NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Action Plan

2030 Climate Neutrality Action Plan of Bergamo

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Table of Contents

Summary

Textual element
After the pandemic that affected the city very seriously making Bergamo the very first European city to face the emergency with horrendous effects, the City of Bergamo reacted in a very strong and powerful manner showing a very interesting period of resilience and high involvement of the entire territory on crucial aspects such as cultural, environmental, and social matter, to mention few. The increasing awareness of the territory on environmental and climatic issues and the desire to act have paved the way for a strong and solid co-planned Climate City Contract. The decision taken by the City to join the NZC path toward neutrality, showed on one hand the Municipality's interest in involving more and more, together with the stakeholders and the civil society, into a solid climate transition for the territory and, on the other hand, highlighted the enthusiastic interest of the entire city eco-system that, together with the Municipality, wrapped up a very interesting portfolio of actions for the climate neutrality also looking at barriers and opportunities. Following the NZC methodology (https://netzerocities.app/ClimateTransitionMap), the implementation of the CCC, and in particular of the Action Plan, was based on the transition map that has the main pillars of: • Building a strong mandate • Understanding the system • Co-designing a portfolio • Activating an inclusive ecosystem for a just climate transition. The document, based on the NZC Action Plan model, details the path toward neutrality of the City of Bergamo, the first results achieved putting the base for a continuous improvement and guaranteeing the all eco-system involvement. Part A set the base for the emission gap calculation, analyzing the most recent and accurate plan of the City of Bergamo for Sustainable Energy and Climate Actions (SECAP) and filling the gap between the SECAP baseline calculation and the NZC methodology. An in depth analysis of the most recent policies and strategies enabling climate neutrality within the territory is presented, highlighting the relevant role the Municipality of Bergamo had and still has. Starting from a description of the urban systems, the systemic barriers, and related opportunities, main core of the second part of the document (module B), is the "Portfolio of actions". During the co-planning phase, 217 actions were collected from 40 stakeholders divided as follows: • 85 actions in the Buildings sector • 32 actions in the Transport sector • 5 actions in the AFOLU sector • 30 actions in the Waste sector • 65 actions transversal sectors The contribution of these actions, together with the strategies outlined by the Municipality of Bergamo (most of which have been the subject of a detailed analysis in terms of potential for emission reduction and related costs) and with the actions already quantified in the SECAP, leads to achievement of the 2030 emissions reduction target [1]. The last part of the Action plan is dedicated to the capacity of the City of Bergamo to enable Climate Neutrality by 2030 by means of relevant governance and social innovation interventions.

[1] equivalent to 80% of the baseline value with baseline emissions equal to 372,516.24 tCO2eq and the remaining 20% identified as residual emissions to be reduced with the strengthening and development of strategies.

List of figures

List of table

Notes

Note on acronyms and abbreviations

All the acronyms and abbreviations meanings are explained along the text when mentioned.

Note on numbers notation

The notation for numbers presented in the text follows the Italian one which uses the dot as million separator (.) and the comma for the decimal numbers.

1 Introduction

Introduction

The City of Bergamo, which was Italian Capital of Culture 2023 with its neighbour Brescia, is a continuously evolving city in terms of culture, society, the development of research and scientific technologies and, last but by no means not least, the ever-increasing attention it pays to the environmental and energy sustainability of its territory.
The Italian Government was quick to back the bid to be designated Italian Capital of Culture (approved on 16 July 2020) by these two cities, both symbols of resilience to the terrible impact of the coronavirus pandemic in Italy. The dossier submitted in their bid to become Italian Capital of Culture focuses on the theme of "the illuminated city": this expression has various meanings, such as tolerance, creativity and the development of research and technologies, as well as the concept of a "lighthouse city", namely a point of reference and leadership.
The City of Bergamo's bid to join the European Mission "100 intelligent cities with zero climate impact by 2030" is also based on this concept of the "lighthouse city".

The municipal administration recognises the absolute importance of climate change and is intensifying its commitment to integrating aspects of climate change mitigation and adaptation into its municipal policies, strategies and plans. Its objective is not just to meet the required Italian milestones, but also match those of its European partners.

The Climate City Contract (CCC) is rooted on a city's main strategic plans, the CCC fitting into these with a logic of complete synergy and non-overlap.

The Climate Transition Strategy (Strategia di Transizione Climatica - STC): funded by the Cariplo Foundation and the Region of Lombardy, this focuses on 7 sectors and addresses climate change mitigation and adaptation with 19 priority actions.

The Circular Economy strategy (Strategia di Economia Circolare)**:** currently being finalised, this is supported by the European Investment Bank (EIB) through its Circular City Centre (C3), a competence and resource centre within the EIB which aims to support cities Europeans in their transition to the circular economy. The Circular Economy Strategy of the City of Bergamo focuses on three main sectors: food waste, construction sector, consumer goods (repair and reuse).

The Sustainable Urban Mobility Plan (Piano Urbano della Mobilità Sostenibile - PUMS): this strategic planning tool develops a medium-long term (10 year) vision of the urban mobility system by setting achievable objectives for environmental, social and economic sustainability. It does this by identifying actions aimed at improving the effectiveness and efficiency of the mobility system and its integration within the urban and territorial structure and developments.

The Territory Government Plan (Piano di Governo del Territorio - PGT): this is the city's town planning tool with targets within the municipal territory falling under three main headings: Attractive Bergamo, Sustainable Bergamo, Inclusive Bergamo.

The Sustainable Energy Action Plan (Piano d'Azione per l'Energia Sostenibile ed il Clima - SEAP): the Municipality of Bergamo joined the Covenant of Mayors in 2009. The first Action Plan for Sustainable Energy (Piano d'Azione per l'Energia Sostenibile - SEAP) was drawn up in 2011. In 2023, with the support of TerrAria Srl, the Municipality drew up its **Sustainable Energy and Climate Action Plan (SECAP)**.

The SECAP is the starting point for calculating the CCC baseline. In order to give continuity to the plans, avoiding their becoming two parallel and disjointed tools, the city of Bergamo's Mission started

with the analysis and baseline in the SECAP (drawn up at the end of 2023). The waste sector was added to this, as per NZC guidelines[1], in order to establish the CCC baseline inventory.

The Municipality of Bergamo started its pathway towards neutrality by **engaging with stakeholders** through an initial **expression of interest** (see Module C), which was then followed by a **workshop** to present the pathway towards neutrality. This expression of interest should be considered an action of innovative governance: it ensured the incisive and inclusive engagement with stakeholders, in full compliance with the transparency principles of Italy's new law on public contracts (Codice dei Contratti Pubblici, D.Lgs 36/2023).
Following this workshop, a series of **one-to-one meetings** was organised to collect the action sheets. In order to guarantee the synergy with the stakeholders needed to achieve synergistic co-planning of the CCC, specific memoranda of understanding were also prepared (e.g. with the healthcare sector and for the launch of CACER (Self-consumption configurations for sharing renewable energy), see Module C).

The **Transition Team**, described in detail in Module C below, has enabled the co-design process involving the entire urban ecosystem. Together, we have worked on developing actions with the potential to reduce emissions in our territory, analysed the pertinent direct impacts and co-benefits, and explored the barriers, risks and possibilities for mitigation.

The entire pathway is permeated by **governance innovation** activities (see, for instance, the expression of interest and the whole stakeholder engagement process), as well as **social innovation** actions. A good example of this are the district networks created to promote and spread practices of involvement towards citizens. Then there is the "Clic.Bergamo" project, focused on strengthening social cohesion as an enabling factor for transition and new urban welfare, and the involvement of the institutional figure known as the Guarantor of Children's Rights (Garante dei diritti dell'infanzia) in order to extend sustainable good practices to minors and families.

Throughout the Climate City Contract process, three documents – the Action Plan, the Investment Plan and the Commitment Plan – were developed and perfected in a synergistic manner following a single pathway of systemic and sustainable co-planning.

The **ForImpact digital platform** is an innovation tool, introduced with the Mission and made available to the Municipality of Bergamo. This has been implemented to ensure the continuous engagement of the Mission's partners, to facilitate governance of the Climate City Contract by monitoring the various actions, their direct and indirect impacts, developments over time and achievement of the City's objectives.

Together with the permanence and envisaged strengthening over the next few years of the Transition Team and continuous optimisation of the project and the pathways started during this initial year of co-planning, this platform is another useful tool to guarantee the **sustainability of the project by 2030**, by continuing to engage the entire urban eco-system.

[1] The IPPU and AFOLU sectors, not included in the SECAP, are analysed but not included in the CCC baseline (see Module A).

Table I-1.1: Climate Neutrality Target by 2030			
Sectors	**Scope 1**	**Scope 2**	**Scope 3**
Stationary energy	Included	Included	Not applicable
	no exclusions	no exclusions	
Transport	Included	Included	Excluded as from guidelines NZC
	no exclusions	no exclusions	
Waste/waste water	Included	Not applicable	Included
	no exclusions	Not applicable	no exclusions
IPPU	Included	Not applicable	Not applicable
	no exclusions	Not applicable	
AFOLU	Included	Not applicable	Not applicable
	No exclusions	Not applicable	
Geographical boundary	**Same as city administrative boundary**	**Smaller than city administrative boundary**	**Larger than city administrative boundary**
(Tick correct option)	x		
Specify excluded/additional areas	No excluded areas		
Map			

2 Part A – Current State of Climate Action

2.1 Module A-1 Greenhouse Gas Emissions Baseline Inventory

The Municipality of Bergamo first adhered to the European Covenant of Mayors campaign in 2009, in the firm belief that it needs to play an active part in the fight against climate change. It therefore drew up its Sustainable Energy Action Plan (SEAP) in 2011, estimating the baseline emissions for 2005. This inventory has since been updated periodically with subsequent monitoring data. The most recent version refers to the year 2021 and forms an integral part of the Municipality of Bergamo's **Sustainable Energy and Climate Action Plan (SECAP),** drawn up in 2023 by TerrAria S.r.l.

The creation of the baseline inventory as per the Climate City Contract (CCC) is, therefore, a further step forward in the process of establishing local emissions and is based on the SECAP inventory, although this has been calculated using the methodology defined at an European level by the Covenant of Mayors. There are, however, certain methodological differences in the two approaches (Covenant of Mayors / Mission 100 Carbon Neutral and Smart Cities) that have called for some changes and additions. As a result, the baseline inventory of the Climate City Contract has had to be altered to reflect the calculation method indicated in the documents made available to the Net Zero Cities consortium.

The differences with the 2021 SECAP baseline are listed below:

- ✓ **Emission factors**: when calculating emissions linked to the "Buildings" and "Transport" sectors, different emission factors to those used for the SECAP baseline have been applied, also in view of the contribution of non-CO_2 greenhouse gases (GHG) to total emissions. Therefore, while the emission factors of the standard IPPC approach (CO_2) were applied to get the SECAP baseline, the emission factors of the IPPC GHG approach (tCO_2eq) were applied when calculating the CCC baseline. These technical considerations refer to the 2006 methodological framework developed by the IPCC in order to create common methods for estimating GHG emissions. This means that different figures for overall emissions are obtained, despite starting from the same initial values of final energy consumption.

- ✓ **Additional emission domains**: this integration is necessary as it is explicitly requested within the 100 Carbon Neutral Cities Mission. The additional domains (or 'sectors') are the following:

    1. **Waste** This sector calculates the emissions linked to waste management that are released directly into the atmosphere, especially those arising from wastewater treatment, which takes place in a plant located within the borders of the Municipality of Bergamo. The emissions linked to the disposal of municipal waste and special waste have not been considered here to avoid double counting. Indeed, the waste-to-energy plant in Bergamo where all such waste is delivered produces heat (district heating) and electricity that have already been accounted for in the "Buildings" sector. The same goes for the emissions linked to the Montello composting plant, which receives the compostable fraction of the city's waste collection and recycling scheme, as this plant has a methane (natural gas) collection and biogas production system. Its emissions are therefore considered net zero. This methodology is consistent with the indications provided by the JRC as part of the Covenant of Mayors campaign. Finally, emissions from energy end-use, namely plant operation

and the collection and movement of waste (vehicle fuel), have already been included in the calculation of stationary energy emissions from Private Transport.

2. **Industrial Processes and Product Use (IPPU)** This sector includes GHG emissions from industrial activities producing emissions other than those energy consumption and the use of specific products. In this specific case, we have been estimated the emissions coming from two steel production plants within the municipal area. These emissions are indicated in the next chapter, but will not be included in the CCC baseline as their value is less than 5% of overall emissions (c.f. NZC "GHG-Inventory-Baseline-Guidance_note-to-cities" guidelines). This choice was taken in order not to differ too much, at this time, from the values of the newly drawn up SECAP. Nonetheless, all the analyses of the IPPU sector have been explained here both to justify the value below 5% of overall emissions and to be able to possibly integrate it into the CCC baseline in the future.

3. **Agriculture, Forestry and Other Land Use (AFOLU)** This sector calculates the emissions directly released into the atmosphere and not connected to energy end-use in the agricultural sector (e.g. manure management, use of fertilisers, the spreading of farm slurry, etc.) and changes in the land use. In this specific case, emissions linked to livestock farming and soil fertilisation have been estimated, while it has been decided to ignore absorption by deciduous wooded areas and permanent meadows. As for the IPPU sector, the emissions in the AFOLU sector are indicated in the following chapter, but will not be taken into account in the CCC baseline as their value is less than 5% of the overall emissions (c.f. NZC "GHG-Inventory-Baseline-Guidance_note-to-cities" guidelines). This choice was taken in order not to differ too much, at this time, from the values of the newly drawn up SECAP. Nonetheless, all the analyses of the AFOLU sector have been explained here both to justify the value below 5% of overall emissions and to be able to possibly integrate it into the CCC baseline in the future.

The tables below divide the emissions according to the model provided by the Net Zero Cities consortium: the sector appears in the rows and the type of energy vector in the columns. Emissions are categorised using the "Scopes" framework, where "Scope 1" refers to emissions generated by combustion processes or GHG emissions within the boundaries of the system in question (in our case, within the municipal area); "Scope 2" refers to emissions generated by the consumption of energy distributed through networks (e.g. electricity and district heating), but where the consumed energy is generated outside the city (e.g. a thermoelectric power station that produces electricity); and "Scope 3" refers to emissions generated outside the city, but which are linked to processes that take place within the city (e.g. the production of waste/wastewater within the municipal area destined for waste-to-energy/treatment in another Municipality.

A-1.1: Final energy use by source sectors													
Base year	**2021**												
Unit	MWh/anno												
	SCOPE 1										**SCOPE 2**	**SCOPE 3**	**Total**
BUILDINGS	**958.992,77**	**235.266,73**	**7.470,40**	**27.991,54**	**-**	**-**	**48.058,18**	**-**	**96.826,98**	**4.169,98**	**517.054,63**	**-**	**1.895.831,22**
Fuel type/ energy used	Natural gas	Heat from district heating	LPG	Heating oil	Diesel fuel	Petrol	Biomass	Biofuels	Geothermal	Other renewables	Electricity		
TRANSPORT	**30.979,37**	**-**	**22.834,38**	**-**	**164.678,30**	**104.477,79**	**-**	**18.088,81**	**-**	**-**	**326,85**	**-**	**341.385,49**
Fuel type/ energy used	Natural gas	Heat from district heating	LPG	Heating oil	Diesel fuel	Petrol	Biomass	Biofuels	Geothermal	Other renewables	Electricity		-
WASTE	-	-	-		-	-	-	-	-	-	-	-	-
Fuel type/ energy used	Natural gas	Heat from district heating	LPG	Heating oil	Diesel fuel	Petrol	Biomass	Biofuels	Geothermal	Other renewables	Electricity		
Industrial Process and ProductUse (IPPU	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel type/ energy used	Natural gas	Heat from district heating	LPG	Heating oil	Diesel fuel	Petrol	Biomass	Biofuels	Geothermal	Other renewables	Electricity		
Agricultural, Forestry and Land Use (AFOLU)	-	-	-	-	-	-	-	-	-	-	-	-	-
Fuel type/ energy used	Natural gas	Heat from district heating	LPG	Heating oil	Diesel fuel	Petrol	Biomass	Biofuels	Geothermal	Other renewables	Electricity		

A-1.2: Emission factors applied						
For calculation in t or MWh of primary energy						
Methodology used: IPCC						
Primary energy/ energy source	Carbon Dioxide (CO_2)	Methane (CH_4)	Nitrous Oxide (N_2O)	F-gases (hydrofluorocarbons and perfluorocarbons)	Sulphur hexafluoride (SF_6)	Nitrogen trifluoride (NF_3)
Electricity [MWh]	0,285	-	-	-	-	-
Natural Gas [MWh]	0,202	-	-	-	-	-
Heating oil [MWh]	0,268	-	-	-	-	-
Diesel fuel [MWh]	0,276	-	-	-	-	-
Petrol [MWh]	0,250	-	-	-	-	-
Gasoline [MWh]	0,2575	-	-	-	-	-
LPG [MWh]	0,227	-	-	-	-	-
Heat for district heating [MWh]	0,114	-	-	-	-	-
Oil fired heating [MWh]	0,268	-	-	-	-	-
Biomass [MWh]	0,018	-	-	-	-	-
Other reweables [MWh]	0	-	-	-	-	-
Geothermal [MWh]	0	-	-	-	-	-
Biofuels [MWh]	0	-	-	-	-	-
CH_4 [ton]	28	-	-	-	-	-
N_2O[ton]	265	-	-	-	-	-

A-1.3: GHG emissions by source sectors				
Base year	2021			
Unit	**tCO_2eq/year**			
	Scope 1	Scope 2	Scope 3	Total
Buildings	230.599,51	147.360,57	-	377.960,08
Transport	83.802,07	93,15	-	83.895,22
Waste	3.790,00	-	-	3.790,00
Industrial Process and Product Use (IPPU)	2.517,00	-	-	2.517,00

Agricultural, Forestry and Land Use (AFOLU)	4.666,73	-	-	4.666,73
Total (included IPPU and AFOLU)	**325.375,30**	**147.453,72**	**-**	**472.829,03**

A-1.4: Activity by source sectors.							
Base year	**2021**						
Unity	$tCO_2eq/year$						
	Scope 1			**Scope 2**			**Scope 3**
BUILDINGS	**108.876,72**	**73.947,95**	**47.774,90**	**40.437,23**	**69.648,55**	**37.274,79**	**-**
Activity	**Residential**	**Tertiary, including municipal services**	**Industry and agriculture**	**Residential**	**Tertiary, including municipal services**	**Industry and agriculture**	
TRANSPORT	**80.416,57**	**3.280,04**	**105,40**	**-**	**93,15**	**-**	**-**
Activity	**Private transport**	**Local public transport**	**Municipal fleet**	**Private transport**	**Local public transport**	**Municipal fleet**	
WASTE	**511,00**	**3.279,00**	**-**	**-**	**-**	**-**	**-**
Activity	**CH_4 wastewater management**	**N_2O wastewater management**					
Industrial Process and Product Use (IPPU)	**2.517,00**			**-**	**-**	**-**	**-**
Activity	**Metallurgy emissions**						
Agricultural, Forestry and Land Use (AFOLU)	**1.284,32**	**343,49**	**3.038,92**	**-**	**-**	**-**	**-**
Activity	**Enteric fermentation**	**Manure management**	**Soil fertilisation**				

A-1.5: Graphs and diagrams

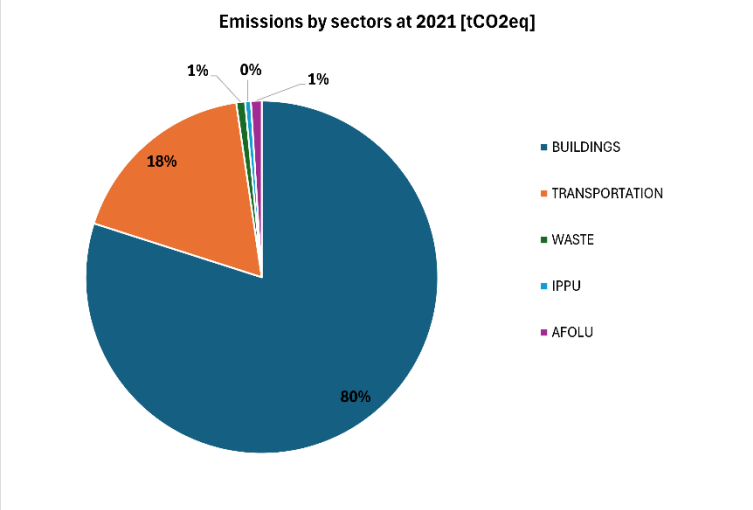


Figure A.1: Breakdown of emissions in 2021 by sector [tCO_2eq]

This graph shows how the majority of the emissions within the Municipality of Bergamo (roughly 80%) are linked to the "Buildings" sector. These include emissions due to final energy consumption associated with the use of buildings and pertinent plant and equipment within the municipal area of Bergamo. 18% of emissions are, however, linked to vehicular traffic. Finally, the "Waste", "Agriculture, Forestry and Other Land Use (AFOLU)" and "Industrial Processes and Product Use (IPPU)" sectors, which also include emissions not directly linked to energy consumption in these sectors, account for just over 2% of total emissions. **For this reason, the IPPU and AFOLU sectors will be excluded from the CCC baseline as per NZC guidelines.**

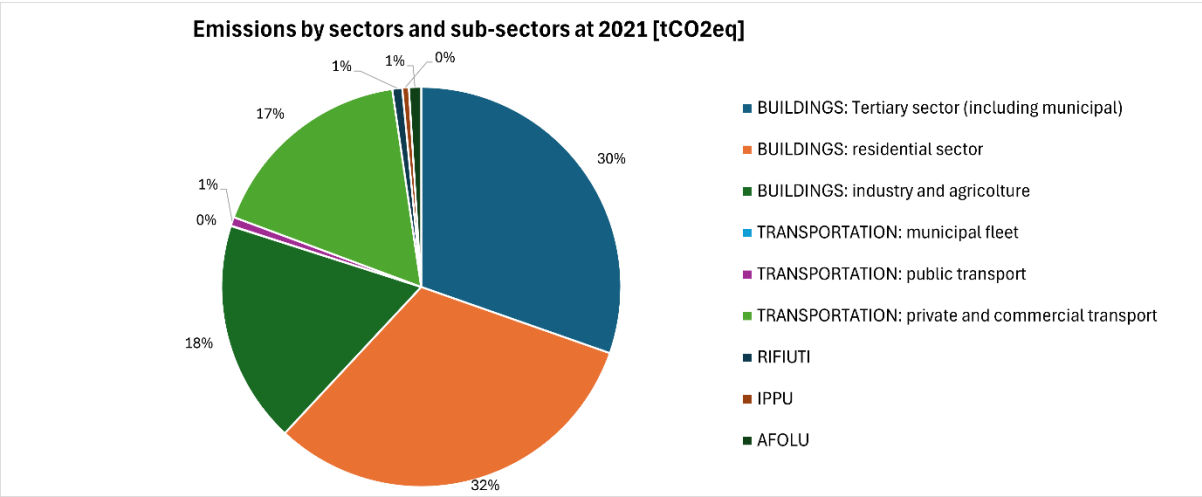


Figure A.2: Breakdown of emissions in 2021 by sector and subsector [tCO_2eq]

The graph in Figure A.2 expands on Figure A.1. More specifically, the "Buildings" sector is divided into the SECAP emission subsectors: residential, tertiary, industry and agriculture, and municipal buildings and

equipment. In this case, the tertiary sector also includes municipal buildings, and the industry sector also includes agriculture. The picture that emerges shows that final energy consumption in the residential and tertiary sectors is substantially equivalent (responsible for 32% and 30% of total emissions respectively). The "Buildings: industry and agriculture" and the "Transport" sector (private, public and municipal fleet) are the third and fourth most important sub-sectors, both responsible for 18% of emissions.

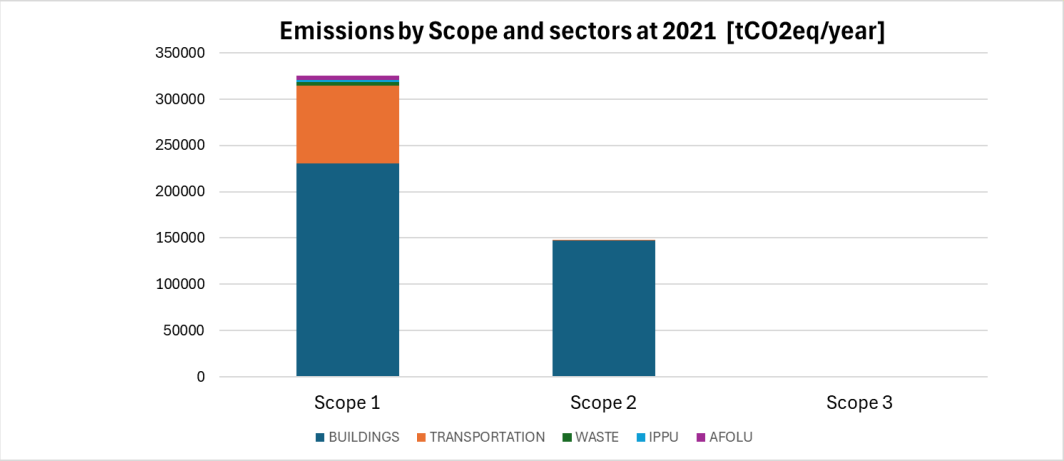


Figure A.3: Breakdown of 2021 emissions by Scope and sectors [tCO_2eq]

The histogram in Figure A.3 shows how the majority of emissions can be traced back to Scope 1, which also includes emissions from the Buildings sector and all the emissions from the Transport sector. Current analysis finds that no emissions can be attributed to Scope 3.

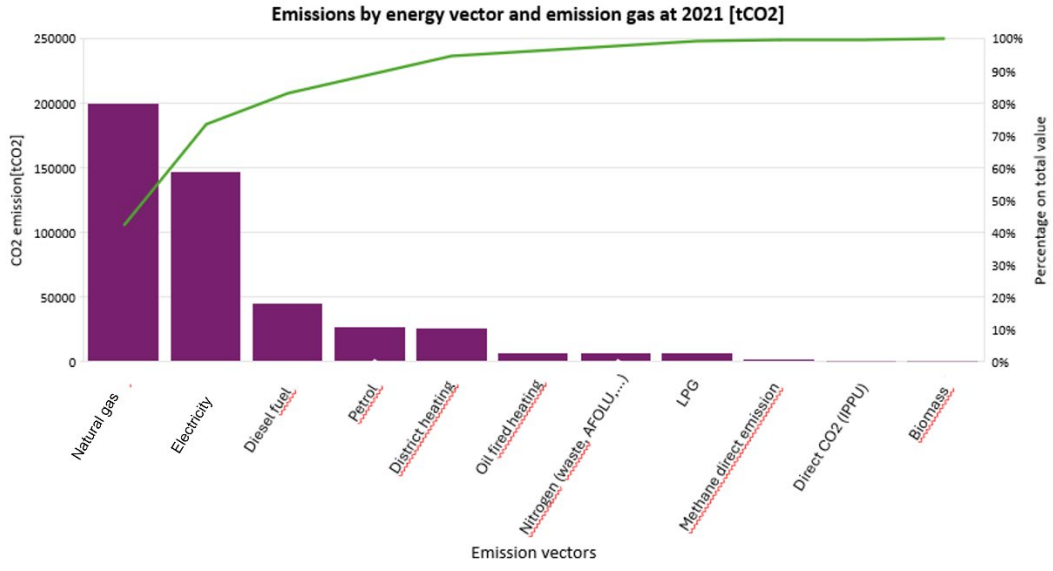


Figure A.4: Breakdown of emissions at 2021 by energy vector and emission gas

The histogram in Figure A.4 shows the emissions of the Municipality of Bergamo divided by emission vector: the two main sources are clearly the consumption of natural gas and electricity. Using the Pareto curve in the graph above, we can deduce that these two energy vectors are responsible for 80% of total emissions.

A-1.6: Description and analysis of the GHG baseline inventory

The values provided above are mostly taken from the Sustainable Energy and Climate Action Plan - SECAP of the Municipality of Bergamo for the year 2021. To integrate the SECAP template, contributions from the additional sectors (WASTE, IPPU and AFOLU) not found in the SECAP have been calculated and added to the SECAP template. As mentioned above, of these three sectors only the Waste sector has been included in the CCC baseline.

CCC BASELINE RESULTS

The Bergamo CCC baseline for 2021 was estimated as **465.645 tCO_2eq**.

The overall picture has the majority of emissions falling within Scope 1 (emissions generated directly within municipal boundaries). The rest of the emissions fall within Scope 2, namely energy end-use (electricity). As regards the breakdown by sector, the majority of emissions (approximately 377.960 tCO_2eq) are found in the "BUILDINGS" category. This effectively corresponds to the Stationary Energy sector, which, together with the "TRANSPORT" sector, amounts for all emissions in the 2021 SECAP inventory. The majority of emissions in the "BUILDINGS" sector are attributable to the Residential and Tertiary sectors.

In the "TRANSPORT" sector (the second biggest contributor to GHG emissions), Private Transport is responsible for 80.417 tCO_2eq, equal to approximately 18% of total emissions. The AFOLU, IPPU and WASTE sectors account for the other emissions (just over 2% of total emissions).

BASELINE - 2021 EMISSIONS	tCO2eq	Weight %
BUILDINGS: tertiary sector (including municipal services)	143.596	30%
BUILDINGS: residential sector	149.314	32%
BUILDINGS: industry and agriculture	85.050	18%
TOTAL BUILDINGS	**377.960**	**80%**
TRANSPORT: municipal fleet	105	0%
TRANSPORT: public transport	3.373	1%
TRANSPORT: private and commercial transport	80.417	20%
TOTAL TRANSPORT	**83.895**	**18%**
WASTE	**3.790**	**0,8%**
IPPU	**2.517**	**0,5%**
AFOLU	**4.667**	**1,0%**
TOTAL, INCLUDING WASTE, IPPU AND AFOLU	**472.829**	**100%**
TOTAL CCC BASELINE (NET OF IPPU and AFOLU as per NZC guidelines)	**465.645 tCO2eq**	

The consumption data in MWh contained in the 2021 SECAP emissions inventory template have been used for energy end-use. However, some changes have been necessary when preparing the CCC baseline in order to comply with the methodological indications contained in the “Infokit for Cities” guidelines.

The differences between the SECAP baseline and CCC baseline are as follows:

1. IPCC emission factors in tCO_2eq/MWh as proposed by the Covenant of Mayor Office (COMo), in ANNEX 1 - Fuel Emission Factors Database, have been applied to the consumption in MWh. Worth noting here is the fact that the SECAP methodology only refers to the IPCC standard emission factors for CO_2.
2. As for electricity consumption, the national emission factor for 2021 has been adopted, equal to 0,285 tCO_2eq/MWh (source: National and European Emission Factors for Electricity Consumption NEEFE, jrc-com-neefe_1990-2021). In the SECAP, however, the emission factor used is 0,255 tCO_2/MWh, as indicated by the Italian Institute for Environmental Protection and Research (ISPRA) in its document entitled “Efficiency and decarbonization indicators in Italy and in the biggest European Countries” published in 2023.
3. The same emission factor used for the SECAP calculations has been applied to district heating consumption, namely 0,114 tCO_2eq/MWh. In fact, where cogeneration or district heating/cooling systems exist, the SECAP Guidelines require the adoption of a local emission factor representing the energy mix used for heat production.
4. As already indicated in the Introduction, the contributions from the WASTE, IPPU and AFOLU sectors have indeed been calculated (see calculation instructions below) but, of these three sectors, only the contributions from the Waste sector have been included as per the NZC guidelines.

WASTE SECTOR

The Waste sector only takes into account those emissions directly released into the atmosphere coming from the wastewater purification process, whereas those relating to waste-to-energy and composting systems are not taken into account in order to avoid double counting. In accordance with the JRC methodology for the calculation of the emissions inventory as part of the European Covenant of Mayors campaign, these emissions have already been considered as stationary energy in the “Buildings” sector.

