NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Action Plan

Nantes Métropole

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Table of contents

Liste des figures

List of tables

Abbreviations and acronyms

CCC	Climate City Contract
GHG	Greenhouse gases
PCAET/ SECAP	Territorial Climate Air Energy Plan
PPE	Multi-year energy plans
SNBC	national low-carbon strategy
ESS	Social economy
RE	Renewable energy
CCRt	territorial renewable heat contract (ADEME)
FTE	Full time equivalent
BATII	Housing and building department in Nantes Metropole

Edito

Will our planet, our cities and our towns still be habitable in 30 years from now?
Will our way of life, our relationship with nature, the state of the environment,will we be able to live happily in the years to come?

These are the dizzying questions we face. And that's why the climate emergency is one of the top priorities of the city's action.
As a pioneer in the fight against climate change, Nantes Métropole adopted its first Climate Plan in 2007, launched a major debate on energy transition in 2016 on energy transition, and drew up its first Territorial Climate Air Energy Plan in 2018. Today, the new 2024-2030 PCAET goes even further. The aim is not only to strengthen our collective efforts to achieve our carbon neutrality targets, but also to speed up the implementation of measures to adapt to climate change, i.e. to anticipate its impacts and protect the population.

Let's face it, our local actions are having an impact: between 2004 and 2024, we reduced greenhouse gas emissions by 35% per capita. Thanks to the actions implemented at the start of this mandate, we are in the process of reversing the trajectory of our emissions. Nevertheless, at the rate we've been going over the last 20 years, we won't achieve carbon neutrality until 2320! So we need to raise our ambitions and we all need to work together to achieve it. This major change of direction is necessary, and everyone must be convinced of this, especially as the disruptions are becoming more and closer to home every year, with heatwaves, droughts and floods.

This new Climate Plan and the Climate City Contract have one essential characteristic to us: they are the result of a collective dynamic. First and foremost, it was co-constructed with the Metropole's partners, the metropolitan municipalities and citizens through the "Fabrique de nos villes" major metropolitan debate. And many of their actions are devoted to informing, mobilising and supporting everyone.
It is essential to fight for the ecology and for social progress at the same time, because we know that the consequences of global warming affect the most vulnerable more strongly and more quickly than the rest of the population.

Awareness of the urgency of climate change, and the desire to take concrete action, are now widespread in our society. That's what's at stake in this climate plan, which we want to be "popular" :
to awaken, federate, recognise and support the will to act that exists in our society, this mobilisation of citizens that can undoubtedly change things just as much as the millions of euros we are investing in infrastructure.

Because global warming will be an enormous accelerator of social inequalities, moving towards a greener world necessarily involves a challenge of solidarity and equality.
As the author Salomé Saqué writes, a person born in 2020 will experience seven times more heatwaves in their lifetime than someone born in 1960! We are facing a major generational and collective challenge that we want to help meet.

Johanna Rolland
Présidente of Nantes Métropole
Tristan Riom
Vice-Président of Nantes Métropole

1. Introduction

Demographics

Nantes Métropole is a French metropolis in the loire-Atlantique département and Pays de la loire region. It was home to 672,420 inhabitants in 2020. Nantes Métropole is one of France's most dynamic metropolitan areas. Indeed, Nantes Métropole's territory has experienced strong demographic growth in recent years. The population grew by 21% between 1999 and 2020, with year acceleration in the last decade. Between 2014 and 2020, more than 8,500 people will have moved into the area each year. Welcoming this new population requires appropriate planning in terms of housing, social, cultural and educational facilities, as well as infrastructure and economic activity. This planning is a major challenge for maintaining quality of life and preserving the region's environmental conditions, in short, it is crucial if the Metropolis is to achieve carbon neutrality by 2030. All the more so as, among the INSEE scenarios, the one chosen anticipates year increase in the Nantes metropolitan area's population of 75,000 compared to the population in 2013, i.e. 680,000 inhabitants by 2030.

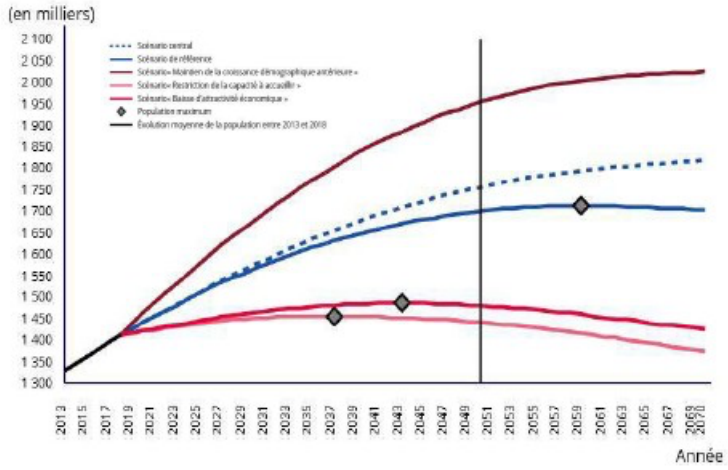


Figure 1 - Towards a slowdown in population growth (INSEE study - October 2023)

Economy

This demographic dynamism is also accompanied by economic dynamism. Indeed, Nantes Métropole's economic activity has historically been structured around the loire River, which has supported the development of trade, transport and industry. There is a strong tertiary concentration of jobs in the area, with one job in two located in the city center, although there is a tendency for jobs to spread out. Of course, the city of Nantes has retained its role as year economic engine, but employment has grown strongly in the other communes of Nantes Métropole and beyond in the urban area.

Air

Air quality in the metropolitan area was average, despite a reduction in atmospheric pollutants between 2003 and 2021p. In 2022, air quality was average on 71% of the days of the year and good on only 8 days. It was even considered "degraded to very poor" 29% of the year (in summer mainly because of ozone formation and in winter because of particulate emissions).

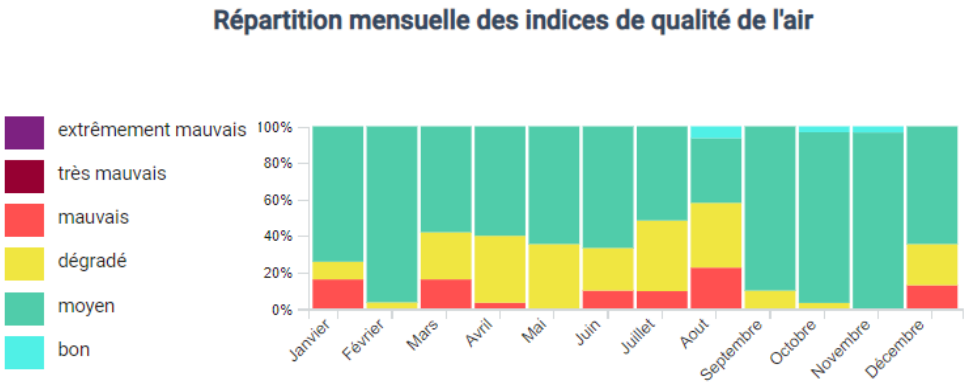
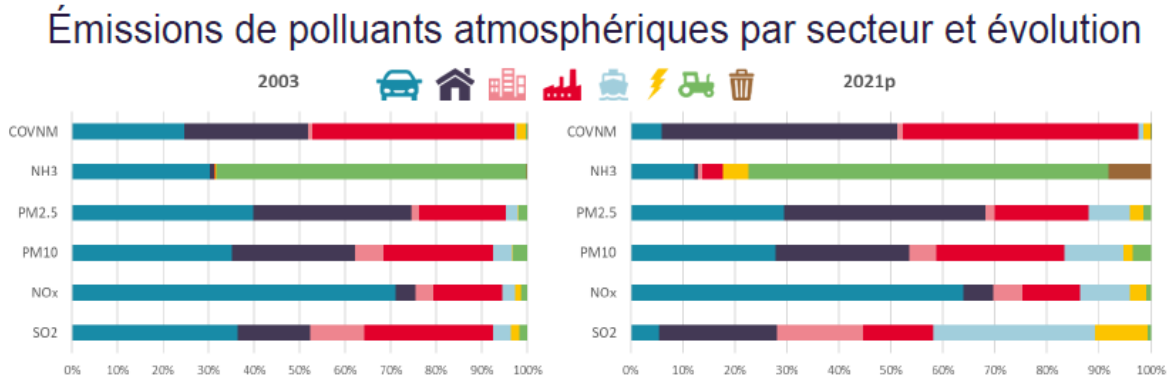


Figure 2 - Air Pays de la loire - Air dashboard for Nantes Métropole - year 2022



Air

Figure 3 - Pays de la loire - Basemis emissions inventory V7 - year 2021 provisional

Between 2003 and 2021$_{forecast}$, Basemis data highlight the following conclusions:

- The road transport sector remains the main cause of air quality deterioration in metropolitan France.
- The residential sector accounts for the majority of pollutant emissions, particularly particulate matter.

Climate Change

Nantes Métropole is vulnerable to climate change because of the rise in average temperatures and the numerous heat waves that affect the area. Temperatures have risen by an average of around 1.5°C over the last sixty years. The Pays de la Loire region recorded as many heat waves between 2000 and 2020 as in the previous five decades. These periods will be more frequent, earlier in the year, longer and more severe.

During the summer of 2022, Nantes Métropole experienced unprecedented heat waves, with local temperatures reaching 42°C. Accidental fires were exacerbated by the combined effects of heat and drought. Over such a period, residents are more exposed to a deterioration in their health, particularly for the most sensitive, while the average level of comfort is considerably reduced. Public spaces, particularly in the densely populated urban centres of our metropolis, can become too inhospitable in hot conditions to allow people to recharge their batteries and enjoy a high level of comfort. The phenomenon is exacerbated in urban areas where ventilation of spaces can be reduced due to the density of buildings, and where the high mineral content and lack of vegetation encourage both the absorption and then storage of heat (causing overheating at night) and also the rise in temperature of surfaces (floors, facades and furniture).

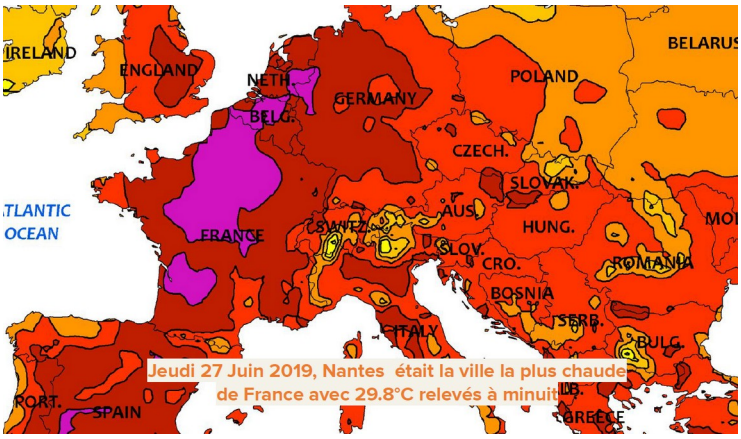


Figure 4 - Heat wave Thursday June 27, 2019

Greenhouse gas emissions

Nantes Métropole has been involved in the fight against climate change for many years. The actions and policies put in place by Nantes Métropole and local stakeholders have produced significant results:

- 24% reduction in per capita energy consumption between 2003 and 2021. This represents an overall reduction of 3% despite a 27% increase in population at the same time.
- 32% reduction in greenhouse gas emissions per capita over the same period. This represents an overall reduction of 13% despite a 27% increase in population at the same time.

However, continuing on this trajectory will not make it possible to achieve carbon neutrality by 2050, let alone 2030.
Currently, the average Nantes resident emits 9.6 tCO2eq/year, whereas the objective of carbon neutrality would require us to emit 2 tCO2eq/year. This significant reduction shows that the effort must come not only from the actions of individual citizens, but also from the massive decarbonisation of our systems and the implementation of certain breakthroughs to achieve carbon neutrality. At a local level, academic partners, players in innovation, smart cities and responsible digital technology are now working together to achieve this objective.

Action Plan

In terms of mitigating climate change, the action plan envisaged as part of the Climate City Contract and the new Nantes Métropole Climate Plan is based on 5 axes:

- **A popular Climate Plan** to raise awareness, involve and motivate all the forces in the area and its institutions
- **Sobriety: reducing our needs** in terms of energy, mobility, energy renovation and businesses
- **Resources: reducing imported emissions** through food, digital technology and re-use, for example.
- **The energy mix:** 20% local RE production by 2030, 100% RE consumption by 2050
- **Natural carbon sinks:** preserve and develop them

In terms of adapting to climate change, the action plan envisaged under the Climate City Contract focuses on 3 areas:

- **Urban resilience,** towards a natural and healthy metropolis
- **Agricultural resilience,** to protect biodiversity and water resources
- **Resilience and crisis management**

2. The City Climate Contract preparation process

Nantes Métropole has built up a strong mandate with all the stakeholders in order to move the process forward within a clear and precise framework. Internally, technical committees and steering committees with elected representatives have been strengthened (C.1-2 Description of organisational and governance measures). Externally, Nantes Métropole initially started with 25 partners in the Mission Ville programme and has now built up a "community" of over 150 players. These players were brought together at events and working groups (Bifurcation Workshops, see C-2 Social Innovation Interventions). Stakeholders played year active role in drawing up action sheets organized by sub-theme. This collaboration has fostered a sharing of knowledge that is crucial to the ecological transition.

Name	Type	Detail
60 Millions de piétons (pedestrians)	Association	Representing pedestrians at national and local level
Alisée	Association	Information and awarenessraising on energy and the environment
Alternatiba	Association	Citizen movement
Livre Blanc pour le Climate	Association	Collective attached to Alternatiba
Ecopole	Association	Stakeholder network
AURAN (age	Association	Town planning agency
Fibois	Association	A network of regional forestry and wood industry associations
Novabuild	Association	Mobilising professionals
Shifter 44	Association	Raising awareness among the general public
City of Bouguenais	Communes of Nantes Métropole	
City of Rezé	Communes of Nantes Métropole	
City of St Herblain	Communes of Nantes Métropole	
City of St Sébastien sur loire	Communes of Nantes Métropole	
City of Vertou	Communes of Nantes Métropole	
EDF	Energy experts	
Engie Solutions	Energy experts	
GRT gaz	Energy experts	
GRDF	Energy experts	
Air Pays de la loire	institution	Monitoring and providing information on the quality of air
Nantes university	institution	
CEREMA	institution	Public body reporting to the Ministry for Ecological Transition and Territorial Cohesion
Chamber of agriculture	institution	Public body under State

		supervision
Departemental council 44	institution	
Audencia	University	
Gustave Eiffel university	University	
School of design Nantes Atlantique	University	
SAMOA	Local public Company	Development of the Ile de Nantes

List of stakeholders involved in drawing up the Climate City Contract

In this way, Nantes Métropole has initiated a co-creation process involving all its stakeholders and working with new players. This inclusive approach has enabled the decision-making process to be enriched by the diversity of perspectives and skills.

