Marseille 2030 Climate Objective

Climate City Contract

Action plan Section

April 2023

Note: This document refers to sections of the "Climate City Contract - Action Plan" template provided by the Net Zero Cities platform.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

ADEME: Ecological Transition Office

AGAM: Marseille Conurbation Urban Planning Office

AMU: Aix-Marseille University

ANRU: National Urban Renewal Agency

AOM: Mobility Organisation Authority

APHM: Public Hospital Assistance - Marseille

ATMO Sud: Air Quality Monitoring Body for the South of France

BHNS: Bus with a High Level of Service (BHLS)

CCC or CVC : Climate City Contract (CCC) or Contrat de Ville Climat (CVC)

CO2: carbon dioxide

CVC: Climate City Contract (see above)

CENAQ: Electrical Connections for Docked Ships

CIGALE: Consultation of Geolocalised Air Climate Energy Inventories (the CIGALE application is produced by ATMO Sud)

CNRS: National Scientific Research Centre

CSR: Refuse Derived Fuel (RDF)

ENR: Renewable energy sources

ENRR: Renewable and recycled energy sources

ETP: Full Time Equivalent (FTE)

GES: Greenhouse gases

CNG: Natural Gas Vehicle

GPMM: Marseille-Fos Port

LPEC: Energy and climate programming law

Métropole AMP: Aix-Marseille-Provence Metropolis

OMR: Residual household waste

OMS: World Health Organization (WHO)

ORECA: Provence-Alpes-Côte d'Azur Region Energy, Climate and Air Observatory

QPV: Priority Development Zone

PCAEM: Metropolitan Climate Air and Energy Plan

PCAET: Regional Climate Air and Energy Plan

PDM: Mobility Plan

PLH: Local Housing Plan

PLU,i: Multiple-Council Local Urban Planning Program

PM 2.5: Particulate Matter, or fine suspended particles with a diameter of 2.5 microns or less

PM10: Particulate Matter, or fine suspended particles with a diameter of 10 microns or less

PPA: Atmosphere Protection Plan

PPE: Multiannual Energy Programming

PREPA: National Air Pollution Emissions Reduction Plan

REM: Metropolitan Express Network

SCOT: Regional Coherence Scheme

SNBC: National Low Carbon Strategy

SRADDET: Regional Plan for Territorial Planning, Sustainable Development and Equality

SRCAE : Regional Plan for Climate Air Energy (now integrated into the SRADDET)

S3REnR: Regional renewable energy grid connection schemes

t CO2e: tonne of CO2 equivalent

TC: Public transport

TCSP: Public transport on dedicated lanes

ZIP : Industrial Port Zone

1. INTRODUCTION

1.1 MARSEILLE INTENDS TO BECOME THE LABORATORY WHERE THE MEDITERRANEAN CARBON NEUTRAL, SOCIALLY DYNAMIC CITIES OF TOMORROW WILL BE PIONEERED.

The commitments made by the City of Marseille, the Aix-Marseille-Provence Metropolis and the Southern Region to this Climate City Contract are part of a long-standing regional dynamic for sustainable energy transition policies and this will be demonstrated in the timeline presented in the "Commitments" section. The motivations behind this are multiple and are clearly set out in the "Commitments" section.

Our common goal is to make Marseille the laboratory where the Mediterranean carbon neutral, socially dynamic cities of tomorrow will be pioneered.

An attractive location that remains highly sensitive to climate change

Marseille, and the Aix-Marseille Provence Metropolis in general, has strong physical characteristics which make it highly sensitive to climate change. The Mediterranean regions are experiencing a 25% higher rate of global warming than the terrestrial average, the same also applies to the Alpine regions. Marseille is thus doubly exposed:

- within its own region, with increased exposure to the consequences of climate change, involving physical risks (forest fires, torrential rains, etc.) and potential health consequences for its population (exposure to heat waves and ozone pollution during the hotter and windless periods of the year, which are often very hot).
- the increased consequences of global warming in the southern Alps, reducing snow cover in winter and accelerating the melting and disappearance of glaciers in summer, are putting the city's water supply at risk, both for domestic supply and for that of its industrial and agricultural sectors.

The region benefits from an attractive Mediterranean climate, although it can occasionally be subjected to more violent climate episodes. These climatic characteristics have a strong influence on the region: specific fauna and flora, major risks, renewable energy potential, impacts on air quality, etc. The Mediterranean climate is characterised by very dry summers and rains that can occasionally be very heavy in the spring and during the months of September and October. Cap Croisette, on the southern coast of Marseille, is the driest place in France with an annual rainfall of around 360 mm. In autumn and spring, severe thunderstorms can occur and cause major flooding in the river valleys and urban areas.

Temperatures are high in summer and remain mild in winter. These specific climatic features contribute strongly to the overall attractiveness of the metropolis.

Finally, the territory is subject to two main winds: the Mistral and the South-East wind. The mistral is the dominant wind, it has a considerable influence on the Provence climate since it is cold, dry and can blow in strong gusts. It considerably increases the wind chill factor. It is also much feared during the summer for its role in spreading wild-fires. The rarer south-easterly wind generally brings the rain. It is usually behind the particularly severe thunderstorms that can occur in autumn and spring.

Marseille is also a very rich reservoir of biodiversity, which must be preserved, notably by combating urban spread and soil artificialisation. In this sense, the re-wilding of the city and policies to enhance and preserve the sea and coastline are key aspects of our Climate City Contract. The city centre of Marseille has lost half of its tree population over the last 75 years.

More resilient buildings, education and awareness-raising initiatives, the re-wilding of the city, are all key subjects in our Climate City Contract.

Air quality: a major health issue in Marseille

Many sources of air pollution are present in Marseille. According to ATMOSud, the region's air quality monitoring body, "the main contributors to these emissions are the road and maritime transport sectors, the industrial sector and its energy production and transformation branch, and the emissions caused by domestic heating in the residential sector. The railways, services sector and waste management sector are also present. Note the high levels of photochemical pollution across the department, and beyond, during the summer months which is directly related to metropolis' major industrial and urban centres. Air quality has improved in the city over the last twenty years, this is due to technological progress (notably in the transport, industry and energy sectors) as well as more protective road and urban development policies which take air quality into account, ... However some problems remain, whether local (high concentrations of nitrogen dioxide, particles, etc.) or more general (particles, ozone), generating high degrees of human exposure to atmospheric pollutants.

4,000 Marseilles residents live in an area where the regulatory limit value for nitrogen dioxide is exceeded; the entire population is exposed to PM2.5 particle levels that exceed the current WHO guidelines. "

As one of the city's key priorities, the Climate City Contract actions also aim to reduce these public health impacts.

A region with a high but massively under-exploited energy potential

Marseille is one of the sunniest areas in mainland France with an average annual sunshine of 1550 kWh/m2 - 15 to 30% more than the other French regions - and 300 days of sunshine per year. The Schéma Régional d'Aménagement et de Développement Durable et d'Egalité des Territoires (Regional Plan for Territorial Planning, Sustainable Development and Equality) sets photovoltaic production targets of 600 to 900 GWh per year by 2030 (i.e. 20 to 25% of 2019 electricity consumption) and solar thermal energy production of around 150 GWh.

The development potential of heating and seawater air conditioning (SWAC) networks is also a major asset. The same regional plan sets the target of 2,000 to 3,000 GWh to be supplied by heating networks in Marseille by 2030. The region also has a potential source of bio-waste that could be methanised to produce biogas, the potential of which has yet to be fully quantified.

Considering all of these potential sources, the share of renewable energy in our energy mix is well on its way to being increased significantly, and this is one of the keystones of our Climate City Contract.

Thassalia - ENGIE

A region marred by significant inequalities

The region's greatest wealth is its population's diversity, with 111 settlement centres each with its own clear urban and historic identity. Marseille is a young, dynamic city in which the population is taking on the challenges of the future through broad democratic processes. The very strong involvement of its citizens, community associations and artists is developing an urban model built on social and ecological justice for the whole of the Marseille region. However, our region remains socially fractured, marred by social inequality. In 2019 26% of the overall population and 40% of tenant households were classed as poor, 38 districts are classed as national priority development zones (QPV) due to the poverty level of their inhabitants.

An industrial-port centre committed to transition

The "Bassins Est" port area is located in the heart of Marseille; on one hand it generates significant economic activity but, on the other, it also generates significant greenhouse gas emissions and atmospheric pollutants. To reduce these nuisances, the Marseille-Fos Port (Grand Port Maritime de Marseille - GPMM) has been implementing the CENAQ system for several years, this involves setting up electrical power connections on the quays to serve passenger ships. The electricity production includes a proportion of renewable energy from photovoltaic installations on various port facility structures. Maritime operators are gradually equipping their ships to use this energy during manoeuvres and dockside operations.

The "Bassins Ouest" port area of Port-Saint Louis, Martigues and Fos-sur-mer, is now France's largest industrial port complex covering almost 10,000 hectares. This area's energy consumption is around 4.5 TWh/year. The zone's industrial businesses, along with the GPMM and local authorities, are committed to industrial decarbonisation processes, in 2023 the zone became one of the first to be accepted for the "low-carbon industrial zones" project call. Although these emissions do not fall within the scope of Marseille's regional assessment, it is important to highlight the synergies that exist within its collective approach to the Climate City Contract.

1.2 HOW THE CLIMATE CITY CONTRACT INTERACTS WITH THE OTHER FRAMEWORK DOCUMENTS

The main framework documents on which we base our benchmark are:

- The Covenant of Mayors, signed by the City of Marseille in October 2021.
- The Metropolitan Climate Air and Energy Plan (PCAEM) as proposed by the Marseille Metropolis, adopted in 2021
- The 2020-2030 Mobility Plan (PDM) as proposed by the Marseille Metropolis, adopted in 2021
- The Regional Plan for Territorial Planning, Sustainable Development and Equality (Schéma Régional d'Aménagement et de Développement Durable pour l'Egalité des Territoires - SRADDET), approved by the Provence Alpes Côte d'Azur Region in 2019
- The National Low Carbon Strategy 2, which sets the national framework for carbon neutrality by 2050, adopted by the decree dated 21 April 2020.

The essential elements for understanding the European, national, regional and local context in which the Climate City Contract is situated are presented in the table in chapter 3.2.1.

The Climate City Contract is a document created in response to the Mission on 100 Carbon Neutral Cities by 2030. It is a document that defines the climate challenge action priorities for the Marseille territory. The Contract and the associated initiatives aim for a drastic reduction in greenhouse gas emissions by 2030.

The document has been put together in a spirit of partnership and through the application of a continuous improvement approach. This first version was drafted over a short period of time between the end of 2022 and the beginning of 2023, with the mission of collaboratively defining and highlighting the challenges faced by the main greenhouse gas emitting sectors (scopes 1 and 2), the potential for reducing emissions, and the "gaps" that will have to be crossed to achieve a 75% reduction in emissions.

The City of Marseille and Aix-Marseille Provence Metropolis supported by the Southern Region, co-signatories of this contract, hereby present an initial action plan that will enable a significant reduction in emissions. Other actions will be specified as the contract is revised, thanks to the collective dynamics of the territory's socio-economic and NGO parties.

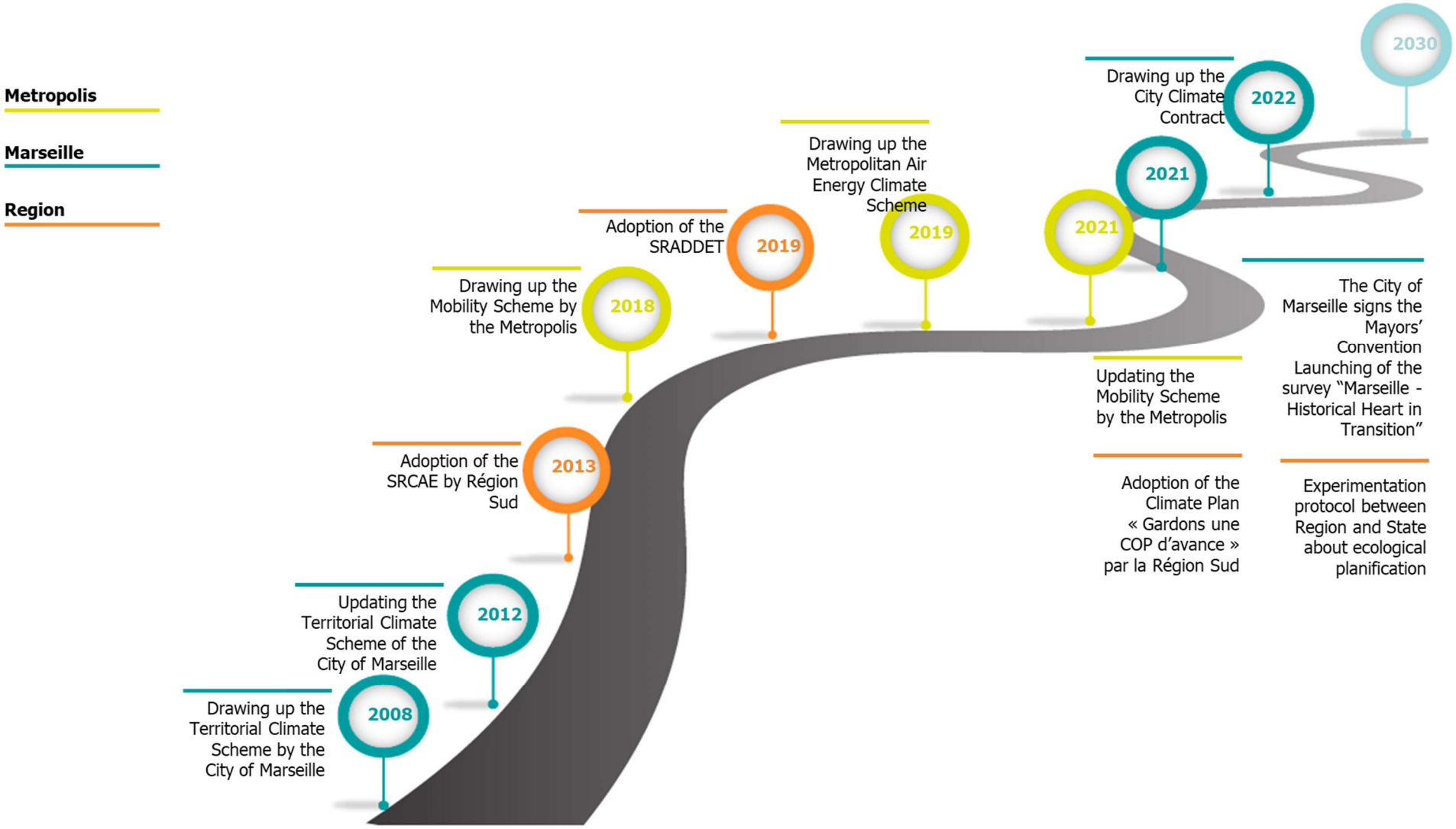


Figure 1 - Elaboration of the main territorial energy transition framework documents

1.3 CONTENT OF THE ACTION PLAN SECTION OF THE CLIMATE CITY CONTRACT

The Climate City Contract is made up of 3 sections:

- The "commitments" section, presenting the motivations of the signatories, their strategic priorities and providing a formal idea of how they will work together
- The "action plan" section, detailing the carbon diagnostic, the defined strategic objectives, an identification of the actions to be completed and a list of projects identified as contributing to the objectives.
- The "budget" section, providing a macroscopic evaluation of the finances already in place to achieve a significant reduction in emissions and, most importantly, those that have yet to be finalised.

This document is the "Action Plan" section, it is organised as follows:

- The first part (3 - Part A) concerns the Marseille territory's carbon footprint evaluation, all identified orientations and strategies along with an assessment of the gap between current emission levels and the carbon neutrality objectives.

Our approach is detailed in Chapter A of this document.

- The second part (4 - Part B) concerns the actions to be implemented in order to achieve these objectives. The action program and its associated indicators are presented in Chapter B of this document.
- The third part (5 - Part C) identifies the innovations to be deployed to achieve carbon neutrality.

The conversion of the carbon neutrality gap into real-world financing requirements, both in terms of infrastructure investment and operational measures, is presented in chapter C of this document, this is then further detailed in the "budget" section of the Climate City Contract.

The "Action Plan" section of the Climate City Contract has been drafted according to the template and guidelines provided by *Net Zero Cities*, it is illustrated by a large number of diagrams, graphs and explanations to ensure that everyone involved can get a full and complete understand of the local issues at stake. The letters used to name the parts of the document refer to those used in the template provided.

The following diagram illustrates the content of this document.

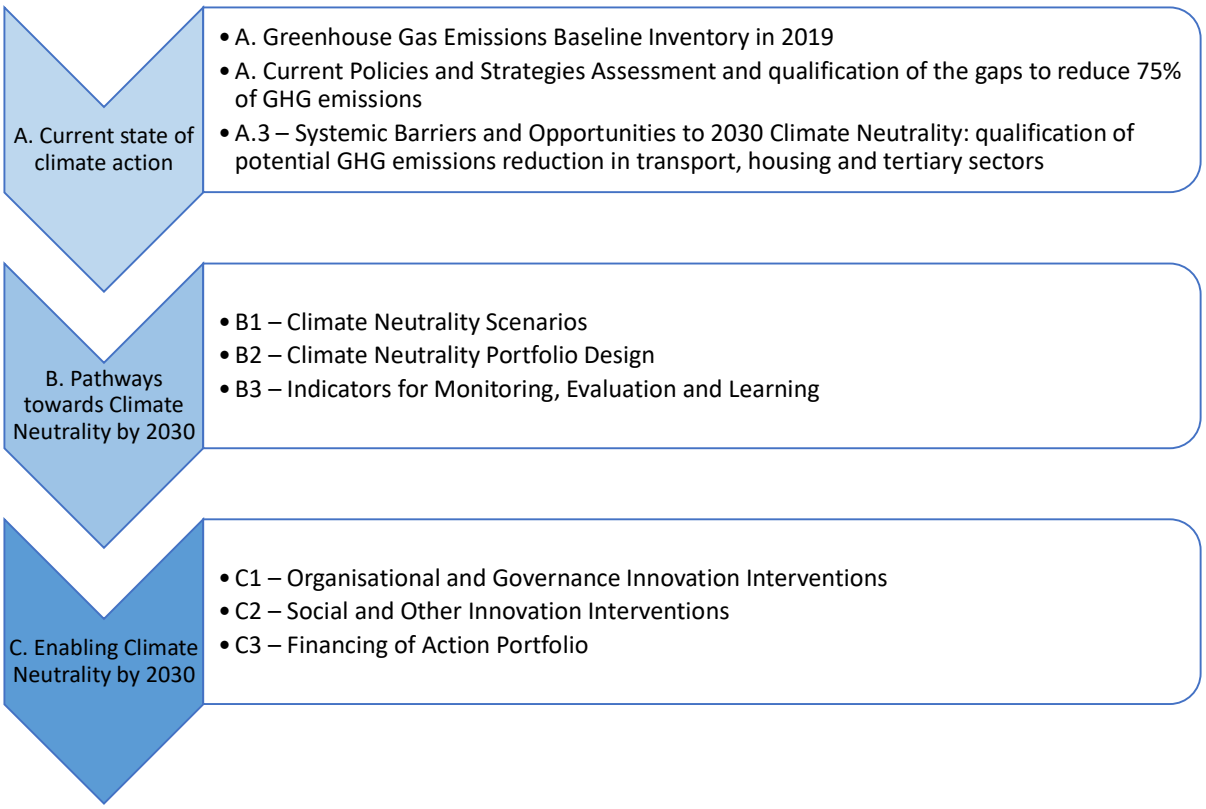


Figure 2 - Diagram illustrating the organisation of the action plan section of the CCC

1.4 THE CLIMATE CITY CONTRACT'S SPECIFIC SCOPE AND FOCUS

- **Consideration of direct and indirect greenhouse gas emissions whilst also using a pragmatic approach to influence directly accessible levers.**

In an effort to raise awareness regarding carbon neutrality challenges on the scale of the Marseille territory, the City and its partners have decided to include direct greenhouse gas (GHG) emissions in the inventory and illustrate some of the indirect emissions data, classifying them into 3 "scopes", in keeping with applicable standards:

- Scope 1: direct GHG emissions - as physically emitted within the region - generated by all activities within the Marseille territory
- Scope 2: indirect emissions - not physically emitted within the territory - associated with the consumption of electricity and heat/cold within the Marseille territory
- Scope 3: the territory's indirect emissions (food, materials brought in, etc.). In order to measure these indirect emissions, the City of Marseille and its partners have decided to illustrate emissions from the food, transport, waste and new-build constructions sectors within the inventory. This scope should be expanded in the future to provide a more complete vision of the territory's carbon footprint (notably as regards the consumption of goods and services by the local population).

However, given the limited room for manoeuvre of the local authorities and the methodological difficulties in monitoring indirect developments within scope 3, the emission reduction targets and trajectories will be initially based on the emission data from scopes 1 and 2.

However, some of the high impact actions identified in the rest of the document, particularly those regarding mobility, food and the circular economy, will have a direct impact on scope 3.

The following diagram illustrates these principles:

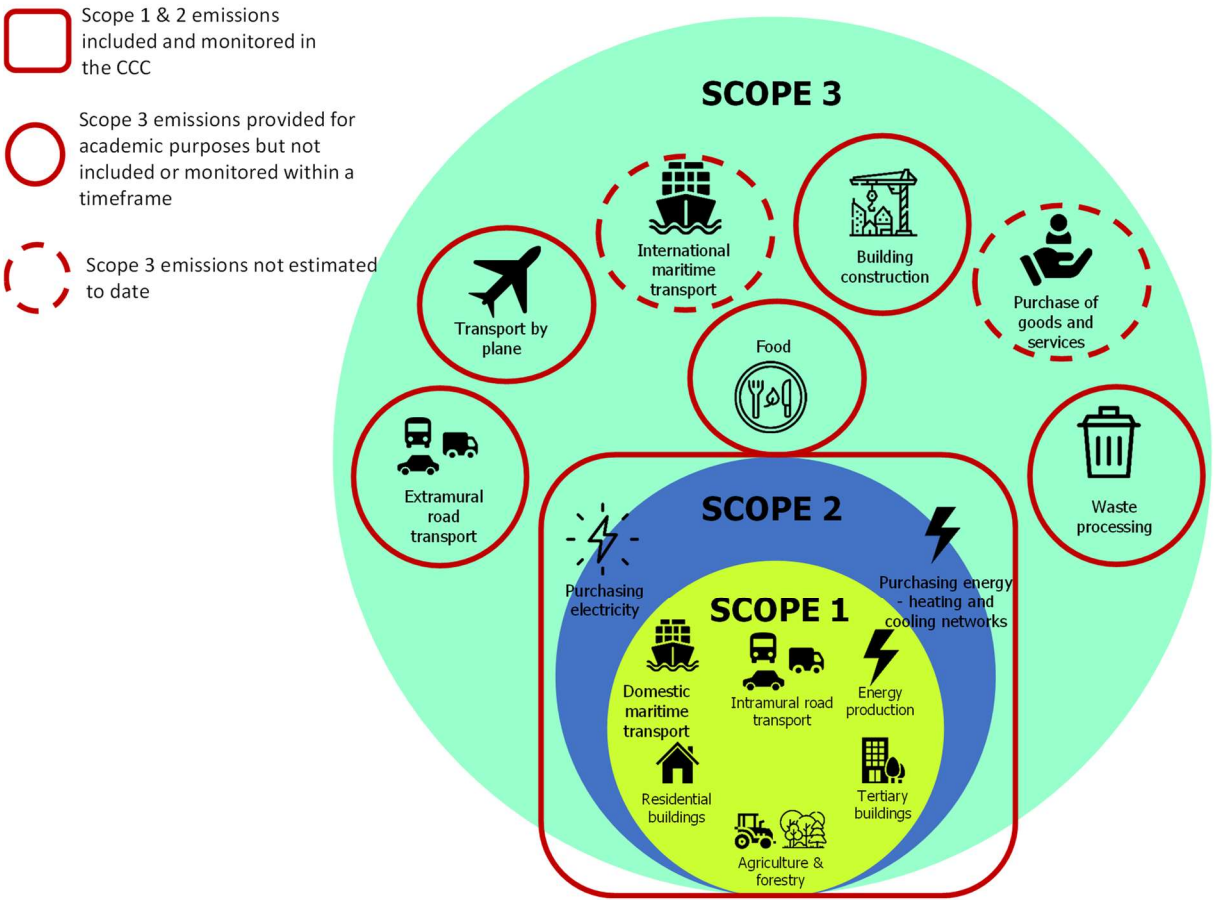


Figure 3 - Scope of emissions covered within the inventory - source INDDIGO

Specific focus on mobility

The "mobility and logistics" sector is the Marseille territory's biggest greenhouse gas emitter. Consequently it requires particular attention, both in terms of how emissions and targets will be quantified and in the choice of carbon neutrality priorities to be set for 2030.

- Methodology for quantifying GHG emissions

The emissions report shown in paragraph A-1 is based on a "land-parcel" approach provided by ATMO Sud, an air quality monitoring body in charge of providing regional greenhouse gas emissions reports. This report only includes the territory's direct emissions. Therefore, for the mobility & logistics sector, this report only reflects emissions generated within the Marseille territory. It does not reflect emissions generated when local residents travel outside of the Marseille territory, nor does it reflect emissions generated by visitors to Marseille, all of which will have a significant impact on GHG emissions, since these largely involve the use of cars over long distances.

In order to complete the land-parcel approach report, global emissions related to road travel by populations within a catchment area are also included, thanks to data provided by the AGAM, the Metropolitan Urban Planning Office The logistics sector emissions included concern vehicle circulation (Light Utility Vehicles, Heavy Goods Vehicles) within the Marseille territory, emissions of this type generated outside the territory have not been included.

- Selecting carbon neutrality priorities

A geographical area's mobility policy cannot, by its very nature, be satisfied with a land-parcel approach. It will be therefore necessary to account for all movements within, across, into and out of the city.

Moreover, the mobility and logistics transport methods are manifold, interdependent and subject to regional planning policies.

The Mobility Organisation Authority (AOM) is both metropolitan and regional (for interurban services).

This is why the issues raised in the climate city contract and the portfolio actions reflect this catchment area approach, and extend beyond a strict Marseille perimeter.

2. CLIMATE CITY CONTRACT ELABORATION PROCESS

2.1 INVOLVEMENT OF ALL CONCERNED PARTIES

Mobilisation of co-signatories and technical partners via 8 thematic commissions

The Climate City Contract was put together by 8 thematic commissions set up in September 2022:

- Mobility & logistics,
- Buildings,
- Energy
- Circular economy & waste,
- Nature in the city.
- Urban agriculture and food,
- Education and awareness,
- Sea & Coast,
- Education & awareness

Each commission is chaired by an elected member of the Marseille City Council and an elected member of the Aix-Marseille-Provence Metropolitan Council, and includes technical advisors from the three local authorities and key institutional partners (ADEME, AGAM, ATMO Sud, AMU, CNRS, etc.).

An initial mobilisation of NGOs, the business sector and institutional partners

In addition to support received during the application phase, a call for contributions launched in September 2022 by the City and the Metropolis gathered more than a hundred decarbonisation project and solution proposals, this has provided raw material for the Climate City Contract and shows that there is a genuine local dynamic in place.

This first consultation will be repeated and enriched through the on-going process associated with the Climate City Contract such that everyone can be more deeply involved in the evaluation of priorities. This will be done in line with the elements which will enhance the contract provided by the European Commission and its *Net Zero Cities* agency.

The creation of the Citizen's Assembly for the Future, in 2023, will also ensure long-term public involvement with the approach, with a view to an ambitious, fair and united ecological transition in response to the current climate, ecological and social emergency.

A large number of partners, who will play an essential role in achieving the targeted emission reductions, are already involved in this approach and are listed in the "commitment section" of the contract.

Strong governance

The governance principles and processes associated with the existence of the Climate City Contract are detailed in chapter 4 of the "commitment section" of the contract.

This diagram shows the relationships between the various governing bodies and partner mobilisation zones .

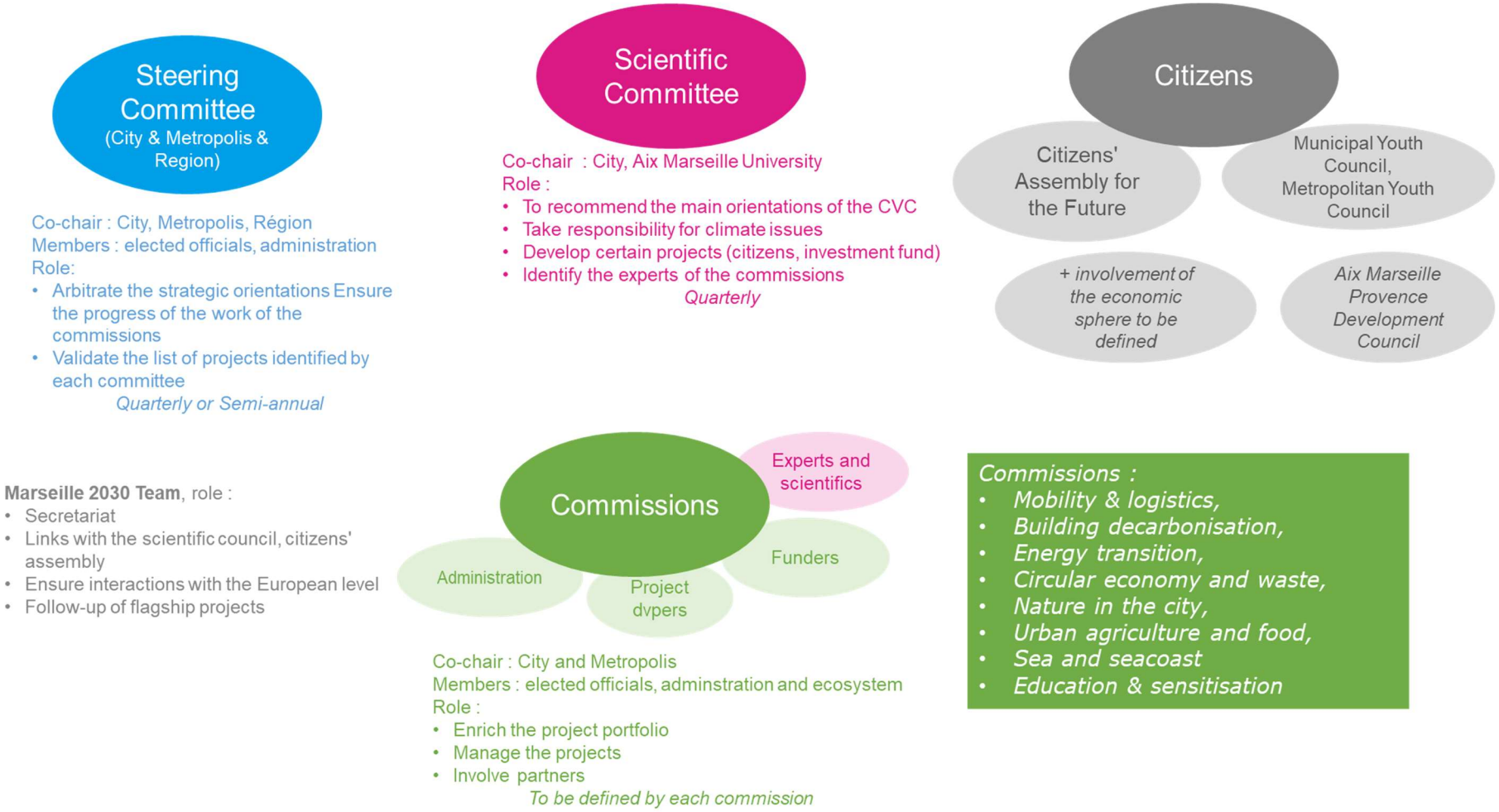


Figure 4 - Diagram showing the program's overall governance

2.2 PRINCIPAL PHASES

The principal development phases of the Climate City Contract are as follows:

- End of 2021: preparation of the application to the European Commission's 100 Cities programme
- Spring 2022: Marseille selected as one of the 100 cities to be included in the European 100 Climate-Neutral and Smart Cities Mission
- Summer 2022: Implementation of the internal organisation associated with the programme
- Autumn 2022: the Net Zero Cities platform publishes the necessary Climate City Contract guideline information and templates
- Autumn 2022: the themed commissions start work on the content of the Climate City Contract and installation of the Scientific Council.
- Winter 2022: First drafting of the Climate City Contract

The planned timetable for 2023 is as follows:

- Spring 2023: submission of a first draft of the contract to the European Commission
- End of 2023: organisation of a contract update based on feedback from the European Commission and further partner commitments.

3. A1 - GREENHOUSE GAS EMISSIONS INVENTORY FOR 2019

The data relating to Scopes 1 and 2 - greenhouse gases emitted directly in the territory and those associated with electricity consumption - are taken from the CIGALE database, which was completed by ATMO Sud, a partner of the City of Marseille, Aix Marseille Metropolis and the Southern Region. Scope 3 data was estimated using ADEME's Carbon footprint tool.

3.1 OVERVIEW OF THE SCOPE 1 AND 2 EMISSIONS

Direct greenhouse gas emissions (scopes 1 and 2), reached approximately **2 million tonnes** of **CO_2 equivalent ($tCO2^e$,) in 2019.** This represents 2.3 tCO2e/inhabitant .

Direct **emissions** of greenhouse gases in Marseille in 2019

2 MtCO2e

i.e. 2.3 tCO2e per cap.

It should be noted that this refers specifically to direct emissions and not the carbon footprint. The carbon footprint should also cover all imports (food, building materials, etc.) as well as emissions generated by the Marseille cluster (long-distance transport, etc.). Applying national ratios, the emissions associated with Marseille's 870,000 inhabitants should be around 7.8 MtCO2e/year. The emissions recorded in Scope 1 and 2 below therefore represent around 25% of the Marseille population's carbon footprint. Initial elements relating to Marseille's carbon footprint (Scope 3) are detailed in *section 3.1.6*.

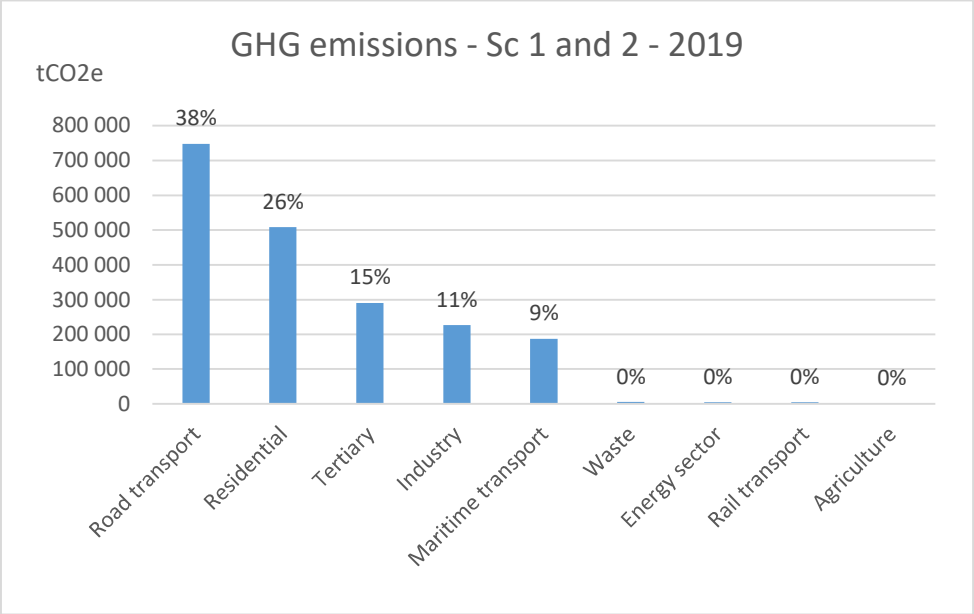


Figure 5 - Greenhouse gas emissions by activity sub-sector - Scopes 1 and 2 - Marseille 2019 - ATMO Sud data

Energy consumption, once more applying a “land-parcel” logic to scopes 1 and 2", reaches nearly 11.4 TWh/year.

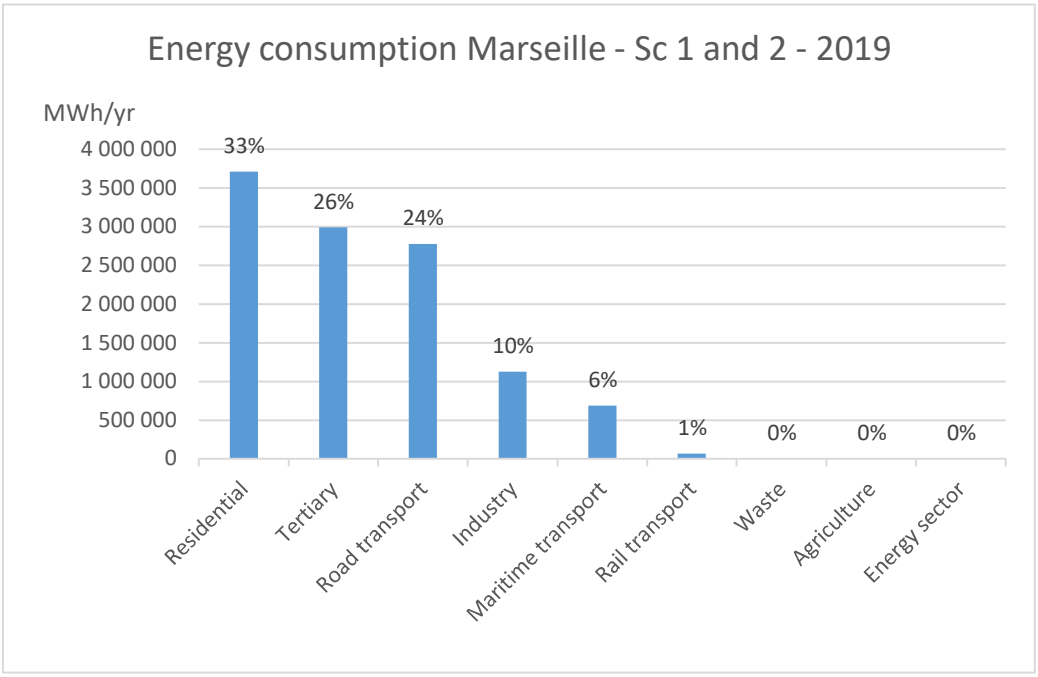


Figure 6 - Energy consumption by activity sub-sector - Scopes 1 and 2 - Marseille 2019 - ATMO Sud data

Some details on the sectors covered for the scopes 1 and 2 emissions report:

- The residential sector includes both private and public housing, which in 2019 included approximately 57,700 single-family homes and nearly 394,000 flats in Marseille.
- The services sector includes office buildings, cafés-hotels-restaurants, shops, education & research buildings, health & social care buildings, sport, culture, leisure and community facilities, transport organisations and community housing.
- The number of industries in Marseille is limited, the report’s scope does not cover the industries of the Fos-sur-Mer Industrial Port Zone (ZIP).
- Road transport includes both passenger and freight transport, within Marseille.
- Rail transport includes passenger and freight transport within Marseille

- Maritime transport includes emissions related to dockside manoeuvres, as well as half of the emissions related to domestic travel, i.e. between 2 French ports.
- Air transport is not taken into account in this report, as the airport is located outside Marseille.
- 'Waste management' corresponds to the collection, treatment and recovery of waste produced in Marseilles: this item is practically zero here because the main treatment and recovery units are also located outside the city
- The energy branch corresponds to emissions linked to the energy production units located within Marseille, mainly the 2 SWAC units, whose emissions are low
- Finally, the emissions from agriculture and forestry correspond to emissions related to livestock or cultivation practices within Marseille.

In order to go beyond these limits, and as part of a genuine ambition to move towards carbon neutrality, it is essential to also assess the emissions related to scope 3, as explained above. A first approach to some of the positions will be proposed in this document.

➡ Important points:

- The building sector is the most energy-intensive sector, accounting for 59% of energy consumption, ahead of the transport sectors, which in turn account for 31% of energy consumption
- But the road transport sector is the most carbon-intensive sector, accounting for 38% of emissions, ahead of the residential (26%) and service (15%) sectors
- This is why the road transport, residential and service sub-sectors are the focus of the Climate City Contract: a detailed presentation of this is provided in the following paragraphs, along with exploratory scenarios, based on a highly ambitious mobilisation of emission reduction potentials.

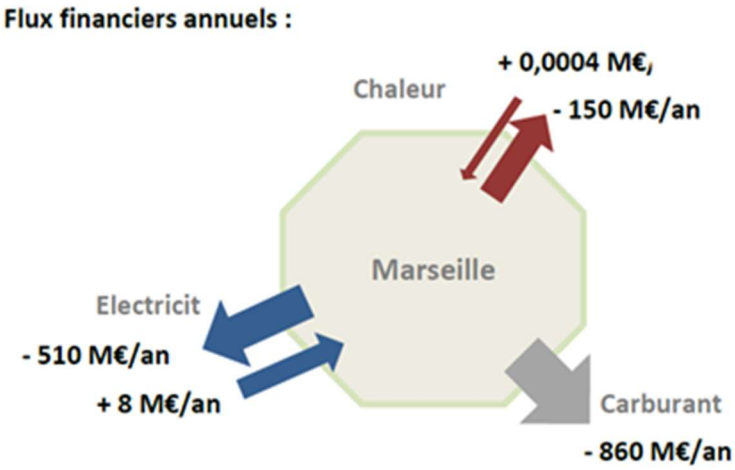
3.2 FINAL ENERGY CONSUMPTION BY SECTOR AND ASSOCIATED EXPENDITURE

This reached 11,361 GWh in 2019, broken down by sector for scopes 1 and 2, as follows:

A-1.1: Final energy by sector				
Reference year	2019			
Unit	MWh/year			
	Scope 1	Scope 2	Scope 3	Total
Buildings	2,979,217	3,709,564		6,688,781
Wood energy	138,160			138,160
Natural gas	2,429,975			2,429,975
Petroleum products	411,082			411,082
Heat and cold networks		137,498		137,498
Electricity		3,572,066		3,572,066
Transport	3,467,818	64,930		3,532,748
Natural gas	15,152			15,152
Petroleum products	3,452,666			3,452,666
Electricity		64,930		64,930
Waste products	0	0		0
Industry excluding energy sector	915,702	211,543		1,127,245
Other renewable energy sources *	55,931			55,931
Other non-renewable energy sources	52,100			52,100
Natural gas	599,751			599,751
Petroleum products	207,920			207,920
Electricity		211,543		211,543
Agriculture and forestry	1,379	731		2,110
Other renewable energy sources *	3			3
Natural gas	664			664
Petroleum products	712			712
Electricity		731		731

According to Regional data given purely for informational purposes, the expenses associated with these energy consumptions represent:

- Around €510m/year of expenditure on electricity purchasing
- Around €860 million/year in fuel purchases



The Marseille territory energy trade balance in 2016 - Carbon Neutrality Strategy objective variants worksheet - Provence-Alpes-Côte d'Azur Region SRADDET

In addition to this regional approach, a more detailed assessment of energy expenditure based on the ATMO data provided along with the various energy unit costs is proposed.

This analysis has been completed for the main energy vectors:

- Electricity
- Natural gas
- Petroleum products
- Heat networks
- Wood energy

The unit cost of these different vectors varies according to the activity sector.

In addition, energy expenditure has been modelled according to two different assumptions to incorporate the impact of energy cost increases resulting from the war in Ukraine:

- Average unit cost since 2017
- Average unit cost since January 2022

The following tables show the unit costs (€/MWh) used and their subsequent increases:

Unit cost (€/MWh) Average cost since 2017	Electricity	Natural gas	Petroleum products	Heating networks	Wood energy
Residential	182 €	138 €	86 €	76 €	64 €
Tertiary	182 €	138 €	86 €	76 €	64 €
Road Transport	147 €	189 €	159 €		
Industry	99 €	38 €	52 €		
Maritime Transport			138 €		
Rail Transport	112 €				
Wastes					
Agriculture	182 €	140 €	1 347 €		
Coût unitaire (€/MWh) Prix moyen depuis janvier 2022	Electricity	Natural gas	Petroleum products	Heating networks	Wood energy
Residential	204 €	138 €	149 €	76 €	116 €
Tertiary	204 €	138 €	149 €	76 €	116 €
Road Transport	147 €	189 €	193 €		
Industry	139 €	66 €	71 €		
Maritime Transport			138 €		
Rail Transport	473 €				
Wastes					
Agriculture	204 €	140 €	1 641 €		

Table 1 - energy price trends - INDDIGO

On the basis of these assumptions, the total cost of energy for the Marseille's various activity sectors is €1.6 million per year, when allowing for trends in average energy costs since 2017. Recent price rises have resulted in a total increase of almost €300k (+15%), thus raising annual energy expenditure to €1.9M.