The waste-to-energy plant within the Municipality of Bergamo uses non recyclable residual municipal waste for fuel (i.e. all waste not suitable for separate waste collection and not recyclable)**.** This plant lies in the industrial area of the city and uses cogeneration processes to produce electricity and heat, which is then distributed through the city’s district heating network.
The food and garden waste coming from the separate waste collection scheme is sent to the composting plant in the Municipality of Montello: this is equipped with a system for capturing biogas for use in a cogeneration system (15,8 MWe total power output) for the production of electricity and simultaneous heat recovery.
Therefore, as already indicated, in order to avoid counting these emissions twice, the contribution of these plants in the “Waste” sector is considered to be equal to zero, as this has already been calculated as stationary energy in the “Buildings” sector.

The municipal wastewater treatment plant lies in the south-west corner of the city. The CH_4 and N_2O emission values linked to the treatment process have been provided directly by the water utility company, Uniacque, which prepares an annual emissions report using the IPCC 2006 methodology. Most of the sewage sludge is sent to the Montello composting plant and so the related emissions have not been counted.

	Emissioni [CO_2eq]		
Sorgente emissione	Da CH_4	da N_2O	Totale
TERMOVALORIZZATORE	non computato: impianto dotato di produzione di calore ed energia elettrica		
DEPURATORE	511,00	3.279,00	3.790,00
COMPOSTAGGIO fanghi	non computato: impianto dotato di captazione di biogas		
COMPOSTAGGIO differenziata	non computato: impianto dotato di captazione di biogas		
TOTALE CO_2eq	**511,00**	**3.279,00**	**3.790,00**

Figure A.5: Summary of Waste sector emissions

AFOLU SECTOR

CH_4 and N_2O emissions directly emitted into the atmosphere within the Municipality of Bergamo by the agricultural sector have been estimated for livestock farming and soil fertilisation. A simplified approach has been adopted due to the limited incidence of the AFOLU sector on total emissions. Absorption linked to the presence of deciduous wooded areas and stable meadows within the municipal area has been ignored, as this category is extremely variable and any analysis of the current situation is especially complex. A precautionary approach has therefore been adopted to estimate the Municipality's emissions. In any case, absorbed emissions amount to roughly 1.000 tCO_2eq and are therefore negligible.

Below are the characteristic data for the municipal area.

COMUNE DI BERGAMO	n° capi
Bovini da latte	216
Bovini da carne	199
Suini da ingrasso	45
Suini familiari	15
Caprini carne	139
Caprini familiare	18
Ovini carne	639
Ovini familiare	16
Cavalli	51
Asini	27
Muli	3
Avicoli	0
TOTALE	**1368**

COMUNE DI BERGAMO		
Superficie territorio comunale	**2687**	ha
Verde ecologico ambientale	**869**	ha
Bosco	*430*	ha
Verde residenziale	*373*	ha
Verde di rispetto	*66*	ha
Terreni agricoli	**1346**	**ha**
Seminativi	*670*	ha
Vigneti	*70*	ha
Toale	**4902**	ha

Figure A.6: Livestock as of 31 December 2021 and ecological/environmental resources of the Municipality of Bergamo

The livestock farms within the Municipality of Bergamo have roughly 1.370 animals in total, most of which are cattle, sheep and goats. This figure has been taken from the Animal Identification and Registration Database set up by the Italian Ministry of Health within the CSN at the "G. Caporale" Institute in Teramo. The number of farms and livestock in each Italian municipality is updated on a six monthly basis.
The emission factors proposed by the Italian National Inventory Report (NIR) drawn up by ISPRA have been used to estimate emissions. These emission factors are specific for each type of animal and refer to the year 2020. Although the baseline year is 2021, these have been used as they were the most up-to-date values available at the time.

Meanwhile, it was decided to use simplified calculations for direct emissions of N_2O linked to aggregate sources, and the use of fertilizers on cultivated soil in particular, to guarantee consistency with the current situation within the territory. This calculation makes it possible to respond to changes in the sector and to provide the cognitive elements needed to consider possible specific actions. The total land used for agricultural purposes is based on the data in the Territory Government Plan of the Municipality of Bergamo; the "arable land" category has been divided into the subcategories "Winter wheat and spelt", "Barley", "Maize" and "Other" on the basis of the provincial distribution of crops using ISTAT data for 2021. Each category has then been associated with the

typical amount of nitrogen fertiliser used for each crop. The IPCC 2006 methodology was used to calculate CO_2eq emissions.

	Emissioni [CO_2eq]		
Sorgente emissione	Da CH_4	da N_2O	Totale
Allevamenti			
Fermentazione enterica	1.284,32		1.284,32
Gestione del letame	234,05	109,45	343,49
Assorbimenti e modifiche dell'uso del suolo	non conteggiato in quanto irrilevante		
Fonti aggregate di emissione (suoli, incendi,...)			
Fertilizzazione con calce, urea	non conteggiato in quanto irrilevante		
Fertilizzazione con composti azotati (sintetici e organici)		3.038,92	3.038,92
Emissioni indirette di N_20 dai suoli	non conteggiato in quanto irrilevante		
TOTALE CO_2eq	**1.518,37**	**3.148,37**	**4.666,73**

Figure A.7: Summary of AFOLU sector emissions

IPPU SECTOR

Emissions linked to the metallurgical sector have been considered in the Industrial Processes and Product Use sector, as there are two production plants in the municipal area. As there are no detailed data available, the ISPRA 2019 database of national emissions database has been used to estimate their emissions, reparametrizing the emissions within the province of Bergamo on the basis of sector employees. In the future, it should be possible to refine this evaluation using more detailed data, especially if the two plants are directly involved in the CCC with actions aimed at reducing the emissions from energy end-use and, above all, as in the present case, emissions directly emitted into the atmosphere.

	Emissioni [CO_2eq]		
Sorgente emissione	Da CH_4	da N_2O	Totale
METALLURGIA	1.520,00	997,00	2.517,00
TOTALE CO_2eq	**1.520,00**	**997,00**	**2.517,00**

Figure A.8: Summary of IPPU sector emissions

2.2 Module A-2 Current Policies and Strategies Assessment

The Municipality of Bergamo started introducing a series of policies aimed at reducing its greenhouse gas emissions several years ago.

After approving its Environmental Energy Plan in 2000, the Municipality of Bergamo joined the European initiative known as the Covenant of Mayors for Climate & Energy in 2009. Then, in 2011, it approved both its Sustainable Energy Action Plan (SEAP) and its Municipal Energy Plan (Piano Energetico Comunale - PEC). To date, the SEAP has been monitored three times: in 2014, 2019 and 2020. The transition from the SEAP to the Sustainable Energy and Climate Action Plan (SECAP) was completed in early 2024. Thanks to its involvement in the New Covenant of Mayors for Climate & Energy and the drafting of its SECAP, the Municipality of Bergamo is no longer limited to just the energy sector when it comes to mitigating CO2 emissions, but can now also introduce actions regarding adaptation to the effects of climate change, such as the risk of floods, heat waves and drought.

Moreover, the city of Bergamo adheres to the Declaration on Climate Adaptation for the Green Cities: this document makes cities and local administrations central stakeholders regarding the issue of climate change. The city has subsequently created an environmental observatory in collaboration with local environmental associations to evaluate the policies and operational actions aimed at achieving the European Commission's and its own Climate Mission objectives.

City Council Resolution no. 135 was passed on the 8th of November, 2021, in view of the Cariplo Foundation Call for Ideas "Climate Strategy" ("Cli.C. Bergamo! – CLImate. Change. Bergamo!, developed by the Municipality of Bergamo, in partnership with the Parco dei Colli di Bergamo, Legambiente Lombardia Onlus and ERSAF (Regional Agency for Agriculture and Forestry Services). This resolution approved a proper Climate Transition Strategy (Strategia di Transizione Climatica - STC), the main aim of this being to reduce and mitigate the risks linked to climate change and, at the same time, to exploit the possibility of redeveloping the territory and restoring the healthy conditions needed for elements such as water, the soil and plant-life can provide ecosystem services, while also organising projects capable of integrating ecological, economic and social issues.

Finally, the Municipality of Bergamo is currently drafting its own Circular Economy Strategy. This establishes a series of good practices at the local level regarding the construction industry, consumer goods and the food sector in order to create support for the replicability of such practices.

Unlike previous plans, the Climate City Contract (CCC) calls for the involvement of the entire city ecosystem, including public and private stakeholders, the Administration as a whole (i.e., its technical, administrative and political parts), investee companies and local citizens. All these have come together to share details of their ongoing and future actions within the municipal area. The drafting of this CCC has afforded the city a good opportunity to align the main municipal planning documents that may have an impact on local greenhouse gas emissions such as, for example, the Sustainable Urban Mobility Plan (Piano Urbano per la Mobilità Sostenibile - PUMS) and the Territory Government Plan (Piano di Governo del Territorio - PGT).

The following list of relevant policies, regulations, strategies and plans that have all contributed and continue to contribute to the drafting of this CCC (section A-2.1) provides a general idea of all the work leading to the compilation of this document at the local, regional and national levels. The aim of this document is not just to consolidate pre-existing strategies, but also to create ever greater synergies between central and local administrations to allow for the increasingly stronger multi-level governance needed to achieve the objective of climate neutrality.

Table A 2.2., on the other hand, shows the most recent policies and strategies where the Municipality of Bergamo has more direct involvement. These policies and strategies are a crucially integral part of the City's strategy to achieve climate neutrality, as will be further explained in Part B of this document.

A-2.1: Description & assessment of policies

The list that follows seeks to highlight the main policies, strategies and regulations relating to the Mission that are being applied by the Municipality of Bergamo. The focus here is on two levels of analysis: local and regional, followed by a brief reference to national policies and their respective possible impacts within the local territory.

Local policies

Sustainable Urban Mobility Plan (PUMS)

The Sustainable Urban Mobility Plan (Piano Urbano della Mobilità Sostenibile - PUMS) is a strategic planning tool which develops a medium-long term (10 years) vision of the urban mobility system (preferably referring to the metropolitan city area, where defined) by setting achievable objectives for environmental, social and economic sustainability. It does this by identifying actions aimed at improving the effectiveness and efficiency of the mobility system and its integration with the urban and territorial structure and developments. The objectives and strategies identified in the Bergamo PUMS work in synergy with the requirements of the Mission to move towards climate neutrality. The Municipality of Bergamo approved its new Sustainable Urban Mobility Plan (PUMS) with City Council Resolution no. 0014-22 dated 05/07/2022. Planned monitoring activities are currently underway which, it is hoped, will soon result in the positive achievement of the Plan's objectives and the drafting of a report on the three-year monitoring campaign.

Urban Mobility Plan for Cycling Strategies (PCSMC)

The purpose of the Urban Mobility Plan for Cycling Strategies (Piano comunale strategico per la mobilità ciclistica - PCSMC) is to promote cycle mobility, identified as an effective and sustainable solution to mobility needs in the urban and peri-urban area of Bergamo, by planning interventions at a local level so that the cycle and cycle-pedestrian network is seen as an integral element of the regional/provincial level network, as well as connecting the major traffic hotspots at a local level (schools, shopping centres, industrial zones, the public transport system and, more generally, places of social, historical, cultural and tourist interest for public use).
After taking into due consideration the planning guidelines contained within the Regional Cycling Mobility Plan (Regional Cycling Mobility Plan - RCMP), the Provincial Plan for the cycle route network and some local planning tools, including the PUMS, the Municipality of Bergamo approved the new "UMPCS - BiciPlan 2022" with City Council Resolution no. 0471-22 of 09/22/2022. The aim of this is to update the contents of the previous 2015 Plan, incorporating the achievements made in the 2015-2022 period, the recent regulatory changes introduced by Italian Decree-Law dated 19th May 2020, no. 34, new predictions using municipal planning tools, as well as directions from the Municipal Administration regarding sustainable mobility. The objectives for cycling mobility are of strategic value for the Mission and include actions strongly linked to sustainable mobility (an expansion of the existing cycle network, improvements in the safety of this network, connections with the collective mobility system, etc.).

Climate Transition Strategy (STC)

The purpose of the Climate Transition Strategy (Strategia di Transizione Climatica - CTS) is to reduce and mitigate risks linked to climate change, while also exploring the opportunity of redeveloping the territory by organising projects capable of integrating ecological, economic and social issues and restoring those healthy conditions needed so that elements such as water, the soil and plant-life can provide essential ecosystem services. The strength of this project is the fact that it involves the participation of numerous partners and stakeholders with a view to collaboration and the distribution of resources. More specifically, these partners are expected to perform 23 actions, including de-paving and urban forestation works which can then be replicated thanks to a consolidated adaptation strategy. At the moment, the STC has reached PHASE III (running from late 2021 to late 2025): the actions envisaged by this strategy are expected to be implemented within this time span and the

results will be constantly monitored. The STC was introduced by the Municipality of Bergamo with City Council Resolution no. 135 dated 8/11/2021.

Circular economy strategy

This establishes a series of good practices at the local level regarding the construction industry, consumer goods and the food sector in order to create support for the replicability of such practices. Still being drafted, this will consolidate a series of actions working in synergy with the objectives of the Mission and the various stakeholders operating within the municipal area.

Urban Traffic Plan (PUT)

Article 36 of Italy's new highway code (Nuovo codice della strada) provides for the drafting of an Urban Traffic Plan (Piano Urbano del Traffico - PUT). This is mandatory for municipalities with more than 30,000 inhabitants. Such a plan comprises a coordinated set of interventions for the improvement of road traffic conditions within the urban area, benefiting pedestrians, public transport and private vehicles alike. These measures should be introduced and operational within a short space of time, providing that the infrastructure and means of transport remain substantially unchanged. The Municipality of Bergamo approved the most recent updates to its Urban Traffic Plan (PUT) with City Council Resolution no. 0045-13 dated 07/10/2013.

Sustainable Energy Action Plan (SEAP)

The Sustainable Energy Action Plan (SEAP, in Italian: Piano d'Azione per l'Energia Sostenibile) is a document drawn up by Municipalities who have signed the Covenant of Mayors to demonstrate how their municipal administrations intend to achieve the objectives of reducing CO_2 emissions. The SEAP had set an objective of -20% of emissions by 2020. The Municipality of Bergamo approved its the Sustainable Energy Action Plan (SEAP) in 2011. This is due to be replaced by the Sustainable Energy and Climate Action Plan (SECAP, in Italian: Piano d'Azione per l'Energia Sostenibile ed il Clima) in 2024.

Territory Government Plan (PGT)

The Territory Government Plan (Piano di Governo del Territorio - PGT) is the city's town planning tool, introduced by Regional Law no. 12 dated 11/3/2005. The drafting of the new Territory Government Plan (PGT) is regulated by Regional Law no. 31 dated 11/28/2014. The PGT organises the objectives to be achieved within the municipal territory under three main headings: Attractive Bergamo, Sustainable Bergamo, Inclusive Bergamo. Planning for the city's future is based on these three strategic lines.
Together with the climate Mission, the PGT identifies 5 macro-objectives for the future of Bergamo:

- Self-transformation of the city;
- Infrastructure and public spaces at the centre of any development;
- Enhancement of the environment;
- Existing public services as the basis for new urban welfare;
- Culture as the driving force for development.

To ensure the Bergamo of the future, general awareness of the theme of sustainability will be achieved by enhancing the environment, strengthening the Green Belt project, protecting agricultural land and developing a climate change adaptation plan.
The PGT requires the approval of regulations to encourage building projects that respect criteria linked to the reduction of greenhouse gas emissions and efforts to prevent climate change.
The Municipality of Bergamo first approved its PGT in 2009. A new PGT for the City of Bergamo was adopted by means of Resolution no. 59 dated 16/10/2023.

Structural green plan

In December 2023 the city council approved its Structural Green Plan with resolution no. 724 Reg.G.C. dated 21/12/2023. This is a framework document that, based on an initial overall assessment of the state of public greenspace and the practices implemented in recent years, lays the foundations for the definition of strategies and future actions in this regard. It also provides for the

subsequent drafting of the Operational Green Plan. This plan is the tool that defines the principles and establishes the policy criteria for the creation of public green space within the general town planning policy. It also encourages investments in new works and maintenance work, as well as setting management priorities for the urban public green infrastructure system. There are currently **2,665,000** square metres of urban greenery managed by the city of Bergamo (an average of 22 square metres per citizen). This green space is spread extremely unevenly between the various districts of the city: the objective is to make it possible for all citizens to easily access nearby urban green space.

Memorandum of Understanding for the Health Sector - "Health services and ecological transition: an alliance between institutions"

This is a memorandum of understanding concerning the health services sector that has been signed by the Municipality of Bergamo, the Order of Surgeons and Dentists - Bergamo (OMCEO), the Health Protection Agency (ATS), the local health authorities (ASST Papa Giovanni XXIII, ASST Bergamo Est and ASST Bergamo Ovest), the University of Bergamo and the Mario Negri Institute of Pharmacological Research in Bergamo. This document foresees for the need to identify actions to reduce the ecological footprint of the healthcare sector: given that the healthcare sector as a whole is responsible for producing a significant amount of CO2 emissions (at least 5%), actions that go beyond the energy efficiency of the buildings and structures used in this sector are necessary. These should involve all healthcare professionals and the entire healthcare services management process in order to reduce their ecological footprint and improve the quality and safety of the care they provide. Private healthcare companies, too, will soon be given the opportunity to sign this memorandum of understanding.

Memorandum of understanding for REC

During the council meeting held on the 21st of December 2023 (Resolution no. 741 Reg. G.C.), the Municipality of Bergamo approved the outline of the memorandum of understanding entitled "Protocollo d'intesa volto ad attività di studio, analisi e lo sviluppo di CACER sul territorio comunale di Bergamo" (Memorandum of understanding for the study, analysis and development of Self-consumption configurations for sharing renewable energy activities within the territory of Bergamo). The purpose of this is to analyse the technical, economic, financial, social and governance issues for the CACER, in line with changes to the regulatory and legislative framework at a European, national and regional level. The memorandum of understanding was proposed by the Municipality of Bergamo and signed by - CERESS S.r.l, A2A Calore & Servizi S.r.l. and ENI Plenitude.

Regional policies

Regional Energy, Environment and Climate Programme (PREAC)

The purpose of the Regional Energy, Environment and Climate Programme (Programma Regionale Energia Ambiente e Clima - PREAC) is to reduce greenhouse gas (GHG) emissions by up to 43.5 million tonnes by 2030 (excluding the sector subject to the ETS, Emissions Trading Scheme). In other words, a reduction of 43.8% compared to 2005. The objective of reducing GHG emissions can be achieved thanks to a 35.2% reduction in energy end-use demand and the production of energy from renewable sources equal to 35.8% of final energy consumption. This can be achieved by strengthening the quantitative objectives already indicated by the Guidelines of the Regional Council in line with policy developments at a national and European level. The Region of Lombardy approved the PREAC in 2022. The direction taken by the PREAC of the Region of Lombardy supports the actions undertaken by the Municipality of Bergamo as part of the "100 Carbon-neutral and smart cities" Mission and will act as a benchmark for the actions described in this Climate City Contract.

Regional Law 23 February 2022, no. 2 for the promotion and development of a system of Renewable Energy Communities (REC) in Lombardy. Towards energy autonomy.

Regional Law no. 2/2022 establishes certain measures for energy transition in the regional socio-economic system. It has set an objective of net carbon neutrality by 2050. More specifically, in order to encourage the production of energy from renewable sources, the Region of Lombardy supports the self-consumption of renewable energy and the creation of energy communities. It also identifies, among the various bodies within the regional system, the entity called the Comunità Energetica Regionale Lombarda (CERL) as responsible for providing technical assistance for the promotion and development of CERs. In 2022, the Municipality of Bergamo commissioned the Bergamo-based company Ceress to carry out a feasibility study concerning the creation of a Renewable Energy Community (REC).

Regional Environmental Energy Programme (PEAR)

The Regional Environmental Energy Programme (Programma Energetico Ambientale Regionale - PEAR) is the regional strategic planning tool for energy and environmental matters. The Region of Lombardy will use this to establish its own energy saving and development objectives for renewable energy sources (RES) in line with the mandatory quotas for the use of RES assigned to each Region as part of the so-called “burden sharing” decree, and new Community Roadmap 2014-2020. The Region of Lombardy approved the PEAR in 2015.

Regional Air Quality Intervention Plan (PRIA)

The Regional Air Quality Intervention Plan (Piano Regionale degli Interventi per la qualità dell’Aria - PRIA) is the planning and programming tool used by the Region of Lombardy to control air quality and reduce airborne emissions to protect the health of the population and the environment. The Region approved the PRIA in 2013 and the later updated version in 2018.

Regional Strategy for Sustainable Development

This strategy sets out the objectives of Agenda 2030 and the National Strategy according to the characteristics, needs and opportunities of Lombardy. Taking into account the objectives set by European, national and regional policies and the current positioning of the region, it sets out the strategic objectives that the Region of Lombardy has undertaken to pursue in order to implement the principle of sustainable development, namely to satisfy the needs of present generations, without compromising its possibility of doing the same for future generations. The Region of Lombardy updated its Strategy for Sustainable Development in 2023 (drawing on the services of FLA and PoliS-Lombardia): approximately 70 targets have been identified, based on regional plans and programmes, together with over 200 indicators regarding the current progress towards each Sustainable Development Goal (SDG) in the region.

Regional Mobility and Transport Programme (PRMT)

The Regional Mobility and Transport Programme (Programma Regionale della Mobilità e dei Trasporti - PRMT) is a tool that provides the framework for the future development of the infrastructure and services needed to ensure the mobility of people and goods within Lombardy. More specifically, this document provides guidelines for making infrastructural choices and reinforces the integrated planning of all services (rail and road transport, navigation and cycling mobility) in order to improve the quality of the offer and spending efficiency. The end goal is a Lombardy “connected with the world”, that is competitive and accessible. The Region of Lombardy approved the PRMT in 2016, valid until 2020. The Municipality is involved in various actions in this area, including: the development of tariff integration, the adoption and spread of electronic ticketing, measures to promote sustainable mobility by reducing the circulation of high-impact vehicles, and initiatives to promote cycling (c.f. the Regional Cycling Mobility Plan).

Regional Waste Management Programme (PRGR) and Regional Polluted Areas Programme (PRB)

The Regional Council approved its Regional Waste Management Programme (Programma Regionale Di Gestione dei Rifiuti - PRGR) by means of Regional Decree no. 1990 dated 20/06/2014. The PRGR includes the Regional Polluted Areas Programme (Programma Regionale delle Aree Inquinate - PRB) and relevant documents foreseen by the Strategic Environmental Assessment (Valutazione Ambientale Strategica - VAS). The technical implementation standards of the PRGR were updated by Regional Decree no. 7860 dated 12/02/2018, which also incorporates the provisions of the new Water Protection and Use Programme (Programma di Tutela e uso delle Acque - PTUA) and Flood Risk Management Plan (Piano di Gestione Rischio Alluvioni - PGRA), as well as other more recent regulations. Lastly, the Regional Council approved the revised PRGR, including the Regional Polluted Areas Programme (Programma delle Aree Inquinate - PRB) by Resolution no. 6408 dated 05/23/2022.
The aim of this programme is to favour the implementation of community strategies for sustainable development, and to act as a programming tool for the Region of Lombardy, allowing it to finalise and integrate all its policies relating to the prevention, recycling, recovery and disposal of waste, as well as the management of polluted sites requiring reclamation.

The most recent national policies and strategies of importance for the purposes of achieving climate neutrality that have been adopted by the Municipality of Bergamo are indicated in the table below. These have allowed the Municipality to take direct beneficial action.

A-2.2: Description of policies and impact at Municipality level			
Level	**Title**	**Description**	**Action by the Municipality of Bergamo**
National	"PNIEC" Update - Integrated National Energy and Climate Plan	The Integrated National Plan for Energy and Climate (Piano Nazionale Integrato per l'Energia e il Clima - PNIEC) contains the national objectives for 2030 regarding energy efficiency, renewable sources and the reduction of CO2 emissions, as well as the goals for energy security, interconnectivity, the single energy market and competitiveness, development and sustainable mobility. A "proposal" to revise this Plan was presented in June 2023 and takes into account the public consultation open to all: private individuals, associations, stakeholders and institutions.	At the direct request of the Ministry itself, the Municipality of Bergamo, together with the other 8 Italian cities involved in the Mission, sent 18 documents to be included as strategies of the new PNIEC.
National	National plan for the containment of natural gas consumption	Published on 17/10/2022, this plan introduces rules for limiting gas consumption during the thermal winter of 2022-2023 as a response to the energy crisis in Italy. It provides for a reduction in the maximum temperature at which buildings may be heated and controls the operating limits for heating systems (namely when they can be switched on, and their management).	The Municipality of Bergamo has implemented this provision across its own properties and has actively encouraged the entire territory to adopt the Plan.
National	National Recovery and	The National Recovery and Resilience Plan (Piano Nazionale di Ripresa e Resilienza - PNRR) is part of the Next	The Municipality of Bergamo is using PNRR funds to finance the

	Resilience Plan (PNRR)	Generation EU (NGEU) program: a 750 billion euro package (approximately half of which in grants) agreed by the European Union in response to the COVID-19 pandemic. The main component of the NGEU programme is the *Recovery and Resilience Facility (RRF)*, lasting six years (2021 - 2026), worth a total 672,5 billion Euros (312,5 billion in grants, the remaining 360 billion as loans at subsidised rates). The Plan is divided into 6 Missions, or thematic areas, for intervention.	development of new significant measures to contain emissions.
	National Energy Strategy (SEN)	Known as SEN2017, this is the result of a structured joint process that lasted a year involving a variety of stakeholders from its very conception (public bodies operating in the field of energy, electricity providers, gas distribution networks and qualified experts in the energy sector). The purpose of this strategy is to render the national energy system more competitive, securer and more sustainable.	The Municipality of Bergamo benefits from national financing amounting to approximately 175 billion by 2030, to be distributed throughout the territory.
	National Climate Change Adaptation Plan (PNACC)	The National Climate Change Adaptation Plan (Piano di Adattamento ai Cambiamenti Climatici - PNAC) was developed in order to implement the National Climate Change Adaptation Strategy (Strategia nazionale di adattamento ai cambiamenti climatici - SNAC), approved by Directorial Decree no. 86 dated 16/06/2015 by the then Ministry for Environment, Land and Sea Protection. It has two main objectives: to provide guidelines for those required to plan and implement the most effective climate change adaptation measures in Italy, with a special focus on the critical issues encountered, and to integrate adaptation criteria into existing planning procedures and tools. Work is currently under way to make progress regarding the document validation procedure for the Strategic Environmental Assessment (VAS) and the Environmental Impact Assessment.	The Municipality of Bergamo refers to the guidelines presented by the PNACC and corresponding Environmental Impact and Strategic Assessments.
National	Memorandum of understanding for the pursuit of the objectives of the European Union Mission “Climate-	Memorandum of understanding between the 9 cities and the Ministry of Infrastructure and Sustainable Mobility (MIMs)	As of September 2022, the Municipality of Bergamo is an integral part of the strategic process aimed at achieving climate neutrality.

	neutral & smart cities”		

The table below provides a summary of the SECAP baseline emissions (Column 1), the potential reduction in emissions through application of the SECAP strategies (Column 3) and, finally, the corresponding objective that the Municipality of Bergamo has set itself in this document (Column 5). Column 2 shows the reduced emissions target for 2030. Last but not least, Column 6 shows the residual Emissions Gap, i.e. the section that includes those emissions that the city unable to reduce for technological, economic, social or environmental reasons. As per the NZC model, this quantity will amount for 20% of the overall total baseline emissions.

A-2.3: Emission Gap											
	(1) Baseline emissions	**(2) Emissions Reduction Target 2030**		**(3) Emission reduction through other Action Plans**		**(4) Emissions Gap**		**(5) Emissions reduction through the CCC Action Plan to address the Gap**		**(6) Residual emissions**	
	Baseline emissions (ideally not older than 2021) - referring to the inventory used for target setting	The emissions reduction target for 2030 ideally achieves a minimum 80% reduction from the baseline, as reported in Section 2 of the Commitments document of the CCC. The overall target should be absolute or net-zero (i.e. including the compensation of any residual emissions).		These are the emissions reductions that would be achieved through existing policies, and plans, outlined in Section A-2.1. Those actions are by definition not part of the action portfolio in section B. If they are fully or partially incorporated in module B-2, their associated reduction potential should be referenced in column (5) and not be included here. WARNING if the baseline is a BAU scenario: If the BAU modelling includes any of these existing measures, please also do not include the associated emissions reduction in this column as otherwise it would be double counted.		(4) = (2) – (3)		This column is used to present the already quantified emission reduction associated with the action portfolios outlined in module B-2. Ideally, this equals the gap. If the there is a difference between the reduction potential of the actions specified in module B-2 (for instance because their reduction potential has not been fully estimated or because additional measures will be identified in future iterations), the CCC AP should be explicit about this difference and explain how the difference will be closed. In principle, as long as the difference has not been addressed, it would be considered as part of the residual emissions.		(6) = (1) – (2)	
	(absolute) (specify units)	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)	(absolute)	(%)
Buildings	377.960,08	302.368,06	*80,00%*	87.402,92	*23,12%*	214.965,14	*56,88%*	77.272,18	*20,44%*	75.592,02	*20,00 %*
Transport	83.895,22	67.116,17	*80,00%*	24.494,04	*29,20%*	42.622,14	*50,80%*	1.786,74	*2,13%*	16.779,04	*20,00 %*
Waste	3.790	3.032.00	*80,00%*	-	-	3.032.00	*80,00%*	-	-	758,00	*20,00 %*
Industrial Process and Product Use (IPPU)	-	-	-	-	-	-	*0%*	-	-	-	*0,00%*
Agricultural, Forestry and Land Use (AFOLU)	-	-	-	6.42		-	*0%*	714,04		-	*0,00%*
Transversal	-	-	-	-	-	-	*0%*	17.214,01		-	*0,00%*
Behavioural	-	-	-	-	-	-	*0%*	74.503		-	*0,00%*
Total	**465.645,30**	**372.516,24**	***80,00%***	**111.903,38**	***24,03%***	**260.619,28**	***55.97%***	**171.488,55**	***36,83%***	**93.129,06**	***20,00 %***

The table above shows how – net of the contributions due to the “Reduced emissions through other existing Action Plans” (column 3) and the “Reduced emissions through the CCC” (column 5) – further reductions in emissions are required in order to reach the 80% reduced emissions target. More specifically, the difference in CO_2 emissions between the total emission gap in column 4 and that in column 5 amounts to approximately 89.130 tCO_2eq. The strategies identified to entirely reduce this quantity of emissions are described in detail in paragraph B-2.3.

Furthermore, it should be underlined that the AFOLU and IPPU sectors are not considered within the baseline as highlighted in column (1) Emissions from baseline in the table above: as reported in the GHG Inventory Baseline Guidance, they can be considered insignificant, and therefore excluded from the baseline, the sectors that do not exceed 5% of overall emissions. Since AFOLU and IPPU together account for 2% of the total, they were not included in the calculation of baseline emission.

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

Form A-3 details the stakeholders involved in drafting the document. All stakeholders who responded to the calls for an expression of interest by the Municipality of Bergamo in September and October are included here, the first addressed to internal stakeholders, the second to external stakeholders (non-municipal bodies). The events aimed at the stakeholders do not impose any constraints regarding adhesion to the Mission: the Municipality's prime goal is, as always, the large-scale spread and promotion of the project aimed at sparking a virtuous bottom-up participation process in future years. Not all the stakeholders, therefore, have presented actions that fall within the scope of this Action Plan and which will be presented in detail in the table below.

