



European Green Capital Award 2025

Brescia application Indicator 6

6. Climate Change: Mitigation

6.A Present Situation

Please complete the following table with most recent data available.

Table 1: Benchmarking Data - Climate Change Mitigation

* For EGL applicants the following applies: when the applicant cannot provide certain benchmark data, a brief description of the current situation regarding climate change mitigation.

Indicator			
Energy consumption		Units	Year of Data
Final energy consumption	5'311'496.5	MWh	2018
Final energy consumption per capita	26'753	kWh/capita	2018
Share of renewable energies of final energy demand	23.7	%	2018
Share of locally produced renewable energies of final energy demand	14.1	%	2018
Energy performance of municipal buildings (mean)	121.8	kWh/m ²	2018
CO ₂ (and other greenhouse gas) emissions		Units	Year of Data
Total CO ₂ equivalent emissions per year	1'313'294	t CO ₂ eq.	2018
Total CO ₂ equivalent emissions per capita	6.61	t CO ₂ eq./capita	2018
Total CO ₂ equivalent emissions per MWh energy consumed	0.25	t CO ₂ eq./MWh energy consumed	2018
Emission reduction targets	Base Year	Target Year	% Reduction
City's emissions reduction targets	2010	2030	- 50% procapita

Data from SECAP of Brescia

Table 2: Benchmarking Data – Energy consumption and CO₂ emissions per sector

* For EGL applicants the following applies: when the applicant cannot provide certain benchmark data, a brief description of the current situation regarding energy consumption and CO₂ emissions per sector.

Sector	Percentage of final energy consumption	Unit	Percentage of total CO ₂ equivalent emission per year	Unit
Agriculture & fisheries	0.1	%	0.15	%
Industrial & commercial	40.9		56.98	
Transport	10.9		10.76	
Domestic	30.2		17.77	
Services	16.3		13.51	
Other	1.6		0.83	
Total	100		100	

This section is aimed at providing information on the current situation in relation to energy and CO₂ emissions (and other greenhouse gases) in the city. Please provide information on the following:

1. A breakdown of the sources of energy.
2. The current monitoring system of CO₂ emissions.
3. The city's organisational structure in charge of energy performances in the city (of buildings, transport, industry, etc).
4. How the city works on emissions reduction with other governmental bodies, private sector service providers, enterprises and citizens.
5. An existing sustainable energy and climate action plan (SECAP)¹ under the Covenant of Mayors for Climate and Energy (CoM) and respective references will be positively noted.
6. The modal share of transport (detailing at least the share of transport by car, public transport, and active transport) and plans such as a sustainable urban mobility plan (SUMP)² or sustainable urban logistics plan (SULP)³.

(max. 1000 words and five graphics, images or tables)

¹ Local authorities joining the Covenant of Mayors commit to submitting an action plan within two years after formally signing up to the initiative. More information on the SECAPs and the relevant processes can be found in the FAQ of the Covenant of Mayors: <https://eu-mayors.ec.europa.eu/en/FAQs>

² https://transport.ec.europa.eu/transport-themes/clean-transport-urban-transport/urban-mobility/urban-mobility-actions/sustainable-urban-mobility-plans_en

³ <https://www.eltis.org/resources/tools/planning-sustainable-urban-logistics>

The Environment-Energy System of Brescia

The energy balance of the city of Brescia benefits from the so-called Environment-Energy Integrated System, described in the section “City Introduction and Context”. Over the years, the expansion of the district heating network, the introduction of cogeneration systems (1978-1982: Lamarmora and North plants), the waste-to-energy plant (1998) and the recovery of thermal waste from industries, played a fundamental role in the reduction of emissions and optimization of the use of resources. Overall, the Environment-Energy Integrated System allowed to reduce the consumption of fossil fuels, thus avoiding, for 2021, the emission of an estimated amount of 908 kton of CO₂ [1].

The following image highlights the environmental benefits due to district heating in 2021.

