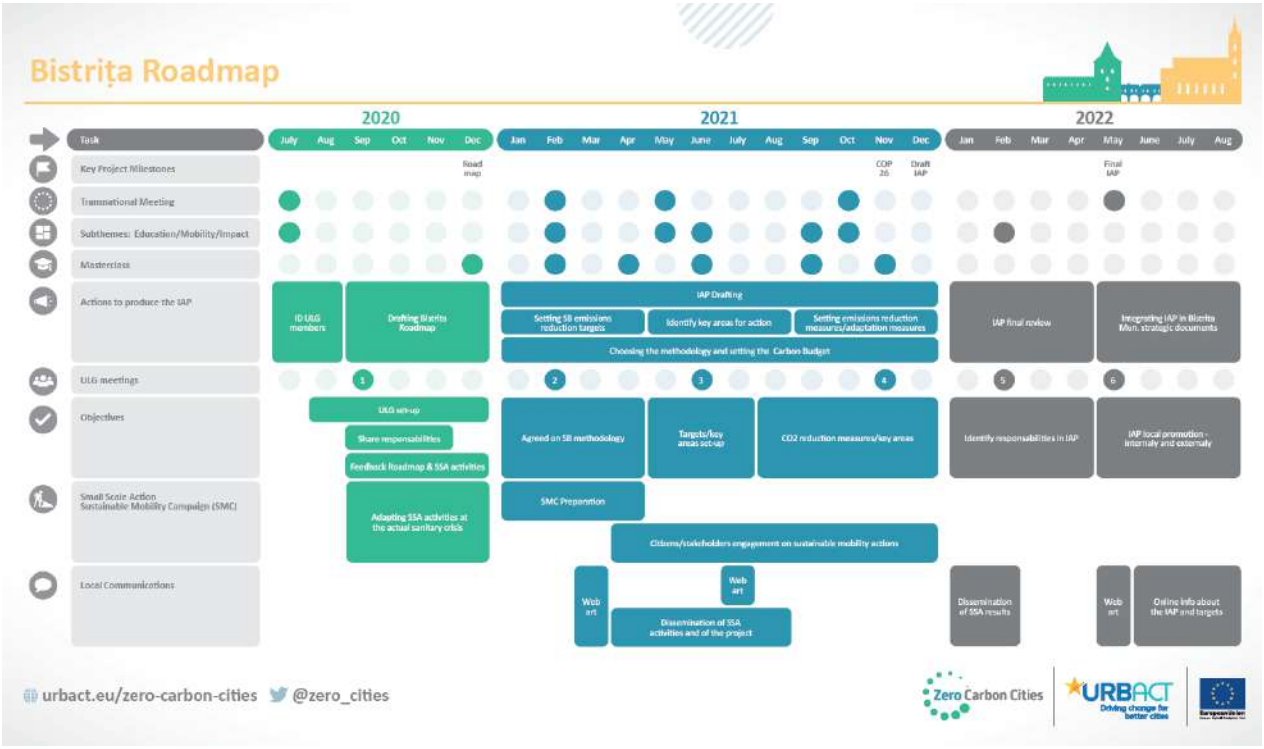
- Funding provided by local funds
    - Annual program of non-refundable financing from the local budget – Funding for non-profit activities in the fields such as youth, sports, education, environmental protection, interdisciplinary, social and culture (according to Law 350/2005 on the Regime of non-refundable financing).
    - Participatory budgeting – Democratic deliberation and decision-making process, in which citizens decide to allocate part of the local budget to certain projects proposed by people from the community. This process allows citizens to identify, discuss and prioritize public investment projects on an online budgeting platform. The areas of interest for these projects are diverse, such as:
        - Pedestrian areas, green spaces, alleys, sidewalks, playgrounds for children, pedestrian street lighting in residential areas, "smart" urban furniture, trees planting.
        - "Green" facades and roofs;
        - Equipment and infrastructure for resilience to climate change, environmental changes.

1.11. Framework for delivery

1.11.1. Process description

The ZCC project represents for Bistrita the foundation for its future focus on reducing the effects of climate change. The methodology used in calculating the available carbon budget until the end of the 21st century has underlined through a scientific method the urgency for GHG reduction actions, as the current activities in the city depict that its carbon budget will be expended even before 2050 if local stakeholders don’t take action on this matter. The proposed methodology allowed for a fair approximation of Bistrita’s carbon budget even if the municipality is facing a scarcity of relevant CO_2 emissions data.