- Overall energy expenditure calculated from average costs since 2017

Energy bill Average cost since Januaray, 2017	Electricity	Natural gas	Petroleum products	Heating networks	Wood energy	**Total**
Residential	292 999 137 €	217 436 264 €	21 593 624 €	10 302 779 €	8 656 154 €	**550 987 957 €**
Tertiary	358 864 370 €	117 900 233 €	13 759 442 €	119 566 €	186 106 €	**490 829 718 €**
Road Transport	375 959 €	2 870 482 €	438 652 053 €			**441 898 495 €**
Industry	20 942 711 €	22 735 650 €	10 811 835 €			**54 490 196 €**
Maritime Transport			95 282 120 €			**95 282 120 €**
Rail Transport	6 985 021 €					**6 985 021 €**
Wastes						**- €**
Agriculture	132 960 €	92 989 €	959 010 €			**1 184 959 €**
Energy production	- €	- €	- €	- €	- €	**- €**
Total	**680 300 157 €**	**361 035 618 €**	**581 058 085 €**	**10 422 345 €**	**8 842 260 €**	**1 641 658 465 €**

Table 2 - energy expenditure by sector and energy type - based on average energy costs since 2017 - INDDIGO

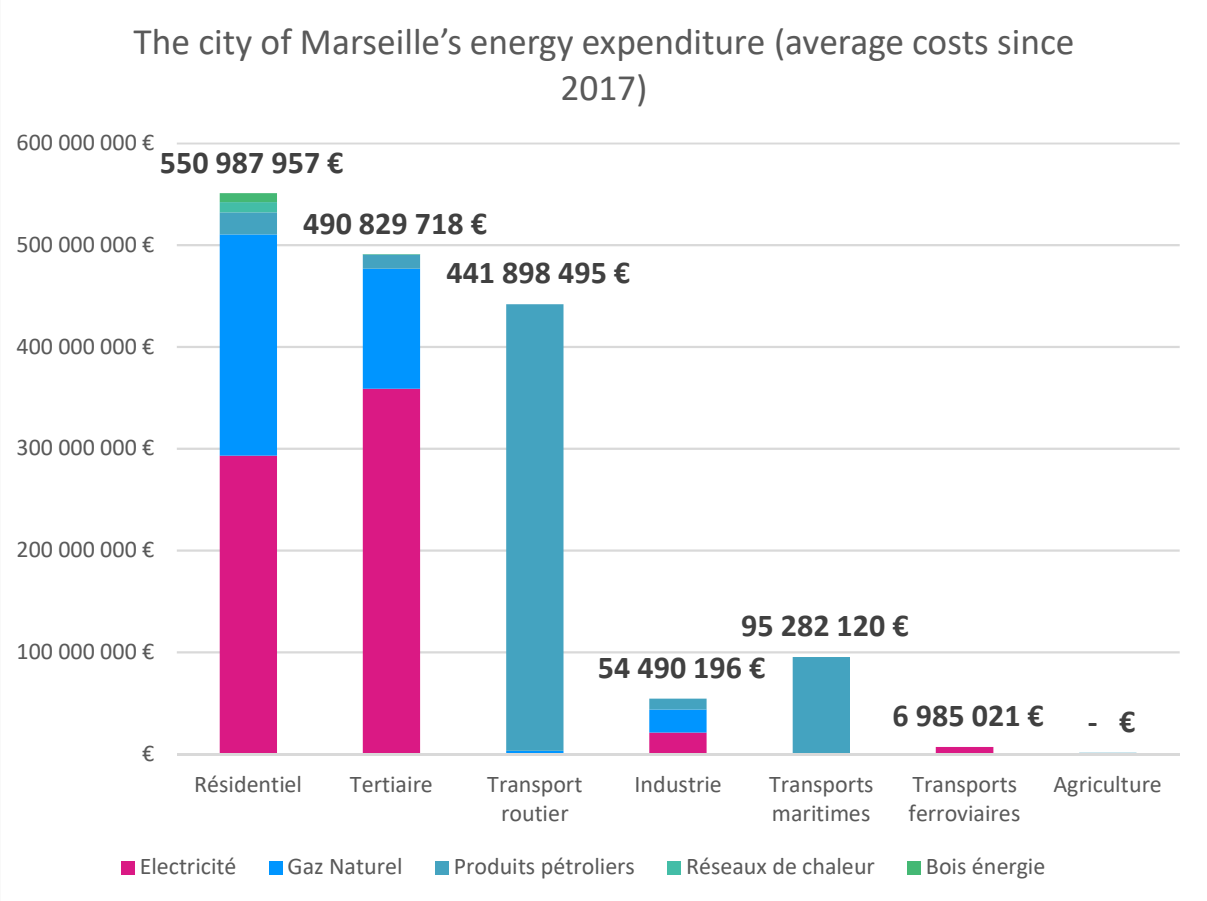


Figure 7 - The city of Marseille's energy expenditure - average costs since 2017 - INDDIGO

- Overall energy expenditure calculated from average costs since 2022

Energy bill Average cost since January, 2022	Electricity	Natural gas	Petroleum products	Heating networks	Wood energy	**Total**
Residential	328 416 615 €	217 436 264 €	37 412 209 €	10 302 779 €	15 689 280 €	**609 257 146 €**
Tertiary	402 243 579 €	117 900 233 €	23 839 034 €	119 566 €	337 316 €	**544 439 729 €**
Road Transport	375 959 €	2 870 482 €	532 451 864 €			**535 698 305 €**
Industry	29 404 412 €	39 488 234 €	14 762 313 €			**83 654 959 €**
Maritime Transport			95 282 120 €			**95 282 120 €**
Rail Transport	29 499 239 €					**29 499 239 €**
Wastes	- €	- €	- €			**- €**
Agriculture	149 032 €	92 989 €	1 168 327 €			**1 410 347 €**
Energy production	- €	- €	- €	- €	- €	**- €**
Total	**790 088 836 €**	**377 788 202 €**	**704 915 866 €**	**10 422 345 €**	**16 026 596 €**	**1 899 241 845 €**

Table 3 - energy expenditure by sector and energy type - based on average energy costs since January 2022 - INDDIGO

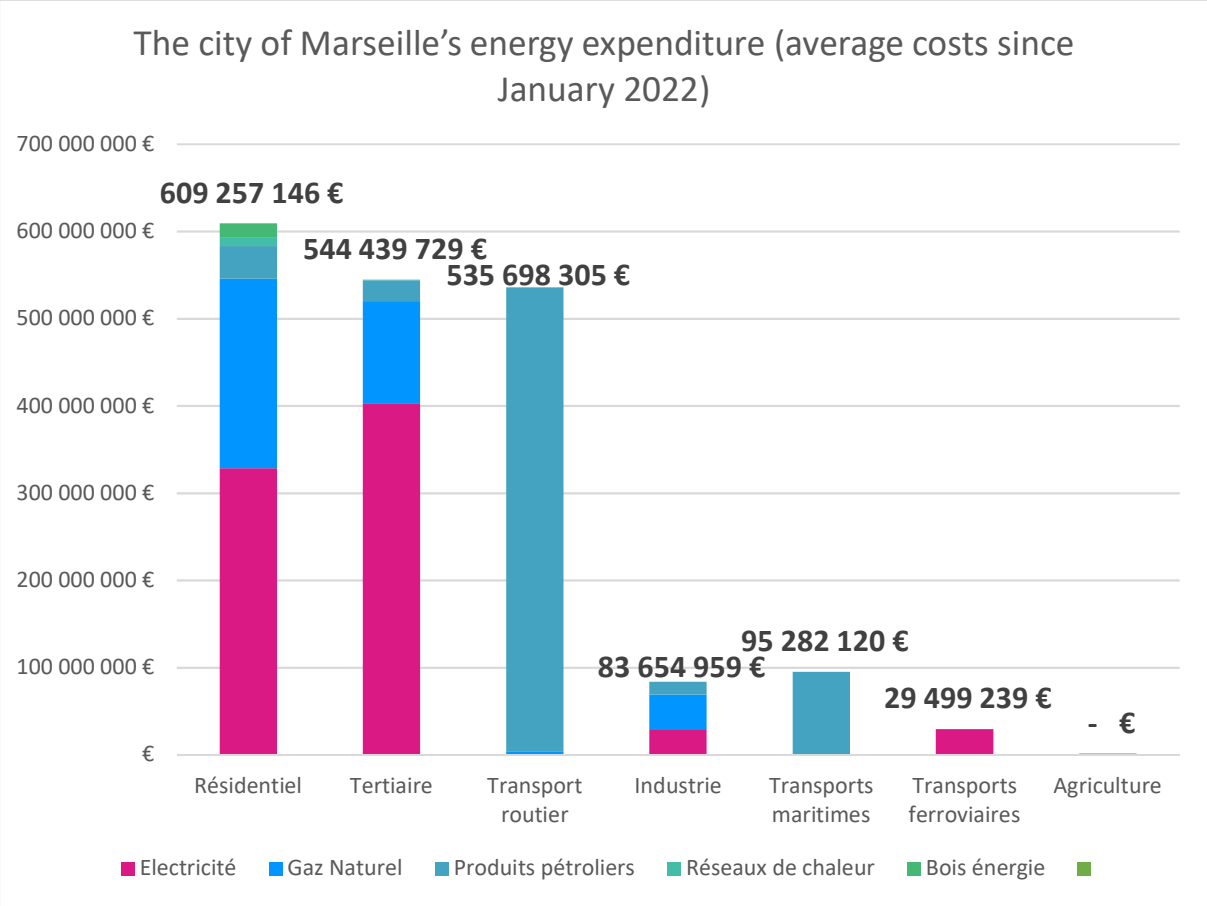


Figure 8 - The city of Marseille's energy expenditure - average costs since January 2022 - INDDIGO

The following table shows cost increases, by energy type and sector, between the average price since 2017, and the average price since January 2022; this demonstrates the extent to which usage control and energy independence are major issues.

Energy bill evolution	Electricity	Natural gas	Petroleum products	Heating networks	Wood energy	**Total**
Residential	12%	0%	73%	0%	81%	**11%**
Tertiary	12%	0%	73%	0%	81%	**11%**
Road Transport	0%	0%	21%			**21%**
Industry	40%	74%	37%			**54%**
Maritime Transport			0%			**0%**
Rail Transport	322%					**322%**
Wastes						
Agriculture	12%	0%	22%			**19%**
Energy production						
Total	**16%**	**5%**	**21%**	**0%**	**81%**	**16%**

Figure 9 - Table of energy expenditure increases by sector and energy type - INDDIGO

3.3 FINAL ENERGY CONSUMPTION BY ACTIVITY SUB-SECTOR

Details of energy consumption by activity sub-sector are provided in the following table, for a better understanding of the energy issues associated with each type of building and type of transport.

A-1.3: Energy consumption by sub-sector			
Reference year		2019	
	MWh/year	**MWh/year**	**MWh/year**
	Scope 1	**Scope 2**	**Scope 3**
Buildings	2,979,217	3,709,564	
Residential	1,961,966	1,745,806	
Service Sector	1,017,251	1,963,758	
Transport	3,467,818	64,930	
Railways	4,250	62,366	
Maritime transport	689,598		
Road transport	2,773,970	2,563	
Waste products	0	0	
Industry excluding energy sector	915,702	211,543	
Agriculture and forestry	1,379	731	
Agriculture	1,379	731	

3.3.1 GREENHOUSE GAS EMISSIONS BY BUSINESS SECTOR

The table below details the scope 1 and 2 GHG emissions for 2019 by sector; data provided by ATMO Sud.

A-1.4: Emissions by business sector				
Reference year	2019			
Unit	t CO2e/year			
	Scope 1	**Scope 2**	**Scope 3**	**Total**
Buildings	628,946	170,211	Not rated	799,157
Transport	936,187	3,446	Not rated	939,633
Waste products	5,465		Not rated	5,465
Industry excluding energy sector	215,750	10,603	Not rated	226,353
Calories	5,305		Not rated	5,305
Agriculture and forestry	624	23	Not rated	647
Total	1,792,277	144,283		1,976,561

3.4 DETAILS BY SECTOR AND DEMONSTRATIONS - SCOPE 1 AND 2

3.4.1 TRANSPORT

The transport sector can be broken down into 3 activity sub-sectors:

- Road transport
- Maritime transport
- Rail transport.

Road transport =

38%

of direct land-based emissions (1er position)

Air transport associated with private travel by the local population is covered by Scope 3. There are two possible approaches to considering this sector's GHG impacts.

- **The first approach is called land-parcel-based** and only covers journeys within the geographical perimeter of Marseille. This method is the one used by ATMO, and for the sake of consistency with the other sectors, it is the one we will use for the emissions reports and monitoring.

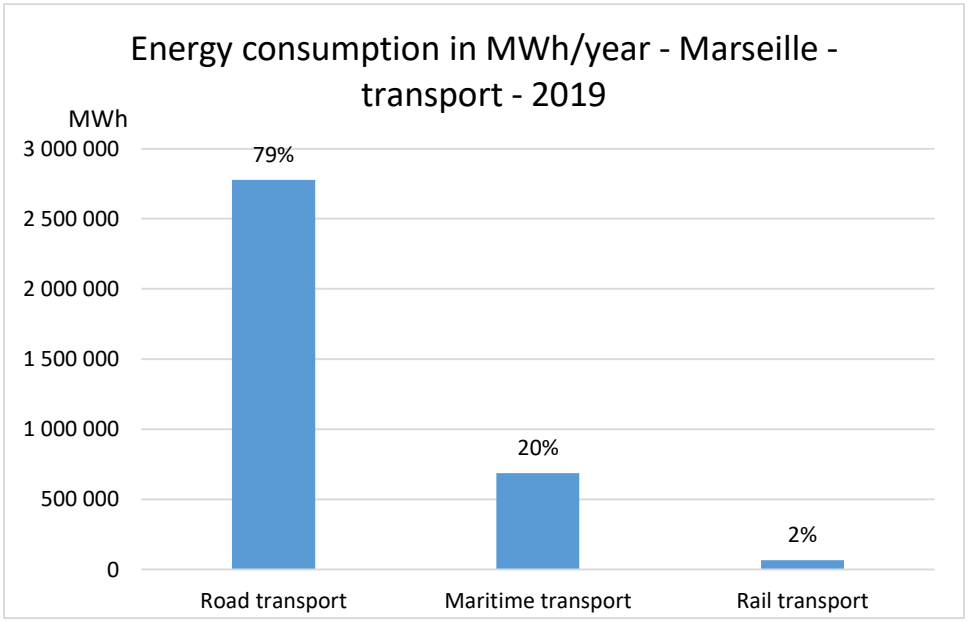


Figure 10 - Transport sector energy consumption - Scopes 1 and 2 - Marseille 2019 - ATMO Sud data

Road transport is by far the most energy intensive, accounting for 79% of all transport energy consumption.

For this data set, maritime transport only covers quayside manoeuvres and local domestic crossings, in order to be consistent with the national statistical methods.

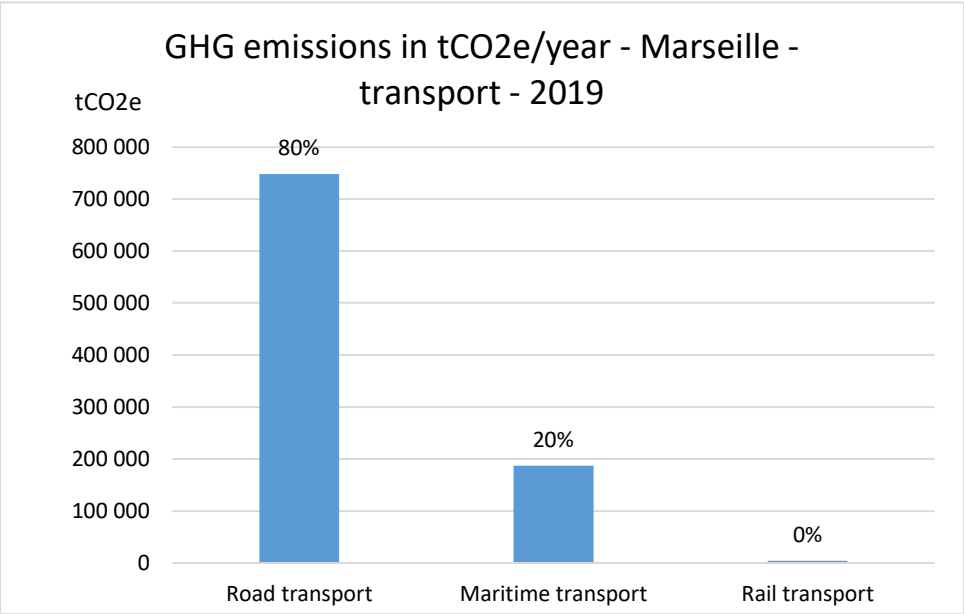


Figure 11 - Greenhouse gas emissions from transport - Scopes 1 and 2 - Marseille 2019 - ATMO Sud data

As the share of electricity used in the transport sector is very limited, the proportion of greenhouse gas emissions for the sector follows that of its energy consumption: the road transport sector is responsible for 80% of this sector's greenhouse gas emissions.

The details of emissions from the road transport sector by vehicle type and energy vector are provided below.

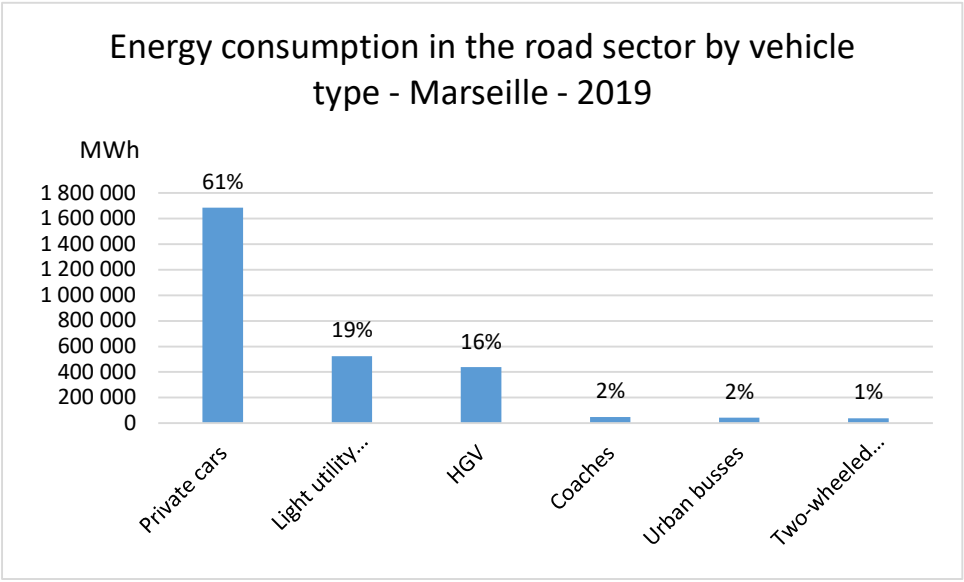


Figure 12 - Energy consumption by the road transport sector by vehicle type - Marseille - 2019 - ATMO Sud data

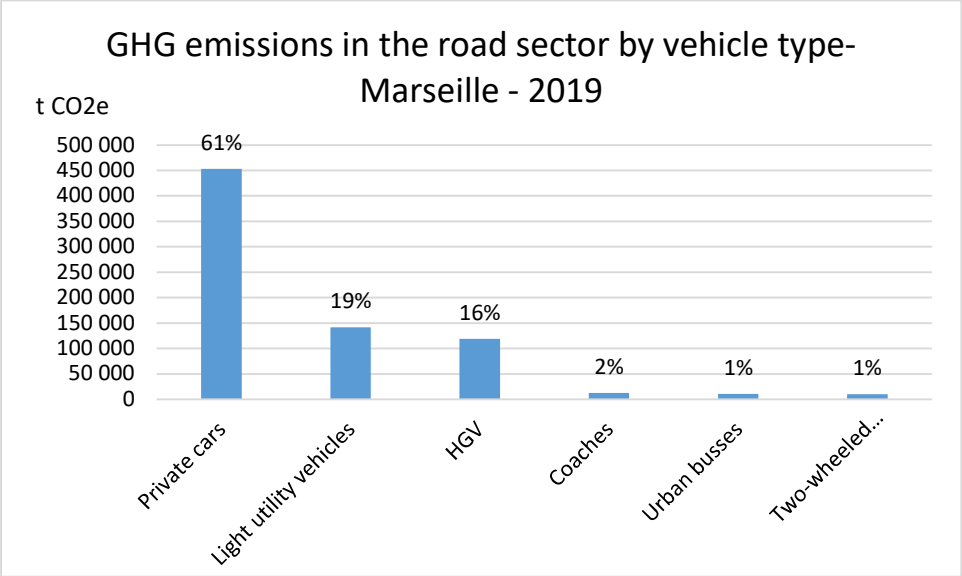


Figure 13 - GHG emissions from the road transport sector by vehicle type - Marseille - 2019 - ATMO Sud data

Private cars accounts for 61% of the road transport sector's energy consumption and greenhouse gas emissions, and action on this target is a priority for local government policies, notably the Climate City Contract.

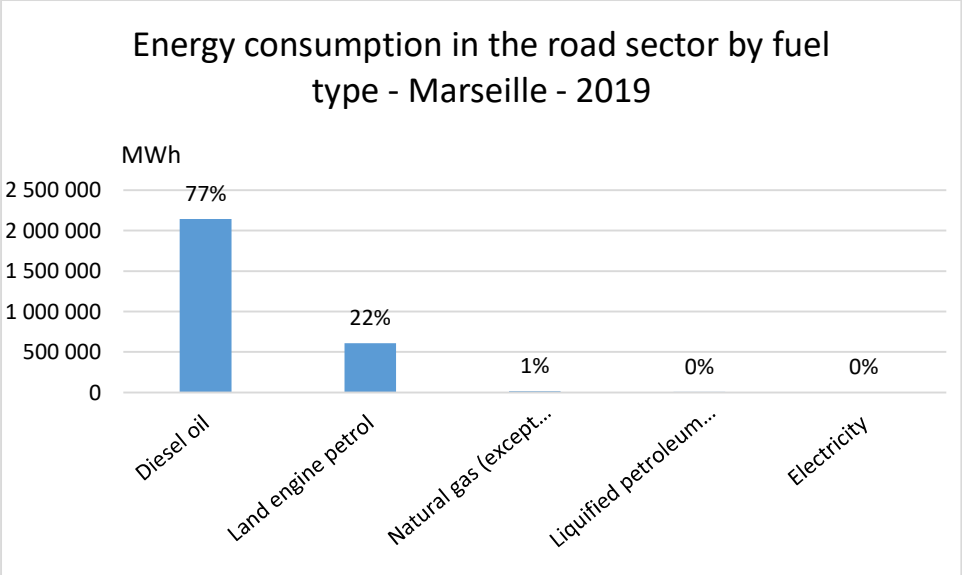


Figure 14 - Road transport sector energy consumption by fuel type - Marseille - 2019 - ATMO Sud data

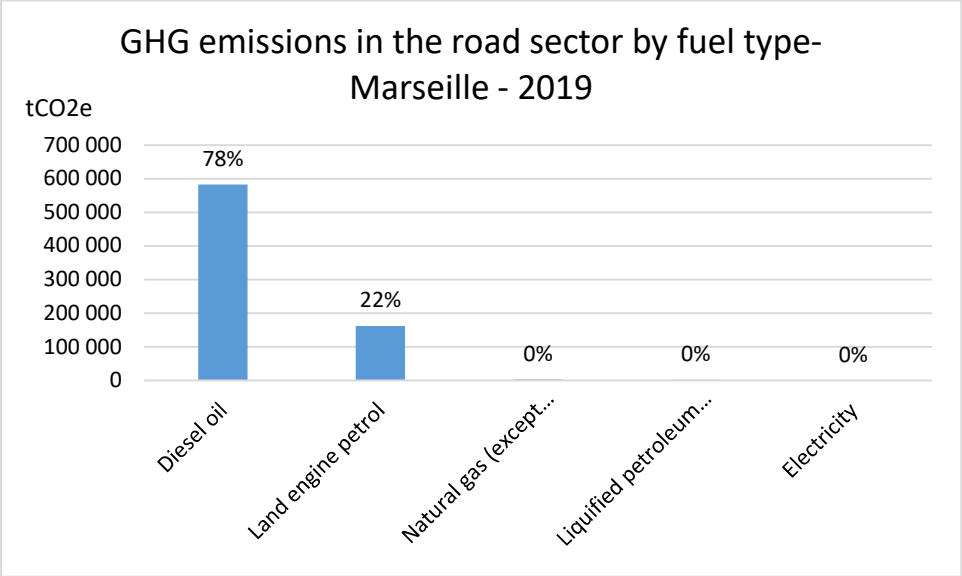


Figure 15 - Road transport sector GHG emissions by fuel type - Marseille - 2019 - ATMO Sud data

These two graphs illustrate the continued dominance of combustion engines, notably diesel powered, in the road transport sector. All potential levers for change must be used to take action: reduction of distances, reduction of the use of private cars, alternative mobility to the private car, alternative power sources. These levers correspond to those considered in the Mobility Plan. The expected by-products of improved air quality and therefore better public health in general equally important to the city of Marseille and its partners.

- **The second approach is to analyse road transport by "catchment areas".** This allows for a better identification of action levers and the evaluation of their potential impact.

The following are the diagnostic elements provided by the Marseille Conurbation Urban Planning Office (Agence d'urbanisme de l'agglomération marseillaise - AGAM) for the preparation of the Mobility Plan (Plan Des Mobilités - PDM) in 2019, relating to the daily movements of the local population on weekdays.

The data comes from a Cerema EMC² certified mobility survey conducted largely during the winter of 2019-2020 (before the COVID 19 pandemic lockdowns).

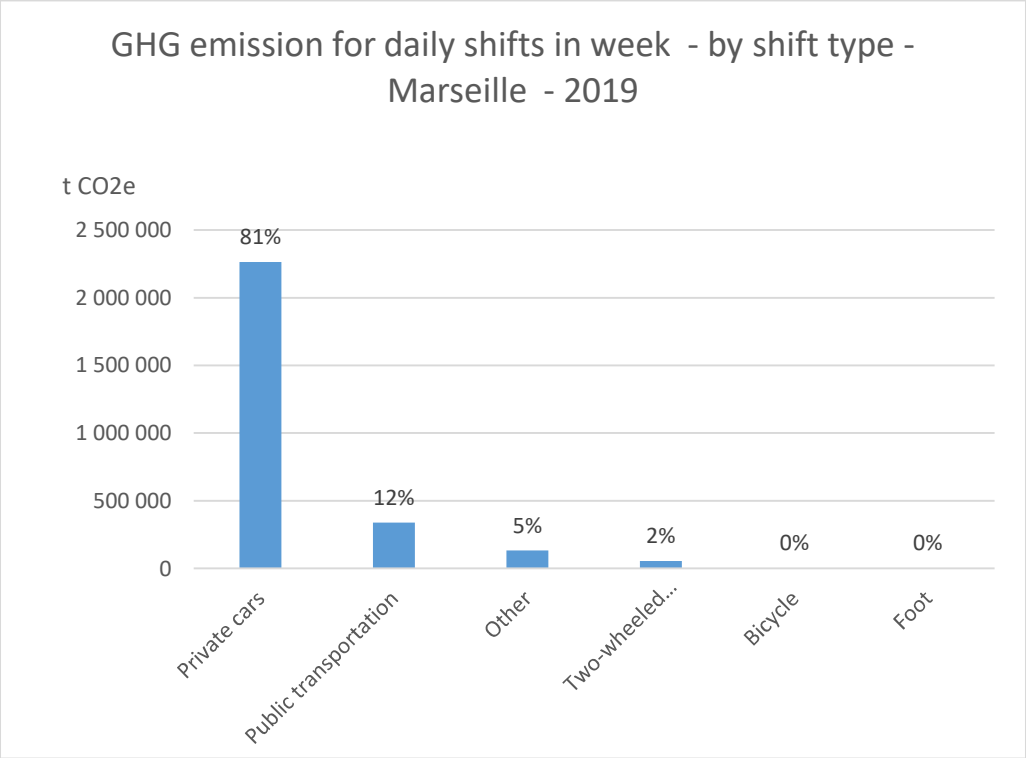


Figure 16 - GHG emissions from daily weekday travel to and from Marseille, and within its urban centre - by travel method (TC: Public Transport) - 2019 - AGAM data

The use of cars for daily trips during the week accounts for 81% of the GHG emissions related to these types of movement.

An evaluation of weekend travel emissions has been completed but has not been published at this stage. However initial analyses do suggest that the GHG burden is greater for longer distances.

Private cars =

81%

of emissions in the weekday road sector (in Marseille and surrounding region)

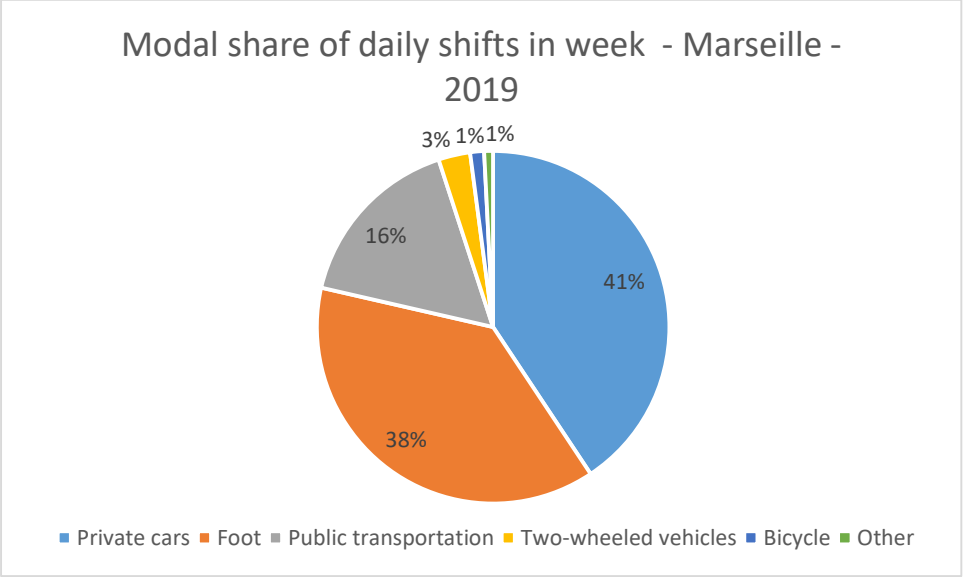


Figure 17 - The breakdown of daily weekday trips, to and from Marseille and within its urban centre, by transport method - 2019 - AGAM data -

The second approach is to analyse road transport by "catchment areas". This allows for a better identification of action levers and the evaluation of their potential impact. The following are the diagnostic elements provided by the Marseille Conurbation Urban Planning Office (Agence d'urbanisme de l'agglomération marseillaise - AGAM) for the preparation of the Mobility Plan (Plan Des Mobilités - PDM) in 2019, relating to the daily movements of the local population on weekdays. The data comes from a mobility survey, conducted largely during the winter of 2019-2020 (before the COVID 19 pandemic lockdowns).

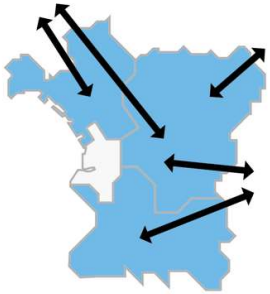
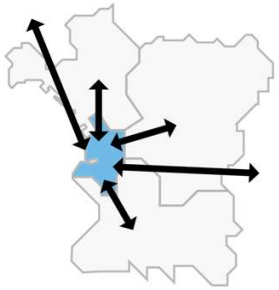
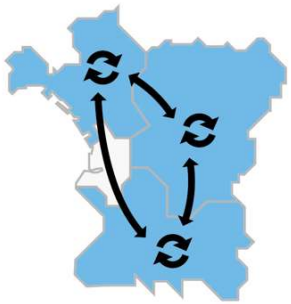
Travel between Marseille (excl. city centre) and other municipalities within the metropolitan area and beyond covering distances over 1km	Travel to and from Marseille city centre over distances greater than 1km	Travel within Marseille, excl. city centre, over distances greater than 1 km	Internal travel within the city centre of Marseille
			
38% of GHG emissions from daily travel on weekdays, • 28% with the metropolis • 10% outside Aix Marseille Provence • Fairly symmetrical circulation • More than 85% of these movements are made by car	37% of GHG emissions from daily travel on weekdays, • 16% within the metropolis • 14% with the rest of Marseille • 7% outside the metropolis	19% of GHG emissions from daily travel on weekdays, • 11% local (a few kilometres) • 8% on the ring road between catchment areas • 65 to 80% (ring road) by car	6% of GHG emissions from daily travel on weekdays, 80% of these journeys are already made by alternative means to the car (public transport, cycling, walking)
Issues : • Development of the road and rail Metropolitan Express Network (Réseau Express Métropolitain - REM) within the metropolis, with a network of interchange hubs outside the city centre • Improved access to the St Charles railway station for metropolitan and regional travel	Issues : - Development of public transport on dedicated lanes (TCSP) and public transport within Marseille - Development of REM in the metropolis and the region - Reduction of private car use in the city	Issues : • Public transport (PT) and cycling network (for internal traffic) • Better Bus with a High Level of Service (BHLS) and cycling (ring road) routes • Restriction of the use of private cars	Issues : • Develop the local use of bicycles • Make walking easier. However, walking already represents a very high share (41%)

Figure 18 - Identification of the GHG challenges for daily mobility - approach by catchment area in Marseille - source AGAM - 2019

- Important points
  - A land-parcel approach to evaluate and monitor emissions, a catchment area approach to identify issues, action levers and quantify potential
  - Road transport sector: Top of the GHG emissions table. Behind 80% of transport sector GHG emissions, and 36% of the total emissions for the Marseilles territory
  - Combustion engines: Leading source of emissions in the road transport sector, in terms of its energy vector. For 2019 electricity represented less than 1% of all road transport energy consumption.
  - In terms of GHGs, the challenges largely concern journeys of more than 7 km (medium and long distance), given the private car's share in these uses, but action on journeys within the urban centre will also be important for environmental and public health reasons, as well as social issues.
  - All potential levers for change must be used to take action: reduction of distances, reduction of the use of private cars inside Marseille, alternative mobility to the private car, alternative power sources. The potential impacts of these major levers are detailed in the next chapter.

3.4.2 RESIDENTIAL

Housing in Marseille is composed of:

- 393,758 flats, i.e. 87% of all housing, responsible for 71% of the residential sector's GHG emissions
- 57,701 houses, i.e. 13% of housing, responsible for 29% of the residential sector's GHG emissions.

For scopes 1 and 2, the residential sector is the region's second largest consumer of energy (3,700 GWh in 2019), and of GHG emissions. It should be noted that these emissions relate to daily energy consumption, the construction/renovation part is not included in this section but elements are presented in the Scope 3 section.

Residential =

26%

of direct land-based emissions (2nd position)

To identify the issues, the following analysis focuses on:

- Breakdown of energy consumption and GHG emissions by use
- Breakdown of energy consumption and GHG emissions by energy vector

Analysis by use

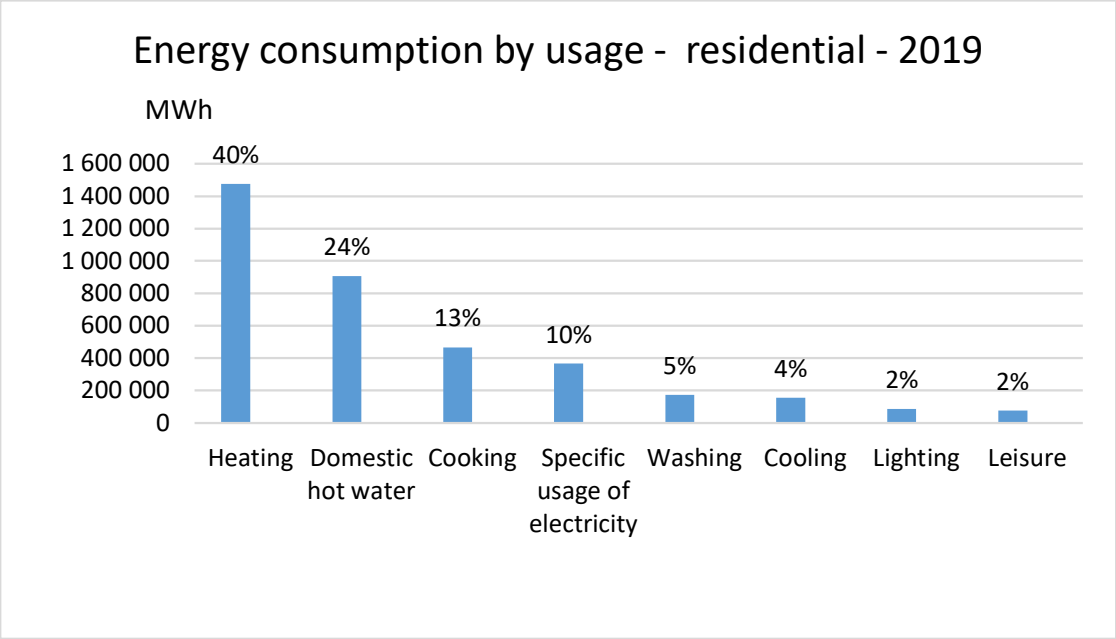


Figure 19 - Residential sector energy consumption, by use - Marseille - 2019 - ATMO Sud data

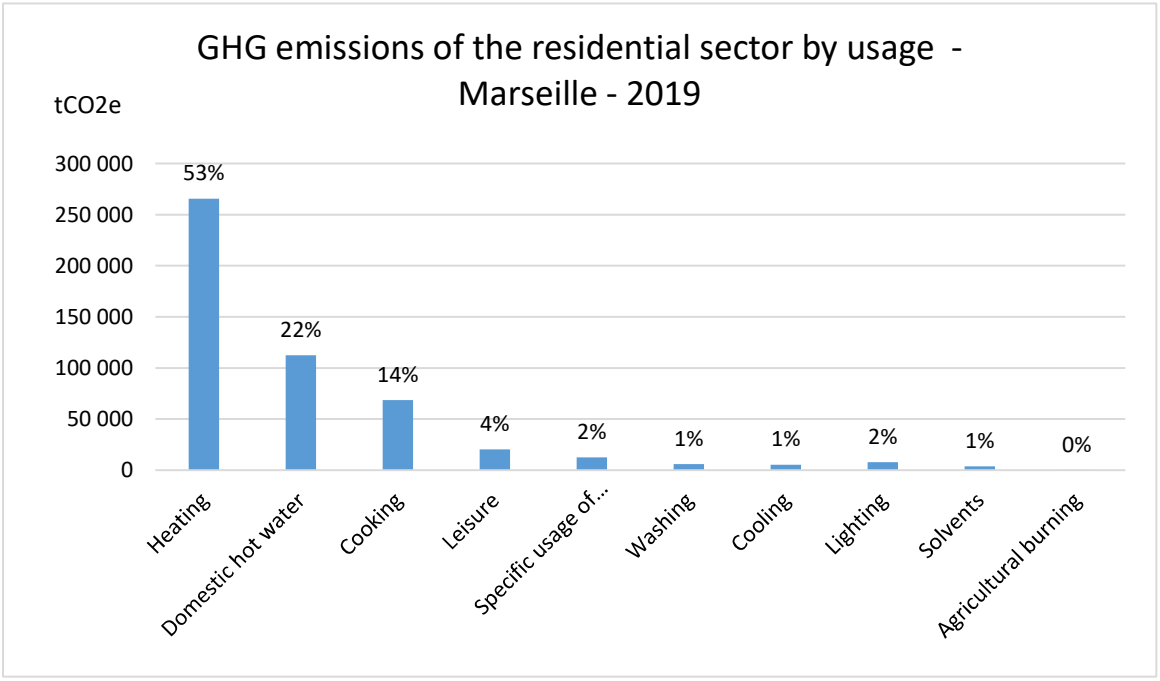


Figure 20 - Residential sector greenhouse gas emissions, by use - Marseille - 2019 - ATMO Sud data

Heating accounts for 40% of energy consumption and 53% of greenhouse gas emissions in the residential sector.

Domestic hot water comes in second place, with 24% of energy consumption and 22% of GHG emissions in the residential sector, followed by cooking (14% of emissions).

Domestic heating =

53%

of emissions in the residential sector

It is therefore important to analyse heating by type of energy, in order to identify the potential levers for reducing the associated GHG emissions.

- **Focus on heating and domestic hot water**

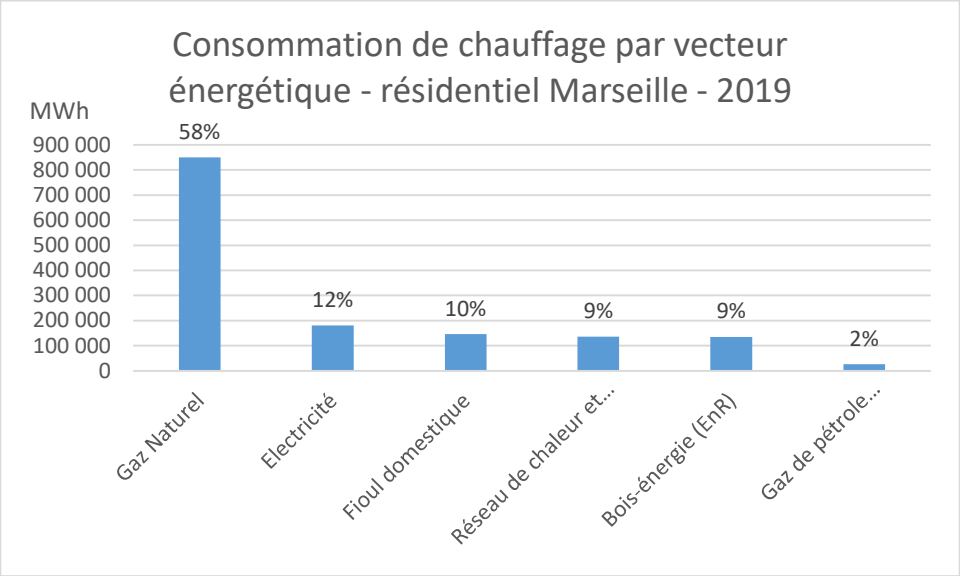


Figure 21 - Heating consumption by energy vector - residential sector Marseille - 2019 - ATMO Sud data

Heating requirements are largely covered by fossil fuels, up to 70%, the vast majority of which is gas.

Electricity is the second most important energy source, at 12%, followed by heating networks (9%) and wood energy (9%).

Fossil fuels =

70%

of energy consumption for residential heating

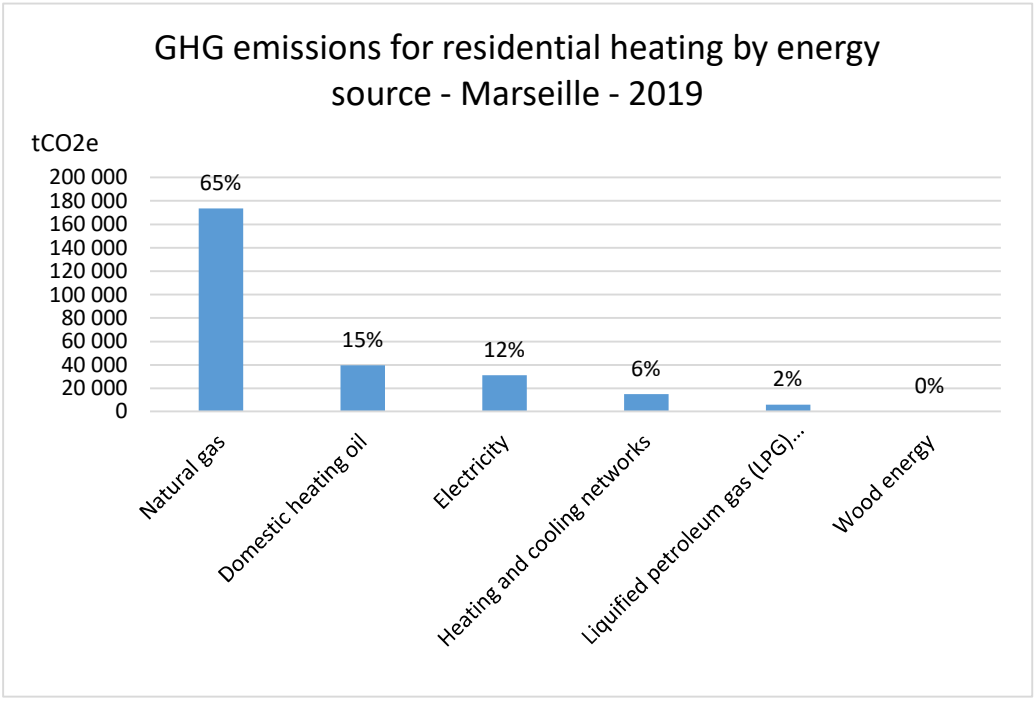


Figure 22 - GHG emissions from residential heating by energy vector - Marseille - 2019 - ATMO Sud data

Fossil fuels account for 80% of GHG emissions from residential heating.

Fossil fuels (49%) and electricity (51%) cover 49% of the domestic hot water needs.

The next chapter presents the quantification of associated potentials.

Analysis by energy type

Fossil fuels account for almost half of the sector's energy consumption (49%), of which the largest share is natural gas (42% of the total).