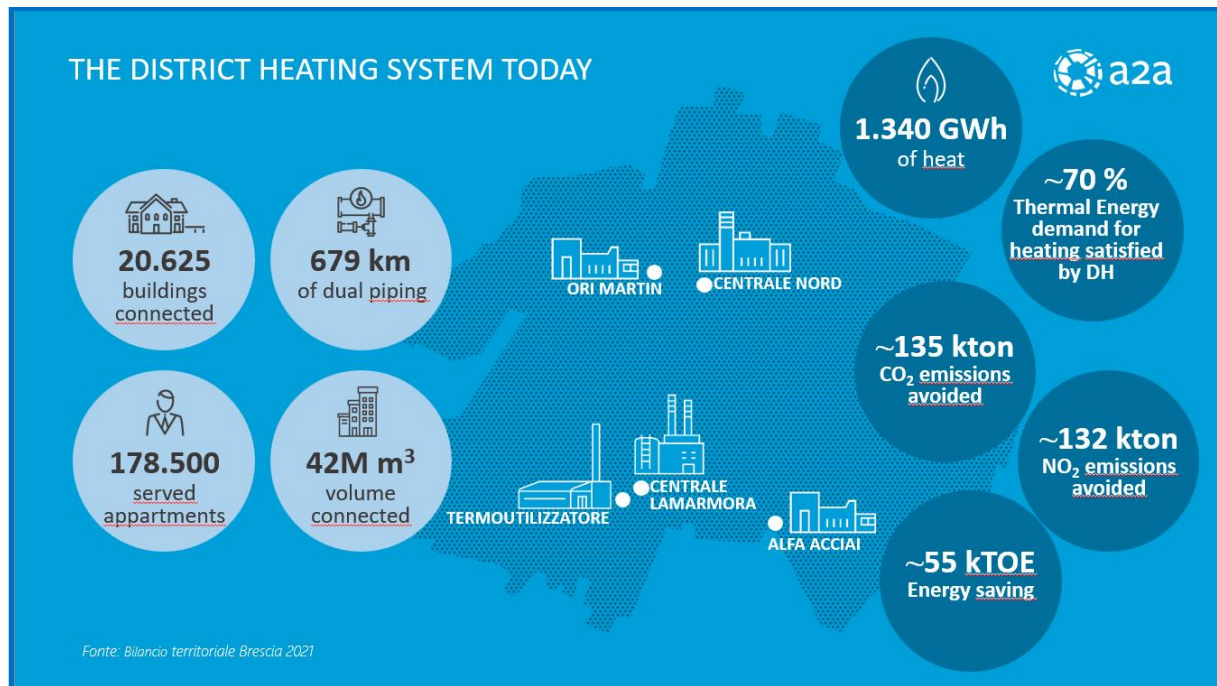


Figure 1: The district heating system today [1]

The waste-to-energy plant annually produces approx. 600 GWh and 900 GWh of electrical and thermal energy, respectively.

Action Plan for Sustainable Energy and Climate (SECAP)

In May 2021, the Municipal Administration approved the SECAP [2]. The inventories of final energy consumption and CO₂ emissions in the municipal area were computed, both for the year 2010 (BEI reference year) and 2018 (MEI monitoring year), according to the methodology codified by the Covenant of Mayors (excluding ETS industry and crossing traffic).

With the SECAP, the Municipality of Brescia set the **target of reducing per capita CO₂ emissions by 50% by 2030**, as compared to 2010. This target does not account for emissions from the private production sector.

The actions of the Mitigation Plan will lead to a reduction in overall emissions corresponding to approximately 312'000 tons of total CO₂. Relevant per capita CO₂ emissions will decrease from 3.3 tonnes/inhabitant*year (2010) to 1.6 tonnes/inhabitant*year (planned for 2030), corresponding to a 52% reduction.

The first monitoring report on the implementation status of the planned actions is currently being drafted. The monitoring emissions inventory will be updated in 2025.

The Climate Transition Strategy (CTS) [3] is the main tool put in place by the city of Brescia to contrast climate change. The *Climate Transition Manager*, appointed by the municipality administration, runs the CTS, coordinating the activities of the municipality sectors involved in mitigation and adaptation actions.

The *Energy Manager* of the Municipality monitors the energy performance of the Municipal Administration, collaborating with the various sectors involved in the maintenance of buildings and in the management of energy utilities.

Moreover, the Municipality plays an important role in guiding the energy policies of the investee companies.

Environmental sustainability of the main industrial plants of the city is supported by the Observatories (waste-to-energy plant, Alfa Acciai, Ori Martin and Caffaro). The Observatories are attended by Municipality technicians, City Council representatives, control bodies, companies' representatives, Universities research-staff and citizens associations. The purpose of the Observatories is to disseminate and share information on the environmental impacts of the above-mentioned industrial activities. The documents delivered by the Observatories are posted on the Municipality of Brescia website [4].

The Sustainability Development Center [SDC] is the coordination center for the sustainable development of the province of Brescia. The Municipality of Brescia is among the institutions contributing to the SDC. The SDC developed the Territorial Strategy for Sustainable Development (TSSD) of the province of Brescia to promote energy efficiency, the diffusion of RES. The TSSD sets the following targets for the provincial territory [5].

Indicator	latest available value for the province of Brescia	TARGET		
		2030	2040	2050
Share of electricity produced from RES on total electricity consumption (%)	33.63%	55%	70%	90%
Renewable energy gross production (GWh)	3944	+30%	+50%	+100%
Greenhouse gas emission intensity of total value added (teq CO ₂ /million €)	318.71	-40%	-60%	-80%

Table 1: Indicators and targets for RES and mitigation defined in the TSSD

Sustainable Urban Mobility Plan (SUPM)

The city is affected by intense vehicle traffic; public transport hence plays a key role in securing mitigation of congestion and pollution. The investment on Local Public Transport (LPT), made by the Municipal Administration, along with the company *Brescia Trasporti* increased the number of passengers within the urban area (cities plus fourteen municipalities of the hinterland) by over 40% in seven years (from 41.3 million in 2012 to 58.2 million in 2019). Great effort has been devoted to promoting soft mobility, facilitating travel on foot and by bicycle. In 2013, a new automatic subway line entered service. The subway, together with the expansion of the surface transport fleet, led to an increase of LPT energy consumption.