A-3.1: Description of urban systems, systemic barriers, and opportunities

Below are details of the main barriers encountered by the individual partners participating in the Mission, as expressed during the process of collecting actions and investments using the specific forms.
Reflecting the sectors expressed by the NZC, these barriers are split into structural, political, economic and financial categories, both with regards to the process of reducing emissions and the use of capital to finance the Mission. Possible solutions are indicated for each barrier, with details of the specific actions that the Municipality and/or stakeholders are engaged in to achieve these.

Transversal barriers

This section contains all those barriers that affect one or more of the relevant sectors within the Mission, i.e. across the board.
One of the most relevant barriers affecting all NZC sectors is that relating to the **constantly changing political and regulatory framework** for energy and climate transition at the European, national and regional levels.
This uncertainty makes it particularly complex for local actors to plan and finance any transition that requires wide-ranging planning and a long-term perspective. A good example of this is the implementing decree presented by the Italian government to the European Commission two years ago regarding self-consumed energy production within the so-called Renewable Energy Communities. The European Commission gave the green light to the decree in November this year, however we must wait to see what the Ministry's next steps will be when it comes to formally promulgating this decree.
Furthermore, unlike other European countries, Italy still has no specific Climate Law that defines, sector by sector, the actions and tools required at a national level in order to achieve climate neutrality. So there are currently no national provisions regarding the transfer of the various forms of economic development support for activities and actions that currently worsen the climate crisis to activities and actions aimed at climate change mitigation and adaptation. This reflects the low levels of interest in sustainability and the need for a shared, synergistic vision of the environmental problem.
In terms of possible solutions, the Municipality of Bergamo is working on developing effective multilevel governance to respond efficiently to the challenges posed by the Mission: this objective is pursued by all the cities involved within the Mission through the "Let'sGov" project, the aim of which is precisely that of identifying and overcoming the barriers that disregard the skills and potential offered by local actors and depend on supra-local levels, such as the political and regulatory framework.

The way stakeholders have been directly involved in the drafting of this document clearly shows how the actors have adopted a **sectoral approach**, both in terms of 'public' and 'external' sectors. The

complexity of creating synergies between different sectors that historically have a silo mentality is a real barrier for the Municipality of Bergamo, and it clearly needs to face this challenge if it wants to overcome sectoral logics and achieve effective and inclusive climate transition.

Another significant and critical issue is linked to the **development of the electricity grid**: indeed, at a national level, the current infrastructure is not capable of meeting the objectives of electrification of consumption and the production of renewable energy in line with the prospect of climate neutrality by 2030. This is why urgent action and investments are now needed to massively upgrade the electricity grid. Discussions are ongoing at a national level, involving all sector players, including Terna S.p.A., responsible for operating Italy's high voltage electricity grid and meeting the European objectives (including those of promoting the integration of renewable sources, increasing the level of security and resilience of the electricity system and investing in the digitalisation of the grid). Various problems are posed by the grid responsible for powering the city of Bergamo, with vast areas deemed to be 'critical' and/or at risk of saturation. This represents a considerable obstacle for local authorities, businesses (including agricultural firms interested in agri-voltaic initiatives) and citizens wishing to install photovoltaic systems of all shapes and sizes, as this risk being subject to delays and critical issues due to difficulties in connecting such systems to the electricity grid.
The Municipality of Bergamo wishes to minimise the impact of this problem by encouraging effective dialogue not only between all institutional levels and the institutional operators of the electricity grid, but also with private operators. In fact, the city has adopted bilateral agreements with private partners, for example that with A2A for district heating. Furthermore, there is the feasibility project that FRI EL GEO is currently involved in within the municipal area of Bergamo in order to provide the city with a geothermal energy source.
At a transversal level, it is worth remembering that **economic and behavioural barriers** have an additional impact.
Historically, Italy has shown little interest in the environment, meaning that the resources allocated for ecological transition are limited and hard to find, especially within local municipal budgets. It is only as a result of the interest shown at a European level since 2020 that considerable funds have now been allocated. The PNRR is just the most recent, aimed at the development of large infrastructures based on the principle of sustainability and cost-effectiveness. At a local level, the Municipality needs to boost its internal capacity to attract European and national public funding, such as through public and private partnerships aimed at creating notable synergy at a public and private level. Moreover, the activation of innovative financial instruments, such as self-financing in the case of RECs, also represents an opportunity for individual citizens to contribute to the ecological transition of the community as a whole.
The limited spread of a climate culture among our citizens and a lack of inclination to change lifestyle is, perhaps, the most alarming 'hidden' barrier on the path to achieving climate neutrality in the city. Indeed, although they may express their concerns and perplexities regarding climate change, citizens do not always seem willing to actually change their lifestyles. This lack of inclination should also be taken into account when preparing communications concerning ecological transition, as the language is often highly technical and not always immediately accessible. Here the Municipality should provide correct information and suitable education for all segments of the population, primarily within the school system by means of teaching and awareness-raising activities focussing on ecological transition, making savings and the circular economy.
Finally, another critical issue that has emerged at the transversal level is data availability: this is particularly so at the municipal level owing to the difficulties met in planning and monitoring energy transition at a local level. This barrier has the same urgency at both a public and private level. One such barrier is the designation of role managers: in the mobility sector, for example, the role of Mobility Manager has been mandatory at a public and private level since 2020 for municipal bodies with over 50,000 inhabitants and private companies with more than 100 employees. When it comes to planning activities relating to mobility, the Mobility Manager needs to access data and provide estimates within

the specified scope. Moreover, many Mission partners who are private companies have presented digital platforms and software for monitoring consumption and industrial processes: at a production level, the adoption of such solutions on a digital scale may prove useful in reducing consumption levels and improving production process efficiency.

Barriers in the Buildings sector

As is the case in many Italian cities, Bergamo's historic town centre contains a large number of buildings subject to **landscape and architectural restrictions**, and therefore subject to specific authorisation procedures and the opinion of the competent executive department (Soprintendenza Archeologica, Belle Arti e Paesaggio). Any energy efficiency intervention that may affect the load-bearing structure of such 'listed' buildings becomes highly problematical, as does the installation of photovoltaic panels on their roofs. In order to avoid disturbance of the visual character of historic buildings, the Municipality should promote a new approach to the redevelopment of historic buildings, one that combines the preservation of the cultural and architectural heritage with good design practice to allow for the installation of renewable energy production plant.
To make such interventions faster to complete and more efficient, it might be a good idea to review and modify current regulations (local and regional regulations, at least).
As is widely known, energy efficiency interventions involve **huge investments**, with very little chance of short-term returns. This represents a barrier both for public authorities and for individual citizens and producers. The national economic incentives known as the "Bonus facciate" and the "110% Superbonus" (tax relief schemes for renovations) have failed to offset the general increase in prices and exorbitant expenses that have, in some cases, led to the suspension or even cancellation of redevelopment projects due to a lack of funds. Certain national **construction constraints** based on sustainability principles (the so-called Minimum Environmental Criteria - CAM) and linked to the broader sector of Nearly Zero Energy Buildings must be respected during the design and construction phases, resulting in a further increase in the overall costs.
The public system of subsidies and incentives aimed at improving energy efficiency needs to be strengthened in order meet the Mission objectives. This means economic aid in financing the transition to renewable sources and, at a cognitive level, campaigns to raise public awareness and provide information regarding the possibilities and what incentives are available.

Barriers in the Mobility and Transport sector

The major barriers here are **behavioural and cultural**: resistance to change and a lack of awareness of how a person or entity's behaviour can have repercussions on the effectiveness of projects aimed at boosting local public transport and the development of soft mobility infrastructure. Mere economic incentives are often not enough to make more people use public transport: crowding, safety and punctuality are the most common faults mentioned by private citizens as the reasons why they prefer not to use public transport.
Alternatives to local public transport (such as car sharing) are not themselves problem free (e.g. availability during rush hours, integration in the use of IT platforms, road safety, etc.).
Citizens will play an active integral part in any transition involving all stakeholders: the Municipality and public bodies should promote public awareness campaigns, education in the schools, innovative sustainable mobility projects and intermodality, as well as bolstering alternative mobility services. All this should go hand in hand with a firm commitment on the part of the institutions to improve travel conditions and increase the availability of local public transport. The local transport company (ATB) will prove crucial in ensuring that the sustainable mobility goals are met at a municipal level. It will be required to act in synergy with all the local players in order to raise awareness of the issues at stake (including public employees, students and employees in the private sector).

The cost of making improvements to local infrastructure are often very costly: local administrations are only too well aware of this and are often unable to act due to high investment costs and their inability to find major sources of long-term financing. This barrier is linked to the one already discussed affecting the Buildings sector: both are linked to European, national and regional policies and governance aimed at supporting climate and energy transition, and to the ability of local governance to attract investment in ambitious long-term projects. Time constraints for the completion of financed interventions is a further challenge for local administrations planning innovative projects in this sector, as there are often long and complex bureaucratic procedures involved.
What is more, some of the barriers indicated by the local transport company (ATB) are rapid technological change and the high rates of replacement and servicing for electric, hybrid or hydrogen vehicles. Indeed, the life cycle of batteries is still a costly process in economic and environmental terms: it is hoped that this will become more efficient in the future, thanks also to technological innovation.

Barriers in the Waste and Wastewater sector

The healthcare sector, in particular, produces huge amounts of waste: by its very nature it requires the use of disposable products and materials that then call for expensive disposal processes. Despite current **technical and procedural difficulties**, this sector is committed to reducing its use of disposable products and to purchasing more sustainable green products, as set out in a memorandum of understanding signed by all local entities with the Municipality. Even individual citizens can contribute in this regard by reducing the amount of waste they produce and adhering to the rules of the now mandatory door-to-door separate waste collection scheme run by the subsidiary Aprica S.p.A.
Behavioural barriers affecting citizens across the board have a major impact the effectiveness of waste disposal schemes. it is hoped that communication (public education and awareness campaigns) and support (appropriate tools and widespread actions across the territory, including in schools and companies) may improve this situation. It is also important that the Municipality encourages and introduces good reuse and recycling practices as this can break down barriers and increase awareness of the benefits of a circular economy.
In terms of waste water treatment, the Municipality of Bergamo benefits from having a highly valued partner: Uniacque S.p.A. This utility company operates both inside and outside the municipal territory and has made significant innovative advances in wastewater treatment processes despite all the red tape that often leads to delays in obtaining authorisation and undertaking projects dependant on public funding, and **laws and regulations** that sometimes create obstacles for hi-tech experimental plants. Added to this are the **barriers of technical and plant complexity**, which are not always predictable.

Barriers in the IPPU sector

Given the reduced importance of the Industrial Processes and Product Use (IPPU) sector within the municipal territory, only one main barrier is worth mentioning here: **the availability of funds** for projects often involving huge investments, production stoppages and a quantifiable medium-long term return on investment. Only a few of the actions in question here are actual plans: the majority are feasibility studies due to these difficulties in getting approval for projects, even in the private sector.

Barriers in the AFOLU sector

Given the urban nature of the city of Bergamo, there are clear physical and territorial limits for the development of projects related to Agriculture, Forestry, and Other Land Uses (AFOLU): historically, the city mostly dates back to an era when green spaces were all kept outside the city limits.

Consequently, re-greening schemes must include concrete spaces and buildings (e.g. green roofs and green walls) in order to increase green spaces and peri-urban forestry. Areas such as these within the urban fabric can help minimise the problem of heat islands.
As with the other sectors already considered, it is again crucial that private stakeholders are involved in re-greening schemes and the planting of new plants and tree species.

The table below lists the various external stakeholders and municipal departments and their respective areas of interest. Overall, XX municipal departments and XX external stakeholders are involved. Most of the external stakeholders are involved as the result of the call for an expression of interest in creating territorial synergies and tackling the challenge of climate neutrality together that was intended for all local actors whose actions have a direct or indirect impact on the municipal area of Bergamo. The role to be played by **citizens** should also not be overlooked: widespread involvement of the population is a key element for the success of the Climate Mission. The Municipality of Bergamo is actively engaged in involvement, engagement and training initiatives aimed at various segments of the population, starting with primary schools.

To guarantee the transparency of the Climate City Contract project, the Municipality has entered into a partnership a Bergamo based provider of technological solutions for sustainable digital transition, SuperUrbanity, for the creation of a platform to ensure visibility for the citizens, the actors involved and the projects still in the pipeline that fall within the Climate Mission.

A-3.2: Systems & stakeholder mapping			
System	**Stakeholders**	**Influence on the city´s climate neutrality ambition**	**Interest in the city´s climate neutrality ambition**
Private company	A2A	Research and development of sustainable electricity generation technology	A multi-service company operating various sectors (environment, energy, heat, networks and smart city technology), engaged in the production, distribution and sale of electricity and gas, waste management and environmental services, as well as product development and services for energy efficiency, circular economy, electric mobility and smart cities.
Public body	ASST Bergamo Est	Diffusion of ESG practices within its sector	Public hospital structure operating within Italy's national health system (SSN)
	ASST Bergamo Ovest	Diffusion of ESG practices within its sector	Public hospital structure operating within Italy's national health system (SSN)
Public body	ASST Papa Giovanni XXIII	Diffusion of ESG practices within its sector	Public hospital structure operating within Italy's national health system (SSN)
Subsidiary	ATB Mobilità S.p.A.	Development of sustainable solutions for Local Public Transport	Design and provision of public passenger transport services
Public body	ATS Bergamo[2]	Diffusion of ESG practices within its sector	Public hospital structure operating within Italy's national health system (SSN)
Private company	Bemoa S.r.l.	Diffusion of ESG practices within the construction sector	Design, construction, renovation and maintenance of civil buildings with a view to sustainability and ESG criteria.
Research centres	Bergamo Scienza	Training and awareness activities for citizens (festivals and events)	Creation of a new culture of scientific dissemination, capable of "educating" people, especially young people; increased interest in and growth of a culture of knowledge-based development; guaranteed dissemination method based on cultural independence and usability accessible for all; free entry to all events
Private company	BRT S.p.a.	Development of sustainable solutions for local logistics	Management of local logistics and goods delivery services

[2] The Municipality of Bergamo is awaiting for official signature by the partner. Nevertheless there is a current MoU signed by the partner and the Municipality of Bergamo for joint actions within the perimeter of the CCC.

Private company	Centri Servizi Aziendali - COESI	Diffusion of ESG practices within its sector	Territory development based on the centrality of the person, with the valorisation of human resources, protection of rights, participation, social and environmental sustainability, inclusion, protection of the vulnerable and quality of life.
Private company	CERESS S.r.l.	Research and development of sustainable electricity generation technology	Consultancy services for energy production systems, promotion of sustainable technology research and development
Trade associations	Confcooperative	Training and awareness towards sustainable practices	Representation, assistance, protection and review of the cooperative movement and social enterprises
Trade associations	Confindustria	Promotion of the circular economy and sustainable practices among local businesses	Promotion of the local economy, studies and communication, business registry and market regulation activities
Private company	Consorzio SBAM	Development of fair and sustainable housing solutions	Local projects to guarantee the right to housing
Private company	Consorzio SOLCO	Facilitator of synergies within the territory	Innovation and creation of growth opportunities within the territory; local community development
Private company	Costim S.r.l.	Diffusion of ESG practices within the construction sector	Design, construction, renovation and maintenance of civil buildings with a view to sustainability and ESG criteria.
Private company	Different Solutions	Innovation in materials and products for the diffusion of sustainable circular practices	Manufacture of machines for special uses not otherwise classified (including parts and accessories)
Municipal department	Direzione Ambiente, Verde pubblico e Mobilità (environment, public green space and mobility)	Development of new mobility and green areas	Sustainable mobility, traffic calming, micro-mobility systems and other management activities regarding traffic, road circulation, permits and viability. PUMS and PULS. Development of nature-based solutions (NBS) and urban green space management
Municipal department	Direzione Edifici ed Impianti (buildings and systems)	Development of sustainable and accessible buildings	Management of design, construction, quality control and testing procedures for new works and systems, and building maintenance; supervision of works and constructions to reduce seismic risk
Municipal department	Direzione Edilizia Scolastica, sportiva e opere pubbliche di	Development of sustainable and accessible buildings	Management of design, construction, quality control and testing procedures for schools and sports facilities

	riqualificazione (schools, sports facilities and public requalification works)		
Municipal department	Direzione Gare ed Appalti, Lavori Pubblici, Infrastrutture e strade (calls for tenders and contracts, public works, infrastructure and roads)	Definition of more stringent ESG criteria for procurement contracts and calls for tenders	Coordination of calls for tenders and management of public works and public lighting
Municipal department	Direzione Generale (general management)	Dissemination of ESG practices, training and awareness	Coordination of internal departments
Municipal department	Direzione Patrimonio e Servizio Abitativo (heritage and housing)	Development of sustainable and accessible buildings	Design and construction of new ERP and ERS housing, housing assignment, interventions for housing problems, maintenance of public real estate
Municipal department	Direzione Risorse Umane, Servizio Associato e sicurezza nei luoghi di lavoro (human resources, associated services and safety in the workplace)	Equal accessibility and safety in the workplace	Personnel management and coordination
Municipal department	Direzione servizi polifunzionali e innovazione (multifunctional services and innovation)	Digitalisation	Development and coordination of IT and telematic systems; management of the technological/administrative aspects of data transmission; digitalisation of processes and management of online services; security of internal IT structures
Municipal department	Direzione servizi socioeducativi (social/educational services)	Dissemination of ESG practices, training and awareness	Development and coordination of educational services at all levels
Municipal department	Direzione Urbanistica e Edilizia Privata (town	Development of sustainable and accessible buildings	Planning and evaluation of the urban and territorial development of the city

	planning and private construction)		
Private company	Edison Next S.p.A.	Research and development of sustainable electricity generation technology	Active in the procurement, production and sale of electricity and gas.
Private company	Esprinet S.p.A.	Digitalisation	Enablers of the technological ecosystem with a deep vocation for environmental and social sustainability.
Private company	Esselunga	Diffusion of ESG practices within its sector	Non-specialised retail shops selling food and non-food products, with home delivery and e-commerce sales.
Foundation	Fondazione Cariplo	Training and awareness activities for citizens (festivals and events)	Mitigation of inequalities, especially by supporting the most vulnerable members of society, and the promotion of economic and social growth within the territory
Foundation	Fondazione Casa Amica	Promotion of social housing	Offer of rented accommodation with rent control and social support for tenants in conjunction with public bodies and local associations
Foundation	Fondazione Civiltà Bergamasca	Training and awareness of new sustainable circular practices	Advice and training in social, economic and inclusion matters
Private company	FRI-EL GEO	Research and development of sustainable electricity generation technology	Design, installation and maintenance of geothermal systems
Municipal department	Garante per i diritti dell'infanzia (guarantor of children's rights)	Protection and valorisation of children	Training and dissemination
Private company	Humanitas	Diffusion of ESG practices within its sector	Private hospital offering diagnosis and treatments with normal hospitalisation.
Private company	Istituto di Ricerche Farmacologiche Mario Negri (Mario Negri Institute of Pharmacological Research)	Diffusion of ESG practices within its sector	Public hospital structure operating within Italy's national health system (SSN)
Private company	Legambiente	Training and awareness activities for citizens (festivals and events)	Valorisation of the city's natural ecosystem; engagement and continuous training

Private company	Legami S.p.A.	Innovation in materials and products for the diffusion of sustainable circular practices	Innovation in materials and production processes, offering stationery products, giftware, accessories, gadgets and other products (diaries, calendars, exercise books, notebooks, bags, backpacks, mobile phone covers and hi-tech products).
Private company	Marlegno S.r.l.	Diffusion of ESG practices within the construction sector	Design, construction, renovation and maintenance of civil buildings with a view to sustainability and ESG criteria.
Private company	Ordine dei Medici Chirurghi e Odontoiatri della Provincia di Bergamo (Order of Surgeons and Dentists - Bergamo)	Diffusion of ESG practices within its sector	Public hospital operating within the National Health System; coordination between the various bodies operating within the local healthcare sector
Municipal department	Pianificazione e controllo strategico e management dei progetti europei (strategic planning and control / management of European projects)	Increased interest in seeking European funding	Coordination of European projects and management of pertinent resources
Public body	Provincia di Bergamo (province of Bergamo)	Diffusion of ESG practices within its sector	Protection of public interests and institutional relations regarding public issues
Private company	S.A.C.B.O. S.p.A.	Diffusion of ESG practices within its sector	Administration and management of airport infrastructures and coordination of the activities of the various operators working within Milan Bergamo Airport
Private company	Sercar S.p.A.	Diffusion of ESG practices within its sector	Canteen management, catering and the production, packaging and transportation of hot meals.
Private company	SIAD S.p.A.	Diffusion of ESG practices within its sector	Research and development, production, marketing and bottling of compressed, liquefied and dissolved gases and their mixtures. Distribution and transportation of liquefied gases. Chemical and microbiological analysis services and the development of feasibility studies for water treatment processes.

Private company	SIMAP S.r.l.	Innovation in materials and products for the diffusion of sustainable circular practices	Wholesale of natural rubber, plastic materials in their primary forms and semi-finished products
Private company	Teal Blue S.r.l.	Digitalisation	Production of software and systems for process digitalisation
Private company	Uniacque S.p.A.	Diffusion of ESG practices within the construction sector	Management of the integrated water service Supply of chemical and microbiological analysis laboratory services for the integrated water service
Public body	Università degli studi di Bergamo (Bergamo university)	Training and awareness towards sustainable practices	Internal and external research and training towards sustainability and ecological transition; development of innovative solutions
Private company	Verde 21 S.p.A.	Diffusion of ESG practices within its sector	Design and energy independence for sustainable development
Private company	W2W Solutions S.r.l.	Digitalisation	Consultancy services for Industry 4.0 training and the design of innovative I4.0 systems and solutions

3 Part B – Pathways towards Climate Neutrality by 2030

This module presents the various impact pathways that the actions contained in the Action Plan will help create within the territory of the city of Bergamo in each sector (Energy systems, Mobility and transport, Built environment, Waste and the circular economy, Green infrastructures and NBS). The objective of the **Theory of Change**, on which this section is based, is to show the transversal effects that individual actions can have, starting with the systemic levers of change set out in the Theory itself. The impact pathways are organised by the levers of change to which the various actions refer. These levers are: Technology, Governance, Social Innovation, Democracy and participation, Finance and investments, Training and information.

3.1 Module B-1 Climate Neutrality Scenarios and Impact Pathways

In order to shed light on the **synergies** between the various actions and their respective impacts, the table below includes details of the expected short/long-term changes and how these are directly/indirectly linked to other initiatives within the same sector or other sectors. The chosen layout shows any causal connections between each expected change and the necessary preconditions for each change. The systemic development of the Theory of Change is a demanding challenge for the Administration and all the bodies involved in the Mission compared to the development of just a single project or programme, as it necessarily involves different organisations and groups of actors working across different sectors and in different contexts.

B-1.1: Impact Pathways – Energy Systems					
Fields of action	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions**	**Indirect impacts (co-benefits)**
Energy systems	Technology	Technological improvements in terms of efficiency and generation of energy from renewable energy sources	Further technological innovations and improved cost efficiency	Increased local production of energy from renewable sources	Improved air quality: reduced dependence on fossil fuels; involvement and awareness of citizens in climate projects; creation of new jobs
	Governance & Policy	Political and institutional support	Widespread political and institutional support		
	Social innovation	Promotion of renewable energy communities	Promotion of bottom-up climate actions		
	Democracy and participation	Engagement of citizens in the objectives of the Mission	Participation of citizens in large-scale projects		
	Funding	Incentives and financial support for the development of renewables	Return on investments and on the sale of network-produced energy		
	Learning and knowledge	Involvement of internal and external stakeholders in the development of renewables	Involvement of internal and external stakeholders in the development of renewables		

Impact Pathways – Mobility & transport					
Fields of action	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions**	**Indirect impacts (co-benefits)**
Mobility & transport	Technology	Development of new technologies for sustainable mobility	Widespread electrification of consolidated public and private fleets and the necessary infrastructure	Reduced emissions from fossil fuels, improved local public transport; reduced private transport-related energy consumption; development of sharing economy services; increased road safety	Improved air quality, traffic and public health; noise reduction, involvement and awareness towards sustainable practices; creation of new jobs, increase in territorial competitiveness
	Governance & Policy	Development of infrastructure needed for the development of electric mobility	Legislation to promote the new electric mobility standard		
	Social innovation	Development of sustainable mobility models that include all sections of society	Ensuring social inclusion in the development of new mobility plans		
	Democracy and participation	Involvement of citizens in the development of sustainable mobility plans	Support of the population in improving mobility programs		
	Funding	Incentives to support the transition towards	Consolidation of financial resources to support the transition		

		sustainable alternative mobility	at a local, national and European level		
	Learning and knowledge	Mobility information for citizens	Definition of a new innovative replicable standard for local public transport		
Impact Pathways – Built environment					
Fields of action	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions**	**Indirect impacts (co-benefits)**
Built environment	Technology	Improved building energy efficiency	Diffusion of building technologies for positive impact buildings (PEB)	Overcoming of regulatory constraints to improve the efficiency of listed buildings; reduced energy consumption by buildings; increased energy production from renewable sources	Reduced energy requirements for buildings; reduced dependence on fossil fuels; improved quality of life; definition of new standards for sustainable living; increased overall property values
	Governance & Policy	Political and legislative support for the development and application of technology	Large-scale diffusion of sustainable housing standards		
	Social innovation	Guaranteed right to housing for all members of society	Guaranteed dignity of housing linked to adequate eco-sustainable standards		
	Funding	Financial support for the development of the green transition of buildings	Increased awareness of private entities regarding loans for the requalification of private properties		
	Learning and knowledge	Strengthening of knowledge and training services for citizens	Thematic desks for citizens and businesses		
Impact Pathways – Green infrastructure & nature-based solutions					
Fields of action	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions**	**Indirect impacts (co-benefits)**
Green infrastructure & nature-based solutions	Technology	Technological development to guarantee efficient interventions	Extension and replicability of innovative solutions on a large scale	Reduced GHG emissions and mitigated climate-change impacts on central urban areas; more trees in the city	Increased urban green spaces, increased biodiversity and ecosystem services, increased number of heat waves, increased urban water drainage; improved quality of life; increased territorial synergies
	Governance & Policy	Legislation in line with the objectives of the Mission	Legislation in line with the objectives of the Mission		
	Social innovation	Social inclusion in solutions with a big impact on town planning for the city	Participation of citizens in the development and improvement of NBS projects		
	Learning and knowledge	Continuous improvements in current technologies	Development of research and development centres		
Impact Pathways – Waste & circular economy					

Fields of action	Systemic levers	Early changes (1-2 years)	Late outcomes (3-4 years)	Direct impacts (Emission reductions	Indirect impacts (co-benefits)
Waste & circular economy	Technology	Use of low-emission technologies	Development of new technologies	Technological innovations to reduce the impact of emissions; reduced amounts of waste sent to landfill	Greater competitiveness of innovative companies; change in consumption habits; improved healthiness of the urban environment; greater diffusion of sustainable practices; increase in territorial synergies
	Governance & Policy	Tax relief	Regulatory adaptation to the Mission's objectives		
	Social innovation	Engagement in recycling waste collection	Spread of circular economy project		
	Funding	Innovative fundings for circular economy	Future financial availability for investments in research and development		
	Learning and knowledge	Implementation of current municipal policies and initiatives for the training and involvement of citizens for reuse and recycling	Increasing of good practises and habits by citizens		

B-1.2: Description of impact pathways
All six levers set out above are pertinent to their corresponding fields of action. Nevertheless, the impact of each lever may vary substantially depending on the particular field of action and even more so as the prevailing conditions change in the future. Indirect impacts concern a complex mix of impacts, ranging from improvements in quality of life to improved air quality, better competitiveness of specific sectors, the spread of sustainable practices among the population and reduced dependence on fossil fuels. These are some of the benefits that such actions offer.

3.2 Module B-2 Climate Neutrality Portfolio Design

The Municipality of Bergamo has been engaged for some time now in planning and implementing concrete actions within its municipal territory aimed at mitigating GHG emissions by means of specific plans and strategies.
This chapter shows the individual actions that the stakeholders involved at a territorial level have contributed to the Mission. The added value of the CCC compared to the plans already in place is the identification of the individual actions planned since 2021 (SECAP baseline year) and lasting until 2030. To provide a full picture of each stakeholder's contribution, we have included an analysis of any **future actions** currently being considered. Indeed, the broad time horizon of this document means that these can be deemed to all intents and purposes as actions that contribute to a reduction in the city's GHG emissions.
The action portfolio is the result of a **co-planning** process initiated by the Municipality of Bergamo together with stakeholders active in the area, as described in detail in Module C-1. This work, conducted in a synergistic manner between all actors, has led to the identification not only of the actions and impacts on the city, but also the barriers and opportunities for the specific sectors involved within the territory, as illustrated in Module A-3.
Overall, the Municipality has attracted the involvement of 40 public and private stakeholders, operating both within the city itself and in the peri-urban areas. One specific characteristic that has emerged is the presence of a large network of companies and stakeholders who operate within the city of Bergamo or in partnership with it, but are physically based outside the municipal border. To take into account those who have expressed an interest in the Climate Mission and provided contributions consistent with the objectives of climate neutrality, Table B-2.2d details all the actions presented by stakeholders operating outside the municipal boundaries without considering their actual contribution in terms reduced $CO_{2eq.}$ emissions, precisely because they are based outside the city limits.

Following the indications of the Net Zero Cities platform, the actions will now be divided into the following **sectors**: Buildings, Transport, Waste and Wastewater, IPPU (Industrial processes and product use) and AFOLU (agriculture, forestry and other land uses). The Transversal sector has also been included for the sake of completeness, as this includes actions and initiatives with impacts on more than just one of the above sectors.

Each action is also categorised, according to the NZC convention, as a measurable, behavioural or policy/governance action. Measurable actions are those directly quantifiable in terms of GHG emissions and/or at an economic level. Behavioural actions, on the other hand, are related to training and/or socio-cultural events which can lead to changes in lifestyle and increase sensitivity and awareness of issues linked to the objectives of the Mission. Finally, policy/governance actions are those that directly impact the policies, rules and innovation of the governance of the municipal territory.

To provide a fuller picture of each action, the attached **Table B-2.1** will contain an extended description, dividing them by sector as above.
The actions presented in Table B-2.2A are **measurable**, while those in Table B-2.2B are also measurable, but still under consideration or in the process of being implemented, taken into consideration in the overall CO_2 reduction budget and fully included in the pathway towards reduced CO_{2eq} emissions within the broader timeframe envisaged by this document; Table B-2.2C, on the other hand, is dedicated to **behavioural** actions, including both actions by the Municipality of Bergamo and those presented by Mission partners. Finally, Table B-2.2D lists the actions of partners located outside the city that do not contribute to reduced CO2 emissions within the municipal border.

These tables indicate the **intervention timeframe** for each intervention. These actions may have already been approved by the respective actors, are close to being introduced, or still in the process of being implemented. At an **impact** level, evidence is provided for each action of the equivalent reduction in CO_2 emissions, calculated according to the Net Zero Cities methodology. The value indicated in the "CO_2eq reduction" column is the result of using the methodology that, starting with the action data provided by the stakeholders, expresses the contribution of each single action to a reduction in baseline emissions on the basis of the conversion factors already explained in Module A. In some cases, the value of the CO_2eq reduction indicated by a stakeholder has been adopted after checking the calculation methodology used.

"N.A." (Not Available) or "-" refers to the fact that the specific value has not been provided by the relevant stakeholder, but the action has still been taken in consideration because deemed relevant. More precise data should be available after monitoring these projects until 2030.
This document does not mention the investment per action by external stakeholders, as this will be detailed in the Investment Plan, which will indicate the actual amount of investment (where available) made by each stakeholder and for each action. Investments by municipal departments are always reported (where available).