Electricity is the main source of energy used, mainly for domestic hot water requirements (51% of requirements), followed by specific electricity requirements, and heating (12% of requirements), cooking (38% of requirements), and finally washing and cooling needs.

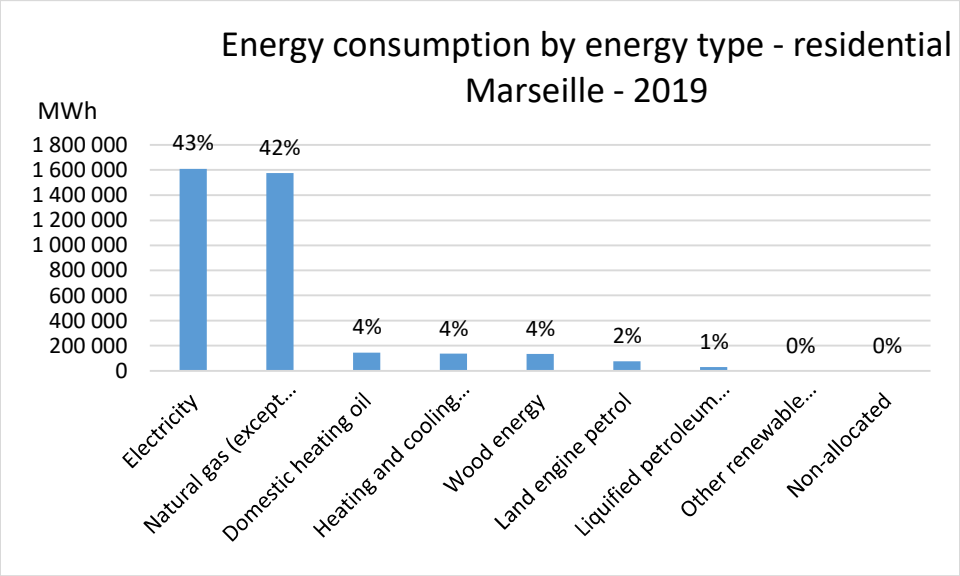


Figure 23 - Energy consumption by energy type - residential Marseille - 2019 - ATMO Sud data

Fossil fuels account for 77% of the sector's GHG emissions, which confirı the issues mentioned above.

Energies fossiles =

77%

des émissions du résidentiel

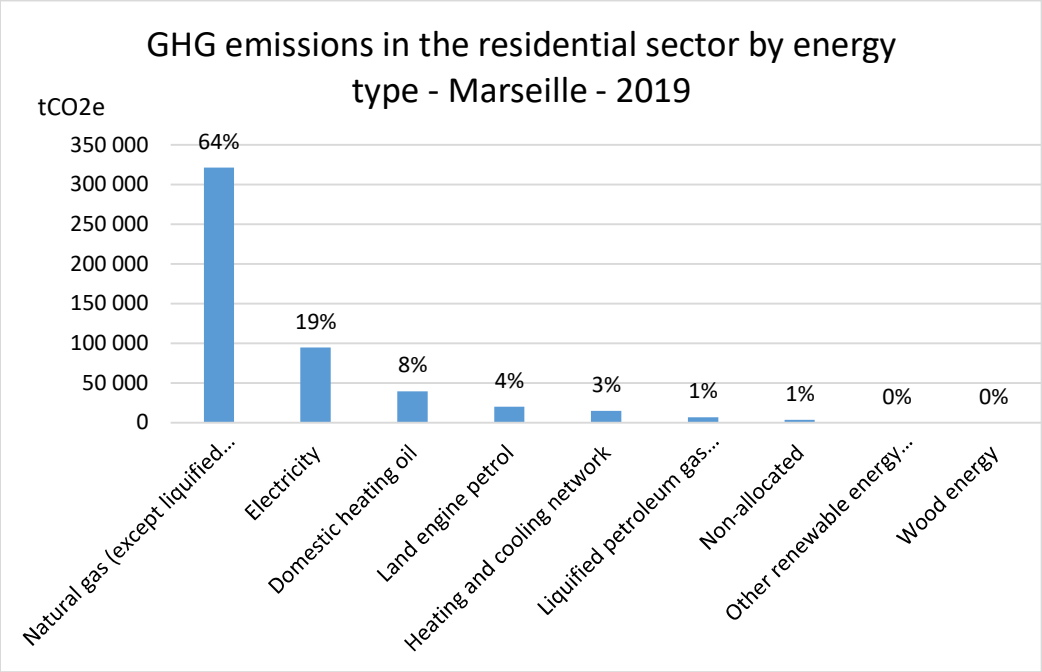


Figure 24 - GHG emissions from the residential sector by energy type - Marseille - 2019 - ATMO Sud data

- Important points
  - The residential sector is the territory's second largest source of emissions (28%)
  - One of the major challenges will be reducing emissions from heating (53% of the sector's emissions) and domestic hot water (29%). Fossil fuels currently account for 70% of domestic heating consumption.
  - Fossil fuels account for 77% of the sector's emissions
  - This data confirms the issues at stake:
- Develop energy efficiency and energy saving measures.
- Develop heat and cold networks for domestic heating and hot water in the residential sector
- Massively increase energy renovation policies
- Further exploit the potential of solar thermal energy for domestic hot water

3.4.3 SERVICE SECTOR

The service sector is the 3rd most energy-intensive sector (2,900 GWh in 2019), and the 3rd largest source of GHG emissions for scopes 1 and 2.

Tertiaire =

15%

des émissions territoriales directes (3ème poste)

Notable facilities include:

- Universities: Étoile, Centre and Luminy faculties
- AP-Hopitaux de Marseille: Timone, Nord, Conception, Européen and all other Marseille hospitals (Saint Joseph, Valvert, Edouard Toulouse)
- The Chanot-Pharo exhibition and conference centre
- Mucem (Museum of European and Mediterranean Civilizations)
- Sports facilities: Orange Velodrome Stadium, Palais Omnisports Marseille Grand Est, Palais des sports

- Venues: Le Dôme, Le Silo, Opéra, Théâtre de La Criée
- Marseille Datacenter (the actual power consumption of the current datacenters is not public domain, the same applies for all currently planned projects. It is therefore difficult to assess this sector's local contribution).

To identify the issues, the following analysis focuses on:

- Breakdown of energy consumption and GHG emissions by building type
- Breakdown of energy consumption and GHG emissions by use
- Breakdown of energy consumption and GHG emissions by energy type

Analysis by type of building

All types of buildings are concerned, as shown in the energy consumption and greenhouse gas emissions breakdowns.

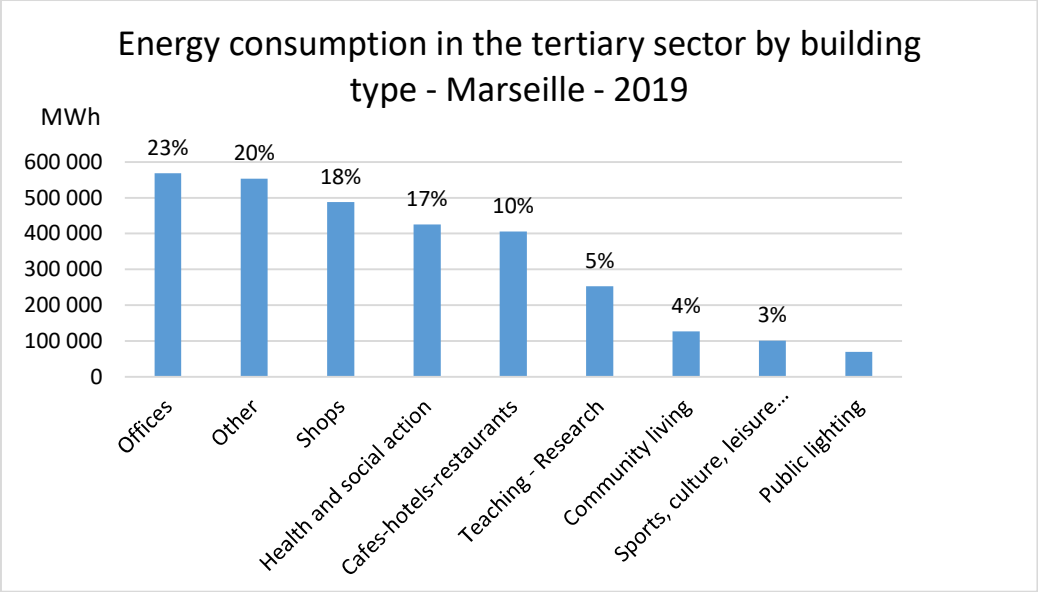


Figure 25 - Energy consumption by energy type - service sector - Marseille - 2019 - ATMO Sud data

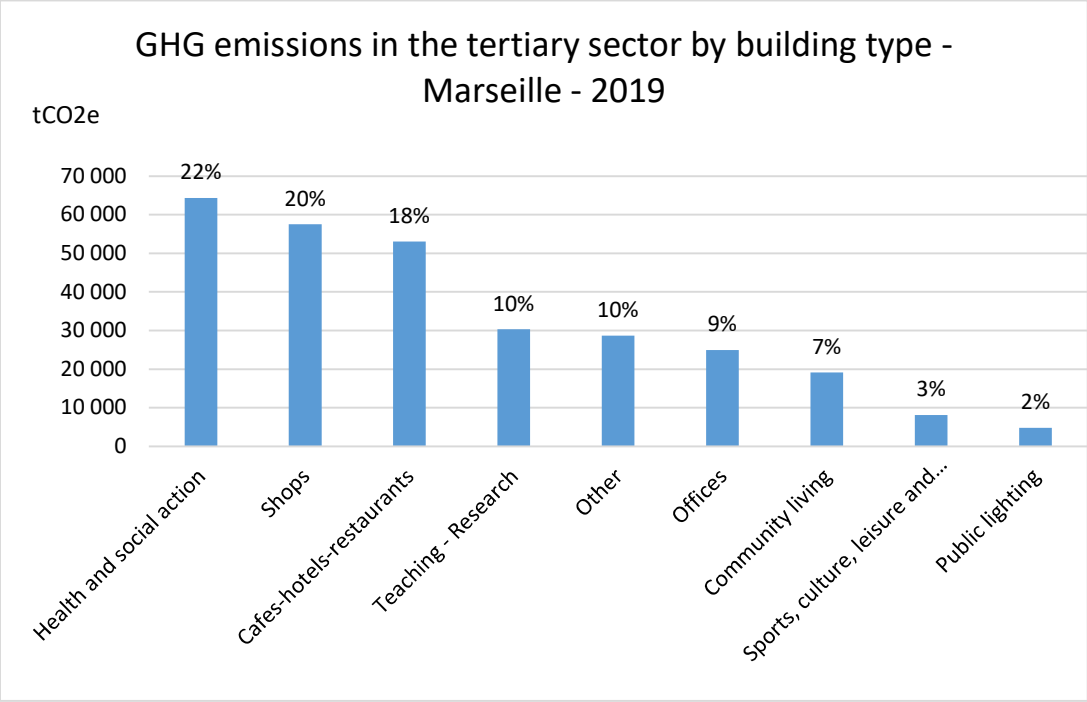


Figure 26 - Greenhouse gas emissions - service sector - Marseilles - 2019 - ATMO Sud data

The ambitious plans to renovate the APHM (hospital) and the AMU (university) buildings will be highlighted in the Climate City Contract.

Finally, it is important to stress the complexity, for the City of Marseille and its public partners, of supporting ambitious actions relating to the public and private service sector, especially retail units (the dominant type of energy consuming building) and hotel-restaurants.

- **Analysis by use**

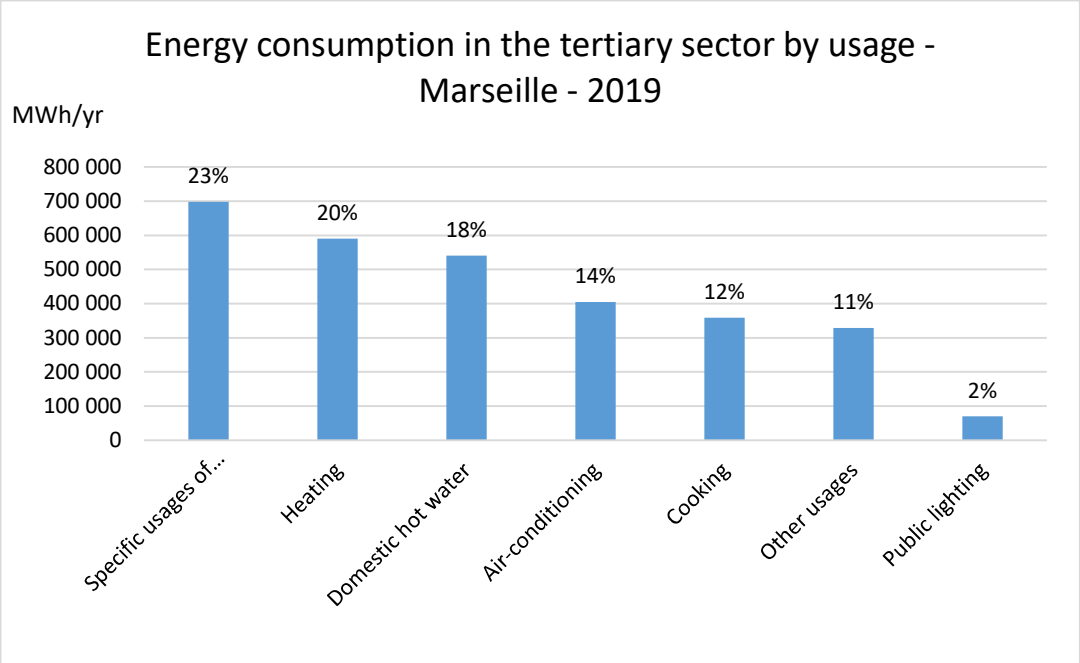


Figure 27 - Energy consumption by usage type - service sector - Marseille - 2019 - ATMO Sud and regional data

Domestic heating is the second largest energy consumer (20%), followed closely by domestic hot water. Actions involving these 2 subjects will be amongst the major Climate City Contract challenges, both to reduce consumption (energy sobriety and efficiency) and to make the energy mix greener.

Chauffage des bâtiments tertiaires =

39%

des émissions du tertiaire

For information purposes, specific electricity uses refer to functions for which the use of electrical power has become essential: washing, lighting, IT, audio-visual, home automation, etc.

Analysis by energy type

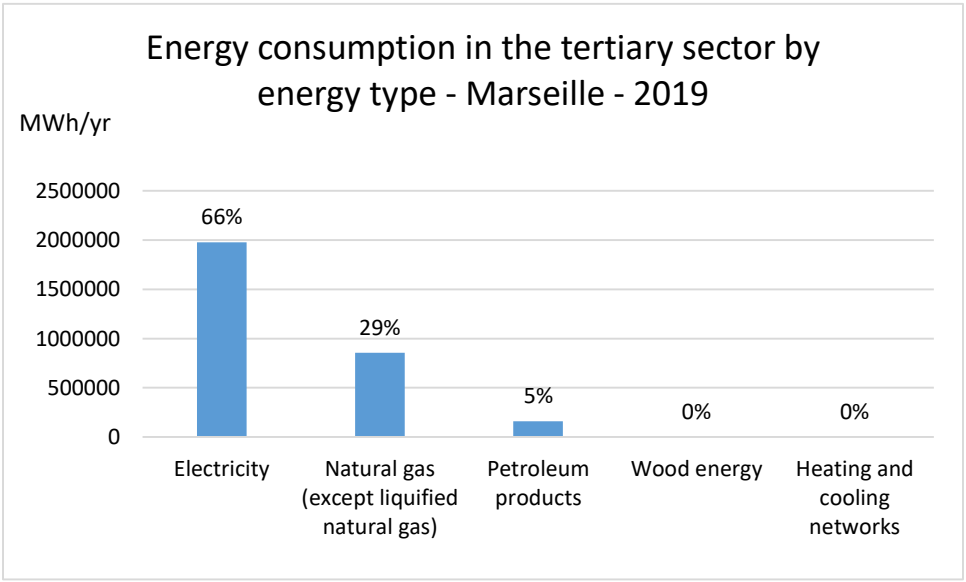


Figure 28- Energy consumption by energy type - service sector - Marseille - 2019 - ATMO Sud and regional data

Electricity is the leading energy source for the service sector, accounting for 66% of its energy consumption, especially for specific electricity uses.

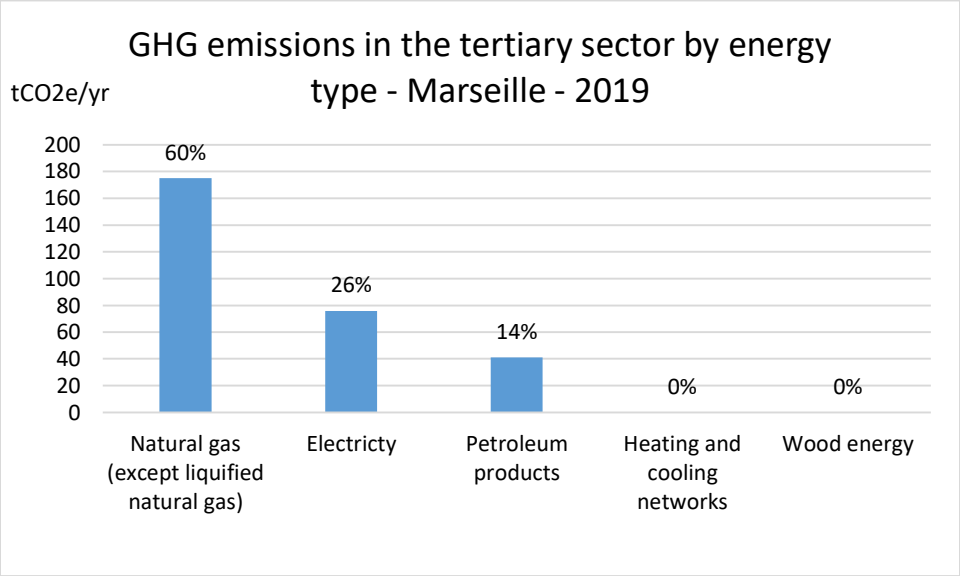


Figure 29 - Greenhouse gas emissions by energy type - service sector Marseille - 2019 - ATMO Sud and regional data

Fossil fuels are responsible for 74% of the sector's emissions. Although natural gas only accounts for a third of energy consumption, it is behind 60% of all service sector building emissions

Fossil fuels =

74%

of emissions in the tertiary sector

- Important points
  - The service sector is the territory's third largest sector for emissions (15%)
  - One major challenge would be to reduce the emissions associated with heating (39% of the sector's total emissions), since fossil fuels currently account for 70% of service sector building heating emissions.
  - Finally, fossil fuels are behind 74% of the sector's emissions
  - This data confirms that energy sobriety and efficiency as well as the application of the service sector decree are major issues tobe confronted.

3.4.4 INDUSTRY

Industrial sector emissions are included in the territory's direct emissions report and cover a small number of industrial sites within Marseille.

More specific data is subject to non-disclosure rules.

Industry =

10%

of direct land-based emissions (4th position)

This section will be presented in greater detail in a future version of the document.

It should be noted that the projected increase in the number of data centres in the territory, both in Marseilles or the metropolis, will result in a very significant increase in electricity consumption (scopes 2 and 3) and in parallel but non-linear CO2 emissions associated with their carbon emitting back-up power sources (scope 1). In order to limit the negative impacts (energy, water, land) of this growth and the competition for access to electrical resources between these new infrastructures and other activities whose decarbonisation will be a priority (docked ships, ship repair, electrification of public transport, etc.), a guidance plan will have to be drawn up collectively, in the short term and involving all parties, to provide a framework for this and make the siting of data centres sustainable (location of data centres, numerus clausus energy, exemplary projects involving the recovery of waste heat or benefits for the territory, etc.).

3.4.5 POWER GENERATION

In 2019, the production of renewable energy reached 292 GWh, about 2.5% of the territory's total energy consumption, this is considered to be a low degree of energy independence.

One of the Climate City Contract challenges will be to significantly increase this figure, notably through heat networks and photovoltaic energy.

Level of energy self-sufficiency

2.5 %

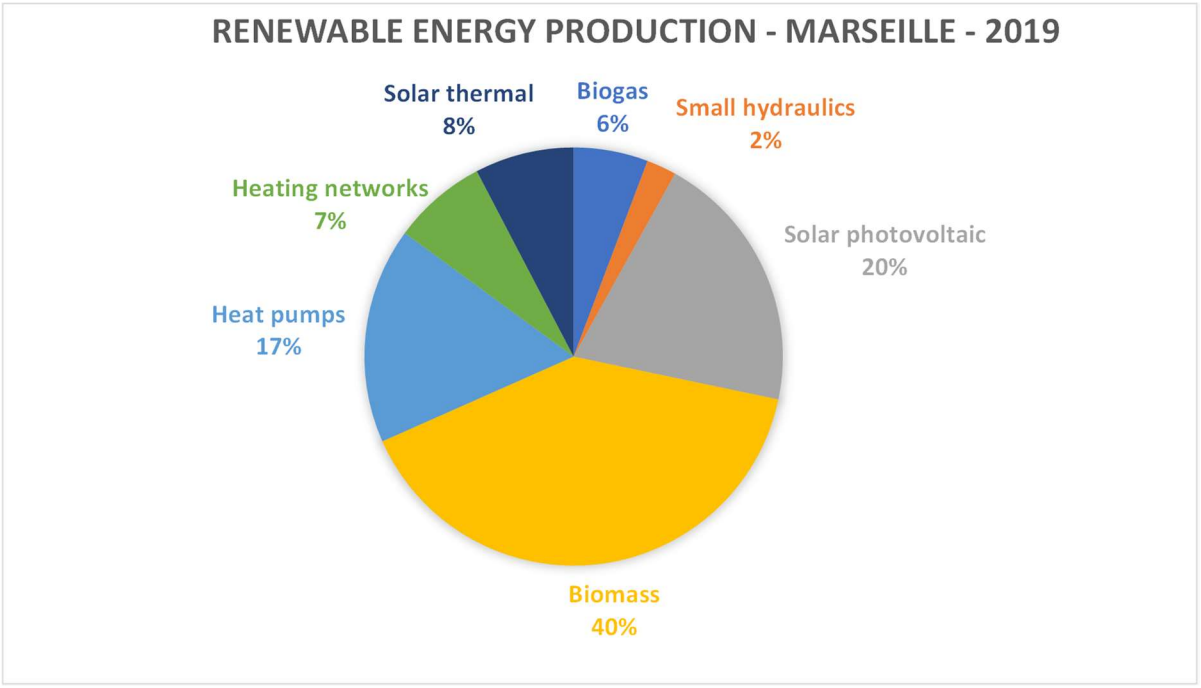
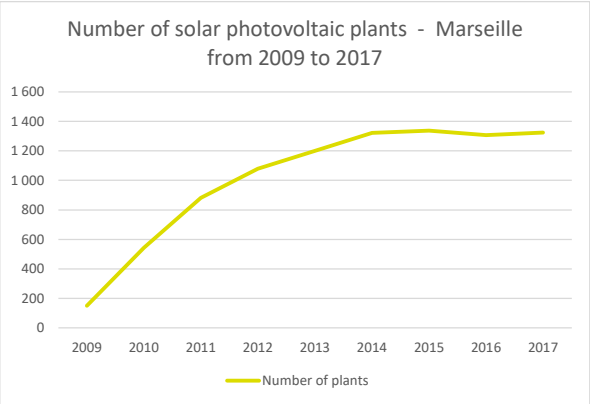


Figure 30 - Breakdown of renewable energy production by sector - Marseille - 2019 - ATMO Sud data

In this context **biomass** production refers to a private sector wood-fired heating plant in Marseille's 1st arrondissement.

The **photovoltaic** sector in Marseille includes both small and large installations. The City of Marseille, with 60 installations on its property, is responsible for 10% of this production.

The regional data for 2009 to 2017 shows a significant progression, both in terms of the number of installations and the installed capacity, but this remains a subject with room for further action to encourage greater energy independence and lower energy expenditure:



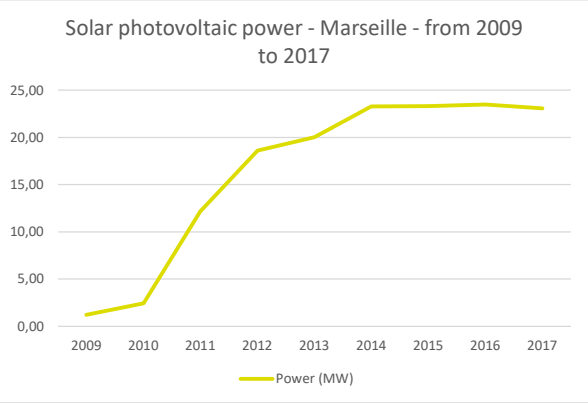


Figure 31 - Progress in Marseille's photovoltaic sector between 2009 and 2017 - ORECA data

The **heat pump** section refers to superficial geothermal and aerothermal energy, and is included in the annual renewable energy production report produced by ORECA.

The territory is also home to one of France's largest biomethane production facilities.

The Sormiou plant was constructed in 1987, in the 'calanque' of the same name, it treats slurry from the Géolide sewage treatment plant. Since 2019, this slurry is used to produce biomethane, which is then injected into the domestic gas network.

Nearly 2,500 households in the Soude district, about 10% of the population of Marseille's 9th arrondissement, are supplied with this locally produced eco-friendly gas. Biomethane is produced directly from the treatment of domestic and industrial sewage from Marseille and 16 of its surrounding municipalities. In 2021, the Sormiou plant produced 27 GWh of biomethane, and could produce up to 40 GWh/year if a proposed extension project is completed. This represents about 1% of natural gas consumption for 2019.

As for heat and cooling networks, currently active facilities in Marseille include:

- 2 sizeable seawater air conditioning plants (SWAC), which retail their heat and cold production to third parties: Massileo and Thassalia, which supply about 1000 eq. households with heat. Some schools and municipal buildings are also connected to the network.

- +100 technical networks that consume all the heat produced (e.g. the 13 Habitat network in the 13th arrondissement) and many of which rely on natural gas.

The geographical distribution of these networks over the Marseille territory is as follows:

Figure 32 - Map of currently operating heat networks in Marseille - 2022 - source: City of Marseille

Operations to extend the SWAC networks are planned or underway.

Heat and cooling networks are a potential source for significant major development.

- Important points
  - Energy self-sufficiency is only 2.5%
  - Innovative installations in place which are likely to be expanded: seawater air conditioning plants, biomethane production plants using sewage treatment by-products to directly supply the domestic networks
  - There is a high development potential associated with heat and cooling networks powered by renewable and solar energy sources.

3.5 REPRESENTATION OF THE MARSEILLE POPULATION'S CARBON FOOTPRINT IN TERMS OF "SCOPE 3" EMISSIONS

To complete this GHG emissions overview following a "Carbon Footprint" logic, the City Council has decided to present 4 complementing emission sources:

- food industry,
- new-build construction,
- waste product emissions,
- mobility related elements.

The City council also hopes include emissions related to the purchase of goods and services as well as those related to international shipping and further develop the evaluations included below in the scope 3 section of a future version of this document.

The aim would be to measure the associated emissions and monitor these indirect emissions over the long-term.

3.5.1 FOOD INDUSTRY

On the basis of an estimated population of 870,731 for 2019, an average number of 2.5 meals/day, an emission ratio per meal corresponding to an average meal, and a French continental climate, the weight of emissions associated with the**food industry is estimated at 1.6Mt CO2e**.,

This can be compared to the 1.9 MtCO2e included in Scope 1 & 2.

3.5.2 NEW-BUILD HOUSING CONSTRUCTION

The total area of individual dwellings built in 2019 (or where work started in 2019) is estimated at 30,169^{m2}.

The **production of individual housing represented 12 ktCO2e** in 2019 (Some carbon accounting rules write off these emissions over 30 years, the annual emissions related to these constructions would then be evaluated at 427 t CO2e.)

The total area of collective housing built in 2019 (or where work started in 2019) is estimated at 140,000^{m2}.

The **production of collective housing represented 94 ktCO2e** in 2019 (or 3.1 ktCO2e with a 30-year write-off period).

This heading therefore represents a total of approximately **106 ktCO2e** (without taking depreciation into account), i.e. 5.6% of total emissions for scopes 1 and 2.

3.5.3 WASTE PRODUCTS

In 2021, emissions from private waste in Marseilles was estimated at around **74.4 ktCO2e,** equivalent to almost 4% of the total emissions reported for scopes 1 and 2. The tonnages used for this estimate are specified at the bottom of the page. Further analysis procedures could be used to include professional waste in these analyses.

The uncertainties for this subject are high, and probably underestimated, the emissions related to business waste have not been assessed.

3.5.4 MOBILITY

In view of the available data, and in order to ensure consistency between the "land-parcel" approach and the "catchment area" approach explained above, Scope 3 emissions relating to mobility have been calculated on the basis of 3 themes:

- Emissions from **individual daily week day car journeys within a 100 km radius,** excluding emissions from movements inside the city centre.
- These are estimated at **1.8 MtC02e**, or approximately 91% of the total Scope 1 and 2 emissions.
- **Air transport emissions**. The estimate is based on the assumption that 40% of total emissions from air travel passing through the local airport (located outside Marseille) can be attributed to travel by Marseille residents or visitors to Marseille.

This therefore involves about 230 ktCO2e in emissions.

This assessment should be completed by the following data:

- Emissions from road travel over distances of more than 100 km
- Emissions from international maritime transport
- Emissions from rail transport outside Marseille

3.5.5 SCOPES 1, 2 AND 3 AND CARBON FOOTPRINT PER CAPITA

At first view and allowing for the uncertainties formulated above, the overall figures indicate total GHG emissions of around 6 MtCO2e, but this does not include certain key emission sources (consumption of goods and services, international logistics, etc.)

Within this largely underestimated configuration, scope 3 represents about 65% of the total.

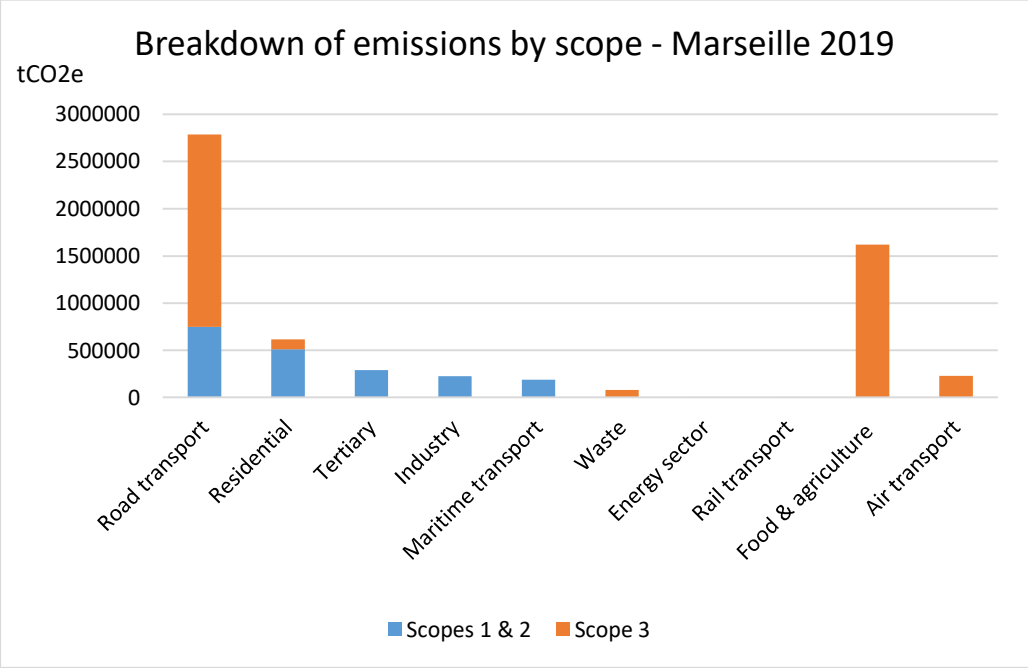


Figure 33 - Breakdown of emissions by scope - Marseille - 2019

➡ Important points

- The scope 3 emissions reconstituted in this document represent 65% of the total emissions for the three scopes and can be considered to be underestimated since certain emissions sources have yet to be assessed (consumption of goods and services in particular)
- The first issue is road transport, notably travel by Marseille residents outside of the region as well as that of visitors to Marseilles
- From a carbon footprint perspective, the second issue is food, a source of emissions over which local authorities have limited influence even if it is clearly very important that it be addressed
- A scope 3 assessment should be extended in future versions of the Climate City Contract to include: emissions associated with construction and public works waste & its reuse, service sector construction, maritime transport (international travel), consumption of goods and services.

3.6 CARBON SEQUESTRATION

In thinking about carbon neutrality, it is also important to assess current carbon storage in soils and biomass, as well as the annual sequestration flows. It would also be interesting to illustrate the issues relating to soil sealing and de-sealing.

Land use in the city of Marseille by ground surface type is characterised by the predominance of non-sealed artificial spaces (45%), followed by grasslands (29%). It should be noted that, at 16%, sealed surfaces remain in the minority.

using this data, and the ratios available in the ADO tool, the carbon stock contained in soils is estimated at **6,000,000 tCO2e**, with a maximum stock in grasslands (40%), and unsealed artificial spaces, such as parks (39%).

Carbon storage
6MtCO2e
in the ground

The main priority is therefore not to destroy this stock.

Beyond the notion of stock, it will be a question of positioning annual net sequestration in relation to annual GHG emissions. **Annual sequestration amounts to 17,900 tCO2e/year**, equivalent to 0.9% of scope 1 and 2 emissions, which amount to 1.98 MTeqCO2.

Annual sequestration of carbon
18 ktCO2e
per year

It should be noted that posidonia has a very high carbon storage capacity. In fact, 1 km2 of this plant could store up to 83,000 tCO2e, i.e. 3 times more than 1 km2 of forest.

Posidonia meadows are said to absorb 10% of the carbon captured by the oceans, even though they represent only 0.2% of their surface area.

1 km2 of stored posidonia
83,000 tCO2e
i.e. 3 times more than 1km2 of forest

The local Posidonia meadows currently cover an area of 107 ha around the Frioul archipelago and 414 ha around the Riou archipelago and along the Calanques coastline.

On the basis of these assumptions, the Posidonia meadows along the Marseilles coastline could store around 43 Mt CO2e, i.e. 7 times the carbon storage in the soil.

As the rate of growth of posidonia is extremely slow, this calls for the implementation of very strong conservations for this essential natural resource.

The annual net sequestration is broken down as follows:

- Wood products used within the territory (according to a ratio per number of inhabitants) sequester 20.7kteqCO_2/year, which is the largest item
- Forests sequester 9.3kteqCO_2/year
- Finally, wetlands sequester 1kteqCO_2/year

Finally, the urbanisation of land between 2012 and 2018, 60 ha of grassland and agricultural land, emitted an average of 9,300 tCO2e/year (i.e. the equivalent of 0.5% of annual emissions for scopes 1 and 2).

➡ Important points

- The carbon stored in Marseille's soil is significant (6MtCO2e), and there is a challenge to preserve it (zero urbanisation, forest conservation, etc.)
- In addition, the annual stored carbon flow is limited: 18 kTeq CO2/year, 0.25% of the territory's emissions, this flow could be increased by de-sealing the soil and planting trees.
- This last carbon sink covers only a small part of the city's emissions, therefore reducing the emissions themselves remains the major lever to be activated to move towards carbon neutrality.

By way of illustration, offsetting 25% of the emissions emitted in 2019 would be equivalent to removing 600 km2 of sealed surfaces, where the total surface area of Marseille is only 240 km2.

4. A2 - ASSESSMENT OF CURRENT STRATEGIES

4.1 A 2.1 AND A 2.2 - FRAMEWORK DOCUMENTS TO BE CONSIDERED

Firstly, the following diagram shows the relationships between the various framework documents provided by French legislation and regulations concerning air-energy-climate, from national to local council level:

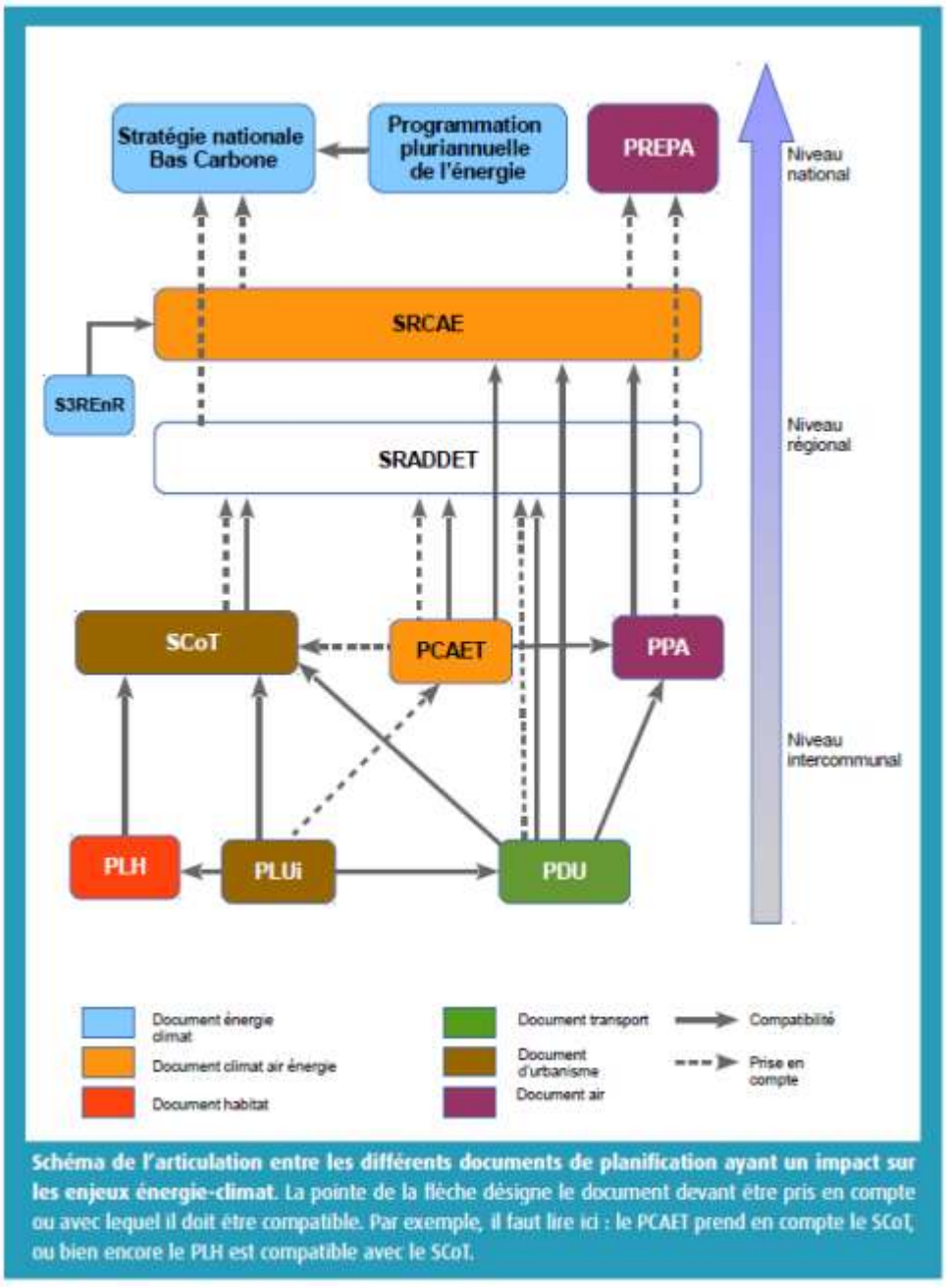


Figure 34 - Relations between air-energy-climate framework documents in France - CEREMA (additional note: the SRCAE ceased to exist in 2019, the 2021 climate and resilience law creates a link between the Pluriannual Energy Programme and the SRADDET, the PDU have been replaced by PDM which must be compatible with the PCAET)

This shows the principle of hierarchy: a local document (PCAEM) must integrate and be compatible with the SRADDET (Regional Plan for Territorial Planning, Sustainable Development and Equality), which itself must take integrate the Stratégie Nationale Bas Carbone (National Low Carbon Strategy) which, since April 2020, has been setting the national carbon neutrality target for 2050.

This second scheme positions the national objectives within the European landscape, its ambition is to achieve carbon neutrality by 2050, with a 55% reduction compared to 1990 emissions by 2030:

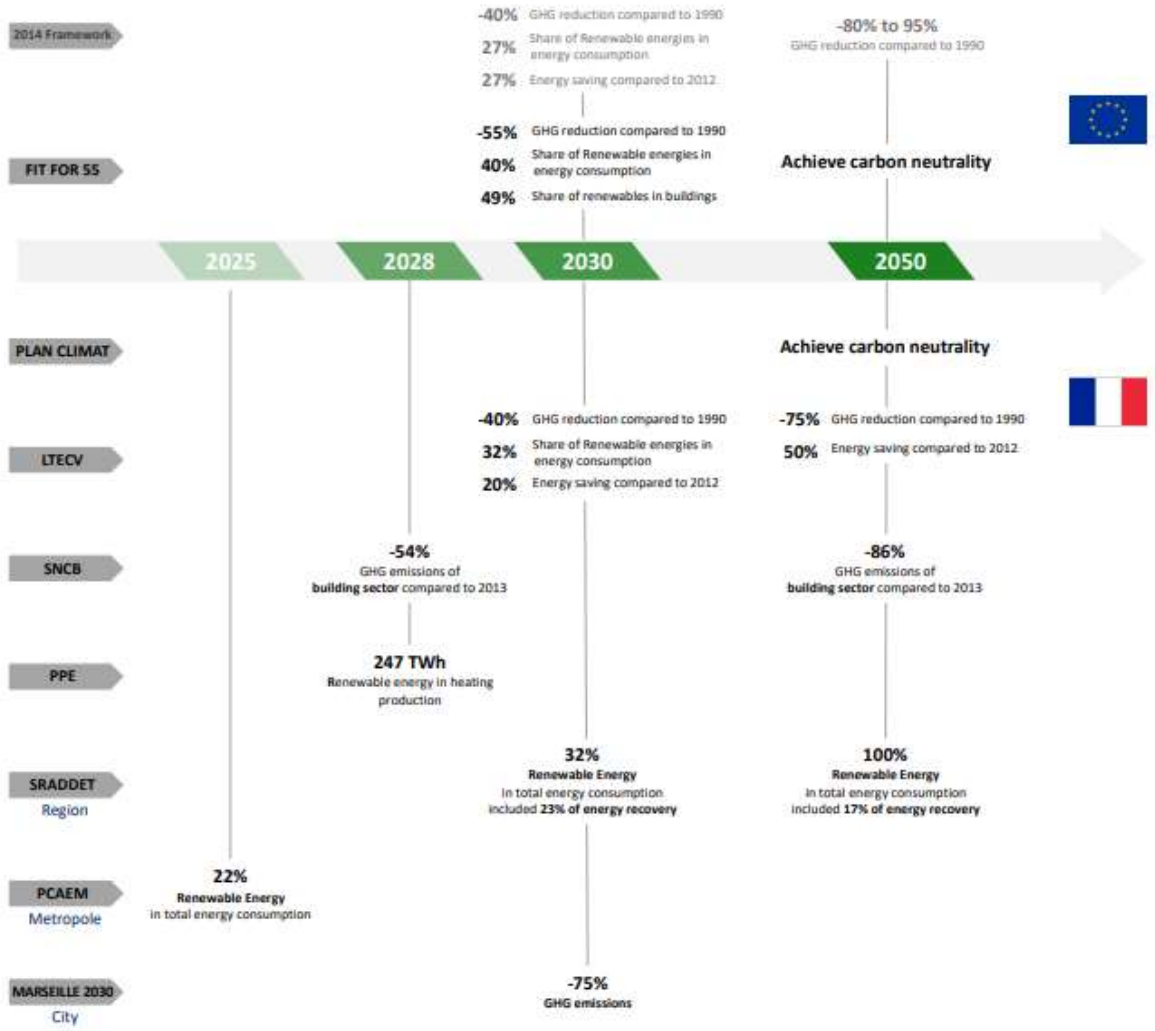


Figure 35 - Local, national and European targets for reducing GHG emissions - source: City of Marseille

The following table highlights the main framework documents influencing the City of Marseille's carbon strategy (non-exhaustive list from a legislative and regulatory point of view):

Level	Title	Energy and climate guidelines	Comments for CCC
European	Green Deal (2019) and Climate Package (2021)	Green Deal: Roadmap to a carbon neutral Europe by 2050 "Fit for fifty" climate package: 55% reduction in GHG emissions by 2030 compared to 1990 (instead of the previous target of -40%). Among the main strategic axes: • Introduction of a carbon tax at borders, • Circular Economy Action Plan • Development of a European climate law	Funding opportunities to be looked at and taken on by Marseille and all of its public and private partners.
European	European agreement on the end of hybrid engines - October 2022	Under the climate package, a ban on the sale of diesel, petrol and hybrid vehicles by 2035.	A contextual element which should be considered to reduce the use of private cars in the city centre, policies proposing alternatives to private cars, and more electric vehicles.
National	Law on energy and climate n°2019-1147 dated 08/11/2019	The Energy and Climate Law dated 8 November 2019 aims to respond to the ecological and climate emergency. It enshrines this emergency as well as the carbon neutrality objective of reducing greenhouse gas emissions by a factor of at least six by 2050 into the (French) energy law. The main objectives include • 40% reduction in fossil fuel consumption by 2030 (based on 2012 figures and compared to 30% previously); • the end of coal-fired power generation by 2022 • renovate class F and G (badly insulated) housing, by 2029 • establishment of the High Council for the Climate	Integration of the national objective of a 40% reduction in energy consumption by 2030, and the obligation to renovate badly insulated flats.
National	Energy and Climate Programming Law (LPEC -	Five-year law, from 2023, to set the main objectives of the PPE and the SNBC	

Level	Title	Energy and climate guidelines	Comments for CCC
	Loi de programmation sur l'énergie et le climat)		
National	National Low Carbon Strategy V2 (SNBC), set by decree n°2020-547 dated 21 April 2020.	Sets the national carbon neutrality targets for 2050, sets sector-specific carbon neutrality targets, and associated carbon budgets. Reviewed every 5 years.	As an indication, a "compatible SNBC" scenario is established by applying the sector-specific GHG emission reduction targets. The CCC should at least be compatible with the SNBC's 2030 objectives.
National	Pluriannual Energy Programming (PPE)	In order to achieve the energy policy objectives laid out in the (French) Energy Code (art. L 100-1, L 100-2 and L 100-4), the PPE presents the action orientations and priorities required for the management of all forms of energy within continental mainland France. The PPE must be compatible with the greenhouse gas emission reduction targets set by the carbon budgets, in particular for the energy sector, as well as with the National Low Carbon Strategy (SNBC). It covers 2 successive periods of 5 years. PPE1: 2016-2023, PPE2: 2019-2028 was approved on 21/04/2020. PPE 3 will cover the period 2024-2033.	Reference document for the national resources and priorities to be implemented to achieve the France's strategic energy objectives.
National	Law on Mobility Orientation ("LOM law") n°2019-1428 dated 24/12/2019	This law on mobility orientation radically reforms the general framework of mobility policies by integrating environmental issues. It was drawn up in response to the national conference on mobility and has four objectives: the end of dependencies on private cars, faster growth towards new forms of mobility, successful ecological transition, and planned investments in public transport. Among the measures: • carbon neutrality for land transport by 2050 • triple the use of cycles by 2024 • introduction of a sustainable mobility package (increased by the "Climate and Resilience" law) • a five-fold increase in public charging points by 2022	The Metropolis Mobility Plan (PDM) has been put together to integrate this law. Make the best use of the opportunity presented by the CCC to discuss new actions, accelerate implementation and review the ambitions of PDM actions.