The Municipal Administration approved the Urban Plan for Sustainable Mobility (SUPM) in 2018 [6]. This plan strengthens the public transport network and promotes soft mobility, thus reducing energy consumption associated with the use of private vehicles by 13% and CO₂ emissions (avoided 18,500 tons/year of CO₂). Currently, the first SUPM monitoring report is being drafted.

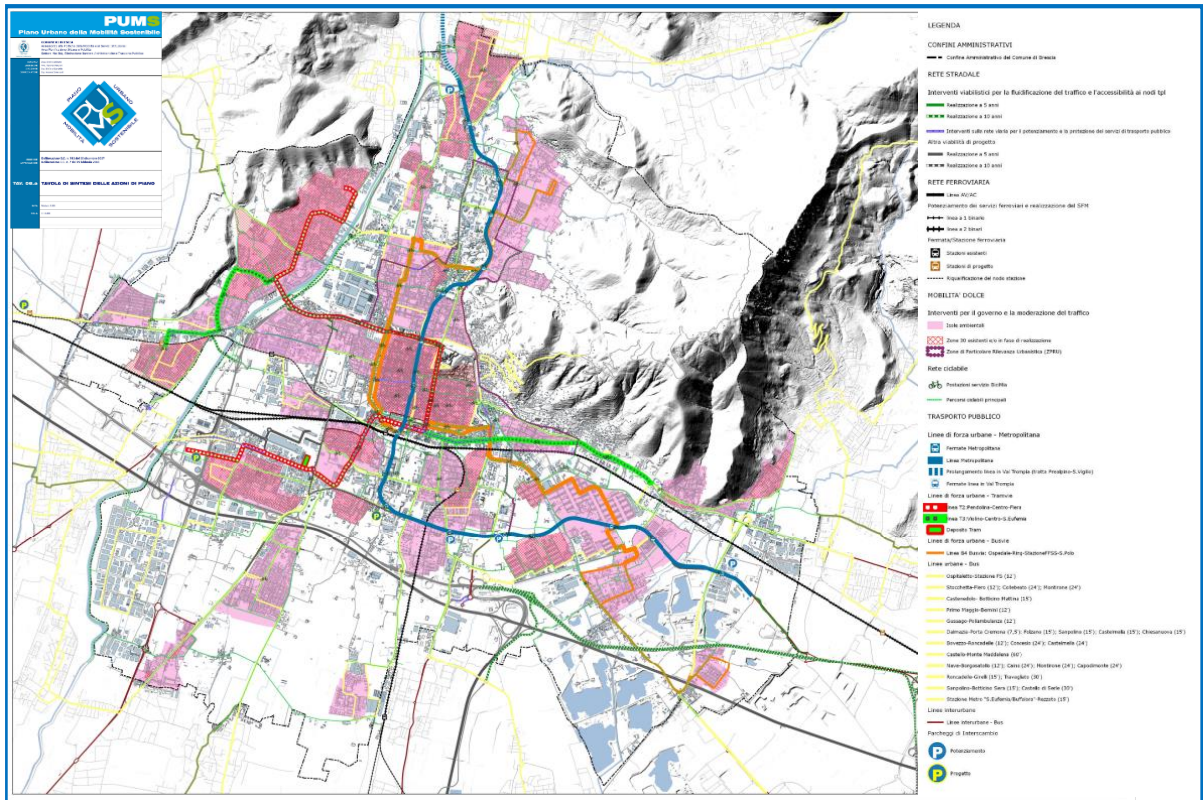


Figure 2: Summary table of the actions envisaged by the PUMS

The modal shares of transport updated to 2021 are shown in the following table.

Indicator		Data	Units	Year of Data Provided
Percentage of population living within 300 metres of an hourly (or more frequent) public transport service		99	%	2021
For all journeys under 5 km, percentage of these journeys undertaken by:	Car	39	%	2021
	Car passenger	<i>n.d.</i>		
	Public Transport	22		
	Cycling	19		
	Foot	17		
	Multimodal	2		
Percentage of buses operating in the city that are	Low (at least Euro VI)	<i>n.d.</i>	%	2019
	Alternatively (electric, hydrogen, LNG etc.)	96		

Table 2: the modal shares of transport year 2021

6.B Past Performance

The aim of this section is to make clear how the situation described in the previous section has been achieved in the past ten years. Please provide the following information:

1. Trends and changes in terms of the energy performance and CO₂ emissions (and possibly other greenhouse gases) in the city that have taken place over the last ten years. Refer to:
 - a. Trends in CO₂ and other greenhouse gas emissions.
 - b. Trends in energy consumption.
 - c. Trends in the use of renewable energy technology.
2. Actions and measures taken by the city authorities in the last 10 years that significantly affected the trends and changes mentioned under 1.