Overall, the city has collected **217 total actions**, split as follows:

- 85 actions in the Buildings sector
- 32 actions in the Transport sector
- 5 actions in the AFOLU sector
- 30 actions in the Waste sector
- 65 actions in the Transversal sector

The individual actions are listed individually and analysed in the following tables. The actions proposed by the Municipality of Bergamo are expressed by referring directly to the competent departments, namely the Mobility, Ecology and Environment department, the Schools/Sports Facilities department, the Education, Instruction and Youth Project department, the Major Works and Redevelopment department, the Health and Safety in the Workplace department, the Public Green Space department, the Educational Services department and the Guarantor for Children's Rights.

Sector: Buildings

B-2.2a: Measurable actions						
Action	**Stakeholder**	**Direct impacts (reduced emissions) tonCO_2eq/a**	**Timeframe**	**Systemic levers**		
New district heating/cooling network	A2A	14.500	2019-2030	Technologies	Funding and finance	-
Construction of new NZEB headquarters	Confindustria	-	2017-2020	Technologies	-	-
Installation of renewable energy sources	Confindustria	-	2020	Technologies	-	-
Introduction of digital platforms and energy/water consumption optimisation software	Confindustria	-	2020	Technologies	Funding and finance	-
“Chorus Life” urban regeneration	Costim S.r.l.	-	2020-2024	Technologies	-	-
Refurbishment of the “LEGNANO” building	Marlegno S.r.l.	26	2022-2023	Technologies	-	-
Refurbishment of the “De Grassi” condominium	Marlegno S.r.l.	50	2022-2023	Technologies	-	-
Creation of a prefabricated wooden structure	Marlegno S.r.l.	26	2023	Technologies	-	-
Feasibility study for the refurbishment of the “Calvi” condominium	Marlegno S.r.l.	15	2021	Technologies	-	-
Feasibility study for the refurbishment of the “Balsamo” condominium	Marlegno S.r.l.	34	2021	Technologies	-	-
New residential bio-district	Marlegno S.r.l.	-	2022-2024	Technologies	-	-
Construction of a new green building - the “Residenza Confort Life” condominium	Marlegno S.r.l.	-	2021-2022	Technologies	-	-
New residential biodistrict - Ponte San Pietro	Marlegno S.r.l.	-	2024-2025	Technologies	-	-
New residential biodistrict - Wood Experience	Marlegno S.r.l.	-	2024-2025	Technologies	-	-
Ozonolysis of sewage sludge	Uniacque S.p.A.	-	2023-2024	Technologies	Funding and finance	Governance and Policy
Installation of advanced process controllers and replacement of air distribution systems	Uniacque S.p.A.	-	2022-2024	Technologies	-	-
EPC contract	ASST Bergamo Est	2.191	2022-2023	Governance and Policy	Funding and finance	-
Energy requalification of Lovere Hospital	ASST Bergamo Est	130	2024-2025	Technologies	-	-
Installation of photovoltaic systems	Legami	20	2020-2021	Technologies	-	-
Requalification construction site	Bemoa	5	2022-2023	Technologies	-	-
Installation of photovoltaic panels	BRT	44	NA	Technologies	-	-
Smart mobility	Verde 21	13	2024	Technologies	Increased knowledge	-

Sharing Culture	Verde 21	11	2024-2025	Technologies	Increased knowledge	-
Citizen services	Verde 21	11	2024-2025	Technologies	Increased knowledge	-
Play Green	Verde 21	27	2024-2026	Technologies	Increased knowledge	-
Fashion & design	Verde 21	27	2024-2026	Technologies	Increased knowledge	-
External collaboration - Teatro Donizetti	Verde 21	1	2023-2024	Technologies	Increased knowledge	-
External collaboration - Smart District Chorus	Verde 21	5	2023-2024	Technologies	Increased knowledge	-
External collaboration - Città Alta	Verde 21	11	2023	Technologies	Increased knowledge	-
Requalification of headquarters	COESI	35	2022-2023	Technologies	-	-
Installation of photovoltaic systems	CERESS	68	2022-2023	Technologies	-	-
Installation of renewable energy sources	ASST Papa Giovanni XXIII	108	2023-2024	Technologies	-	-
Relighting of premises in Via Borgo Palazzo (Bergamo)	ASST Papa Giovanni XXIII	9	2021	Technologies	-	-
Relighting of premises in Via Garibaldi (Bergamo)	ASST Papa Giovanni XXIII	4	2021	Technologies	-	-
Relighting of premises in Mozzo and San Giovanni	ASST Papa Giovanni XXIII	14	2022	Technologies	-	-
Connection of the premises in via Borgo Palazzo (Bergamo) to the district heating network	ASST Papa Giovanni XXIII	415	2023	Technologies	Funding and finance	-
Creation of a new medical centre (CdC) and territory operations centre (COT) in Via Borgo Palazzo (Bergamo)	ASST Papa Giovanni XXIII	40	2023-2024	Technologies	-	-
Creation of a new medical centre (CdC) in Via Garibaldi (Bergamo)	ASST Papa Giovanni XXIII	65	2024-2025	Technologies	-	-
Creation of new medical centres (CdC), territory operations centres (COT) and a community hospital (OdC) in locations outside the city of Bergamo	ASST Papa Giovanni XXIII	-	2024-2025	Technologies	-	-
Technological upgrading of kitchens	ASST Papa Giovanni XXIII	-	2023-2024	Technologies	-	-
Replacement of refrigerator motors	ASST Papa Giovanni XXIII	17	2022-2023	Technologies	-	-
FABER requalification project	Provincia di Bergamo (province of Bergamo)	0	2022-2025	Technologies	-	-
Photovoltaic system	SerCar	22	2021	Governance and Policy	Funding and finance	-
Energy diagnosis - Celadine	Esselunga	-	2018-2019	Technologies	-	-
Installation of a power quality system - Celadina	Esselunga	44	2023	Technologies	-	-

Installation of machine learning systems - Celadina	Esselunga	33	NA	Technologies	-	-
Energy diagnosis - Corridoni	Esselunga	-	2022-2023	Technologies	-	-
Installation of high efficiency motors - Corridoni	Esselunga	14	2023	Technologies	-	-
Installation of a power quality system - Corridoni	Esselunga	34	2023	Technologies	-	-
Energy diagnosis - San Bernardino	Esselunga	-	2021-2022	Technologies	-	-
Relighting of the San Bernardino car park	Esselunga	26	2022-2023	Technologies	-	-
Photovoltaic systems	Bergamo University	130	2022-2024	Technologies	Funding and finance	-
General requalification of the heating and cooling systems at the headquarters in Via dei Caniana (Bergamo)	Bergamo University	42	2022-2024	Technologies	-	-
Improved efficiency of office lighting systems	Bergamo University	32	2022-2024	Technologies	-	-
Heat generators	Bergamo University	20	2022-2024	Technologies	-	-
Installation of renewable energy source systems	SACBO	738	2023-2024	Technologies	Funding and finance	-
Schools/sports facilities under construction	Building sector	88	2023-2026	Technologies	-	-
Planned construction of schools/sports facilities	Building sector	94	2024-2026	Technologies	-	-
Ongoing requalification of municipal buildings	Building sector	10	2023-2026	Technologies	-	-
Completed requalification works	Building sector	63	2022	Technologies	-	-
Electricity saving plan	Humanitas	719	2022-2023	Technologies	-	-
Reductions in thermal energy consumption	Humanitas	128	2022-2023	Technologies	-	-
Installation of renewable energy source systems	Humanitas	114	2022-2024	Technologies	Funding and finance	-

63 actions fall within the Buildings sector, for an overall reduction of approximately 20.275 tCO_{2eq} per annum.

Sector: Transport

B-2.2a: Measurable actions						
Action	**Stakeholder**	**Direct impacts (reduced emissions) tCO_2eq/a**	**Timeframe**	**Systemic levers**		
New charging point infrastructure	Confindustria	0	2020	Technologies	-	-
Electrification of the company fleet	Uniacque S.p.A.	13	2024-2028	Technologies	-	-
Turnover of last mile delivery fleet	BRT	86	2020-2030	Technologies	-	-
Installation of EV charging points at branches	BRT	-	2020-2030	Technologies	-	-
Creation of pickup points	BRT	-	2020-2030	Technologies	-	-
Design of the E-BRT line (Bergamo - Dalmine)	ATB	780	2024-2026	Technologies	Funding and finance	Governance and Policy
New Villa d'Almè tram line	ATB	500	2024-2026	Technologies	Funding and finance	Governance and Policy
Development of the company fleet	ATB	400	2023-2033	Technologies	-	-
Corporate smart working	COESI	6	2022-2030	Social Innovation	Governance and Policy	-
Creation of the Papa Giovani XXIII bike park	ASST Papa Giovanni XXIII	-	2023-2024	Funding and finance	Governance and Policy	-
Installation of EV charging points in ASST car parks	ASST Papa Giovanni XXIII	-	2021-2022	Technologies	-	-
Installation of EV charging points for the company fleet	ASST Papa Giovanni XXIII	-	2022-2023	Technologies	-	-
Installation of charging points in the Via Borgo Palazzo visitor car park	ASST Papa Giovanni XXIII	-	2021-2023	Technologies	-	-
Leasing of hybrid and full electric vehicles for the company fleet	ASST Papa Giovanni XXIII	-	0	Technologies	-	-
Expression of interest in the installation of EV charging points	Mobility sector	-	2022-2023	Governance and Policy	Funding and finance	-
Electrification of the airport operations fleet	SACBO	1.369	2018-2030	Technologies	-	-
Doubling of the Ponte San Pietro-Bergamo railway line	Mobility sector	-	2023-2026	Technologies	Funding and finance	Governance and Policy
Upgrading of the Bergamo rail hub (new PGT)	Mobility sector	-	2023-2026	Technologies	Funding and finance	Governance and Policy

Requalification of Bergamo station and boosting of the transport interchange	Mobility sector	-	2023-2026	Technologies	Funding and finance	Governance and Policy
Exchanger car parks installed	Mobility sector	-	2018-2019	Funding and finance	-	-
Exchanger car parks planned and foreseen	Mobility sector	-	2023-2026	Funding and finance	-	-

21 actions fall within the Transport sector, for an overall reduction of approximately 3.154 tCO_{2eq} per annum.

Sector: Waste and wastewater

B-2.2a: Measurable actions						
Action	**Stakeholder**	**Direct impacts (reduced emissions) tCO_2eq/a**	**Timeframe**	**Systemic levers**		
Efficient water treatment systems	Confindustria	-	2020	Technologies	Funding and finance	Governance and Policy
Subtraction of waste for disposal	SIMAP	-	2023	Social Innovation	Governance and Policy	-
Reduced use of anaesthetic gases	ASST Bergamo Est	-	2023-2024	Technologies	-	-
Implementation of separate waste collection - Seriate Hospital	ASST Bergamo Est	-	2024	Technologies	Increased knowledge	-
Quaternary waste water treatment (ozonation)	SIAD	-	2023-2028	Technologies	Governance and Policy	-
Reduction of the non recyclable fraction from administrative areas	ASST Papa Giovanni XXIII	-	2023-2024	Social Innovation	Governance and Policy	-
Separate collection of hard and soft plastics	ASST Papa Giovanni XXIII	-	2023-2024	Social Innovation	Governance and Policy	-
Appointment of an ADR consultant	ASST Papa Giovanni XXIII	-	2023-2024	Social Innovation	-	-
Waste reduction	ASST Papa Giovanni XXIII	-	2023-2030	Democracy and Participation	Governance and Policy	-
Reduction of single-use plastic - San Giovanni Bianco	ASST Papa Giovanni XXIII	-	2023-2030	Democracy and Participation	Governance and Policy	-
Reduction of disposable plastic in Bergamo, switching to biodegradable material.	ASST Papa Giovanni XXIII	-	2022-2030	Democracy and Participation	Governance and Policy	-
PNRR project - Collection centre	Waste sector	-	2023-2025	Increased knowledge	Social Innovation	Democracy and Participation

PNRR project - Recycling and reuse centre	Waste sector	-	2023	Increased knowledge	Social Innovation	Democracy and Participation
PNRR project - Compacting baskets	Waste sector	-	2023	Increased knowledge	Social Innovation	Democracy and Participation
PNRR projects - Ecological islands	Waste sector	-	2023	Increased knowledge	Social Innovation	Democracy and Participation

15 actions fall within the Waste/Wastewater sector. It is not possible to quantify the reduction in CO_{2eq} in detail.

Sector: AFOLU

B-2.2a: Measurable actions						
Action	**Stakeholder**	**Direct impacts (reduced emissions) tonCO_2eq/a**	**Timeframe**	**Systemic levers**		
Planting of shrubs and plants	Legambiente	16	Ongoing	Governance and Policy	Democracy and Participation	Funding and finance
Urban re-greening	Legami	81	2023-2024	Governance and Policy	Democracy and Participation	Funding and finance
Municipal plan for the planting of new trees	Green department	617	2022-2030	Governance and Policy	-	-

The overall reduction in emissions made possible by these three actions in the AFOLU sector is approximately 714 tCO_{2eq} per annum.

Sector: Transversal

B-2.2a: Measurable actions						
Action	**Stakeholder**	**Direct impacts (reduced emissions) tonCO_2eq/a**	**Timeframe**	**Systemic levers**		
Supply of certified green energy	Edison Next	120	2023-2028	Technologies	Governance and Policy	-

Supply of certified green energy for EV charging points	Edison Next	1	2023-2028	Technologies	Governance and Policy	-
Purchase of certified green energy	Confindustria	33	2020	Technologies	Governance and Policy	-
Purchase of certified green energy	Uniacque S.p.A.	-	2021-2023	Governance and Policy	-	-
Telemedicine	ASST Bergamo Est	11	2022-2023	Technologies	-	-
Purchase of certified green energy	Legami	117	2020-2030	Governance and Policy	-	-
Purchase of certified green energy	BRT	109	2018 - 2030	Governance and Policy	-	-
Setting-up of a renewable energy community	SBAM	9	2023-2024	Democracy and Participation	Governance and Policy	Technologies
Smart city tourist infopoint	Verde 21	5	2024	Technologies	Increased knowledge	-
Supply of green electricity	ASST Papa Giovanni XXIII	14.250	2024	Technologies	-	-
Installation of a WHP distributor	ASST Papa Giovanni XXIII	-	2022-2030	Democracy and Participation	Governance and Policy	-
Participation in the new ARIA call for tenders	ASST Papa Giovanni XXIII	-	2024-2030	Social Innovation	-	-
Supply of organic produce	SerCar	-	2022-2030	Democracy and Participation	Governance and Policy	-
Purchase of green energy - Celadina	Esselunga	884	2022	Technologies	Governance and Policy	-
Purchase of green energy - Corridoni	Esselunga	884	2021	Technologies	Governance and Policy	-
Purchase of green energy - San Bernardino	Esselunga	912	2021	Technologies	Governance and Policy	-
Purchase of green energy	SACBO	4.371	2018-2030	Technologies	Governance and Policy	-
Municipal smart working	Safety department	0	2022-2030	Increased knowledge	Social Innovation	-

The overall reduction in emissions made possible by these 18 actions in the Transversal sector is approximately 21.704 tCO_{2eq} per annum.
None of the stakeholders participating in the Mission have indicated the existence of any action in the **IPPU sector**.

Table B-2.2b below lists the actions currently **being considered** but where the current stage of development is not clear, although the proposing partner is intent on implementing the relevant project. As already specified in the paragraph above, the aim is to monitor these projects in future editions of the CCC in order to pinpoint the actual impacts in terms not just of reduced emissions but also of capital investment.

B-2.2b: Measurable actions under consideration/future							
Sector	**Action**	**Stakeholder**	**Direct impacts (reduced emissions) $tonCO_2eq/a$**	**Timeframe**	**Systemic levers**		
Transport	Installation of “City Plug” charging points	A2A	-	2024-2035	Technologies	-	-

Buildings	LED street lighting	Edison Next	10	2023-2028	Technologies	-	-
Buildings	Installation of renewable energy source systems	Edison Next	1.094	2023-2028	Technologies	-	-
Buildings	New district heating/cooling network	Edison Next	330	2023-2028	Technologies	Funding and finance	-
Buildings	New NZEB building	Edison Next	-	2023-2028	Technologies	-	-
Buildings	Energy requalification of existing buildings	Edison Next	830	2023-2028	Technologies	-	-
Buildings	Energy management and monitoring system	Edison Next	-	2023-2028	Technologies	-	-
Transport	New infrastructure for EV charging points	Edison Next	-	2023-2028	Technologies	-	-
Transport	Regulation of city access flows	Edison Next	-	2023-2028	Social Innovation	Governance and Policy	Funding and finance
Buildings	Introduction of digital software platforms to optimise energy consumption	Edison Next	-	2023-2029	Technologies	Funding and finance	-
Waste	Implementation of wastewater network mapping	Different Solutions	-	2023-2030	Technologies	Funding and finance	-
Waste	GIS-centric computerisation of the aqueduct network	Different Solutions	-	2024-2030	Technologies	Funding and finance	-
Waste	Industry 4.0 integrated water networks	Different Solutions	-	2024-2031	Technologies	Funding and finance	-
Waste	Adoption of mini power plants	Different Solutions	-	NA	Technologies	-	-
Buildings	System energy efficiency	Uniacque S.p.A.	184	2023-2025	Technologies	Funding and finance	-
Buildings	Installation of renewable energy sources in 15 sites	Uniacque S.p.A.	617	2024-2026	Technologies	-	-
Buildings	Biogas production	Uniacque S.p.A.	-	NA	Technologies	Funding and finance	Governance and Policy
Transversal	Digital platform for collecting consumption data for industrial processes	W2W Solutions	-	NA	Technologies	Funding and finance	-
Waste	Medical waste treatment and sterilisation systems - Seriate Hospital	ASST Bergamo Est	-	2024	Technologies	Increased knowledge	-
Transversal	Hospital catering	ASST Bergamo Est	-	2024-2025	Technologies	Increased knowledge	-
Transversal	Reduced energy consumption of foodservice trolleys	ASST Bergamo Est	-	2024-2025	Technologies	-	-
Buildings	Digital platforms and software to optimise consumption	Teal Blue	-	NA	Technologies	Funding and finance	-
Buildings	Geothermal power plant and new district heating network	FRI-EL GEO	55.592	2024-2029	Technologies	Funding and finance	Governance and Policy
Buildings	Improved building energy efficiency	Bemoa	-	Ongoing	Technologies	-	-
Buildings	Installation of photovoltaic systems	Bemoa	1	Ongoing	Technologies	-	-
Transversal	Purchase of certified green energy	Bemoa	-	Ongoing	Governance and Policy	-	-
Buildings	Digitisation of buildings	Bemoa	-	Ongoing	Technologies	Funding and finance	-

Transport	Electrification of the territory	Bemoa	-	2027-2030	Technologies	-	-
AFOLU	Re-greening initiatives	Bemoa	-	Ongoing	Governance and Policy	Democracy and Participation	Funding and finance
Transversal	New company headquarters	Bemoa	-	2027-2030	Technologies	-	-
Transport	Electrification of company vehicles	Bemoa	-	2027-2030	Technologies	-	-
Transport	Adoption of the commuter travel plan (PSCL)	BRT	-	2022 - present day	Social Innovation	Democracy and Participation	-
Transversal	Distribution of equipment and devices for projects and systems	Esprinet	-	NA	Technologies	Funding and finance	-
Buildings	Photovoltaic systems in the process of being approved	CERESS	1.368	2024-2030	Technologies	-	-
Buildings	Installation of electrostatic filters - Celadina	Esselunga	10	2025-2026	Technologies	-	-
Buildings	Relighting of the salesroom - Corridoni	Esselunga	86	2024-2025	Technologies	-	-

The table below lists the **behavioural** actions by public and private stakeholders for which it has not been possible to estimate a direct reduction in emissions. this means that the table only provides the name of each action followed by a brief description. As will also be indicated in Module C, given the commitment shown by the municipal administration and the stakeholders to awareness and training actions for citizens, this type of action will be calculated on the basis of the Environmental Energy Agency methodology (https://www.eea.europa.eu) as representing 20% of the city's CO_2 emissions reduction target.

B-2.2c: Behavioural actions		
Stakeholder	**Azione**	**Descrizione**
Edison Next	Training/Awareness/Information	Integrated plan to communicate climate neutrality interventions in the Porta Sud district
Guarantor of children's rights	Environment and Health section	Space for sharing proposals regarding sustainable actions by the Municipality of Bergamo
Guarantor of children's rights	Awareness of sustainability issues	Courses as part of the school curriculum, tailored to each age group, with the involvement of family paediatricians
Confindustria	BG Circular project	During the three-year period 2020-2022, 120 companies were actively evaluating and improving their proposed recycling, reuse and sustainability actions. In 2022, this project was mainly aimed at small/medium local enterprises.
Confindustria	Energy desk for companies	72 appointments in September 2022 to provide free information and advice on energy efficiency measures for companies
Confindustria	Technical training	Collaboration with the University of Bergamo for the provision of training on energy topics at both a high school and university level (three-year degree course to be proposed for the 2023/2024 academic year); free initiative
Confindustria	Drafting of the commuter travel plan	Support for participating companies located within the municipal area in the drafting of a commuter travel plan for their employees and the appointment of a company mobility manager
Confindustria	OPEN ES platform	Platform that measures a company's level of sustainability and checks their position within their sector in order to improve individual performance and that of the entire community; in collaboration with Eni. Free initiative.

ASST Bergamo Est	Purchasing procedures and green procurement	Use of green procurement; orientation towards purchases with a higher sustainability value
ASST Bergamo Est	Memorandum of understanding regarding the appropriateness of pre-admission tests	Awareness campaign to reduce and rationalise tests and consultations, with a consequent positive impact on environmental sustainability and the use of company resources
ASST Bergamo Est	Setting-up of the intra-company Green Team	Planning of awareness activities for all ASST staff on six key topics for decarbonisation
ASST Bergamo Est	Promotion of lifestyles - Seriate Hospital	“GLOBAL HEALTH” awareness campaign to promote good lifestyles
ASST Bergamo Est	Appointment of a Mobility Manager	Appointment and definition of training budget
Bergamo Scienza	“Fare Sostenibilità” sustainability project	Training, information and awareness activities concerning Bergamo Scienza’s activities, with a particular focus on sustainability
Legambiente	“Puliamo il mondo” project	Volunteer environmental conservation campaign to engage children and young people. Annual investment value
Legambiente	“Cammina Foreste Urbane” project	Promotion of urban green spaces and awareness of their importance within the urban landscape. Annual investment value
Legambiente	“Dirama” project	Nature festival project, with natural heritage promotion and valorisation events. Annual investment value
Legambiente	Environmental education	Training courses in primary and secondary schools on environmental and sustainability topics. Annual investment value
Legami	Experimental circular economy project	In collaboration with the Municipality of Bergamo, a pathway has been launched in schools dedicated to the recovery of waste plastic stationery products using special collection boxes
Legami	Corporate Carbon Footprint Measurement	Actions already planned and yet to be planned with a view to compliance with ESG criteria. The value of the investment is 5% of the company’s profits
Bemoa	Application of ESG criteria	Search for funds and calls for tenders aimed at virtuous companies
ATB	CE4CE European project	Project promoting the diffusion of circular economy principles in the public transport sector, resource optimisation, reduced waste, and increased process efficiency. 80% ERDF financing; 20% MEF fund
SOLCO	Awareness events and environmental education/support activities	Workshops, training courses, educational interventions, environmental art projects and environmental monitoring activities
SOLCO	Recycling and reuse centres	Interactive workshops to introduce reuse and recovery practices, the collection and regeneration of used material, and an online exchange platform
Cariplo	Support for the drafting and activation of the “Click Bergamo” project.	Support for the territory through: technical assistance to support the drafting of the climate transition strategy (STC) and in designing new renewable energy communities (REC); economic contribution for the implementation of certain actions within the STC, and REC management
Educational services	European “Food Trail” project	Modification of school menus with the introduction of vegetable proteins (especially legumes) to partially replace animal proteins. Accurate measurement of waste levels and degree of satisfaction to evaluate the effectiveness of the changes. At the same time, an activity park dedicated to children; training for teachers and canteen committees, and information events for parents.
Educational services	“Green Menu”: nutrition and sustainable diets	A commercial business to promote healthy and sustainable nutrition, committed to guaranteeing meals using only plant-based ingredients

COESI	"Skift" project	Project created by CSA COESI, in partnership with 6 partners from 4 European countries, with the objective of supporting the green transition of social economy companies, i.e. making them more environmentally sustainable. 10 companies in the province of BG are taking part in this project
Confcooperative	Memorandum of understanding with the Diocese of Bergamo for environmental and social sustainability	Promotion of concrete actions and training regarding social and green issues
Confcooperative	Memorandum of understanding for spreading knowledge of renewable energy communities (REC)	Support in setting up at least 2 RECs in the city and province
Confcooperative	ESG Sustainability	Pathway towards the structuring of a service providing support and advice on environmental sustainability, aimed at achieving environmental, social and corporate governance (ESG) sustainability
Confcooperative	"Impact Register" from a green perspective	A register called the "Impact Register" has been set up to provide cooperative authenticity criteria for members
CERESS	Dissemination of opportunities and REC creation	Inform all stakeholders of the opportunity represented by the renewable energy communities (REC) tool and identification of a group of users with whom to create an initial REC, with disclosure of the legal and regulatory aspects, and economic/financial feasibility studies
ASST Papa Giovanni XXIII	Appointment of an Energy Manager	Communication of annual consumption data to FIRE (Federazione Italiana per l'uso Razionale dell'Energia), energy management activities. Annual appointment, starting in 2021
ASST Papa Giovanni XXIII	Appointment of a Mobility Manager	Appointment of a figure responsible for managing intercompany transport starting in 2021
ASST Papa Giovanni XXIII	Waste collection training for staff	Training courses for hospital staff
ASST Papa Giovanni XXIII	Food technology consultant	Advice regarding the verification and food safety of meals for patients and employees
ASST Papa Giovanni XXIII	Waste reduction and circular economy	Use of waste from the ASST canteen (service currently suspended, entrusted to DUSSMANN)
ASST Papa Giovanni XXIII	Company newsletter	Raising staff awareness and training through daily snippets
Fondazione Casa Amica	Education on energy consumption	Educational actions regarding energy consumption (private utilities and heating), aimed at families living in houses with rent control and managed by the Foundation
AST Bergamo	Integrated cooperation and multilevel governance for public health	Promotion of actions to reduce GHG emissions and the spread of sustainable behaviour by means of information and training, also involving local authorities. Implementation through shared strategies and town planning tools
AST Bergamo	Improved management of watercourses	With the involvement of public administrations to redevelop watercourses and so improve the use of available resources
AST Bergamo	360° training and awareness	Soft mobility and environmental sustainability awareness campaigns for schools, public administrations, citizens and local associations, companies and entrepreneurs
AST Bergamo	Soft mobility	Initiatives aimed at employees regarding the use of alternative mobility
SerCar	Food/environmental education for students and parents	Collaboration with the Municipality of BG in the "Food Trails" project.
SerCar	Reduction of canteen waste	SerCar has been monitoring (by weighing) the waste produced in some school buildings within the Municipality of BG since January 2022 in order to draw up statistics concerning the least popular dishes. As a result, the recipes are altered or the food presented in a different way in order to reduce waste.

Esselunga	Energy management system - Celadina	Preparation and certification of the Energy Management System according to ISO 50001
Esselunga	Training and awareness - Celadina	Training activities through e-learning in 2022 and the publication of good practices on the company portal to raise awareness in 2023
Esselunga	Energy management system - Corridoni	Preparation and certification of the Energy Management System according toISO 50001
Esselunga	Training and awareness - Corridoni	Training activities through e-learning in 2022 and the publication of good practices on the company portal to raise awareness in 2023
Esselunga	Energy management system - San Bernardino	Preparation and certification of the Energy Management System according to ISO 50001
Esselunga	Training and awareness - San Bernardino	Training activities through e-learning in 2022 and the publication of good practices on the company portal to raise awareness in 2023.
Bergamo University	IMPROVE - Innovare e Migliorare i PROcessi Valorizzando le nostre Expertise	The “IMPROVE” project (Innovate and iMprove PROcesses by Valorising our Expertise) has the following objectives: streamlining of operational activities by eliminating non-value activities; digitalisation of processes to reduce the use of printed paper; reduced use of emails to direct activities towards a shared online environment; development of the digital skills of University of Bergamo staff
SACBO	Airport Carbon Accreditation certification	This certification is aimed at certifying the commitment of each participating airport to reducing Co2 emissions. It is approved and recognised at an institutional and global level. The SACBO Group has achieved the third level of accreditation in the Airport Carbon Accreditation certification scheme.
Educational services	“Tutti in campo per il nostro pianeta” project	Awareness project regarding the virtuous management of resources and responsible consumption in order to create a culture of circularity among young people. Training courses are planned for primary/secondary school teachers and students
Educational services	“Bergamo Mercati” project	The focus of this project is to enable students to discover the fruit and vegetable market in Bergamo and so highlight the importance of sustainability in all areas of everyday life
Waste sector	“Mi piace un sacco” project	Adoption of coded bags for collecting the non recyclable fraction of municipal waste and plastic packaging. This system saw the amount of separated waste rise from 71% in 2019 to 77% in 2022
Waste sector	“Sfida alle plastiche” project	The aim of this project was to identify effective solutions aimed at reducing single-use plastic waste within local communities through changes in selling, purchasing and consumption behaviours, as well as the implementation of new strategies inspired by the principles of ecodesign in order to design products and systems that allow for easy, convenient reuse, recovery and repair.
Waste sector	Expression of interest in managing the collection of used clothing	Objective: to identify one or more businesses willing to manage the collection of second-hand clothing and accessories, and cleaning the areas around the collection bins.
Humanitas	UNI ISO 14001 certification	Guaranteed compliance with regulations (an ethical and corporate priority). Regulation of processes with environmental impacts in order to minimise risk. Framework for the eco-sustainable pathway towards medium/long-term corporate choices
Fondazione Civiltà Bergamasca	“Aver Cura della Casa Comune” project	Awareness initiatives and calls for tenders dedicated to protecting the environment.

Finally, the table below shows the **quantified measurable** actions presented by partners operating **outside the municipal border**: their contribution to reducing emissions is not included when calculating the overall reduction in CO_{2eq} emissions that the Municipality of Bergamo presents in order to achieve climate

neutrality by 2030. The reason why the Municipality has decided to include the individual actions and their respective stakeholders as signatories of the document – despite not contributing to the overall reduction in CO_2 emissions as they do not satisfy the territoriality requirement – is that it wants to create an inclusive virtuous ecosystem where the actions of each subject can stimulate and share good practices for all subjects, regardless of whether they operate inside or outside the municipal borders.