FIGURE 20 BISTRITA ROADMAP DURING THE ZCC PROJECT

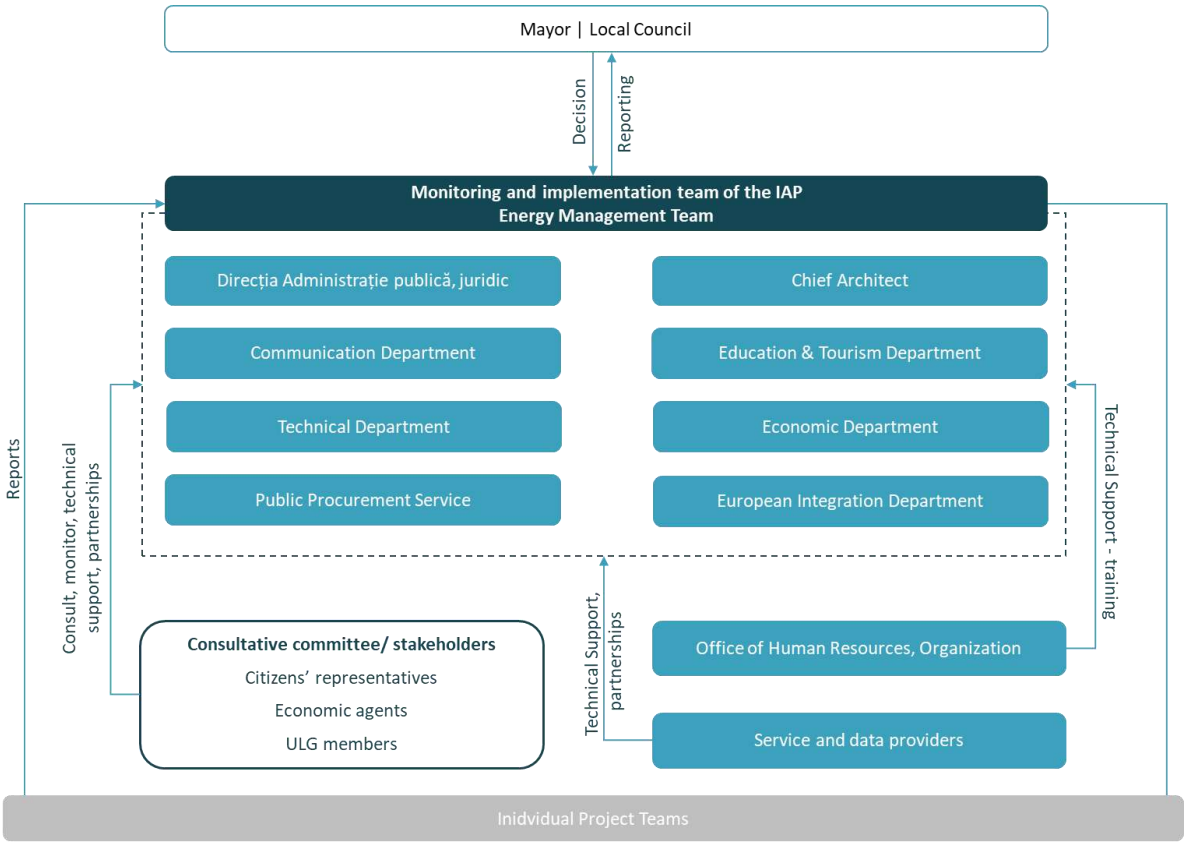


As a result of the calculations, Bistrita needs to focus immediately on implementing actions in order to avoid consuming its carbon budget. This implies that the Urban Local Group needs to acquire new members, both public and private, who can cooperate on following the present plan thoroughly so that long-term actions have enough time to be addressed. Nonetheless, the small-scale actions already implemented showed positive feedback from the community and other entities, therefore as the plan is progressing there is a high chance of successfully achieving the climate neutral target if further actions create the same impact at local level.

As perceived from the ZCC project, cooperation is the quintessential element for the success of the following actions. The sharing of knowledge and best practices within this project has helped the municipality understand not only the importance of future actions, but also the mechanisms through which it can engage stakeholders in delivering more innovative projects towards the final goal. The main idea of this plan needs to be presented also to the community in order to maximise the focus on carbon reduction, mitigation, adaptation and resilience.

The successful transition of the IAP from development to implementation poses a new series of challenges for the municipality and the local group as the document proposes an extensive portfolio of projects, setting the city's ambitions for 2050. Monitoring and evaluating the implementation of the strategy is extremely important in the project economy. This approach will be coordinated by the developed Energy Management Team, with the support of other departments from the City Hall, ULG members, economic agents and other citizens' representatives. The core team will be responsible for proposing, developing and delivering of IAP projects, while for each individual project separate teams may be organised (individual teams on projects comprising of representatives from multiple stakeholders).