Level	Title	Energy and climate guidelines	Comments for CCC
		• the possibility of deploying low emission zones (LEZ) • redirecting investment from the railways towards commuting services.	
National	Climate and resilience law n° 2021-1104 dated 22/08/2021	This law presents some of the Citizens' Climate Convention's 146 proposals to reduce greenhouse gas emissions by 40% before 2030, in a spirit of social justice and adopted by the French President. Obligation to respect the European commitment to a 55% reduction in emissions by 2030, compared to 1990 figures. Among the measures: • environmental labelling, development of bulk sales with an obligation for large retailers to devote 20% of their floor space to bulk sales by 2030 • additions to the LOM law with the creation of low-emission zones (LEZ) in urban areas with more than 150,000 inhabitants by the end of 2024, a ban on domestic flights where train alternatives of less than 2.5 hours exist, the sale of the most polluting new cars (emitting more than 95 gCO2/km) to be banned by 2030 and the most polluting new trucks, buses and coaches by 2040. • accelerating the renovation of badly insulated flats • Zero Artificialisation principle to be applied on the mainland by 2050.	Contextual elements to be taken into account in the CCC strategic orientations.
National	LAW No. 2023-175 dated 10 March 2023 on accelerating the production of renewable energy	The law aims to speed up procedures, release the necessary land (e.g. car parks, derelict land, motorway verges, etc.), accelerate offshore wind power and improve the financing of renewable energy projects.	This law could be a driving force for developing comprehensive and coordinated city-wide projects.
Regional	Regional Plan for Territorial Planning, Sustainable Development and Equality (Schéma Régional d'Aménagement, de Développement Durable	This was the first SRADDET to be adopted in France, it is a genuine framework document for local authorities which implements the National Low Carbon Strategy (SNBC). The region has demonstrated its willingness to set key objectives to push for carbon neutrality and a 75% reduction in greenhouse gas emissions by 2050. The main objectives include: • Reducing primary energy consumption by a factor of two between 2012 and 2050, including the renovation of half of the older housing units by 2050	The CCC's climate commitments are compatible with the SRADDET objectives, allowing certain carbon neutrality commitments to be accelerated. The Region, in keeping with the SRADDET, is already

Level	Title	Energy and climate guidelines	Comments for CCC
	et d'Egalité des Territoires - SRADDET), approved on 15 October 2019	• Meet all energy needs with renewable and recovered energy: hydroelectricity, photovoltaic, offshore wind, wood energy, heat recovery, etc., with a first step in 2030: multiply the production of renewable energy by a factor of 9 compared to 2012. • A twofold increase in the number of passengers using regional transport • A 75% reduction in GHG emissions from the transport sector by 2050, with a 15% reduction target for private car emissions • Support innovation, especially for the development of exemplary local and regional government planning practices.	funding some of the CCC actions.

Level	Title	Energy and climate guidelines	Comments for CCC
Metropolitan	Metropolitan Climate Air and Energy Plan (PCAEM), adopted in 2021	In terms of climate, the main objective is a 21% reduction in greenhouse gas emissions by 2030, with a 75% reduction by 2050. The strategy is based on 13 major axes, involving 100 key actions: - Axis 1: Exemplarity to be placed at the heart of public action on all levels - Axis 2: Promotion of resilient development in the face of climate change - Axis 3: Proposition of genuine sustainable mobility alternatives - Axis 4: Support for the transition of economic forces - Axis 5: Stricter climate-air-energy targets for port and airport activities - Axis 6: Management of the impact of air, energy and noise on facilities and buildings - Axis 7: Development of an energy mix based on renewable and recovered energy sources - Axis 8: Actions in favour of waste prevention and optimised re-use - Axis 9: Support for more sustainable agriculture and food practices - Axis 10: Protection and optimised management of water resources - Axis 11: Conservation of biodiversity, natural resources and aquatic and terrestrial environments - Axis 12: Mobilisation of all involved parties on the mainland's climate-air-energy issues - Axis 13: Effective leadership of the metropolitan climate plan process	The PCAEM will be one of the foundations of the CCC. It lays the foundations for the "Business as usual" scenario, a scenario which must be strengthened to achieve carbon neutrality, a more ambitious objective than the PCAEM.
Metropolitan	Mobility plan	In close collaboration with the City of Marseille, all of the local municipalities and the Southern Region, the Metropolis is developing the 2020-2030 Mobility Plan. 17 ambitious objectives have been selected, each contributing action to cope with the climate emergency, these include: - Between 2012 and 2030, a 28% reduction in greenhouse gas emissions and a 29% reduction in energy consumption by the transport sector - A doubling of the use of metropolitan transport and a 50% increase in the use of urban public transport - A bicycle use to be increased to 7%, compared to only 1% in 2017.	The PDM will be part of the foundations of the CCC. It includes the foundations for the "Business as usual" scenario, a scenario which must be strengthened to achieve carbon neutrality, a more ambitious objective than the PCAEM.

Level	Title	Energy and climate guidelines	Comments for CCC
Municipal, with a European scope	Covenant of Mayors, signed in October 2021.	The City of Marseille signed the Covenant of Mayors, including its 2050 carbon neutrality, resilience, and the anti-fuel poverty objectives.	The CCC will be the operational expression of this commitment.

4.2 A-2-3: GAPS TO BE BRIDGED ON THE WAY TO CARBON NEUTRALITY: WHERE ARE WE STARTING FROM? WHERE ARE WE GOING?

4.2.1 METHOD

It should be remembered that this analysis only covers Scope 1 & 2 emissions.

The assessment of the "gaps to be bridged" to reach carbon neutrality involved three stages:

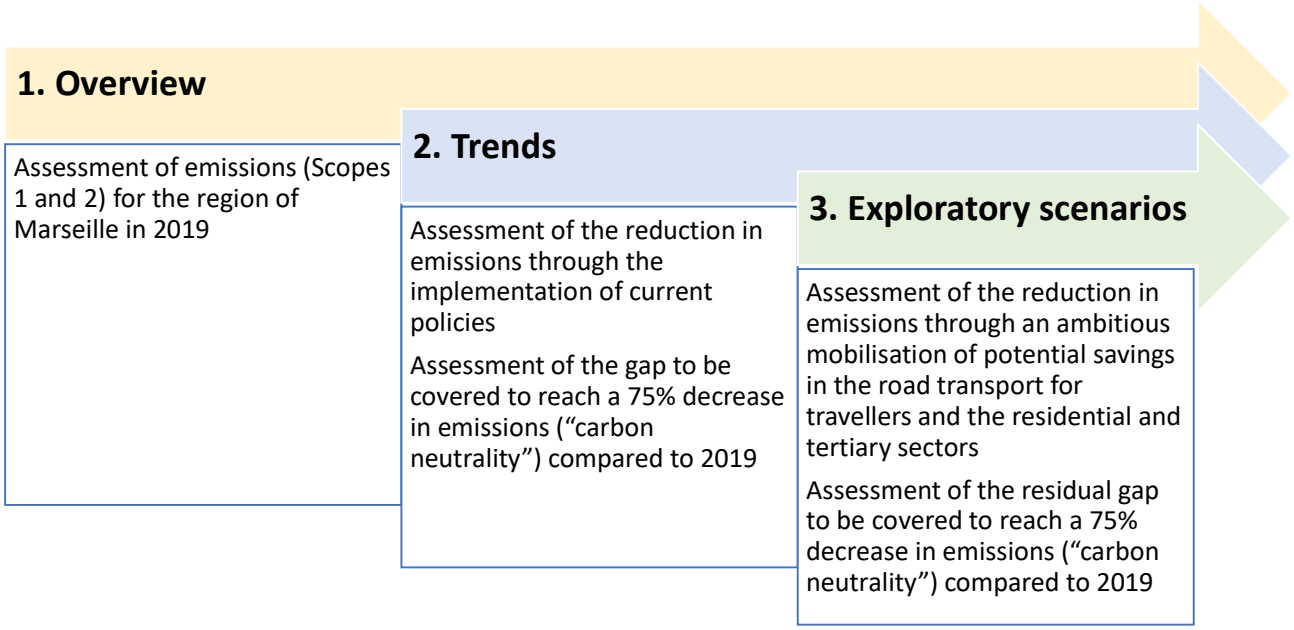


Figure 36 - Methodological overview for estimating gains and gaps to be bridged - INDDIGO

Analysis steps 1 & 2 are presented below.

Analysis step 3, consisting of exploratory scenarios, is presented in chapter 3.3.1 "Opportunities".

4.2.2 CURRENT STRATEGY TRENDS: WHAT GAINS? WHAT ARE THE GAPS BETWEEN HERE AND CARBON NEUTRALITY?

The following table shows the projected gains from the local, regional and national policies currently in place, and the gap that remains to be bridged over and above these gains to achieve carbon neutrality, i.e. a reduction in greenhouse gas emissions of 75% compared to 2019, the reference year.

Tendanciel

25%

de gains d'émissions par rapport à 2019

	Overview		Goal			Trend				Gap	
Sector	**2019**		**Carbon neutrality in 2030:** -75% of all emissions in all sectors, sequestration of residual emissions (25%)			**Trend in 2030: current policies**				**Gaps to be filled between trends and carbon neutrality**	
	Emissions in tCO2e	%	Emission targets tCO2e	Reduction targets tC02e/2019	Compensation targets: 25% maximum	Emission targets tCO2e	Reduction targets tC02e/2019	Reduction targets % / 2019	Reference	Reduction gaps tCO2e	% difference in target reductions
Road transport	747 900	37,8%	187 000	-560 900	-187 000	544 400	-203 500	-27%	PDM : -28% /2017	-357 400	-48%
Residential	508 100	25,7%	127 000	-381 100	-127 000	382 700	-125 500	-24%	Development on the fly	-255 600	-51%
Tertiary	291 000	14,7%	72 800	-218 300	-72 800	229 300	-61 800	-21%	PCAEM : -28%/2012	-156 500	-96%
Industry	226 400	11,5%	56 600	-169 800	-56 600	159 800	-66 500	-29%	Development on the fly	-103 200	-46%
Maritime transport	187 300	9,5%	46 800	-140 400	-46 800	152 400	-34 900	-19%	Development on the fly	-105 600	-56%
Waste	5 500	0,3%	1 400	-4 100	-1 400	5 500	0	0%	Development on the fly	-4 100	-75%
Energy sector	5 300	0,3%	1 300	-4 000	-1 300	4 500	-800	-15%	Maintaining 2012 level	-3 200	-60%
Rail transport	4 500	0,2%	1 100	-3 300	-1 100	3 800	-700	-16%	Maintaining 2012 level	-2 600	-59%
Agriculture	600	0,0%	160	-500	-200	700	20	-2%	Maintaining 2012 level	-500	-73%
Total Sc 1 and 2 emssions	1 976 600	100,0%	494 100	-1 482 400	-494 200	1 483 100	-493 600	-25%		-988 700	-50%

Table 4 - trend gains and gaps to be bridges before reaching carbon neutrality by 2030, according to current policies - INDDIGO

➡ Important points

- According to our estimates, emissions in 2030 should fall by 25%, compared to 2019, with the current policies put in place, notably the mobility plan, the metropolitan climate and energy plan, along with regional and national policies.
- The gap to be bridged is therefore 50%

The table in Appendix 2, provides details on the estimation of these gains for information purposes only.

4.3 A3 - SYSTEMIC BARRIERS AND OPPORTUNITIES ASSOCIATED WITH ACHIEVING CARBON NEUTRALITY

4.3.1 OPPORTUNITIES TO ACHIEVE CARBON NEUTRALITY: EXPLORATORY SCENARIOS

Major transformations will have to be made to head towards carbon neutrality. The initial works presented within the framework of the City Climate Contract focus on the territory's direct emissions (Scopes 1 & 2) and the 3 highest emitting sectors: personal mobility, residential and services.

In a second phase, an analysis of freight transport and local industry should be added to achieve a complete vision of possible evolutions to the territory's direct emissions (Scope 1 & 2).

Furthermore, the reduction of indirect emissions (Scope 3) will be a major task, impossible to achieve in the short term.

There follows a detailed account of the thinking behind the project, including some initial financial information. The scenarios are referred to as "ambitious exploratory" because they will involve major transformations.

These analyses were carried out to measure how global carbon neutrality objectives can be transposed to a very local, urban scale. They have not been modelled, as have other large-scale exercises (Negawatt, ADEME's Transition 2050, SNBC scenarios, etc.), they are the result of estimates by experts in the field, which make it possible to grasp the masses involved.

4.3.1.1 Ambitious exploratory scenario for personal mobility

This scenario was developed using mobility data for Marseille, with a "catchment area" approach..

This approach has made it possible to estimate the GHG emission gains obtained by using certain levers in a very ambitious way to reduce emissions relating to daily travel within the Marseille catchment area on weekdays.

The working hypotheses are as follows:

- Inclusion of travel within the Marseille urban centre,
- Partial inclusion of GHGs related to trade flows, within a 100 km radius
- Transit emissions are not included, but appear to be negligible
- Only emissions from private cars for weekday travel have been included.
- Individual mobility will decrease slightly, with a relatively limited impact on GHG, and there will be a slight population growth, also with a limited impact: these 2 effects are expected to cancel each other out.

The levers selected are the following:

- 30% of the vehicle fleet will be electric powered by 2030, this is the expected national trend. For the record, the MDP assumption is 10% by 2030 (which was the expected national trend at the time the MDP was drawn up but which was re-evaluated in 2022). Also for the record, a European agreement signed in October 2022 projects a total ban on the sale of diesel, petrol and hybrid vehicles by 2035.
- Implementation of the PDME/PDMA/PDMS actions
- 50% of urban buses and 25% of coaches will be electric (low hypothesis considering the objective of a 100% electric fleet in the territory by 2030)
- Increase car use efficiency to 10% (carpooling) with a focus on commuting
- Increase in alternative travel methods to the car (except walking, as there is a slight shift from walking to cycling and public transport).

- very strong shift in the share of cycling (from 2 to 15% for Marseille, compared to the 12% target of the MDP),
- a marked increase in the use of public transport (from 16 to 23%).

- To achieve this degree of cycling use, 1,100 km of cycling facilities would need to be developed in Marseille by 2030 (€300M cycling plan)
- Option: Speed limit reduction to 10 km/h on expressway - additional 2% gain on the whole road sector.

Changes to modal shares for this exploratory scenario can be shown as follows:

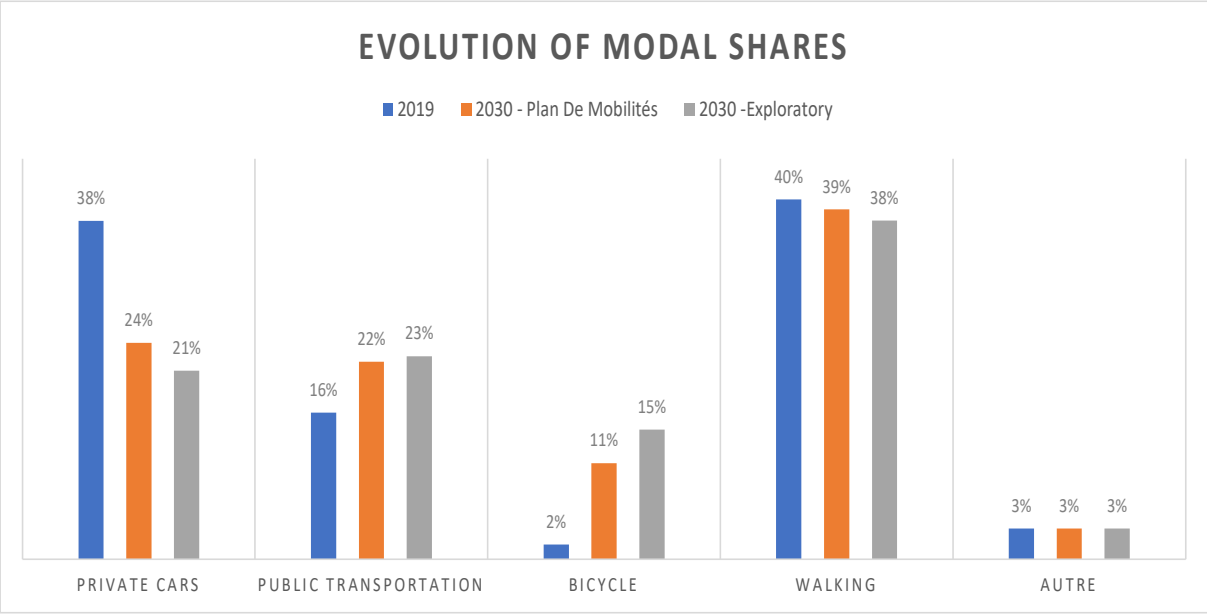


Figure 37 - changes to modal shares for the exploratory mobility scenario - source AGAM and INDDIGO 2022

A table with more detailed figures is provided in Appendix 3.

In conclusion, the potential for reducing emissions through the daily use of private cars on weekdays is estimated at almost 60%.

Exploratory scenario for mobility

60%

reduction in emissions for the road sector/ 2019

➡ Important points

- By pushing the modal shares of public transport, cycling and car-pooling to the maximum, and assuming a transformation of the vehicle fleet to 30% electric, the gain in GHG emissions relative to the use of individual cars during the week (with a catchment area approach) would be around 60%.
- As regards cycling, a 15% modal share means building 700 km of cycle lanes or paths by 2030 (out of the 1,500 km of roads in Marseille) and in addition to the 130 km already planned in the PDM, i.e. 200 million euros.
- This gain is extrapolated to 60% for the whole road sector
- For distances greater than 15 km, the priority issues are:
  - Issue 1: modal shift to interurban public transport and sobriety,
  - Issue 2: support policy for electric vehicles to be redefined

        - Issue 3: carpooling
    - For distances less than 7.5 km, the issues are :
        - Issue 1: cycling plan to be strengthened
        - Issue 2: reducing traffic in the city centre
    - The city climate contract is an opportunity to continue investigating the most effective levers, to accelerate some of the MDP actions by strengthening their ambition, and to envisage new structural actions.

The feasibility analysis of the levers explored in these scenarios must be the subjected to additional collective analyses to identify more precisely the associated actions that will enable their successful implementation.

4.3.1.2 Ambitious exploratory scenario for the residential sector

In the same vein, an estimate of the emission reduction potential of the existing residential sector with the implementation of ambitious levers has been established.

The working hypotheses are as follows:

- Weighted GHG emissions shares for individual houses and collective housing units: 29% and 71% respectively
- Number of individual houses: 72,061
- Number of collective housing units: 379,091

The selected levers are the following:

- Energy renovation of 30% of individual houses and flats by 2030, with a 50% reduction target for heating consumption.

This means comprehensive and efficient renovation works, to BBC renovation level, on approximately 21,600 houses and 3,800 apartment buildings (with an average of 30 apartments per building) over 7 years, i.e. between 2,000 and 4,000 houses and 400 to 800 buildings per year.)

- Changes to the energy mix by 2030, based on a drastic reduction of fossil fuels and a major development of heat and cooling networks
    - Petroleum products: from 10% to 0%, i.e. a total ban
    - LPG: from 2% to 0%, i.e. a total ban
    - Natural gas: from 58% to 20%, i.e. reduction by a factor of 3
    - Individual wood energy: from 9% to 10%, i.e. maintaining the current share
    - Local heating networks: from 9% to 40%, 80% from renewable energy sources and 20% from natural gas. The network share would supply the equivalent of 50,000 housing units/year.

The potential for renewable energies should be investigated in greater detail as part of a master plan for the heating networks.

    - Electricity: increase from 12 to 30%, i.e. by a factor of almost 3, this allows for an increase in the use of heat pumps
- Sobriety actions: lowering temperature settings, switching off electrical appliances, reducing certain household appliances, reducing domestic hot water consumption, etc.

The potential gain from residential sector energy efficiency improvements and energy mix changes is estimated at 25% of the sector's total emissions, this can be broken down as follows:

- ¾ of these gains would come from the energy renovation of 30% of the territory's housing units

- The other 1/4 of the gains would come from greening up the energy mix.

Potential additional gains from energy efficiency actions is estimated at 20%.

Thus, this ambitious exploratory scenario could lead to a 45% reduction in residential sector emissions.

Exploratory scenario for residential sector

45%

reduction in emissions for the residential sector/2019

An initial look at the financial aspects of the approach would be as follows

- Energy renovation of 30% of the territory's housing units: around €4.5 billion
- Development of 100 km of heating and cooling networks: €200 M, to which must be added investments in production units, as well as the costs of necessary works on residential buildings
- Household energy efficiency and sobriety actions: M€ 120

➡ Important points:

➡ The proposed exploratory scenario could lead to a 45% reduction in residential sector emissions, from the following levers:

- Simple and inexpensive energy efficiency and sobriety actions: gain of around 20%
- Massive acceleration in energy renovation works: 2,000 to 4,000 houses and 400 to 800 residential buildings per year on average by 2030, targeting the least energy-efficient housing first
- Through the accelerated development of urban heating networks, 80% of which will be supplied by renewable energy sources, to provide approximately 500 GWh by 2030, i.e. 40% of residential needs, or approximately 50,000 housing units: a key issue for the territory, with very significant potential and proven efficiency.
- In addition, reduce emissions related to domestic hot water consumption through energy saving actions and renewable energy sources.

4.3.1.3Ambitious exploratory scenario for the service sector

Finally, an ambitious exploratory scenario is proposed for the third largest emitter of greenhouse gas emissions, the service sector.

Reminder: heating accounts for 39% of the sector's emissions.

The selected levers are the following:

- Implementation of the service sector decree for all public and private service sector buildings, including buildings of less than 1,000 m2, a reduction of 40% by 2030, through energy renovation works and other energy efficiency actions, and the implementation of sobriety plans
- Changes to the energy mix, with variations according to the type of building, based on the following principles:
  - No more fuel oil
  - Reduction in the use of natural gas by a factor of 2
  - Development of a heating network, 80% of which will be supplied by renewable energy sources

Greenhouse gas emission gains from renovation works to the sector's buildings are estimated at 19%, to which should be added the emission reductions from greening up the energy mix which should come to about 8%, this should come to a total gain of 30% for service sector emissions.

The gains associated with sobriety measures are estimated to be around 20%.

Thus, this ambitious exploratory scenario could lead to a reduction of around 50% in service sector emissions.

Exploratory scenario for tertiary sector

50%

reduction in emissions for the tertiary sector/2019

- Important points
- The proposed exploratory scenario could lead to a 50% reduction in service sector emissions, through the application of the following levers:
  - Simple and inexpensive energy efficiency and sobriety actions: gain of around 20%
  - Energy renovation works on the sector's buildings leading to a 40% reduction in energy consumption for heating
  - Through the accelerated development of district heating networks, and a drastic reduction in fossil fuels

4.3.1.4 Exploratory scenarios for other sectors

Further exploratory work can be established in a future version of the contract.

4.3.2 CONCLUSIONS OF THE EXPLORATORY SCENARIOS AND GAPS TO BE BRIDGED

This third stage, known as the "Exploratory Scenarios", has therefore made it possible to achieve a vision of the scale of possible emissions gains that could result from an ambitious mobilisation of potentials: this gain would be around 55% (53%) of emissions compared to those of 2019.

Exploratory scenarios

55%

reduction in emissions compared to 2019

For the record, the main levers to be mobilised are:

- For distances over 15 km: modal shift to interurban public transport, review of policy to support electric vehicles, carpooling
- For distances of less than 7.5 km: bicycle plan to be reinforced, reducing traffic in the city centre
- Energy sobriety in all sectors
- The deployment of energy efficiency measures, and in particular the global energy renovation works on 30% of residential units, the renovation of service sector infrastructure to reduce energy consumption for heating by 40%
- The development of heating networks, to provide 40% of total energy requirements for residential use, along with a greening up of the sector,
- No more fuel oil usage and a drastic reduction in the use of natural gas.

The following graph illustrates these issues, globally and by sector:

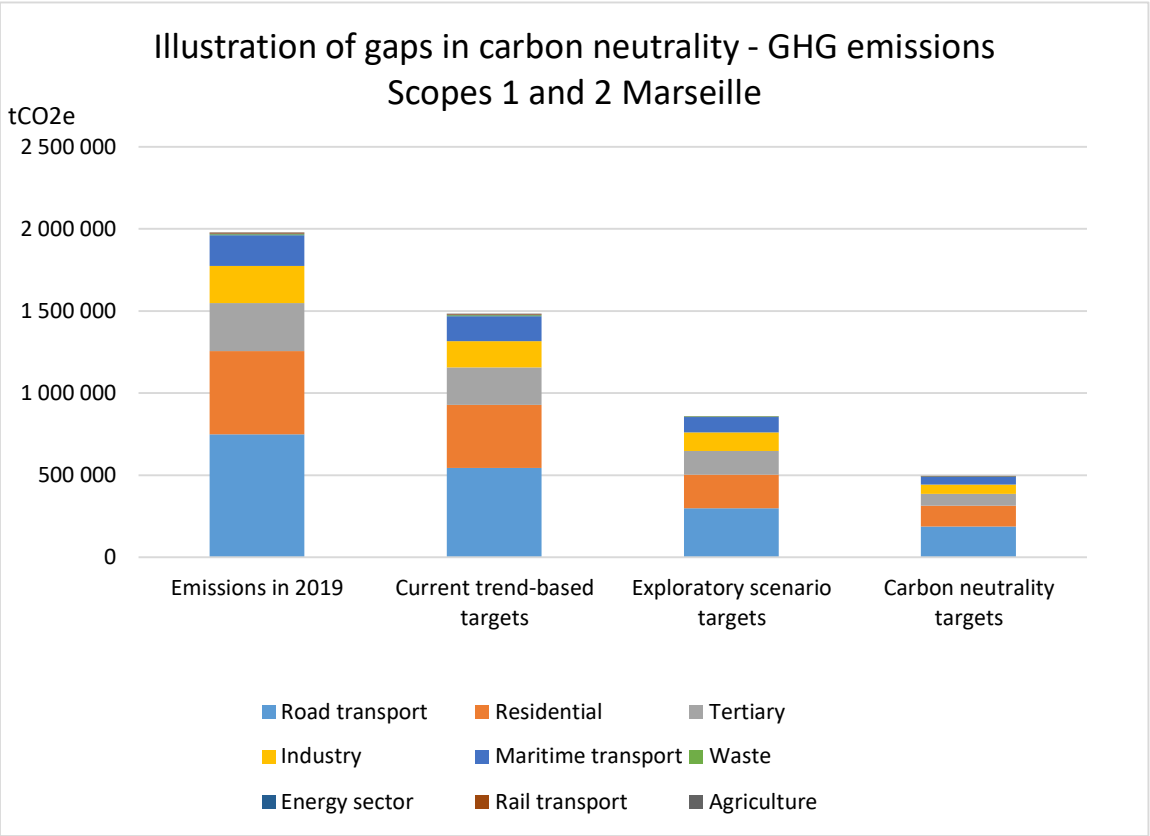


Figure 38 - - Global and sector -specific illustration of the gaps on the way to carbon neutrality - GHG emissions Scopes 1 and 2 - Marseille - Data ATMO, AGAM, INDDIGO

	Overview		Goal			Exploratory scenarios			Residual gap	
Sector	**2019**		**Carbon neutrality in 2030:** -75% of all emissions in all sectors, sequestration of residual emissions (25%)			**Ambitious mobilisation of potential Exploratory sc drawn up in the frame of the CCC**			Residual gap to achieve carbon neutrality, even with full use of potential identified	
	Emissions in tCO2e	%	Emission targets tCO2e	Reduction targets tC02e/2019	Compensation targets: 25% maximum	Reduction potential in tCO2e/2019	% of reduction/ 2019	Reference	Reduction gaps in tCO2e	% difference in target reductions
Road transport	747 900	37,8%	187 000	-560 900	-187 000	-448 700	-60%	Exploratory scenario	-112 200	-15%
Residential	508 100	25,7%	127 000	-381 100	-127 000	-228 600	-45%	Exploratory scenario	-152 500	-30%
Tertiary	291 000	14,7%	72 800	-218 300	-72 800	-145 500	-50%	Exploratory scenario	-72 800	-25%
Industry	226 400	11,5%	56 600	-169 800	-56 600	-113 200	-50%	Hypothesis	-56 600	-25%
Maritime transport	187 300	9,5%	46 800	-140 400	-46 800	-93 600	-50%	Hypothesis	-46 800	-25%
Waste	5 500	0,3%	1 400	-4 100	-1 400	-2 700	-50%	Hypothesis	-1 400	-25%
Energy sector	5 300	0,3%	1 300	-4 000	-1 300	-5 300	-100%	100%RES	1 300	25%
Rail transport	4 500	0,2%	1 100	-3 300	-1 100	-4 500	-100%	100% Electric	1 200	25%
Agriculture	600	0,0%	160	-500	-200	-300	-50%	Accelerated AFTERRES sc	-200	-25%
Total Sc 1 and 2 emssions	1 976 600	100,0%	494 100	-1 482 400	-494 200	-1 042 400	-53%		-440 000	-22%

Table 5 - Emissions gains and residual gaps on the way to carbon neutrality in 2030, according to the exploratory scenarios - INDDIGO

Appendix 3 contains a table detailing the how the exploratory scenarios were put together.

➡ Important points

- Current trends illustrate the gains that can be achieved through current strategies (PCAEM and PDM in particular), and the observed and expected changes that could come from regional and national policies: the reduction in emissions is estimated at -25% in 2030 compared to 2019. The gap is therefore a further 50% in gains before reaching carbon neutrality in 2030.
- The exploratory scenarios illustrate the possibility of reducing emissions by almost 55% by 2030 compared to 2019. These potentials are very ambitious and require substantial financial, human, technical and political resources.
- If all these potentials are mobilised, there would remain a residual gap of around 20% (22%) of emission reductions to reach carbon neutrality (keeping 25% of emission offset).
- The potentials already identified here and the search for other new potentials, will be the subject of more in-depth studies to be completed during 2023, along with a strengthened partnership between the CCC sponsors, in order to enhance the Climate City Contract with ever more ambitious actions, with support from the national government and Europe.

4.3.3 THEMATIC AND SYSTEMIC BARRIERS

The main barriers identified by theme are the following:

Passenger mobility:

- A strong local culture of car use and difficult access to many local employment sites without a car. The introduction of constraints to reduce the use of private cars must therefore be accompanied by actions aimed at offering alternative mobility solutions of at least equivalent theoretical capacity along with specific support in terms of change of use and awareness.
- Switching to electric vehicles: uncertainty about environmental impacts other than carbon that continue to raise questions (extractivism and the real recycling potential), the cost of electric vehicles is too high for many households (and the supply of second-hand vehicles is still limited), reinforced by uncertainty about the cost of electricity, and the unavailability of recharging points in public spaces, combined with the complexity or even the impossibility of deploying recharging systems in some private car-parks.
- Development of cycling: a strong feeling of insecurity both in use and when parking in public spaces.
- Modal shift to public transport: still limited on many routes
- In addition to the significant investments required, there is a lack of human resources to manage projects and programmes (bicycle plan, studies related to the deployment of heavy transport, etc.)

Logistics:

- Structural projects must be deployed to enable the development of rail freight
- There is no significant incentive to switch fleets to electric or bio NGV
- Cycle logistics: there is no strong local regulatory incentive, distribution platform sites are difficult to find
- Collective use of transport infrastructure (e.g. night tram) could be explored in greater detail

Residential Energy Retrofit:

- Incentives for renovation works are limited by a partial regulatory constraint (RT only applies in case of heavy renovation works). Households with the financial means still prefer comfort renovations over energy renovations.
- Collective housing units remain highly complex in terms of the number of involved parties
- No zero-interest financing tools available
- Outstanding debts for high value energy renovation works
- Lack of access to accurate and high quality advice
- Lack of strong regulatory or fiscal constraints, difficulties in implementing such constraints without also allowing for social criteria
- Lack of qualified professionals to meet the demand
- Works in the historic city centre remain complex

Energy renovation on service sector buildings

- Regulatory constraints being implemented via the service sector decree, will the impact of the regulations be sufficient?
- Technical difficulties in monitoring the energy performance of asset portfolios
- Distribution of responsibilities between the owner (who should invest but is not confronted with energy costs) and the tenant (confronted with energy costs but unable to plan investments with ROI beyond 15 or 30 years)
- Lack of access to accurate and high quality advice
- Lack of resources to manage projects

From a **systemic point of view**, the barriers can be considered as follows:

- **The constraints are not strong enough** to induce the changes necessary for energy transition, both for mobility or energy renovation works
- The profound changes needed affect the concepts of individual freedom and comfort which remain obstacles to change even when faced with the climate emergency
- The introduction of further constraints remains complicated considering the uncertainties regarding **social acceptability and the capacity to support these constraints** without increasing the hardship for certain sectors of the population of Marseille.
- The lack of **investment financing capacity** for these transition actions will be a major obstacle.
- Associated with this is incapacity to **dedicate resources for managing energy transition projects**. More generally, the territory lacks the means to develop the appropriate technical engineering and financial capacities.
- The time required for administrative procedures, although necessary, is in some cases a hindrance to the implementation of projects, particularly in the field of renewable energy
- Decision-making processes requires time for appropriation, acclimatisation and consultation, hence the importance of setting up an ambitious but effective CCC management system.

5. B - PATHWAYS TO CARBON NEUTRALITY IN 2030

5.1 B.1-SCENARIOS FOR ACHIEVING CARBON NEUTRALITY

5.1.1 REDUCTION OF SCOPE 1 AND 2 EMISSIONS

The collective commitment is to commit to a drastic reduction in GHG emissions for the Marseille territory by 2030. The first exploratory scenarios were put together collaboratively to propose a trajectory towards reducing direct GHG emissions by 50% compared to 2019. New actions will be added to the plan at a later stage as part of its on-going, systemic and socially inclusive approach.

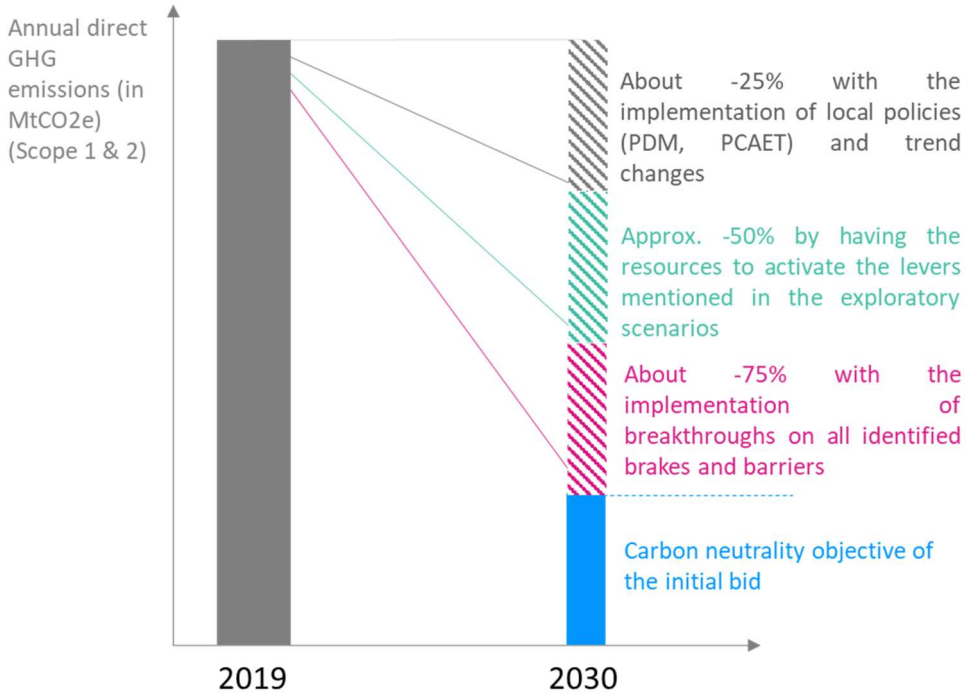


Figure 39 - Pathway to carbon neutrality for the city of Marseille by 2030

Thematic	**Main brakes and barriers**	**Areas of work** (not necessarily supported by local authorities**)**
On the scenarios aiming at -25% by 2030		
Mobility: passengers - implementation of MDP projects	Availability of funding for projects programmed in the MDP Local culture giving an important place to the car and insecurity of alternative mobility practices	Mobilisation of subsidies and financial mechanisms to secure the implementation of projects Awareness-raising and education, telling the story of a low-carbon Marseille 2030, demonstration in pilot districts
Mobility: logistics - implementation of action plan projects	Weak regulatory incentives, Unavailability of human resources to support projects Limited land reserves	Identification of local incentives Mobilisation of subsidies and financial mechanisms to secure the implementation of projects Modification of urban planning documents
Tertiary energy renovation	Limited funding capacity of actors	Mobilisation of financial mechanisms such as third-party financing

Residential energy renovation	Regulations not incentive enough (and uncertainty about the impact of the obligation to renovate thermal flats) Limited financing capacity of individuals Lack of expertise in quality comprehensive renovations	Research into innovative third-party financing mechanisms Regional actions on key professional sectors
On the exploratory scenarios aiming at -50% by 2030 <u>in addition to the above</u>		
Mobility: passengers - acceleration on soft levers: cycling, carpooling, electric vehicles (EV), and incentives for modal shift	Limited funding and HR capacity Social context not conducive to accelerating EV penetration	Mobilisation of subsidies and financial mechanisms to secure the realisation of projects, identification of low-cost deployable solutions Setting the scene for a decarbonised Marseille 2030 Identification of socially targeted financing solutions
Mobility: logistics	*Not identified at this stage*	*Not identified at this stage*
Energy renovation in the tertiary sector - 40% reduction in energy consumption for the entire tertiary sector	Uncertainty on capacity No regulatory incentive for areas under 1000m2	*Not identified at this stage*
Residential energy renovation - achieving 30% of homes renovated and accelerating on RDCF	No regulatory incentives and inability of households to finance renovations RDCF: Limited HR capacity &. Long deployment times for delegation/concessions/etc.	Request for derogations to experiment with innovative schemes integrating constraints and financing solutions adapted to each type of household Setting the scene for a decarbonised Marseille 2030
Relating to a -75% scenario by 2030 <u>in addition to the above</u>		
Mobility: passengers	Structural projects for post-2030 modal shift (LNPCA in particular) Pace of EV penetration needed out of reach Urbanistic changes impossible in a short time	*Breaks to be identified* *Search for innovative solutions for additional funding (especially European)*
Mobility: logistics	Penetration rate of heavy duty electric vehicles/H2 needed out of range	*Breaks to be identified* *Search for innovative solutions for additional funding (especially European)*
Tertiary energy renovation	Pace of renovation currently out of reach	*Breaks to be identified* *Search for innovative solutions for additional funding (especially European)*

Residential energy renovation	Pace of renovation currently out of reach	*Breaks to be identified* *Search for innovative solutions for additional funding (especially European)*

Brakes	Work areas
Massive lack of financial resources for local authorities (public space planning, transport infrastructure development, energy renovation of heritage, etc.) **and public/private actors** (energy renovation, vehicle electrification, etc.)	Improve the mobilisation of existing financing tools, Innovate on financial tools in partnership with public and private banks Develop breakthroughs with lower cost solutions (e.g. tactical urban planning, mutualisation of infrastructure use on tram-freight, etc.).
Regulatory constraints not incentive enough (national or European)	Ask for derogations to experiment with innovative arrangements (integrating constraint and solution) and use political visibility to push for changes in the frameworks
Lack of financial resources of households (electric vehicle, energy renovation, etc.)	Mobilise subsidies with a priority focus on low-income households
Lack of human resources to manage transition projects and programmes	Search for structural mechanisms to finance operating expenses, internal work with human resources to support reorientation in key positions (e.g. internal campus), training plan for transition professions Optimising project management and monitoring with digital technology
Lack of coherence of national objectives and strategies (economic recovery, housing/building, zero land reclamation, adaptation, resilience, renaturation, tourism)	Expertise, digital and cartographic tools to arbitrate on conflicts of use
Complexity of public & private actors	Amplify shared governance, clarify shared responsibilities, create a framework for collective commitment
Difficulty in mobilising land for key projects (logistics, waste, renewable energy, etc.)	Benchmark with solutions implemented in other cities Improve the integration of land demands for low-carbon solutions into changes to planning documents
Social acceptability of transition measures and local culture	Increase awareness, develop events (e.g. pedestrianisation as part of Sundays on the Canebière or the Marseilles summer) Develop a narrative on "Marseille 2030, a low-carbon city Creation of consultation mechanisms (Citizens' Assembly of the Future, etc.) and mobilisation of existing mechanisms (Metropolitan Development Council, Municipal Youth Council, etc.)
Questioning the environmental impact - carbon footprint, water, materials, etc. - transition solutions (electric cars, solar panels, etc.)	Promote the circular economy - recovery, reuse, repair - and make it visible

Lack of expertise	Mobilisation of regional observatories (ORECA, ATMO, etc.) and national expertise centres (Cerema, ADEME, etc.) Improving the sharing of expertise between communities

5.1.2 B 1.3 SUMMARY OF THE CARBON OFFSET STRATEGY

The initial works highlighted the importance of the carbon stored in Marseille's soil, the importance of its conservation (zero net artificialisation) and contributing to its increase (development of nature in the city, de-sealing).

At the same time, work is underway on posidonia and its contribution to local and global carbon sinks.

Further work is needed to define a coherent carbon offset strategy and establish the role that Marseille can play in maintaining and increasing global carbon sinks.

5.2 B2 - CARBON NEUTRALITY PORTFOLIO

5.2.1 ORGANISATION

The portfolio is organised around 8 key issues specific to Marseille, the Aix-Marseille Metropolis and the Southern Region.

For each of the themes and actions, the context and the territory's carbon neutrality challenges will be reiterated in the "Description" and "Carbon neutrality challenges" boxes.

Each theme is organised as follows:

- Main axes, highlighting either a targeted or a subjective approach
- Numbered actions, which constitute "umbrella actions", themselves integrating different projects run by the City, the Metropolis, the Region, or partners such as local businesses, NGOs, public bodies, etc.

The following table is a summary of the portfolio and contains the key information. It is complemented by a series of "Action Sheets" included in the appendix to this document.