B-2.2d: Measurable extra-territorial actions							
Sector	**Action**	**Stakeholder**	**Direct impacts (tonCO_2eq/a)**	**Timeframe**	**Systemic levers**		
Waste	Implementation of wastewater network mapping	Different Solutions	-	2023-2030	Technologies	Funding and finance	-
Waste	GIS-centric computerisation of the aqueduct network	Different Solutions	-	2024-2030	Technologies	Funding and finance	-
Waste	Industry 4.0 integrated water networks	Different Solutions	-	2024-2031	Technologies	Funding and finance	-
Waste	Adoption of mini power plants	Different Solutions	-	NA	Technologies	-	-
Buildings	New residential bio-district	Marlegno S.r.l.	-	2022-2024	Technologies	-	-
Buildings	Construction of a new green building - the “Residenza Confort Life” condominium	Marlegno S.r.l.	-	2021-2022	Technologies	-	-
Buildings	New residential biodistrict - Ponte San Pietro	Marlegno S.r.l.	-	2024-2025	Technologies	-	-
Buildings	New residential biodistrict - Wood Experience	Marlegno S.r.l.	-	2024-2025	Technologies	-	-
Transversal	Purchase of certified green energy	Uniacque S.p.A.	-	2021-2023	Governance and Policy	-	-
Buildings	Installation of advanced process controllers and replacement of air distribution systems	Uniacque S.p.A.	-	2022-2024	Technologies	-	-
Buildings	Biogas production	Uniacque S.p.A.	-	NA	Technologies	Funding and finance	Governance and Policy
Transversal	Purchasing procedures and green procurement	ASST Bergamo Est	-	NA	Governance and Policy	-	-
Transversal	Memorandum of understanding on the appropriateness of pre-admission tests	ASST Bergamo Est	-	2024	Democracy and Participation	-	-
Transversal	Setting-up of the intra-company Green Team	ASST Bergamo Est	-	NA	Democracy and Participation	Social Innovation	-
Transversal	Telemedicine	ASST Bergamo Est	11	2022-2023	Technologies	-	-
Waste	Reduced use of anaesthetic gases	ASST Bergamo Est	-	2023-2024	Technologies	-	-
Waste	Medical waste treatment and sterilisation systems - Seriate Hospital	ASST Bergamo Est	-	2024	Technologies	Increased knowledge	-

Waste	Implementation of separate waste collection - Seriate Hospital	ASST Bergamo Est	-	2024	Technologies	Increased knowledge	-
Transversal	Promotion of lifestyles - Seriate Hospital	ASST Bergamo Est	-	2024	Increased knowledge	Social Innovation	-
Buildings	EPC contract	ASST Bergamo Est	2.191	2022-2023	Governance and Policy	Funding and finance	-
Buildings	Energy requalification of Lovere Hospital	ASST Bergamo Est	130	2024-2025	Technologies	-	-
Transport	Appointment of a Mobility Manager	ASST Bergamo Est	-	2023	Social Innovation	Democracy and Participation	-
Transversal	Hospital catering	ASST Bergamo Est	-	2024-2025	Technologies	Increased knowledge	-
Transversal	Reduced energy consumption of foodservice trolleys	ASST Bergamo Est	-	2024-2025	Technologies	-	-
Transport	Installation of EV charging points at branches	BRT	-	2020-2030	Technologies	-	-
Buildings	Installation of photovoltaic panels	BRT	44	NA	Technologies	-	-
Transversal	Purchase of certified green energy	BRT	109	2018 - 2030	Governance and Policy	-	-
Transport	Adoption of the commuter travel plan (PSCL)	BRT	-	2022 - present day	Social Innovation	Democracy and Participation	-
Buildings	Creation of new medical centres (CdC), territory operations centres (COT) and a community hospital (OdC) in locations outside the city of Bergamo	ASST Papa Giovanni XXIII	-	2024-2025	Technologies	-	-
Waste	Reduction of single-use plastic - San Giovanni Bianco	ASST Papa Giovanni XXIII	-	2023-2030	Democracy and Participation	Governance and Policy	-
Buildings	Photovoltaic system	SerCar	22	2021	Governance and Policy	Funding and finance	-
Buildings	Installation of renewable energy source systems	SACBO	738	2023-2024	Technologies	Funding and finance	-
Transport	Electrification of the airport operations fleet	SACBO	1.369	2018-2030	Technologies	-	-
Transversal	Purchase of green energy	SACBO	4.371	2018-2030	Technologies	Governance and Policy	-
Buildings	Airport Carbon Accreditation certification	SACBO	-	NA	Governance and Policy	-	-

Mission partners operating outside the city limits offer a reduction in emissions of roughly 9.000 tonnes of CO_{2eq}.

B-2.3: Summary action strategy for reaching the reduction target emission of the SECAP baseline

This paragraph introduces the main strategies that the Municipality of Bergamo intends to implement over the next few years in order to achieve its climate neutrality objectives by 2030. Where possible, the corresponding emissions and costs have been quantified for each of these strategies. Please refer to the results of future monitoring of this document regarding the costs and emissions of strategies not estimated here.

- **Strategy for the installation of photovoltaic systems to generate green energy**

The total surface area of the roofs on civil and industrial buildings within the territory has been analysed in order to estimate the potential for the installation of photovoltaic systems within the city limits. Accordingly, within the municipal territory of Bergamo, the total surface area of roofs on industrial building is approximately 1.2750000 m^2, while that of roofs on civil buildings amounts to approximately 2.906.000 m2. It is estimated that 30% of the roofs in this second subset are on listed buildings, and so excluded from our calculations of those potentially suitable for the installation of photovoltaic modules. As a result, 30% of the surface area has had to be subtracted from the overall figure for roofs on civil buildings.
The scenario that the Administration expects to achieve by 2030 is based on the following hypotheses:

- 80% of industrial roofing and just 33% of the roofs on civil buildings (i.e., net of listed buildings) are suitable for the installation of photovoltaic modules;
- The net surface area of the roofs currently occupied by photovoltaic modules is 47% (industrial buildings) and 52% (civil buildings) of the total suitable surface area.

Given the aforementioned hypotheses, the estimated scenario envisages a net surface area occupied by photovoltaic modules equal to 38% of the total roofs on industrial buildings and 17% of the total roofs on civil buildings.
Using the methodology mentioned above, we can use this scenario to calculate that the total power that could be installed on the roofs in the city of Bergamo, net of the systems already in place in 2021, will amount to approximately 174.000 kW_p, which corresponds to an estimated annual production of roughly **208.820 MWh/a**, having considered an hypothetical average annual output of 1.200 kWh/kW_p.

Therefore, the estimated potential saving in terms of tonnes of CO_{2eq} comes to **59.514 tCO_{2eq}/a.**

- **Electrification of consumption in the tertiary and residential sectors**

Excluding the interventions already included in the SECAP, the strategy for the electrification of the tertiary and residential sectors also involves the **installation of heat pumps** based on the targets in the Regional Energy, Environment and Climate Programme (PREAC) to reduce annual heat consumption by 2,9% per annum in the tertiary sector and 0,7% per annum in the residential sector.
According to PREAC predictions, the replacement of conventional boilers with heat pumps will generate savings of approximately 69.000 MWh/a in natural gas (methane) and other fossil energy sources. The installation of heat pumps will necessarily lead to an increase in electricity consumption, estimated to be about 23.000 MWh/a. Changes in CO_2 emissions are linked to these consumptions, which we have estimated as follows:

- **Reduction** in emissions linked to fossil energy sources (methane, LPG and diesel): 10.569 tCO_{2eq}/annum in the tertiary sector; 3.532 tCO_{2eq}/annum in the residential sector.
- **Increase** in emissions due to increased consumption of electricity: 5.436 tCO_{2eq}/annum in the tertiary sector; 1.636 tCO_{2eq}/annum in the residential sector.

In light of this, the net value of overall reduced CO_2 emissions through the electrification strategy in the **Tertiary** sector comes to **5.633 tCO_{2eq}/annum**. Likewise, the **Residential** sector will see a reduction in overall emissions of **1.896 tCO_{2eq}** per annum**.**

- **Increased energy efficiency of the industrial sector**

In order to increase the energy efficiency of the industrial sector, the municipal administration has a strategy to meet the scenario envisaged by the regional energy, environment and climate programme (PREAC), which foresees a 35% reduction in natural gas consumption and an 8% increase in electricity consumption (excluding the increase in installed photovoltaic power, already considered in the strategy above). Starting with the consumption data for this sector indicated in the SECAP baseline, the Municipality envisages various types of interventions, such as measures to increase the energy efficiency of processes, interventions on the outer surfaces and other aspects of systems and plant, and the electrification of consumption. It estimates that these will lead to an overall reduction in consumption of approximately 68.323 MWh/a, net of the increase in electricity consumption as a result of the electrification interventions.

In view of this, the overall net reduction in CO_2 emissions in the industrial sector will be roughly **13.000 tCO_{2eq}/a.**

- **Strategy for waste management in the municipal area: new call for tenders in order to award the waste management service contract**

In the spring of 2024, the Municipality of Bergamo intends to launch a **call for tenders in order to award a contract for the municipal waste management service and ancillary cleaning services**. This contract will have a duration of seven years, with the option of renewal every two years thereafter, taking into account the minimum environmental criteria for the awarding of municipal waste management services set out in the current national action plan on green public procurement (PANGPP). Among the most relevant elements of the tender, which all form part of the Municipality's strategy for efficient and transparent municipal waste management, are the following points:

- One of the contractor's obligations is to guarantee **a minimum percentage of separate waste collection of 78%** within the first calendar year and 80% in the second year.
- Based on the **regional waste plan**, the following recovery goals are envisaged from 2027 onwards:
    - EU municipal waste recycling > 67,8%;
    - packaging recycling > 78,7%;
    - separate waste collection > 83,3%;
    - municipal waste reduction > 8,9%;
    - residual municipal waste production per capita 73 kg/inhabitant per annum;
    - selection waste > - 30%;
    - recycling waste > - 20%.

In the event of any failure to achieve these objectives, which will also by verified by means of product analysis, the contractor will be asked to come up with an improvement plan, agreed with the Municipality, in order to optimise the collection system by reducing the quantities of non-compliant material. This might include measures to optimise the distribution of bins, increase collection frequencies, strengthen the collection control plan, adapt the communication plan for users and anything else deemed necessary. Other obligations for the contractor will be **communication and awareness activities for citizens** regarding, for instance, how to prevent waste production by pointing out how following the correct methods for conferring particular types of waste can be useful and add value.
The contractor's **vehicles and equipment** must also meet efficiency criteria, particularly when it comes to tackling fine dust particles.
The overall annual cost of the contract amounts to €21.111.170 (including VAT), with a seven-year starting price of €147.781.900.
No specific studies have been conducted regarding reduced emissions: please refer to later monitoring versions of this document for evidence of this, if available.

- **E-Plan: development of private electric mobility and related infrastructure**

A negotiated procedure was published in July 2021 for the assignment of the task of drafting a **plan for the development of electric mobility (Piano per lo sviluppo della Mobilità Elettrica)** in the Municipality of Bergamo based on the indications already set out in the PUMS. The plan includes the following specific interventions:

- Installation of infrastructure for charging electric vehicles: approximately 90 EV charging points are to be installed within the municipal area in 2024-2026
- Installation of EV charging points in the transport hub car parks around the edge of the municipal territory
- Pre-installation of private charging infrastructure (Wall Box)
- Incentives for the installation of EV charging points at private company headquarters
- Subsidies when adopting e-mobility for company, logistics and goods vehicles

These actions are, to all intents and purposes, a very important strategy for the city, one that is being promoted heavily by the municipal administration, as can be seen in the SECAP and the actions collected during the drafting phase of the CCC. For this reason, **no further reductions in emissions have been estimated to avoid double counting of reductions in CO_2 emissions**. The electrification of private mobility is a key element in the Transport sector and the Municipality will be focusing on this in the coming years, through direct incentives and the strengthening of sharing platforms.

- **<u>Strategies for the digitalisation of municipal public services</u>**

As part of the PNRR Mission “Digitalisation, Innovation, Competitiveness and Culture”, the Municipality of Bergamo is planning interventions to boost the digitalisation of its services and enable digital applications and so improve public access to public administration data. As for the PNRR deadlines, the budgeting period only goes as far as 2026. Some of the interventions presented below are in the process of being started, but will only be implemented properly in the two-year period 2024-2026 (apart from the action concerning the migration of local PAs to the cloud, as this task is yet to be assigned). No estimate of the potential reduction in CO_{2eq} due to these digital innovation and digitalisation actions is currently available.

Intervention	State of play	PNRR funding
Enabling cloud migration for local PAs	Not started	€1.031.574
Citizen experiences of municipal public services	Started	€398.397
Pago PA platform adopted	Started	€96.145
IO App adopted	Started	€45.060
Digital notifications platform	Started	€69.000
Total		€1.640.176

In addition to PNRR actions, the Municipality of Bergamo is also engaged in various digital activities in several sectors in order to optimise its management of services (for example waste and the heating of buildings), with a secondary, but no less relevant, result being a reduction in emissions.

- **<u>Partnerships with companies, A2A and REA for the recovery of thermal heat from industrial processes</u>**

Project to recover heat from the Dalmine waste-to-energy plant: in order to increase the amount of heat that can be supplied by the overall city’s district heating system, a connection is planned between the Bergamo district heating plant and the REA waste-to-energy plant in Dalmine in order to fully exploit the heat produced there. Timeline: activation of heat recovery starting in the 2024-2025 thermal season (October 2024) Target: an incremental increase in the amount of heat produced as a

function of the number of buildings connected to the network (upon completion of the expansion of the district heating network, there will be a 50% increase in heat compared to 2020).

Owing to the strategic value of this action, not enough data has been collected to estimate the potential reduction in CO_2 emissions. **This is a virtuous action that the Municipality will monitor in future editions of this document and, where possible, will provide quantitative evidence in terms of reduced emissions.**

- **Strategy for the development of the circular economy**

The Municipality has a long history of environmental policies, as has been amply described in the sections on policies. The move away from a linear economy towards a circular economy is of fundamental importance for anyone, including the city of Bergamo, wishing to pursue ambitions regarding climate action, nature protection and sustainability. It is equally important in benefiting innovation, growth and employment.

The concept of circularity touches on various points, such as: the reduced use of resources, with less material used to create products or provide services; the extended use of resources, by optimising resource use and increasing product life through durable design; the use of materials and services capable of extending the life of goods, together with their reuse, repair and regeneration; the use of regenerative raw materials to replace fossil fuels and non-renewable materials with renewable energies and materials, thus safeguarding the natural capital and ecosystem services.

The current vision of the city's **Circular Economy Plan** has a time horizon of eight years, meaning it goes beyond the end of 2030, in line with the deadlines of this document and the objectives of the Climate Mission.
The city's circular economy plan focuses on **three main areas**:

- Construction (recovery and re-purposing of existing property, new buildings with especial attention on those undergoing de-construction and demolition, as well as on the design and choice of materials and in situ technologies);
- Food (production and disposal of waste, reduction of upstream losses, and maximised downstream circularity);
- Consumer goods (recovery, reuse, repair and resale of objects)

The document has a purely **strategic** value, but provides strong guidelines for the projects planned both by the Municipality and by the external partners involved. Many of the actions included in the Circular Economy Plan have been included in the CCC (for instance, the "Chorus Life" and "Porta Sud" regenerative building interventions, the requalification of the new "Palazzetto dello Sport" indoor stadium and the "GAMeC" modern art museum, the various projects to reduce food waste including "Food Trails" and the new city food policy, and interventions to boost the recycling and reuse centres). Where possible, their impact on reduced emissions has been quantified.

The whole circular economy strategy is not quantifiable in terms of CO_{2eq}. However, this represents a growth model for the city to well beyond 2030.
In light of this strategy (not currently directly quantifiable in terms of reduced emissions) and the digitalisation strategy, not to mention the other strategies above (for which their impacts on emissions are known but not easily quantifiable), we estimate an overall additional reduction in emissions equal to 15% of the value of these strategies.
In the future, these strategies, together with the adoption of new strategies or the strengthening of current strategies, will also lead to a gradual reduction in residual emissions for which a specific "hard to abate" project is not currently possible. Nevertheless, they still affect those sectors with the most impact on local emissions: buildings and transport.

Therefore, after analysing the strategies presented here, the Municipality of Bergamo estimates a quantified reduction of 80.043 tCO2eq per annum plus a further 15% for those strategies that are not, at present, directly quantifiable.

This contributes to the reduction in the initial baseline: the graph below illustrates this reduction and its specific components.

- **SECAP actions**: a reduction of **111.903 tCO_{2eq}** per annum thanks to actions implemented within the SECAP time horizon of 2030;
- **CCC actions**: a reduction of **96.985 tCO_{2eq}** per annum through actions collected from stakeholders within the Municipality and externally through the Climate City Contract.
- **Behavioural** actions: based on the NZC guidelines, the potential energy savings arising from behavioural measures can vary from a minimum of 2% to a maximum of 20%, in agreement with the European Environment Agency; the Municipality of Bergamo, as per Module C of this document, has presented actions and initiatives of such a kind that it has decided to estimate their weight as equal to 20% of the emissions reduction target (80% of the baseline total).
- **Municipal strategic actions:** as indicated in the paragraph above, these account for an estimated reduction in emissions of 92.050 tCO_{2eq} per annum.
- **Delta GAP:** zero.

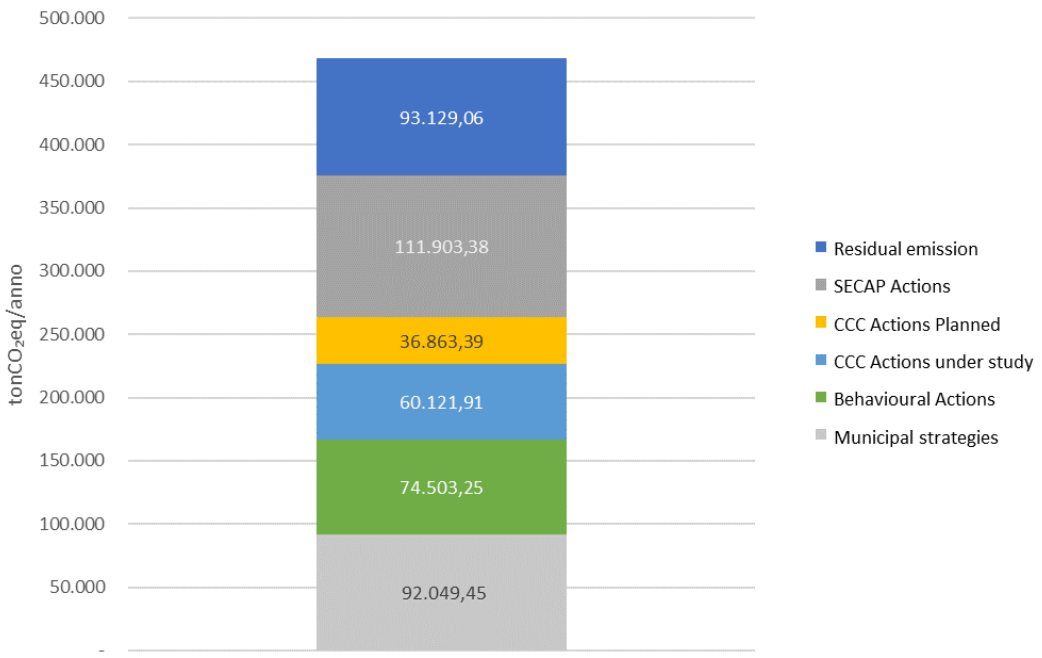


Figure B.1 Composition of the SECAP Baseline reduction

With the strategies implemented for 2030, the Administration exceeds the climate neutrality objective of reducing baseline emissions by 80%: the result is higher than the baseline emissions reduction target, effectively decreasing a part (2,925 tCO2eq) of 20% of residual emissions.

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

The following table shows the reference target values for 2025, 2027 and 2030: these are an estimate of what might be expected in terms of improved technology, infrastructure and awareness of the entire city ecosystem towards the issues of carbon neutrality.

Rather than present a macro-estimate for each individual sector, the Municipality has preferred to list just some of the strategic projects for the specific sector.

B-3.1: Impact Indicators						
Outcomes/ impacts addressed	**Action/ project**	**Indicator No. (unique identifie d)**	**Indicator name**	**Target values**		
				Baseline	2027	2030
Increased cycling mobility	Extension of the bike sharing service	#1	Number of bike sharing bicycles available	400	450	550
	Extension of the cycling infrastructure network	#2	Total km of cycle routes, cycle/pedestrian paths, cycle lanes and green routes	90	120	170
Improved takeup of local public transport	Monitoring of public transport users	#3	Passengers transported each year by urban lines	26 mln	29 mln	32 mln
	Extension of the local public transport network	#4	Total public transport vehicles in service with electric/hybrid traction	60%	80%	100%
Electrification of the territory	Development of renewable energy sources (RES)	#5	Power from renewable energy sources installed in the municipal area (MW)	11 MW	18 MW	25 MW
	Availability of EV charging points	#6	Number of EV charging points available in the municipal area	200	280	350
Development of separate waste collection practices	Diffusion of separate waste collection within the municipal area	#7	% of total waste that is separated	75%	80%	90%
Increase in green space in the city	Monitoring of city trees	#8	New trees planted	27.000	35.000	42.0000
	Improved city liveability	#9	Per capita extension of usable green space in urban areas	22	28	32

Further details of the individual indicators specified above are provided below.

The bike sharing service indicator has been taken directly from the ATB website. In partnership with the German company nextbike, ATB (Bergamo's local transport company) was entrusted with running the sharing service in January 2022, including the creation of 68 docking stations and the provision of both conventional push-pedal bicycles and electric pedal-assist bicycles aimed at encouraging bike travel between the town centre and the old walled city (Città Alta). The role played by bicycles within the territory is considerable not just for citizens, but also tourists: the city saw a significant increase in tourist flows in 2023 when it was Capital of Culture 2023. In fact, there were just over 2,5 million visitors to the city and the province of Bergamo as a whole during the first 10 months of 2023.

The use of alternative mobility goes hand in hand with the development of adequate cycling infrastructure: the city's strategic plan for cycling mobility (Piano strategico per la mobilità ciclistica - also known as "Biciplan") published in September 2022 contains the cycling guidelines that the municipal administration first introduced in 2012. Indeed, existing cycle infrastructure has increased from 77 km in 2014 to 90 km in 2022. The administration wants to boost the cycling infrastructure in order to increase its usage in the city. An equally important element in this regard is the safety and maintenance of the existing infrastructure.

The Municipality of Bergamo is focusing on the electrification of the territory, as can be seen from the installed photovoltaic power targets. Added to this, another crucial element is the electrification of transport, and private transport in particular: the target is to install a minimum of 30 EV charging points every year. This figure is deliberately conservative, given current technological and regulatory barriers. However, the city is also committed to be simplifying the rules and regulations, and plans to make various interventions to ensure adequate provision of electricity throughout the territory.

ATB Servizi S.p.A., the local public transport operator in Bergamo, recorded 26 million passengers in 2022 (21 million in 2021) on its road and funicular network. This figure also includes those lines that cover the extra-urban area, as it has not been possible to separate the purely city data from the extra-urban data. Furthermore, according to its corporate turn over plan, this company expects that all its vehicles will be electric by 2030 (58,6% of the fleet is currently diesel free). This electrification goal involves the purchase of 131 new buses, of which 52 will be electric, 63 methane (bio-gas) and 16 methane/electric hybrids. This plan started in 2022 with the delivery of the first 2 electric buses. A further 17 methane buses will be added in the coming months. Most of the new electric buses will be purchased between 2025 and 2030.

With regard to green space planning, design and management, the figure for green square metres per inhabitant comes from the city's own green space plan (Piano del verde comunale): these data are inclusive of the "Parco dei Colli" area, in the north-west of the city, and the "Villaggio Sposi" area, at present an undeveloped area but which is earmarked for the construction of buildings used for ERS after a change in use. Finally, in order to improve air quality, the municipal administration has planned the planting of 20.000 new trees over the next 7 years.

4 Part C – Enabling Climate Neutrality by 2030

The purpose of this section is to outline the enabling interventions, i.e. those relating to organisational or collaborative governance models and social innovations designed to support and enable the portfolio of proposed climate actions and to achieve the co-benefits already described in the impact pathway.

4.1 Module C-1 Governance Innovation Interventions

This module describes the governance innovations that the city of Bergamo has put in place to achieve climate neutrality by 2030. The innovations in institutional planning, leadership and the collaboration and awareness processes are detailed below. These include both internal interventions regarding the municipal administration and those concerning external stakeholders involved in the Mission.

We will begin by shedding light on the participatory governance model that the city has adopted in order to facilitate the goal of climate neutrality, known as the **Transition Team**. This working party has guaranteed horizontal involvement between city institutions and the various municipal sectors involved, as well as ensuring the accountability of the main levels of city government.

Below are the main interventions of social innovation that are classed as actions with a direct impact on our ability to meet the goals of the Mission.

C-1.1: Description or visualisation of the participatory governance model for climate neutrality

The construction of a solid mandate for the transition to zero emissions by 2030 requires the involvement of the entire territory. Multiple actors, both within and outside the Municipality, have been involved in the process. The first step taken by the Municipality of Bergamo regarding the Mission was to set up the **Transition Team**.

Responsibility for the governance of the Mission within the municipal administration lies with the Ecology and Environment Department, with four officials and a manager already actively involved. The Ecology and Environment Department also provides the **Climate Transition Manager**, in the person of the Head of Department, as already indicated in the Climate Transition Strategy (STC). In addition to this figure, the **Mobility Manager** and the **Energy Manager** of the Municipality of Bergamo are also members of the Transition Team.

The other departments of the Municipality were involved by appointing **a contact person for each**. These departments include: Mobility and Transport, Public Green, Botanical Garden, Buildings and Monuments, Technological Systems, School and Sports Buildings, Major Requalification Works, Contracts and Tenders, Planning of administrative activities and public works, Network structures and hydraulic works, Housing Service, Heritage, and European Planning. The Mayor directly has involved all the sectors to ensure full engagement. At a political level, both the **Mayor** and the **Councillor for the Environment and Mobility** are actively involved.

The Municipality of Bergamo also drew on the external support of the **NetZeroCities** Platform, **TerrAria** and **AESS**.

NetZeroCities advisors provided support during the drafting of the documentation, involving discussions and remote working sessions to better direct the drafting process.

TerrAria, an external consultant for the Environmental, Energy and E-Government departments, acts as the Energy Manager for the Municipality of Bergamo and has been responsible for drafting the Municipality's own Sustainable Energy and Climate Action Plan (SECAP).

AESS (the Agency for Energy and Sustainable Development) was tasked with supporting the implementation of the Action and Investment Plans, including all document drafting actions, which involved, by way of example, one-to-one meetings with stakeholders, creation of the portfolio of actions and their analysis in terms of emissions reduction and investments, identification of barriers and opportunities for transition to zero emissions, identification of lines of governance and overall planning (including strategy) for climate neutrality, and analysis of impact pathways.

The Transition Team, when extended to all actors within the city involved in the Mission, becomes the Urban Ecosystem. It includes: citizens, the public and private sector, trade associations, and the world of research and education.

As a first step, the **internal sectors** of the Municipality of Bergamo likely to have the greatest contribution to achieving climate neutrality were invited to join the Transition Team, a move that was also of crucial importance in consolidating the Team's impact within the Municipality.

On the 13th of September 2023, the selected sectors (the Environment Directorate, the Public Green and Mobility Directorate, the General Directorate, the Buildings and Systems Directorate, the School and Sports Construction and Public Requalification Works Directorate, the Tender Management, Procurement, Public Works, Infrastructure and Roads Directorate, the Human Resources, Associated Safety in the Workplace Department, Heritage and Public Housing Department Directorate, the Urban Planning and Private Construction Directorate, and SUEAP) were invited to an event at the Bergamo Council Chamber for a presentation of the Climate City Contract, the working methodology, the first macro actions to be identified and the involvement of the Municipality's sectors in the **co-creation** of a portfolio of actions and the analysis of barriers and opportunities for climate neutrality.

Details of these presentations were then sent to each sector, together with an action collection form which they were asked to fill in with behavioural and measurable actions, strategies, plans and guidelines which would then become part of the portfolio itself.

AESS supported the Municipality during this phase and during the subsequent one-to-one in-depth analysis with each sector.

On the 30th of August 2023, the Municipality passed a managerial resolution to approve its Public Announcement of an **Expression of Interest for the identification of stakeholders (large companies, SMEs, startups, third sector bodies, universities, research centres, etc.) to sign the Climate City Contract of the City of Bergamo, within the "100 carbon Neutral & smart cities" EU Mission**. This Expression of Interest, published that same day, required potential stakeholders to express their willingness to join the pathway and invited them to a public event to be held on the 11th of October 2023.

Said meeting duly took place on the 11th of October 2023 in the Council Chamber in Palazzo Frizzoni, and was attended by 16 local organisations, including companies, third sector bodies, associations and public bodies.

This event was followed by in-depth one-to-one meetings for the co-creation of the action portfolio.

Some stakeholders (such as A2A S.p.A., Edison next and ATB – Azienda Trasporti Bergamo), that is those who play an important role within the territory and who immediately showed strong interest in becoming part of the Mission, were involved from the very beginning of the process, as their actions are deemed to have a strong impact on the territory in terms of innovation and reduced CO2eq emissions. Actions concerning the development of the city's district heating network, the electrification of public transport and climate-neutral urban regeneration.

This **Expression of Interest** can be considered as an action not only of **innovative governance**, in full compliance with inclusion and transparency principles and the New Code of Public Contracts 2023 (Legislative Decree no. 36 dated 31/03/2023), but also of social innovation due to the involvement of local actors across the board.

Citizen involvement

The current Regulation no. 22 of the Municipality of Bergamo which regulates the methods of participation, recognises civic participation as a fundamental method for taking urban transformation decisions and for promoting social inclusion. Participation here means the maximum involvement of individual citizens or associations, social groups and economic actors, according to criteria for adequate diffusion, continuity and structuring, whilst still respecting the needs for the speed and transparency of procedure.

Involvement also means **co-planning** with citizens. This occurred when drafting the climate transition strategy (STC). As part of the participatory process for the Malpensata district, citizens living in the area were involved in designing an area that would turn from a car park into an integral part of a city park thanks to land reclamation and subsequent de-paving activities.

This initiative is an example of the participation process for urban planning tools, as variously foreseen by state and regional regulations, by the implementation tools referred to in the Transformation Areas in the Plan Document, by integrated programmes, by district contracts, by urban recovery plans and sector plans of urban or territorial relevance. This means that the involvement of external stakeholders hoped for by the Municipality of Bergamo is **transversal**, i.e. it cuts across the specific municipal tools. The participatory model will also involve plans/programmes that have already been approved, but are subject to substantial variant modifications. It will need to be commensurate with the territorial scale in question: in the case of the Malpensata district, citizens living within the area itself were involved, while projects of a broader scope will see more transversal involvement.

Finally, careful comparison with the work carried out by TerrAria regarding the SECAP is needed to find the points of contact between the SECAP itself and the CCC. AESS performed all the technical activities required to establish the baseline, calculate the emission gap, identify potential scenarios for climate neutrality, analyse the potential for innovative governance models, and pinpoint levers and barriers in close collaboration with the Municipality of Bergamo.

The action portfolio was, as mentioned above, co-created by the overall Urban Ecosystem.

The Municipality of Bergamo was also able to involve a large number of stakeholders totalling **40 private entities and 10 municipal sectors** through the work carried out by the Transition Team.

Due to its unique existence at a national level, the involvement of the Guarantor of Child Rights is of special importance, together with the specific involvement of the local healthcare sector through a memorandum of understanding between the healthcare bodies and the Municipality of Bergamo.

The **Guarantor of Children's Rights** is a figure within the Municipality that is committed to promulgating sustainable practices aimed at minors and families through a website designed in collaboration with the Municipal Administration itself and other awareness campaigns for paediatricians and schools.

More specifically, there is already a specific section called “Environment and Health” on the website (https://bambiniegenitori.bergamo.it/ambiente-e-salute) where documents and proposals, leaflets or posters for use by the families of minors can be posted for information purposes. The contents of this section are consistent with the themes of the Mission. These include, for instance, the actions undertaken by the Municipality to improve air quality in the city; a letter from Italian paediatricians to promote the importance of access for minors to natural environments and the need to rethink and plan our cities to guarantee this right; an appeal by the Italian associations of paediatricians, and signed by the Guarantor, to stimulate local administrators to make decisions to protect children and the environment against air pollution.

There is also a close look at the **Memorandum of Understanding for the healthcare sector** that the Municipality of Bergamo agreed and signed together with seven other sector players within the territory. These partners are listed below. Some of them are also signatories to the CCC, being responsible for actions and contributions consistent with the objectives of the Mission.