(max. 600 words and five graphics, images or tables)

Trend of energy consumption and CO2 emissions

The energy consumption and CO2 emissions of the city of Brescia in the year 2010 (BEI reference year) and 2018 (MEI monitoring year) [2] are shown in the following figure. The data were processed and analyzed according to the methodology codified by the Covenant of Mayors (excluding ETS industry and crossing traffic).

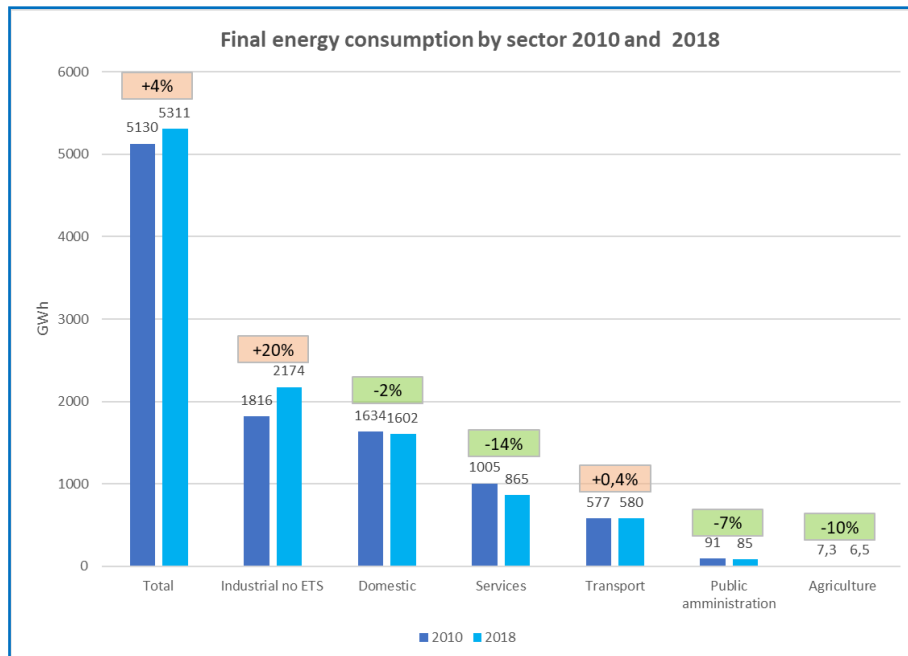


Figure 3: Final energy consumption by sector: 2010 and 2018

Between 2010 and 2018, CO₂ emissions increased by 4.8%. This trend is mainly due to the increase of indirect emissions from ETS plants (electric arc still mills, in particular), correlated to augmented production volumes. The CO₂ emissions, excluding the contribution from the production sector, decreased by 9.4% in the same period.

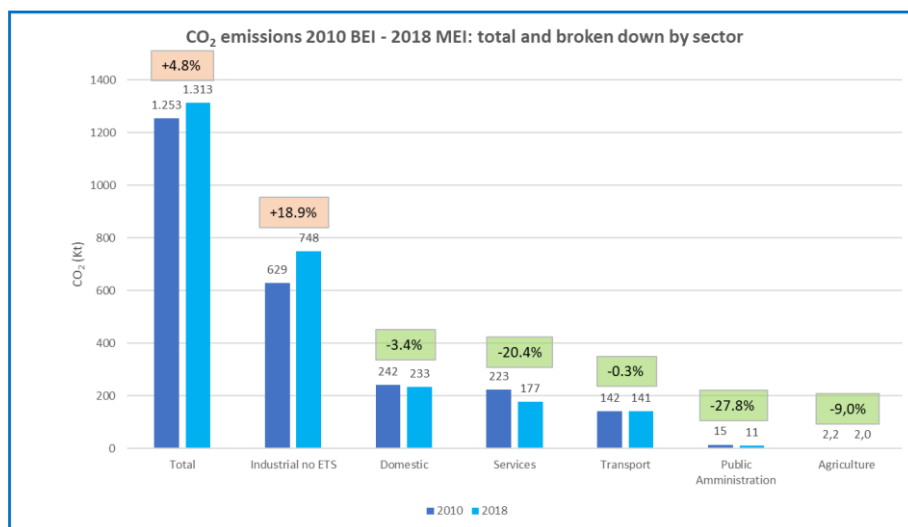


Figure 4: CO₂ emissions for 2010 (BEI) and 2018 (MEI) by sector

Trend in the use of renewable energy: photovoltaic

The details of the photovoltaic systems installed in the city of Brescia (cumulative installed power and energy generated) are shown in the following figure.