Each "Action Sheet" presents the actions in detail, highlighting the involvement of a very wide range of partners, all committed to this carbon neutrality approach. These sheets contain the following information:

- Action sheet number
- Action sheet title
- Theme and axis to which the action relates
- The sponsor and partners
- The scale of action: local, metropolitan, regional
- The sector(s) of activity concerned, highlighting its multi-disciplinary nature
- Innovative character
- Involvement from the general public
- Co-benefits: social, health, environmental, etc.
- financing details:

Investment amount

Validated financial sources and the associated amounts

Financing yet to be raised

Operating requirements and associated budget

- Implementation schedule
- An estimate of greenhouse gas emission gains, or demonstrative indicators
- Achievement monitoring indicators
- Performance indicators
- The list of projects, specifically highlighting those proposed by partners

2023-2030 KEY MILESTONES


Nature en Ville
Agriculture urbaine & alimentation
Mer & littoral
Sensibilisation & Education
Eco Circulaire & déchets
2023
2025
2028
2030
Lancement du Plan Arbre
Passage à la gestion naturaliste
renaturation espace public
Lancement Rues Jardins citoyennes
Parc Bougainville (1ere tranche)
Définition d'un projet éducatif sur l'alimentation durable et la diète méditerranéene
1ères expérimentations de collecte sélective sur le patrimoine municipal
Schéma territorial de restauration écologique (Mouillage, nurseries)
Actions de sensibilisation biodiversité et éco-systèmes marins
Base nautique du Roucas Blanc rénovée
Construction d'un parcours d'éducation à l'environnement (2024)
Lancement labélisation écolocrèches
Création Parc des Annonciades (15e arrdt) et Val d'Hor (11é arrdt)
Livraison plaine sportive de la Busserine (2024) et parc de la Solidarité
Renaturation de 8 jardins publics
Parc des Aygalades (2026)
Démarrage parcs NPNRU Air Bel, etc. (2024, 2025)
Démarrage restructuration parc Longchamp (tranche 1)
Parc Bougainville (1ere tranche)
Domaine de Montgolfier (14e arrdt – 12Ha), Vallon des douces (11e arrdt – 9Ha)
Parc agricole contreforts du Massif de l'Etoile
Généralisation de la collecte sélective sur l'ensemble des lieux municipaux
Déploiement de la collecte des biodéchets
Mise en place de composteurs dans les espaces publics et les écoles
Aménagement et protection des 4 accès au parc national des Calanques
Plan posidonie
16 Écolocrèches labellisées
Création du 2ème ENJEU (Massif de l'Etoile, 2026)
Projet Cantine de demain
8 000 arbres urbains et 300 000 plants forestiers plantés
Restauration et renaturation Borely et Longchamp
Livraison parc des Aygalades
Renaturation de l'Huveaune
Amélioration trame turquoise Jarret
Développement des jardins partagés et familiaux (progressif entre 2023-2030)
Soutien + de 10 projets innovants agriculture urbaine
Réemploi généralisé sur un ensemble de filières
Réutilisation de matériaux généralisée sur les chantiers
Valorisation énergétique d'une partie des bio-déchets
3 bases nautiques modernisées et décarbonées (Roucas, Corbières, Pointe Rouge)
Ports de plaisance décarbonés et électrification de la flotte des bateaux passagers et plaisance
Bilan & ajustement du parcours d'éducation à l'environnement
+ 30 projets soutenus
Espace public renaturé et contribution forte au rafraîchissement urbain
Reconquête agricole de plus d'une 100aine d'hectares
Ceinture verte agricole autour de Marseille
Régime alimentaire marseillais bas carbone
Réduction significative des émissions associées à la consommation de biens et aux déchets
Dépollution et renaturation du littoral
Protection et restauration des posidonies
Projet SMILO : Frioul, île 100% verte
Ensemble des Marseillais sensibilisés aux enjeux environnementaux locaux

5.2.2 OVERVIEW AND PRIORITIES

MOBILITY AND LOGISTICS		Carbon neutrality	Contribution to the territory's energy autonomy	Health & adaptation to climate change	Tackling inequalities	Job creation
Axis 1: Reduce transport demand						
MOB1	Cycling plan	The exploratory scenarios highlight a significant potential contribution	Reducing energy demand for fossil fuels	Contribution to sports practice & air quality improvement	Development of mobility at lower cost to users	100,000 national jobs by 2050 thanks to the bicycle industry (1)
MOB2	Pedestrian plan	Modal share already very high (40% in 2030). Stake in maintaining	Contribution to energy sobriety. Maintaining the quality of life	Contribution to sports practice & air quality improvement	Development of mobility at lower cost to users	
MOB3	Calming the public space	The development of active mobility and the reduction of the role of the car have a significant impact on the modal shift	Contribution to energy sobriety. Maintaining the quality of life	Contributes to the reduction of speed in the city, noise, improvement of air quality	Development of accessibility for all	Public works generated and maintenance
Axis 2: Increase modal shift						
MOB4	Develop heavy infrastructures (metro, tramway, TER and funitel)	The development of the offer is an important point to accelerate the modal shift	Decreasing consumption of fossil fuels but increasing demand for electricity	Reduction of noise pollution, improvement of air quality	Development of mobility at lower cost to users	Numerous jobs generated by the works and for the operation

MOB5	Developing light infrastructure	The development of the offer is an important point to accelerate the modal shift	Decreasing consumption of fossil fuels but increasing demand for electricity	Reduction of noise pollution, improvement of air quality	Development of mobility at lower cost to users	Numerous jobs generated by the works and for the operation
MOB6	Preparing the metropolitan express network	The GHG impact will be seen post 2030	Decreasing consumption of fossil fuels but increasing demand for electricity	Reduction of noise pollution, improvement of air quality	Development of mobility at lower cost to users	Numerous jobs generated by the works and for the operation
MOB7	Supporting modal shift	To accompany the other measures	Reducing energy demand for fossil fuels	Contribution to sports practice & air quality improvement	Development of mobility at lower cost to users	

MOBILITY AND LOGISTICS		**Carbon neutrality**	**Contribution to the territory's energy autonomy**	**Health & adaptation to climate change**	**Tackling inequalities**	**Job creation**
Axis 3: Increase the use of cars and the use of a limited fleet						
MOB8	Scaling up of car sharing and car pooling	The exploratory scenarios highlight a significant potential contribution	Contribution to energy efficiency.	Reduction of noise pollution, improvement of air quality	Development of mobility at lower cost to users	Jobs related to the public carpooling service
Axis 4: reduce the carbon intensity of vehicles on the road						

MOB9	Decarbonising public transport and shore-side electrification of ships	In the modelling of the scenarios, the GHG impact remains moderate	Decreasing consumption of fossil fuels but increasing demand for electricity	Reduction of noise pollution, improvement of air quality	No impact	No local impact
MOB10	Accelerating the adoption of electric vehicles	The exploratory scenarios highlight a significant potential contribution	Decreasing consumption of fossil fuels but increasing demand for electricity	Reduction of noise pollution, improvement of air quality	Vigilance on support policy	
MOB11	Decarbonising the road	Low GHG impact	Decreasing consumption of fossil fuels but increasing demand for electricity			
Axis 5: Logistics: encourage modal shift to rail freight						
LOG1	Rail freight in Marseille and reopening of ITE		Reducing energy demand for fossil fuels	Reduction of noise pollution, improvement of air quality	No impact	
Axis 6: Decarbonising logistics vehicles						
LOG2	Support for the acquisition of clean vehicles	Exemplarity and contribution to the EPZ	Decreasing consumption of fossil fuels but increasing demand for electricity	Reduction of noise pollution, improvement of air quality	No impact	
Axis 7: Transforming last mile logistics						
LOG3	Create 3 Urban Logistics Hotels (ULOs) and 15 distribution centres			Reduction of noise pollution, improvement of air quality	No impact	

LOG4	Development of cyclology			Reduction of noise pollution, improvement of air quality	No impact	

ENERGY		Carbon neutrality	Contribution to energy self-sufficiency	Health and adaptation to climate change	Fight against inequalities	Job creation
Axe 1: To organize the transition of heating networks						
E1	To organize the transition of heating networks	Division by 2 of the carbon content of the two networks concerned	Reduction of demand for fossil fuels	Improvement of air quality	Attractive cost for heating and cooling	Generated by works and operation
E2	To extend existing see geothermal energy networks		Reduction of demand for fossil fuels	Improvement of air quality. Carbon free-cooling solution.	Attractive cost for heating and cooling	Generated by works and operation
E3	To creat new heating & cooling networks	In exploratory scenario, contribution to 10 to 25% in GHG emissions gains in housing and tertiary sectors	Reduction of demand for fossil fuels	Improvement of air quality. Carbon free-cooling solution.	Attractive cost for heating and cooling	Generated by works and operation
Axe 2: To develop solar energy						
E4	To equip city buildings with solar photovoltaic	Exemplary but low carbon impact	Contribution to more mastery, local production	Possible contribution to carbon free-cooling solution.	Contribution to more mastery of energy costs for the city	Generated by works and operation
E5	To equip some buildings in the territory	Less carbon impact than fossil fuels substitution	Contribution to more mastery, local production	Possible contribution to carbon free-cooling solution.	Better mastery of costs for project owners	Generated by works and operation
E6	To develop 10 energy communities	Less carbon impact than fossil fuels substitution	Contribution to more mastery, local production	Possible contribution to carbon free-cooling solution.	Better mastery of costs for project owners & users	Generated by works and operation
E7	To accelerate the development of solar thermal	Important issue of GHG emissions reduction relative to hot water (22% of emissions in housing sector))	Reduction of demand for fossil fuels		Better mastery of costs for project owners	Generated by works and operation
Axe 3 : To develop biogas						
E8	To sustain biogas projects	Potential saving estimated about 300 kTCO2e/year	Reduction of demand for fossil fuels		Better mastery of costs for users	Generated by works and operation
Axe 4 : Transversal actions						
E9	To develop financiel tools	Help developping renewable energies	Reduction of demand for fossil fuels		Better mastery of costs for users	Generated by works and operation

BUILDINGS		Carbon neutrality	Contribution to energy self-sufficiency	Health and adaptation to climate change	Fight against inequalities	Job creation
Axe 1: Public tertiary sector						
B1	To develop frugality and efficiency plans	In exploratory scenario, 50% of GHG emissions gains in tertiary sector, of which a part of 20% thanks to frugality	Reduction of energy demand		Reduction of energy costs	
B2	To develop buildings retrofitting	In exploratory scenario, 50% of GHG emissions gains in tertiary sector, of which a part of 20% thanks to frugality	Reduction of energy demand for heating	Reduction of energy demand for cooling	Reduction of energy costs	Generated by works
Axe 2: Private tertiary sector						
B3	To develop frugality plans and buildings retrofitting	In exploratory scenario, 50% of GHG emissions gains in tertiary sector, of which a part of 20% thanks to frugality, and a part of 20% thanks to buildings retrofitting.	Reduction of energy demand	Reduction of energy demand for cooling	Reduction of energy costs	Generated by works
Axe 3 : Housing sector						
B4	Housings - Accompagny households in housing retrofitting	In exploratory scenario, 45% of GHG emissions gains in housing sector, of which a part of 25% thanks to retrofitting	Reduction of energy demand for heating	Reduction of energy demand for cooling	Reduction of energy costs	Accompaniement actions
B5	Housings - Accompagny households in housing retrofitting, especially private damaged housings and social housings	In exploratory scenario, 45% of GHG emissions gains in housing sector, of which a part of 25% thanks to retrofitting	Reduction of energy demand for heating	Improvement of sanitary conditions	Reduction of energy costs	Generated by works
B6	Housings - Accompagny reduction of energy poverty	Thanks to development of renewable energies and networks	Thanks to development of renewable energies and networks	Improvement of sanitary conditions	Reduction of energy costs	Accompaniement actions and works

CIRCULAR ECONOMY & WASTES		Carbon neutrality	Contribution to energy self-sufficiency	Health and adaptation to climate change	Fight against inequalities	Job creation
Axe 1: Prevention and composting						
ECD1	To double axareness actions to reduce wastes production	To reduce 10% of households wastes is equivalent to avoid GHG emissions about 8 450 T CO2e, in scope 3 of territory emissions	Reduction of energy demand relative to waste treatment			
ECD2	To Develop professional wastes composting		Reduction of energy demand relative to waste treatment			
Axe 2: Reuse						
ECD3	To secure and amplify the devlopment of recovery centers and first reuse projects	Reuse and recycling can save GHG emissions due to raw materials extraction and transformation into "products"	Reduction of energy demand relative to waste treatment		Access to new resources	Jobs in recovery centers
ECD4	To create resue platform for buidlings wastes	Example : reuse 1 tonne of steel avoids the emissions of 1 410 to 4 760 kgCO2e.	Reduction of energy demand relative to waste treatment			New jobs
Axe 3: more green and separated wastes collection						
ECD5	Devlopment of sorting ansd separated collection of city wastes.	To reduce about 2 300 TCO2e relative to city activities wastes				
ECD6	Improvement of households wastes collection	To reduce about 6 000 TCO2e /year, in scope 3 of territory emissions				
ECD7	Greening of vehicles used for wastes collection	Natural Gas dump trucks : reduction of 17%, ie about 500 TCO2e/year.		Improvement of air quality		
ECD8	Sorting and wastes collection	Reduction estimated to 6 000 TCO2e/year	Reduction of energy demand relative to waste treatment			
ECD9	To create new infrastructures to valorize plastics and "Solid Recovered Fuels"		Reduction of demand for fossil fuels			Generated by works and operation

NATURE IN CITY		Carbon neutrality	Contribution to energy self-sufficiency	Health and adaptation to climate change	Fight against inequalities	Job creation
NV1	To restore and et renature spaces in the city	Contribution to carbon sequestration		Cooling, préservation of biodiversity, improvement of well-beeing	Access to nature for all people	
NV2	To create new parks, gardens or other spaces with nature	Contribution to carbon sequestration		Cooling, préservation of biodiversity, improvement of well-beeing	Access to nature for all people	
NV3	To renature and set up ecological continuities	Contribution to carbon sequestration		Cooling, préservation of biodiversity, improvement of well-beeing	Access to nature for all people	
NV4	To plan nature in the city	Contribution to carbon sequestration		Cooling, préservation of biodiversity, improvement of well-beeing	Access to nature for all people	
NV5	To manage nature in the city	Contribution to carbon sequestration		Cooling, préservation of biodiversity, improvement of well-beeing	Access to nature for all people	

URBAN AGRICULTURE AND FOOD		Carbon neutrality	Contribution to energy self-sufficiency	Health and adaptation to climate change	Fight against inequalities	Job creation
Axe 1: upstream approach						
AA1	Protection plan and recapture agricultural area	Important issue: carbon sequestration	Contribution to food self-sufficiency	Improvement local and raw products offer	Short food circuits, costs masterized	
Axe 2: backing approach						
AA2	Local, sustainable, quality and affordable food for all people	Free carbon and meaty food - Reduction of GHG emissions thanks to short food circuits	Contribution to food self-sufficiency	Access to healthy and ecofriendly food for all people	Access to healthy and ecofriendly food for all people	Jobs in food production and distribution networks
Axe 3: upstream and backing approach: important dynamic of associations and private stakeholders						
AA3	Emerging and innovating projects	Improvement of production and consumption uses toward more frugal and free carbon uses	Contribution to food self-sufficiency	Improvement of production and consumption uses toward more healthy uses	Access to healthy and ecofriendly food for all peopl	Jobs in food production and distribution networks

SEA AND COASTLINE		Carbon neutrality	Contribution to energy self-sufficiency	Health and adaptation to climate change	Fight against inequalities	Job creation
ML1	Free carbon sailing bases and ports	GHG emissions of domestic maritime transport equals 10% of GHG emissions of scopes 1 &2	Reduction of energy demand			
ML2	A renatured, cleaned and quiet coastline	Important issue: carbon sequestration		Preservation of biodiversity, and improvement of well-beeing	Preservation of shared patrimony	
ML3	Preserved Posidonia and sea biodiversity	Important issue: carbon sequestration		Preservation of biodiversity	Preservation of shared patrimony	
ML4	Archipelagos and islands: a singularity to be protected			Preservation of biodiversity	Preservation of shared patrimony	
ML5	A common international action and knowledge sharing			Preservation of biodiversity	Preservation of shared patrimony	
ML6	Awareness actions			Preservation of biodiversity	Preservation of shared patrimony	

EDUCATION AND AWARENESS ACTIONS		Carbon neutrality	Contribution to energy self-sufficiency	Health and adaptation to climate change	Fight against inequalities	Job creation
ES1	To sustain development and creation of 2 new infrastructures dedicated to ecologyt education					
ES2	To tranform uses in schools and nurseries					
ES3	To creat educative circuit according to climate urgency, frugality and respect for the environment					
ES4	Soutenir un maximum d'actions de sensibilisation du territoire					
ES5	To gather all the citizens and companies into climate challenge					

5.2.3 MOBILITY AND LOGISTICS

5.2.3.1 Reducing transport demand

MOB1 - BICYCLE PLAN

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
For the metropolis, the modal share for cycling is 1.2%; the mobility plan aims to increase this figure to 12% by 2030. The cycling plan, which contributes to this objective, aims to achieve a modal share of 5% for cycling by 2024, through the completion of 85 km of key cycling routes, rising to 130 km by 2030, and the development of secondary routes. These routes make up a primary network of 8 lines, and a secondary network which will be defined as part of the Local Mobility Plans later on. In addition, the bicycle plan intends to install 3,600 new bicycle parking spaces by 2024, 60% of which will be secure. Finally, the self-service bicycle hire scheme will be fully electric by 2023. The cycling plan includes 3 axes and 15 actions: Axis 1: develop the use of bicycles for everyday travel needs, axis 2: promote access to bicycles for as many people as possible. Axis 3: make the territory more attractive and safer for cycling. Additional analyses on multi-modal usages could be carried out to increase the impact of cycling on commuting.	In 2019, only 2% of journeys were by bicycle. Several studies have shown a direct link between the modal share of cycling and the number of cycle or low-traffic lanes per inhabitant. The exploratory scenario highlights a significant GHG reduction potential if the actions already programmed are taken even further.	AMP City of Marseille, Southern Region ADEME, AGAM, User Associations	**Financial**: 59m currently envisaged (An additional €200m would be needed to increase the scope to meet the exploratory scenario) There is a need to increase staff numbers to complete the projects. **Security**: the development of secure parking facilities is an important service to support the development of the practice

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Construction of 8 main lines in Marseille**(2030**)
City of Marseille	AMP	Extend the main network to include a secondary network (24 routes identified by the City of Marseille) and set up a dedicated signposting plan for cycle lanes
AMP		Cycle lanes integrated into the development of the Huveaune greenways (Phase 1: **2022-2026**, Phase 2: **2026-2030**)
City of Marseille	AMP	Integration of bicycle parking when removing car parking 5 metres before pedestrian crossings (around 600 spaces), organisation of priority for cyclists at traffic lights (at least 250 crossroads) and stricter penalties for parking on cycle lanes
City of Marseille		Improving the management of self-service fleets (bicycles, scooters)
AMP		Secure bicycle stations to be installed, especially near to metropolitan transport hubs
AMP		Extension of the self-service bicycle service (VLS)
Collectif Vélo en Ville		Cycling school, metropolitan bicycle visits, help with cycle maintenance, etc.
Cap au Nord		Proposed active mode facilities (Foresta track, via Hospitalia)

MOB2 - PEDESTRIAN PLAN

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
To complete the actions that will contribute to reducing traffic in the city centre, encouraging walking for short-distance trips, improving air quality and bettering community life with the objective being that 1 of every 3 journeys under 2km is by foot. Access is an important part of this action plan, for the disabled, the elderly and the temporarily disabled.	Walking represents a modal share of around 40%, which is already very high and contributes to carbon neutrality. The prospects for its development remain limited, but maintaining the current level and the developing accessibility are essential issues.	AMP City of Marseille	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP	City of Marseille	Development of a pedestrian plan for Marseille along with the associated investments (pedestrian signage, new street furniture, installation of benches/fountains/toilets, safer pedestrian crossings, reducing traffic, landscaping and refurbishing, etc.)
City of Marseille	AMP	Elimination of double parking over a number of zones (about 3,800 parking spaces in Marseille)
City of Marseille		Establishment of a café terrace charter to improve public space
City of Marseille	MPA, CEREMA	Deployment of school roads

MOB3 - REDUCING TRAFFIC IN PUBLIC SPACES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Organising public space to make the city more ecologically resilient will involve developing or extending 30 km/h speed limit zones, redesigning certain squares, redefining circulation to reduce traffic, deploying more parking controls and setting up dedicated new public transport sites. All of these measures will contribute to limiting the use of cars in the city centre and encouraging alternative transport methods.	40% of journeys of less than 3 km within the metropolis as a whole are made by foot. However, parked or rolling vehicles occupy a huge majority of the public space. Limiting the use of cars in city centres is a lever for achieving carbon neutrality. Such policies could also include improve air quality, reduce noise pollution, and improve the quality of roads and public spaces, notably as part of a drive for a more resilient city centre.	AMP City of Marseille	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille	AMP	Development of a traffic reduction plan (extended application of one-way traffic loops)
City of Marseille	AMP	Extension of 30 km/h speed limit zones within the city, apart from certain major roads and pedestrian areas
City of Marseille	AMP	Redevelopment of a series of squares (pedestrianisation, landscaping, de-sealing)
City of Marseille		Deploying more parking inspections

MOB4 - HEAVY INFRASTRUCTURE DEVELOPMENT (METRO, TRAMWAY, TER AND FUNITEL)

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The objective of the mobility plan is to increase the modal share of public transport for the metropolitan area from 9% to 13% by 2030. Many works for the development of heavy infrastructures have been signed off for the years to come: • Redevelopment of the St Charles railway station • Extension of tram lines • Cable transport • Expansion of the TER (local rail service) offer • Redevelopment of railway lines to double their capacity • Electrification of railway lines	Since the metropolis was first established in 2016, it has become the sole Mobility Organising Authority for its catchment area. As such, it has taken over the management of the urban public transport networks and the interurban public transport lines (formerly departmental), which are now included in its scope. The railway network remains under the jurisdiction of the Regional Council. With two metro lines (Marseille), four tramway lines (Marseille and Aubagne) and 6 High Level of Service Bus lines (4 in Marseille, 1 in Aix-en-Provence and Marignane -Saint-Victoret - Vitrolles - Les Pennes Mirabeau), the Metropolis will have 90 km of High Level of Service Transport in 2019. Half of the one million daily public transport journeys are made on these HLST lines The challenge will be to raise the target to 22% of the modal share by 2030, through the actions planned in the MDP and the other private car use restriction measures. The rail network needs to become more reliable and public transport access needs to be improved.	AMP Southern Region Status RTM City of Marseille	**Financial**: Around €2 billion in investment will be required to finance the infrastructures identified in the action, of which €360 million is already covered by existing commitments (State, Region, Department, Metropolis) Associated staff will have to be increased to complete the projects.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Improved accessibility for 16 metro stations
AMP		Extension of the tramways prioritized in the “Marseille en grand” plan
AMP		Funitel Marseille Provence Airport - Vitrolles
AMP		Study on the service to the North Hospital
AMP		Redevelopment of the Saint Charles railway station in connection with the New Provence Alpes Côte d'Azur Line programme (2035)
Southern Region		Expansion of the TER offer (new OMNEO equipment, maintenance workshops), for Marseille: redevelopment of the Blancarde site and development of the Arenc site
Southern Region	SNCF Réseau/AMP	Aix-Marseille capacity increase, maintenance and yards
Southern Region	SNCF Réseau/AMP	Railway ring + station development in Marseille (reopening of the Aix-Rognac line)
Southern Region	SNCF Réseau/AMP	Blue Coast: Upgrading to improve commercial speed**(2025**)
Southern Region	SNCF Réseau/AMP	Electrification of the railway lines between Aix-en-Provence and Marseille and on the blue coast
AMP		Renovation - lighting, surveillance - of the Marseille rail tunnels (Vieux Port, Major, Joliette and Saint Charles)

MOB5 - DEVELOPMENTS TO LIGHT INFRASTRUCTURE

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The objective of the mobility plan is to increase the usage share of public transport for the metropolitan area from 9% to 13% by 2030. A lot of work on light infrastructure development will be started over the coming years: • Development of High Level Service Bus (BHLS) lines • Urban developments to improve bus performance and accessibility • Reorganisation of the urban bus network (frequency and service) • Implementation of a City -AMPM-RTM Objective Contract on speed	Since the metropolis was first established in 2016, it has become the sole Mobility Organising Authority for its catchment area. As such, it has taken over the management of the urban public transport networks and the interurban public transport lines (formerly departmental), which are now included in its scope. The railway network remains under the jurisdiction of the Regional Council. With two metro lines (Marseille), four tramway lines (Marseille and Aubagne) and 6 High Level of Service Bus lines (4 in Marseille, 1 in Aix-en-Provence and Marignane -Saint-Victoret - Vitrolles - Les Pennes Mirabeau), the Metropolis will have 90 km of High Level of Service Transport in 2019. Half of the one million daily public transport journeys are made on these HLST lines The challenge will be to raise the target to 23% of the usage share by 2030, through the actions planned in the MDP and the other private car use restriction measures.	RTM AMP City of Marseille Status Southern Region	**Financial**: €80 to 100 million in investment will be required to finance the identified actions, of which €21 million is already covered by existing commitments (State, Region, Department)

First projects identified

Sponsor(s)	Partner(s)	Project(s)
RTM & AMP		Reorganisation of the urban bus network (frequency and service) for deployment in **2025**
AMP		Construction of a B4 High Level Service Bus line between the Gèze and La Fourragère interchange hubs serving the 11th, 12th, 13th, 14th and 15th districts (Merlan shopping centre (13014), Sévigné school (13013), Arnavaux, La Cabucelle, Bon secours, Fontvert, Grand Saint Barthélémy, Saint Jérôme, Malpassé, Corot and Frais Vallon priority districts)**(2024**)
AMP		Construction of a high level service bus line B3 to Allauch
AMP		Developments to improve bus performance and disabled access at stops
AMP &RTM	City of Marseille	Development of a City - Metropolis - RTM objective contract in order to improve commercial speed (bus lanes, traffic light priorities, video enforcement)

Cap au Nord		Taco 3.0: deploying micro-shuttles between companies and certain Multimodal Interchange Centres (Gèze, Bougainville, TER stations)

MOB6 - PREPARING THE METROPOLITAN EXPRESS NETWORK

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The high service level network ("+") for metropolitan travel - from Aix-en-Provence to Miramas or from Marseille to Martigues for example - is the Réseau Express Métropolitain (REM). It will be implemented on a majority of lines by 2025. It is based on a simple and easy-to-understand fare structure, a high service level, and three modes covering different travel needs:	Since the metropolis was first established in 2016, it has become the sole Mobility Organising Authority for its catchment area. As such, it has taken over the management of the urban public transport networks and the interurban public transport lines (formerly departmental), which are now included in its scope. The railway network remains under the jurisdiction of the Regional Council. With two metro lines (Marseille), four tramway lines (Marseille and Aubagne) and 6 High Level of Service Bus lines (4 in Marseille, 1 in Aix-en-Provence and Marignane - Saint-Victoret - Vitrolles - Les Pennes Mirabeau), the Metropolis will have 90 km of High Level of Service Transport in 2019. Half of the one million daily public transport journeys are made on these HLST lines The challenge will be to raise the target to 23% of the modal share by 2030, through the actions planned in the MDP and the other private car use restriction measures. The rail network needs to become more reliable and public transport access needs to be improved.	AMPM City of Marseille, National, Southern Region, RTM, Department	**Financial**: Around €4bn of investment will be required - including €3.6bn dedicated to phases 1&2 of the LNPCA - to finance the infrastructure identified in the action, including €3bn already covered by existing commitments (State, Region, Department, Metropolis)

First projects identified

Sponsor(s)	Partner(s)	Project(s)
DREAL/Southern Region/Department/AMP		Development of VRTCs
AMP		Multimodal motorway interchange hubs on the Metropolitan Express Network lines serving Marseille
AMP / Region/Stations and Interchanges/AMP		Construction and/or development of a series of Multimodal Interchange Centres (Marseille La Gaye, Les Caillols, Frais Vallon, Arenc, Saint André, Cap Horizon, Saint Victoret Pas des Lanciers)
Southern Region		LNPCA - Phase 1 & 2
Southern Region		Creation of a railway halt - and associated Multimodal Interchange Hub - in Plan de Campagne
AMP / Southern Region		Developing station access

MOB7 - SUPPORTING THE MODAL SHIFT

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The implementation of heavy or light infrastructure will be essential to the development of alternatives transport options to the private car, but for such investments operations to be effective, they will have to be accompanied by various targeted support measures. These support measures could include: • Incentive pricing • Awareness-raising and educational activities • Development of digital tools	The challenge will be to raise the target to 23% of the modal share by 2030, 15% for cycling, and 20% for carpooling to business parks or 4% across the Metropolis as a whole, through the actions provided for in the PDM, to be strengthened, and private car use restriction measures.	AMPM City of Marseille, Southern Region, RTM,	**Financial**: 7 to 10 M€ in investment will be required in association with the improvement of user services (4G, Card payments). Operating budgets must also be prepared: eco-driving training (400 drivers/year), loss of revenues associated with accessible fares Associated staff will have to be increased to complete the projects.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Introduction of accessible and intermodal fares**(2024**)
AMP		Development of park-and-ride facilities (e.g. integration of a P+R in the Saint André Multimodal Interchange Hub)
CIQ 15/16th		Application for a park-and-ride facility at the northern entrance to Marseille
City/AMP/Region		Support for sustainable mobility and behavioural change: bike school, awareness-raising and improvement of the customer experience, car-free days, etc.
City/AMP/Region		Reduction of job dispersion, support for residential change, 1km walk approach
ASPTT Marseille		Olympic Games 2024 - Cycling for less pollution

AMP		Eco-driving training for metropolitan network drivers
City of Marseille		Employee travel plan (as part of the City's Sobriety Plan)
AMP		Improving user service: 4G in the metro, easier card payment, MaaS**(2024**)
AMP		Video enforcement equipment for bus lanes

5.2.3.3Less empty seats in cars and a limited fleet numbers

MOB8 - SCALING UP CAR SHARING AND CAR POOLING

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action consists of developing the practice of carpooling through • The creation of a public carpooling service to serve areas with little or no public transport • The introduction of dedicated lanes • The development of carpooling laybys • The development of car-sharing	The challenge will be to raise the target to 23% of the modal share by 2030, 15% for cycling, and 20% for carpooling to business zones or 4% for the Metropolis as a whole, through the actions provided for in the PDM, the Region's intention to develop the VR2+ and private car use restrictions. The exploratory scenario highlights a significant GHG reduction potential if the actions are taken even further.	AMPM City of Marseille, Southern Region, National, Department	**Financial**: €3M in investment for the development of a carpooling service and the necessary laybys, the financing of which is already covered by existing commitments (State, Metropolis), €2.5M annual operating budget and 3 FTEs. Investments associated with dedicated lanes have not been covered here The deployment of strong incentives will be necessary: logistical advantages (reserved lanes), ease of use (stations in public space), financial (subsidies for the practice)

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Setting up a carpooling service
State / Department / Southern Region		Development of VR2+ lanes
AMP		Development of carpooling laybys within the territory
City of Marseille		Development of car-sharing (increase in the number of allocated spaces, increase in the number of vehicles run by private sector businesses)

5.2.3.4Reducing the carbon intensity of vehicles using the roads

MOB9 - DECARBONISING PUBLIC TRANSPORT AND DOCK-SIDE ELECTRIFICAL POWER SUPPLIED FOR SHIPS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action aims to decarbonise road and maritime transport whether managed by the Metropolis, the Region or private business	This is a necessary condition for carbon neutrality, and a chance to set an example.	AMPM Southern Region, RTM	**Financial**: Around €930m in investment needed to finance all the projects. Financial contributions already programmed, operating needs and associated FTE not identified at this stage.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
RTM		Acceleration of the **2035/2030** decarbonisation plan: purchase of vehicles (100% electric fleet planned) and electrification of warehouses (La Rose, Arenc, Saint Pierre)
GPMM / Southern Region / City of Marseille		Electrical Connections for Docked Ships (CENAQ): Ships bound for the North Africa (station 5), ships in dry docks (dry docks 8, 9, 10), cruise ships (J4), large cruise ships
AMP		Zero-carbon road REM electric coaches
Region		Minimal electrification of the Aix-en-Provence Marseille line**(2027)**
AMP / Region		Decarbonisation of inter-urban vehicles
AMP		Development of alternative fuels (BioGNV stations, H2 maritime ferry)
GPMM		Deployment of 2 photovoltaic power plants, partially self-powered (installed target capacity: 7.5MWp)
AMP		Equipping warehouses and park-and-ride facilities with photovoltaic panels
CCI		Hydrogen station for maritime ferries (Anse de la Réserve), Smart Port en Grand, Structuring of a hub for the retrofitting of the pleasure-boat fleet, Experimentation with decarbonised maritime ferries

MOB10 - ACCELERATING THE ADOPTION OF ELECTRIC VEHICLES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The development of electric vehicles will depend on the development of recharging services and support policies. The aim is to deploy 5,700 charging points by 2025 (233 terminals currently deployed in the Metropolis), including 3,000 in the Marseille territory, and to deploy charging points in car parks and park-and-ride facilities (regulatory obligations)	One of the challenges in moving towards carbon neutrality is to decarbonise journeys of more than 10 km, i.e. journeys outside Marseille. One lever is the deployment/expansion of the public transport offer, another lever which should be targeted is a policy of support for the deployment of electric vehicles. The exploratory scenario highlights a significant GHG reduction potential if the actions are taken even further.	AMPM Southern Region, RTM	**Financial**: €3M + if targeted accompanying measures are included. **Property**: The deployment of recharge stations apartment blocks will face a number of technical and organisational obstacles

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Deployment of the IRVE scheme (3,000 charging points in public spaces within Marseille and installations in car parks, including park-and-ride facilities)**(2025**)
Bovlabs & EPA Euromediterranee		Experimentation with smart terminals integrating renewable energy storage in vehicle batteries (vehicle-to-grid)

MOB11 - DECARBONISING ROADS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action aims to decarbonise road equipment: white roads, use of photovoltaic solar energy, renovation of street lights	This action will have less of an impact on carbon neutrality, but by setting an example, it will contribute all the same.	AMPM Dealer	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP/Dealer		White road
AMP/Dealer		Photovoltaic
AMP/Dealer		L50
AMP		Renovation of LED tunnel lighting

5.2.3.5Logistics: Encourage modal shift to rail freight

LOG1 - RAIL FREIGHT IN MARSEILLE AND REOPENING OF THE INDUSTRIAL SPUR BRANCH LINES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This project aims to develop modal transfer, renovate and create certain non-operated sidings, and create the conditions for a reliable and efficient service. It also relies on the development of support for economic actors to facilitate mutualisation, reorganisation of rail services and the emergence of local urban logistics The EIB ELENA fund has provided support for the creation of a local rail freight service. It will finance survey works by up to 90% over 4 years.	Limit the increase in heavy goods traffic on the roads of the Metropolis and at around the periphery of Marseille.	AMPM GPMM, City of Marseille	**Financial**: Around €141m in investment will be required to finance the Local Rail Freight Service project and the Reopening of a number of Industrial Spur Branch Lines. The other project of this action is currently estimated at €26M, but this remains to be confirmed

			Operating requirements and associated FTE not identified at this stage.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Development of a local rail freight service (studies, purchase of land, creation of a logistics centre, purchase of rolling stock and handling equipment)**(2030**)
AMP		Reopening of a number of Industrial Spur Branch Lines:, Saint Marcel, Sogaris (Marseille centre), Saint Martin de CRAU,**(2029**)
GPMM		Modernisation of the Mourepiane terminal: creation of 6 gantry lanes (2027)

5.2.3.6Decarbonising logistics vehicles

LOG2 - SUPPORT FOR THE ACQUISITION OF CLEAN VEHICLES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Supporting the transformation of professional vehicle fleets by opening an advice desk and a financial aid desk.	To facilitate and support the renewal of decarbonised logistics vehicle fleets.	AMPM Region, CCI, private businesses	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP/REGION/CCI		Support desk for the renewal of HGV and Light Utility Vehicles
The Post Office		Deployment of 100% low-emission delivery service for Marseille**(2024**)
Private Parcels (CMA CGM)		Development of a clean fleet
DHL		Conversion of a dozen Light Utility Vehicles to electric
Bert&You		Marseille city centre deliveries to be fully electric

5.2.3.7Transforming last mile logistics

LOG3 - CREATE 3 URBAN LOGISTICS HUBS (HLU) AND 15 DISTRIBUTION CENTRES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
To create gateways to consolidate logistics flows into Marseilles and propose a network of urban platforms for local distribution.	Optimise distribution flows to limit pollutant emissions.	Private business AMPM City of Marseille	**Financial**: Around €700m in investment will be required (including €500m of investment associated with the MIN Arnavaux project) to finance the projects in this action, which will be covered mainly by private businesses. **Property**: Locating land for the HLU and Distribution Centres will be difficult (less profitable activities than other projects)

First projects identified

Sponsor(s)	Partner(s)	Project(s)
Private	AMP, City of Marseille	Creation of 3 Urban Logistics Hubs: West (Saint Louis, Sogaris), East (Saint Marcel)
AMP		Development of the transformation project and development of the MIN Arnavaux (Minopolis, 12ha logistics platform)
Private	AMP, City of Marseille	Development of a network of 15 urban distribution centres
The Post Office		Development of Urban Logistics Hubs (around 15,000m2) and distribution centres (around 5,000m2) in Marseille

LOG4 - DEVELOPMENT OF CYCLOLOGISTICS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Promote bicycle deliveries for local logistics purposes by developing favourable conditions.	Decarbonising local deliveries, given that it is estimated that 30% of logistics volumes could be delivered by bicycle in the city centre.	AMP Private partners	Financial needs not assessed at this stage **Property**: Releasing land for deconsolidation functions is an important aspect of possible support for these actions.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
Synchronicity		Priority deployment of Urban Resource Units in the Low Emissions Zone to recover short supply chain waste using cyclologistics
AgilenVille		Experimentation with logistics micro-hubs (9m2) in public spaces, with a target of 30 or so inside the LEZ by 2026
CCI		Structuring an economic sector around cyclo-mobility
DEKI	AMP	An innovative delivery round optimisation tool

5.2.4 ENERGY

General note: The objectives of the SRADDET set a consumption coverage rate for the territory for 2030 of 45% (currently 1%) and 32% on the regional level (source: Carbon Neutrality Strategy objective variants worksheet - Provence-Alpes-Côte d'Azur Region SRADDET).

5.2.4.1 Organising the transition of heating networks

E1 - ORGANIZE THE TRANSITION OF EXISTING NETWORKS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The city of Marseille has a very significant potential for developing heating and cooling networks The RDC&F share is about 26 GWh, or 0.4% of the total. The role of heating networks is therefore almost non-existent in the energy mix. An initial, non-exhaustive inventory of the facilities currently operating in Marseille includes the following networks: • 2 heating networks that sell the heat they produce to third parties; • +100 technical networks that consume all the heat they produce (no resale); This first action aims to identify 3 pilot sites to launch an extension project and renewable energy switchover feasibility study. These pilot sites could be: • Residences La Rose Le Clos, La Rose Val Plan, Bégude Nord and sud (13 Habitat), 13th arrondissement, • 5th arrondissement, Timone Hospital (AP-HM) and Timone University (AMU) • 11th arrondissement, Résidences Air Bel (Erilia Logirem Unicil)	Pending a response from CEREMA for a global vision of the development of heating and cooling networks. A halving of the CO2 content is expected for each of the pilot sites.	City of Marseille AMPM AP-HM Social landlords	Not assessed at this stage In the framework of the exploratory scenario, the connection of around 50,000 housing units will be targeted, representing a budget of around €200M, which will be mainly covered by private investment. These projections must be the subject of more detailed analyses to be developed in a master plan.

E2 - EXTEND EXISTING MARINE GEOTHERMAL NETWORKS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The city of Marseille has a very significant development potential for heating and cooling networks (awaiting responses from CEREMA). The RDC&F share is about 26 GWh, or 0.4% of the total. The role of heating networks is therefore almost non-existent in the energy mix. This second action aims to develop the two heat networks that use SWAC energy, Thassalia and Massileo.	A complementary impact assessment should be conducted to identify the potential contribution of any expansion works to the decarbonisation of the residential/service sectors.	City of Marseille, AMPM private network owners (Dalkia and Engie)	In the framework of the exploratory scenario, the connection of around 50,000 housing units will be targeted, representing a budget of around €200M, which will be mainly covered by private investment. These projections must be the subject of more detailed analyses to be developed in a master plan.

First projects identified

Sponsor(s)	Partner(s)	Project(s)	GHG gain
City of Marseille	Dalkia/EDF	CALORIMER - Massileo SWAC network - Project to extend the network to supply renewable energy to the Fabriques, GLAM and Cazemajou districts	Not assessed at this stage
City of Marseille	ENGIE	Duplication of the Thassalia urban network (currently within the Euro-Mediterranean scope)	1290 tCO2e saved per year

E3 - CONSTRUCT NEW HEATING AND COOLING NETWORKS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The City of Marseille has a very significant development potential for heating and cooling networks (awaiting responses from CEREMA). The RDC&F share is about 26 GWh, or 0.4% of the total. The role of heating networks is therefore almost non-existent in the energy mix. An initial, non-exhaustive inventory of the facilities currently operating in Marseille includes the following networks: • 2 heating networks that sell the heat they produce to third parties; • +100 technical networks that consume all the heat they produce (no resale); This third action aims to study the development potential for heat and cold networks, by drawing up a heat network master plan, this will be followed by a more global and prospective evaluation of the operational implementation.	Pending a response from CEREMA for a global vision of the development of heating and cooling networks.	AMPM City, delegates	In the framework of the exploratory scenario, the connection of around 50,000 housing units will be targeted, representing a budget of around €200M, which will be mainly covered by private investment. These projections must be the subject of more detailed analyses to be developed in a master plan.

First projects identified

Sponsor(s)	Partner(s)	Project(s)	GHG gain
AMPM		Heat recovery from sewage water (study)	
City of Marseille		ZAC Vallon Regny (construction of a heating network as part of a development project)	3,670 teqCO_2 saved per year with the Extended Biomass Scenario

5.2.4.2Develop solar energy production

E4 - PV SOLAR ENERGY INSTALLATIONS FOR MUNICIPAL PROPERTIES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The School Plan will be a clear opportunity for to launch and expand PV. Given the availability of school rooftops, it will be possible to use them for PV solar energy installations. While the local authority lead projects are focussing on energy self-sufficiency for the buildings, the SEM (Company with both private and public capital) could be given access to any unused surfaces. In addition to schools, it will be possible to install photovoltaic production facilities on other public buildings (notably local council facilities and service sector buildings). The initial work for the establishment of the SEM provided a first look at potential photovoltaic energy production on city property, estimated at 70,000 MWh/year. The first action would be to exploit this potential and fit all municipal property: municipal property solar energy conversion plan. Installed capacity: 61 facilities including 50 schools, 2 kindergartens, 9 others): 6.56 MWp of installed capacity => 7.73 GWh of estimated energy produced per year. =>A feasibility study is underway to equip 30 more sites (schools, fire stations, car impound sites). => renegotiation is underway concerning the occupation/lease agreement with the company that operates the PV installations on the roofs of the Friche Belle de Mai (407MWp/487 MWh). =>ENERCOOP Equipping small disused plots of land (between 0.4 and 1ha) with solar photovoltaic systems despite the absence of a public support mechanism for this type of project.	The development of renewable electricity is essentially a question of energy autonomy and controlling energy bills. The potential is extremely high in Marseille, and its exploitation is a key issue for the CCC.	City of Marseille AMPM, Southern Region, ADEME, local businesses, members of the public, etc	Objective 2030: 15 MWp installed for approximately 100,000m2 of equipped roofs, representing an investment of around €18M (which can be covered by private and public investments or innovative financing tools)

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Solar power conversion for municipal buildings

E5 - EQUIPPING THE TERRITORY'S BUILDINGS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The second action would be to exploit this potential to equip other public and private buildings in the territory. More than ten private businesses have shared their production development objectives for the area. The projects already identified represent around a projected 30MWp.	The development of renewable electricity is essentially a question of energy autonomy and controlling energy bills. The potential is extremely high in Marseille, and its exploitation is a key issue for the CCC.	City of Marseille, AMPM Southern Region, ADEME, local businesses, members of the public, etc.	Target installed capacity in 2030 on large roofs across the territory: 375 MWp (source: SSEE 2022 study on the projected establishment of an energy SEM) Financial: The overall investment requirement, which will be covered by private investment, will be around €350-400 million.