- Ordine dei Medici Chirurghi e Odontoiatri di Bergamo (Order of Surgeons and Dentists - Bergamo)
- ASST Papa Giovanni XXIII (Local health authority - Hospital)
- ASST Bergamo Est (Local health authority - East)
- ASST Bergamo Ovest (Local health authority - West)
- ATS di Bergamo (Public health service - Bergamo)
- Bergamo University
- Istituto di Ricerche Farmacologiche Mario Negri (Mario Negri Institute of Pharmacological Research)

The urgent need to address the climate emergency with concrete actions has raised awareness in the healthcare sector, especially since this sector contributes significantly to air emissions. The aim of the memorandum of understanding is to go beyond the work to make buildings more energy efficient which, although necessary and commendable, represents just a small part of the overall emissions in this sector (around 10% of the overall total). In this regard and by virtue of this memorandum of understanding, the parties have undertaken to draw up a specific road map setting out the actions they intend to pursue in order to achieve the goals of international climate agreements. On the basis of the relative environmental impact and their importance according to the scientific community, 6 specific areas of work have been identified. The healthcare companies undertake to appoint a manager for each of these and to establish the concrete actions they intend to implement in order to reduce the ecological impact of healthcare treatments:

1. Building management: heating, cooling and lighting
2. Transfers and mobility of staff, patients and visitors
3. Medical waste
4. Healthy and sustainable nutrition
5. Use of anaesthetic gases, drugs and medical devices
6. Appropriateness of care (20-30% of healthcare services are pointless or inappropriate).

Furthermore, the **University of Bergamo** contributes to the project by collaborating in training initiatives and establishing specific indicators and adequate measurement tools to quantify the main sources of emissions and monitor results.

The Mario Negri Institute of Pharmacological Research intends to initiate study and research activities with the aim of discovering and making known the consequences of a poor diet for human health and the health of the planet. It will then also provide details of which improvements in eating habits may have a concrete impact on reducing air pollution, land consumption, ocean acidification and the level of phosphates in land used for agriculture. The documentation centre at the Mario Negri Institute will critically monitor everything being published on climate warming and mitigation activities, as well as on potential action in the province of Bergamo in order to prepare citizens for the consequences of global warming, which is already predicted to start having an impact on our general well-being now and overs the years to 2050.

The city's engagement process also aims to involve the most expert and specialist sectors in energy transition. With this in mind, the Administration signed a **CACER Memorandum of Understanding** in January 2023 with three operators: CERESS, Eni Plenitude and A2A. The aim of this is to develop common models of statutes and pathways for the implementation and spread of Communities for Renewable Energy (REC), Collective Self-Consumption Groups (AUC) and for remote individual self-consumption (AID): three forms of development of the electricity network, called CACER in the document. The involvement of this sector will result in the maps of public buildings being updated to indicate those suitable for renewable energy sources (FER), as well as encouraging advantageous public-private partnerships for managing the requalification, maintenance and adaptation of buildings, and developing training and dissemination spaces for citizens (such as one-stop shops on municipal premises to support citizens and stakeholders in adopting responsible and effective energy efficiency actions). The purpose of this initiative is to stem the phenomenon of **energy poverty**, a term used to define the widespread difficulties in accessing basic energy services. This issue is of significant importance at a local, national and even international level: the strategies adopted to date have found that, in order to address the problem, constant contributions and collaboration between subjects of different natures and social characters are needed, in both the public and private spheres. Therefore, with this agreement the parties undertake to:

- carry out a study to assess the activation of CACER aggregation initiatives within the territory of the Municipality of Bergamo;
- set up a round table attended by the Municipality of Bergamo (supported by AESS and ENEA), Eni Plenitude, Ceress and A2A, with the aim of evaluating and proposing new forms of governance between public and private entities, and so try new methods of collaboration between different subjects with expertise in the matter.

Another Innovative Governance action is the participation of the Municipality of Bergamo in the pilot project known as **Let'sGOv - GOverning the Transition through pilot actions** (Horizon 2020 Grant Agreement program no. 101036519), co-ordinated by the Municipality of Bologna and whose partners including the 9 Italian cities participating in the Mission, the Energy Center of the Polytechnic of Turin, the University of Bologna and AESS. Thanks to Let'sGOv, cities will have the opportunity to benefit from training sessions and work on specific clusters focused on governance and the best involvement of internal and external actors on three specific themes: Engagement, Data and Finance.

Although these might not seem likely to have an impact in terms of reducing direct emissions, such training, awareness and promulgation activities are in all respects **a fundamental element of ecological transition and its positive outcome**.

The first results of this important participatory process appear even before the official delivery of the Climate City Contract on 15 March: three partners of the Mission joined together in a memorandum of understanding as part of the analysis of possible actions for the impact of daily behaviour regarding the use of energy sources at home, in particular where the sources are shared in a condominium or co-housing environment.
The project aims to use consumption data from direct measurements, bringing quantitative information about the private behaviours and habits in relation to the season and the internal and

external environmental conditions. This quantitative information is collected thanks to energy and environmental sensors and is transformed into values and indicators on which the managers of the shared residence will base the information campaign to improve the efficiency of the accommodation, reduce consumption and guarantee better quality living in terms of temperature, humidity and air quality.
The information produced will develop the communication flows based on both economic and cultural leverage to raise user awareness of more sustainable behavior in relation to the well-being of the lived environment.

C.1.2: Sample Table: Relations between governance innovations, systems, and impact pathways

Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
Transition Team	Working party across all municipal sectors with the aim of identifying partners within the Urban Ecosystem to achieve neutrality objectives	Complex synergy between municipal sectors; tendency to work in silos between different sectors	All municipal sectors involved	Extension of the principles of the Mission to the entire Urban Ecosystem	The transversal involvement of citizens guarantees participation and increased knowledge in all segments of the population
Climate, Mobility and Energy Manager of the Municipality of Bergamo	Appointment of three distinct figures responsible for Climate Transition, Energy and Mobility.	Inclusion of representatives for environmental, mobility and energy issues within the Transition Team.	Municipality of Bergamo, TerrAria	Energy, mobility and climate topics with a contact person and better management of the aforementioned issues.	Greater awareness of climate, energy and mobility issues within the Municipality.
Expression of interest to identify stakeholders	Expression of interest aimed at publicising the Mission and broadening the range of stakeholders	Greater dialogue and discussion between the Municipality and stakeholders	Urban Ecosystem	Expansion of the number of stakeholders signing the CCC	Greater synergy between the Municipality and local actors
Actions to support the work of the Guarantor of Children's Rights	Promotional and awareness campaigns regarding the protection of minors and their families	Involvement of segments of the population not normally particularly involved	Citizens and families; world of early childhood training; educational institutions	Training and sharing of good practices	Involvement of new generations to rethink the current development model
Health sector memorandum of understanding	Setting-up of a Steering Committee with representatives from each organisation signing the memorandum in order to define the strategies and priority	Difficulty in involving new organisations; difficulty in monitoring the objectives	All public healthcare organisations currently involved in the memorandum of understanding	Sharing virtuous practices to reduce the sector's impact	Extension of the memorandum of understanding to the private healthcare sector

	areas of intervention needed to reduce the ecological footprint of healthcare services				
CACER memorandum of understanding	Setting-up of a round table to carry out studies on the municipal territory to assess CACER aggregation initiatives	Difficulty in involving interested parties and a lack of funds; spread of Energy Communities and collective and individual Self-Consumption Groups	Municipality of Bergamo, A2A, Eni Plenitude and CERESS;	Reduction in our dependence on fossil fuels and the spread of individual and collective self-consumption practices	Possibility of extending the memorandum to other local operators
Let'sGOv	Pilot project for the optimisation of multi-level governance models	Opportunity to create synergy on governance issues between the 9 Italian cities adhering to the Mission.	Municipalities of Bergamo, Bologna, Prato, Florence, Turin, Roma Capitale, Parma, Padua and Milan, the University of Bologna, Energy center and AESS.	Innovative multi-level governance tools	Boost to the 9-city network Mission.

4.2 Module C-2 Social Innovation Interventions

Below are details of the most significant interventions for which the city of Bergamo is responsible and involved, both actions with its direct involvement and initiatives entrusted to external third parties. Some of the initiatives reported above are described as cross cutting social initiative such as the Expression of Interest for the stakeholders involvement and the engagement of the Guarantor of Children's Rights as main actor of the co-planning process. These initiatives are not reported above once again.

C.2.1 Sample Table: Relations between social innovations, systems, and impact pathways					
Intervention name	Description	Systemic barriers / opportunities addressed	Leadership and stakeholders involved	Enabling impact	Co-benefits
District networks	Spread of practices involving all citizens	Bottom-up co-planning; difficulty in involving all segments of the population	Citizens and all municipal sectors and stakeholders wishing to have an impact on the territory	Bottom-up involvement of the population	Spread of ESG and circular economy practices; increase in the effectiveness and efficiency of public policies
Clic.Bergamo	Project to boost social cohesion as an enabling factor for transition and for new urban welfare goals.	Possibility of citizen involvement and participation in decision-making processes, planning and the implementation of interventions at a local level	Municipal sectors and local citizen networks	Boost the involvement of different segments of the population	Spread of ESG and circular economy practices; increase in the effectiveness and efficiency of public policies
Framework agreement for engineering services	Outsourcing of the consultancy service regarding energy requalification of heritage buildings	Opportunity to spread virtuous building practices; a lack of incentives	Municipality of Bergamo and companies operating in the construction sector	Greater fluidity in outsourcing services	Increase in the value of properties
Platform for engaging, monitoring and spreading the CCC to all stakeholders	ForImpact.AI is a digital platform that allows Municipalities to work together with their stakeholders to generate impact on a local scale. This platform offers an opportunity for public interface to involve citizens in territorial transformations and sustainability policies, as well as being a valid collaborative and data management tool. It is also is a collaboration, monitoring and communication	Involvement of the population and stakeholders, collaboration between stakeholders and public administration, possibility of monitoring and spreading the project.	SuperUrbanity	Involvement of the population and stakeholders, monitoring of actions	Involvement and awareness-raising

	tool that simplifies the process of understanding current works and investments through the means of storytelling and data visualization. It informs citizens of all that is happening in the area thanks also to a Data Driven approach, boosting the efficiency of each decision by virtue of dynamic data monitoring.				

C-2.2: Description of social innovation interventions

This section presents actions at both a public and private level aimed at increasing social innovation, involvement and training.
Note that the behavioural actions of individual public and private stakeholders have already been presented in Table B-2.2c, classified according to the NZC methodology. These are also classed as social innovation interventions as they represent additional actions with respect to the core business of the individual stakeholder proposing them.

In addition to some of the Governance Innovation actions already mentioned (and linked closely to Social Innovation, such as the Expression of Interest for the involvement of stakeholders and the various memoranda of understanding drawn up by the Municipality, e.g. CACER and the Healthcare sector), below are details of major innovative social actions forming part of the virtuous actions that the municipal administration has put forward in support of the city of Bergamo's candidacy for the Net Zero City project of the Climate City Contract.

The modes of participation implemented by the Municipality of Bergamo are a fundamental method for urban transformation decision making and for promoting social inclusion. Participation here means the maximum involvement of individual citizens or associations, social groups and economic actors, according to criteria for adequate diffusion, continuity and structuring, whilst still respecting the needs for the speed and transparency of procedure.
The Municipality of Bergamo has set up a department called "District Networks" aimed at supporting, promoting, building and enhancing the city's district networks and encouraging dialogue and the virtuous process of mutual recognition between departments, the municipal structure and social subjects, educational bodies, committees, associations, groups, etc. District networks comprise representatives from each residents group, association and committee, whether formal or informal, responsible for communicating with officials from other bodies, institutions and organisations in their territory. District networks are non-partisan and non-denominational, they share and have at heart the common good, and play close attention to ensuring the social cohesion of the district. They have a strong propensity for participatory democracy and the creation of widespread co-responsibilities. The District Networks working model promotes the active participation of residents and dialogue between the various departments, services and bodies in a district, as well as encouraging collaboration and facilitating the planning and implementation of joint actions to meet shared goals. The municipal administration recognises the figure of "district operator" (operatrice/operatore di quartiere) to support, promote and enhance the work of all district networks. The District Networks department supports other municipal departments in implementing various kinds of participatory processes involving citizens in specific projects (e.g., the requalification of spaces or services, the Territory Government Plan, etc.).
One of the many objectives of the Cli.C.Bergamo! Climate Transition Strategy (a project co-financed by the Region of Lombardy and the Fondazione) is the desire to strengthen social cohesion as a central factor for a new level of urban welfare. This can also be achieved through urban regeneration actions involving the creation of high quality infrastructures, public spaces and shared services, and aimed at promoting the development of local communities and at structuring networks of surveillance, collaboration and social solidarity. Citizen awareness, involvement and participation therefore plays an important role in the decision-making processes, planning and implementation of these interventions. A recent example of a participatory process is that involving the Malpensata district, during which citizens were involved in designing an area which, thanks to land reclamation and subsequent de-paving activities, would turn from being a car park into an integral part of a city park. During the 3 scheduled meetings, participants discussed the environmental and socio-economic functions that might characterise the new area, recognising the important role that green areas and plants have in counteracting the effect of climate change and in providing basic ecosystem services. At the end of the participatory planning process, a Master Plan was drawn up by the University of

Milan and presented to the citizens. This incorporated all their requests where compatible with the restrictions dictated by the reclamation intervention. A fourth meeting will also be held, to present and explain the executive project.
In general, the participatory process concerns urban planning tools, as variously foreseen by state and regional regulations, by the implementation tools referred to in the Transformation Areas in the Plan Document, by integrated programmes, by district contracts, by urban recovery plans and sector plans with urban or territorial relevance. The participation project also concerns plans/programmes already approved but subject to substantial variant modifications. The participation process will need to be commensurate with the relevant size of the territory concerned and, depending on the plan/programme in question, may involve a single district, several neighbouring districts or the entire city.

The Municipality of Bergamo has also relied on a procedure for the outsourcing of consultancy services in order to finalise a Framework Agreement for engineering and architectural services relating to the energy requalification of heritage buildings for a period of 2 years. The services covered by this contract include the following activities:

- Energy performance diagnosis of buildings, also preparatory to and needed for the energy requalification, renovation, demolition and rebuilding of municipal properties

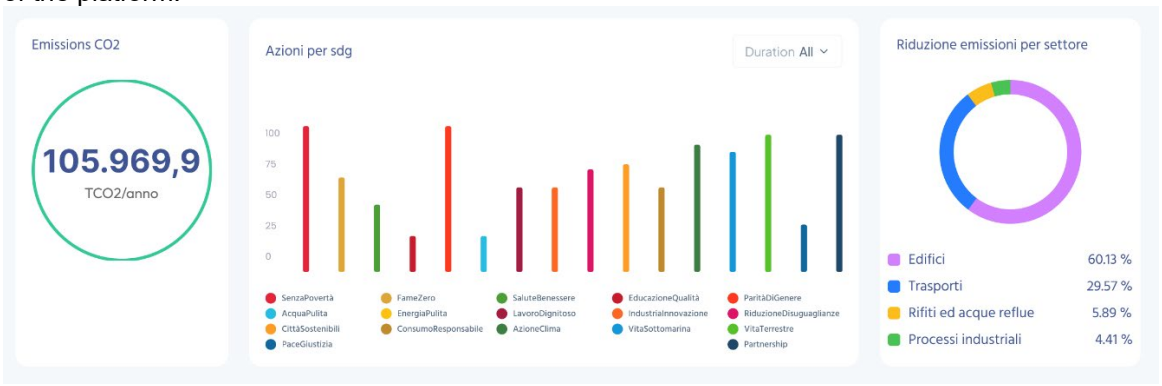
- Energy Performance Certificates for buildings, also preparatory to and needed for the energy requalification, renovation, demolition and rebuilding of municipal properties.

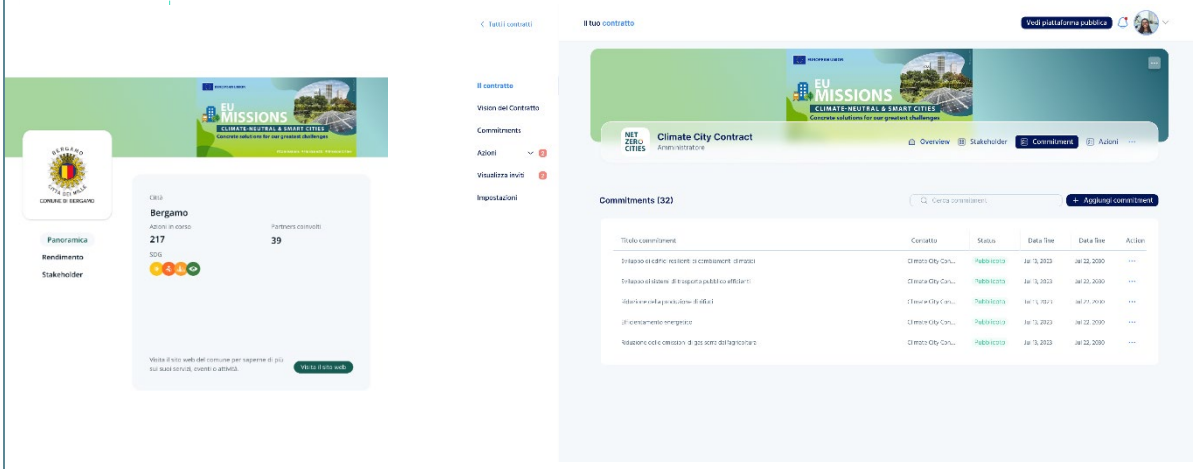
- Support activities aimed at obtaining GSE funding for “Conto Termico” initiatives, including, among others, the following activities: assessment of the possibility of accessing GSE funding, preparation of an initial estimate of how much funding might be obtained and drafting of a plan of works; assistance and indications for the architect/system engineer regarding the technical choices to be adopted in order to achieve the energy performance needed to obtain GSE funding; preparation of the documentation and the compilation/uploading of the application for funding on the GSE portal; support to the works management regarding the practicalities of obtaining GSE funding; collection of all the documentation needed to report back to the GSE and the compilation/uploading of the same on the GSE portal.

The procedure was announced in August 2023 and outsourced with a maximum total fee of € 138.000 for reliable services with individual contracts. A person in the Environment, Public Green and Mobility department has been made responsible for managing this procedure on behalf of the Municipality: it is expected that management will be extended to other services in the coming years, especially in the context of climate actions benefiting the environment. This action can be considered both one of social innovation, as it involves specific external engineering and architecture sectors for the energy component, and of innovative internal governance, as an internal figure of reference has been appointed.

The jewel in the crown of the Municipality of Bergamo’s actions for social innovation and digitalisation is the ForImpact platform, a digital tool for the involvement, monitoring and dissemination to all citizens of the commitments that the Administration and its partners are making regarding its 2030 neutrality goals.
Thanks to this platform, and by signing of concrete commitments such as the CCC, the Municipality is able to bring stakeholders together and steer their digital collaboration, engaging them through the means of common agreements.

ForImpact ensures the transparency of the governance of the City Contract, as well as allowing for the engagement of all citizens through storytelling and data visualization functions. This story-telling is facilitated by using a code system for the planned interventions, adopting the UN's SDGs framework (Agenda 2030) and through Artificial Intelligence. This step is of fundamental importance, as it combines the outputs of the CCC with the SDGs of the UN's Agenda 2030, creates new synergy and facilitates the interpretation of the Climate City Contract actions from an SDGs point of view.
ForImpact uses aggregate data visualization and soft data management to indicate the number of stakeholders involved, explain the planned actions, show the progress made in CO2 equivalent reduction and describe the indirect impacts of each action. Moreover, the data is clustered by sector of intervention, thus providing detailed understanding of which areas need extra attention in order to achieve the objectives.
The ForImpact platform is the digital tool that will also support the Municipality of Bergamo during the subsequent phase of continuous evolution and monitoring of the pathway towards neutrality by making it easier to update the process on a continuous basis.
Below are some screenshots of the platform[3]. In Annex 2 is presented a more comprehensive view of the platform.





[3]The values presented in the images attached can not be considered as final value being the platform still in beta version as we are writing.

5 Outlook and next steps

This section should draw any necessary conclusions on the CCC Action Plan above and highlight next steps and plans for refining the CCC Action Plan as part of the Climate City Contract in future iterations.

Plans for next CCC and CCC Action Plan iteration
The iteration of the Action Plan, and in general of the entire pathway towards climate neutrality by 2030, will be guaranteed by all the governance and social innovation actions introduced and systematised by the Municipality of Bergamo. The internal Climate, Mobility and Energy Managers will continue to act as co-ordinators, strengthening the Transition Team. Fruitful and diligent collaboration between all municipal employees and the central nucleus of the Transition Team, i.e. the Ecology and Environment Department, will guarantee a fluid internal process for the gathering of information, exchange of opinions and experiences, adding to the ever-increasing upwards curve in collaboration and the optimisation of intra-sectoral governance. The ForImpact digital platform will play a key role in the continuous involvement of all present and future partners of the Mission, and should also establish itself as a key tool for citizen communications. Relations with the stakeholders will continue, both through the already established round tables (see the various memoranda of understanding described in this chapter) and possibly future ones, both through direct discussions and via the digital platform specifically created for the Mission.

6 Annexes

Annex 1: Tab. B-2.1: Description of actions portfolio.

Annex 2: ForImpact platform.

Annex 1

Tab. B-2.1: Description of actions portfolio

Sector	Action	ID	Stakeholder	Description
Buildings	New district heating/cooling network	1	A2A	Development of the local public transport network (+22 km), integration of recovered heat in the district heating network (+50%) and improved level of service for citizens
Buildings	LED street lighting	3	Edison Next	New installation of 7645 LED street lights with remote adaptive control
Buildings	Installation of renewable energy source systems	5	Edison Next	Self-production of electricity through renewable sources with the intention to install photovoltaic panels on the roofs of buildings (maximum available surface area: c. 13,4 MWp)
Buildings	New district heating/cooling network	6	Edison Next	Installation and management of a low temperature thermal energy vector distribution network, for roughly 26 MW overall thermal power
Buildings	New NZEB building	7	Edison Next	Construction and management of energy systems to meet NZEB requirements in new builds constructed by others, for a total of approximately 490.000 m2 gross floor area
Buildings	Energy requalification of existing buildings	8	Edison Next	Construction and management of energy systems for existing buildings subject to energy requalification by others, for a total of approximately 24.000 m2 gross floor area.
Buildings	Energy management and monitoring system	9	Edison Next	Activities, measures and procedures to improve energy efficiency and reduce consumption, with the aim of achieving reduced environmental impact and improved economic performance.
Buildings	Introduction of digital software platforms to optimise energy consumption	13	Edison Next	The client will have the use of a horizontal governance platform capable of managing all the various vertical services throughout the territory.
Buildings	Construction of new NZEB headquarters	21	Confindustria	Transfer of the headquarters from an energy-consuming building to a new NZEB building where energy consumption is partially covered by a photovoltaic system
Buildings	Installation of renewable energy sources	23	Confindustria	Installation of a 70 kWp photovoltaic system at the new HQ currently under construction.
Buildings	Introduction of digital platforms and energy/water consumption optimisation software	24	Confindustria	Management of HQ comfort levels with lighting and temperature control based on presence detectors
Buildings	“Chorus Life” urban regeneration	33	Costim S.r.l.	Smart district for the recovery and requalification of a brown field area (former industrial zone) of 70.000 square metres in the north east of Bergamo. Plus: - a trigeneration system and home automation systems to control presence and temperature - self-production of energy from renewable energy sources - 2,5 km of bike lanes
Buildings	Refurbishment of the “LEGNANO” building	34	Marlegno S.r.l.	Re-cladding, new insulation and the replacement of doors and windows, to go from energy class B to A2 on completion
Buildings	Refurbishment of the “De Grassi” condominium	35	Marlegno S.r.l.	Re-cladding, new insulation and the replacement of doors and windows, to achieve class A1 on completion
Buildings	Creation of a prefabricated wooden structure	36	Marlegno S.r.l.	Demolition and re-construction of a mini condominium with bio-build systems
Buildings	Feasibility study for the refurbishment of the “Calvi” condominium	37	Marlegno S.r.l.	For future energy efficiency measures to take the energy class from F to A1 through re-cladding, new thermal insulation and replaced doors and windows
Buildings	Feasibility study for the refurbishment of the “Balsamo” condominium	38	Marlegno S.r.l.	For future energy efficiency measures to take the energy class from E to A1 through re-cladding, new thermal insulation and replaced doors and windows
Buildings	New residential bio-district	39	Marlegno S.r.l.	14 apartments and 4 semi-detached villas with high energy performance thanks to the use of wood as the main construction material; each building will only use renewable energy sources
Buildings	Construction of a new green building - the “Residenza Confort Life” condominium	40	Marlegno S.r.l.	12 high-performance residential units built in wood; each building will only use renewable energy sources
Buildings	New residential biodistrict - Ponte San Pietro	41	Marlegno S.r.l.	30 high-performance residential units built in wood; each building will only use renewable energy sources
Buildings	New residential biodistrict - Wood Experience	42	Marlegno S.r.l.	20 high-performance residential units built in wood; each building will only use renewable energy sources
Buildings	System energy efficiency	43	Uniacque S.p.A.	Adaptation of the existing water treatment plant (within the city) to meet the current potential in the municipal area. A 253 kWp renewable energy system on the same site and other photovoltaic systems in the outlying areas to cover energy consumption
Buildings	Installation of renewable energy sources in 15 sites	44	Uniacque S.p.A.	Photovoltaic systems in 15 different sites in outlying areas (within 20 km from the city of Bergamo)
Buildings	Ozonolysis of sewage sludge	46	Uniacque S.p.A.	Pilot project for the production of bio-methane: for a potential increase from 30 to 105 square metres/day
Buildings	Installation of advanced process controllers and replacement of air distribution systems	48	Uniacque S.p.A.	Interventions in 6 systems in outlying areas (call for tenders)
Buildings	Biogas production	49	Uniacque S.p.A.	Construction of anaerobic sludge digestion sections for energetic valorization of the resulting biogas; awaiting public-private partnership (PPP) proposal
Buildings	EPC contract	59	ASST Bergamo EST	Management contract for air conditioning systems, with energy saving goals
Buildings	Energy requalification of Lovere Hospital	60	ASST Bergamo EST	Interventions for the installation of thermal insulation, new doors and windows, and LED lighting
Buildings	Digital platforms and software to optimise consumption	64	Teal Blue	Digital platform for the creation of a digital connector system for energy consumption data acquisition
Buildings	Geothermal power plant and new district heating network	71	FRI-EL GEO	The “Bergamo” geothermal project will see the extraction of geothermal fluid from the subsoil to power an ORC electricity production plant, and a district heating network.
Buildings	Installation of photovoltaic systems	73	Legami	Installation of photovoltaic panels with total power output of 56,6 kWp
Buildings	Requalification construction site	77	Bemoa	Construction site for the energy requalification of two residential units, from class G to class A3/A4
Buildings	Improved building energy efficiency	78	Bemoa	Private building energy requalification goals as a corporate strategy
Buildings	Installation of photovoltaic systems	79	Bemoa	Strategy of installing renewable energy systems in SDG requalified buildings; to date, a 1,5 kW photovoltaic system has been installed
Buildings	Digitisation of buildings	81	Bemoa	Company strategy to install home automation systems and remote consumption control systems
Buildings	Installation of photovoltaic panels	90	BRT	Installation of photovoltaic panels in branches for self-production of electricity

Buildings	Smart mobility	100	Verde 21	Installation of 25 photovoltaic totems providing public transport information to citizens
Buildings	Sharing Culture	101	Verde 21	Installation of 20 photovoltaic totems allowing user interface with images and historical/cultural information
Buildings	Citizen services	102	Verde 21	50 information totems to promote and support city initiatives
Buildings	Play Green	103	Verde 21	50 photovoltaic totems in parks and playgrounds to entertain children and families through games and activities
Buildings	Fashion & design	104	Verde 21	50 totems for advertising and to promote traders
Buildings	External collaboration - Teatro Donizetti	105	Verde 21	Two installations in Teatro Donizzetti
Buildings	External collaboration - Smart District Chorus	106	Verde 21	Installations in the Smart District: negotiations under way
Buildings	External collaboration - Città Alta	107	Verde 21	Installation of 3 cubes and pyramid during the Bergamo Landscape event
Buildings	Requalification of headquarters	114	COESI	Installation of photovoltaic panels (total power: 90 kWp), intelligent lighting systems and home automation
Buildings	Installation of photovoltaic systems	122	CERESS	18 photovoltaic systems built in the city in 2022/2023, with power output ranging from 3 to 80 kWp (total installed power: 200 kWp)
Buildings	Photovoltaic systems in the process of being approved	123	CERESS	Various projects developed on behalf of the municipal administration and awaiting approval: cemetery area (potential output: 307 kWp) and municipal warehouse area (63 kWp). The final goal is to have installed 4 MWp by 2030
Buildings	Installation of renewable energy sources	125	ASST Papa Giovanni XXIII	Installation of a photovoltaic system at the Papa Giovanni XXIII hospital, on the southern roof of the “Piastra” building and the roof of “Torre 7” (364 kWp)
Buildings	Relighting of premises in Via Borgo Palazzo (Bergamo)	126	ASST Papa Giovanni XXIII	Replacement of existing external lighting with LED lighting
Buildings	Relighting of premises in Via Garibaldi (Bergamo)	127	ASST Papa Giovanni XXIII	Replacement of existing external lighting with LED lighting
Buildings	Relighting of premises in Mozzo and San Giovanni	128	ASST Papa Giovanni XXIII	Replacement of existing external lighting with LED lighting
Buildings	Connection of the premises in Via Borgo Palazzo (Bergamo) to the district heating network	130	ASST Papa Giovanni XXIII	Connection to the district heating system to save on energy instead of using the existing gas boilers (to be kept as a backup). Network provider to bear the cost.
Buildings	Creation of a new medical centre (CdC) and territory operations centre (COT) in Via Borgo Palazzo (Bergamo)	136	ASST Papa Giovanni XXIII	Energy requalification (cladding and plant) of the CdC and COT buildings. PNRR funding
Buildings	Creation of a new medical centre (CdC) in Via Garibaldi (Bergamo)	137	ASST Papa Giovanni XXIII	Energy requalification (cladding and plant) of the CdC buildings. PNRR funding
Buildings	Creation of new medical centres (CdC), territory operations centres (COT) and a community hospital (OdC) in locations outside the city of Bergamo	138	ASST Papa Giovanni XXIII	Energy requalification (cladding and plant) of: the San Giovanni Bianco hospital, the Sant’Omobono Terme centre, the Villa d’Almè centre and the Zogno centre. Interventions financed by PNRR funding.
Buildings	Technological upgrading of kitchens	144	ASST Papa Giovanni XXIII	14 new appliances (e.g., new generation ovens, extraction hoods, dishwashers)
Buildings	Replacement of refrigerator motors	145	ASST Papa Giovanni XXIII	Refrigerator motors to be replaced with a cold storage unit fitted with two AC motors powered by R448A bio-gas refrigerants.
Buildings	FABER requalification project	160	Provincia di Bergamo	Energy efficiency of 4 high schools in the municipality of Bergamo
Buildings	Photovoltaic system	161	SerCar	Photovoltaic system on the roof of the new bakehouse at the food preparation centre in Curnasco (Treviolo)
Buildings	Energy diagnosis - Celadina	166	Esselunga	Energy diagnosis (inspection in 2018 and report issued in 2019)
Buildings	Energy management system - Celadina	167	Esselunga	Preparation and certification of the Energy Management System according to ISO 50001
Buildings	Installation of a power quality system - Celadina	169	Esselunga	Automated energy consumption control system at company HQ
Buildings	Installation of machine learning systems - Celadina	170	Esselunga	Financed via profit sharing (50% of savings)
Buildings	Installation of electrostatic filters - Celadina	171	Esselunga	Electrocstatic filters installed on air conditioning units
Buildings	Energy diagnosis - Corridoni	173	Esselunga	Energy diagnosis (inspection in 2018 and report issued in 2019)
Buildings	Energy management system - Corridoni	174	Esselunga	Preparation and certification of the Energy Management System according to ISO 50001
Buildings	Installation of high efficiency motors - Corridoni	176	Esselunga	Installation of switched reluctance motors on air conditioning units in the store
Buildings	Installation of a power quality system - Corridoni	177	Esselunga	Installation of systems to improve the quality of the electricity used to power plant
Buildings	Energy diagnosis - San Bernardino	179	Esselunga	Energy diagnosis (inspection in 2021 and report issued in 2022)
Buildings	Energy management system - San Bernardino	180	Esselunga	Preparation and certification of the Energy Management System according to ISO 50001
Buildings	Relighting of the San Bernardino car park	182	Esselunga	Relighting of the underground car park with presence control
Buildings	Relighting of the salesroom - Corridoni	183	Esselunga	Plan to replace all lighting on the premises
Buildings	Photovoltaic systems	184	Bergamo University	Installation of photovoltaic systems on the roofs of the buildings in Via dei Caniana, Via Moroni and Via Pignolo, and installation of photovoltaic canopies at the CUS Bergamo sports centre
Buildings	General requalification of the heating and cooling systems at the headquarters in Via dei Caniana (Bergamo)	185	Bergamo University	Replacement of all fan coil units. Installation of a new multi-purpose air condenser unit. Installation of automatic management and control technology (BEMS) for heating and electrical plant.
Buildings	Improved efficiency of office lighting systems	186	Bergamo University	Replacement of existing lights with new LED lights at various premises around Bergamo (total 15.000 square metres)
Buildings	Heat generators	187	Bergamo University	Requalification of the “Chiostro maggiore” and “Casermette” heating systems at the S. Agostino complex in Bergamo
Buildings	Installation of renewable energy source systems	189	SACBO	Installation of a photovoltaic system on the roof of a section (F) of the P3 long-stay car park
Buildings	Airport Carbon Accreditation certification	192	SACBO	This certification is aimed at certifying the commitment of each participating airport to reducing Co2 emissions. It is approved and recognised at an institutional and global level. The SACBO Group has achieved the third level of accreditation in the Airport Carbon Accreditation certification scheme.
Buildings	Schools/sports facilities under construction	198	Buildings department	List of buildings: Palestra San Tomaso (gym); G.Rosa primary school; new Mazzi-Calvi new school complex; extraordinary building maintenance of schools; rebuilding of the “Villaggio Sposi” nursery school; requalification of the Angelini school; requalification of the bowling alley; energy efficiency of the Locatelli school; requalification of the Via Scais sports complex
Buildings	Planned construction of schools/sports facilities	199	Buildings department	List of buildings: extraordinary building maintenance of schools; demolition and rebuilding of the Scuri primary school, Coriandoli nursery school, Ciliegio nursey school, Bruco Verde nursery school, Erbavoglio nursery school; new De Amicis school canteen
Buildings	Ongoing requalification of municipal buildings	200	Buildings department	Construction of the new GAMeC pavillion and recovery of Casa Suardi (PNRR funding) and recovery of former railway structures to create a new cycle/pedestrian route