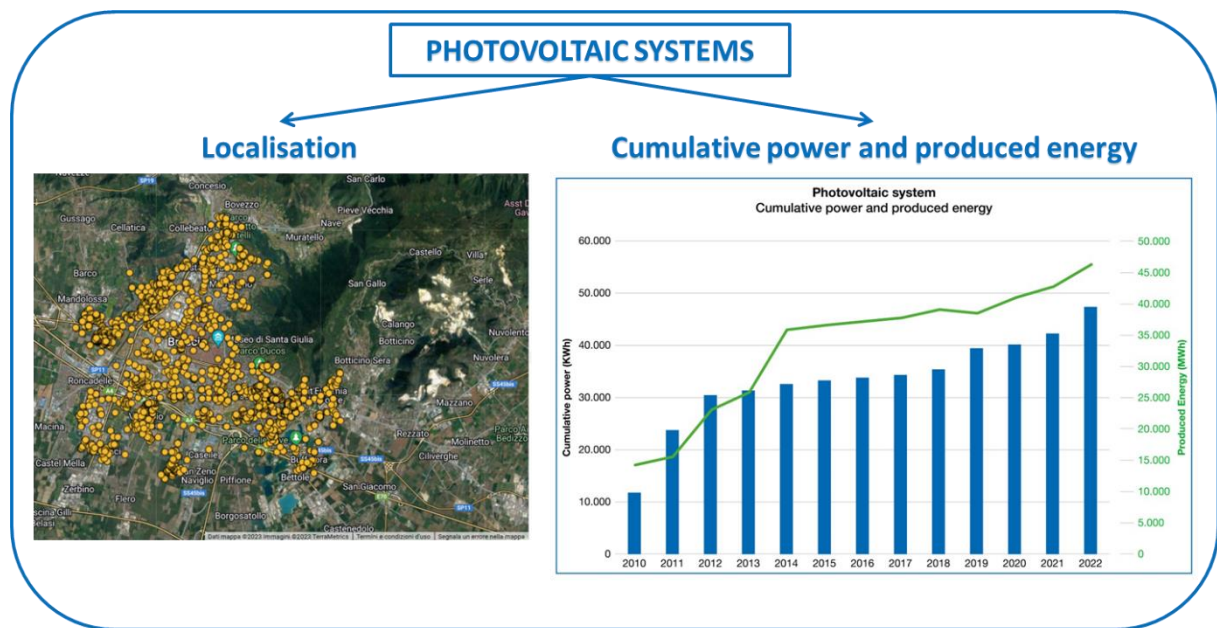


Figure 5: Photovoltaic systems: localisation (2021), cumulative power and energy produced from 2010 to 2022. Data from UNARETI and GSE

The city of Brescia is implementing the following strategies and plans to contrast climate change:

- ✓ Strategic Urban Plan (PGT - 2016), which states a zero-land consumption to limit soil sealing [7]
- ✓ Sustainable Urban Mobility Plan (SUMP - 2018) [6] to boost sustainable mobility
- ✓ Sustainable Energy Action Plan (SECAP -2021) [2]
- ✓ Climate Transition Strategy (CTS-2021) [3] containing long-term mitigation, adaptation targets and pilot actions to be implemented in the short term
- ✓ Upgrading, in 2022, of the Building Regulations [8], which includes the mitigation and adaptation targets at building level

Main Actions and interventions undertaken by city authorities in the past 10 years

Public Lighting

Renovation of the public lighting system (installation of LED lighting fixtures and flux reducers - sustained cost €10.5 million) led to a substantial reduction in public lighting-related CO₂ emissions (58% reduction between 2010 and 2020).

Brescia towards decarbonisation

In the period 2005-2017, the A2A Group launched a €140 million action plan to upgrade the Environment-Energy System. The plan improved the efficiency of the energy production and district heating systems, decarbonising and reducing pollutant emissions.

In 2018, the A2A Group launched an additional €100 million action plan, called "Brescia towards decarbonisation" [9], with the primary purpose of replacing coal with "greener" sources for energy production in the Lamarmora plant. The phasing out of coal has been completed in 2020.