The bifurcation workshops organised with the stakeholders listed above took place in several stages in order to advance step by step in the process and come up with concrete proposals:

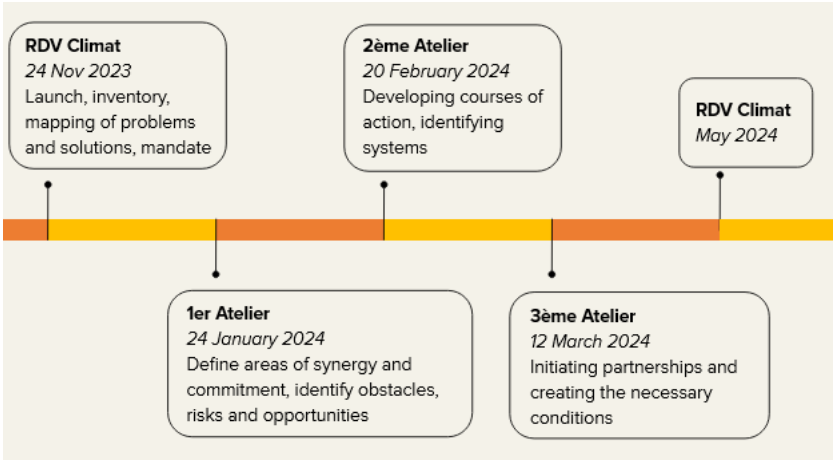
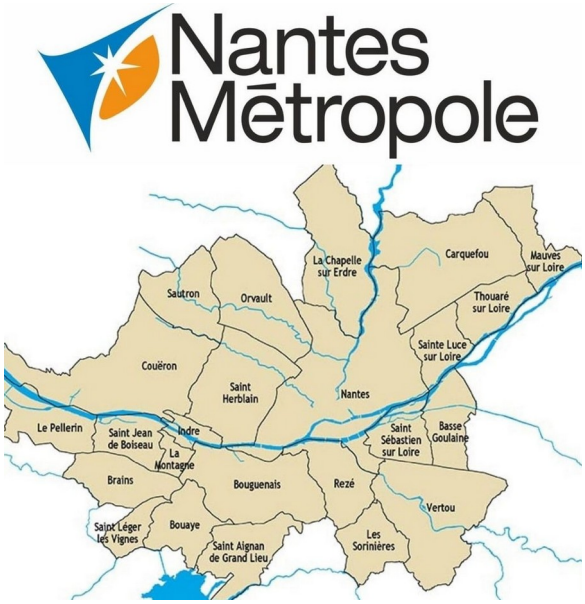


Figure 5 - The Climate City Contract preparation process

Nantes Métropole would like to thank the Net Zero Cities teams and the team in charge of the economic model for their support and expertise.

3. Part A – Current state of Climate Action

A-1 Greenhouse Gas Emissions Baseline Inventory



The geographic coverage of the GHG inventory is the territory of Nantes Metropole covered by 24 cities. It is the same territory as the one for carbon neutrality.

Figure 6 - Scope for calculating greenhouse gas emissions.

Table A.1-1: Final energy consumption by sector				
base year	**2021**			
unit	MWh/year			
	Scope 1	Scope 2	Scope 3	Total
building	**3 396 226**	**3 089 233**	**not calculated**	**6 485 460**
(Type of fuel/energy used)	wood: 164 087 natural gas: 2 936 265 oil products: 295 874	heating and cooling network: 405 385 electricity: 2 683 849	not calculated	wood: 164 087 natural gas: 2 936 265 oil products: 295 874 heating and cooling network: 405 385 electricity: 2 683 849
Transport	**4 580 174**	**59 248**	**not calculated**	**4 639 422**
(Type of fuel/energy used)	natural gas: 97 439 oil products: 4 176 036 other renewables: 306 698	electricity: 59 248	not calculated	natural gas: 97 439 oil products: 4 176 036 other renewables: 306 698 electricity: 59 248
waste				
(Type of fuel/energy used)				
Industrial Process and Product[1] Use (IPPU)	**931 904**	**630 454**	**not calculated**	**1 562 358**
(Type of fuel/energy	wood: 2 250 natural gas: 558 755	electricity: 630 454	not calculated	wood: 2 250 natural gas: 558 755

used)	oil products: 370 900			oil products: 370 900 electricity: 630 454
Agriculture, forestry and land use (AFOLU)	**71 844**	**25 315**	**not calculated**	**97 159**
(Type of fuel/energy used)	wood: 7 480 natural gas: 16 881 oil products: 47 483	electricity: 25 315	not calculated	wood: 7 480 natural gas: 16 881 oil products: 47 483 electricity: 25 315
No transmitters included	***11 870*** *oil products: 11 870*	**0**	**not calculated**	**11 870** *oil products: 11 870*

Table A.1-2: Emission factors applied

Primary energy sources	Carbon dioxide(CO2)	Méthane (CH_4)	Nitrous Oxide (N_2O)	F-gases (hydrofluorocarbons and perfluorocarbons)	Sulfure hexafluorure (SF_6)	Nitrogène fluorifère (NF_3)
Heating network	In its inventory, Air Pays de la Loire uses the carbon content of heating networks as defined in the appendix to the decree on the energy performance of existing buildings intended for sale.					
Electricité	Electricity					
Combustibles fuels (wood, natural gas, oil products)	For fuels, Air Pays de la Loire uses in its inventory the emission factors of the OMINEA database, published in 2021. This database is subdivided according to the SNAP nomenclature for polluting activities and the NAPFUE nomenclature for fuels.					

table A.1-3a: Emissions de green house gas by sector

base year	**2019**				
unit	**equivalent CO2/year (tCO2eq/year)**				
	Scope 1	**Scope 2**	**Scope 3**	**Total**	**% of total**
Transport	990497			990497	40 %
building	739227			739227	30 %
electricity		181149		181149	7 %
waste			111021	111021	5 %
Other (including industrial processes and product use, agroforestry, forestry and other land use)	443442			443442	18 %
TOTAL	2173167	181149	111021	2465336	100 %

table A.1-3b: Emissions de green house gas by sector – business as usual 2030					
base year	**Business as usual 2030**				
unit	**equivalent CO2/year (tCO2eq/year)**				
	Scope 1	**Scope 2**	**Scope 3**	**Total**	**% of total**
Transport	916491			916491	38 %
building	745636			745636	31 %
electricity		229916		229916	10 %
waste			54805	54805	2 %
Other (including industrial processes and product use, agroforestry, forestry and other land use)	443442			443442	19 %
TOTAL	2105568	229916	54805	2390290	100 %

Table A.1-4: Greenhouse gas emissions by sector (data from the economic model by NZC)			
base year		**2019**	
	Scope 1	**Scope 2**	**Scope 3**
Transport			
Transport need - passenger cars + motorcycles (M km/year)	3920		
Transport need - buses (M km/year)	29		
Transport need - trains/metro (M km/year)	3		
Transport need - light duty trucks (<3.5 t) (M km/year)	213		
Transport need - heavy duty trucks (>3.5 t) (M km/year)	901		
building and heating			
Heating demand (space heating + domestic hot water)(GWh/year)	4684		
electricity			
Electricity demand within city boundaries (GWh/year)		3399	
waste			
Collected waste within city boundaries (tonnes)			311457
Other (including industrial processes and product use, agroforestry, forestry and other land use)			

A.1-5: Graph and tables

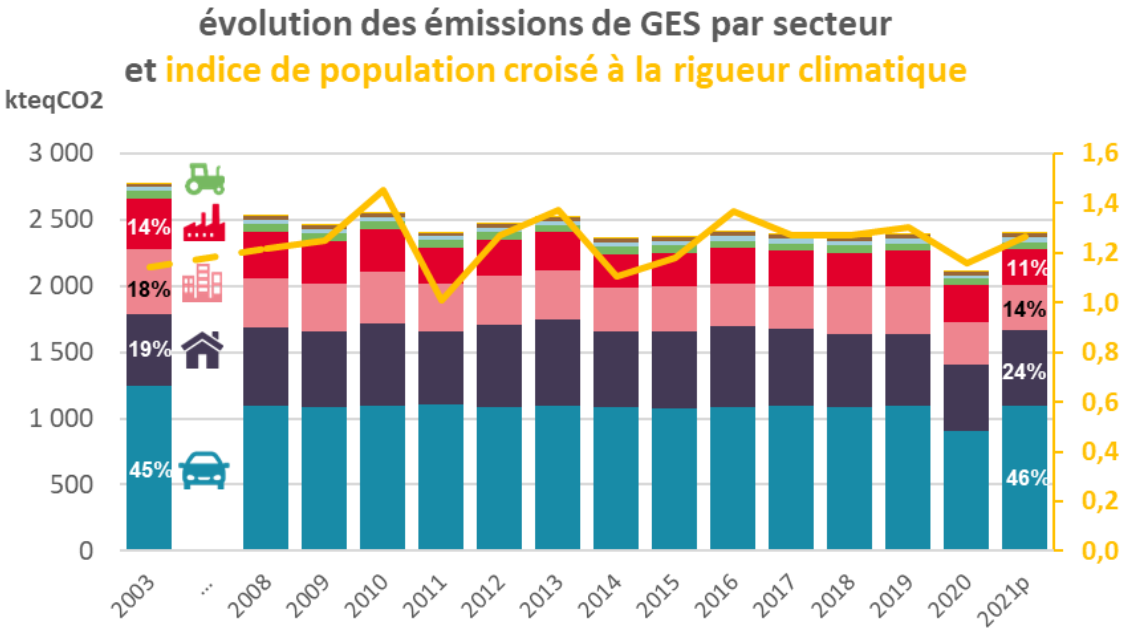


Figure 7 - GHG emissions by sector and population index crossed with climate severity
Source: Air Pays de la loire, BASEMIS® V7

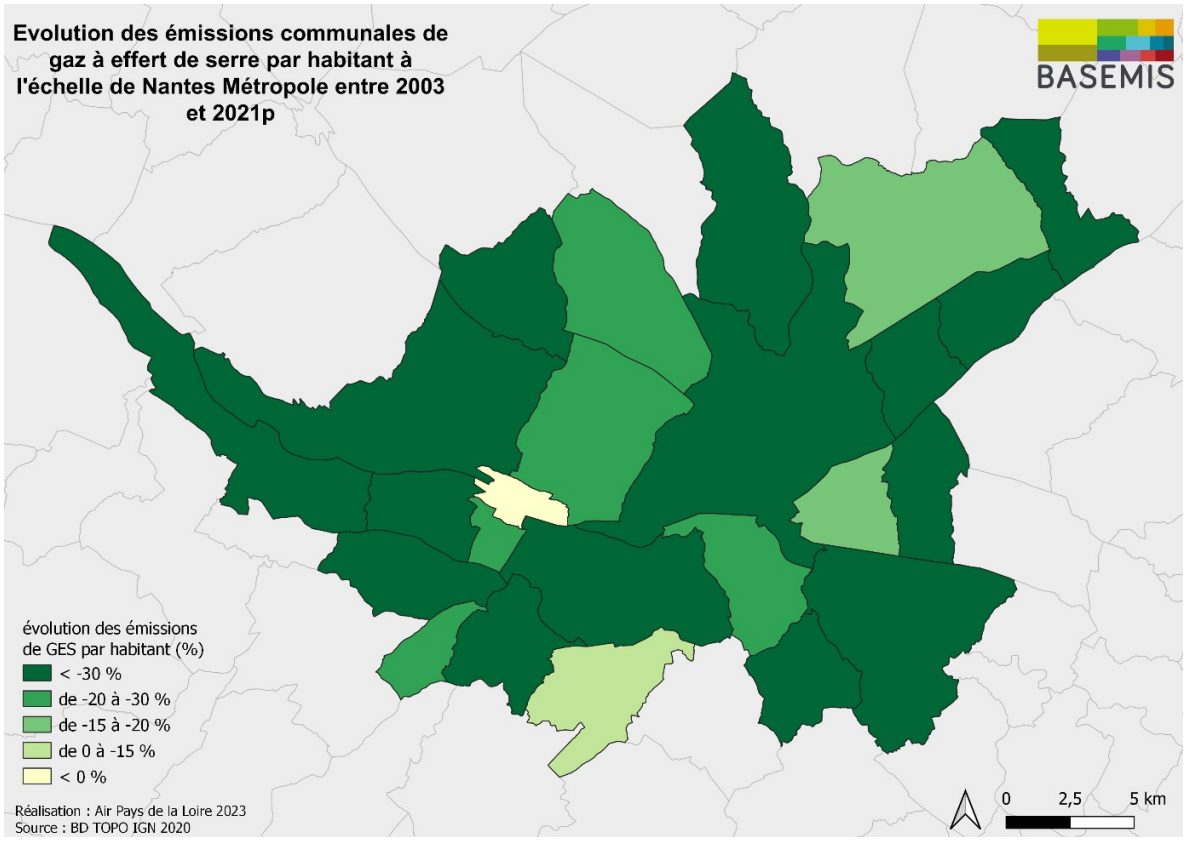


Figure 8 - Local GHG emissions per capita for Nantes Métropole between 2003 and 2021
Source : Air Pays de la loire, BASEMIS® V7

A.1-6: Description and assessment of the green house gas inventory

Our inventory is described with the "PCAET" reporting format (Decree 2016-849 of June 28, 2016) and includes the following sectors:

- Residential
- Commercial
- Industrial
- Transport (road and non-road, also known as other transport)
- Waste management
- Agriculture
- Energy sector (excluding electricity, heat and cooling production for GHG emissions, as these emissions are recorded at the consumption stage).

Non-energy and energy-related GHG emissions are reported for each of the above-mentioned sectors.

In addition, the LULUCF sector (land use, land-use change and forestry) and the sector that collects emissions not included in the SECTEN or PCAET reporting formats, i.e. the biotic sector (natural emissions from forests, grasslands and wetlands), international aviation and international shipping, are reported separately.

In addition, GHG emissions from biomass are excluded from the totals, but are included in our inventory for information purposes.

In summary, the inventory covers direct emissions (Scope 1), i.e. those occurring on site, and also includes indirect GHG emissions linked to the consumption of heat and electricity (Scope 2). This means that direct GHG emissions linked to electricity and heat production facilities are accounted for at the level of the user sectors (residential, tertiary, etc.).

Although Nantes Métropole's population increased by 27% between 2003 and 2021, GHG emissions decreased by 13% over the same period, which is the reference period for Nantes Métropole's PCAET.

Per capita GHG emissions have fallen even further over the same period (-32%).

Given the high proportion of energy-related GHG emissions (over 90%) in Nantes Métropole, variations in GHG emissions from one year to the next are strongly correlated with variations in energy consumption.

Climate rigor, technological improvements, building insulation, the trend towards less carbon-intensive energy consumption (particularly wood-energy and electricity), etc. explain this reduction in GHG emissions.

Furthermore, in 2021, Nantes Métropole's LULUCF sector absorbs 32 kteqCO2. This absorption is not enough to offset the 2,404 kteqCO2 emitted in 2021 by the various activities in the area (there is a 1% ratio between GHG emissions and carbon sinks).

However, despite the virtuous efforts we have been making for decades and the encouraging results we have achieved, it is clear that continuing on our current trajectory will not enable us to achieve carbon neutrality by 2050, let alone 2030. Mission Ville must help us accelerate and achieve the ambitious goal of carbon neutrality by 2030.

Note that the evolution of GHG emissions (table A 2.4) takes into account a BAU “Business As Usual” scenario (i.e. GHG emissions in 2030 without Mission Ville). This makes it possible to determine the scale of emissions reductions needed to achieve climate neutrality, while taking into account population growth, GDP increases, etc.

A-2 Current Policies and Strategies Assessment

A.2-1: Current policies and strategies for carbon neutrality and energy transition

A wide range of energy and climate policies and strategies have been developed at different levels. The following diagram gives some examples of the strategies developed at each level: international, national, regional and local.