Buildings	Completed requalification works	201	Buildings department	Valorization of historic buildings and monuments in the city centre and completion of the Malpensata indoor sports stadium
Buildings	Electricity saving plan	213	Humanitas	Interventions aimed at plant and buildings, such as the replacement of refrigeration units, and the installation of heat pumps and refrigerator temperature monitoring systems
Buildings	Reductions in thermal energy consumption	214	Humanitas	Replacement of boilers, changed to set point temperatures, temperature monitoring systems
Buildings	Installation of renewable energy source systems	215	Humanitas	Installation of a new photovoltaic system and other interventions to improve the energy efficiency of buildings

Sector	Action	ID	Stakeholder	Description
Transport	Installation of “City Plug” charging points	2	A2A	EV charging points and low environmental impact green petrol stations
Transport	New infrastructure for EV charging points	10	Edison Next	Installation of various types of EV charging points: 20 DC-Fast charging points for a total 2.000 kW of vehicle charging power; 58 AC Slow Wall-boxes for a total of 429 kW of vehicle charging power.
Transport	Control of city access flows	12	Edison Next	Implementation of smart solutions to control private vehicles entering the city. Possible actions: restricted access areas (ZTL), pedestrianization, restricted access hours, low emission zones.
Transport	New charging point infrastructure	25	Confindustria	Installation of two leased EV charging points in the car park, powered by renewable energy.
Transport	Electrification of the company fleet	47	Uniacque S.p.A.	Long-term leasing of 12 electric vehicles to replace the old fossil fuel powered vehicles (average 15.000 km/year).
Transport	Appointment of a Mobility Manager	61	ASST Bergamo EST	Appointment and definition of training budget for an ad hoc figure
Transport	Electrification of the territory	82	Bemoa	A corporate goal is the installation of one charging point for every completed requalification intervention
Transport	Electrification of company vehicles	86	Bemoa	Renewal of the company fleet with electric vehicles
Transport	Turnover of last mile delivery fleet	87	BRT	Addition of electric vehicles to the pickup/delivery fleet (owned by suppliers) to replace thermal engine vehicles in order to reduce pollution There are 8 electric vehicles in the city and the province of Bergamo clocking up roughly 150.000 km/year.
Transport	Installation of EV charging points at branches	88	BRT	Installation of EV charging stations (wall-points or charging points) for supplier vehicles: 17 charging points in Stezzano.
Transport	Creation of pickup points	89	BRT	To reduce last mile pickup/delivery km and so emissions in town centres: about 140 pickup points in the city and province of Bergamo, and 9 parcel lockers
Transport	Adoption of the commuter travel plan (PSCL)	92	BRT	Drafting of the commuter travel plan in line with current laws
Transport	Design of the E-BRT line (Bergamo - Dalmine)	93	ATB	Use of electric buses between the station in Bergamo, Dalmine and other towns in the surrounding area: 30 km in distance, about 170 trips per day. Project funded by PNRR
Transport	New T2 Valle Brembana tram line	94	ATB	Design and construction of the tram line: total 12 km (PNRR funding)
Transport	Development of the company fleet	95	ATB	Replacement of diesel vehicles with full electric and methane powered vehicles: 33 mln in PSNMS and PNRR funding and 17 mln corporate self-financing
Transport	Corporate smart working	115	COESI	Fewer staff commutes led to an annual reduction of 33.000 km in 2022
Transport	Appointment of an Energy Manager	124	ASST Papa Giovanni XXIII	Communication of annual consumption data to FIRE (Federazione Italiana per l’uso Razionale dell’Energia), energy management activities. Annual appointment, starting in 2021
Transport	Appointment of a Mobility Manager	131	ASST Papa Giovanni XXIII	The hospital has had a Mobility Manager since 2021
Transport	Creation of the Papa Giovani XXIII bike park	132	ASST Papa Giovanni XXIII	Creation of a bike park with 90 places for bicycles and 7 places for scooters. Incentives to use sustainable mobility for hospital visitors and staff. Fully funded by the Municipality of Bergamo
Transport	Installation of EV charging points in ASST car parks	133	ASST Papa Giovanni XXIII	A total of 12 EV charging points installed, split between the Papa Giovanni XXIII hospital, San Giovanni Bianco and the HQ in Via Borgo Palazzo. Funded by the Region of Lombardy.
Transport	Installation of EV charging points for the company fleet	134	ASST Papa Giovanni XXIII	A total of 14 wall-boxes installed
Transport	Installation of charging points in the Via Borgo Palazzo visitor car park	135	ASST Papa Giovanni XXIII	A total of 4 EV charging points to be installed (donated by a private company, NovoNordisk)
Transport	Leasing of hybrid and full electric vehicles for the company fleet	143	ASST Papa Giovanni XXIII	Existing leasing of 10 hybrid vehicles (eletric/petrol); future leasing of 13 hybrid vehicles and 1 full electric car.
Transport	360° training and awareness	157	ATS Bergamo	Soft mobility and environmental sustainability awareness campaigns for schools, public administrations, citizens and local associations, companies and entrepreneurs
Transport	Soft mobility	158	ATS Bergamo	Initiatives aimed at employees regarding the use of alternative mobility
Transport	Expression of interest in the installation of EV charging points	159	Mobility department	34 EV charging points were installed throughout the municipal area in 2022 (regional call for bids), 18 of which at municipal buildings. A further 32 charging points planned for 2023, 16 of which have already been installed by Hera and A2A. The remaining charging points will be installed in 2024 by Be charge and Atlante.
Transport	Electrification of the airport operations fleet	190	SACBO	Reduced consumption and emissions from fossil fuel vehicles by replacing these with electric vehicles (80-90% of all vehicles).
Transport	Doubling of the Ponte San Pietro - Bergamo railway line	193	Mobility department	Addition of a second track to boost the Ponte San Pietro - Bergamo railway line
Transport	Upgrading of the Bergamo rail hub (new PGT)	194	Mobility department	Boosting of the railway line as per the territory government plan (Piano di Governo del Territorio - PGT)
Transport	Requalification of Bergamo station and boosting of the transport interchange	195	Mobility department	Requalification of the passenger area and strengthening of the connections for both civil and freight use
Transport	Exchanger car parks installed	196	Mobility department	Construction of the single-level Malpensata car park (former gasometer) and the Area Mercatale car park
Transport	Exchanger car parks planned and foreseen	197	Mobility department	Envisaged car parks: T1 stop in Pradalunga; Bergamo railway station; Via Baioni; Viale Giulio Cesare. Planned car parks: T2 stop in Sant’Antonio; T2 stop in Petrosino; Chorus Life district

Sector	Action	ID	Stakeholder	Description
Waste	Implementation of wastewater network mapping	15	Different Solutions	Scanning of real physical data for network pipelines and artefacts, identifying critical issues, damage, interaction with the environment and hydraulic risks. The data can be immediately associated with the relevant hydraulic and structural maintenance techniques
Waste	GIS-centric computerisation of the aqueduct network	16	Different Solutions	The use of a drone/underwater robot system to pinpoint leaks, and locate and quantify the existing network
Waste	Industry 4.0 integrated water networks	17	Different Solutions	Data acquisition for the optimisation of network maintenance and repair activities, predictive development for urban planning, and greater efficacy of actions
Waste	Adoption of mini power plants	18	Different Solutions	Installation of autonomous scalable and modular electricity generating plants using rainwater and solar energy (electrolysis).
Waste	Efficient water treatment systems	26	Confindustria	System to use non-potable water for hygienic purposes thereby reducing the use of water from the aqueduct; virtuous action within the Kilometro Rosso Innovation District
Waste	BG Circular project	27	Confindustria	During the three-year period 2020-2022, 120 companies were actively evaluating and improving their proposed recycling, reuse and sustainability actions. In 2022, this project was mainly aimed at small/medium local enterprises.
Waste	Subtraction of waste for disposal	32	SIMAP	Construction of a supply chain for the reduction of roughly 40 tons of waste destined for disposal
Waste	Reduced use of anaesthetic gases	55	ASST Bergamo EST	Pilot project: a 50% reduction in the use of desflurane (200 times higher global warming potential than other components). The value of the investment is equal to the savings obtained from reduced desflurane consumption.
Waste	Medical waste treatment and sterilisation systems - Seriate Hospital	56	ASST Bergamo EST	Purchase and installation of equipment for the shredding and sterilization of hazardous and non-hazardous medical waste, resulting in reduction in the volume/weight of the waste (reduced transport) and with possible reuse of residue waste
Waste	Implementation of separate waste collection - Seriate Hospital	57	ASST Bergamo EST	Purchase of modular bins for separate waste collection for use by both visitors and staff
Waste	Experimental circular economy project	75	Legami	In collaboration with the Municipality of Bergamo, a pathway has been launched in schools dedicated to the recovery of waste plastic stationery products using special collection boxes
Waste	Recycling and reuse centres	109	SOLCO	Interactive workshops to introduce reuse and recovery practices, the collection and regeneration of used material, and an online exchange platform
Waste	Quaternary waste water treatment (ozonation)	120	SIAD	Use of ozone generated from O2 (gas pipeline and/or vaporised liquid oxygen) to combat emerging micropollutants, and the possible reuse of treated water
Waste	Reduction of the non recyclable fraction from administrative areas	139	ASST Papa Giovanni XXIII	A total of 198 general waste bins have been replaced by 98 separate waste collection bins. Joint project with Aprica
Waste	Separate collection of hard and soft plastics	140	ASST Papa Giovanni XXIII	The overall weight of usefully separated hard plastic waste is currently roughly 5000 kg.
Waste	Appointment of an ADR consultant	141	ASST Papa Giovanni XXIII	An external ADR consultant has been appointed to manage the transport by road of dangerous goods and hazardous waste.
Waste	Waste collection training for staff	142	ASST Papa Giovanni XXIII	Training courses and awareness campaigns towards separate waste collection at work and the use of green products
Waste	Waste reduction	146	ASST Papa Giovanni XXIII	Approximately 1500 meals for patients are produced each day on the basis of the patients' choices the day before in order to minimise waste.
Waste	Reduction of single-use plastic - San Giovanni Bianco	147	ASST Papa Giovanni XXIII	The disposable plastic glasses used by patients have been replaced with reuseable beakers.
Waste	Reduction of disposable plastic in Bergamo, switching to biodegradable material.	148	ASST Papa Giovanni XXIII	The disposable tableware purchased and managed in-house for various catering needs have been replaced with equivalent items made from biodegradable materials to eliminate plastic. A saving in terms of 1.560.000 plastic products each year.
Waste	Waste reduction and circular economy	152	ASST Papa Giovanni XXIII	Use of waste from the ASST canteen (service currently suspended, entrusted to DUSSMANN)
Waste	To improve the management of watercourses	156	ATS Bergamo	With the involvement of public administrations to redevelop watercourses and so improve the use of available resources
Waste	Reduction of canteen waste	164	SerCar	SerCar has been monitoring (by weighing) the waste produced in some school buildings within the Municipality of Bergamo since January 2022 in order to draw up statistics concerning the least popular dishes. As a result, the recipes are altered or the food presented in a different way to reduce waste.
Waste	PNRR project - Collection centre	206	Waste department	The Municipality has obtained 1M euros in funding for the construction of equipment for separate waste collection and the creation of a special waste collection centre. These structures will meet environmental sustainability criteria, including the installation of photovoltaic panels. Cost for the Municipality of Bergamo: € 1.500.000
Waste	PNRR project - Recycling and reuse centre	207	Waste department	The Municipality has obtained 1M euros in funding for the construction of equipment for separate waste collection and the creation of a second-hand items recycling and reuse centre open to the public. These structures will meet environmental sustainability criteria, including the installation of photovoltaic panels.
Waste	PNRR project - Compacting bins	208	Waste department	The Municipality has obtained funding for the purchase of 130 plastic and paper recycling bins in order to optimise its separate waste collection.
Waste	PNRR projects - Ecological islands	209	Waste department	The Municipality has obtained funding for the purchase of 50 automatic ecological islands for the recycling of waste electrical and electronic equipment (WEEE).
Waste	"Mi piace un sacco" project	210	Waste department	Adoption of coded bags for collecting the non recyclable fraction of municipal waste and plastic packaging. This system saw the amount of separated waste rise from 71% in 2019 to 77% in 2022
Waste	"Sfida alle plastiche" project	211	Waste department	The aim of this project was to identify effective solutions aimed at reducing single-use plastic waste within local communities through changes in selling, purchasing and consumption behaviours, as well as the implementation of new strategies inspired by the principles of ecodesign in order to design products and systems that allow for easy, convenient reuse, recovery and repair.
Waste	Expression of interest in managing the collection of used clothing	212	Waste department	Objective: to identify one or more businesses willing to manage the collection of second-hand clothing and accessories, and cleaning the areas around the collection bins.

Sector	Action	ID	Stakeholder	Description
AFOLU	Planting of shrubs and plants	69	Legambiente	Planting of 240 new trees and 630 shrubs in various parts of the city in collaboration with other associations and bodies. “Bosco E.on” and “Azzera CO2” projects (the latter in Grumello al Piano). Annual investment value
AFOLU	Environmental education	70	Legambiente	Training courses in primary and secondary schools on environmental and sustainability topics. Annual investment value
AFOLU	Urban re-greening	72	Legami	Purchase of an area of 3 hectares to create a protected to safeguard biodiversity: 2640 plants planted
AFOLU	Re-greening initiatives	83	Bemoa	Partnerships with other bodies under consideration for large-scale planting projects within the municipal territory
AFOLU	Municipal plan for the planting of new trees	203	Green department	Planting of 20.000 new trees and shrubs within the municipal area as part of the plan to plant new trees

Sector	Action	ID	Stakeholder	Description
Transversal	Supply of certified green energy	4	Edison Next	Supply of certified green energy with a guarantee of origin for the consumption of energy not coming from photovoltaic systems. Estimated annual purchase: approximately 6.700 MWh/annum. The value of the investment depends on market prices
Transversal	Supply of certified green energy for EV charging points	11	Edison Next	Supply of certified green energy with a guarantee of origin amounting to approximately 2,9 MWhe/annum.
Transversal	Training/Awareness/Information	14	Edison Next	Integrated plan to communicate climate neutrality interventions in the Porta Sud district
Transversal	Environment & health section	19	Guarantor of children's rights	Space for sharing proposals regarding sustainable actions by the Municipality of Bergamo
Transversal	Awareness of sustainability issues	20	Guarantor of children's rights	Courses as part of the school curriculum, tailored to each age group, with the involvement of family paediatricians
Transversal	Purchase of certified green energy	22	Confindustria	The purchase of green energy to cover HQ energy requirements that are not met by self-production through its photovoltaic system
Transversal	Energy desk for companies	28	Confindustria	72 appointments in September 2022 to provide free information and advice on energy efficiency measures for companies
Transversal	Technical training	29	Confindustria	Collaboration with the University of Bergamo for the provision of training on energy topics at both a high school and university level (three-year degree course to be proposed for the 2023/2024 academic year); free initiative
Transversal	Drafting of the commuter travel plan	30	Confindustria	Support for participating companies located within the municipal area in the drafting of a commuter travel plan for their employees and the appointment of a company mobility manager
Transversal	OPEN ES platform	31	Confindustria	Platform that measures a company's level of sustainability and checks their position within their sector in order to improve individual performance and that of the entire community; in collaboration with Eni. Free initiative.
Transversal	Purchase of certified green energy	45	Uniacque S.p.A.	Purchase of green energy to meet 100% energy requirements in 2021 - 2023. No purchase planned for 2024 (suspended) to recover part of the economic outlay due to price increases. Purchase of 100% green energy to continue in 2025-2030.
Transversal	Digital platform for collecting consumption data for industrial processes	50	W2W Solutions	This tool was created to quantify the value of GHG emissions and so estimate and compare the effect of the efficiency actions being implemented.
Transversal	Purchasing procedures and green procurement	51	ASST Bergamo EST	Use of green procurement; orientation towards purchases with a higher sustainability value
Transversal	Memorandum of understanding on the appropriateness of pre-admission tests	52	ASST Bergamo EST	Awareness campaign to reduce and rationalise tests and consultations, with a consequent positive impact on environmental sustainability and the use of company resources
Transversal	Setting-up of the intra-company Green Team	53	ASST Bergamo EST	Planning of awareness activities for all ASST staff on six key topics for decarbonisation
Transversal	Telemedicine	54	ASST Bergamo EST	Televisit (virtual doctor) service introduced from 1/1/2022 to 30/9/2023
Transversal	Promotion of lifestyles - Seriate Hospital	58	ASST Bergamo EST	"GLOBAL HEALTH" awareness campaign to promote good lifestyles
Transversal	Hospital catering	62	ASST Bergamo EST	Purchase and use of the individual patient meal booking programme
Transversal	Reduced energy consumption of foodservice trolleys	63	ASST Bergamo EST	Replacement of multi-portion foodservice trolleys with those equipped with modern technology to guarantee significant energy savings Investment per trolley
Transversal	"Fare Sostenibilità" sustainability project	65	Bergamo Scienza	Training, information and awareness activities concerning Bergamo Scienza's activities, with a particular focus on sustainability
Transversal	"Puliamo il mondo" project	66	Legambiente	Volunteer environmental conservation campaign to engage children and young people. Annual investment value
Transversal	"Cammina Foreste Urbane" project	67	Legambiente	Promotion of urban green spaces and awareness of their importance within the urban landscape. Annual investment value
Transversal	"Dirama" project	68	Legambiente	Nature festival project, with natural heritage promotion and valorisation events. Annual investment value
Transversal	Purchase of certified green energy	74	Legami	Purchased to guarantee consumption requirements are met; 395 MWh in 2022
Transversal	Corporate Carbon Footprint Measurement	76	Legami	Actions already planned and yet to be planned with a view to compliance with ESG criteria. The value of the investment is 5% of the company's profits
Transversal	Purchase of certified green energy	80	Bemoa	Annual energy consumption
Transversal	Application of ESG criteria	84	Bemoa	Search for funds and calls for tenders aimed at virtuous companies
Transversal	New company headquarters	85	Bemoa	Following criteria that reflect compliance with ESG criteria.
Transversal	Purchase of certified green energy	91	BRT	Contract for the supply of alternative and renewable energy sources
Transversal	CE4CE European project	96	ATB	Project promoting the diffusion of circular economy principles in the public transport sector, resource optimisation, reduced waste, and increased process efficiency. 80% ERDF financing; 20% MEF fund
Transversal	Distribution of equipment and devices for projects and systems	97	Esprinet	The provision of equipment and devices needed to implement emission reduction projects and solutions within the renewable energy sector and other sectors
Transversal	Setting-up of a renewable energy community	98	SBAM	Creation of a renewable energy community comprising 110 apartments within a five-villa complex. EV charging points, wall-boxes and docking stations for soft mobility vehicles. Funded by Bergamo Smart City
Transversal	Smart city tourist infopoint	99	Verde 21	Creation of 10 photovoltaic monolith signs with an infopoint providing cultural and tourist information for tourists.
Transversal	Awareness events and environmental education/support activities	108	SOLCO	Workshops, training courses, educational interventions, environmental art projects and environmental monitoring activities
Transversal	Support for the drafting and activation of the "Click Bergamo" project.	110	Fondazione Cariplo	Support for the territory through: technical assistance to support the drafting of the climate transition strategy (STC) and in designing new renewable energy communities (CER); economic contribution for the implementation of certain actions within the STC, and CER management
Transversal	European "Food Trail" project	111	Educational services	Modification of school menus with the introduction of vegetable proteins (especially legumes) to partially replace animal proteins. Accurate measurement of waste levels and degree of satisfaction to evaluate the effectiveness of the changes. At the same time, an activity park dedicated to children; training for teachers and canteen committees, and information events for parents.
Transversal	"Green Menu": nutrition and sustainable diets	112	Educational services	A commercial business to promote healthy and sustainable nutrition, committed to guaranteeing meals using only plant-based ingredients
Transversal	"Skift" project	113	COESI	Project created by CSA COESI, in partnership with 6 partners from 4 European countries, with the objective of supporting the green transition of social economy companies, i.e. making them more environmentally sustainable. 10 companies in the province of Bergamo are taking part in this project

Transversal	Memorandum of understanding with the Diocese of Bergamo for environmental and social sustainability	116	Confcooperative	Promotion of concrete actions and training regarding social and green issues
Transversal	Memorandum of understanding for spreading knowledge of renewable energy communities (CER)	117	Confcooperative	Support in setting up at least 2 CERs in the city and province
Transversal	ESG Sustainability	118	Confcooperative	Pathway towards the structuring of a service providing support and advice on environmental sustainability, aimed at achieving environmental, social and corporate governance (ESG) sustainability
Transversal	“Impact Register” from a green perspective	119	Confcooperative	A register called the “Impact Register” has been set up to provide cooperative authenticity criteria for members
Transversal	Dissemination of opportunities and CER creation	121	CERESS	Information for all stakeholders of the opportunity represented by the renewable energy communities (CER) tool and identification of a group of users with whom to create an initial CER, with disclosure of the legal and regulatory aspects, and economic/financial feasibility studies
Transversal	Supply of green electricity	129	ASST Papa Giovanni XXIII	Annual electricity supply for all company premises with a guarantee of origin through the “green option” in the Consip convention: this action will be re-proposed each year every time the Consip convention is renewed.
Transversal	Installation of a WHP vending machine	149	ASST Papa Giovanni XXIII	A WHP vending machine providing healthy snacks and fruit has been added to the other snack vending machines installed on company premises, in compliance with the programme to promote health in the workplace.
Transversal	Food technology consultant	150	ASST Papa Giovanni XXIII	Advice regarding the verification and food safety of meals for patients and employees
Transversal	Participation in the new ARIA call for tenders	151	ASST Papa Giovanni XXIII	New catering service in full compliance with minimum environmental criteria (CAM)
Transversal	Company newsletter	153	ASST Papa Giovanni XXIII	Raising staff awareness and training through daily snippets
Transversal	Education on energy consumption	154	Fondazione Casa Amica	Educational actions regarding energy consumption (private utilities and heating), aimed at families living in houses with rent control and managed by the Foundation
Transversal	Integrated cooperation and multilevel governance for public health	155	ATS Bergamo	Promotion of actions to reduce GHG emissions and the spread of sustainable behaviour by means of information and training, also involving local authorities. Implementation through shared strategies and town planning tools
Transversal	Supply of organic produce	162	SerCar	Increase in the percentage of organic produce compared to total produce supplied.
Transversal	Food/environmental education for students and parents	163	SerCar	Collaboration with the Municipality of Bergamo in the “Food Trails” project.
Transversal	Purchase of green energy - Celadina	165	Esselunga	Obtained guarantees of origin starting on 1/1/2022 for a total of roughly 3,1 GWh/annum
Transversal	Training and awareness - Celadina	168	Esselunga	Training activities through e-learning in 2022 and the publication of good practices on the company portal to raise awareness in 2023.
Transversal	Purchase of green energy - Corridoni	172	Esselunga	Obtained guarantees of origin starting on 1/1/2021 for a total of roughly 3,1 GWh/annum
Transversal	Training and awareness - Corridoni	175	Esselunga	Training activities through e-learning in 2022 and the publication of good practices on the company portal to raise awareness in 2023.
Transversal	Purchase of green energy - San Bernardino	178	Esselunga	Obtained guarantees of origin starting on 1/1/2022 for a total of roughly 3,2 GWh/annum
Transversal	Training and awareness - San Bernardino	181	Esselunga	Training activities through e-learning in 2022 and the publication of good practices on the company portal to raise awareness in 2023.
Transversal	IMPROVE - Innovare e Migliorare i PROcessi Valorizzando le nostre Expertise	188	Bergamo University	The “IMPROVE” project (Innovate and iMprove PROcesses by Valorising our Expertise) has the following objectives: streamlining of operational activities by eliminating non-value activities; digitalisation of processes to reduce the use of printed paper; reduced use of emails to direct activities towards a shared online environment; development of the digital skills of University of Bergamo staff
Transversal	Purchase of green energy	191	SACBO	Purchase of certified green energy as part of the supply of electricity for the airport infrastructure
Transversal	Municipal smart working	202	Safety department	Plan allowing municipal employees to work from home
Transversal	“Tutti in campo per il nostro pianeta” project	204	Educational services	Awareness project regarding the virtuous management of resources and responsible consumption in order to create a culture of circularity among young people. Training courses are planned for primary/secondary school teachers and students
Transversal	“Bergamo Mercati” project	205	Educational services	The focus of this project is to enable students to discover the fruit and vegetable market in Bergamo and so highlight the importance of sustainability in all areas of everyday life
Transversal	UNI ISO 14001 certification	216	Humanitas	Guaranteed compliance with regulations (an ethical and corporate priority). Regulation of processes with environmental impacts in order to minimise risk. Framework for the pathway towards eco-sustainability for medium/long-term corporate choices
Transversal	“Aver Cura della Casa Comune” project	217	Fondazione Civiltà Bergamasca	Awareness initiatives and calls for tenders dedicated to protecting the environment

Annex 2

ForImpact platform

Bergamo 2030: Un patto di territorio per la neutralità climatica

Che cos'è il Climate City Contract

Il Climate City Contract è un patto per l'assunzione di responsabilità nella riduzione delle emissioni di CO_2, non solo da parte...

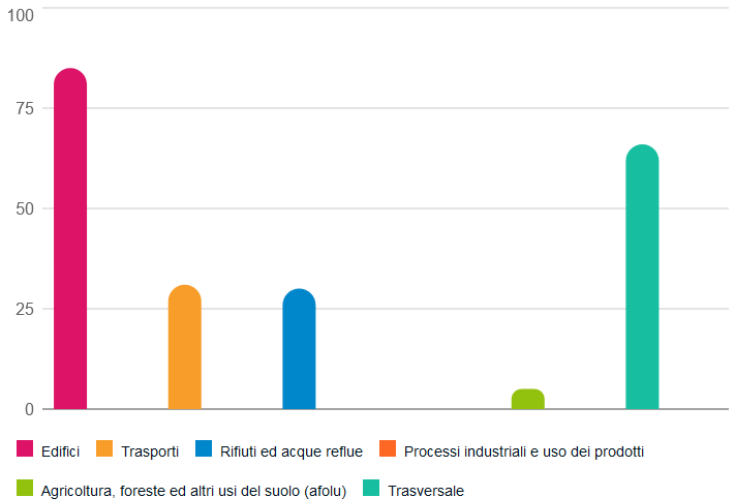
Il lavoro già in corso

A proposito di contratto climatico, esso arriva in contemporanea con tutto il filone PNRR che vede la città al centro di un profondo...

Scopri la nostra vision

Evidenzia il numero di azioni per ciascun ambito di riferimento

Evidenzia i settori su cui la città si concentra per ridurre l'emissioni.



Innovazione per la sostenibilità

Le azioni intraprese che hanno un impatto diretto sul territorio

Vedi tutte le azioni →

Comune di Bergamo

Rifiuti ed acque reflue

Manifestazione d'interesse per la gestione della raccolta di indumenti usati

Comune di Bergamo

Rifiuti ed acque reflue

Progetto "Sfida alle plastiche"

Comune di Bergamo

Rifiuti ed acque reflue

Progetto "Mi piace un sacco"

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Azioni per la sostenibilità

Filtra per: Stakeholder (1) Categoria d'impatto (1)

Comune di Bergamo ✕ Trasporti ✕ Rimuovi tutti

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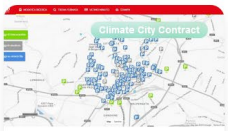

Comune di Bergamo

Trasporti

Parcheggi scambiatori programmati e previsti

Comune di Bergamo

Trasporti

Parcheggi scambiatori realizzati

Comune di Bergamo

Trasporti

Riqualificazione stazione di Bergamo e potenziamento dell'interscambio modale

Comune di Bergamo

Trasporti

Potenziamento nodo ferroviario di Bergamo (nuovo PGT)

Comune di Bergamo

Trasporti

Raddoppio ferroviario Ponte San Pietro-Bergamo

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Azioni per la sostenibilità

Filtra per: Stakeholder Categoria d'impatto

Ordina per: Default

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Rifiuti ed acque reflue

Progetto "Mi piace un sacco"

Comune di Bergamo

Rifiuti ed acque reflue

Progetti PNRR - Isole Ecologiche

Comune di Bergamo

Rifiuti ed acque reflue

Progetto PNRR - Cestini compattanti

Panoramica dei progressi in evoluzione

Numeri per raccontare gli sforzi di un'intera comunità

Stakeholders

I protagonisti del patto di territorio impegnati per una città più sostenibile

41

Impegni

Sono gli ambiti in cui la città intende intervenire per raggiungere la neutralità climatica

5

Azioni

I progetti concreti messi in atto dagli stakeholder del territorio

217

Contributo agli SDG

Obiettivi dell'Agenda 2030 su cui insistono le azioni

15

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Climate City Contract | Impegni | Azioni | Ecosystem | Agenda ONU 2023

Impegni per un futuro sostenibile

Raggiungimento neutralità climatica nel settore dell'edilizia pubblica e...