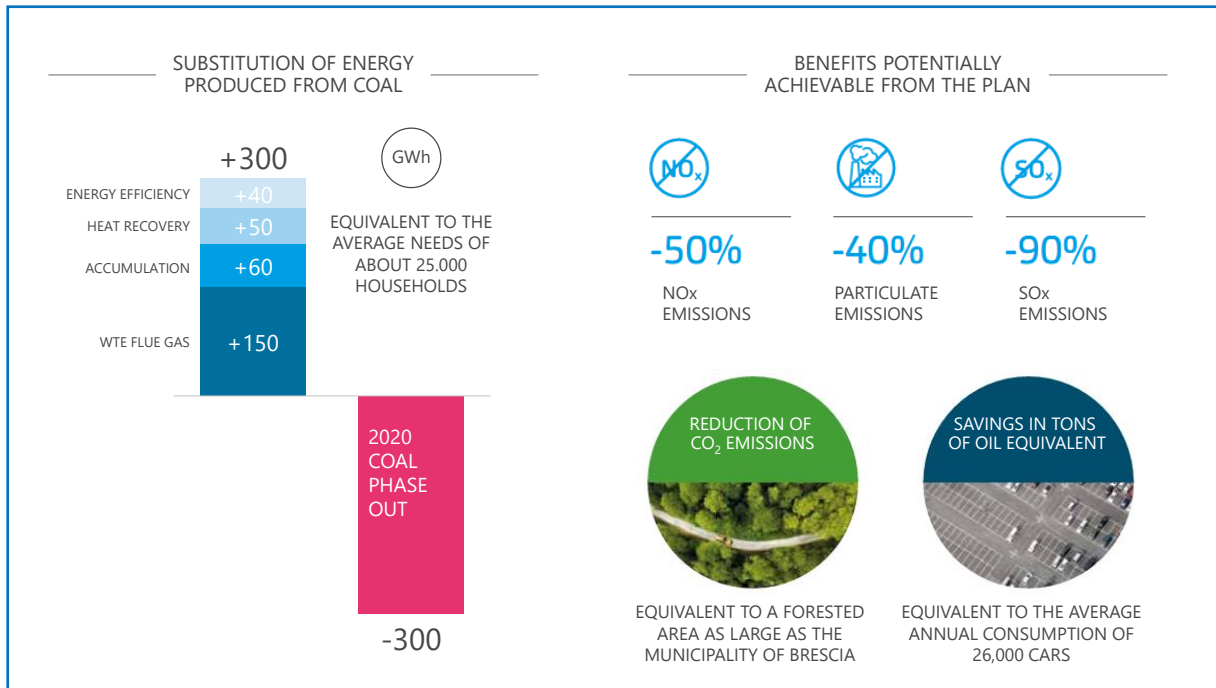


Figure 6: Coal phase out and potential benefits [9]

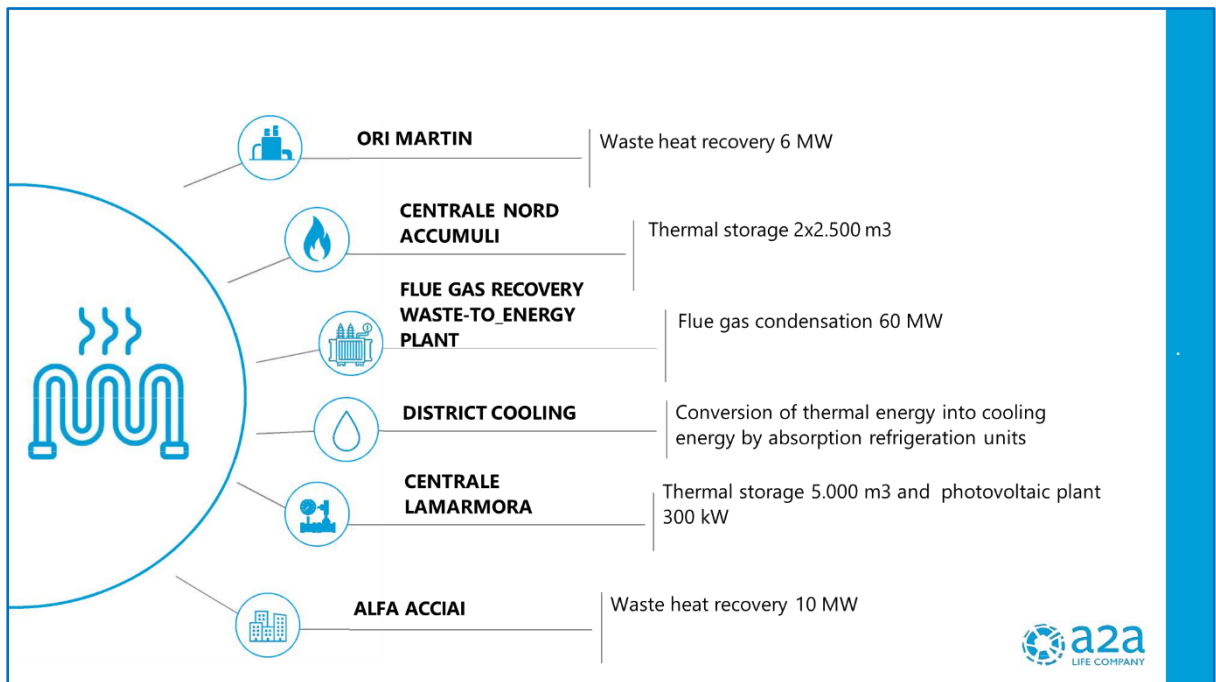


Figure 7: Evolution of the District Heating network 2018 - 2023 [9]

Mobility: main actions already implemented

The main initiatives implemented to supporting sustainable mobility are:

- ✓ Construction of an automatic subway line (in service since 2013): construction cost approximately € 777.1 million, annual management costs € 36 million
- ✓ Upgrade of the urban bus fleet in service to methane power in replacement of fossils fuels: €20.5 million
- ✓ Renovation of the railway station (tracks, sidewalks, shelters, lifts, underpasses, etc...)
- ✓ Expansion and upgrade of the existing bicycle path network, development of bike-sharing and widespread bike parking throughout the city
- ✓ Pedestrianisation and establishment of Zone 30 and Limited Traffic Zone (LTZ).