FIGURE 21 IMPLEMENTATION AND MONITORING SCHEME FOR BISTRTITA'S IAP



1.11.2. ULG involvement

Bistrita's ULG group main members are the Environmental Protection Agency, the County Council, Babes-Bolyai University, County Water Management System, County Public Health department, ICPE Environment Cluster. They represent the core partners for the URBACT local group, but the member list expands continuously, so there are also involved: activist NGOs, schools, potential polluters etc. Important to mention is also the implication in this group of some municipal internal departments, such as: technical department, environmental compartment, project management department etc.

Even though the ULG currently compromises of many public bodies, the aim for further cooperation is to involve new members, especially from the private sector and the local community. The main ULG responsibilities shall be:

- Communicate, organize and participate in regular meetings: held at least once every 4-6 months;
- Active involvement in implementing Small-Scale Action (SSA) and Large-Scale Actions;
- Active involvement in IAP monitoring;
- Help the Energy Management Team update the IAP according to its progress;
- Establish further monitoring indicators.

Important to remark is the fact that through Small-Scale Actions, the project and its aim became more known throughout the community. So, as a result of the installation of the air quality monitoring sensors, a local college in Bistrita shown its interest to participate in the local project activities and so to be part of the stakeholders group. Even more, in this context, the municipality

received a request from another local high school, which benefits from the placement of an air quality monitoring sensor in a classroom, to conduct a study on the variation of related indicators, conducted over a period of at least 6 months. Also, because Bistrita's SSA – the "Sustainable Urban Mobility Campaign" – has been widely promoted throughout media and the activity had many participants, other stakeholders have already shown their interest to join the ULG group.

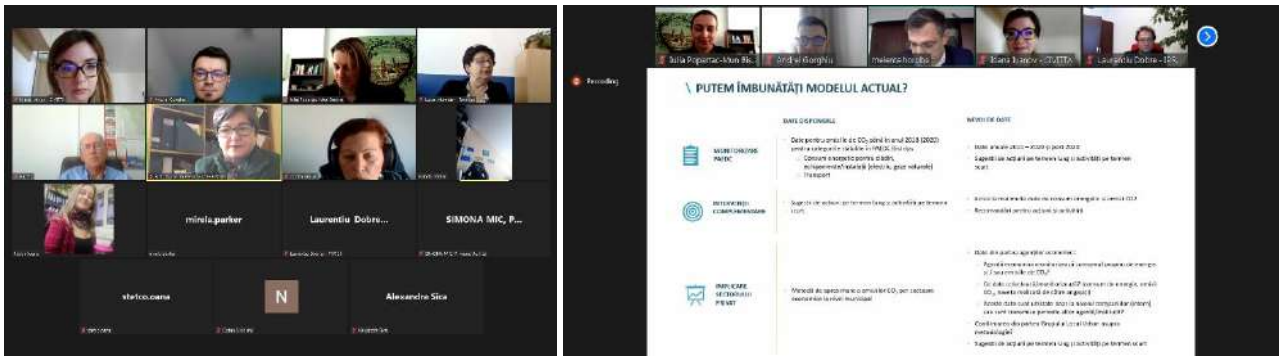
1.11.3. Horizontal approach

DIGITAL TRANSFORMATION| During the implementation of the ZCC project, the local administration has made use of the digital media opportunities in order to reach its ULG members, other interested stakeholders and the community. ULG meeting have been organised and conducted mainly using video-conferencing platforms (Zoom), while information related to the ZCC project and small-scale actions have been disseminated using social media (the municipality's page and Bistrita Green&Smart&Active page). Moreover, the local administration created a mobile app for viewing daily results of the air quality monitoring network set up during the project, while also allowing viewing access through the "uradmonitor.com" platform.

Nonetheless, further use of digital tools will ease the local administration's reach to other stakeholders and the city's population. As proposed in the large-scale actions above, campaigns will need to be further carried for raising public awareness on alternative mobility, reduction of energy consumption, selective collection and recycling of waste. While speaking to citizens during local events is certain to produce a small impact, using social media and other platforms will still be the core approach for spreading information. Moreover, the local administration plans to develop a platform where the implementation of the IAP may be monitored by the general public, thus strengthening trust between the city hall and the community.

FIGURE 22 POST EXAMPLES ON SOCIAL MEDIA FOR BISTRITA'S SMALL-SCALE ACTIONS DURING THE ZCC PROJECT

FIGURE 23 PRINT SCREENS FROM ONLINE ULG MEETINGS DURING THE IAP DEVELOPMENT



GENDER EQUALITY | Bistrita municipality knows, respects and has included in the Internal Regulations the provisions of the Labour Code regarding gender equality. The ethical principles promoted take into account personal autonomy, non-discrimination and equal opportunities in employment, while professional experience, specialization and specific knowledge are the only accepted principles in qualitative hierarchy. Respecting the principle of gender equality is a mandatory condition for achieving European standards, which also guides the municipality in carrying out its activities.