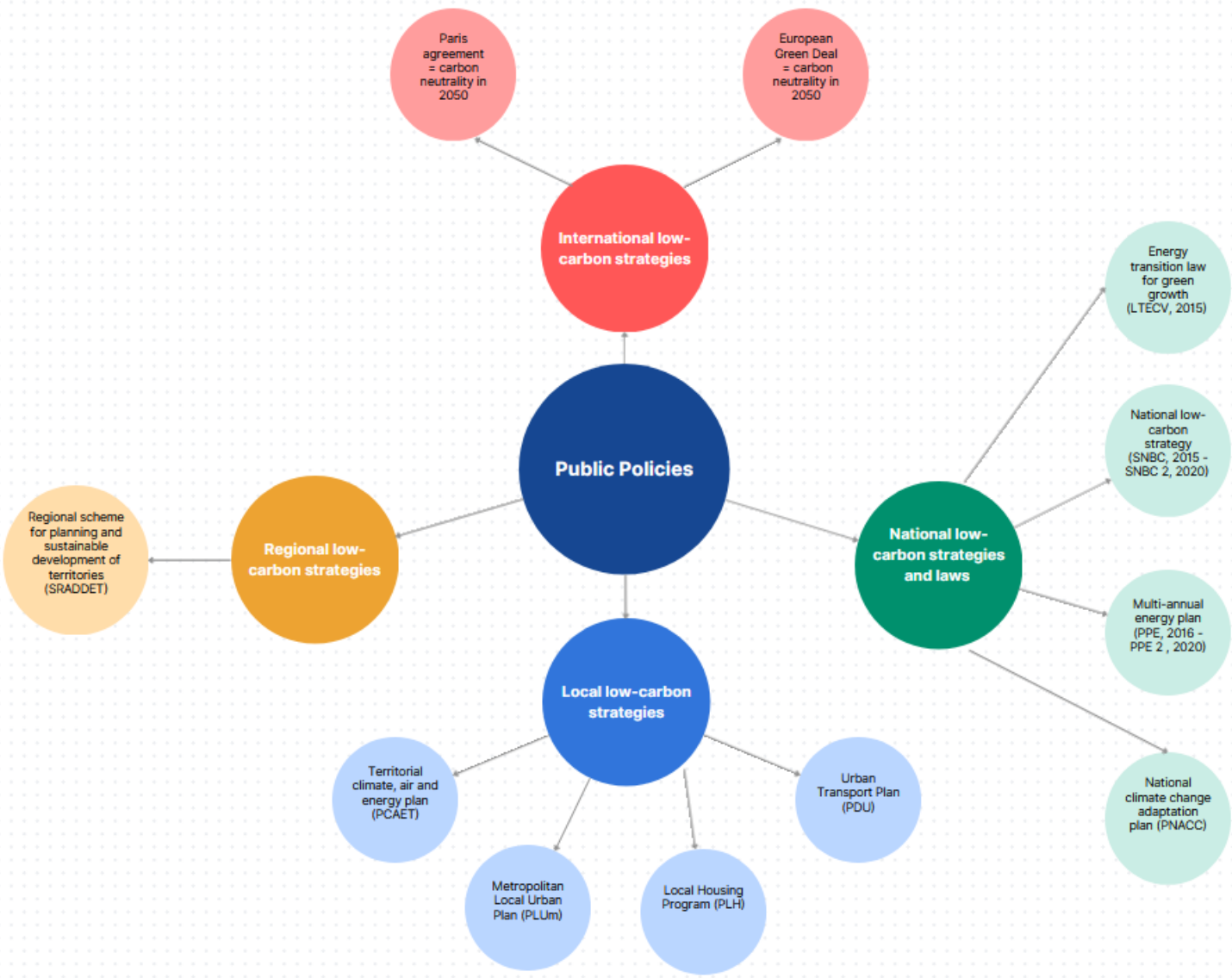


Figure 9 - Current policies and strategies for carbon neutrality and energy transition

Source: Nantes Métropole 2024

A complete list of the various public policies influencing environmental issues and the implementation of portfolio actions, as well as a document explaining how the French states works as there can be some particularities, can be found in Annex 2 – French cities framework .

A.2-1: Assessment of current policies and strategies for carbon neutrality and energy transition

Beyond this long technical list, the interest lies above all in analysing the strategies put in place and seeing whether they are sufficiently effective.

Evaluation of global policies

1. Are energy and climate policies and strategies aligned with the objectives?
Existing policies and strategies aim to be carbon neutral by 2050, which is in line with the international commitments made in the 2015 Paris Agreement and with the recommendations of scientists (IPCC in particular).

2. What are the strengths and weaknesses of energy and climate policies and strategies?
Although the measures taken to reduce the impact of the sectors that emit the most greenhouse gases (transport, residential, industry, digital, agriculture, etc.) are to be welcomed, much more needs to be done, particularly by adopting a principle of sobriety, putting in place adequate funding and an ambitious employment and training policy that is consistent with the objectives of ecological planning. It will also be necessary to prioritise uses in the face of constraints on access to the resources needed for the transition (TheShiftProject – 2023).

The table below summarises the main strengths and weaknesses of the ecological planning planned in France for each GHG emissions sector.

Secteur	Strengths	Weaknesses
Transport	Prioritisation of small, light electric vehicles (weight penalty and support for industries producing intermediate vehicles and bicycles) Development and reinforced maintenance of "sobriety infrastructures" (cycle paths, railway lines and stations, bus routes, etc.) Consideration of sober air travel	Need for clearer consideration of manufacturing emissions from electric vehicles and rare metal requirements Invest in long-distance rail travel Control demand for air transport through regulatory measures (higher air fares, higher taxes, ban on certain domestic routes, etc.).
Energy renovation	Priority given to low-energy homes An end to new gas and oil-fired boilers	Lack of employment figures and support for the new build sector Caution about conflicts of use of biomass and biogas

Industry		Need for sectoral plans (steel, cement, chemicals and the different categories of industries and players), so that we can close the loop and come up with a genuine industrial policy.
Digital	Assessment of digital electricity consumption to identify electrical loops	Underestimation of electricity consumption by data centres and projected consumption by the digital sector
Energy	Prioritising the uses of local biomass Main use of hydrogen for industry Development of heating networks	Need to prioritise electrical uses Need to systematise the installation of PV on buildings Need for funding for feasibility studies
Agriculture	Maintain the area of permanent grassland, which represents a large volume of carbon that should not be removed Reduction in livestock numbers	The need to integrate biofuels and biogas into the agricultural planning document, as potential conflicts of land use and biomass use are to be expected.

Comments on the publications and framework documents of the General Secretariat for Ecological Planning (SGPE) – The Shift Project- 2023

It should also be noted that imported emissions (Scope 3) are still not sufficiently taken into account.

3. How are energy and climate policies and strategies structured?

The existing tools interact with each other and there is a hierarchy of documents in relation to each other. For example, the local PCAET must be compatible with the regional SRADEET, which in turn must take account of the SNBC. This hierarchy means that national objectives can be applied right down to local level.

However, there is a growing problem: local authorities have to commit to ever more ambitious territorial targets, even though they hold only a small part of the solution in their hands.

The fact is that not all the sectors that emit the most greenhouse gases are within the remit of metropolitan authorities, and even when they are, public policies alone cannot remove all the obstacles. In many cases, the conditions for success in achieving territorial objectives go beyond the mere remit of the metropolis.

Take the example of energy renovation in the private sector: Nantes Métropole has set up a highly effective and ambitious energy renovation support scheme, Mon Projet Renov. The results are very promising. However, the scheme faces a number of obstacles that go beyond the remit of Nantes Métropole: lack of skilled labour, lack of bio-sourced materials, instability of national financial aid, lack of facilitating banking tools, etc. These various levers are as much a matter of regional, national and European level as they are of public institutions and the private sector (banks, businesses, etc.).

Finally, no area depends solely on metropolitan public policy. Every action taken by the metropolis is 'constrained' by the system in which it evolves, by lifestyle habits, by resistance to change, by the legislative context, by societal choices, etc. Achieving carbon neutrality will only be possible if each player takes responsibility and if ambitious, coherent and aligned commitments converge.

Assessment of Nantes Métropole's policies

The policies and strategies put in place by Nantes Métropole are meticulously monitored to enable constant improvement and better results.

Nantes Métropole's policies	Assessment of Nantes Métropole's policies
European Energy Award	The City of Nantes and Nantes Métropole were awarded the Gold label in 2021 for a period of 4 years. The next certification will take place in 2025.
Regulatory mid-term assessment of Nantes Métropole's Territorial Climate Air Energy Plan (2021)	In light of the mid-term assessment of the Climate Plan and in order to address the increasingly pressing climate emergency, amplify its ecological transition action and strengthen its position in the collective fight against the climate crisis within the European Union, in December 2021 Nantes Métropole committed to pursuing the 2050 targets set by the new European Covenant of Mayors. To guide the community's action in this direction and align with these Covenant of Mayors commitments, in December 2021 the metropolis chose to specify its targets for 2050: - 100% renewable energies - carbon neutrality within the metropolis' area of influence.
Nantes Métropole's green budgeting	This approach involves year analysis of all expenditure at each stage of the budget. It provides year overall vision that progressively integrates all the issues of the ecological transition reference framework, complementing other instruments for measuring ecological performance. This budgeting allows decisions to be made on investment and operating costs, to finance projects that are most in line with the goal of carbon neutrality.
Evaluating public policies through research	The metropolis is working closely with the Gustave Eiffel University to set up year in-depth evaluation of the Climate Challenges launched as part of the Pilot Cities call for projects, with the aim of monitoring their impact on the behavior of local citizens. This evaluation will be carried out in two stages: firstly, year analysis of the Défis Climate scheme to assess the changes in behavior induced, followed by year ongoing assessment of public policies, ensuring their alignment with the imperative to accelerate the transition.
Metropolitan-wide climate council	The aim of this council will be to provide a clear and precise analysis of public policies, focusing on certain areas in order to draw up a detailed analysis. The council will bring together a wide range of local players, including private companies, associations and local authorities.

Figure 10 – Assessment of Nantes Métropole's policies

A.2-3: Description of systemic barriers, opportunities and co-benefits

Barriers

Systemic barriers have emerged as a result of the work carried out by the various working groups. These need to be taken into account if carbon neutrality is to be achieved.

One point that is not to be overlooked is **the weight of responsibility** for carbon neutrality that is imposed on local decision-makers (in this case, the metropolis). Indeed, the local authority cannot act alone, and the path to carbon neutrality must be taken in concert with decision-makers at other levels. This includes regional, national and European players, without whom carbon neutrality cannot be achieved. For this reason, the carbon strategy for 2030 must be established at all levels, and a strategy must be drawn up by all players, not just local authorities. With larger-scale strategies, all stakeholders and citizens will be involved in the process, and it is only in this way that the objective can be achieved.

The local authority has identified a number of **financial obstacles** to implementing the carbon neutrality trajectory. Achieving the energy transition and then carbon neutrality would place too great a financial burden on the local authority, which would not have enough funding on its own to make up for the investment required. So this second point ties in with the first: carbon neutrality must be achieved in concert with the other players, or it will not be achieved at all. More specifically, the financial burden of the technologies needed to achieve carbon neutrality weighs too heavily on local authorities' portfolios: carbon sinks, in particular, represent a significant cost for local authorities, while the electrification of the car fleet represents a major challenge both in financial terms and in terms of the timeframe for its development. These measures are necessary, but because of their cost and timeframe, they could jeopardise the achievement of carbon neutrality by 2030. Similarly, the human resources available to local authorities to work on these issues are too limited.

What's more, to achieve a fair and successful ecological transition, **profound changes in behavior are essential.** A major challenge lies in the need to change the behavior of both community players and citizens, so that the ecological transition is integrated as a fundamental pillar of every initiative within the metropolis. At present, although citizen involvement is on the increase, significant tensions remain over the implementation of new measures to promote carbon neutrality. This resistance could jeopardize the success of the transition, which depends on the support and involvement of all citizens. Nantes Métropole is actively involved in these issues to facilitate a transition that is fairer, more equitable and accepted by all.

In a global context of rising energy prices, households are increasingly vulnerable. In fact, we can see that individual homes in the region are not very efficient, resulting in high energy costs that are directly passed on to households. Inhabitants on modest incomes face the risk of energy insecurity, and as a result, households are unable to commit to year ecological and energy transition when they are already unable to keep themselves adequately heated. There is therefore a real need to work on supporting low-

income households in their energy and ecological transition. However, to date, public action has focused too much on curative rather than preventive measures, so it is now necessary to remedy this imbalance and support households upstream to avoid having to manage a situation in year emergency. We can see that it is necessary to prepare and build the transition for and with the most fragile households, to enable them to make a fair transition.

In the fight against climate change, adaptation and mitigation strategies can sometimes seem to contradict each other. While adaptation seeks to reduce the harmful consequences of climate change on communities and ecosystems, it can often result in solutions that maintain or even reinforce the practices that are driving this change, such as continued reliance on fossil fuels. This creates a direct tension with mitigation efforts, which aim to reduce these polluting emissions at source. This competition of objectives highlights the complex challenge of ecological transition. What's needed is real consultation and support to build the transition together. What's more, the overlapping of objectives can hinder the ecological transition dynamic, with some goals aiming to reduce consumption while others require material transformation. Even within climate change mitigation, there is sometimes a lack of convergence between short-, medium- and long-term objectives.

The rebound effect is characterized by year increase in consumption linked to a reduction in another area. This rebound effect can have serious adverse effects on our economy and climate. It is therefore necessary to identify possible rebound effects of the measures applied, in order to try to control them. This barrier to change can therefore be transformed into a real opportunity if taken into account from the right angle.

The electrification of the grid represents a major transition towards more sustainable energy sources. However, this transition requires **a large quantity of resources** (water, rare metals, etc.). The finite nature of these resources in the face of growing demand and the environmental impact of their extraction and processing are major challenges that need to be addressed globally as quickly as possible.

Opportunities

Over and above the systemic barriers listed above, there are a number of opportunities linked to the ecological transition that will enable a fairer and more sustainable transition to be made and new ways of thinking and doing things to be developed.

First and foremost, **the ecological transition allows for strong and close collaboration between the various stakeholders in an area.** As part of the Climate City Contract, Nantes Métropole has introduced a new way of working by bringing together the various stakeholders in the area around a common objective: achieving carbon neutrality for a fairer, healthier and more sustainable city. This new work cycle means that the various players no longer work in silos, but can create a common dynamic and generate synergies and

opportunities.

Similarly, the city is striving to share its vision for the city with its citizens and to take account of their aspirations and demands. In this way, action plans and public policies are directly derived from the recommendations made by citizens during the Great Debates and the Climate Challenges.

Nantes Métropole is committed to putting the conversion of industries at the heart of its transition. The principle of the double loop is an inspiring concept for achieving this: in a context of socio-ecological vulnerability, communities must be capable of transforming their previous structures and ways of doing things in order to build a new world based on sustainable growth. This means organising the decline of the current dominant system while encouraging and supporting the emerging system, hence the concept of double transition.