Several initiatives have been undertaken to reduce CO₂ emissions through the development of electric mobility, for instance implementing the recharging network for electric vehicles.

6.C Future Plans

Please describe the following:

1. The medium term (2030) and long term (2050) objectives for further emissions reduction and shaping a sustainable energy system. An existing sustainable energy and climate action plan (SECAP) under the Covenant of Mayors should be referenced, or – if not – the elaboration of such plan should be considered.
2. The overall strategy for climate change in the city to achieve the ambitions described under 1 and how it is integrated with other environmental areas. Please refer to:
 - a. The city's strategy regarding renewable versus non-renewable energy mix, including the plans to implement the European Solar Rooftops Initiative.
 - b. Measures affecting the total energy use and CO₂ emissions in the city.
 - c. The city's strategy and measures to promote the transition towards increased zero-emission transport including active mobility (i.e. walking and cycling) (if not yet done, elaboration of a sustainable urban mobility plan (SUMP) and/or logistics plan).
 - d. Changes in industries, consumers' behaviour, municipal buildings and import and export chains.
 - e. Innovative approaches your city is planning to use.
3. To what extent measures and ambitions described under 1 and 2 are supported by:
 - a. Strategic and policy commitments.
 - b. Budget and resource allocations.
 - c. Plans for monitoring of impacts.
 - d. Participatory approaches.

(max. 600 words and five graphics, images or tables)

Emissions reduction target and shaping a sustainable energy system

The mitigation plan for Brescia to achieve the target of reducing per capita CO₂ emissions by 50% by 2030 compared to 2010 emissions [2], operates along two paths:

- ✓ Reduction of energy consumption
- ✓ Increase the use of renewable energy sources (RES).

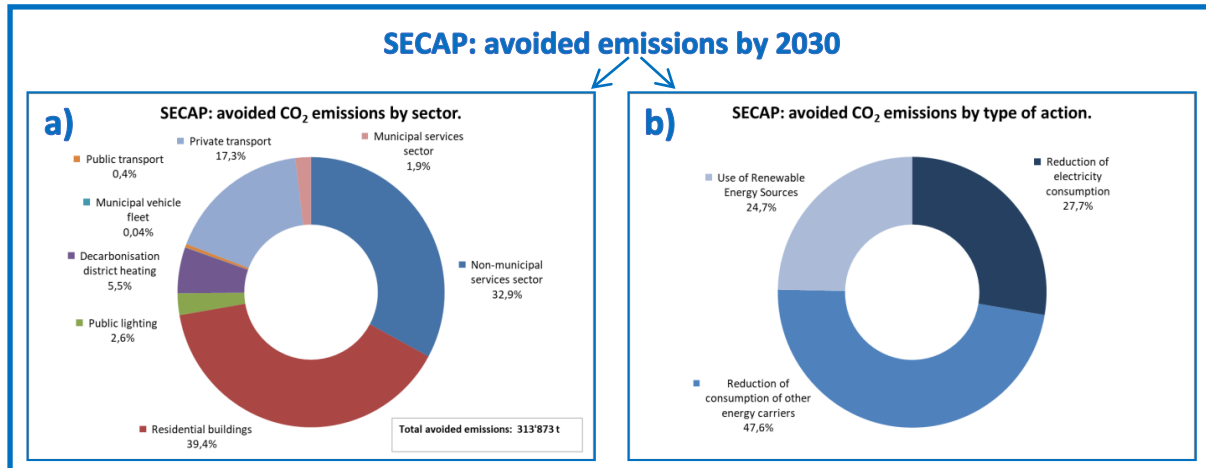


Figure 8: SECAP of Brescia: breakdown of total emissions avoided by sector (A) and by type of intervention (B)

75% of the emission reduction target will be achieved by reducing energy consumption (thermal and electric energy), whereas the remaining 25% reduction will be achieved replacing traditional with renewable energy sources to cover the municipal energy needs.

Role of renewable energies sources (RES)

The target planned [2] for 2030 is to cover with RES the share of energy consumptions in the following sectors: 100% for public lighting and 26% for municipal services.

Climate Transition Strategy (CTS)

The CTS, in synergy with the SECAP, set specific mitigation actions highlighted in the following table. Those actions have already been funded.