During the ZCC project this principle of gender equality has been integrated in both the design and implementation phase of the project. When forming the project team and ULG members' list, the principle of equal opportunities and treatment, including gender equality, was taken into account. The principle will be also further applied in the implementation phase of the IAP, as the selection of project-based team members will be based exclusively on criteria related to professional performance, general and specific skills. Moreover, the administrative team will require any other subcontractors needed for implementing the IAP to ensure fair treatment of their employees regardless of race, ethnicity and gender.

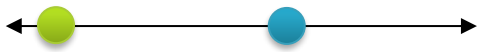
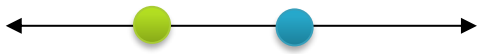
Thus, Bistrita municipality will ensure equal opportunities and treatment between employees, women and men, in employment relationships of any kind, as well as identify stakeholders and partners who will respect the same principle.

1.11.4. Risk Analysis

The following table presents a concise list of risks and mitigation measures for the IAP implementation period. For the risks that were evaluated with the Mentimeter[4] tool, the score is available in the description of the risk.

RISK	MITIGATION MEASURES
- **Probability**	- **Estimated impact**
Low level of interest of interest from stakeholders (4.1 score)	Providing more information, for all categories of stakeholders, on the need to unite individual efforts in

[4] During one of the ULG meetings the probability of some of the risks was assessed using the Mentimeter tool. The highest score was 6.1 (Market risks like the prices increase) while the lowest was 3.6 (7- Natural hazards - disasters, pandemics etc.)

	the face of obvious challenges generated locally / globally by climate change; Carrying out an information and dissemination campaign aimed at different categories of stakeholders; Ensuring / maintaining a good collaboration between the local public administration and different categories of stakeholders.
Low level of interest from local elected officials - mayor, local councillors and from civil servants from the city hall departments (5.9 score) 	Provide more information and explanations about the "city carbon budget" concept and the benefits of this approach: - the budgetary approach is essential to demonstrate to partners, businesses and citizens that urgent action is needed. Without the budgetary approach, it is easier for local actors to focus only on the "zero carbon" deadline (2050), a few years in the future, rather than focusing on the urgent need for immediate action. - Organizing regular, short interdepartmental meetings, with the presentation of concrete examples of climate approach of the actions proposed annually in the local budget.
Delays in conducting public procurement procedures due to complaints or non-participation of potential suppliers in the procurement procedure 	Provide a sufficient period of time in order to cover the risk of delays.
Delays in the execution of contracts due exclusively to the provider 	Stipulation in the contract of penalties applied to the provider in case of delays due exclusively to the provider.
Market-related risks: rising prices for construction materials (6.1 score) 	Estimation with caution of investment execution costs.
Insufficient financial resources (5.7 score) 	Aim to expand the opportunities for financial investments from the private sector early in the plan's implementation.
Time too short to complete the actions (4.1 score) 	Start the implementation as early as possible in order maximise the available time for actions.
Limited level of experience in monitoring, reporting and verifying activities / lack of procedures 	Improved digitalisation of processes at institutional level Assignment of a responsible person Elaboration of guidelines

Limited data availability or differences in data from various sources 	Indicators should be easy to monitor and measure, based on data that is available with ease Create partnerships with local providers for increased utility of data
Difficulties in ensuring support from industrial stakeholders in complying with the necessary standards 	Ensuring and implementing quality standards and minimum requirements with respect to environmental impact from the procurement and selection stage

1.12. Conclusions and next steps

Bistrita has set on a path towards becoming carbon neutral within the broader context of tackling climate change. However, the record-level energy consumption of the city poses many challenges towards achieving fewer emissions. The IAP has underlined the main objectives for achieving the neutrality goal while highlighting the necessity for immediate action in order to fit into the remaining carbon budget. Nonetheless, this ambitious list of measures leads to a high resource demand, but at the same time implies the city can become sustainable.

In regard to the main steps and actions following the completion of the IAP, the municipality needs to address the following matters:

- Present the IAP to other possible stakeholders and improve media coverage of the target Bistrita has set for 2050;
- Create a long-term partnership with the current ULG members in order to ensure continuity after the ZCC project ends;
- Develop the energy management team within the City Hall;
- Integrate the IAP medium and long-term actions in other strategic documents of the city in order to foster synergies and improve the potential for funding;
- Set together with the ULG members tasks and responsibilities for implementing the actions set in the IAP;
- Reach out further to private entities in the city, especially economic agents from the industry sector where there is a lack of data, and invite them to events with the ULG in order to expand the group;
- Implement on a yearly basis short-term actions in order to raise public awareness on the need to address climate change and necessary actions towards a climate neutral city;
- Constantly organize ULG meetings in order to monitor the implementation of all IAP actions;
- Implement the IAP proposed actions.