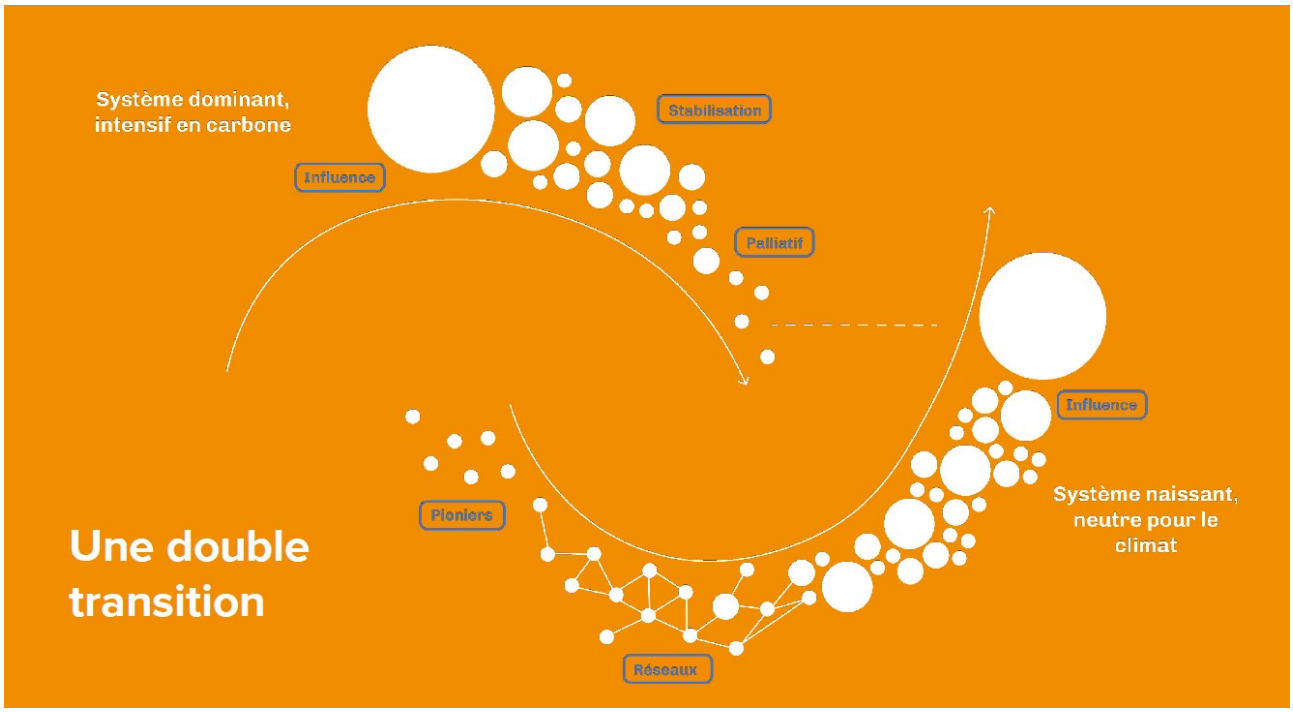


Figure 11 - Representation of the double-loop system

The ecological transition will also bring the places of production and consumption closer together, something that has tended to disappear with globalisation. The metropolis has set itself the goal of relocating certain activities; relocating energy production, for example, is a real opportunity within the framework of the transition to restore sovereignty to the region. With this in mind, Nantes Métropole has set a target of consuming 100% renewable energy and producing 50% local energy by 2050. This will not only lead to better management of resources, but will also enable the region to regain its autonomy and work more closely with neighbouring regions (regional alliance).

What's more, bringing the places where people live closer to the places where they consume and rebuilding around neighbourhoods will strengthen local solidarity. **The transition is therefore an**

opportunity to rethink the city in order to rebuild lifestyles and move towards a more balanced lifestyle and better health.

Co-benefits

Climate policies have many co-benefits, all of which lead to an improvement in quality of life and well-being. For example :

- policies aimed at reducing GHG emissions lead to **an improvement in air quality** due to the associated reduction in atmospheric pollutants co-emitted during the combustion of fossil fuels
- climate policies that lead to a modal shift away from private cars towards walking and conventional or electrically-assisted bicycles, modes that are described as active because they involve physical activity, **reduce sedentary lifestyles and the risk of cardiovascular disease and premature mortality.**
- **greening food policies help to mitigate the destruction of biodiversity, reduce the world's need for cultivated land and reduce the risk of non-infectious diseases** (Garnett 2016) - the development of renewable energies **reduces vulnerability to energy supply and strengthens energy security**

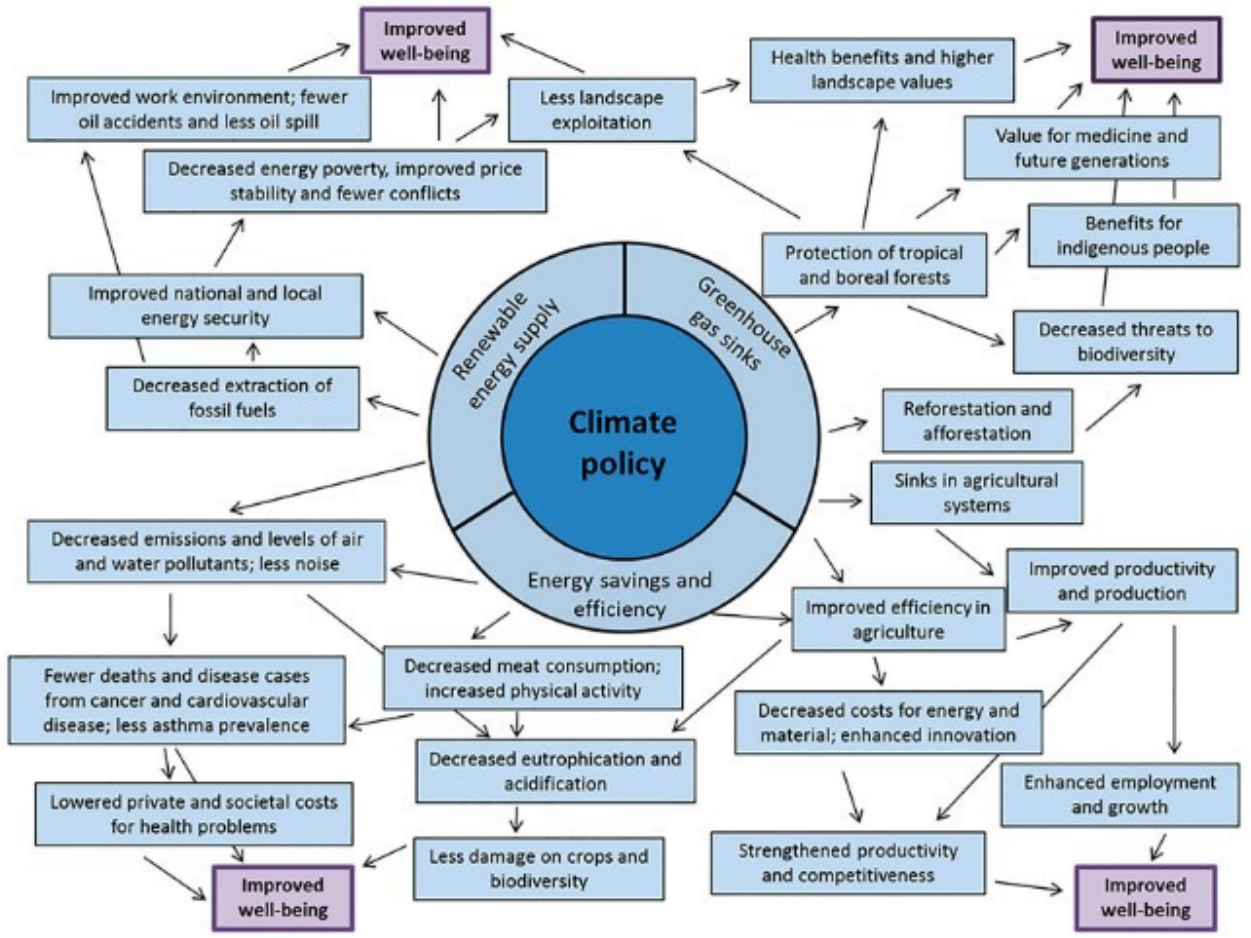


Figure 12 – Co-benefits of ecological transition (Source : Karlsonn et al. 2020)

The literature shows that **co-benefits can act as a lever for the adoption of climate policies and increase the acceptability** of climate policies and people's willingness to pay to combat global warming (Longo et al., 2012).

Energy renovation is a perfect example of a virtuous action with multiple co-benefits:
- reducing energy consumption and greenhouse gas emissions (mitigation)
- combating fuel poverty (social justice)
- improving winter AND summer comfort for users (adaptation)
- installation of renewable energy
- creation of local jobscarbon storage via bio-based materials
- consolidation of a local biobased materials industry.

Similarly, **nature-based solutions are proving to be beneficial** for the climate (carbon storage), for adapting to climate change (cool islands, shading, combating drought, etc.), for biodiversity, for human health (air quality, mental health), etc. **These solutions are called "no-regrets" because they have only positive impacts.**

The diagram below shows the extent to which climate policies offer numerous and cascading co-benefits for human and environmental health.

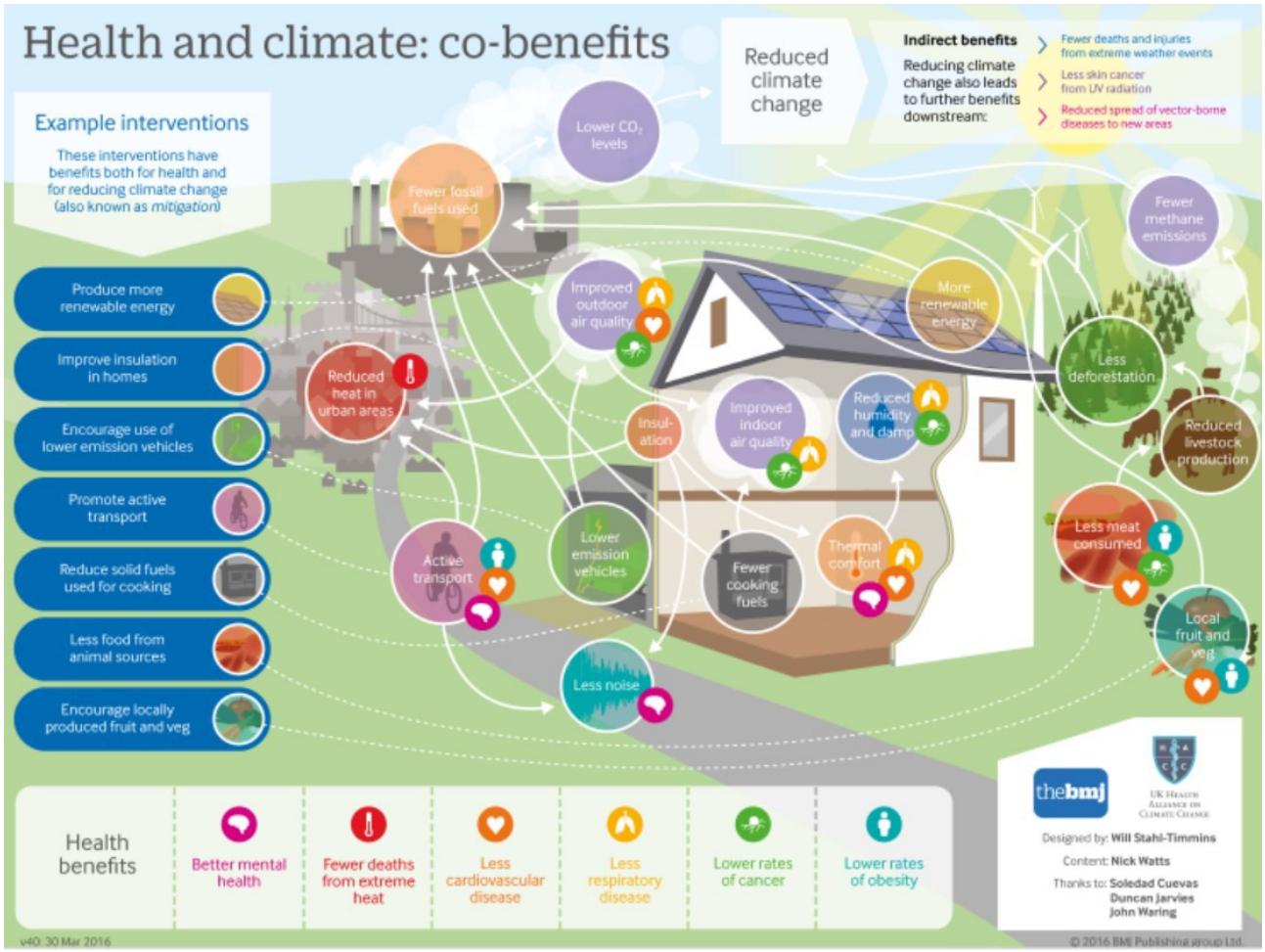


Figure 13 – Health and climate : co-benefits

For example, climate policies that lead to a modal shift from private car use to walking and conventional or electrically-assisted cycling - modes that are described as active because they involve physical activity - reduce the risk of cardiovascular disease and obesity rates, and improve the mental health of users.

They reduce ambient noise, which in turn improves people's mental health. Similarly, the development of active modes of transport will help to reduce urban heat islands, which in turn will reduce the mortality rate in the event of extreme heat. By also reducing the consumption of fossil fuels, active modes of transport improve air quality, leading to a reduction in cardiovascular disease, respiratory illness and cancer.

Finally, reducing the use of fossil fuels leads to a reduction in GHG emissions and mitigation of climate change, with co-benefits in terms of mortality in the event of extreme weather events, UV-related skin cancers and the spread of disease.

Moreover, the results show that the co-benefits of climate policies can partially (Syri et al. 2001, van Vuuren et al. 2006, Woollacott 2018, Chang et al. 2020) or completely (Thompson et al. 2016, Kim et al. 2020) **offset the costs of reducing GHG emissions**, particularly in the context of 1.5 to 2°C trajectories (Markandya et al. 2018, Vandyck et al. 2018, Xie et al. 2018, Sampedro et al. 2020).

Table A.2-4: Emissions gap

	Baseline Emissions (BAU 2030)	**Emissions Reduction Resulting from CNAP**		**Remaining Emissions**		**Residual Emissions Offsetting1**		**Emissions Gap (amount necessary to achieve net-zero)**	
	(Absolute value)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)	(Absolute value)	(% of BAU 2030)
Transport	916	683	75 %	234	25 %	183	20 %	50	5 %
Building and heating	746	548	74 %	198	26 %	149	20 %	48	6 %
Electricity	230	115	50 %	115	50 %	46	20 %	69	30 %
Waste	55	1	1 %	54	99 %	11	20 %	43	79 %
Other (including IPPU and AFOLU)	443	355	80 %	89	20 %	89	20 %	0	0 %
Total	2390	1701	**71 %**	689	29 %	478	20 %	211	9 %

Table A2.4 shows a 71% reduction in GHG emissions compared with 2030. However, Nantes Métropole is aiming for an 80% reduction in line with the principle of carbon neutrality, based on the fact that French national specificities such as the decarbonization of nuclear-generated electricity will make it possible to close the gap.