Mitigation actions	Climate change risk				Cost €
	hydrogeological	flood	heat	extreme meteoric events	
3.1 CREDIT ASSIGNMENT AND RETROFIT OF THE BUILDING HERITAGE			X	X	401'000
3.2 ZERO ENERGY DISTRICT IN VIA MILANO			X	X	650'000
3.3 SUSTAINABLE MOBILITY INCENTIVES	X	X	X	X	300'000

Table 3: mitigation actions planned in the CTS

Mobility: future actions

In the public transport sector, the SUMP [6] planned the following future actions:

- ✓ The extension of the subway line (M1) beyond the northern city limits and upgrading of the park-and-ride at three subway stations (work already started in *Prealpino station* [€ 16 million]; end of work at all stations expected in 2024)
- ✓ Reorganization of the urban surface public transport network: construction of two new tram lines (T2: € 360 million state funding, end of work by 2029 and T3), establishment of a new high-capacity bus line (B4)
- ✓ Quadrupling the existing railway tracks and activation of high-speed train services connecting Brescia to the Veneto region (by 2029)
- ✓ Realization of "*La Piccola Velocita*" freight yard and intermodal terminal (operational capacity of 190'000 IUs/year) to move long-distance freight transport from road to railway (works: 2024-2027)
- ✓ Expansion of the public electric car charging service (300+ charging points by the end of 2023)
- ✓ Development of a "mobility credits" system to direct travel choices towards the most sustainable ones
- ✓ Electrification of the bus fleet (acquisition of 50+ new 100% electric buses by 2030)
- ✓ Upgrade of the entire city street network to encompass "bicycle-friendly" mobility; promotion of a "bike-friendly" culture
- ✓ Creation of Zone 30 in all the city residential areas.

Update of the A2A 2021-2030 Strategic Plan

A2A Strategic Plan [10] encompasses various initiatives, with the Brescia area in the core, aimed at mitigating climate change:

- ✓ Development of the Hydrogen Valley – H2Valcamonica project. The project pursues the production of hydrogen through electrolysis, with energy supplied by the Brescia waste-to-energy plant. The hydrogen produced will be used to power trains on the Brescia-Iseo-Edolo railway line starting from 2025
- ✓ Upgrading of the electric recharging infrastructure network (doubling the delivery points from 100 to 200)
- ✓ Efficiency improvement of the Brescia waste-to-energy plant, through the "fume recovery project", leading to energy production and heat recovery increase and emissions reduction
- ✓ Boosting biomethane production to reduce the use of fossil fuels, in line with the objectives of the REPower EU plan. In a circular economy perspective, biomethane from agricultural/agri-food waste could be used within the cogeneration plants feeding district heating.

6.D References

List supporting documentation, adding links where possible. Further detail may be requested during the pre-selection phase. Documentation should not be forwarded at this stage.

(max. 400 words)

[1] A2A territorial sustainability report of the province of Brescia 2021

<https://content.gruppoa2a.it/sites/default/files/2022-07/260722-bilancio-territoriale-brescia.pdf.pdf>

[2] Municipality of Brescia (2021). Sustainable Energy and Climate Action Plan (SECAP)

https://www.comune.brescia.it/sites/default/files/imported/servizi/ambienteeverde/Documents/PAESC_MAGGIO%202021.pdf

[3] Municipality of Brescia (2021). Climate Transition Strategy (CTS)

https://www.comune.brescia.it/sites/default/files/imported/servizi/urbancenter/unfilonaturale/Documents/210720_UC_AT_188-RELAZIONE_STC_BS_rev2.pdf

[4] Observatories web pages

<https://www.comune.brescia.it/aree-tematiche/ambiente/osservatori/informazioni-generalis>

[5] Sustainability Development Center, Territorial Strategy for Sustainable Development (TSSD) of the province of Brescia

<https://drive.google.com/file/d/1MqfAyQUpfeZP0SGP-sk79LOMwgsmv2h5/view?usp=sharing>

[6] Municipality of Brescia (2018). Urban Plan for Sustainable Mobility (SUPM)

<https://www.comune.brescia.it/sites/default/files/imported/servizi/mobilitaetraffico/settMob/docPianificazione/pums/Documents/PUMS%20-%20Relazione%20Generale.pdf>

[7] Municipality of Brescia (2023). Strategic Urban Plan of Brescia

<https://www.comune.brescia.it/aree-tematiche/urbanistica/piano-di-governo-del-territorio>

[8] Municipality of Brescia (2022). Building regulations

<https://www.comune.brescia.it/sites/default/files/imported/servizi/casa/SUE/Documents/Regolamento%20edilizio.pdf>

[9] A2A Plan “Brescia towards decarbonisation”

<https://www.gruppoa2a.it/en/home>

[10] A2A Strategic Plan

<https://content.gruppoa2a.it/sites/default/files/2022-11/22122-CS-Piano-Strategico-ita.pdf>

Word Count Check

Please complete the below word count check.

Section	Number of words in graphics/images/tables	Number of words in body of text	Total number of words in graphics/ images/ tables and body of text	Max. words
6A	0	729	729	1000
6B	0	492	492	600
6C	0	513	513	600