First projects identified

Sponsor(s)	Project(s)
AMPM	Solar energy conversion of local government buildings - construction of PV plants
RTM	RTM solar energy conversion plan for 5,500^{m2}
MIN	MIN solar energy conversion plan
APHM	Solar energy conversion of roofs and wastelands
Friche Belle de Mai	Solar energy conversion of roofs
SNCF	Solar energy conversion
L2	Recovery
AMU	Solar energy conversion of roofs (Saint Charles, Saint Jerome, etc.) and car parks

GPMM	Solar energy conversion of car parks and buildings in the eastern catchment areas
VEOLIA / Onyx	Shade structure over the Veolia Milliere offices
VEOLIA / Etoile	Solar power plant on the Etoile “ecopole”

Sponsor(s)	Project(s)
Department	Solar energy conversion of secondary schools
Region	Solar energy conversion of Marseille's high schools
SDC 8 PL Marseillais	Co-ownership solar energy project
Lepidos-FNE-CAN	Solar energy coverage on motorways
APHM	

E6 - DEVELOP 10 ENERGY COMMUNITIES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The third action consists of encouraging and supporting the establishment of local energy communities, thus promoting the involvement of the general public, local businesses and developing the effective management of this energy source. Grouped energy self-sufficiency solar plants cover a radius of 2km and can produce up to 3MW.	The development of renewable electricity is essentially a question of energy autonomy and controlling energy bills. The potential is extremely high in Marseille, and its exploitation is a key issue for the CCC.	City of Marseille, AMPM Southern Region, ADEME, local businesses, members of the public, etc.	Financial: Installed capacity of 30 MWp targeted for the 10 energy communities, representing an investment requirement of around €30M. Land: Public or private roofs with energy communities located within 2km diameter areas

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille, AMPM		Sirius (collective energy self-sufficiency and management)
City of Marseille, AMPM		Cité des Arts de la rue, public buildings, private companies
		Photovoltaic cluster covering 3 private buildings (142 kWp)
Hammerson		200 kWp power plant project

E7 - ACCELERATE THE DEPLOYMENT OF SOLAR THERMAL ENERGY

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The initial work for the establishment of the SEM provided a first look at potential solar thermal energy production on city property, covering 14,000 m² over around 180 installations. The fourth action will be to encourage the deployment of solar thermal energy installations for the larger domestic hot water consumers.	The development of solar thermal energy is a major issue, given the carbon impact of traditional domestic hot water supplies for the residential sector as assessed in the diagnostic. The potential is extremely high in Marseille, and its exploitation is a key issue for the CCC.	City of Marseille AMPM, delegates	Around €100-150M of investment to target a deployment of 144,000m2 (180 installations) generating around 126GWh of energy per year.

First projects identified

Sponsor(s)	Partner(s)	Project(s)	GHG gain
City of Marseille, AMPM	ASSOCIATION HOPITAL SAINT JOSEPH DE MARSEILLE	Solar thermal energy installation	30 tCO2e saved per year
City of Marseille, AMPM	SARL TARIOT	Renovation of the solar powered water heating system	

5.2.4.3Developing biomethane plants

E8 - SUPPORT BIOMETHANE PROJECTS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Development of biomethane plants using Marseilles natural sources and exploration of the potential for micro-methanisation.	166,000 existing households (of which 150,000 use natural gas and 16,000 use heating oil). Estimated maximum potential savings of 300 Kt CO2 eq / year Today, it is estimated that more than 50% of these households still use the old low-temperature boilers. Replacing them with a high performance boilers means a 30% reduction in energy consumption, as well as a reduction in costs and GHG emissions	City of Marseille, AMPM Southern Region, ADEME, local businesses	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP	SUEZ	Increase of the Sormiou WWTP's biogas injection capacities
VEOLIA / Hammerson		Biopile: micro-methanisation unit in the 'terrasses du port' shopping centre and scaling up to 10 additional installations
VEOLIA		Implementation of biogas capture and recovery at the Septème les Vallons ISND

5.2.4.4 Transversal

E9 - DEVELOPING FINANCING TOOLS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Given the City of Marseille and the Metropolis renewable energy development ambitions along with their commitment to the "100 carbon neutral cities" programme, the establishment an SEM would make it possible to accelerate transition and decarbonisation. The local authorities (City of Marseille, Aix-Marseille-Provence Metropolis, Bouches-du-Rhône Department) are currently planning to establish a local energy SEM with private partners (banks, businesses, etc.) to such that this new structure can be launched and projects can be put into action. During a second phase, it would then be possible to extend the group of public and private shareholders to include other partners (other municipalities, etc.) and to refine its articles and shareholder agreement.	The development challenges involved will concern photovoltaic power plants, which can be quick to complete and will be highly visible to the public, and the development of energy networks using local resources (wastewater, sea). The creation of the Energy SEM will also involve the development of a partnership with the Metropolis.	City of Marseille, AMPM, Department	Financial: An initial analysis of the investment potential of an outsourced financial tool provides an investment budget estimation of around €150-200 million over 10 years with an initial capitalisation of €11 million for the City.

5.2.5 BUILDINGS

5.2.5.1 Public administration sector

B1 -DEVELOPING ENERGY EFFICIENCY AND SOBRIETY PLANS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Public sector authorities in the Marseille territory are implementing sobriety plans to deal with the current and future energy shortages and price increases. The City of Marseille, the Metropolis and the Region have all committed to an energy sobriety plan aimed at considerably reducing the energy consumption and carbon emissions of public buildings. These initiatives are in line with the city's sustainable development policy, the regional 'Une COP d'avance' climate plan, and the metropolitan area's PCAET (MAMP). At the end of 2022, Aix Marseille University and the APHM also adopted their own energy efficiency plans.	Our challenges: => Public institutions must set the example, temperature reduction, changes in practices, awareness => 40% less energy consumed by 2030 (service sector decree objective) => 10% less energy consumed by the end of 2023 (Objective laid out in the national and local government Sobriety Plan dated 6 October 2022)	City of Marseille, AMP Metropolis, Southern Region AMU, APHM, State	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)	GHG impact
City of Marseille		Energy sobriety plan 2022-2030 : 6 axes: Municipal Buildings, Lighting, Transport, IT, Waste, Water, Transversal issues.	10% reduction on public buildings, public lighting and for staff travel (fleet, commutes)
Metropolis		Energy Sobriety Plan Oct 2022	
Region		Sobriety plan 2022 including Marseille high schools	
AMU		Energy and Carbon Saving Plan	Energy savings: - 10% in 2024 and -40% in 2030)
APHM		Energy sobriety plan	Actions on heating, renovation, water, travel

B2 - DEVELOP ENERGY RENOVATIONS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The energy renovation for these public buildings, also subject to the service sector decree, will be a priority for reducing carbon footprints and public operating costs, this will also be important in terms of setting an example. • This action is initially aimed at Marseille City Council public buildings and other large complexes such as the AMU (Aix Marseille University) and the APHM (Assistance Publique - Hôpitaux de Marseille).	Our challenges: Emissions from (public and private) service sector buildings for the city of Marseille have been estimated at 291 ktCO2e in 2019, i.e. 15% of the city's total emissions (according to the Carbon Footprint report) In the exploratory scenario, 50% emission gains for the service sector are targeted, 20% of which could come from renovation works.	City of Marseille, AMP Metropole, Southern Region AMU, APHM, State, Marseille Habitat	The budgetary projections for this action are detailed in the investment plan

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Renovation of school buildings (School Plan Part 2)
City of Marseille		Renovation of the municipal council property
AMPM		Renovation of the metropolitan council property
AMU		Renovation programme for university buildings: North site, St Jérôme, Canebière
APHM		Modernisation programme for AP-HM hospitals (500,000m2 of hospital buildings over 4 sites - North, Timone, Conception, South, consuming a total of 74Gwh of electricity per year and 71 Gwh of gas per year)

5.2.5.2Private service sector

B3 - PRIVATE SERVICE SECTOR - DEVELOP ENERGY SOBRIETY PLANS and DEVELOP ENERGY RENOVATION PROJECTS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The service sector decree aims to reduce energy consumption by 40% for 2030, 50% for 2040 and 60% for 2050, compared to a specific reference year. Concerns all public or private service sector buildings of more than 1000 m2. To achieve these objectives, the city and its partners are encouraging the implementation of energy sobriety and efficiency plans by private sector businesses. For example, several private sector businesses are currently involved in the implementation of energy sobriety and efficiency plans or the mobilisation of climate action plan networks.	In the exploratory scenario, 50% emission gains for the service sector are targeted, 20% of which could come from sobriety initiatives.	Private service sector businesses	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)
'Terrasses du port' shopping centre		Sobriety plan
Grand Littoral		Sobriety plan
City of Marseille	EnvirobatBDM, Construction sector businesses	Sustainable Construction Charter
CCI		
CMAR and CCI	City	Eco-Challenges for retailers and craftsmen, to promote environmental, energy, transport, waste, eco-product, water management, packaging, social responsibility initiatives
CCI		Actions on its real estate assets, approximately 50 sites in Marseille including the Kedge site, with a RE2020 compliance budget. Decarbonisation of economic buildings in Marseille's business parks

Business Climate Convention - Southern Region	CCI	66 institutional structures and companies, including Onet Group, the Marseille water board, Corsica Linea, Pietra and the Villages Clubs du soleil, will all follow a nine-month multiple stage program towards a Climate/Sobriety action plan
Cap Au Nord Entreprendre		Network of 60 companies, various industrial recycling, ecology and waste actions. Reducing car use, rethinking travel in the north of Marseille, 7 activity zones
Symbiose Vallée Huveaune		Group of entrepreneurs in the Huveaune Valley: activating local cooperation initiatives, joining the Ademe 2 Scenario. Collective workshops to engage businesses, the general public and accelerators in view of the energy crisis.

5.2.5.3- Residential

B4 - RESIDENTIAL - ENERGY RENOVATION SUPPORT FOR PRIVATE HOUSEHOLDS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The Agence Locale de l'Énergie et du Climat de la Métropole Marseillaise is a member of the national France Rénov' network, it provides personalised assistance to the inhabitants of the southern part of the Aix-Marseille-Provence metropolitan area through its energy renovation platform. The metropolis and the city of Marseille are committed to supporting energy renovation projects on private housing. Role of the National Government: On the national scale this is a colossal ambition: 90% of private housing, i.e. 27 million homes, to be brought up to BBC performance levels (80kWh/m2/year). In comparison, the average energy consumption for French private housing is 200kWh/m2/year. The scale of the renovation work will be enormous since this will involve moving from 50,000 BBC renovations per year to 700,000. Thelargest tools, such as MaPrimeRénov' or social landlord grants, will fall under the responsibility of the Anah or the Anru.	The residential sector is responsible for 25% of the Marseille territory's carbon emissions. The exploratory scenario aimed at 45% emission gains from the residential sector, 25% of which could come from renovation works. Potential additional gains from energy efficiency actions is estimated at 20%.	City of Marseille, AMP Metropolis, National Government	Financial: The exploratory scenarios provided a first financial approach: • Energy renovation of 30% of private housing: €4.5 billion • Development of 100 km of heating networks: € 200M • Household energy sobriety and efficiency initiatives: M€ 120

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMPM		Espace Accompagnement Habitat, Allo Rénov Energie - support for private households
ALEC	City, Metropolis, AMP	Supporting private household energy renovation projects

B5 - RESIDENTIAL - ENERGY RENEWAL PROJECTS FOR THE RESIDENTIAL SECTOR - covering RUN-DOWN PRIVATE HOUSING and council housing

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action targets run-down private housing and will help reduce energy consumption and CO2 emissions in the residential sector by undertaking effective energy renovation work projects. It will improve living conditions and energy bills of low-income households as well as the architectural quality of buildings. Financed by the ANRU. Role of the National Government: On the national scale this is a colossal ambition: 90% of private housing, i.e. 27 million homes, to be brought up to BBC performance levels (80kWh/m2/year). In comparison, the average energy consumption for French private housing is 200kWh/m2/year. The scale of the renovation work will be enormous since this will involve moving from 50,000 BBC renovations per year to 700,000. Thelargest tools, such as MaPrimeRénov' or council housing authorities grants, will fall under the responsibility of the Anah or the Anru.	The residential sector is responsible for 25% of the City of Marseille's carbon emissions. 100,000 of Marseille's housing units are classed as seriously energy-inefficient, that represents 1 in 4 homes. 28,000 housing units (F to G energy efficiency labels) are considered to be energy inefficient and high CO2 emitters. These are mainly private, low-income homes. Due to changes in French legislation, landlords will no longer be allowed to rent out these homes unless energy renovation works are completed on them, by 2025 for G-labels and by 2034 for E-labels.	City of Marseille, AMP Metropolis Status	*Not assessed at this stage*

First projects identified

Sponsor(s)	Partner(s)	Project(s)
SPLA-IN	Metropolis, City	4 demonstration blocks
AMPM	ANAH, Department, Region	Financing of renovation works notably for energy efficiency - see PCAEM + PLH
ERILIA (social landlord)		Approximately 6,000 housing units to be renovated - €50m budget
LOGIREM		82% of housing units to have 1,B,C energy efficiency labels ANRU impulse: La Castellane and Air Bel: 774 housing units undergoing rehabilitation = €40m

UNICIL		25% to be renovated to BBC standards, with ten or so F-rated residences to be upgraded to C rating by 2024

B6 - RESIDENTIAL - SUPPORT FOR THE REDUCTION OF ENERGY POVERTY

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
A specific action to combat fuel poverty is underway. This largely takes the form of an implementation of the SLIME programme, which involves private housing, the objective is to provide support for 1,300 housing units over 3 years, with a total budget of €1.5M. After three years, a review will be conducted to adjust and redeploy the operation more widely.	The residential sector is responsible for 25% of the City of Marseille's carbon emissions. 100000 of Marseille's housing units are classed as seriously energy-inefficient, that represents 1 in 4 homes. 28000 housing units (F to G energy efficiency labels) are considered to be energy inefficient and high CO2 emitters. These are mainly private, low-income homes. Due to changes in French legislation, landlords will no longer be allowed to rent out these homes unless energy renovation works are completed on them, by 2025 for G-labels and by 2034 for E-labels.	City of Marseille National Government, GERES, Southern Region, AMP metropolis	Financial: For the City of Marseille: €1.2M in support over 3 years is planned, within the framework of the SLIME programme. The financing required for the later scaling up phase remains to be assessed.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City	GERES	SLIME: support for 1,300 housing units over 3 years, total budget €1.5M
Cap au Nord	SONERGIA, SOLIHA, ABDE, VEOLIA	Support for the overall renovation of a 30 to 50 housing unit residency (13, 14, 15 or 16th arrondissement)
Sonergia, Soliha		Development of the experimental SOLIHA BBC Solidaire programme

5.2.6 CIRCULAR ECONOMY AND WASTE MANAGEMENT

5.2.6.1 Prevention and composting

ECD1 - DOUBLING WASTE MANAGEMENT AWARENESS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The action aims to support waste-at-source reduction, sorting and littering awareness-raising, training and communication activities for the general public.	The management of 1 tonne of residual household waste emits around 0.26 tCO2e (collection, processing and energy recovery). 325,000 tonnes of household waste were collected in Marseille over 2020, the equivalent of 84,500 tCO2e. Reducing household waste by 10% would be the equivalent to reducing emissions by 8,450 tCO2e (indirect emissions, scope 3)	AMP Metropolis City of Marseille, Southern Region, ADEME, all companies and NGOs that work on raising awareness or developing new models	The main obstacle will be financial (ability to finance large-scale awareness-raising actions by supporting initiatives, notably those planned by NGOs)

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP	Zero Waste Marseille	Helping the population to changes its practices
Provence-Alpes-Côte d'Azur Chamber of Trades and Crafts	Southern Region, ADEME, City of Marseille, CCI	RACINE project: eco-challenges for retailers, 'repair'actors'
Rive Neuve (federator)	Business and NGO Collective	Clean Project 2024: federating a group of businesses and NGOs around waste management and the circular economy
Avenir Zéro Mégot NGO		Olympic Games 2024 - Zero Waste

ECD2 - DEVELOPMENT OF PROFESSIONAL WASTE COMPOSTING

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action will involve improving the collection and recovery of bio-waste produced by businesses and professionals. In particular, it will include the establishment of a number of composting sites, to be run by private sector businesses, the installation of compost boxes in public parks and gardens, and educational initiatives.	Further analysis will be needed to identify the carbon contribution of this action.	AMP Metropolis City of Marseille, Southern Region, ADEME, private businesses	*Not assessed at this stage*

First projects identified

Sponsor(s)	Partner(s)	Project(s)
LVD Environment		Development of a composting activity
The Alchemists	EPA Euromediterranee	Astragale project: development of a composting site in the 15th arrondissement
City of Marseille		Setting up compost boxes in public parks and gardens, schools and public places

5.2.6.2Reuse

ECD3 - SECURING AND EXPANDING THE DEPLOYMENT OF RESOURCERIES AND THE PIONEER RE-USE PROJECTS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The objective of the action is to confirm the deployment of the territory's first reuse projects and support the scaling up of the territory's first successful experiments. As laid out in axis 4 of the PMPDMA (Metropolitan Plan for the Prevention of Household and Assimilated Waste), the objective is "one re-use solution per 45,000 inhabitants, i.e. 20 re-use points across the City". Nearly fifteen local government supported experimental projects are underway in the metropolitan area.	Re-use and recycling will economise emissions associated with raw material extraction and their transformation into "products". As for recycling, the process of transforming waste into new raw materials will in itself generate some emissions. Example of reuse: one returnable glass bottle = 39% less CO2e emissions than a non-returnable glass bottle	AMP Metropolis City of Marseille, Southern Region, ADEME, private businesses	Budget not assessed at this stage **Land**: the ability to release affordable land for the storage of resources will be an important issue for action's success.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
Aix-Marseille-Provence Metropolis		PMPDMA action for the development of reuse solutions
Association des Ressourceries de Région + EPA Euroméditerranée		Establishment of re-use centres on residential building ground floors
The Arts Reserve		Development of a recycling centre for artistic materials and an associated service offer (training, exchange of good practices, collectivisation)
Regional re-use centre association		Collectivisation platform for the re-use of office furniture in Marseille
Cap Au Nord		Development of the Reuse Lab
Cap Au Nord		Industrial and Territorial Ecology project in the business park and construction of a Fab Lab "Ecosystem
Citizens of the earth		Symbiose Vallée, an industrial and territorial ecology initiative in the Lower Huveaune Valley

ISOWATT		Manufacture of insulation out of recycled paper and cardboard
Glokis	Southern Region, IADYS, Fil&Fab,	Structuring a recovery organisation for the city's used fishing equipment (fishing nets, long-lines, etc.)
EKO!	City of Marseille, ADEME	Creation of a structure to promote low-tech and re-use
Saint-Gobain		Recycling of ZirPro Beads
Repulp Design		Recycling of citrus waste for the production of a bio-sourced injection material
WERECY		Establishment of an industrial unit for the second life of LI-ION batteries
Synchronicity		Priority deployment of Urban Resource Units in the Low Emissions Zone to recover short supply chain waste using cyclologistics
Valdelia		Support for public procurement agents regarding the AGEC Act
MIN / AMP		Deployment of reusable and unbreakable crates in the MIN (National Wholesale Market)
SOOFUT L'INCASSABLE		Experimentation with the re-use of glass bottles in breweries
City of Marseille		Integration public procurement clauses to increase re-use rate

ECD4 - CREATING CONSTRUCTION SITE WASTE RE-USE PLATFORMS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action aims to deploy platforms for the storage / offloading of construction site waste for its transformation into resources. This will require identifying the right properties and finding a managing business. The implementation of these platforms must be accompanied by stricter obligations in construction/demolition/rehabilitation contracts favouring the re-use of materials and taking advantage of the obligation to carry out a Product Equipment Material Waste (PEMD) diagnosis for any demolition work. In addition to reducing construction materials logistics distances, these platforms will also increase reuse practices in Marseille.	Re-use and recycling will economise emissions associated with raw material extraction and their transformation into "products". Example of re-use: Steel beams for re-use in construction: re-using 1 tonne of steel prevents the production of between 1410 and 4760 kgCO2e. Reusing 5000 linear metres of 200mm girders = between 182 and 618t tCO2e saved in manufacturing.	AMP Metropolis City of Marseille, Southern Region, ADEME, private businesses	Budget not assessed at this stage **Land**: The location of land to develop storage platforms will be a challenge for the success of the action.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
RAEDIVIVA		Regional construction and public works re-use initiatives
R-AEDIVIVA / R-AEDIFICARE		Development of a digital platform for the reuse of construction materials
Eiffage		Establishment of a NOE platform, a logistics platform for low-carbon building sites
R+Eveil		Development of services and expertise concerning the reuse of building materials
SUEZ		Fibrous insulation made from waste materials
Valdelia		Support for structures developing the reuse of construction materials
Valdelia		Support for furniture manufacturers

5.2.6.3Ecological waste sorting and collection

ECD5 - DEPLOYMENT OF URBAN WASTE SORTING AND SEPARATE COLLECTION

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The City will develop several actions aimed at reducing the amount of waste produced and improving its re-use: • Reduction action (food waste, public procurement criteria, eco-design in communication, fewer print-outs) • Implementation and development of bio-waste sorting and selective collection (in schools, services, parks and gardens, beaches etc.)	Potential long-term target: a reduction of 2,300 tCO2e related to the waste produced by the city's activities	City of Marseille	**Financial**: annual budget of around €6M (collection, transport, processing)

ECD6 - IMPROVING DOMESTIC WASTE COLLECTION

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
There are several ways to reduce the CO2 emissions generated by the collection of household waste: • Reduce the household waste collection frequency: Help residents/professionals to use waste reduction and recovery solutions, as well as legislation to enforce good practices • Increase recycling: The Metropolis hopes to increase the density of resident recycling solutions (waste collection centres, mobile sorting centres, etc.) and to structure the packaging recycling system by setting up a sorting centre	A reduction of 6,000 tCO2e per year may be possible (indirect emissions, scope 3)	AMP Metropolis City of Marseille, Southern Region, ADEME and private sector operators	*not assessed at this stage*

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Help households to adapt to a reduced household waste collection frequency
AMP		Increase recycling: development of recycling solutions for residents (waste collection centres, mobile sorting centres, etc.) and structure packaging recycling systems by setting up a sorting centre
SUEZ		Improving the efficiency of the waste sorting centre in Les Pennes Mirabeau (13)
Green City Org		Project to collect waste and data from the top 10 rain water outfalls
Association Sauvage Méditerranée		Olympic Games 2024 - The Mobile Recycling Shop

ECD7 - GREENING UP THE WASTE COLLECTION VEHICLE FLEET

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The Metropolis has committed to greening up 90 waste collection trucks, converting them from diesel to NGV over 7 years. Experimentation with a hydrogen fuel cell power on electric locomotives, for the non-electrified parts of the rail lines used for transporting waste from Marseille to Fos	NGV trucks: 17% reduction, i.e. a reduction of 500 tCO2e (indirect emissions, scope 3)	AMP and partner operators	*not assessed at this stage*

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AMP		Greening up the Metropolis waste collection vehicle fleet
AMP		Greening up the transport of waste from Marseille to the processing site
Veolia		Conversion of 46 trucks to GNV and electric power

ECD8 - BIO-WASTE SORTING AND COLLECTION

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Axis 3 of the PMPDMA 2019-2025 concerns the recovery of bio-waste. On a nationwide level, bio-waste makes up a third of household waste, i.e. an estimated 231,800 tonnes per year for mainland France. (RPQS AMP figures 2017). For individual housing, this is estimated at 75,700 tonnes/year (AGAM 2011 data for individual housing). The energy transition for green growth law dated 17 August 2015 states that bio-waste should be separated at source across the board by 2025 (article 70.4). Several actions will contribute to this: • Enhancing the value of the "bio-waste" resource by developing individual composting • Enhancing the value of the "bio-waste" resource by developing collective or shared composting • Enhancing the value of the "bio-waste" resource by developing vermicomposting • Combating food waste in the catering industry The collection of bio-waste from professionals is also a priority, this will be implemented through the mobilisation of support levers for the associated structures	This action will allow the Metropolis to: 1. Reduce the volume of mixed bio-waste collected; 2. Reduce the volume of green waste; 3. Encourage autonomous waste management by inhabitants; 4. Reduce processing costs and comply with the law. This will also allow for more involvement in the territory's circular economy dynamic, the improvement of soil condition and will be a useful part of reducing food waste. In terms of avoided GHG, the reduction is estimated at 6,000 tCO2e (indirect emissions, scope 3)	AMP Metropolis City of Marseille, Southern Region, ADEME and private sector operators	**Financial**: The budget for axis 3 of the PMDPMA is around €2.2 million

An action relating to the creation of new infrastructures for the recovery and reuse of RDF and plastics is planned but will require further survey works.

5.2.7 NATURE IN THE CITY

NV1 - RESTORING AND RENATURING CITY SPACES

Description	Budget and the major identified obstacles
Marseille is a dual city, with highly urbanised areas including relatively ordinary natural vegetation, inherited from the old feudal estates, and conversely, some extraordinary vegetation features that cover the hills and the Calanques uplands (Calanques National Park). Landscapes currently occupy 700 hectares, this includes historical parks such as Longchamps and Borely, gardens, landscaping around roads, cemeteries, squares, etc.; this is constantly increasing but remains insufficient. Indeed, apart from natural reservations such as the Calanques National Park or the rest of the hills, the city of Marseille has a natural landscape shortage. While the WHO recommends 12m² of locally (within 300m) accessible natural landscape per inhabitant, on this scale it has only 4.6m² of public urban landscapes with just 1.8m² in the city centre, unlike Barcelona 7.7m², Toulon 10m², Nice 8.6m², Paris 14m² or Strasbourg 68m². Although many projects, both in progress and in preparation, are part of the city's renaturing strategy which will involve the creation of parks and gardens inside the city, a constant effort must be made to reduce the lack of square metres per inhabitant necessary for the full development of the city's population. Among the renaturing and rehabilitation projects are the Mélizan square (8), the Aygalades park under the supervision of the Euromediterranée OIN, the Labadie garden (13001), the National garden (13003), the Barquière garden (13009), the Anonciades park (13015), the Val d'Hor garden (13011). The eco-garden label is also being deployed in 8 of the city's parks, including Central de Bonneveine and Bortoli (8th), Colline Saint-Joseph (9th), Saint-Cyr (10th), La Buzine (11th), La Moline (12th), Athéna (13th), and L'Oasis (15th) to ensure more ecologically sound management policies. Vegetation clearly represents an undeniable asset for achieving the ambition of a sustainable and durable city in the current climate change context. The ability of plants to sequester carbon is a key factor in dealing with air pollution and improving air quality and public health. The higher the level of vegetation, the greater the benefits of urban heat and thermal comfort resulting in a decrease in the need for air conditioning especially with the current need for energy sobriety. With this in mind, the City of Marseille's ambition is to develop natural landscapes within the city, to green up public spaces, to renature and restore its parks and gardens. This ambition is guided by the following philosophy:	**Financial**: Around €56m in investment will be needed to finance the identified actions as well as a further €650k annual operating budget. This does not include the development of nature in the public space, which will need to be the subject of further analyses. Associated staff will have to be increased to complete the projects.

• - Implementation of the Soil/Water/Vegetation triptych as the basis for adaptation by 2030 • Treat the city as a whole rather than concentrating human and financial resources on just a small number of sites • - A fractal logic: strategic perimeter and operation positioning • - Definition of actions by urban landscape type • - Promotion and organisation of public involvement This renaturing ambition is also reflected in the Plan Avenir Ecole (Future School Plan) with the de-sealing and renaturing of schoolyards. The objective in the city-centre, identical to that of the peripheral areas, will be deployed within the strategy defined by the "Sustainable historic centre in Marseille by 2030" study and will be in line with the city “greening up” dynamic by introducing more trees in the city, renaturing existing parks and gardens, and removing sealed tarmac ground coverings. All of these projects will be implemented with respect for schedules and the civil population. In this respect, the Tree Plan will involve planting 8,000 urban trees and 300,000 woodland plants, this is scheduled to start in 2023, and will be the first branch of the strategy for a green and carbon neutral city. This will help to : • Increase the carbon sequestration potential • Create cooling islands and capture air pollution • De-seal ground surfaces • Implement citizen actions	

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Tree plan for city council land
City of Marseille		Garden renaturing strategy
City of Marseille		Renaturing strategy for parks with the ‘éco-jardin’ label
City of Marseille		Restoration of historic parks

City of Marseille		Restoration of historic parks
MAMP		Analysis of the metropolitan area’s de-sealing potential
MAMP		Restore the surroundings of parks and gardens (VDM, MAMP strategy)
City of Marseille	MAMP, local resident associations	Participatory street gardens
MAMP / City of Marseille		Canopy plan (roads and squares)
MAMP/ City of Marseille		Resilient city centre projects (squares and blocks)
City of Marseille		Preservation of biodiversity in the context of land consolidation and support projects
City of Marseille		Restoration of biodiversity and landscapes in natural spaces in contact with the city
City of Marseille		De-sealing of schoolyards

NV2 - CREATE NEW PARKS AND GARDENS OR OTHER NATURAL SPACES

Description	Parties involved	Budget and the major identified obstacles
Marseille currently has 58 parks and aims to develop nature in the city by renaturing/restoring its existing parks (the subject of the "Restoring and renaturing urban spaces" sheet) but also by increasing the number of parks and gardens in the city's northern districts. The Marseille area is also well endowed, it has many wastelands and unused or underused spaces. 200 hectares could potentially be mobilised for vegetation or for agricultural or composite projects where the involving the garden spirit. Among the new parks identified will be the creation of the Aygalades park (22 ha, supervised by EUROMLED), the Anonciades park (13015) and the Val D''Hor garden (13011). Issues associated with the action: ▪ Increase the carbon sequestration potential ▪ Create wellness islands where shade is favourable and reinforce climate comfort ▪ Renature unused spaces in deprived areas of the city ▪ Socialisation (Open Air Cinema, etc.) and nature awareness ▪ Energy efficient equipment and investment (school grounds) ▪ Better acceptance of urban densification ▪ Physical and mental health ▪ Recover landscape forms and strengthened continuity ▪ Raise public awareness of what how nature fits with the city ▪ Better distribution and continuity of a public plant service ▪ Slowing down of urban rhythms and resynchronisation with natural rhythms	City of Marseille Euromed	**Financial**: Around €38M in investment will be needed to carry out the actions identified. Associated staff will have to be increased to complete the projects. **Property**: Continued monitoring of land-use should be carried out to increase the chance of pre-empting land for parks and gardens

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Complete redesign of the major parks
City of Marseille		Creation of new parks (Annonciades, Jardin du Val d'Hor)
City of Marseille		Creation of new NPNRU framework parks
MAMP	City of Marseille	Development of the Mirabilis urban park, Sainte Marthe
MAMP	City of Marseille	Development of Vallon Regny park with hydraulic function
City of Marseille		jardinier les friches
EUROMED		Parc des Aygalades

NV3 - RENATURING AND (RE)DEVELOPING ECOLOGICAL CORRIDORS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
These actions operate on the great corridors of the blue infrastructures, these are nature's spinal columns that ensure connections with the strategic areas in the hillsides; Huveaune, Jarret, Marseille Canal, Aygalades; they will have a significant potential for carbon sequestration. These linear urban and waterway projects are based on: Renaturing and ecological engineering: recreating wetlands for non-human life, .. The increase in wetlands, which play a fundamental role in the carbon cycle (on a global scale, 25 to 30% of carbon is estimated to be stored in terrestrial ecosystems, i.e. twice as much as the world's forests) and other urban and landscape functions: thoroughfares for active life, natural infrastructures and venues for life and productive cultures. These natural solutions contribute to climate and risk regulation, supply and production (food, biomass) and the creation of socio-cultural and recreational spaces. There is a real need to reintroduce these great green and blue infrastructures into the heart of the city, the waterways of Marseille are its genuine ecological corridors and structural thoroughfares: Huveaune, Jarret, Canal de Marseille, Aygalades. The major strategic ecological corridors of the territory are based on these green and blue infrastructures: North Nerthe-Etoile linkup, East Garlaban-Calanques linkup. Recreating wildlife inhabited wetlands will play a fundamental role in the carbon cycle (on a global scale, 25 to 30% of carbon is estimated to be stored in terrestrial ecosystems, i.e. twice as much as the world's forests) and other urban and landscape functions: thoroughfares for active life, natural infrastructures and venues for life and productive cultures. These natural solutions contribute to climate and risk regulation, supply and production (food, biomass) and the creation of recreational and efficient social ecosystems. These structuring green and blue infrastructures provide the support for a finer network that weaves together the various urban micro-structures: garden streets, family allotment gardens, planted promenades, private and public	=>Developing carbon sinks via wetlands =>Create multifunctional climate regulating spaces with socio-cultural benefits	City of Marseille EPAGE HUCA, MAMP,	*Not assessed at this stage*

landscapes; as well as the other structures: turquoise (biodiversity) and brown (earth). They help to develop ecological functions and contribute to making the city more resilient. These urban waterway projects city aim to: • Reconnect the major river bed with its minor bed in order to restore its natural hydro-morphological functions: restoration of the major water cycle (connection to the soil and its water table), development of new wetlands, opening up the waterways; • Restore the ecological corridors for both terrestrial and aquatic plants and animals and take on the challenges facing aquatic life and more specifically fish; • Enhance these spaces and change the way citizens look at them and use them: turn them into calm and pleasant paths, educational routes and shaded planted walks in order to chase away the old habits of using waterways as rubbish dumps; • Improving the quality of life for citizens: paths along watercourses provide spaces for walking and significantly improve well-being and other socio-cultural co-benefits; • Reduce the risk of flooding by de-sealing the watershed and improving infiltration.			

First projects identified

Sponsor(s)	Partner(s)	Project(s)
MAMP/EPAGE HUCA		Development of the banks of the Huveaune
Metropolis/ City of Marseille		Restoring city's peripheries
MAMP		Pleasure walks and restoration of the la Grave, la Fumade waterways
VDM/MAMP		Canal de Marseille: greenway between Longchamp and Ste Marthe
MAMP		AMITER Capelette project

MAMP		Renaturing the Jarret river and ground de-sealing for the Rose Frais Vallon PRU (Urban Land Consolidation Perimeter)
VDM		Definition of the turquoise infrastructure and restoration of the Jarret ecological corridor
MAMP	City of Marseille	Renaturing the Savine plateau as part of the PRU
MAMP	City of Marseille	Green infrastructure linked with the Kallisté park as part of the PRU
MAMP	City of Marseille	General NPNRU Air Bel development (municipal park, reduction of hotspots, fertile areas, etc.)
VDM		Implementation of an ecological/naturalist management plan for municipal land included in the Jarret turquoise infrastructure
VDM		Restoration of the Loubière cave to encourage bats

NV4 - PLANNING NATURE IN THE CITY

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This table presents a set of actions aimed at integrating the 'nature in the city' concept into planning tools. (PLUi, OAP, etc.). These actions are a logical continuation of the current PLUi which organises: • The preservation of almost 99% of the upland heartlands as well as 90% of the territory's wildlife migration or ecological corridors. These areas offer conditions that favour the movements and life cycles of various species.. These are the fundamental issues for a metropolitan 'nature in the city' planning strategy (AMP will be the competent authority), in which the city of Marseille functions as a partner and AGAM is the project manager. This will be the main development axis of the Multiple-Council Local Urban Planning Program (PLUi), and is therefore enshrined in an enforceable regulatory document. It is based on two levers which can be integrated into amendment no. 3: • Complete the Marseille Provence green and blue infrastructure, by fleshing out and re-grouping the land through graphic boundaries and the identification of project sectors to be renatured. This section includes a significant territorial and regulatory interpretation which is implemented at the same rate as the procedures for modifying the urban planning document. In particular, the following objectives will be included: • Insert a multi-thematic "Nature in the city, resilience and health" Planning and Development Orientation (OAP) to provide general planning principles for the 'nature in the city', water cycle and public health themes. The aim of this is to apply a spirit of education and partnership to develop reflections on environmental issues in operational	Strengthen and promote the deployment of the territory's sustainable projects within the ecological transition and low-carbon strategy framework	City of Marseille MAMP, AGAM	*Not assessed at this stage* *Associated staff will have to be increased to complete the projects.*

projects and a more qualitative way of approaching development.			

First projects identified

Sponsor(s)	Partner(s)	Project(s)
MAMP/AGAM/VDM		Modification of the 'Nature in the City' action PLUi
MAMP/AGAM/ VDM		'Nature in the City' OAP
City of Marseille		Development of 'pocket gardens'
City of Marseille		Development of nature reservations

NV5 - MANAGING NATURE IN THE CITY

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action sheet aims to provide the right conditions for natural life to become strong and healthy in urban spaces and function as a genuine real lever for carbon sequestration. It includes: • the definition of a strategy for landscape sustainability which will therefore involve: positions suitable for solutions based on Nature, using local socio-ecosystems and the relationship with the living, new approaches that are more economical in terms of resources (SFN, biomimicry, planetary health, etc.) • a management reference framework, the basic issue of which will be to clarify governance, perimeters and the coordination of actions • training for managers • experimentation: partnerships / demonstrators • supply	Improve public knowledge of ecosystem functionality to improve the management of natural areas and contribute to optimal carbon capture	City of Marseille MAMP, Euromed, EpageHUCA	*Not assessed at this stage* *Associated staff will have to be increased to complete the projects.*

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Landscape Sustainability Strategy
VDM/MAMP/Epage HUCA/EUROMED		Drafting of a reference framework for managing nature in the city
City of Marseille		Training framework
City of Marseille		Improving knowledge of biodiversity and the natural environmental potential of the earth
City of Marseille		Municipal plant production

		Definition of ecological corridors/green infrastructures and enhancement of the potentials of municipally owned brownfields
Eaux de Marseille		A low carbon water service

5.2.8 URBAN AGRICULTURE AND FOOD

5.2.8.1 Upstream approach

AA1 - PLAN FOR THE PROTECTION AND RECOVERY OF AGRICULTURAL LAND

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Since the middle of the 20th century, urbanisation and the development of transport infrastructures have led to the gradual disappearance of a large part of the agricultural land around Marseille. The "green belt" on the periphery has been fragmented to the north and east of the city and has almost disappeared in the southern districts. Despite this, the city of Marseille still has some 60 hectares of cultivated land and a potential 120 hectares of agricultural wasteland that could be reclaimed. It has one major asset, the Marseille canal, a structure that supplied water to the old market garden belt. This could be used to return to the traditional gravity-fed irrigation techniques. By resettling farmers the objective of the City and the Metropolis is to encourage eco-responsible agricultural production that follows agroecology principles, as the first link in a sustainable food policy. A real dynamic is underway, as can be seen with the project for an agricultural park of about a hundred hectares in the Hauts de Sainte-Marthe district where farmers have already started working on public land.	Around 1.6MTeq in CO2 emissions are linked to food supplies for in Marseille, i.e. the equivalent of 82% of the direct emissions (scope 1 and 2) of the city's GHG report. Processed food products account for half of human consumption In the Provence-Alpes-Côte d'Azur region. Our challenges: => Increase carbon sequestration potential => Reduce carbon emissions through short circuits => Improve the supply of unprocessed local food produce.	City of Marseille Metropolis Cité de l'Agriculture, Department, Soleam, Chamber of Agriculture, Terre de liens, Safer...	**Financial**: Around €25 million in investment will be required to finance these actions, including €12.5 million in other additional requirements.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
Aix-Marseille Provence Metropolis	Cité de l'Agriculture, City of Marseille, Department, Soleam, Chamber of Agriculture	Agricultural park in the Sainte-Marthe and Bessons-Giraudy sectors, in the foothills of the Massif de l'Etoile (Marseille 14th), with a potential for reclaiming more than a hundred hectares of land
City of Marseille		Domaine Montgolfier (14Ha of agricultural land on an exceptional bastide estate, in the Ste-Marthe sector, Marseille14th): heritage, cultural, agricultural and food production project
Aix-Marseille Provence Metropolis / City of Marseille		Reclaim agricultural wasteland to encourage the establishment of new farms - Develop an agricultural land belt around Marseille
City of Marseille	Aix-Marseille Provence Metropolis / Region / Terre de liens / Safer...	Vallon des douces (9Ha of agricultural land in the Treille sector, Marseille11th): creation of an agricultural and food production centre on currently disused land
City of Agriculture	Aix-Marseille Provence Metropolis / City of Marseille	Development of an agricultural and food production test area
City of Agriculture	City of Marseille	Decarbonisation project for urban farms

5.2.8.2Downstream approach

AA2 - LOCAL, SUSTAINABLE, QUALITY FOOD ACCESSIBLE TO ALL

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
In recent years there has been a strong demand for locally sourced high quality produce. Short supply circuits are becoming more structured. Market gardening represents 60% of direct sales. The rest of the production is handled by the MIN des Arnavaux in Marseille. The dynamic is supported by NGO networks, the AMAP, 'Les Paniers Marseillais' or other companies that bring consumers and producers together. The City and the Metropolis aim to support this dynamic, after having carried out an inventory and developing the necessary infrastructures: local sales outlets, food halls as well as direct sales from the farms. To	Our challenges: => Change consumption behaviour: less processed food and high carbon impact meat products => Give everyone access to healthier and more environmentally friendly food => Reduce carbon emissions through short supply circuits	City of Marseille Metropolis Targeted local businesses	**Financial**: €350k to €500k will be needed to finance the identified actions.

this end, the municipal educational farms sell their organic produce directly twice a week. The sustainable food policy also includes using educational farms to raise awareness among young people about virtuous eating habits and the Mediterranean diet. The City aims to increase educational activities in school, especially through school dinners. Access to quality food is a key element of the food project. Marseille has a rich network of socially committed NGOs and can rely on a network of social centres maintain their close ties with the population. Fruit and vegetable baskets are distributed across the territory for a special price. Projects are emerging to enable the less well-off to have access to local produce. This can be seen with the "marmites solidaires" project, a joint initiative run by the MIN and the food bank, which organises the collection of unsold food which it processes through professional integration initiatives and distributes to people in need. This project is a model for the social and solidarity economy and it is expected to expand in the future.			

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille / Aix-Marseille Provence Metropolis		Increase the number of distribution points for local produce: markets, food halls, mobile grocery shops, etc
City of Marseille	and public and private sector partners	Development of shared and allotment gardens
MAMP	City of Marseille	Urban agriculture project, shared gardens in the context of urban renewal projects (fertile districts of Air Bel, La Savine, etc.)
City of Marseille	and public and private sector partners	Educational project on changing dietary habits - Promotion of the Mediterranean diet
City of Marseille / Metropolis	Private sector sponsors	Food poverty projects: solidarity grocery shops + VRAC project (grouped purchasing in priority neighbourhoods) + food banks, solidarity grocery stand at the MIN, 'Marmite solidaire', etc.