A-3 Systemic Barriers and Opportunities to 2030 Climate Neutrality

Table A.3-1: System and stakeholder mapping

System	Stakeholders	Réseau	Influence	Interest
Gouvernance and politics	National Level	10 French cities - mirror group	Climate City Contract – a concentrated effort by French cities and the national level to accelerate work towards climate-	A long-term commitment ensuring cooperation between the metropolis and its stakeholders,

			neutral cities. This includes transition working groups, workshops, year annual event with various partners, and the mayor's signature.	involving multi-level governance through collaboration, particularly with civil society. Reviewed annually.
	Local Level	-private companies - local authorities - associations	Climate Council – from 2024	Establish a dedicated space for the transition to climate neutrality where all actors can meet to exchange and work effectively and sustainably towards achieving climate neutrality at the metropolitan level.
	Local to National Level		Territorial Climate Air Energy Plan (PCAET)	
	Local Level	-citizens	Development Council	A citizen, consultative, and autonomous body serving the territory since 1996. Its purpose is to bring together volunteer citizens and civil society actors to collectively identify priority needs, spot new challenges, and build the necessary responses for our daily lives and future in the Nantes metropolitan area and its 24 municipalities.
	Local Level	-private companies - local authorities - associations	Metropolitan Food Actors Council	This council ensures democratic and citizen monitoring and evaluation of the 8 commitments of the "Territorial Food Project" roadmap. It comprises 22 members representing the entire food system,

				from farm to fork.
	Local Level	-private companies (waste) -local authorities	Waste Prevention Local Plan Monitoring Committee	Territorialize and specify operational waste prevention objectives and define actions to achieve them. Thus, waste prevention and, more broadly, resource economy, are at the heart of any circular economy strategy.
	Local Level	-private companies	Meet-up - Corporate Social Responsibility - RSE Platform Ambassadors Network	The objective is to unite the various economic development actors in the territory to engage SMEs and micro-enterprises in coherent CSR approaches, allowing them to improve their social, environmental, economic, and territorial impact. It is based on transparent and participatory governance, a resource site, working groups, year ambassadors strategy, and year annual event "the big meeting of those committed to changing the company".
Stakeholders	Local Level	-city merchants - local authority	Plein-centre	Create a link between Nantes merchants and artisans to promote "made in Nantes"
	Regional Level	-City of St-Nazaire - Nantes Metropolis - partners (private companies)	Maritime Port Decarbonization	The goal is to reduce emissions in the St Nazaire port area by 50% by 2030 and achieve carbon neutrality by 2050.
Citizen involvement	Departmental Level	-companies - cooperatives -	Carbon Cooperative	Raise awareness among local actors

		associations -local authorities		about energy-climate issues. Support organizations and local authorities in measuring and reducing their greenhouse gas emissions. Promote projects for carbon reduction and sequestration that go beyond current practices and regulations by selling carbon credits.
Research	Local Level	-citizens -local authority	Grand Debates	Citizen consultation to establish public policies created by local actors. Rethink our way of living in cities, working, consuming, producing, living, and moving. The Grand Debate thus addresses many themes: environment, urban planning, housing, public health, local facilities, mobility, jobs and activities, waste management, water supply...
	Local Level	-citizens -local authority	Climate Challenges (Pilot Cities project)	Encourage and support behavior changes among local citizens.
	Local Level	-university -research -local authority	Work with Gustave Eiffel University	Evaluate public policies and draw conclusions related to Climate Challenges.

A.3-3: Description / visualization of the participatory model of the climate-neutral city

Implementing the transition to climate neutrality in Nantes Métropole relies on unprecedented citizen involvement, going beyond the traditional framework of technological solutions to include a social and participative dimension. With this in mind, the Climate Challenges have emerged as a powerful lever for mobilization and collective action. Launched in response to Net Zero Cities' “30 Pilot Cities” Call for Projects,

these challenges offer a unique platform for residents to actively contribute to the ecological transition. This project is a perfect example of an ideal participatory model for a climate-neutral metropolis.

The Défis Climat (Climate Challenges) are based on the principle of citizen participation. Citizens taking part in the workshops organised by Nantes Métropole are invited to choose the theme or themes that best suit them (energy, waste, food, digital, leisure, consumption, mobility, water). They can then take part in a collective challenge with a team, or choose to go it alone. Using the "Nantes Métropole climate challenges" app, participants can track their progress, calculate their carbon footprint (with ADEME) and be invited to take part in festive events. Questions posed by the scientific team from the Gustave Eiffel University along the way will provide a better understanding of the obstacles encountered by citizens on their way to carbon neutrality and help influence future public policies.

Nantes Métropole has been organising **major debates** for a number of years, with a view to including citizens in the consultation and co-construction of policies. Alongside the Great Debates on "Nantes, the Loire and us" in 2015 and "Longevity, opening up the possibilities", Nantes Métropole has proposed two Great Debates on energy and climate: "The energy transition, it's us" in 2017 and "Building our cities, together, inventing tomorrow's life" in 2023. The aim of these democratic events is to give the city's driving forces - residents, experts, local decision-makers and civil society players - the opportunity to speak out, contribute and propose new ways of doing things. The participatory model of the climate-neutral city, as conceptualised through the Great Debates organised by Nantes Métropole, embodies an innovative approach to urban policy-making. By encouraging open and inclusive dialogue, the Great Debates provide an opportunity to collectively explore ways of achieving a resilient and environmentally-friendly city. The proposals that emerge from these discussions are subjected to rigorous analysis and serve as the basis for the development of public policies. This participatory process gives citizens a central role in defining the city's strategic orientations, thereby strengthening the legitimacy and effectiveness of the decisions taken. By placing citizen involvement at the heart of its governance, Nantes Métropole is part of a dynamic of democratic innovation, where cooperation and consultation are the driving forces behind sustainable and inclusive urban transformation. The actions devised by citizens during these Major Debates have been incorporated into the action sheets of the PCAET and the Climate City Contract, demonstrating the deep involvement of citizens, who are directly involved in drawing up the city's major measures and future public policies.

Nantes Métropole's participatory model transcends citizen consultation to encompass all the players involved in the territory, fostering a collaborative, integrated and holistic approach. To this end, a close partnership with the world of research has been initiated, setting up several work cycles, notably in connection with the Défis Climate. Institutions such as the Université Gustave Eiffel are collaborating with Nantes Métropole to analyze the data generated by the Défis Climate. The aim of this collaboration with the academic world is not only to evaluate the system put in place, but also to capitalize on the lessons learned from the approach about the brakes and levers on behavioral change. This partnership between Nantes

Métropole and the world of research is year essential pillar for a better understanding of socio-environmental dynamics, effectively guiding initiatives aimed at building a more sustainable future. It also offers invaluable perspectives for guiding policies and actions in favor of ecological transition.

For their part, the workshops at the bifurcation enabled the construction of projects by and for local players: players from associations, local authorities and private companies established in the area. These workshops also provided year opportunity to continue Nantes Métropole's collaborative and holistic approach to working with its stakeholders. As explained above, these workshops brought together players who were not accustomed to working together, and enabled them to create projects in which they would be both players and beneficiaries. This collective work is helping to bring about change for certain players who will no longer have a place in a low-carbon world, and it is therefore necessary to support them in this transition to climate neutrality: in this way, a fair and sustainable transition for all can really be put in place.

In terms of governance, Nantes Métropole is to launch a Climate Council. The launch of such a Council marks a decisive step in the transformation of a metropolis towards climate neutrality. This Council will enable us to deepen our dialogue with stakeholders, and will provide a forum for ongoing dialogue to enrich the public policies and projects carried out in the area.

Work on the prefiguration of this council began in spring 2024, based on the bifurcation workshops. It is continuing to finalise the mandate and composition of the council. The council will be set up in 2025, as soon as the new PCAET is adopted by the Metropolitan Council. It will thus join the community's already active open governance bodies.

Its main tasks will be to:
- Monitor the implementation of structuring and partnership-based actions under the 2024-2030 PCAET,
- Identify initiatives and provide inspiration.

The Rendez-Vous Climat will also bring the PCAET to life: organised with local stakeholders every 2 years since 2011, they will be stepped up to annual intervals.

Discussions within the Council will be in-depth, allowing the various aspects of the fight against climate change to be explored in depth. The aim will be not only to identify best practice and the most innovative solutions, but also to understand the social, economic and environmental implications of each decision taken. By giving a voice to all stakeholders, the Council will promote an inclusive and balanced approach to the transition to climate neutrality.

The guidelines drawn up by this Council will have a significant impact, influencing the policies and actions of the city as well as private stakeholders. These guidelines will be based on a solid consensus and a shared understanding of the issues, which will strengthen their legitimacy and effectiveness. The Climate Council's holistic approach reflects recognition of the complexity of the climate challenges and the need for an integrated response. By involving all strata of society, this Council will foster genuine collective mobilisation in favour of a sustainable and resilient future. Ultimately, it embodies the spirit of collaboration and commitment needed to meet the challenge of climate change and build a better future for all.

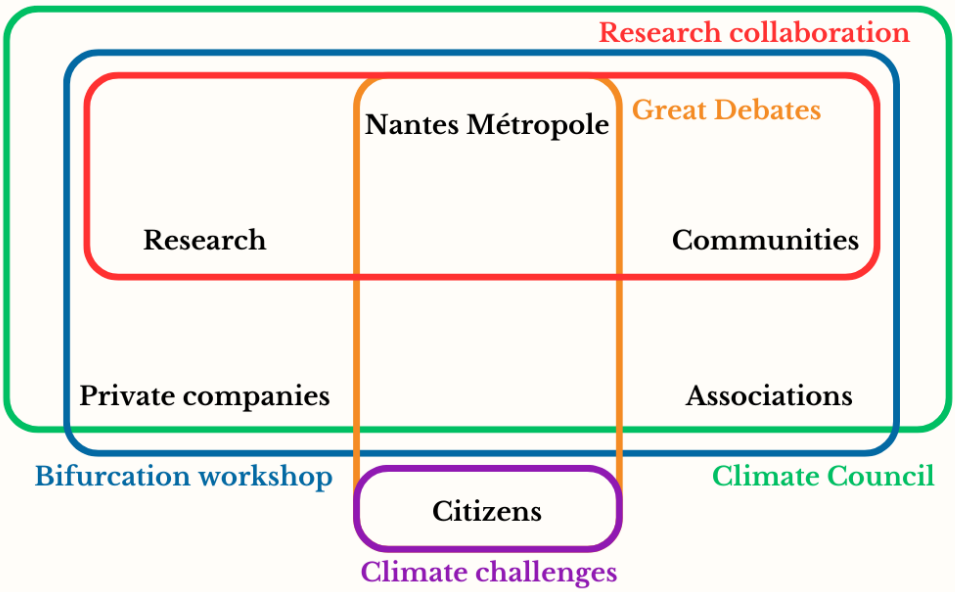


Figure 14 - Organization of Nantes Métropole's participative approach

A new Climate Plan for the metropolis is currently being drawn up and will be approved during 2025, based on the participative model mentioned above, using co-creation and portfolio thinking as key elements.

4. Part B – Pathways towards Climate Neutrality by 2030

B-1 Climate Neutrality Scenarios and Impact Pathways

To build its carbon neutrality scenario, Nantes Métropole has combined the elements of its diagnosis with the aspirations and proposals of the region's stakeholders and citizens.
The proposed strategy should make it possible to achieve carbon neutrality while meeting the expectations of the area's stakeholders, and to build together a healthier, fairer, more sustainable and more resilient city in the face of climate change.

Findings

Mitigation
- In 2021, metropolitan France's overall emissions will account for 6,653 kt of greenhouse gases.
- 60% of these emissions are "imported" from outside the area for our activities and consumption (food, tourism, digital, goods and services, etc.). This is known as Scope 3.
- Of the 40% of emissions within the region, 46% come from the transport sector and 38% from buildings (including 24% from the residential sector and 14% from the tertiary sector). Industry emits almost 10%. The industrial and tertiary sectors are the only two sectors for which there has been a reduction in energy consumption since 2003.
- Nantes Métropole's areas of responsibility that emit the most greenhouse gases are waste (55%), heating networks (21%) and urban transport (12%).
- Nantes Métropole's natural carbon sinks store 32 kteqCO2 per year, which represents 1% of the territory's GHG emissions.

Adaptation
The summer of 2022 was unprecedented in terms of heat waves and drought: local temperatures reached 42°C and the Loire-drinking water sector was placed in crisis 1 (level 4/4) during the summer period.
- A survey of 1,300 people in Nantes after the summer heatwave revealed that :
- 40% of people said they were physically affected by the heat,
- 35% found the heat inside their homes unbearable,
- 50% of people in Nantes felt that their neighbourhoods were unbearable in the heat.
- In its 1st report in 2022, the regional IPCC predicted the following situation in the Pays de la Loire region:
- Average temperatures are expected to rise by around 1.5°C in 60 years, with the increase reaching 2°C to 2.5°C in 2055 in the worst-case scenario. With such a rise, Nantes
would have average annual temperatures equivalent to those in Biarritz.
- In the absence of effective mitigation measures, we can expect an additional 18 to 27 days of heat waves over the next thirty years, and 49 to 69 days over the

period 2071-2100.
- Precipitation will intensify and increase in the summer, and decrease in intensity and fall in the winter.

What vision for Nantes in 2030?
"*It's essential to fight for the ecology and for social progress at the same time, because we know that the consequences of global warming will affect the most vulnerable more severely and more quickly than the rest of the population.*

Because global warming will be a huge accelerator of social inequality, progress towards a more ecological world necessarily involves a challenge of solidarity and equality.

Awareness of the urgency of climate change, and the desire to take concrete action, are now widespread in our society. That's the whole point of this climate plan, which we want to be "popular": to awaken, federate, recognise and support the will to act that exists in our society, this citizen mobilisation that can undoubtedly make as much of a difference as the millions of euros we are investing in infrastructure".

Johanna Rolland
Présidente of Nantes Métropole
Tristan Riom
Vice-Président of Nantes Métropole

In order to achieve the objective of carbon neutrality in the metropolitan area, it is necessary to massively reduce greenhouse gas emissions by prioritising the sectors that have the greatest impact (transport, residential, industry, etc.), while at the same time increasing carbon storage capacity via natural carbon sinks. The principle of sobriety is seen as a prerequisite, and particular attention must be paid to imported resources and emissions.

Convinced that the collective dynamic and the mobilisation of citizens are essential drivers of the transition, Nantes Métropole wishes to propose a new "popular" PCAET and CCC and encourage changes in behaviour.

Finally, Nantes Métropole wishes to put in place a new, more ambitious strategy for adapting to climate change and move towards a public policy approach to enable climate change to be taken into account in a structural way and accelerate the in-depth transformation of the territory.
- The elected representatives of the metropolitan area have also chosen to concentrate human, technical and financial resources more strongly at the interface of the areas of action deemed to be priorities in the short term for responding to the climate emergency: urban planning, biodiversity, water, health and agriculture.
- Resilience actions to improve the region's robustness in crisis management will also be stepped up.

The action plan
The energy transition is based on the triptych Sobriety-Efficiency-Renewables. This means taking complementary action on sobriety (reducing consumption), energy efficiency (more performance while consuming less) and the development of renewable energy production.
Based on this triptych, Nantes Métropole's 2024-2030 PCAET and CCC aim, in an unprecedented way, to :
- Make energy and climate issues accessible to as many people as possible: the aim is to propose a "popular" climate plan that democratises the subject among

different audiences, popularises the technical content and strengthens information and awareness-raising.
- Develop a "resources" approach to broaden the debate: save common goods (water, soil, etc.) and take into account imported emissions, which account for 60% of our global emissions.
- Preserve and significantly develop natural carbon sinks to achieve a balance between residual GHG emissions and absorptions.