Panoramica

Azioni

Raggiungimento neutralità climatica nel settore dei trasporti

Raggiungimento della neutralità climatica nel settore rifiuti e acque...

Edifici

Raggiungimento neutralità climatica nel settore dell'edilizia pubblica e privata

Attraverso il Climate City Contract la città ha intrapreso un ambizioso percorso per ridurre le emissioni di gas serra nel settore degli edifici, comprendendo l'importanza cruciale di questo settore nel contesto della lotta al cambiamento climatico. Riconoscendo che gli edifici sono responsabili di una significativa quota di emissioni di CO2 a livello locale, La città si impegna a promuovere l'efficienza energetica e l'uso di energie rinnovabili attraverso una serie di politiche innovative e sostenibili.
Tra le iniziative principali, il Comune ha introdotto azioni per la riqualificazione energetica degli edifici esistenti, incoraggiando l'installazione di isolamento termico, finestre ad alta efficienza e sistemi di riscaldamento e raffrescamento più efficienti.
Parallelamente, per i nuovi edifici, vengono promossi standard elevati di efficienza energetica, spingendo verso la realizzazione di edifici a energia quasi zero (NZEB) che producono tanta energia quanta ne consumano grazie all'uso di fonti rinnovabili integrate, come pannelli solari e pompe di calore.
Il Comune sta anche investendo in tecnologie innovative come le reti di teleriscaldamento alimentate da fonti rinnovabili e il recupero del calore dai processi industriali, riducendo ulteriormente la dipendenza dai combustibili fossili.
Vengono inoltre promosse pratiche di sensibilizzazione alla sostenibilità per ingaggiare nello sforzo condiviso enti pubblici e privati e singoli cittadini.

Tutte le azioni / Edilizia scolastica e sportiva programmata

Panoramica | Informazioni | Impatti indiretti

Stakeholder

Comune di Bergamo
Edifici

Climate City Contract

Settore: Edifici

Status: In corso

Data inizio: January 2024

Data fine: January 2026

Condividi l'azione

L'azione in numeri

93.5

[tonCO₂/a]

Riduzione emissioni

I dati inseriti sono una stima degli indicatori e dei dati dell'azione.

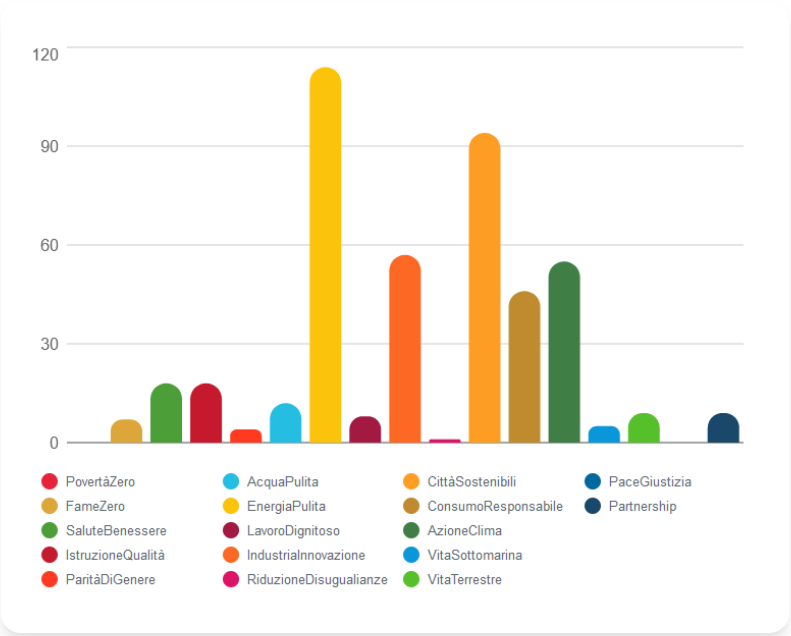
Tutte le azioni / Manifestazione d'interesse per la gestione della raccolta di indumenti usati

Panoramica | Informazioni | Impatti indiretti

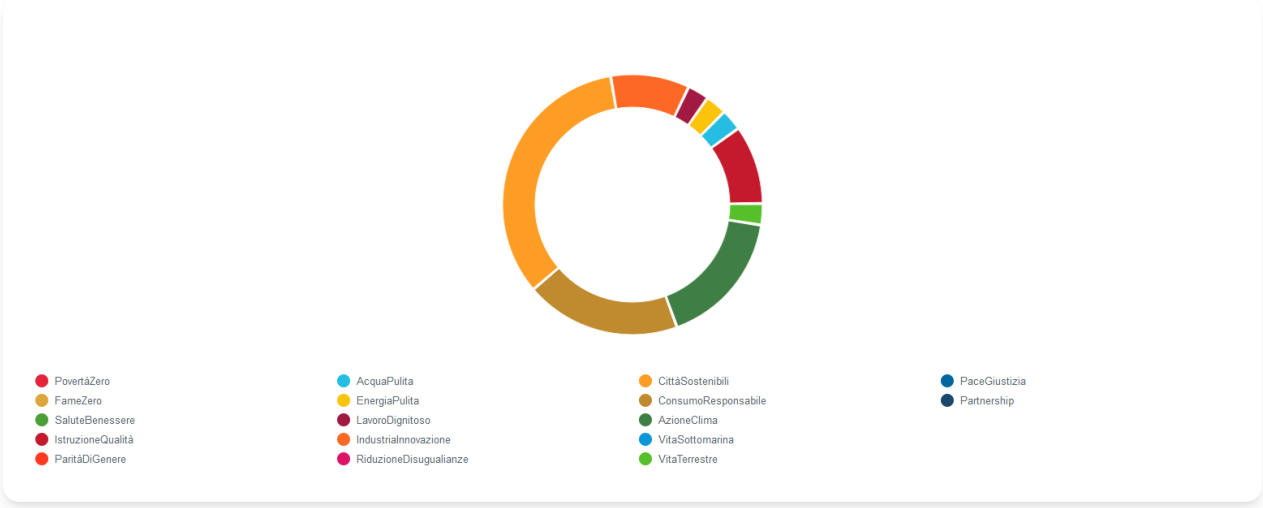
Questa azione consiste nella manifestazione d'interesse per la gestione della raccolta di indumenti usati, con l'obiettivo di individuare uno o più operatori economici per gestire l'attività di raccolta di abbigliamento usato e accessori, nonché la pulizia delle aree circostanti i contenitori. L'azione rientra nel settore dei rifiuti ed acque reflue e si svolgerà dal 1 gennaio 2024 al 1 gennaio 2026.

Contributo del contratto all’Agenda 2030

Rappresenta il numero di azioni che contribuiscono a ciascun SDG.



Un’analisi delle performance



NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Commitments

Climate Neutrality Commitments of Bergamo

NetZeroCities has received funding from the H2020 Research and Innovation Programme under the grant agreement n°101036519.

Table of contents

1 Introduction

Introduction

Bergamo embraces the *EU Mission Climate neutral and smart cities* challenge with great conviction. Having seen a considerable rise in collective awareness of general environmental issues over the years, and efforts to curb global warming in particular, it feels fully engaged.

Its candidacy for the Mission has also provided a major stimulus for it to enthusiastically relaunch the capacity for action and vision of a city that was so severely affected by the 2020-2021 pandemic. Indeed, Bergamo was the first European city to face a COVID-19 emergency of horrendous and unexpected proportions. In order to beat the resulting paralysis, it needed to engage in a European policy of regeneration and rebirth with climate transition a central priority.

The *Climate City Contract* has been and continues to be a sign of hope for Bergamo and a project for a better future, one that involves all stakeholders within the territory.

Finally, the Mission was immediately viewed as the ideal framework to link and rationalise the many ambitious environmental policies already in place, and hopefully break down the traditional walls between municipal departments, making the climate challenge the interpretative paradigm shaping every public policy.

The city had already joined the Covenant of Mayors in 2009 and has carbon footprint reduction commitments within its SEAP. These commitments were fully respected over the course of the following decade, with CO2 emissions cut by roughly 37% compared to the 2005 baseline.

A more recent and more innovative initiative has been the strategic project known as Cli.c Bergamo (Climate Change Bergamo) created in response to the Fondazione Cariplo's "Climate Strategy Call". This is a call for ideas for the development and implementation of a Climate Transition Strategy for the local context, with financing for the chosen pilot projects. The Municipality of Bergamo presented a complex, articulated project comprising various actions that also involves several areas outside the city limits that fall within the territorial system known as the "Parco dei Colli di Bergamo". The plan includes both mitigation goals and adaptation actions.

The theme of limiting global warming is also a major characteristic of the most recent sector planning tools, such as the Sustainable Urban Mobility Plan (PUMS), the Structural Green Plan, and the Territory Government Plan (PGT) in the process of being approved, among others. The PGT, for example, provides for a drastic reduction in land consumption and the regeneration of abandoned areas within the city; it also plans to provide the Municipality with regulations aimed at encouraging forms of sustainable construction with reduced CO2 emissions.

The salient points of the pathway to carbon neutrality involve various sectors within the Municipality. **Sustainable mobility policies** play an important role, resulting in policies for reductions in private traffic, for public transport innovation and electrification. These include a new tram line, the new Electric Bus Rapid Transit (E-BRT) line, new railway infrastructure and the renewal of the local public transport fleet. Other aspects of fundamental importance are the **energy and thermal efficiency of public and private buildings and an increase in the production of energy from renewable sources**. Bergamo expects to see substantial development of its district heating network (+50% heat available) with the involvement of private stakeholders, and its decarbonisation. Major impetus for renewable energy production is needed, which the Municipality intends to provide by promoting photovoltaic systems and using the REC (Renewable Energy Communities) tool. A memorandum of understanding has recently been signed by the Municipality with private sector players operating in the field of renewable energy aimed at the development of governance models for the development of forms of shared energy whose main objective is to tackle the issue of energy poverty and ensure the inclusion of disadvantaged citizens. This desire to pay special attention to the most vulnerable sections of society is the direct result of an awareness that these are also the most affected by the effects of climate change. In 2022, the Municipality of Bergamo commissioned a study to identify the priority areas for the development of energy communities. This started with an analysis of the

municipal areas most affected by energy poverty. The various actors to be involved were then identified and public meetings were held in each district to provide more information on the possibilities for shared collective self-consumption of energy.
This is just one of the many examples showing how participatory processes are closely linked to actions within the territory.

Other important actions are also envisaged to promote research into forms of circular economy and the production of energy and heat by means of the recovery of renewable sources (such as waste heat valorisation and the development of geothermal plants). To promote a circular economy, a recycling and re-use centre is currently being created based on the active participation of citizens: they will now be able to drop off their unwanted objects and buy second-hand items, thus recovering valuable resources and avoiding further emissions of CO2 into the environment. Last but not least, an invitation to tender for the management of urban waste will shortly be published that has environmental sustainability as its key characteristic.

The Municipality's current commitments regarding the reduction of its carbon footprint are contained in the strategic instruments already approved, or about to be approved, by the municipal administration. The Sustainable Energy and Climate Action Plan (SECAP) is a point of reference here. By inheriting and expanding the goals of the previous plan (SEAP), the Municipality has set itself the challenge of reducing baseline emissions by 55%. The other tools already mentioned will contribute greatly to meeting this goal.

The Mission is of fundamental usefulness when it comes to broadening the context of these objectives to the city, its actors and its stakeholders. It is the very concept of CCCs that makes this new level of innovation possible: the principle of co-responsibility means that the whole community accepts the climate challenge and adopts the targets that the city sets itself.

The context of Bergamo is that of an area rich in businesses, associations and civic life. These worlds have already largely accepted the need for climate change mitigation with specific objectives within their governance strategies.

Unfortunately, the links between these different initiatives are still weak, as is the link with what the public administration is attempting to achieve. This is why the CCC represents the ideal context to overcome these limitations and break down the barriers, and so integrate as far as is possible the various actions into a common framework supported by all the actors involved. A good example here is the recent memorandum of understanding signed between the Municipality and companies operating in the healthcare sector, an important part of the local economy. The various healthcare companies, the public and private hospitals in the city and the Ordine dei Medici (order of physicians) have agreed the objectives of the future CCC with the municipal administration and undertake to be part of it: by setting up an "inter-institutional green table" the representatives of the healthcare companies will have the chance to discuss, compare and exchange good practices in order to meet the challenging goals of the Mission.
The "Garante per i diritti dell'infanzia" (children's rights guarantor, an institutional figure within the Municipality of Bergamo) is also a member of the round table and is committed to promoting awareness-raising initiatives and measures to protect the health of mothers and children against from the effects of climate change.

2 Goal: Climate neutrality by 2030

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Goal
The goal is to achieve net neutrality by 2030, i.e. an 80% reduction in CO2eq emissions and a compensation rate of 20% thanks to strategic actions that also include outlying areas outside the city limits. The objectives for 2030 affect the entire city: no parts of the city are exempt. In fact, the stakeholders hold that the scope of these actions should not finish at the city limits, but cover the entire province. The territorial context is that of a relatively small city, both in terms of population and in terms of surface area compared to the general urban area. This provincial capital has 120,000 inhabitants and forms the core of a highly urbanised, densely populated metropolitan area of at least 350,000 inhabitants in a province with 1.1 million inhabitants. The territory is also very fragmented (243 autonomous municipalities). The municipality of Bergamo has an area of just 40 square kilometres. One must therefore assume that, as far as possible and as much as possible, the scope of any policy should reach beyond the narrow limit of the city itself to include larger territorial areas and all subjects within the province. Bergamo lies in the most populous region of Italy (Lombardy, with approximately 10 million inhabitants) and the geographical context of the Po Valley, i.e. a highly urbanised, densely inhabited area, with a strong economy and marked environmental problems, particularly with regard to air quality. The objective of the CCC, as far as possible, should be to broaden the limits of the project to a far larger area. Climate change mitigation actions and the decarbonisation of the local context will certainly enjoy co-benefits. First of all, the actions envisaged in the CCC provide for obvious improvements to the city mobility system by virtue of a reduction in the use of private vehicles and the major development of public transport systems, including the electrification of the fleet. These policies will then allow for actions aimed at improving the quality of public space: more pedestrian areas, and more green and permeable areas by reducing the amount of asphalt and concrete surfaces. This will then result in an improvement in the quality of life for citizens, a reduction in road accidents, and a better chance of adapting to climate change, especially with respect to the issues of water management and heat islands. More green areas and greater soil permeability will gradually introduce for the idea of a “sponge city” and a shaded city. A positive side effect of any improvement in the quality of public spaces will, of course, be an increase in the commercial and tourist attractiveness of the city, with positive repercussions on the local economy. Of course, tourism needs to be managed with special care in order to prevent it from turning into something erosive and unsustainable. However, it still represents an interesting opportunity for economic growth. Climate policies will boost the city’s reputation and make it better known and recognisable within Europe. Again, this will increase its economic attractiveness and draw potential investments by large international players. The highly innovative nature of climate policies has a positive return in terms of research and development in all the sectors involved. The actions in the CCC can also help drive the local economy, representing an opportunity for appreciable innovation in the work sector, thus resulting in new specialised jobs. Better mobility and greater energy efficiency make it possible to improve air quality, i.e. cut pollution levels. The CCC actions aiming to reduce greenhouse gases will also lead to a reduction in harmful emissions (PM 10, PM 2.5, NOx, etc.). This theme is all the more relevant when one considers the critical context of the Po Valley, as already mentioned. Better air quality results in better health for citizens and, especially, those most at risk (children and the elderly). Circular economy actions have close links to the Food Policy and other more general food policies. The fight against food waste and the search for environmentally sustainable menus also generates

positive effects for public health, starting with children and their relationship with school canteens. Food education and environmental education are mutually supportive.

The energy policies envisaged in the CCC will also have a clear impact on society, as they are effective energy poverty mitigation tools. Improvements to building efficiency and the activation of RECs are two actions with financial benefits, as they can help those sections of the population most exposed to fluctuations in energy prices. Energy efficiency is a way to reduce public spending and reallocate resources that would otherwise still be used to support the fossil fuel economy.

Climate policies are therefore intergenerational equity policies, as they endeavour to guarantee secure comfortable living conditions for future generations. They are also equity policies of a more general nature (generational, gender, etc.): in line with the logic of the SDGs, they are policies that pursue different objectives simultaneously, and in synergy.

The CCC clearly pursues the objective of fair and just climate transition, according to the principles of environmental, economic and social sustainability.

There are two ETS plants within the municipal territory (the district heating heat production plant and the plant for the new Bergamo Hospital). These plants are not included the target to avoid counting their emissions twice.

3 Strategic priorities

Strategic priorities

The main **strategic lines** identified by the Municipality of Bergamo to achieve neutrality by 2030 and which will have a profound impact on the reduction of CO2 emissions are as follows:

a) **Promotion of energy efficiency in public and private buildings**. The Municipality's SECAP activities provide good examples regarding public buildings and public administration actions. These include the introduction of Energy Performance Contracts (EPCs) to improve the efficiency of approximately 120 public buildings. Other actions include the "Conto Termico" incentives for renewable heating and REC development. As regards the private sector, there are numerous stakeholders who have proposed building redevelopment actions or consumption monitoring systems.

b) **Increase in the production of energy from renewable sources**. Examples include the extension of the city's district heating network and the production of heat using increasingly more renewables, the spread of photovoltaic systems on roofs (the Municipality is currently in the process of drafting a Masterplan for the development of photovoltaic systems on public roofs) and measures to facilitate the development of forms of shared collective energy self-consumption (the Municipality has signed a memorandum of understanding with private players in the energy sector to identify new forms of governance that prioritise energy poverty mitigation).

c) **Electrification of final consumption.** Examples include the rollout of EV charging points, the creation of new local public transport infrastructure powered exclusively by electricity, the electrification of the existing local public transport fleet and the promotion of the use of electric vehicles for last mile delivery within the city.

d) Implement forms of circular economy and food waste reduction. Public actions implementing this strategic line include the approval of the circular economy strategy (under development) and the publication of a new call for tenders for the management of the separate waste collection system. Food policy actions will also be developed in collaboration with the private sector.

e) Sustainable land management and reduction of land consumption. The new Territory Government Plan of the Municipality of Bergamo is in the process of being approved: this provides for a marked reduction in land consumption, urban regeneration, the expansion of

protected municipal areas and the approval of regulations to encourage green building and the reduction of CO2 emissions in the construction industry.

These strategic lines are therefore expressed as commitments in the Action Plan by sector:

Sector	**Commitment**
Buildings/Energy	Strategic lines a), b) c) and d) Promote and create energy efficient buildings using cladding and other suitable systems capable of guaranteeing reduced emissions, while also exploiting renewable energy sources to replace fossil fuels. Promote sustainable construction by exploiting secondary raw materials, recovering building materials and generally deploying the circular economy in the construction sector.
Transport	Strategic lines b), c) and d) Produce and use renewable energy for transport by championing the electrification of public and private means of transport. Promote and boost public transport, cycle routes, electric micromobility and low-emission vehicles in general.
Waste	Strategic line d) Promote and roll out schemes for separate waste collection, waste recovery and the recycling of goods, drawing on an efficient waste management service and public information and awareness campaigns.
Production	Strategic lines a), b) c) and d) Promote and boost the energy efficiency of industrial sites, both in terms of buildings and structures, and production processes. Reduce consumption and waste during production, including the introduction of forms of circular economy. Reduce air emissions or prevent their dispersion.
Agriculture and Land Consumption	Strategic lines a) and e) Promote and implement the production and use of renewable energy in the agricultural sector. Conserve undeveloped areas, and promote and introduce “zero kilometre” agriculture.

Over the course of the next 2-3 years, the **priority objectives** will be the following:

Electrification of end-use consumption

- Electrification of local public transport through:
  - the construction of the Electric Bus Rapid Transit (E-BRT) line that will connect the city to the municipalities to the west with strategically important services, such as a university centre and a scientific centre (Kilometro Rosso);
  - the construction of the second electric tram line (TEB2) that will connect Bergamo with Val Seriana;
    For both these interventions
    Timeline: start of operation by 2026
    Target: completion and inauguration of the two lines within the set time frame
  - the conversion of the local public transport fleet into a low-emission fleet (diesel free)
    Timeline: launch in 2024; completion by 2026
    Target: 100% of the fleet to be diesel free within the set time frame
- Development of the charging network for electric vehicles: to date, there are 49 public access EV charging points in the municipal area.
  Timeline: launch in 2022; completion by 2024

Target: installation of a further 16 charging points

Increase in the production of energy from renewable sources

- Heat recovery project for the Dalmine waste-to-energy plant: the Bergamo district heating plant and the REA waste-to-energy plant in Dalmine are to be linked in order to fully exploit the heat produced and increase the amount of heat that can be supplied by the city district heating system.
  Timeline: activation of heat recovery starting in the 2024-2025 thermal season (October 2024)
  Target: an incremental increase in the amount of heat produced as a function of the number of buildings connected to the network (upon completion of the expansion of the district heating network, there will be a 50% increase in heat compared to 2020).
- Extension of the city district heating network to city buildings to fully exploit the heat being produced.
  Timeline: by 2026
  Target: annual extension of the network (3-5 km/year)

Promotion of the energy efficiency of public and private buildings

- The Municipality of Bergamo has entrusted the energy requalification of approximately 120 public buildings to a third party with a ten-year EPC contract.
  Timeline: as per the schedule of works
  Target: as per the tender specifications
- Development of the first CACER project promoted by the Municipality of Bergamo.
  The Municipality has signed a memorandum of understanding that foresees a round table with private sector players to discuss the development of the most suitable forms of governance for the city and with the aim of mitigating energy poverty.
  Timeline: conclusion of the CACER round table by 2025; launch of CACER by 2026.
  Target: conclusion of the round table and start of the CACER

Implement forms of circular economy and the reduction of food waste

- Creation of a new separate waste collection centre for urban waste, and a new recycle and re-use centre
  Timeline: publication of the call for tenders by 2024; completion and opening by 2026
  Target: completion of works and opening of the centres
- Publication of a new call for tenders for the management of the separate waste collection system
  Timeline: publication by 2024;
  Target: awarding of the contract

Sustainable land management and reduction of land consumption

- Extension of protected city areas and inclusion of the same in the “Parco dei Colli di Bergamo”
  Timeline: by 2026
  Target: 50% of the municipal territory to be included in the “Parco dei Colli”

Needless to say, these strategic intervention priorities must be developed systemically and involve the relevant public and private stakeholders, such as the local public transport company (ATB), local multi-utility companies, “Parco dei Colli” and other private stakeholders operating within of the municipal territory. Of especial importance are those stakeholders linked to the field of research and development (e.g. universities and research centres) as these can speed up the decarbonisation process and spread these principles across society.
Last but not least, the goals envisaged by the strategic lines can be met by implementing and strengthening systems to engage and involve the population (especially the more vulnerable members of society) with interactive dissemination platforms, public meetings and campaigns to raise awareness and encourage the active participation of residents in CCC actions.

4 Process and principles

Process and principles

In order to meet the climate neutrality target, the Municipality of Bergamo has adopted a continuously evolving and modulating work process. Just as when drafting the CCC, it is essential that the whole urban ecosystem (public and private stakeholders, members of society and the institutions, and the various municipal sectors) is involved in order to release the full potential of the territory.
To attract and involve stakeholders, the Municipality of Bergamo has published an Expression of Interest on its website, posts news on its social media and sends newsletters to keep people updated on the progress of the project. To allow people to understand the enormous potential of this project and further engage stakeholders, plenary workshops and individual meetings have been held so that the objectives of the Mission can be explored in depth.
A plenary conference will also be held following submission of the CCC on the NZC platform, the purpose being to bring together all the stakeholders involved and promote the creation of new synergies.
Last but not least, the ForImpact.AI digital platform project is well under way: this will allow Municipalities to work together with their stakeholders to ensure an impact on a local scale. This platform offers an opportunity for public interface to involve citizens in territorial transformations and sustainability policies, as well as being a valid collaborative and data management tool. It is also is a collaboration, monitoring and communication tool that simplifies the process of understanding current works and investments through the means of storytelling and data visualization. It informs citizens of all that is happening in the area thanks also to a Data Driven approach, boosting the efficiency of each decision by virtue of dynamic data monitoring.

The process includes continuous monitoring of the effectiveness of the actions so as to recalibrate the efforts as and when required, and assess whether to continue in the current direction or take the decision to direct resources towards other more successful actions. It is also expected that the strong network created with the other 8 Italian cities participating in the EU Mission and the main Ministries involved (a memorandum of understanding was signed in September 2022) will contribute substantially to the smooth running of the process, as it will make it easier to overcome any critical issues at the project or implementation stages that might hinder the pursuit of the Mission. Likewise, the sharing of good practices, activities of particular importance and innovative projects developed by the network will allow for the creation of a knowledge base that will be of benefit to other Municipalities, public administrations or public bodies who might themselves decide to “join” the cause and so catalyse and spread the guiding principles of the Mission.

Monitoring will also be made possible thanks to the platform currently being finalised: this will allow for stakeholder collaboration, public communications and the monitoring of the impact of each action.

The principles that have guided and will guide the implementation of the CCC are as follows:

1. **Co-responsibility and multilevel governance**: the city has accepted an extremely complex challenge requiring the development of an active and collaborative urban ecosystem, comprising entities from both the public and the private sectors who jointly feel the need to tackle climate change as the guiding principle behind their every choice, decision and action. The only way to overcome this challenge is for everyone to assume responsibility for their own actions.
2. **Inclusivity – people at the centre**: for climate transition to be truly useful to society, it must be ethical, fair, inclusive and accessible to all. This principle must guide all choices so as not to leave anyone behind and to ensure that transition is sustainable from every point of view, and not just in terms of the environment.
3. **Innovation**: the only way to successfully implement such a challenging and new project for the entire society is to create new forms of governance among local stakeholders and

	welcome innovation as a transition driver. The envisaged actions should also result in substantial social, technical and governance innovation.

5 Signatories

Name of the signatory (organisation)	Sector	Level of operation	Legal form	Name of the responsible person	Position of the responsible person
Municipality of Bergamo	Public authority	Local level	Public Body	Giorgio Gori	Mayor
A2A S.p.a.	Private sector	International level	joint-stock company (s.p.a.)	Renato Mazzoncini	CEO and General Manager
ASST Bergamo Est	Public authority	Local level	Public Body	Dott. Marco Passaretta	General Manager
ASST Bergamo Ovest	Public authority	Local level	Public Body	Dott. Giovanni Palazzo	General manager
ASST Papa Giovanni XXIII	Public authority	Local level	Public Body	Francesco Locati	General manager
ATB Mobilità S.p.A.	Publicly held company - Subsidiary	Local level	joint-stock company (s.p.a.)	C. Rita Donato	General manager
TEB s.p.a.- Tramvie Elettriche bergamasche[1]				Gian battista Scarfone	CEO
ATS Bergamo[2]	Public authority	Local level	Public Body	Massimo Giupponi	General Manager

[1] This Company is held by ATB and it's responsible for the development of the new T2 Valle Brembana tram line, already considered in the Action plan.
[2] Awaiting for signature. Nevertheless, the partner has signed a MoU with the Municpality of Bergamo for joint actions included in the CCC.

Bemoa S.r.l.	Private sector	Local level	limited liability company (s.r.l.)	Walter Battaglia	Sole administrator
BergamoScienza	Private sector – Research Center	Local level	Non-profit association	Rosella Colleoni	Secretary general
BRT S.p.a.	Private sector	National level	joint-stock company (s.p.a.)	Roberto Pregno	Research and Development Director
CENTRO SERVIZI AZIENDALI COESI SOC. COOP. IMPRESA SOCIALE	Private sector	Local level	social enterprise	Massimo Monzani	President
CERESS S.r.l.	Private sector	National level	limited liability company (s.r.l.)	Gianluigi Piccinini	Technical manager
Confcooperative	Trade association	Local level	Association	Lucio Moioli	Secretary general
Confindustria Bergamo	Trade association	Local level	Association	Paolo Piantoni	General Director
Consorzio SBAM	Private sector	Local level	consortium of social cooperatives	Alessandro Santoro	Chairman of the board of directors
Consorzio Sol.Co. Città aperta	Private sector	Local level	consortium of social cooperatives	Fausto Gritti	Chairman of the board of directors
Costim S.r.l.	Private sector	National level	limited liability company (s.r.l.)	Davide Albertini Petroni	CEO
Different solutions	Private sector	National level	start up	Stefano Dini	Project Manager
Edison Next S.p.a.	Private sector	International level	joint-stock company (s.p.a.)	Giovanni Brianza	CEO

Zeliatech s.r.l. (Gruppo Esprinet S.p.A.)	Private sector	International level	limited liability company (s.r.l.)	Sergio Grassi	Country Manager (Zeliatech Srl)
Esselunga	Private sector	Regional level	joint-stock company (s.p.a.)	Luca Alovisi	technical director
Fondazione Cariplo	Foundation	Regional level	Bank foundation	Giovanni Azzone	President
Fondazione Casa Amica	Foundation	Local level	foundation	Alessandro Santoro	Director
Fondazione della Comunità Bergamasca	Foundation	Local level	foundation	Federica Bruletti	Secretary general
Fri-el Geo S.r.l.	Private sector	National level	limited liability company (s.r.l.)	Ernst Gostner	Chairman of the board of directors
Humanitas Gavazzeni	Private sector	National level	joint-stock company (s.p.a.)	Alessandro Liguori	CEO
Istituto di Ricerche farmacologiche Mario Negri	Research Center	International level	IRCCS (Institutes of Hospitalization and Scientific Care)	Giuseppe Remuzzi	Director
Legambiente	Private sector	Local level	APS (association for social promotion)	Elena Ferrario	President
Legami S.p.a. Società Benefit	Private sector	International level	joint-stock company (s.p.a.) Benefit Company	Alberto Fassi	CEO
Marlegno S.r.l.	Private sector	National level	limited liability company (s.r.l.)	Giampietro Tonani	Project Manager

Ordine dei Medici Chirurghi e Odontoiatri della provincia di Bergamo	Trade association	Local level	Professional association	Guido Marinoni	President
Provincia di Bergamo	Public authority	Local level	Public Body	Pasquale Gandolfi	President
S.A.C.B.O. S.p.a.	Publicly held company	International level	joint-stock company (s.p.a.)	Emilio Renato Angelo Bellingardi	General Manager
S.I.A.D. S.p.a.	Private sector	International level	joint-stock company (s.p.a.)	Bernardo Sestini	Chairman and CEO
SerCar S.p.a.	Private sector	Regional level	joint-stock company (s.p.a.)	Marco Carrara	Owner
SIMAP S.r.l.	Private sector	International level	Company	Abramo Balduzzi	Co-owner
Superurbanity (Pn6 srl)[3]	Private sector	National level	limited liability company (s.r.l.)	Rodolfo Pinto	CEO & Managing Director
Teal.Blue Società Benefit S.r.l.	Private sector	International level	limited liability company (S.r.l.) benefit company	Marco Aldo Piccolino Boniforti	Managing director
Uniacque S.p.a.	Publicly held company	Local level	joint-stock company (s.p.a.)	Pierangelo Bertocchi	CEO
Università degli Studi di Bergamo	Public authority	International level	Public Institution	Annalisa Cristini	Deputy Rector for Welfare and Sustainable Development

[3] Superurbanity is a provider of technological solutions for sustainable digital transition who has entered into a Partnership with the Municipality for the development of the CCC platform already considered and mentioned in the Action Plan.

Verde21 S.p.a	Private sector	National level	joint-stock company (s.p.a.)	Giuseppe De Beni	CEO & Managing Director
W2W Solutions Italia srl	Private sector	National level	limited liability company (s.r.l.)	Roberto Caspani	Owner - CEO