5.2.8.3 Upstream and downstream: NGOs and private businesses with strong dynamics

AA3 - INNOVATIVE AND EMERGING PROJECTS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Many private project leaders have expressed their interest in contributing to the construction of a sustainable and quality food policy. These projects are complementary to the projects led by the local authorities and enable them to implement, at their own level, the European "From Farm to Table" strategy, which specifically recommends that the current food system be changed to: • ensure sufficient, affordable and nutritious food within global limits, • halve the use of pesticides and fertilisers, as well as the sales of antimicrobials, • increase the share of land used for organic farming, • promote more sustainable food consumption and healthy diets, • reduce food loss and waste, • combat food fraud in the supply chain, • improve animal welfare. The majority of projects reconcile production practices with educational actions, and a special effort is made for ecological transition (energy reduction, reducing food waste, organic farming). Some projects are very innovative in terms of their low carbon footprint impact production methods.	Our challenges: => Activate all the levers contributing to the implementation of the territory's sustainable food policy and the reducing the carbon footprint impact => Encourage innovative projects to change production and consumption patterns towards healthier, less carbon-intensive practices.	City of Agriculture City of Marseille Metropolis NGOs, businesses, restaurants...	**Financial**: €6 to 7 million will be needed to finance the identified projects

First projects identified

Sponsor(s)	Partner(s)	Project(s)
DANTHEZ		Maison de l'alimentation durable
MASTOC		Nursery gardens - 15 micro-nurseries in Marseille
Collectif enchanté		Tiers-Lieu du collectif enchanté
Le Paysan urbain		Ecological engineering: greening up Marseille
Les jardins de Julien		Les Jardins de Julien, a green agora in the heart of the Hauts de Ste Marthe
Individual sponsor, producer		Fleurs de Marseille
VVOUM		Vers des Vergers Ouverts, Urbains, Méditerranéens (Open, Urban, Mediterranean Orchards)
Aglio Olio e Peperoncino NGO - Casa Consolat		Mycorrhiza: a virtuous circle for an ecological vineyard and city
Plateau Grognarde Caillols NGO		Project for the Grognarde Caillols Plateau
Individual sponsor, landscape architect		La ferme de la Nerthe
Pépins Production		The Bougainville neighbourhood nursery
Individual sponsor		Bio Ani
Le Cloître	PROMAN Foundation - Apprentis d'Auteuil - TEKIO - Culture Éco - Cité de l'agriculture - CIQ Château Gombert	La Betheline agro-ecological farm
Pain et Partage		PASTIS - Pôle Alimentaire Solidaire Territorial et d'Innovation Sociétale
Heko Farm		TALUS
Lycée des Calanques		3 projects: The Calanques farm + Remediation of coastal waters by integrated multi-trophic aquaculture + Biodiversity in the Calanques for global health in Marseille
ESAT Le Rouet		Agroecological micro-farm

Table de Cana		
Paniers Marseillais		

5.2.9 SEA AND COASTLINE

ML1 - CARBON-FREE WATER SPORTS CENTRES AND MARINAS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The aim of this action is to green up Marseille's marinas and water sports centres by upgrading of technical port equipment to meet environmental standards, installing renewable energy (photovoltaic), evaluating the electrical conversion of the public and private fleet, and re-equipping of quays.	Marseille has 14 marinas and 3 water-sports centres. Marinas, are strategic infrastructures for the region's development but are greatly concerned by challenges associated with global warming. These facilities are constantly evolving to provide a public service that meets sustainable development requirements. The Clean Harbours certification lays down certain bases for the reduction of energy consumption in marinas, but a broader vision is becoming indispensable for their modernisation. The marinas, and water sports centres, will be strong vectors in these fields, and can be home to innovations and/or other more common but nonetheless effective practices.	City of Marseille Metropolis, Southern Region, ADEME, local businesses	**Financial**: Around €7.5 million (including €7 million for the Clean Harbours) in investment will be required to finance this action.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
Metropolis (DIPOR) and delegates		Modernisation and decarbonisation of marinas: "Clean Port" and "Active Biodiversity Port" certification procedures for the prevention of pollution (environmental standards for technical port equipment and special equipment) and the preservation of biodiversity in ports.
City of Marseille		Modernisation and decarbonisation of Marseille's water sports centres (Corbière and the Pointe-Rouge light sailing area)
Metropolis		Setting up infrastructures in ports (electric terminals) for the deployment of electricity as an alternative energy source to petrol
Metropolis (marinas) City of Marseille RTM (ferries and infrastructures) All institutions and companies will work together to assist in the		Electrical conversion of passenger ships and pleasure craft. Study for the implementation of an aid for the electric conversion of pleasure boats

electrical conversion of pleasure boats		

ML2 - A PLEASANT, UNPOLLUTED AND RENATURED COASTLINE

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
Coastal areas are subject to significant environmental pressures: erosion, over-frequentation, pollution, artificialization. In this context, this action aims to reduce these pressures: facilitate user access to the sectors to be protected (new access points, limited access points, public transport offer), renature the access gates, extend the beaches reasonably, evaluate the renovation of the Prado seaside park, depollute industrial wastelands, use the advantages of posidonia meadows to reduce beach erosion	Measuring 57 km from Estaque to the Calanques, the Marseille coastline is characterised by its length, richness and diversity. Today, it has become vulnerable by human intervention and climate change. The challenge is to preserve its biodiversity, carbon sink, and the coastal sediment flows that maintain the precarious balance of marine ecosystems and protect the coastline	Metropolis (AMPM) City of Marseille, State, Calanques National Park, ADEME	**Financial**: Around €25 million will be needed to finance the action, including €9 million for additional requirements.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
Metropolis AMP + City of Marseille		Improvement of access to the sea (yachting): surveys and works on slipways and accessibility
Calanques National Park		Improving access to the Calanques National Park: 4 CNP gateways in Marseilles: renaturalise the areas, reduce the environmental pressures and pollution caused by heavy frequentation, improve the public transport offer
City of Marseille		Redevelopment of the coastline for better public access: - Improved access to the sea (light boating and beach use): - Restructure and reclassify beaches and seaside areas, including: 1/ Upgrade and restructure the Prado seaside park 2/ Restructure and expand the Corbière beaches - Develop innovative, soft and nature-based solutions to combat beach erosion (swell-absorbing reefs, Posidonia) - Addition of carbon footprint related constraints to specifications coastal development project contracts

ADEME (and City of Marseille, Metropolis, National Government as co-financiers)		Remediation of brownfield sites on the southern coast to protect users as well as the coastal and marine environment

ML3 - PRESERVING POSIDONIA AND MARINE BIODIVERSITY

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
This action targets the preservation of posidonia and marine biodiversity through projects involving nurseries, ecological moorings, polluted water management, beach management and macro-waste reduction.	The Mediterranean has one major asset in the fight against climate change: posidonia which functions as a major carbon sink, storing up to 10 times more carbon than forest soils. In Corsica, the analysis of matte cores has revealed very significant carbon accumulations (700 tonnes per hectare). The local Posidonia meadows currently cover an area of 107 ha around the Frioul archipelago and 414 ha around the Riou archipelago and along the Calanques coastline. Their decline, brought about by human intervention, throughout the Mediterranean, and in particular in Marseilles, represents a danger both for the species they host and the benefits they provide humans.	City of Marseille AMPM, Private ports, State, Calanques National Park, GPMM, Euromed	**Financial**: 7.6M (nurseries, CNP mooring scheme...) Land:

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille/MetropolisPorts/Calanques National Park		Presentation and implementation of the Territorial Ecological Restoration Scheme (STERE) including operations to restore ecological functions and habitats: - Organisation of moorings for small and large yachts (particularly in the Parc des Calanques), - Installation of nurseries, etc. - Ecological moorings for diving activities
VDM/METROPOLE		Actions to combat macro-waste: Zero Plastic Waste Beach Charter action plan
City of Marseille		Posidonia Plan: list of initiatives including:

		- marine pollution prevention initiatives; - greater scientific and technical expertise for the establishment of Posidonia meadow protection and restoration methods; - education and awareness-raising operations - Support and implementation of innovative meadow restoration experiments
GPMM/EPA EUROMED/METROPOLE/VDM		Actions against industrial, domestic and rainwater pollution, including the watersheds (Huveaune and Aygalades): - Combined water retention network and reservoir (ARENC) - Optimisation of coastal drainage works - Master plan for managing rain water within the GPMM - Operation to reduce commercial pollution - Rainwater management for the Corbières site

ML4 - ARCHIPELAGOS AND ISLANDS: UNIQUE FEATURES IN NEED OF PROTECTION

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
These islands are the jewels of the Marseille coast, they stand out for their number and variety. - The Riou archipelago, the only uninhabited island on the coast of the French mainland - The Château d'If, Marseille's the first royal fortress, - The Frioul archipelago and its two islands, both wild and urban - The Endoume archipelago and its military fort	The carbon neutrality of Marseilles must be achieved through the neutrality of its islands, they are one of the territory's unique features and must be protected.	AMPM, City of Marseille, State, Calanques National Park,	**Financial**: Around €15m will be+ needed to finance the action.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille Parc National des Calanques Conservatoire du littoral	All parties involved with the Frioul Islands	Presentation of the global strategic plan for the Frioul Islands, the result of collaborative work by all parties involved in the Frioul Islands and their surroundings; part of the SMILO NGO's certification process: a complete action plan integrating waste, energy, biodiversity, landscape and heritage aspects
City of Marseille		Rehabilitation and renaturing of the Plaine Hoche (Frioul)
City of Marseille		Management of the Frioul archipelago : - Accessibility and visits - Removal of landscape black spots and renaturing
RTM Icard		Accessibility of islands and archipelagos (ferry and barge)
Parc National des Calanques Conservatoire du littoral		Programme to promote the heritage of the Calanques National Park (archipelagos, southern coastline and Cap Croisette)

ML5 JOINT INTERNATIONAL ACTION AND EXCHANGE OF EXPERTISE

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The aim is to strengthen research programmes, especially on an international scale. These are projects involving research, innovation, data acquisition, data sharing and feedback	Improve knowledge on decarbonation issues through research and international exchanges of practices	AMPM Cities, private ports, National Government, Calanques National Park, GPMM, Euromed, ADEME	*not identified at this stage*

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Completion of a diagnosis of the Marseilles territory to anticipate the development of recommendations for the local and shared governance of sensitive coastal, island and marine environments. Collaboration with foreign authorities to participate in monitoring the Marseilles approach such that they can later transpose it to their own territories, as well as provide methodological and practical support to the Marseilles diagnosis based on their own experience
AMP Metropolis		International outreach: towards COASTING 2 on a Mediterranean scale
UPACA		Working towards energy transition for marinas (study)
Region		Study and research projects on bioethanol and hydrogen
Calanques National Park (PNC)		Study and research on the management of invasive alien plant species (IAS)
Calanques National Park (PNC)		Study and research on soil erosion management
Calanques National Park (PNC)		Climate change adaptation/mitigation in a protected area

ML6 - AWARENESS CAMPAIGNS

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The objective is to support the dynamics of marine environment education groups through workshops on biodiversity and marine ecosystems, eco-actions, environmental issues related to water	Protecting marine biodiversity by changing habits and raising user awareness.	AMPM Cities, Calanques National Park, Assoc	**Financial**: Around €550k will be needed to finance the action.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
AIEJE Le Naturoscope		Mediterranean Eco-actions campaign for the Metropolis area's bays where covered by the Contract
AIEJE Le Naturoscope		InfEau Mer campaign for beach users and the general public
Calanques National Park		Call for "Educalanques" ideas - 3rd generation learning partnership
EPAGE HuCA		Deployment of ISEF projects across the EPAGE HuCA (excluding BV Huveaune) - Aygalades sector
City of Marseille		The HUBLOT, a place to raise marine environment awareness for the general public - Discovery trail and numerous educational activities
City of Marseille		Educational programmes initiated by the Municipal Centre for the Discovery of the Sea (Pointe-Rouge) + Underwater trails + Development of educational marine areas
Associations/NGOs (Naturoscope, Marseille capitale de la mer, CPIE, FSN 13, Surfrider, Amie du Marégraphe, Planète Mer, Hatoup, etc.)		Educational activities for a varied public: children (school, leisure centres), young people, adults

5.2.10 Education and Awareness

ES1 - SUPPORT THE DEPLOYMENT OF 2 NEW INFRASTRUCTURES DEDICATED TO ENVIRONMENTAL EDUCATION

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The City of Marseille currently has eight environmental education facilities, three educational farms, two nature centres, two coastal biodiversity awareness facilities and a youth facility for the environment (ENJEU), to raise nature awareness among the general public, especially young people. These structures are genuine levers for building the foundations of tomorrow's sustainable practices: • By making children aware that sustainable development is about the needs of present and future generations. • By encouraging and adopting environmentally friendly behaviour. • By helping the children of Marseille to learn to be responsible In this context, the aim is to continue to deploy these municipal or association facilities in strategic locations across Marseille	Raising awareness of the need to respect the environment in order to change current and future practices	City of Marseille SMUC	**Financial**: Around €1.5M in investment needed to finance the first actions identified

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Creation of a 2nd ENJEU (ENvironnement JEUnesse), in the northern districts and linked with the Massif de l'Etoile
SMUC (Stade Marseillais Université Club)		La Ferme du 8ème

ES2 - TRANSFORMING SCHOOL AND NURSERY PRACTICES

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The city of Marseille is committed to a strong practice transformation dynamic to reduce carbon emissions by municipal facilities; activate the levers that will improve the quality of life and health for its population, especially its children: Ecolocrèche certification, implementation of a new school catering model which will have an impact on more than 55,000 children, serving 6 million meals per year (end of the single central kitchen model, training to reduce food waste in canteens, etc.)	Consume better and less to reduce our carbon footprint	City of Marseille	**Financial:** Around €130 million in investment will be needed to finance the first actions identified.

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Supporting crèches through the Ecolocrèche Label procedure
City of Marseille		The 'Canteen of Tomorrow' project which will involve working to reduce food waste in school restaurants. Under the current Public Service Delegation (DSP) for school catering, 55,000 meals per day are prepared in a single central kitchen and then transported to the school restaurants using refrigerated vehicles. The aim is to design a new school catering system proposing a new production method (no more single central kitchen, construction of around thirty new kitchens) and by reconsidering how the system is managed. In this context, the issue of carbon impacts will be important (procurement, delivery, etc.). Short circuits, links with urban agriculture, increasing the share of products from organic agriculture by contributing to the structuring of local channels, the use of cyclo-deliveries, work on food waste, support for municipal staff in change and ecological transition, will play a role in reducing carbon emissions.

ES3 - CREATION OF AN EDUCATIONAL PROGRAM THAT ALSO COVERS THE CLIMATE EMERGENCY, ENERGY SOBRIETY AND RESPECT FOR THE ENVIRONMENT

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The City of Marseille is implementing a wide range of actions in the field, educational approaches to inform, raise awareness, train and educate people of all ages integrating respect for the environment. The objective here will be to target young children, aged 3 to 11, and define an adapted educational programme that meets the environmental challenges of tomorrow within the framework of the local educational project and in conjunction with the popular education federations and the French Ministry of Education.	Implementing an educational program covering awareness raising and experimentation will have a positive on younger children and help build a sustainable and healthy future	City of Marseille	Around €300K per year will be available to support the creation and implementation of the educational program

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Deployment of engineering resources in order to build and lead the educational program and scientific support for the approach (support for the development of scientific culture by qualified and recognised invited experts).
City of Marseille	Popular education federations, associations, the Metropolis, French Ministry of Education, etc.	Organisation of an environmental education partnership network
City of Marseille		Creation of a digital platform to centralise the educational proposals for the program with the aim of improving comprehension, consistency and equity. A dynamic tool that will bring the program to life.
City of Marseille		Creation and dissemination of educational tools to support people who work with children (kits, podcast, etc.)

ES4 - SUPPORT A MAXIMUM OF AWARENESS-RAISING ACTIONS ACROSS THE TERRITORY

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The City of Marseille is working alongside those involved in environmental education and sustainable development to raise general awareness of ecological and energy transition challenges. It intends to support a maximum number of project applications combining environmental, social, economic or cultural themes: energy, biodiversity, water, waste, mobility, food, consumption, housing, solidarity, health, sport and heritage. These projects will feed into the awareness-raising-education program.	To be able to support the dynamics involved in the evolution of more sober, decarbonised and healthy practices	City of Marseille French Ministry of Education, ville de l'enseignement	**Financial**: Around €3 million per year will have to be mobilised to finance the first actions identified

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Operation of ENJEU 2: human resources and scientific support
City of Marseille and French Ministry of Education	French Ministry of Education, Génération vélo	Learn to ride a bike
City of Marseille and French Ministry of Education	Associations/NGOs	Funding of environmental education interventions to enrich the program
City of Marseille		Eco-citizens' village (fun courses with free workshops for young people to raise awareness on ecology and respect for the planet) - Road education trails
La Ligue de l'enseignement		Development of a comprehensive educational programme for the world of tomorrow
Surfrider foundation		Cinemaplage and escape game
EDF		Development of junior climate murals
Les Amis de Gylofere		From the land to the plate
Ligue Sud de Voile		JO 2024 - Serious Game for the Sea

Earthship Sisters		JO 2024 - Earthship Sisters
Léo Lagrange Méditerranée		Carbone Scol'ERE
Léo Lagrange Méditerranée		Houses for all Mobilised for the environment

ES5 - INVOLVING ALL CITIZENS AND BUSINESSES IN THE CLIMATE CHALLENGE

Description	Carbon neutrality challenges	Parties involved	Budget and the major identified obstacles
The City of Marseille wants to help the people of Marseille to become more involved in public and political actions and to demonstrate their desire to participate in the transformations that will lead to greater energy efficiency and social cohesion.	To develop an environmental and social policy through a citizen participation approach. A31	City of Marseille	Not assessed at this stage

First projects identified

Sponsor(s)	Partner(s)	Project(s)
City of Marseille		Creation of l'Assemblée du futur (the parliament for the future - see Governance)
City of Marseille		Creation of a public awareness raising and participation tool
Veolia		Project proposal: Creation of a citizen's supervisory body ('observatiore citoyen')
CCI		Proposal of a group of projects: Marseille commerce and trade decarbonisation and zero-carbon acceptance observatory - Dissemination and exchange of good practices, Large-scale awareness-raising-action for company directors and their employees covering climate issues and the co-construction of operational action plans
Cité des transitions		Creation of a grouping dedicated to the hundreds of businesses locally involved in Marseille's ecological, social and solidarity-based transitions

5.3 B3-INDICATORS FOR STEERAGE, EVALUATION, AND LEARNING

A trajectory progress assessment monitoring impact and achievement indicators must be put in place, specifically based on monitoring already completed by the SRADDET, the PCAET and the ADEME Territoire Engagé Transition Ecologique approach. The 9 French cities involved in the 100 Cities mission will work together during 2023 to identify a common set of indicators.

6. C - ACHIEVING CARBON NEUTRALITY BY 2030

6.1 C1-INNOVATIONS IN ORGANISATION AND GOVERNANCE

C.1.1: Governance actions needed for transition					
Action	Description	Leader	Involved parties	Impacts	Co-benefits
Establishment of shared territorial governance	Organisation of steering committees chaired by the City, Metropolis and Region Organisation of 8 themed commissions	City, Metropolis, Region	Technical and scientific partners (ADEME, CEREMA, Members of the Scientific Council) External project partners	Steering of high-impact projects and fluidity of exchanges on projects involving large numbers of partners	-
Structuring of the City's internal climate action (via the Ademe Territoire engagé label developed with the European Energy Award)	Internal audit of local authority handling of the transition with identification of action plans for progress	City of Marseille	All city council departments	A transversal approach to identify areas for improvement in all areas: urban planning, public spaces, purchasing policy, IT, etc.	
Steering committee for the development of public spaces (Roads Committee/3DS Law)	Governance associated with the development of public space in Marseille	City of Marseille / Metropolis	-	Implementation of a coordinated public space improvement program and its relation to climate issues	Quality of life, Health,
Housing Inventory	34 commitments, 3 of which are	City of Marseille / Metropolis	to be completed later	Coordination of housing-related actions	Quality of life, Reduction of inequalities

	specifically related to energy efficiency and fuel poverty			including energy renovation works	
Energy Sobriety Plans for local authorities and businesses	Internal strategies to mobilise all parties towards a rapid reduction in energy consumption and awareness of the need to set an example	City of Marseille / Metropolis / Region / Public and private partners	…	These plans identify high-impact actions that will be relatively inexpensive and could be implemented in the short term	Accompanying behaviour change
Euromed Collective Innovation Laboratory	A space for dialogue to pool the efforts of local businesses through a common approach to sharing information and skills	Euroméditerranée	National governement, Southern Region - Provence-Alpes-Côte d'Azur, Bouches-du-Rhône Department, Aix-Marseille-Provence Metropolis, City of Marseille	Increasing competence in innovation	

Public and private parties involved in the Marseille 2030 approach

All of the parties listed below are involved in the Marseille 2030 initiative. Some of them have supported the city's bid by highlighting the strengths that need to be activated to make Marseille a model of carbon neutrality. Others, also mentioned in the action plan section, have proposed initial projects which will contribute to the goal of carbon neutrality.

Type	CAPITAL STRUCTURE
Association/NGO	MARSEILLE CAPITALE DE LA MER
Association/NGO	LA ROUE MARSEILLAISE
Association/NGO	COLLECTIF ANTI NUISANCES ENVIRONNEMENT

Association/NGO	AIRCARTO
Association/NGO	LE JARDIN DE NOAILLES
Association/NGO	UBÁ SUSTAINABILITY
Association/NGO	CAP AU NORD
Association/NGO	MARSEILLE PASSIF 2030
Association/NGO	BIOZERGY
Association/NGO	LES MOUTON MARSEILLAIS
Association/NGO	ENTREPRENEURS POUR LA PLANETE
Association/NGO	SYNDICAL PROFESSIONNEL DES PILOTES DU PORT
Association/NGO	WINGS OF THE OCEAN
Association/NGO	LA RÉSERVE DES ARTS
Association/NGO	R-AEDIFICARE
Association/NGO	SURFRIDER
Association/NGO	ATELIER BLEU CPIE CÔTE
Association/NGO	GERM
Association/NGO	LE PAYSAN URBAIN
Association/NGO	ASSOCIATION SMART AVENIR GREEN
Association/NGO	LEPIDOS
Association/NGO	GERM
Association/NGO	CITÉ DE L'AGRICULTURE
Association/NGO	OPERA MUNDI
Association/NGO	HEKO FARM - LE TALUT
Association/NGO	1 DÉCHET PAR JOUR
Association/NGO	VELO EN VILLE
Association/NGO	VELOSAPIENS
Association/NGO	WELLO
Association/NGO	FNE PACA
Association/NGO	FRESQUE DU CLIMAT
Association/NGO	LES COLPORTES
Association/NGO	NEEDE
Association/NGO	PLASTIC ODYSSEY
Association/NGO	SURFRIDER
Association/NGO	BLEU TOMATE
Association/NGO	BOU'SOL
Association/NGO	AMERMA
Association/NGO	LA TABLE DE CANA

Association/NGO	ALEC
Association/NGO	CLUB IMMOBILIER
Association/NGO	ENVIROBAT BDM
Association/NGO	GERES
Association/NGO	NOS QUARTIERS DEMAIN
Association/NGO	RAEDIFICARE
Association/NGO	PLANETE BIODIV
Association/NGO	NEGAWATT
Association/NGO	VIRAGE ENERGY
Association/NGO	GREEN CROSS FRANCE
Association/NGO	ZERO WASTE FRANCE
Association/NGO	1 DECHETS PAR JOUR
Association/NGO	ATMOSUD
Association/NGO	AVITEM
Association/NGO	GREC SUD
Association/NGO	CLUB CROISIERE MARSEILLE PROVENCE
Association/NGO	MARSEILLE SOLUTIONS
Association/NGO	YES WE CAMP
Association/NGO	NOS QUARTIERS DEMAIN
Business	BIOMITECH
Business	EAUX DE MARSEILLE
Business	NEO-ECO, EMPAN ET NATURAL-SOLUTION
Business	AEROPORT MP
Business	AGILENVILLE
Business	ALKIOS
Business	BERT
Business	BET LAMOUR
Business	BÉTON MALIN
Business	BOVLABS
Business	CARBON 24
Business	CEMEX
Business	CITEO
Business	CMA CGM
Business	CONSTRUCTA
Business	CREDIT AGRICOLE ALPES PROVENCE
Business	DEKI

Business	EDF
Business	E-DOLPHIN
Business	EIFFAGE
Business	ENEDIS
Business	ENERCOOP
Business	ENEDIS
Business	ENERLIS
Business	ENGIE
Business	EQOSPHERE
Business	ESSENTIAL
Business	FAB'LIM
Business	FLEXYCONSIGN
Business	GLOKIS
Business	GRDF
Business	GREEN CITY
Business	GREEN PROD
Business	HL INTERNATIONAL EXPRESS VITROLLES
Business	HOPPS
Business	HYSILABS
Business	LA TEAM WEB
Business	INCASSABLE
Business	INTERXION FRANCE
Business	ISOWAT PROVENCE
Business	LA FABULERIE
Business	LA POSTE
Business	LEMON TRI
Business	LES ALCHIMISTES
Business	LICA EUROPE
Business	EVOLIO - LA VARAPPE
Business	LIGN.O
Business	LITTERSNAP
Business	MASSILIA SUN SYSTEM
Business	MESSIBAT INTERNATIONAL
Business	MIN - MINOPOLIS
Business	MIOS BY SNEF
Business	NATURAL SOLUTIONS

Business	NEO ECO
Business	OLIVIANNE
Business	OM
Business	ORANGE
Business	OZO
Business	PAIN ET PARTAGE - PASTIS
Business	PROVENCE AVENIR
Business	PSEALOG/KEEEX
Business	REDMAN MÉDITERRANÉE
Business	RICHEL GROUP
Business	RIVE NEUVE
Business	SAS LORMAUTO
Business	SAS MEGA - GREEN DAYS HOLIDAY
Business	SIRADEL
Business	SONERGIA
Business	SUEZ
Business	SUPER CAFOUTCH
Business	SURYA CONSULTANTS
Business	SYNCHRONICITY
Business	TDSO
Business	TECHNOCARBON
Business	VEOLIA
Business	WAVESTONE
Business	WEATHER MEASURES
Business	WERECY
Business	SERENY SUN
Business	YOYO ECO
Business	ZAKARIAN-NAVELET
Business	ZEI-WORLD
Institution	GPMM
Institution	AIX MARSEILLE UNIVERSITY
Institution	EUROMEDITERRANEE
Institution	SMART PORT EN GRAND (GPMM, CCI AMP, AMU)
Institution	CCIAMP
Institution	APHM
Institution	ADEME

Institution	AMU
Institution	CAPENERGIES
Institution	CAISSE DES DEPOTS - BANQUE DES TERRITOIRES
Institution	CEREMA
Institution	CHAMBRE DES METIERS ET DE L'ARTISANAT
Institution	PREFECTURE 13
Institution	AIX-MARSEILLE-PROVENCE METROPOLIS
Institution	PROVENCE-ALPES-CÔTE D'AZUR REGION
Institution	IRD

6.2 C2-SOCIAL AND OTHER INNOVATIONS

Involvement of citizens and stakeholders in the climate transition

Social inclusion will be the cornerstone to achieving climate neutrality in Marseille, in keeping with the municipal commitment to a fairer, greener and more democratic city. Since 2020, a number of actions have been completed to mobilise the parties involved around climate transition and social justice issues. First of all, the city of Marseille organised a **dozen "Transition Mondays" sessions**. These conference-debates have been a chance to regularly invite everyone involved in the ecological transition process (companies, associations, institutions, citizens) to meet up and exchange on different themes.

The city has systematised the inclusion of all involve d parties in the city's policy making decisions: Organising the "**Housing Inventory**" in November 2022, the 2nd day of the **Sustainable Construction Charter** in October 2022 and organising a seminar associated with **participative workshops on resilient city centre** and climate change adaptation including in March 2022. In these development operations, the city has increased the number of its **citizen consultation mechanisms**: for the Catalans beach, the Place Jean Jaurès or the Place Sébastopol for example.

At the end of 2022, an association was created to support the **Cité des transitions project**, this involved a hundred or so highly motivated businesses and individuals from Marseille, who will coordinate the networking of transition ecosystems and site them in multiple locations across the city.

In the midst of all these local democracy mechanisms and after a number of consultations, **the Citizens' Parliament for the future** was officially launched on 15 March 2023 at the Town Hall. This will be a major element of municipal strategy for citizen participation. This assembly of 111 citizens will examine the public administrations political initiatives and, more specifically, it will be involved in monitoring the climate city contract. Initial work will focus on two defined topics:

- The use of water, a shared resource threatened by drought.
- Tourism, how to welcome visitors and respect the city and its inhabitants.
- As well as two further topics that the Parliament will define for itself.

As part of a collective approach to transforming the territory, and in collaboration with the Aix-Marseille-Provence Metropolis and the Southern Region, the City of Marseille has organised **two workshops to bring together all involved parties: businesses on one hand and associations/NGOs** on the other, to draw up the Climate City Contract in December 2022.

After launching a inviting everyone to express their interest through an online questionnaire, the Marseille 2030 Mission collected just over 100 proposals, highlighting the dynamism of Marseille's population. There is significant popular support for these projects, depending on their themes, maturity and impact on decarbonisation. Further work will be carried out to identify the different levers of support these projects will require and the role that the Marseille 2030 approach could play in them.

An endowment fund has also been created to mobilise private funding which will be passed on to projects for the decarbonisation of the territory. It aims to support the launch and up-scaling of innovative projects covering all aspects of decarbonisation.

C.2.1: Social innovations needed for transition					
Name of the action	Description	Leader	Parties involved	Impacts envisaged	Co-benefits
Citizens' Assembly for the Future	Establishment of a college of randomly chosen citizens to guide municipal public action. A working group will be dedicated to Marseille 2030 and the decarbonisation of the territory (see Annex 7.5)	City of Marseille	Citizens	This parliament will work on the social obstacles (acceptance and capacity of the people of Marseille to support the transformations necessary to achieve carbon neutrality, capacity for direct action by the population)	Strengthening social ties, improving how inequality issues can be integrated into the transition
Mobilisation of the Municipal Youth Council on the climate challenge	A council of around thirty high school students whose purpose is to guide public action. The 2022-2023 group works on the climate dimension	City of Marseille	High school students	Identification of obstacles and perspectives from a young person's point of view	Civic involvement, Social ties
Resilient City Heart project consultation methodology	Development of a methodology to improve consultation in development projects	City of Marseille / Metropolis	Citizens, research and training institutes for urban and landscape planning	A solid methodology will make it possible to accelerate the transformation of public	Social ties, improved consideration of how social inequality issues can be integrated into transition,

			(ENSP, IMVT)	space, assist the transformation of mobility resources and return nature to the city	
Marseille 2030 partnerships and mobilisation of businesses	In the short term: identification of climate projects proposed by local businesses/associations In the medium term: Consolidate business/association commitments build up the dynamics In 2023, the City of Marseille's economic roadmap will be drawn up, this could also address the definition of low-carbon economic sectors and how they could be integrated into a future update of the City Climate Contract.	City of Marseille / Metropolis / Region	Businesses, associations, public institutions	Creation of local emulation and a feeling of belonging to a project that will succeed, creation of synergies between all involved	Social ties

7. ANNEXES

7.1 CARBON STORAGE DATA

By way of illustration, the following graphs show land use by soil type in the Marseille territory followed by the carbon stocks, in CO2 equivalent, of these surfaces.

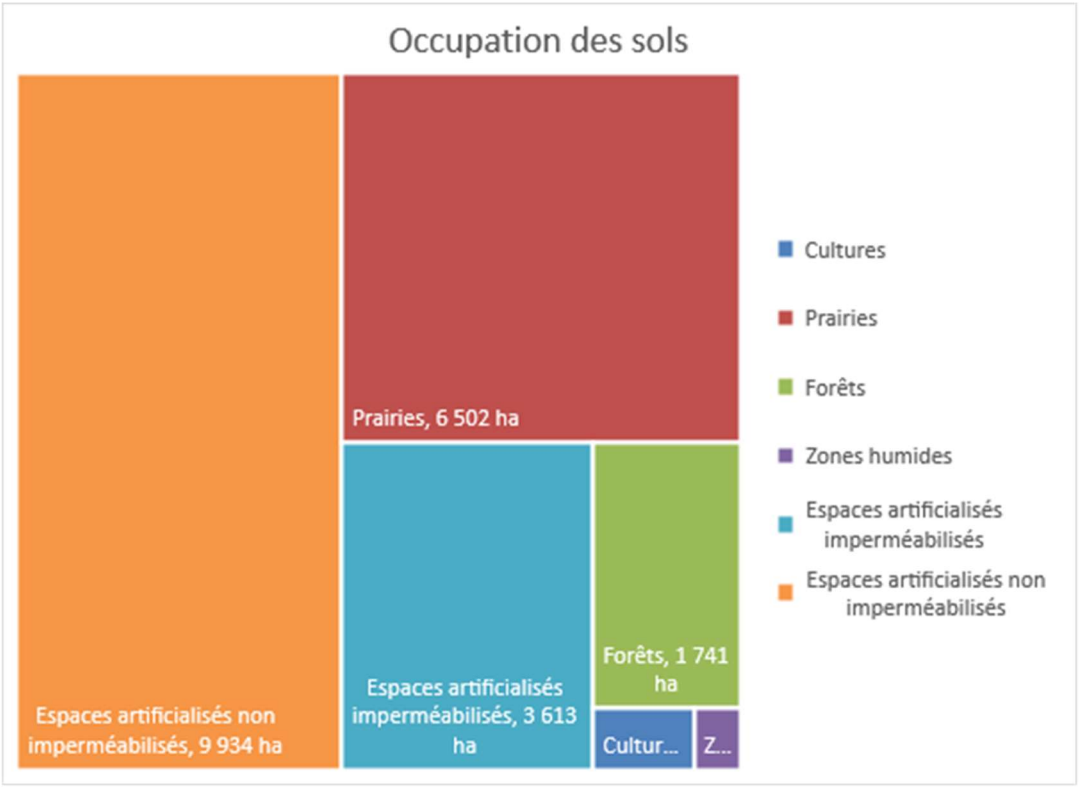


Figure 40 - Distribution of land by soil type - Marseille - 2018 - Corine Land Cover data

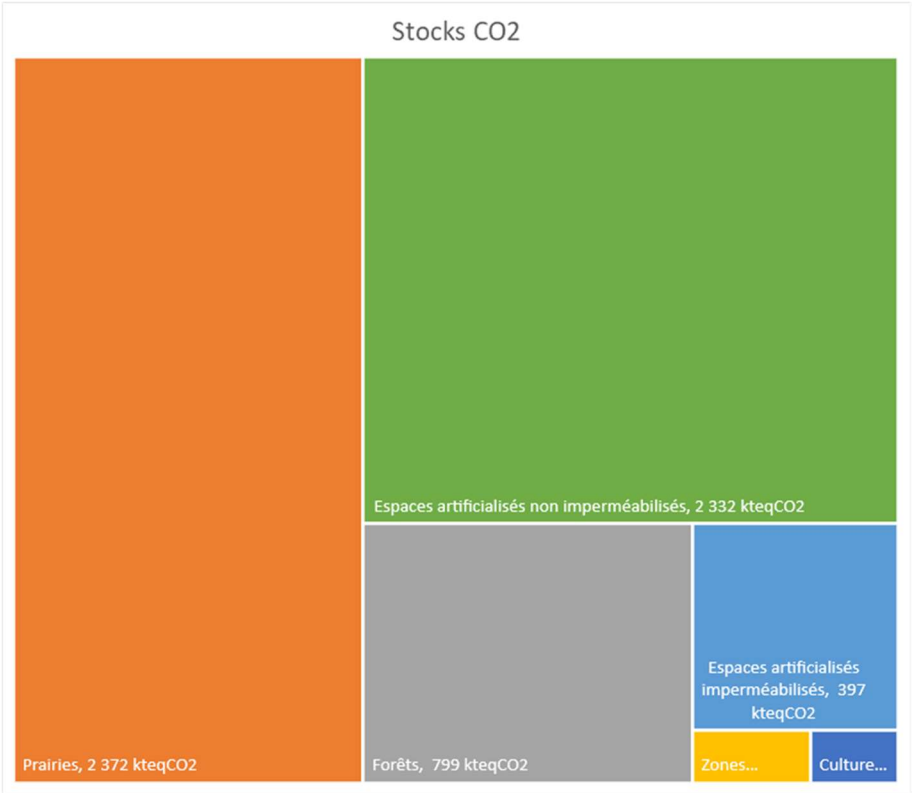


Figure 41 - CO2 stocks by soil type - Marseille - 2018 - Corine Land Cover and ALDO data

Finally, the following graph details the annual carbon sequestration flows, in tCO2e/year.

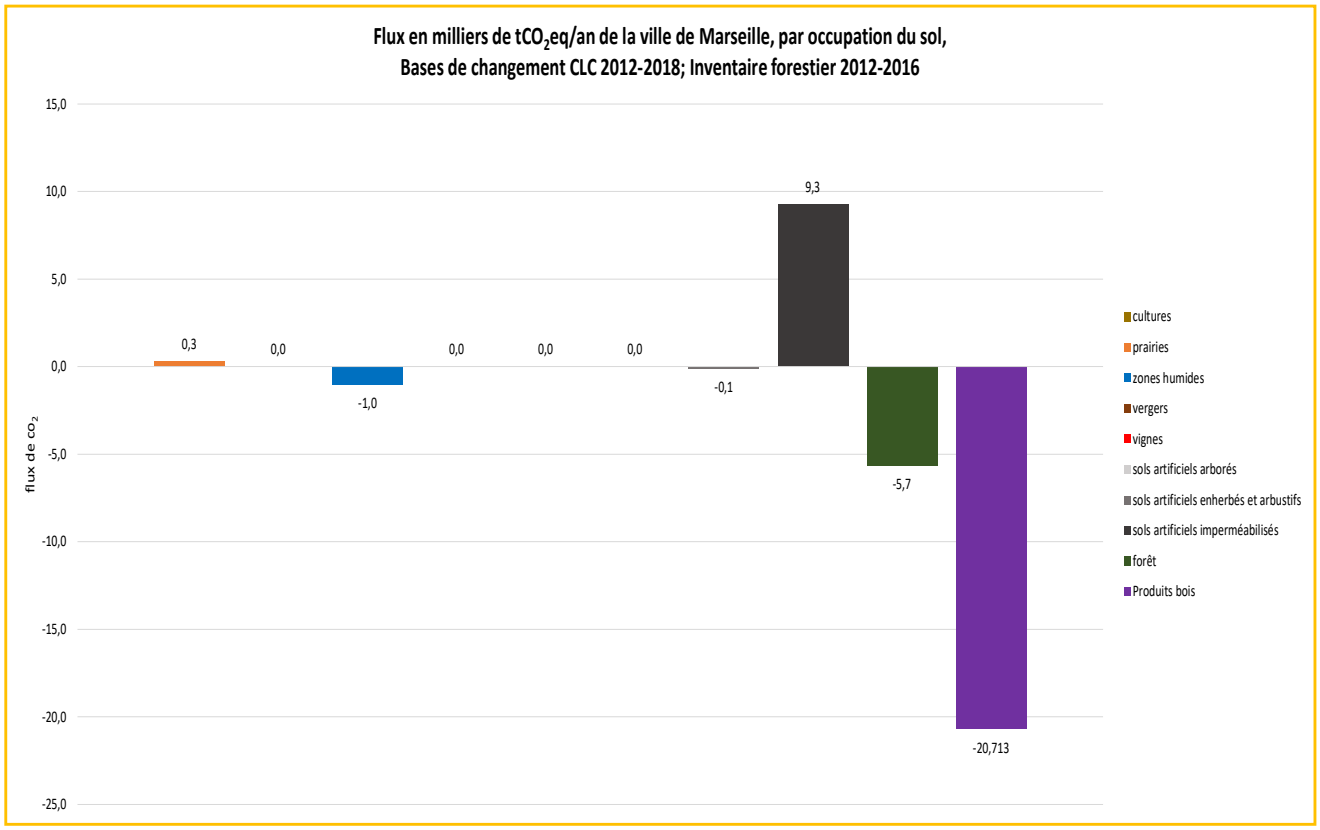


Figure 42 - Annual sequestration flow - Marseille - 2018 - Corine Land Cover data and ALDO ratios, ADEME

7.2 DETAILS OF THE TREND SCENARIO

The following table specifies the assumptions or methodological choices made to produce the trend scenario.

Secteur	Scénario tendanciel: Politiques actuelles - gains/2019				
	Objectifs d'émissions en 2030	Objectifs de réduction en valeur	Objectifs de réduction en % / 2019	Référence	Commentaires
Transports routier	544 378	-203 494	-27,2%	PDM : -28% /2017	Equivaut également à l'objectif du PCAEM appliqué au transport routier (rappel: -26% des émissions du transport / 2012)
Résidentiel	382 683	-125 459	-24,2%	Evolution fil de l'eau	L'application de l'objectif du PCAEM (-19%/2012), reviendrait à un objectif de baisse de 1,2% / 2019. De plus, le fil de l'eau indiqué dans le PCAEM (baisse de 8% entre 2012 et 2030), aboutirait à des émissions plus élevées qu'en 2019. D'où le choix de partir sur l'évolution "fil de l'eau selon extrapolation de la période 2012-2019" qui permet d'intégrer une réelle baisse tendancielle des émissions et de ne pas se pénaliser au regard de l'objectif global.
Tertiaire	229 252	-61 764	21,2%	PCAEM : -28%/2012	L'objectif du PCAEM de 28%/2012 est cohérent par rapport aux données 2019. Le tendanciel du PDAEM également. En revanche, le potentiel de réduction est à éclaircir selon données ATMO.
Industrie	159 816	-66 538	-29,4%	Evolution fil de l'eau	L'objectif de réduction du PCAEM (-18,6%/2012) ne peut s'appliquer ici: Les caractéristiques de l'industrie sur Marseille sont très différentes de l'industrie sur l'agglo avec la ZIP, et l'application de cet objectif entraineraait une hausse des émissions de 19% par rapport à 2019. Le tendanciel du PCAEM ne serait non plus cohérent avec les données 2019. D'où le choix de conserver le tendanciel "fil de l'eau selon extrapolation de la période 2012-2019", ce qui permet d'intégrer dans le tendanciel la politique national de décarbonation du secteur industriel.
Transports maritimes	152 377	-34 907	-18,6%	Evolution fil de l'eau	Le PCAEM ne fournit pas d'objectif ni de tendanciel spécifiquement sur le secteur maritime. En appliquant le tendanciel tranport du PCAEM, l'évolution ne serait pas cohérente avec les émissions 2019. D'où le choix de conserver le tendanciel "fil de l'eau selon extrapolation de la période 2012-2019", ce qui permet d'intégrer dans le tendanciel les actions d'électrification à quai, et les stratégies de décarbonation des principaux armateurs (en particulier CMA-CGM)
Déchets	5 465	0	0%	Evolution fil de l'eau	Le PCAEM ne fournit pas d'objectif spécifique sur ce secteur, ni de tendanciel. Choix de garder le "fil de l'eau selon extrapolation de la période 2012-2019", soit pas d'évolution depuis 2012.
Branche énergie	4 520	-785	-14,8%	Maintien niveau 2012	Le PCAEM ne fournit pas d'objectif GES sur ce secteur, ni de tendanciel. L'évolution au fil de l'eau en extrapolant la période 2012-2019 aboutirait à une évolution à la hausse de près de 29%, ce qui ne reflète pas les engagements de production d'ENRR du SRADDET et du PCAEM. D'où le choix de garder le niveau 2012, soit une baisse de près de 15% par rapport à 2019.
Transports ferroviaires	3 761	-717	-16,0%	Maintien niveau 2012	Le PCAEM ne fournit pas d'objectif ni de tendanciel spécifiquement sur le secteur ferroviaire. Le fil de l'eau selon extrapolation de la période 2012-2019 aboutirait à une augmentation de 32%. Pour refléter à la fois la politique de développement du train pour les trajets du quotidien et l'électrification, le choix est de garder la valeur 2012, soit une baisse de 16% /2019
Agriculture	666	20	-2%	Maintien niveau 2012	Le PCAEM fixe pour objectif une baisse de 2% des émissions / 2012, ce qui aboutirait à une hausse des émissions de 3% / 2019. D'où le choix de garder le niveau d'émissions de 2012 permettant d'illustrer le soutien à l'évolution des pratiques agricoles
Total émissions Sc 1 et 2	1 482 918	-493 643	**-25%**		

7.3 DETAILS OF THE EXPLORATORY SCENARIOS

7.3.1 DETAILS FOR ALL SECTORS

The table on page 62 of this document resumes the estimated potential gains under ambitious exploratory scenarios.

The methods used by each sector are specified below.

Sector	Exploratory scenario development method and assumptions.
Road transport	The exploratory scenario was based on the passenger transport share, which represents 65% of road sector emissions. Note: the use of private cars is behind 61% of all road sector emissions. No exploratory work has been carried out on the logistics share. Therefore, the result of the exploratory scenario for the passenger mobility share has been applied to the whole road sector; significant evolutions could however occur in the logistics sector, with changes to engines (the development of LEZs), and changes to distribution channels.
Residential	The exploratory scenario has been detailed in the body of the report. It is based on sobriety measures, the renovation of housing, and the changes to the energy mix supplying the sector.
Service Sector	The exploratory scenario has been detailed in the body of the report. It is based on sobriety measures, the renovation of housing, and the changes to the energy mix supplying the sector.
Industry	An ambitious hypothesis of a 50% reduction in emissions from this sector was proposed, allowing for European changes to carbon taxation, the decarbonisation of industry being a national priority, and investments, notably those made in the construction of an industry sector for hydrogen production.
Maritime transport	An ambitious hypothesis of a 50% reduction in emissions from this sector was proposed by the sector's operators, in view of changes to European legislation on maritime transport and the envisaged development of less carbon-intensive fuels. CMA CGM's commitment illustrates this dynamic.
Waste products	An assumption of a 50% reduction in emissions from this sector has been made, notably considering reduction at source, collection and bio waste recovery policies. In terms of scopes 1 and 2, this sector will not be the priority for reducing emissions.
Energy sector	A hypothesis of 100% reduction of emissions from this sector has been put forward, considering a total greening up of the territory's energy production.
Agriculture	The Afterres scenario envisages that the sector's emissions will be halved by 2050, while the exploratory scenario advances this objective to 2030. It should be remembered that in the Marseille territory, this sector represents only 0.03% of total emissions.

7.3.2 MOBILITY

The following details the methodology used to develop the road passenger transport exploratory scenario.