In order to embody the narrative around the ecological transition and the vision advocated for the territory by 2030, the CCC's climate actions have been organized according to the city's strategic objectives, namely :

- encouraging behavioral change = a popular Climate Plan and Climate City Contract
- reduce our needs = sobriety
- reduce imported emissions = resources
- improve the energy mix with 20% local renewable energy production by 2030 and 100% renewable energy consumption by 2050
- preserve and develop natural carbon sinks
- adapt the region to climate change and make it more resilient

The portfolio of actions by strategic objective is detailed in table **B 2.1.**

In table B 1.1 below, in line with the template and the Economic Model of NZC, we have deliberately decided to present the actions by emissions sector. This classification makes it easier to read for the players involved and specialists in each sector, who can at a glance scan the actions planned in their field of expertise. This presentation also makes it easier to identify the expected direct carbon impacts by sector or sub-sector, and to highlight the weight of each sector in relation to the others. It goes without saying that the vision of Nantes Métropole 2030 will only be achieved through the implementation of all these actions, across all sectors.

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
Transport	*Reduced motorized passenger transportation need*	1. support 1,000 households a year with climate challenges 10. Promote the development of alternatives to individual car use 11. Reduce the impact of carbon-based mobility 12. Limit the need for new road infrastructure 13. provide a structured, simple, easy-to-understand mobility offer for all inhabitants of the metropolitan area. 14. Develop school ecomobility 29. Ensure the availability of a "basket" of essential services: services, shops, healthcare professionals and craft trades, in central and suburban areas and neighborhoods. 30. Strengthen local retailing, by limiting the	Governance Infrastructure Awareness Innovation Support	-Reduced need for carbon-based transport thanks to closer proximity to shops and amenities (political ambition: the quarter-hour city). -Reduced commuting times -Increased number of cyclists	-Fewer cars in the metropolis Reduced need for carbon-based transport thanks to closer proximity to shops and amenities (political ambition: the quarter-hour city) -Reduced commuting times -Increased number of cyclists	229	-Improved air quality -Improved overall health -children's independence -creation of social links

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
		development of major and intermediate commercial zones.					
	Shift to public & no-motorized transport	1. support 1,000 households a year with climate challenges 10. Promote the development of alternatives to individual car use 11. Reduce the impact of carbon-based mobility 13. provide a structured, simple, easy-to-understand mobility offer for all residents of the metropolitan area 14. Develop school ecomobility	Governance Infrastructure Awareness Innovation Support	-increased use of public transport and bicycles increased use of car-sharing schemes -use of alternative modes (bicycles, woodybus, etc.) to get to school	-expansion of streetcar, bus and busway networks -expansion of bicycle paths -increased use of public transport and bicycles increased use of car-sharing schemes -use of alternative modes (bicycles, woodybus, etc.) to get to school	129	-improved overall health -better air quality -children's independence -creation of social links
	Increased car pooling	1. support 1,000 households a year with climate challenges 10. Promote the development of alternatives to individual car use	Governance Infrastructure Awareness Innovation	-increased carpooling -increase in carpool parking facilities -increase in the number of carpool lanes in the	-acceptance of carpooling as a regular mode of transport acceptance of car-sharing as a regular mode of	69	-creating social links

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
		11. Reduce the impact of carbon-based mobility 13. provide a structured, simple, easy-to-understand mobility offer for all inhabitants of the metropolitan area 15. Co-construct and experiment with "mobility stations	Support	metropolitan area increase in car-sharing use	transport		
	Electrification of cars + motorcycles	1. accompagner 1 000 foyers par year avec les défis climat 11. réduire l'impact des mobilités carbonées	Gouvernance Infrastructure Innovation	-year increase in the number of electric vehicles (after a sharp decline in the need for cars)	-increase in the number of electric vehicles (after a sharp drop in the need for cars) -electric vehicles are becoming the norm	64	-noise reduction in the metropolis -economic boost
	Electrification of buses	11. reduce the impact of carbon-based mobility	Gouvernance Infrastructure Innovation	-the company in charge of public transport buys electric vehicles	-the company in charge of public transport buys electric vehicles -electric vehicles become the norm	14	-noise reduction in the metropolis -economic boost
	Optimized logistics	14. school ecomobility	Gouvernance	generalize last-mile soft mobility	generalize last-mile soft mobility	125	-improved air quality

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
			Infrastructure Innovation	-optimize vehicle loading	-optimize vehicle loading		-economic gain
	Electrification of trucks	11. reduce the impact of carbon-based mobility	Gouvernance Infrastructure Innovation	-the company buys electric vehicles	-the company buys electric vehicles -electric vehicles become the norm	53	-noise reduction in the metropolis -economic boost
Building and heating	*Building renovations (envelope)*	17. Double the number of energy-efficiency renovations to 10,000 homes per year in the region. 18. Strengthen the Mon Projet Renov scheme 19. Invest in the renovation of public-sector buildings in line with the requirements of the tertiary sector decree.	Governance Infrastructure Innovation Support Investment	-increase the rate of energy renovation to 10,000 homes per year -provide financial support to residents for their energy renovation projects -renovate public buildings	-continue to renovate 10,000 homes a year -provide financial support to residents for their energy renovation projects -renovate public buildings	67	-improved quality of life -economic gain for local residents -reduced energy poverty
	New energy-efficient buildings	9. Continue to lead and implement the sobriety plan 16. Develop a frugal, low-carbon reference	Governance Infrastructure Innovation	-generalize the construction of energy-efficient buildings -widespread re-use	-generalize the construction of energy-efficient buildings -widespread re-	12	-improved health -economic gain -less transport and recycling/landfill (thanks to reuse of

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
		framework 27. Adopt circular urbanism as the metropolitan way of doing business 28. Intensify the use of space in existing public buildings	Support Investment	of materials -use of bio-sourced materials	use of materials -use of bio-sourced materials		materials)
	Efficient lighting & appliances	1. support 1,000 households a year with climate challenges 16. Develop a frugal, low-carbon reference framework 18. Strengthen the Mon Projet Renov scheme 19. Invest in the renovation of public buildings to meet the requirements of the tertiary sector decree.	Governance Infrastructure Innovation Support Investment	-partial change of heating mode (efficient electric pump)	-Renewal of 50% of lighting and household appliances (including electric pumps) within 10 years.	5	-economic growth -improved quality of life
	Decarbonizing heating generation	51. Implement master plan for heating networks 52. Support the region in promoting renewable heat projects	Governance Infrastructure Innovation Investment	-deployment of the master plan for heating networks	-deployment of the master plan for heating networks	464	-economic boost -energy poverty reduction

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
Electricity	*Decarbonizing electricity generation*	42. Support the territorial development of renewable energies, particularly in acceleration zones. 43. Develop support for citizen renewable energy projects 44. Develop the purchase of renewable energies in our energy purchasing group. 45. Define new carrying tools, particularly for renewable electricity. 46. Implement the BATII roadmap for photovoltaic solar power on public property. 47. Solarize local authority assets (excluding BATII) 48. Support companies in solarizing their assets 49. Undertake a study with partners on a solar ring road. 50. Manage solar energy production capacity in	Gouvernance Infrastructure Innovation Investment	-Increasing solar potential in the metropolitan area -study of various solar projects -increase solar electricity production on public and private buildings -massive investments	-Increasing solar potential in the metropolitan area -study of various solar projects -increase solar electricity production on public and private buildings -massive investments -increase the share of renewable energies in the city's energy mix	115	-economic gain -use of previously used surface

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
		agricultural and natural areas, in line with the objectives of the territorial food project.					
Waste	*Increased waste recycling*	1. support 1,000 households a year with climate challenges 33. Make reuse year economic priority with the opening of a totem pole and the testing of a partner platform. 34. Draw up a regional roadmap with local players to increase the use of construction waste and bio-sourced materials, and structure year eco-construction sector. 35. Open a metropolitan "ressourcerie" and support the opening of "boutiques de réemploi" for each municipality and each urban policy district.	Gouvernance Infrastructure Innovation Accompagnement Investment	-finalize the development of composters across the metropolis -implement the Local Program for the Prevention of Household and Similar Waste (PLPDMA) 2021-2026 -increase the efficiency of waste transportation and sorting reduce waste through re-use	-finalize the development of composters across the metropolis -implement the Local Program for the Prevention of Household and Similar Waste (PLPDMA) 2021-2026 -increase the efficiency of waste transportation and sorting reduce waste through re-use	1	-economic growth -increased social cohesion -improved -quality of life
	Éducation populaire	1. support 1,000	Infrastructure	-raising public awareness of the	-acceptance /understanding of		-social ties -feeling better

table B.1-1: Climate action pathways by emissions sector						
Field of actions	**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
(public education)	households a year with climate challenges 2. Raise awareness of the ecological transition among 10,000 children a year 3. Develop and support popular education in ecology 4. Raise awareness and train employees	Innovations Support Investment	challenges of the ecological transition	the need for ecological transition		about your city
Climate and culture	5. Develop a 100% eco-event strategy 6. Promote climate-related cultural creations 7. Run Place aux actes, a web magazine to support changes in practices 8. Create popularization/communication tools on climate issues	Infrastructure Innovations Accompagnement Investissement	-raising public awareness of the challenges of ecological transition -promoting activities linked to the ecological transition	-acceptance /understanding of the need for ecological transition		-social links -feeling better about your city
Entreprises	20. Promote CSR solutions to VSEs, SMEs and business groups. 21. Promote responsible commercial brands 23. Set up local initiatives	Infrastructure Innovations Accompagnement	- raise awareness of the challenges of the ecological transition among professionals, particularly in the private sector	-acceptance /understanding of the need for an ecological transition -carbon neutrality as a guiding		-social links -inter-company links -increase in private and private/public partnerships

table B.1-1: Climate action pathways by emissions sector							
Field of actions		**Portfolio of actions**	**Systemic levers**	**Early changes (1-2 years)**	**Late outcomes (3-4 years)**	**Direct impacts (Emission reductions by 2030)**	**Indirect impacts (co-benefits)**
		to accelerate the ecological and energy transition of the most energy-intensive businesses (industry, construction). 25. Support low-tech stakeholders and build a local low-tech strategy	Investissement	-promote activities linked to the ecological transition	principle for private enterprise		

B.1-2: Description of impact pathways

Achieving carbon neutrality in the Nantes Métropole area implies maximum GHG emissions of around 340 kteqCO2 in 2030. This figure corresponds to a 55% reduction in energy consumption between now and 2050 (in line with Ademe Transition(s) 2050 scenarios 1 and 2) and the fact that the energy consumed has a low carbon content (60gCO2/kWh compared with 250gCO2/kWh today).

Conversely, carbon neutrality implies "cancelling out" the residual GHG emissions by storing them in carbon sinks. The city's policy guidelines and Ademe scenarios 1 and 2 advocate a preference for natural carbon sinks rather than technical carbon sinks (with the exception of bio-sourced materials). By 2030, it will therefore be necessary to be able to store 340 kteqCO2.

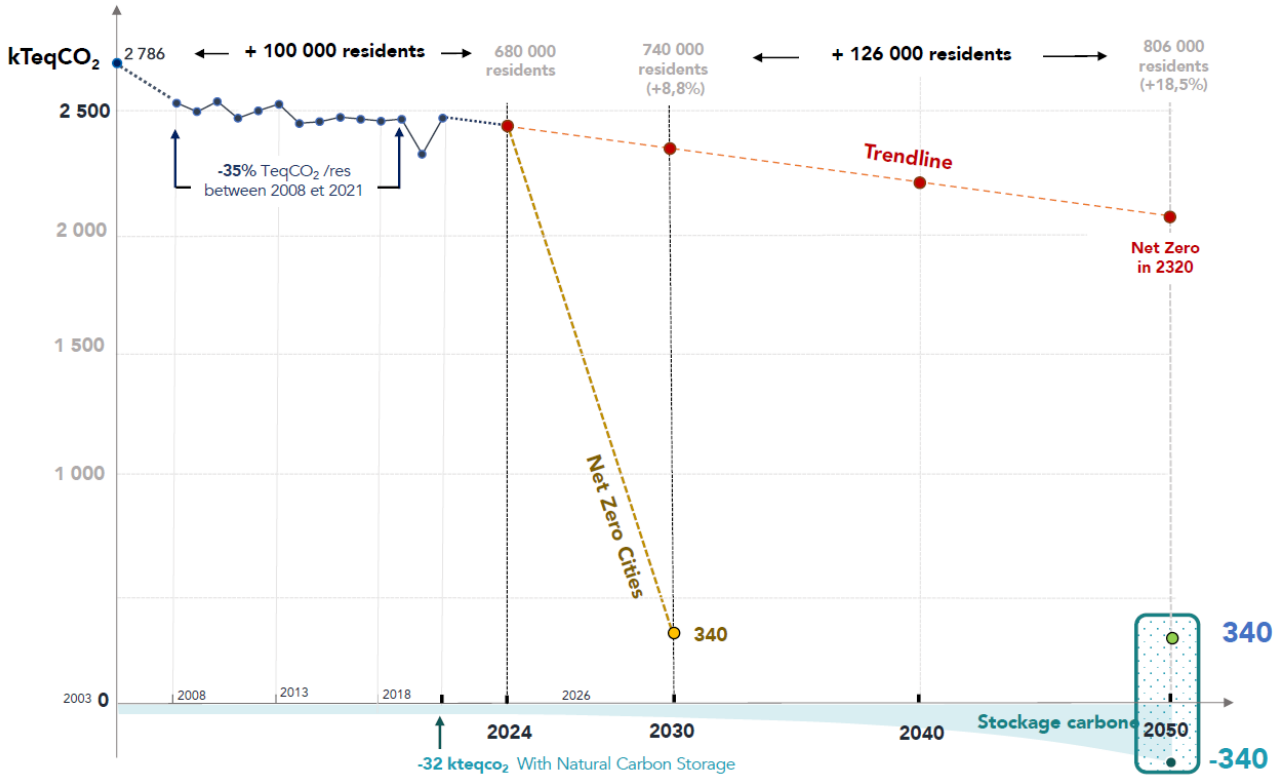


Figure 15 - Nantes Métropole climate target, AURAN 2024

The majority of greenhouse gas emissions in the metropolitan area come from the transport and building (and heating) sectors, so it was important and necessary for Nantes Métropole to reduce these sectors as a structural priority.

In fact, the tertiary, residential and road transport sectors alone account **for 82% of the region's emissions**, so it seems necessary to tackle these sectors as a matter of priority.

With this in mind, the city has decided to take strong action in these areas, including the renovation of 10,000 homes per year, which represents a doubling of the target previously set in the city's guide documents. Or reducing the share of carbon-based mobility in the road transport sector.

The action choices made by the metropolis are therefore aimed directly at the sectors that emit the most greenhouse gases: **transport** and **buildings.**

Figure 16 - Nantes Métropole cadastral emissions by sector, AURAN 2024

The targets for GHG reduction, energy consumption and renewable energy production to achieve a carbon-neutral 2030 trajectory are detailed in the following tables:

GES_kTeqCO2	2021	2030
Road transport	1 095	153
Other transport	39	5
Residential	568	79
Commercial	345	48
Industry	271	38
Agriculture	48	7
Energy branch	7	1
Waste	32	4
Emitters not included	45	6
Total	**2405**	**340**

Carbon sinks	-32	-340

Figure 17 - Co2e reduction by sector

Consommation GWh	2021	2030
Road transport	4313	1908
Other transport	326	144
Residential	3658	1618
Commercial	2827	1251
Industry	1562	691
Agriculture	97	43
Others	12	5
Total	**12 796**	**5 660**

Production GWh	2021	2030
Renewable energy in Nantes Metropole	**973**	**2875**
Wind	0	70
Solar	47	1074
Hydroelectricity	0	5
Biomethane	30	120
Renewable gas (H2, Syngaz)	0	477
Heating and cooling networks	415	679
Renewable heat Diffuse Solar thermal, wood, Aero-geothermal	174	450
Biofuels	307	200
Renewable energy out Nantes Metropole	**11 823**	**2 785**
Total local Renewable energy	**9 %**	**50 %**

Figure 18 - reduction of energy consumption and production of renewable energies by sector

	2021	2030
Carbonation rate (gCO2/kWh)	188	60
Nantes Metropole CO2 emissions	2405	340

Feasibility of the trajectory :

The actions in the Action Plan (see portfolio B.2) have been calibrated to enable the figures given in the tables above to be achieved. The trajectory can only be followed through the implementation of the Action Plan. The support of Europe, via the Mission City, the alignment of international and national legislation, and the mobilization of substantial financial capital are essential for the realization of this Action Plan and the achievement of Nantes Métropole's ambitious objectives.

In terms of offsetting the 340 kteqC02 of residual emissions, Nantes Métropole wishes to rely solely on natural carbon sinks (including bio-sourced materials).

Action 53 of the portfolio consists in “creating a structure to store carbon” in order to calibrate the mechanisms to be mobilized (aggregation of private financing to be redistributed in carbon storage projects, additional financing system...). This project is in the prefiguration phase.

It should be noted that the carbon and ecological resilience structure's scope of action extends beyond Nantes Métropole, whose storage potential is limited: neighboring communities, the Nantes St Nazaire Metropolitan Cluster and even the Loire Atlantique department.

The implementation of these numerous actions will also lead to year overall improvement in health in the metropolitan area, with year improvement in air quality and a shift towards active modes of transport (cycling, walking, etc.). The overhaul of town centers and the upgrading of neighborhoods will enable the development of a strong social bond between citizens.

A detailed description of each action is presented in module B-2 Climate Neutrality Portfolio Design , with co-benefits and implementation timetable for each action, and if available, the cost per action and the reduction in terms of greenhouse gases.
These actions are the fruit of collaborative work with all Nantes Métropole's stakeholders: private companies, associations, local authorities and institutions, as well as all Nantes Métropole and Ville de Nantes technicians, to enable in-depth work. At the same time, the metropolis has drawn up its 2024-2030 Territorial Climate Air Energy Plan (PCAET), so the actions in the PCAET action plan are the same as the actions in this action plan. This makes it possible to send out a strong message of involvement both at national level with the PCAET and at European level with this Climate City Contract.

In part B-2 Climate Neutrality Portfolio Design , the metropolis has chosen to classify its actions by major policy areas, to make the issues easier to read and understand, whereas in the previous part the actions

were grouped by major decarbonization areas. This choice was made to ensure better political support and greater consistency of the issues at stake across the metropolitan area.

In addition, year adaptation section has been added to the portfolio of actions; indeed, the metropolis has a Climate Change Adaptation unit within its Ecological Transition Department. This makes it possible to work in depth on the issues involved in climate programming. The metropolis has therefore also chosen to present here the key actions of the PCAET Adaptation action plan, to demonstrate its real commitment and the consideration it gives to all aspects of the ecological transition.

The table in module B-3 Indicators for Monitoring, Evaluation and Learning provides a complete breakdown of all the actions relevant to this plan. It describes the desired indicators and targets for each individual project.

B-2 Climate Neutrality Portfolio Design

The actions highlighted in the table above are those chosen by the elected representatives to become the flagship initiatives of the action plan. These actions will be carried out with increased determination, illustrating the strong political will of the metropolis. They are also the initiatives with the greatest potential to reduce greenhouse gas emissions in the region, making a significant contribution to the fight against climate change. As described above, the choice has been made here to classify the actions by major policy areas, to make it easier to understand the issues at stake on a territorial scale.

Similarly, year adaptation section comprising 5 action sheets has been added to the portfolio to enable all aspects of the ecological transition to be taken into account. The key actions are in red in this tab.

table B.2-1: Description of actions

Sector	Field of action	Number	Description of the portfolio	
			List of action	Description
Mitigation				
A people's climate plan	People's education	1	Accompany 1000 households per year with climate challenges	Engage 6,000 households in a carbon neutrality approach between 2024 and 2030 (i.e., 1,000 households per year): digital, transport, housing, energy consumption, food, waste, leisure… +One week truly without a car: Offer residents to give up their car and provide free access to all alternative mobility options.
		2	Raise awareness among 10,000 children per year about ecological transition	Continue developing multi-themed educational offerings around ecological transition issues.
		3	Develop and support popular education on ecology	Develop "transition neighborhoods" to enable citizen initiatives and amplify actor movements.
		4	Raise awareness and train agents	Sensitization workshops around the transversal issues of ecological transition.
	Climate and Culture	5	Develop a 100% eco-event strategy	Develop eco-events while maintaining existing labels and rankings to support the transition of the

				territory's event sector.
		6	Promote cultural creations related to the climate	Make the future desirable through culture in the city.
	Media	7	Animate "Place aux actes," a web magazine to support practice changes	Create a dedicated section on the institutional website.
		8	Create tools for simplification/communication on climate issues	The goal is to democratize energy/climate topics with accessible and simplified deliverables.
Sobriety: reducing our needs	Energy	9	Continue to animate and implement the sobriety plan	Reduce consumption by 10% in two years (lowering pool temperatures, extending public lighting off times...).
	Mobility	10	Reduce the use of cars to make more room for active mobility	Generalize the pedestrian and cyclist-friendly city. Limit the use of new road infrastructures Study the evolution of delivery conditions in downtown Nantes. Support the electrification of the vehicle fleet
		11	Prioritize the development of alternatives to individual cars.	Increase the cycling modal share to 15% and strengthen local active transportation
		12	Offer a simple, readable, and structured mobility offer to all residents of the metropolitan living area.	
		13	Develop school eco-mobility	Foster a common culture to encourage changes in family and children's travel practices towards active modes (walking, cycling) and public transport.
		14	Co-create and experiment with "mobility stations"	Support behavior change towards sustainable mobility and make alternatives to individual cars attractive by facilitating multi-modality.
	Energetic renovation	15	Develop a frugal and low-carbon reference framework	Develop a decision support tool: a frugal and low-carbon reference framework for urban planning and new/rehabilitated buildings to reduce the carbon, water, energy, and material footprint of projects.
		16	Double the number of energy renovations	Renovate 10,000 homes per year, doubling the

			to reach 10,000 homes per year in the territory	current PLH objective.
		17	Strengthen the "Mon Projet Renov" scheme	Annually support 1,000 private individual or co-owned homes in year energy renovation project with Nantes Métropole's "Mon Projet Rénov" aids.
		18	Invest in the renovation of public heritage to the level of the tertiary decree	Complete and efficient renovations, actions with a short return time, and usage/surface actions.
	Companies	19	Promote RSE solutions to SMEs, small businesses, and business collectives	Work on the offer to design a territorialized offer by theme, user-oriented for SMEs, small businesses, and mid-sized companies.
		20	Promote responsible commercial brands	Highlight responsible businesses in Nantes City Center.
		21	Accelerate the densification of activity zones to improve the job/surface ratio	Increase densification and land optimization in activity zones to transform economic activity areas.
		22	Implement territorial animation to accelerate the ecological and energy transition of the most energy-consuming companies (industry, construction)	Animate a network of the most energy-consuming companies, linked to the "Territory of Industry" approach.
		23	Open dialogue on the transition of heated industrial greenhouses to low-energy systems	Open dialogue on heated greenhouse market gardening, representing 10% of the territory's gas consumption.
		24	Support low-tech actors and build a territorial low-tech strategy	Support the emergence and structuring of low-tech and frugal innovation actors.
		25	Consider ecological transition issues in procurement practices	Nantes Métropole's Responsible Purchasing Promotion Scheme (SPAR) is a tool aimed at better considering the social and environmental impact of public procurement.
Resources: reducing imported emissions	Circular urbanism	26	Adopt circular urban planning as a metropolitan mode of operation	Recycle spaces, transform existing structures, intensify uses, and renature.
		27	Intensify the use of existing public building surfaces	Each new building construction or heavy renovation project must integrate a reflection to enable space sharing.

	1/4h lifestyles	28	Ensure essential services in centers, village centers, and neighborhoods: services, shops, health professionals, and artisans	Define a strategy to strengthen economic centralities, including supporting urban projects and actions to intensify economic activities adapted to local needs.
		29	Strengthen local commerce, limiting the development of major and intermediate commercial zones	Control the development of commerce in major and intermediate commercial poles.
	Tourism	30	Implement a sustainable tourism strategy	Adapt to climate change and the scarcity of natural resources; meet new tourist expectations; address recruitment tensions in the sector; preserve the uniqueness of a territory "upturned by art and culture" and its position as a creative and committed destination.
	Nantes, land of reuse	31	Make reuse year economic priority with the opening of a flagship site and the experimentation of a partnership platform	Design a multifunctional platform to recover materials from a site for reuse or recycling.
		32	Develop a territorial roadmap with local actors to scale up the use of construction waste and biosourced materials and structure year eco-construction sector	Project of a platform for reuse, requalification, and recycling of materials from building deconstruction-demolition, integrating all functions of the sector's value chain: storage, requalification, reuse, recycling.
		33	Open a metropolitan resource center and support the opening of reuse shops in each municipality and political district of the city	In response to waste reduction-prevention, solidarity, social cohesion, and integration issues, Nantes Métropole has adopted a support strategy for the solidarity reuse sector.
		34	Engage in a dialogue with ESS actors to develop a new repair and maintenance service offer	A project will be launched with ESS actors to develop a service offer for better repair and thus extend the lifespan of goods.
	Numeric	35	Control the impacts of digital equipment and usage	Annual impact assessment, time monitoring, and action plan implementation.
	Feeding	36	Vegetalize food with local production	Support school catering to vegetalize plates, support local production of plant proteins, and support local partners in diversifying productions.
		37	Structure the production, processing, and	Contribute to the implementation of the metropolitan

			distribution of the agricultural sector by prioritizing short circuits	public food and agriculture policy in line with the Territorial Food Project (PAT).
		38	Launch a reflection on food landscapes to map and strengthen the distribution of fresh, local, and quality products on the territory	Engage agricultural and agri-food companies in collective and cooperative dynamics of transformation and market integration, based on short circuits.
	Water	39	Achieve a 10% reduction in water consumption across the territory by 2030 by local authorities, individuals, and businesses + secure departmental and metropolitan drinking water through the Alliance of Territories by 2050	Support water savings in the framework of a water agency call for projects in the Loire-Brittany region for local authorities.
Energy mix: 20% local RE production by 2030	Deployment	40	Support the territorial development of renewable energies, particularly in acceleration zones	Ensure coordination of renewable energy projects mapped in acceleration zones.
		41	Develop support for citizen renewable energy projects	Specify the positioning of citizens in the territorial renewable energy company (SAS EnR), particularly on flagship projects.
		42	Increase the purchase of renewable energy in our energy purchasing group	Study the feasibility of applying and exceeding territorial renewable energy objectives.
	Renewable electricity	43	Define new support tools, particularly for renewable electricity	Create a governance and technical/financial support tool for renewable energies.
		44	Deploy the BATII roadmap on photovoltaic solar on public heritage	Encourage the creation of collective self-consumption loops to locally benefit from renewable and decarbonized energy.
		45	Solarize the community's no-BATII heritage	Integrate the solarization obligation (roofs and car parks) in the renewal of public service delegations (DSP).
		46	Support companies to solarize their heritage	Study ongoing convention with Atlansun to educate companies on solar energy via local business clubs in connection with Nantes Métropole economic developers.

		47	Engage a study with the state on a solar peripheral	Study the opportunity/feasibility of solarizing part of the peripheral taking into account all issues (technical, usage, regulatory, air quality, noise, financial, acceptability...).
		48	Regulate solar energy production capacities on agricultural and natural spaces while respecting the objectives of the territorial food project	Study the renewable energy production capacities on agricultural spaces while respecting the objectives of the territorial food project.
	Renewable heat	49	Deploy the heat network master plan	Develop, extend, and densify existing networks to provide year additional 240 GWh of heat.
		50	Support the territory to promote renewable heat projects (including CCRt)	Mobilize and support territory actors in deploying renewable heat solutions: waste heat, solar thermal, geothermal, or wood energy.
	Renewable gas	51	Support renewable gas project developers in the territory, including innovation	Support the development of renewable gas production (methanization - pyrogasification - hydrothermal gasification...) in the territory.
Natural carbon sinks: preserve and develop		52	Consume ⅓ less agricultural, natural, and forest spaces compared to the 2019 PLUm target	The 2019 PLUm has set year objective to reduce the annual consumption rate of ENAF by 50% by 2030 compared to the 2004-2014 period, aiming to reach year annual consumption rate of 83.4 ha/year by 2030.
		53	Carbon structure and ecological resilience	Create a structure to store carbon and increase ecological resilience. Fund local natural carbon storage and environmental restoration projects (biodiversity, soil, water). Aggregate private (companies, individuals) funding to redistribute in local projects, complementing public funding. Provide advice to evaluate carbon stocks and potential. Extend action beyond Nantes Métropole, including neighboring communities, the Nantes St. Nazaire Metropolitan Pole, and department 44.
		54	Implement the intervention plan to restore the territory's rivers, marshes, and ditches for good ecological status	The master plan for aquatic environments, developed after a two-year study, was approved by the Metropolitan Council on February 9, 2024.

Adaptation				
Urban resilience: towards a natural and healthy metropolis	Fresh urban air		Implement the intervention plan to restore the territory's rivers, marshes, and ditches for good ecological status	The master plan for aquatic environments, developed after a two-year study, was approved by the Metropolitan Council on February 9, 2024.
	Urban and housing		Building a health-friendly metropolis adapted to future climatic conditions, based on assessment and development of urban planning documents	We therefore need to study how to strengthen the current PLUm (20219 -2030) with a view to urban planning that is adapted to climatic hazards and promotes environmental health. The aim today is to strengthen the constituent parts of the PLUm, to make them interact with each other and reinforce their practical scope.
	Research		Implement the urban micro-climate observatory	Establish a partnership between IRSTV and Nantes Métropole to set up year urban micro-climate observatory. IRSTV has the expertise and research experience to co-construct this observatory. The IRSTV already has a number of measuring stations in Nantes, installed as part of research projects or on year observation site.
Agricultural resilience: protecting biodiversity and water resources	Natural carbon sinks		Carbon structure and ecological resilience	Create a structure to store carbon and increase ecological resilience. Fund local natural carbon storage and environmental restoration projects (biodiversity, soil, water). Aggregate private (companies, individuals) funding to redistribute in local projects, complementing public funding. Provide advice to evaluate carbon stocks and potential. Extend action beyond Nantes Métropole, including neighboring communities, the Nantes St. Nazaire Metropolitan Pole, and department 44.
Resilience and crisis management	Civic involvement		Strengthening the population's risk culture and memory	A weak risk culture and the loss of memory of past events make a region's population more vulnerable to future crises. In the face of climate change, strengthening the culture and memory of risk is a key factor in building resilience.