The evolution of modal shares as projected in the Mobility Plan is shown in the table below:

Scénario PDM

	Nombre de déplacement	Dépl-km	Coef	Marche	TC	Voiture	Vélo	Autre	Distance moyenne	Part VP		Part TC		Part vélo		Part MAP		Part Autre	
										2019	**2030**	2019	**2030**	2019	**2030**	2019	**2030**	2019	**2030**
0 à 1km	875 501	386 111	1,0	734 577	30 341	93 745	9 555	7 283	**0,4**	10,7%	**4,7%**	3,5%	**3,5%**	1,1%	**9,0%**	83,9%	**82,0%**	0,8%	**0,8%**
1 à 2,5km	684 018	1 076 767	1,0	321 566	99 838	222 114	20 048	20 452	**1,6**	32,5%	**12,0%**	14,6%	**22,0%**	2,9%	**17,0%**	47,0%	**46,0%**	3,0%	**3,0%**
2,5 à 7,5km	736 254	3 259 698	1,0	58 036	207 232	418 369	13 786	38 830	**4,4**	56,8%	**35,7%**	28,1%	**40,0%**	1,9%	**12,0%**	7,9%	**7,0%**	5,3%	**5,3%**
7,5 à 15km	283 761	2 944 990	1,0	3 783	84 216	177 381	1 013	17 369	**10,4**	62,5%	**55,9%**	29,7%	**32,0%**	0,4%	**5,0%**	1,3%	**1,0%**	6,1%	**6,1%**
15 à 30 km	114 084	2 404 820	0,5	112	19 016	86 834	330	7 791	**21,1**	76,1%	**67,6%**	16,7%	**25,0%**	0,3%	**0,6%**	0,1%	**0,0%**	6,8%	**6,8%**
30 à 50km	50 848	1 883 763	0,3	-	11 514	36 849	134	2 351	**37,0**	72,5%	**69,8%**	22,6%	**25,0%**	0,3%	**0,6%**	0,0%	**0,0%**	4,6%	**4,6%**
50 à 100km	20 872	1 391 877	0,1	-	3 565	16 189	-	1 118	**66,7**	77,6%	**69,6%**	17,1%	**25,0%**	0,0%	**0,0%**	0,0%	**0,0%**	5,4%	**5,4%**
TOTAL	2 765 339	13 348 026																	
		Dépl-km VP	5 438 189						**Dépl.**	1 051 482	**672 023**	455 723	**612 582**	44 865	**298 606**	1 118 074	**1 086 934**	95 194	**95 194**
									%	38,0%	**24,3%**	16,5%	**22,2%**	1,6%	**10,8%**	40,4%	**39,3%**	3,4%	**3,4%**
									Dépl-km	5 438 189	**4 188 698**	2 281 783	**2 938 150**	111 705	**762 530**	1 126 539	**1 068 837**	495 812	**495 812**
									%	40,7%	**31,4%**	17,1%	**22,0%**	0,8%	**5,7%**	8,4%	**8,0%**	3,7%	**3,7%**

Table 6 - Evolution of modal shares projected in the Mobility Plan - AGAM data - Metropolis

The evolution of modal shares as projected in the Exploratory Scenario is specified in the table below:

Scénario Exploratoire

	Nombre de déplacement	Dépl-km	Coef	Marche	TC	Voiture	Vélo	Autre	Distance moyenne	Part VP		Part TC		Part vélo		Part MAP		Part Autre	
										2019	**2030**	2019	**2030**	2019	**2030**	2019	**2030**	2019	**2030**
0 à 1km	875 501	386 111	1,0	734 577	30 341	93 745	9 555	7 283	**0,4**	10,7%	**3,7%**	3,5%	**3,5%**	1,1%	**10,0%**	83,9%	**82,0%**	0,8%	**0,8%**
1 à 2,5km	684 018	1 076 767	1,0	321 566	99 838	222 114	20 048	20 452	**1,6**	32,5%	**9,0%**	14,6%	**22,0%**	2,9%	**23,0%**	47,0%	**43,0%**	3,0%	**3,0%**
2,5 à 7,5km	736 254	3 259 698	1,0	58 036	207 232	418 369	13 786	38 830	**4,4**	56,8%	**32,7%**	28,1%	**40,0%**	1,9%	**17,0%**	7,9%	**5,0%**	5,3%	**5,3%**
7,5 à 15km	283 761	2 944 990	1,0	3 783	84 216	177 381	1 013	17 369	**10,4**	62,5%	**51,9%**	29,7%	**32,0%**	0,4%	**9,0%**	1,3%	**1,0%**	6,1%	**6,1%**
15 à 30 km	114 084	2 404 820	0,5	112	19 016	86 834	330	7 791	**21,1**	76,1%	**54,2%**	16,7%	**35,0%**	0,3%	**4,0%**	0,1%	**0,0%**	6,8%	**6,8%**
30 à 50km	50 848	1 883 763	0,3	-	11 514	36 849	134	2 351	**37,0**	72,5%	**58,4%**	22,6%	**35,0%**	0,3%	**2,0%**	0,0%	**0,0%**	4,6%	**4,6%**
50 à 100km	20 872	1 391 877	0,1	-	3 565	16 189	-	1 118	**66,7**	77,6%	**57,6%**	17,1%	**35,0%**	0,0%	**2,0%**	0,0%	**0,0%**	5,4%	**5,4%**
TOTAL	2 765 339	13 348 026																	
		Dépl-km VP	5 438 189						**Dépl.**	1 051 482	**585 720**	455 723	**631 162**	44 865	**401 574**	1 118 074	**1 051 689**	95 194	**95 194**
									%	38,0%	**21,2%**	16,5%	**22,8%**	1,6%	**14,5%**	40,4%	**38,0%**	3,4%	**3,4%**
									Dépl-km	5 438 189	**3 703 920**	2 281 783	**3 123 955**	111 705	**1 159 001**	1 126 539	**971 340**	495 812	**495 812**
									%	40,7%	**27,7%**	17,1%	**23,4%**	0,8%	**8,7%**	8,4%	**7,3%**	3,7%	**3,7%**

Table 7 - Evolution of modal shares projected in the exploratory scenario - source AGAM and INDDIGO

Finally, the following table resumes the assumptions used to assess the carbon impact of the main passenger mobility actions included in the City Contract, the Mobility Plan scenario and the exploratory scenario.

		Reduction in GHG (tCO2e)	Reduction in GHG (tCO2e)	*Comment*
Sheet 1	Bike scheme	-51 832	-27 870	*100% des gains vélo*
Sheet 2	Pedestrian scheme			*En accompagnement des autres mesures*
Sheet 3	Public place calming			*En accompagnement des autres mesures*
Sheet 4	Developing large-scale infrastructures (Metro, Tramwa	-36 084	-35 600	*69% des gains TC*
Sheet 5	Developing light infrastructures (busway)	-6 349	-6 300	*12% des gains TC*
Sheet 6	Preparing the Metropolitan Express Network	-9 840	-9 700	*19% des gains TC*
Sheet 7	Monitoring the modal shift			*En accompagnement des autres mesures*
Sheet 8	Scaling up car-sharing	-22 655	-22 700	*Baisse du nombre de véhicules de 5%*
Sheet 9	Decarbonising public transport	-4 527	-4 500	*30% des bus urbains électriques et 10% des autocars*
Sheet 10	Accelerating adoption of electric vehicles	-35 942	-38 400	*10% du parc électrifié à l'horizon 2030*
Sheet 11	Reduction of speed limit on A-roads			*En accompagnement des autres mesures*
		-21%	-9%	
	Baisse des émissions GES	**-34%**	**-30%**	

Table 8 - Carbon impacts of mobility actions included in the Climate City Contract, as applied to Marseille in the Mobility Plan scenario - INDDIGO

		Exploratoire			
		Reduction in GHG (tCO2e)	**Reduction in GHG (tCO2e)**	**% reduction in emisions for road sector**	*Comment*
Sheet 1	Bike scheme	-80 092	-79 600	-11%	*700km d'aménagements vélos supplémentaires vs PDM*
Sheet 2	Pedestrian scheme			0%	*En accompagnement des autres mesures*
Sheet 3	Public place calming			0%	*En accompagnement des autres mesures*
Sheet 4	Developing large-scale infrastructures (Metro, Tramway, T	-34 649	-34 400	-5%	
Sheet 5	Developing light infrastructures (busway)	-6 097	-6 000	-1%	
Sheet 6	Preparing the Metropolitan Express Network	-23 659	-23 500	-3%	*Accélération projet REM*
Sheet 7	Monitoring the modal shift			0%	*En accompagnement des autres mesures*
Sheet 8	Scaling up car-sharing	-45 310	-45 000	-6%	*Baisse du nombre de véhicules de 10%*
Sheet 9	Decarbonising public transport	-8 617	-8 600	-1%	*50% des bus urbains électriques et 25% des autocars*
Sheet 10	Accelerating adoption of electric vehicles	-95 708	-96 000	-13%	*30% du parc électrifié à l'horizon 2030*
Sheet 11	Reduction of speed limit on A-roads	-6 192	-6 200	-1%	*Baisse de 4% des émissions des dépl. > 15km*
		-30%			
	Baisse des émissions GES	**-62%**	**-62%**		

Table 9 - Carbon impacts of the Climate City Contract's mobility actions as applied to Marseille in the exploratory scenario - INDDIGO

7.3.3 RESIDENTIAL

The following details the methodology used to develop the residential exploratory scenario

		Individual houses	Collectiv housing	Total		Sources
	Number of housing	72 061	379 091	451 152		ATMO
	Energy consumption (GWhEF)	325	1 153	1 478		ATMO
	GHG Emissions (kTCO2e)	79	193	272		ATMO
	Avergae area	85	62			INSEE
	Initial average energy consumption (kWhEP/m²/year)	69	60			Base DPE + ATMO
	Heating energy consumption reduction goal	-50,0%	-50,0%	-50,0%		Hypothesis
	Heating energy consumption goal (kWhEP/m²/year)	35	30			Hypothesis
	Part oh housings to retrofit	30,0%	30,0%	30,0%		Hypothesis
	Number of housings retrofitted in 2030	21 618	113 727	135 346		Calculation
	Ryhtm of annual retrofitting 2024/2030	3 088	16 247	19 335		
	2024	2 162	11 373	13 535		
	2025	2 162	11 373	13 535		
	2026	2 162	11 373	13 535		
	2027	2 162	11 373	13 535		
	2028	4 324	22 745	27 069		
	2029	4 324	22 745	27 069		
	2030	4 324	22 745	27 069		
	Energy gain (GWhEP/year)	64	212	275		Calculation
Primary Energy	Energy wood	5	17	22		ATMO
	Heating networks	5	17	22		
	Electricity	15	51	67		
	Natural gas	32	105	137		
	Fuel	5	18	23		
	Liquefied Petroleum Gas	1	3	4		
Final Energy	Energy wood	5	17	22		Calculation
	Heating networks	5	17	22		
	Electricity	7	22	29		
	Natural gas	32	105	137		
	Fuel	5	18	23		
	Liquefied Petroleum Gas	1	3	4		
	Energy gain (GWhEP/year)	55	182	237		Calculation
	Energy consumption reduction	-17%	-16%	-16%		Calculation
	Final energy consumption	270	970	1 241		Calculation
	Initial GHG emission coefficient in residential sector	0,242	0,168	0,184		ATMO
	Final GHG emission coefficient in residential sector	0,119	0,119	0,119		Hypothesis
	Final GHG emissions	32	115	147		Calculation
	GHG emissions gain	46	78	125		Calculation
	GHG emission reduction rate	-59%	-40%	-46%		Calculation
		147	361	508		
	GHG emissions gain total rate in residential sector	-32%	-22%	-25%		
	Part of GHG emissions gain due to retrofitting	66%	77%	74%		
	Part of GHG emissions gain due to renewable energy	34%	23%	26%		

Table 10 - Table of assumptions and calculations for the residential exploratory scenario - INDDIGO

7.3.4 SERVICE SECTOR

The following details the methodology used to develop the service sector exploratory scenario.

Etat des lieux	
Energy consumption in the tertiary sector (GWh)	2 425
Heating part	24%
Heating energy consumption (GWh)	590
GHG emissions in the tertiary sector (ktCO2e)	270
Heating part	39%
Heating part of GHG emissions in the tertiary sector (ktCO2e)	106

Heatinf energy mix	Actual	Projected
Oil products	11%	0
Natural Gas	57%	30%
Electricity	32%	30%
Heating & cool from networks	0%	40%

Emissions coefficients (ktCO2e/GWh)	Actual	Projected
Oil products	0,250	0,250
Natural Gas	0,204	0,204
Electricity	0,039	0,039
Heating & cool from networks	0,088	0,054

Types of buildings in the tertiary sector	Energy consumption (GWh)	Heating energy consumption	GHG emissions	Heating GHG emissions
Offices	24%	18%	10%	14%
Cafes-hotels-restaurants	17%	13%	20%	14%
Shops	20%	15%	21%	14%
Teaching - research	10%	16%	11%	17%
Community living	5%	7%	7%	8%
Transport organizations	2%	2%	4%	3%
Health and social actions	18%	24%	24%	28%
Sports, culture, leisure and collective facilities	4%	4%	3%	3%
	100%	100%	100%	100%

	Goal -40%	Goal -30%	Goal -20%
Heating energy consumption after retrofitting (GWh)	354	413	472
Energy consumption gain after retrofitting(%)	10%	7%	5%
Heating GHG emissions after retrofitting (ktCO2e)	55	64	73
GHG emissions gain due to retrofitting (%)	19%	16%	12%
Final GHG emissions with new energy mix (ktCO2e)	33	38	44
GHG emissions gain with new energy mix (%)	8%	10%	11%
Total GHG emissions gain (ktCO2e)	73	68	63
Total GHG emissions gain (%)	27%	25%	23%

Table 11 - Table of assumptions and calculations for the service sector exploratory scenario - INDDIGO

7.4 ENERGY BILL: SOURCE DATA

Table of sources:

Sources	Electricity	Natural gas	Petroleum products	Heat networks	Wood energy
Residential	SDES	SDES	SDES	AMORCE 2017	SDES
Service Sector	SDES	SDES	SDES	AMORCE 2017	SDES
Road transport	https://mobiliteverte.engie.fr/conseils-et-actualites/borne-de-recharge/prix-recharge-voiture-electrique.html	https://www.glpautogas.info/fr/prix-gnc-gnv-france.html	SDES		
Industry	SDES	SDES	SDES		SDES
Maritime transport			https://www.fioulreduc.com/prix-gnr		
Rail transport	https://www.enviscope.com/sncf-reseau-annonce-un-prix-de-lelectricite-multiplie-par-4/				
Agriculture	SDES	SDES	SDES		

SDES: https: //www.statistiques.developpement-durable.gouv.fr/prix-de-lenergie-0

7.5 CITIZENS' ASSEMBLY FOR THE FUTURE : KEY ELEMENTS

A new space for reflection, the Citizens' Assembly for the Future intends to allow citizens to formulate concrete ecological and social transition proposals for the construction of a pilot city. The parliament was launched on 15 March 2023. 111 members of the Marseille population, who had expressed their interest in the Citizen's Parliament for the Future, were chosen at random to exercise their roles as citizens of the future within the parliament for a period of one year (non-renewable).

What is the Citizens' Assembly for the Future ?

It is a new democratic tool that allows a random selection of the people of Marseille to work together on medium and long-term issues, it also aims to get the population more involved in public and political action.

3,000 citizens from the voting register were selected at random and invited to participate by an email from the city council. They were then invited to express their interest in participating in the parliament.

From those who confirmed their interest a final random selection of 71 was made. This method ensured a representative sample of the population, respecting gender and age group parity across the city's districts and covering all educational backgrounds.

Representatives of the population who reside in Marseille but are not registered on the electoral lists were also selected randomly: 24 people were thus contacted through solidarity associations.

Finally, 16 young citizens of Marseille aged 16 to 18, were identified through educational establishments and selected at random from those of the city's high school students who agreed to participate.

A total of 111 randomly selected citizens constitute the Citizens' Parliament for the Future. They are appointed each year for a non-renewable period of one year.

How does it work?

The citizens are divided into four working groups of 25 to 30, who meet up once a month, on Saturdays, to work collectively in as a parliament or in groups on themes chosen by the City of Marseille and the assembly itself.

The quality of its work is ensured by the presence of experienced and independent facilitators along with debates and presentations with experts and scientists.

What is its role?

The Citizens' Parliament for the Future is responsible for formulating opinions, making concrete proposals and expressing wishes on subjects concerning the territory of Marseilles, its operation, public spaces, living environment, etc.

These proposals are forwarded to the City of Marseille and examined by its elected representatives and the specific departments concerned by the issues raised. They may also lead to proposals to be debated by the municipal council

Marseille 2030 Climate Target Plan

Climate City Contract

Commitments Section

April 2023

This document refers to sections of the '*Climate City Contract - Commitment*' template provided by the *Net Zero Cities* platform, the organisation responsible for supporting cities in the European '100 Smart and Carbon-Neutral Cities 2030' programme.

CONTENTS

1. INTRODUCTION

The Mediterranean is one of the most vulnerable regions as regards global climate change, which will only exacerbate already existing natural hazards (floods, forest fires, etc.), and is also one of the 34 biodiversity hotspots[1] in the world. Intensive and polluting human activities, combined with sea acidification and extreme temperatures, are damaging the Mediterranean's biodiversity and the health of its inhabitants. The Mediterranean has been a centre for economic, cultural and scientific exchange and for interaction in terms of migration since antiquity. This historic uniqueness has resulted in the emergence of a Mediterranean culture and an urban lifestyle of which Marseille is an archetypal example. Marseille epitomises the Mediterranean. From Massilia to the present day, the city has always been a key port and a place of welcome. It is a city of strong contrasts, ranging from new districts to a run-down historic city centre and very poor districts, and from high-tech industries to a survival economy.

In order to meet the twofold challenge of drastically reducing its fossil fuel consumption while seriously addressing the city's social problems, Marseille is adopting a unique, innovative and ambitious perspective on two interconnected approaches:

- **A top-down approach to sectoral public policies for the decarbonisation** of the urban area using all the available technologies appropriate to our city and involving the inhabitants in order to encourage their support and inclusion,
- **A bottom-up creative, cross-sectoral and human approach** to an overall transformation of society which will result in energy sobriety as well as social cohesion and new shared wealth, and which is democratic in nature because it is supported by all the stakeholders in the area, who are being encouraged by the City, the Metropolis and the Region to form an ecosystem.

The hybrid solutions which Marseille will implement through this dual approach will bring about cultural, technical, industrial and behavioural changes. The roadmap followed by this region could become a model for the Mediterranean. Marseille must become an area where carbon resilience is embodied in proactive policies which combine significant investment in social issues with changes in usage and infrastructure. It is about turning the current vulnerabilities into genuine assets.

On the strength of its commitment and political engagement, and the enthusiasm generated by the initial application, Marseille is proud to be joining the '100 smart and climate-neutral cities by 2030' programme. This is the **starting point of an unprecedented collective mobilisation to tackle the climate crisis**.

Following its selection during the second quarter of 2022, the City began the initial work on the Climate City Contract (CCC) the following quarter with the creation of a launch steering committee involving the Metropolis and the Region. 8 committees worked during the last quarter of 2022 on the development of a first version of the CCC based on the templates provided by *Net Zero Cities*[2] in November 2022.

1 The concept of 'hotspot', developed by the NGO Conservation International, designates regions of the world where it is important to act as a priority because their biodiversity is both rich and under threat. As in other 'hotspots', the biodiversity of the Mediterranean Basin is marked by a high level of endemic wildlife.
2 Organisation supporting the European Commission in leading the Smart and Carbon-Neutral Cities Mission

2. OUR MOTIVATIONS

In addition to the desire to intensify climate action, collectively joining the '100 smart and climate-neutral cities by 2030' programme meets a range of expectations and aspirations. The motivations of the authorities to collectively make commitments in this document include:

- **Organising climate-oriented local institutional cooperation**: Although the application phase at the end of 2021 underlined the fact that a significant number of local stakeholders aspire to refocus their actions around prioritising the climate, it also underlined the advantage of setting up a method to drive initiatives forward. It was stressed that a collective commitment for the region and the climate (especially from the political sphere) aimed at prioritising cooperation and action regarding the challenge of climate change is necessary in order to involve the whole region in the transformations which need to be achieved.
- **Supporting the scaling up of transition initiatives brought about by the Marseille ecosystem** by mobilising all available resources (community expertise, funding tools, etc.) and by enabling everyone to find their place in this transition.
- **Setting up funding mechanisms** to sustain climate action over the coming decades and mobilise a maximum amount of public (European, national and local) and private funding to support high-impact actions in Marseille.
- **Building the narrative of a carbon-neutral Marseille** based on a shared collective vision which allows everyone to envisage themselves in a new low-carbon lifestyle and which outlines the evolution of the local economy which needs to take place.
- **Guaranteeing that the transition deployed is fair and helps to combat social inequalities** in the region.

3. OUR COMMITMENTS REGARDING THE CLIMATE EMERGENCY

The City of Marseille and the Aix-Marseille-Provence Metropolis supported by the Région Sud, co-signatories of this first version of the Climate City Contract, have been committed for many years to an energy and ecological transition based on solidarity in the face of climatic as well as social, economic and environmental challenges. There have been a number of landmark commitments in the past, which we would like to highlight here.

In 2013, the **Région Sud** adopted the first version of the Regional Climate Air and Energy Plan (SRCAE), which was subsequently updated and integrated into the Regional Plan for Sustainable Planning and Development for the Equality of Regions (SRADDET), approved on 15 October **2019**. This was the first **SRADDET** to be adopted in France. It includes, among others, the objectives set out in the National Low Carbon Strategy (NLCS). Since 2017, the Region has placed the climate issue at the centre of its action with the Climate Plan 'A COP in Advance', which includes 141 actions. From 2017 to 2020, the City and the Metropolis were partners in a European project led by the Région Sud called 'Nature For City LIFE'.

In **2019**, the **Metropolis** (created on 1 January 2016) ratified its metropolitan project and adopted, among its 12 commitments, that of 'entering the post-carbon era, to change our air and our energy'. The Metropolis' goals were reflected in the unanimous adoption in December 2021 of its Metropolitan Climate Air and Energy Plan (PCAEM), the only regulatory document in the region, which aims to reduce greenhouse gases by 14% by 2025, reduce energy consumption by 50% by 2050, cover 100% of needs with renewable energy, adapt the region to climate change and reduce emissions of pollutants and noise pollution (by 25% by 2025). The strategy is broken down into 13 key areas of focus and 100 flagship actions. In addition to this plan, a number of programmes have directly contributed to this initiative's goals, including the Sustainable Development and Planning Project of the Regional Coherence Plan which includes an objective relating to the artificialisation of land; the inter-communal Local Urban Plan (adopted in 2019) which is constantly being developed with regard to nature in the city and health-oriented urban planning; the Local Housing Plan (adopted in March 2023) which is in line with the

objectives of the PCAEM in terms of energy renovation and emphasises the balance between the renovation of the old stock and new production and, lastly, the establishment of a Low Emission Zone in Marseille.

Between **2018 and 2021,** the **Metropolis**, in close partnership with the **City of Marseille**, all the communes and **Région Sud,** drafted the **Mobility Plan** for the period 2020-2030. 17 ambitious objectives contributing to action in the face of the climate emergency have been retained, including between 2012 and 2030, a 28% reduction in greenhouse gas emissions and a 29% reduction in energy consumption in the transport sector, a doubling of the use of metropolitan transport, a 50% increase in the use of urban transport and an increase in the modal share of cycling to 7%, compared to 1% in 2017.

In **2021**, the **City of Marseille** broke new ground by conducting an experiment and pedestrianising the Corniche Kennedy. It announced, following conclusive results, that this calming of the public space in terms of traffic would be repeated on a monthly basis. At the end of 2021, the City made a more general commitment to the climate and signed the **Covenant of Mayors** (a covenant also signed by the Metropolis), with the objective of being carbon neutral by 2050, of becoming more resilient and of combating fuel poverty. This commitment will be followed, in 2022, by the launch of a climate action structuring process based on a proven national methodology (Territoire Engagé Transition Ecologique, French version of the *European Energy Award*).

Also in **2021**, the City of Marseille and the Metropolis published the **ground-breaking study 'The Historic Heart of Marseille in Transition'** as part of the 'PIA2 Investment in the Future Sustainable City' programme. The **City**, the **Metropolis** and the **Region** organised a seminar on climate change resilience measures for cities on 22 March 2022.

At the end of 2021, the **City of Marseille** will ratify a historic agreement with the State to finance the renovation plan for Marseille's schools, many of which are veritable heatwasters. The Schools Plan aims to renovate the city's 470 schools, 174 of which will be completely renovated or created. It is unprecedented in its scope and should enable all children to be offered decent learning conditions.

The **City of Marseille** then launched an application for a European Commission climate programme. After gathering around a hundred supporters from the region to put together its application, Marseille was selected from among more than 370 cities to join the '100 Carbon-Neutral Cities by 2030' programme. Seen as a founding act for a new era for Marseille, this designation is an opportunity to launch an unprecedented level of collaborative work around the challenge of climate change and the transformation of Marseille by 2030. The Municipal Youth Council quickly took up the approach and brought a strong message to the European Commission during a visit to Brussels in December 2022.

The **Provence-Alpes-Côte d'Azur Region** adopted, in June 2022, a new Regional Plan for Economic Development, Innovation and Internationalisation (SRDEII) 2022-2028. One of the 5 strategic priorities is to promote environmentally friendly economic growth by aiming for carbon neutrality by 2050. Within the framework of the experimental protocol between the State and the Provence-Alpes-Côte d'Azur Region launched at the end of 2022, the Region also wishes to become a pilot region for the deployment of ecological planning in France.

In November 2022, the **City of Marseille** approved an ambitious Energy Efficiency Plan, aiming for a 10% reduction in the community's overall energy consumption by 2023, then 40% by 2030 and 60% by 2050. The City is committed to taking concrete action on a daily basis to reduce energy consumption (lowering heating, raising the set temperature of air conditioning, etc.) as well as energy efficiency (renovation of the most energy-intensive municipal buildings, better management of ventilation, etc.).

In the same month, the City of Marseille organised for the first time the "États Généraux du Logement" (General Housing Forum) in order to respond to urgent needs and to create the tools to move forward in resolving the housing crisis in Marseille. A series of commitments directly concern the fight against fuel poverty, the development of renewable energy and energy renovation.

At the start of 2023, **the City of Marseille** put in place an ambitious Tree Plan in order to give a major boost to the return of nature to the city with the planting of 308,000 woodland plants, including 8,000 mature trees by 2028.

In 2022, the **Aix-Marseille-Provence Metropolis** has been elected European Capital of Innovation, a metropolis that is the cradle of an "innovative diversity" that aims to build, experiment with and replicate the model of tomorrow's Mediterranean city, socially inclusive, resilient to climate change and sustainable.

In 2022, the **Climate City Contract** was a further step in this story and represented a strong desire on the part of authorities to work together to accelerate the energy transition and contribute to achieving carbon neutrality.

4. THE AIM OF THE CLIMATE CITY CONTRACT

The commitment made in this document is first and foremost a commitment to the region's citizens and socio-economic players to act practically, rapidly and effectively in order to put Marseille on the road to carbon neutrality. Civil society is committed, expectations are high and justified.

To meet these expectations, the City of Marseille, the Metropolis and the Region must share a clear assessment and understanding of the situation, a common ambition, an operational roadmap and an ongoing working process. In this respect, the Climate City Contract has an unprecedented educational and political scope, and is structured primarily with this in mind. It should be noted that the Climate City Contract is an iterative process and that this document is a first step.

On the strength of a common political commitment and shared challenges, the co-signatories of this contract have chosen to work together to share their expertise, to collaborate on the implementation of climate actions, to strengthen the scope and timetable of current actions, to innovate together through experimentation, to develop new methods of mobilising civil society and the economic sphere, and lastly, to look for new sources of public and private funding from local organisations to Europe.

This document constitutes the first version of the Climate City Contract, which binds the City of Marseille, the Aix-Marseille-Provence Metropolis and the Region to this voluntary, collective and ambitious approach, as well as all the partners carrying out a project in the area. Its purpose is to define a form of governance and a working method which will enable effective collective action in the face of the challenge of climate change in the Marseille area.

The Climate City Contract is based on a template provided by the *Net Zero Cities* mission and comprises 3 parts:

- The ‘commitments’ section, reflecting the motivations of the signatories, their strategic priorities and a formalisation of their way of working together.
- The ‘action plan’ section, detailing the carbon assessment, the strategic objectives set, an identification of the actions to be carried out and a list of identified projects contributing to the objectives.
- The ‘funding plan’ section which assesses macroscopically the financial resources already mobilised and, above all, the amount still to be committed, in order to achieve the shared 2030 objective.

5. 2030 OBJECTIVE: AIM FOR A DRASTIC REDUCTION IN EMISSIONS AND MARSEILLE'S ADAPTATION TO CLIMATE CHANGE

Europe's objective within the framework of the Smart and Carbon-Neutral Cities Mission is twofold:

- To create 100 carbon-neutral cities by 2030 by and for citizens (cities are responsible for 70% of GHGs);
- To ensure that these cities serve as centres of experimentation and innovation to enable all European cities to follow suit by 2050.

The challenge is immense: the current rate of reduction in the carbon footprint of France is in the order of 1% to 2%[3] per year. A goal of carbon neutrality in 2050 requires a rate of 4% and carbon neutrality in 2030 requires a rate of 10% per year.

As part of the work carried out to draw up this first version of the Climate City Contract, an analysis of greenhouse gas (GHG) emissions directly emitted[4] within the Marseille area concluded that the rate of reduction - without significant action by public authorities or companies and based on a continuation of the trends observed between 2012 and 2019 - would be a 10% reduction in emissions between 2019 and 2030 and a 25% reduction with the deployment of the policies currently under consideration (in particular, the Metropolitan Mobility Plan and the Metropolitan Air and Energy Climate Plan).

These emission reductions are to be set against the following targets, again for 2030 and compared to 2019: a 35% reduction is required in the carbon budgets of the National Low Carbon Strategy, a 75% reduction is required to meet the vision of carbon neutrality, taking into account that the remaining 25% is absorbed by local, national and global carbon sinks.

The collective commitment is to work towards a drastic reduction in the region's GHG emissions as part of the '100 Carbon-Neutral Cities by 2030' mission. The first exploratory scenarios, the result of concerted collective work, propose a trajectory to reduce direct GHG emissions by 50% compared to 2019 levels. New actions will subsequently enrich the plan using an iterative approach of systemic change and the inclusion of citizens.

In order to achieve this ambitious goal, **authorities are committed to making Marseille a pilot Mediterranean city for carbon neutrality** and **to working collectively in order to adapt to climate change.**

3 Key Figures on Climate - France, Europe and World - CGDD - 2021 - https://www.statistiques.developpement-durable.gouv.fr/sites/default/files/2020-12/datalab_81_chiffres_cles_du_climat_edition_2021.pdf

4 The GHGs considered as being emitted directly within the area are: emissions linked to the consumption of gas and electricity in residential and commercial buildings and factories, and emissions linked to transport (road, sea and rail) which actually occur within the municipality of Marseille.

While the focus of the European Mission is first and foremost on the issue of climate change mitigation - and therefore on associated greenhouse gas emissions - the collective commitment also covers the following objectives:

- **Contributing to the reduction of poverty and to social empowerment** will be inseparable from climate action. The region's greatest asset is the diversity of its population, with 111 village-like neighbourhoods each with a strong urban character and history. Marseille is a young and dynamic city in which civil society is seizing the challenges of the future through a widespread demonstration of democracy. The very strong involvement of citizens and associations is encouraging an urban model of social and ecological justice for the Marseille area. However, the region is socially fractured, with strong social inequalities. The rate of poverty reached 26% of the overall population, affecting children in particular and 38 neighbourhoods are designated as national priority neighbourhoods (QPV) because of their inhabitants' level of poverty. The approach must contribute to significantly reducing the rate of poverty in the region.
- **Combining adaptation to climate change and reduction of GHG emissions** so that Marseille can enter a transition which prepares the city for climate change and prioritises adaptation in the investment choices made. This must become one of the fundamentals of the approach by identifying the requirements for adaptation in order to take into account the future climate on the one hand, and on the other hand, to avoid 'maladaptation'[5]. An assessment of vulnerabilities will have to be carried out as part of the process.
- **Contributing to improving the region's energy resilience**: in the context of the European energy crisis, sobriety and the fight against fuel poverty, in addition to directly contributing to decarbonisation, will help to improve the region's ability to withstand various crises. These approaches are also necessary in order to enter an era of regenerating ecosystems and reducing the use of natural resources.
- **Improving the health of residents** must be a priority in the development of public policies and projects deployed within the framework of the climate transition.
- Lastly, **increasing employment in Marseille**: the transition must create local jobs, enabling Marseille to significantly reduce its unemployment rate (17% in 2019, i.e. 8 percentage points higher than the national average).

5 Adaptation which fails to reduce vulnerability, and instead increases it.

6. KEY PRIORITIES AND STRATEGIC INTERVENTIONS

Through the Climate City Contract, the City of Marseille and the Aix-Marseille-Provence Metropolis supported by the Région Sud hope to transform their climate commitments into concrete actions which will have a strong impact on the Marseille region. The time has come for action and for projects both in terms of setting an example as a region with regard to the challenge of climate change - in which everyone must play their part - and in terms of improving energy and climate resilience.

After an initial work phase, several committees focusing on various themes identified different priorities for action which were shared between institutions. These are detailed below and should guide the operational work on projects being deployed in the coming years. It should be noted that they will be updated and enriched as the process unfolds.

Priority 1 - Revolutionise the way people travel in Marseille (Transport & Logistics Committee)**:**

- Target high-emission passenger journeys: City-Metropolis journeys, city centre-Metropolis journeys, city centre - rest of Marseille journeys and internal Marseille journeys
- Accelerate the 'sobriety' drivers which have a strong potential impact between now and 2030 at a relatively controlled cost (cycling plan, traffic calming of public spaces, reserved lanes for public transport or car sharing, etc.).
- Secure funding for the development of major infrastructure projects (Metropolitan Mobility Plan, deployment of EV charging infrastructure, etc.) which are feasible between now and 2030, and for structuring projects with a post-2030 impact (particularly projects supported by the Region and its partners)
- Develop inclusive mobility and contribute to the opening up of the northern districts.
- Support the transition to low-carbon logistics (rail freight, logistics platforms, zero-emission vehicles, cyclo-logistics, etc.)

Priority 2 – Decarbonise the housing stock by combating fuel poverty and substandard housing (Housing Committee)**:**

- Fight against soil artificialisation by favouring rehabilitation whenever possible
- Support and expand the energy renovation of private and social housing
- Support the rehabilitation of public tertiary buildings using a comprehensive and exemplary approach. To this end, the City of Marseille's school plan is a priority.
- Lead a network of public and private partners, draw up a common reference framework about sustainable construction and combat urban heat islands by acting in particular on the old city center within the framework of the Partnership Development Project (PPA)
- Take action on vocational training and the construction industry as a whole, and make the connection between employment supply and demand

Priority 3 – Scale up sobriety, efficiency and renewable energies (Energy Committee)

- Deploy a strategy for energy sobriety in the region at different levels (individuals, organisations, region)
- Diversify the local energy mix and support an increase in the use of renewables in Marseille:
    - Develop a large-scale plan for solar energy (photovoltaic and solar thermal)
    - Develop heating and cooling networks
    - Develop new economic & energy models such as local energy communities

Priority 4 – Reduce, Reuse, Sort and Recycle (Circular Economy & Waste Committee)

- Take action to reduce waste at source (increase communication and support for behaviour change, facilitate composting)
- Develop reuse, local channels, recycling centres, returns deposits and the circular economy in general (including the construction sector)
- Improve sorting and implement the separate collection of bio-waste
- Develop the material and energy recovery of collected waste

Priority 5 – Strengthen our Mediterranean model of a green city (Nature in the City Committee, Urban Agriculture & Food Committee, Sea & Coastal Committee)**:**

Nature in the city:

- Increase the tree stock, increase the resilience of the existing stock and restore the urban landscape in order to preserve the ecosystem services provided
- Preserve the green network and increase its density by creating new green spaces (continuous/discontinuous) and by 're-naturing' the existing ones
- Improve biodiversity functioning through green, blue, dark and brown corridors and involve citizens in the associated projects
- *'Bitumen removal'* in order to return water to the soil and help reduce urban overheating
- Use nature-based management (sobriety and frugality)

Urban agriculture & food:

- Plan to reclaim agricultural land: reclaim the 120 ha of unused agricultural land, install new farmers and develop agroecology and organic farming practices
- Increase access to local, sustainable, quality food which is accessible to all: short supply chains, out-of-home catering (RHD), food insecurity, urban vegetable gardens, collective gardens and the fight against food waste, etc.
- Make the city's school catering exemplary in terms of local distribution channels, organic products, zero plastic, reduction of waste
- Support innovative and emerging projects

Sea & coast

- Support a transition to low-carbon marinas and water sports centres
- Develop a peaceful, depolluted and 're-naturalized' coastline
- Preserve and restore posidonia and marine biodiversity
- Protect a unique local feature: archipelagos and islands
- Conduct joint international action and the sharing of knowledge
- Act on upstream pollution (land-based waste collection devices, education, etc.) and organise pilot projects on cleaning up macro-waste at sea.

Priority 6 – Raise awareness across the whole region (Education & Awareness-Raising Committee)

- Create an educational pathway on the environment which includes an extensive component on climate issues (in particular within the framework of the Regional Educational Project)
- Organise the transformation of organisations and professional practices, particularly through training (local authority employees, citizens, companies, etc.)

7. ORGANISATIONAL PRINCIPLES

In addition to agreeing on a set of common objectives and theme-based priorities, the partners commit to operating principles which should ensure that the objective is achieved. After the first months of work, the following core principles have been identified:

A science based approach

The scientific requirements for staying on a 1.5°C global warming trajectory provide the overall framework for the approach. These requirements are translated into concrete objectives which are as operational as possible for each of the actions developed. The aim is to be able to make the link between the targets for reducing emissions, the roadmaps and actions taken, and, where possible, the projects deployed.

In order to ensure that this scientific requirement is indeed one of the guidelines of the approach, a **scientific committee** was set up in 2022. Its role is to guide the process in its main choices. In practical terms, the scientific committee, composed of some fifteen members (see appendices), can:

- Select subjects to put on the agenda for the approach, appoint experts to participate in the working committees,
- Advocate and recommend within the iterative process changes to the contract (in terms of content and method)
- Request regular evaluations of the programme's progress.

This scientific committee is also used as a means to increase the links between urban action and the world of research within the various projects.

Institutional co-piloting of the approach: collective governance

The process is initiated by the City of Marseille and piloted collectively with the Aix-Marseille-Provence Metropolis and the Région Sud. These authorities are actively involved in the various governance bodies (committees, etc.) particularly in order to:

- Organise the management and monitoring of actions and projects in the action plan
- Facilitate the implementation of the projects identified in the contract: share objectives and requirements, communicate information on the progress of the project, make use of the skills available to speed up the implementation of the projects, provide technical advice on sticking points, identify sources of funding, etc.
- Share expertise between authorities in order to make progress on different issues (e.g. cycling facilities, energy renovation, greening the city etc.)
- Collectively study the responses which can be given to external project leaders

An opportunity to promote the region's vitality and creativity

As mentioned in the introduction, the transformation of the region must combine a normative and plan-based approach - breaking down the annual carbon budgets to be respected into actions and projects - and a local creative approach - identifying and facilitating local initiatives which contribute directly to the objective. In the initial stages of the process, the region's stakeholders were sounded out on their willingness to get involved and a first series of projects was identified that they wished to carry out. The remainder of the process should contribute to:

- Mobilising local, national and European resources (public and private) to support local initiatives which are directly in line with the mission's objectives. For example, this support could take the form of:
    - Engineering support to obtain funding,

    - Setting up agreements to facilitate the roll-out of projects,
    - Consideration of new solutions in public procurement,
    - Unlocking direct funding,
    - etc.
- Setting up a working process allowing the involvement of the whole ecosystem in the formulation of their own objectives, the evolution of the approach's priorities, the practical implementation of actions and feedback on requirements. The governance involved at this stage in this first version of the contract remains to be decided.

A strong citizen involvement

Climate neutrality for Marseille is achievable not only through a reduction of the region's emissions through technology, but also, and more importantly, through the engagement of its inhabitants. Social inclusion is the cornerstone of Marseille's transformation. It will rely on several innovative initiatives which will contribute to the creation of a 'participatory transitional ecosystem' which will produce beneficial changes in community practices.

The first large-scale initiative is the Citizens' Assembly for the Future (ACF), launched on 15 March 2023 by the Mayor of Marseille. Just over one hundred citizens, representative of the population of Marseille and selected at random, will have the task of coming up with concrete proposals for the future of the City of Marseille. These proposals may take the form of opinions*, wishes* or suggestions for discussion*. The first two subjects referred to the City have been those of restraint in the use of water and sustainable tourism in Marseille. The City has agreed to make available to the ACF any information and expertise deemed useful to the ACF's work. A working group will be dedicated to the theme of 'Climate Neutral Marseille in 2030'.

In September 2022, the President of the Aix-Marseille-Provence Metropolis called on the Development Council - which represents the voice of civil society and citizens (240 members representing socio-economic stakeholders, including 60 citizens) - to work in 2023 on the following question: 'How can we achieve Aix-Marseille-Provence's objectives in terms of transition?' It was asked to submit proposals to elected officials as regards changing lifestyles and consumption patterns in order to drastically reduce the carbon footprint and to adapt to climate and environmental challenges.

In addition to these initiatives, there has been the gradual engagement in the climate crisis of existing forums of discussion (Municipal Youth Council, Metropolitan Youth Council, etc.) as well as the involvement of citizens in all the projects carried out in the region, which is not detailed here but can be seen in part in the action plan section of the contract.

The implementation of evaluation and shared monitoring

An evaluation of the roadmap's progress by following impact and achievement indicators must be set up, based in particular on the monitoring already carried out within the framework of the SRADDET, the PCAET and the ADEME Region Committed to Ecological Transition initiative. In 2023, the 9 French cities involved in the 100 Cities mission will work together to identify a common set of indicators.

Summary of governance bodies put in place

Steering Committee
(City & Metropolis & Region)

Co-chair : City, Metropolis, Région
Members : elected officials, administration
Role:
- Arbitrate the strategic orientations Ensure the progress of the work of the commissions
- Validate the list of projects identified by each committee

Quarterly or Semi-annual

Marseille 2030 Team, role :
- Secretariat
- Links with the scientific council, citizens' assembly
- Ensure interactions with the European level
- Follow-up of flagship projects

Scientific Committee

Co-chair : City, Aix Marseille University
Role :
- To recommend the main orientations of the CVC
- Take responsibility for climate issues
- Develop certain projects (citizens, investment fund)
- Identify the experts of the commissions

Quarterly

Citizens

Citizens' Assembly for the Future

Municipal Youth Council, Metropolitan Youth Council

+ involvement of the economic sphere to be defined

Aix Marseille Provence Development Council

Commissions

Experts and scientifics

Funders

Administration

Project dvpers

Co-chair : City and Metropolis
Members : elected officials, adminstration and ecosystem
Role :
- Enrich the project portfolio
- Manage the projects
- Involve partners

To be defined by each commission

Commissions :
- *Mobility & logistics,*
- *Building decarbonisation,*
- *Energy transition,*
- *Circular economy and waste,*
- *Nature in the city,*
- *Urban agriculture and food,*
- *Sea and seacoast*
- *Education & sensitisation*

8. PROCESS AND SCHEDULE

Quarterly meetings

The various bodies of governance (Steering Committee, committees, scientific council) will meet quarterly to ensure the management of the process, the actions and the associated projects. A bi-annual meeting, chaired by the signatory authorities, will ensure progress on key actions and projects.

An iterative process and a broadening of stakeholders

This first version of the contract mentions the commitment of the City and the Metropolis supported by the Region as the foundation of the approach. This is a commitment to enter into an iterative working process both on enriching the understanding of the climate crisis (carbon and energy assessment, analysis of climate change) and its local repercussions and on the regular adjustment of priorities in the portfolio of actions and priority projects.

An initial consultation of the region's stakeholders has been carried out, but the approach is intended to be further enriched by projects from the Marseille ecosystem in future versions of the Climate City Contract.

An update in 2024 and bi-annual updates

A first update of the Climate City Contract is already planned for 2024. This update will be based mainly on the recommendations of the Scientific Council and the Citizens' Assembly for the Future.

Then, provided that the Climate City Contract proves to be the right vehicle to pilot this type of approach in the next two years, a process of updating the different parts of the contract will be carried out every two years (2025-2027-2029).

Work schedule 2023-2024

The Marseille 2030 Climate Target Plan approach is intended to be expanded in 2023 and 2024 along the following lines:

- Developing local institutional cooperation
    - Conducting regular committees focusing on different themes and steering committees to monitor the implementation of the projects identified in the action plan
    - Implementing internal project monitoring within the City of Marseille and regularly sharing progress to identify possible synergies between authorities or with the local ecosystem
- Mobilising funding mechanisms
    - Facilitating a dialogue with the European Commission and the *Net Zero Cities* platform on the tools available to support local projects
    - Developing an endowment fund to support a range of local projects
    - Responding to calls for projects relating to the '100 Smart and Carbon-Neutral Cities in 2030' programme
- Creating a collective narrative of a carbon-neutral Marseille which enables everyone to envisage themselves being part of the transformations to be carried out in the area
- Supporting local stakeholders developing projects addressing the challenge of climate change
- Ensuring that the transition is fair, in particular by leading a working group within the Citizens' Assembly for the Future dedicated to the transformation of Marseille as regards the challenge of climate change.

9. SIGNATURE

The signatories commit to the objectives, priorities and operating principles outlined in this document. They undertake to mobilise human and financial resources which are in line with the objectives.

Benoît Payan,

Mayor of Marseille

Martine Vassal,

President of the Aix-Marseille-Provence Metropolis