				-flooding actions included in the PAPI loire Aval 2023-2029 -Global strategy to be developed by the community

B.2-2: Description of each action

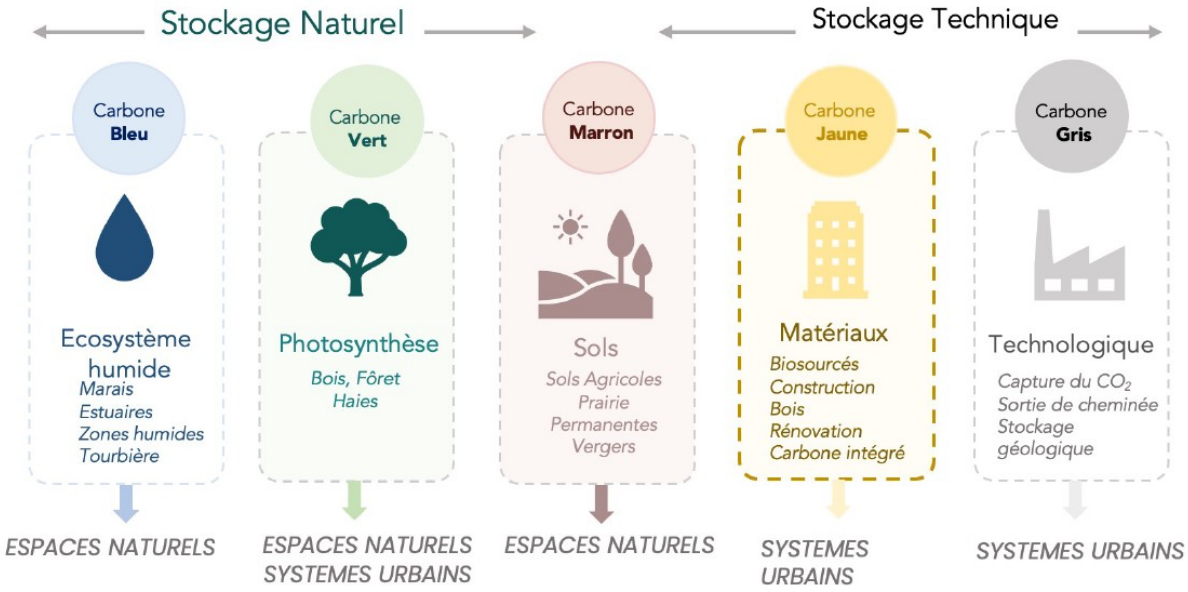
Annexe 1 – Action plan

It has not always been possible to specify the cost of each action for the time being.
Given that Nantes Métropole is aware that this stage will be a prerequisite for any search for funding, it is planned to give priority to working on the cost of the actions in future COTECs. We are also counting on the assistance of city finance specialists.

B.2-3: Summary of strategies for residual emissions

The political vision adopted for the reduction of residual emissions favours natural carbon sinks, as outlined in Ademe's scenarios 1 and 2. With this in mind, Nantes Métropole aims first to achieve a significant reduction in emissions, and then to offset the remaining emissions by using these natural carbon sinks. However, this approach does not take into account existing and future technological solutions for carbon sequestration.

This strategy therefore excludes any consideration of technological sequestration options. Furthermore, the implementation of sequestration via natural carbon sinks is limited to the scale of the département, as the metropolis does not have sufficient land to diversify its uses, whether for residential purposes, reforestation, livestock farming or agricultural production.



One of the flagship actions of the action plan is to set up a carbon structure (sheet no. 53): to develop local financing for natural carbon storage and environmental restoration projects, combining private and public funds, while providing advice on assessing carbon stocks. The structure will extend beyond Nantes Métropole, with shared governance to ensure transparency and efficiency.

The Land Use, Land-Use Change and Forestry sector is not conventionally included in a territory's total GHG emissions, but is necessary to achieve carbon neutrality by 2030. This sector generates both emissions and absorptions of CO2. It enables us to estimate the carbon sinks in a given area, through three flows: forest growth (absorptions), wood harvesting (emissions) and changes in land use (emissions and absorptions) (e.g.: cultivated land that becomes grassland will store carbon, while in the opposite direction, it will release some).

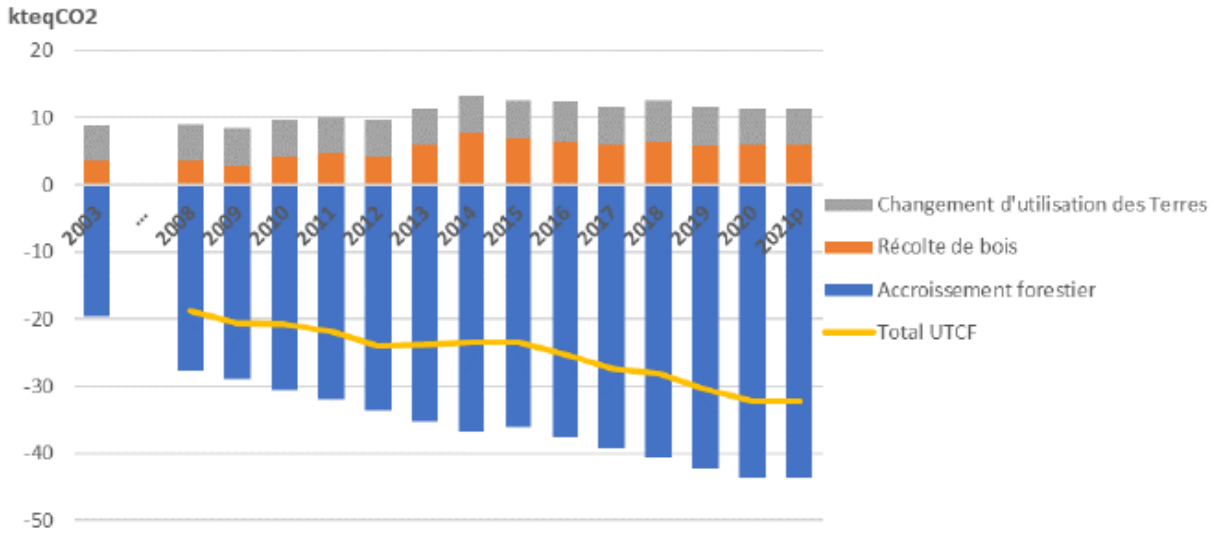


Figure 19 - Carbon sinks in the region in kteq CO2

In the Nantes Métropole area, carbon sinks grew steadily between 2003 and 2021p (by a factor of 3), despite the artificialization of the land and the harvesting of wood, both of which are sources of emissions. Forest growth is the main source of absorption in the region (2-fold increase between 2003 and 2021p). Wood harvesting has increased on the territory, generating growing emissions (2-fold increase between 2003 and 2021p).
The change in land use varies according to activities and authorizations under local town planning schemes, for example. Over the period 2003-2021p, emissions linked to land use change are stable (around 6 kteqCO2 per year).

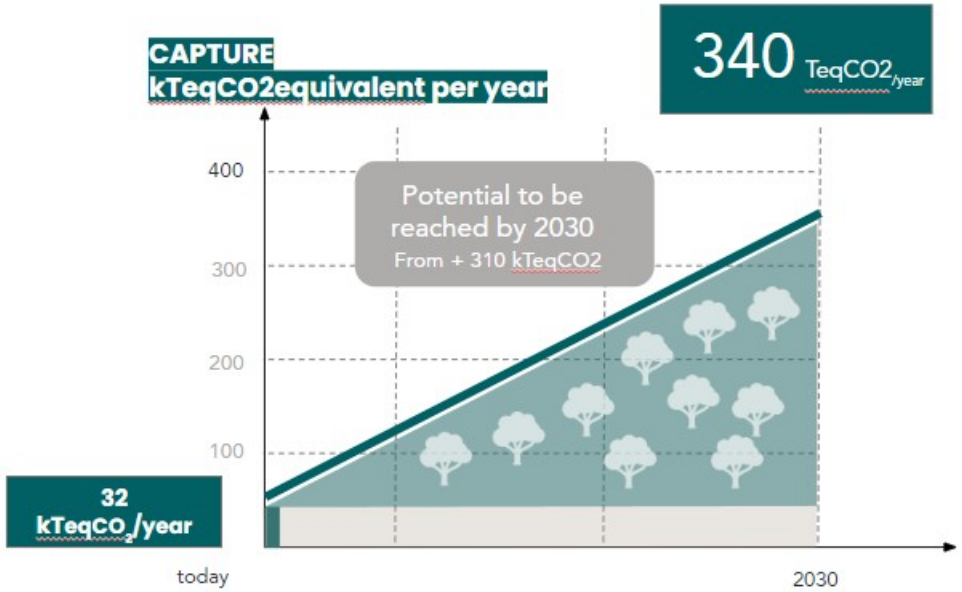


Figure 20 - Capture of kTeq CO2 potential to be achieved by 2030

In 2021p, the Nantes Métropole LULUCF sector as a whole absorbs 32 kteqCO2. This absorption is not enough to offset the 2,404 kteqCO2 emitted by the various activities in the area.

The ratio of carbon sinks to GHG emissions is around 1%. This rate is stable over the entire period considered (2003, 2008-2021p).

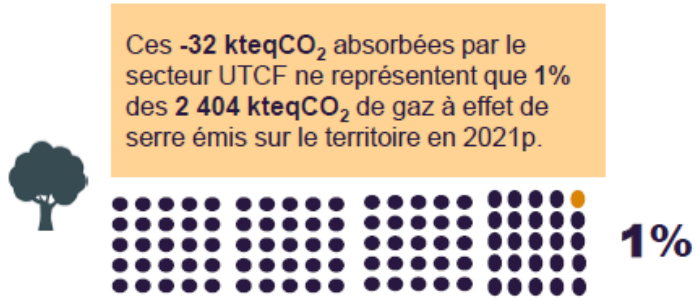


Figure 21 - Carbon sink in relation to local emissions

B-3 Indicators for Monitoring, Evaluation and Learning

Table B.3-1: Pathways						
Target / Expected Impact	**Action / Project**	**Indicator No.**	**Indicator Name**	**Target value**		
				2025	2027	2030
Reduction of CO2 emissions compared to business as usual 2030	All action plan actions	A1	Greenhouse gas emissions			-71%
Increase in CO2eq capture in the territory (at the departmental scale)	53. Create a structure to store carbon and increase ecological resilience	A2	Carbon sinks			
Increase in renewable energies in the share of local energy consumption and production	40. Support the territorial development of renewable energies, particularly in acceleration zones. 41. Develop support for citizen renewable energy projects 42. Develop the purchase of renewable energies in our energy purchasing group. 43. Define new carrying tools, particularly for renewable electricity. 44. Implement the BATII roadmap for photovoltaic solar energy for our assets. 45. Solarize public-sector assets (excluding BATII) 46. Support companies in solarizing their assets 47. Initiate a study with the government on a solar ring road 48. Supervise solar energy production capacity in agricultural and natural areas, in line with the objectives of the territorial food project. 49. Implement a master plan for	B1	Local renewable energy production			

Table B.3-1: Pathways						
Target / Expected Impact	**Action / Project**	**Indicator No.**	**Indicator Name**	**Target value**		
				2025	2027	2030
	heating networks 50. Support the region in promoting renewable heat projects (including CCRt) 51. Support local renewable gas project developers, including innovation					
Reduction in energy needs	40. Support the territorial development of renewable energies, particularly in acceleration zones. 41. Develop support for citizen renewable energy projects 42. Develop the purchase of renewable energies in our energy purchasing group. 43. Define new carrying tools, particularly for renewable electricity. 44. Implement the BATII roadmap for photovoltaic solar energy for our assets. 45. Solarize public-sector assets (excluding BATII) 46. Support companies in solarizing their assets 47. Initiate a study with the government on a solar ring road 48. Supervise solar energy production capacity in agricultural and natural areas, in line with the objectives of the territorial food project. 49. Implement a master plan for heating networks	B2	Energy consumption	-10%	-5% par rapport à 2027	-5% biannual decrease

Table B.3-1: Pathways						
Target / Expected Impact	**Action / Project**	**Indicator No.**	**Indicator Name**	**Target value**		
				2025	2027	2030
	50. Support the region in promoting renewable heat projects (including CCRt) 51. Support local renewable gas project developers, including innovation					
Reduction of collected waste and increase in reuse/recycling	31. Make reuse year economic priority with the opening of a totem pole and the experimentation of a partnership platform. 32. Draw up a regional roadmap with local players to increase the use of construction waste and bio-sourced materials and structure year eco-construction sector. 33. Open a metropolitan "ressourcerie" and support the opening of "boutiques de réemploi" in every municipality and every urban policy district.	D1	Collected waste			
Increase in waste reuse	31. Make reuse year economic priority with the opening of a totem pole and the experimentation of a partnership platform. 32. Draw up a regional roadmap with local players to increase the use of construction waste and bio-sourced materials and structure year eco-construction sector. 33. Open a metropolitan "ressourcerie" and support the opening of "boutiques de réemploi" in every municipality and	D2	Reuse			Making it year economic priority

Table B.3-1: Pathways						
Target / Expected Impact	**Action / Project**	**Indicator No.**	**Indicator Name**	**Target value**		
				2025	2027	2030
	every urban policy district.					
Reduction in water consumption	39. Achieve a 10% reduction in water consumption across the territory by 2030 by local authorities, individuals, and businesses; secure departmental and metropolitan drinking water through the Alliance of Territories by 2050	E1	Water consumption per habitat - volumes withdrawn from rivers			
Improvement of water bodies' status	54. Implement the intervention plan to restore the territory's rivers, marshes, and ditches for good ecological status	E2	Ecological status of water bodies			
Reduce consumption of agricultural, natural, and forest spaces	52. Consume ⅓ less agricultural, natural, and forest spaces compared to the 2019 PLUm target	F1	Evolution of natural, agricultural, and forest spaces (ENAF)			-ENAF consumption of 56ha/year -50% reduction in current rate of NFA consumption
Increase public transport usage (modal shift)	12. Offer a structured, simple, readable mobility offer to all residents of the metropolitan living area	G1	Public transport usage			16% modal share public transport
Increase the average number of passengers in a car	10. Reduce the use of cars to make more room for active mobility. 11. Promote the development of alternatives to the private car. 12. Provide a structured, simple, easy-to-understand mobility offer for all inhabitants of the metropolitan area.	G2	Carpooling			

Table B.3-1: Pathways						
Target / Expected Impact	**Action / Project**	**Indicator No.**	**Indicator Name**	**Target value**		
				2025	2027	2030
Increase cycling modal share	10. Reduce the use of cars to make more room for active mobility. 11. Promote the development of alternatives to the private car.	G3	Cycling infrastructure			15% bicycle modal share
Increase walking, cycling, and public transport modal share	10. Reduce the use of cars to make more room for active mobility. 11. Promote the development of alternatives to the private car.	G4	Modal share			58% total modal share bike/walk/TC
Increase the quality of food products offered and integrate ecological transition into all purchases made by the metropolis	25. Consider ecological transition issues in procurement practices	H1	Organic and vegetarian products in municipal canteens			

Today, the metropolis has selected multiple indicators to track its progress towards climate neutrality. Here are the most relevant indicators linked to the action plan. These indicators are already monitored by the metropolis, and are included each year in the sustainable development reports of the Metropolis and the City of Nantes.

The community attaches great importance to monitoring these indicators, aware of their crucial role in assessing and adapting its trajectory. Regular monitoring of these measures by the Direction Animation de la Transition Écologique enables us to identify areas requiring adjustment, and to ensure that the initiatives in place are contributing effectively to achieving our climate neutrality objectives. This rigorous monitoring testifies to the metropolis' commitment to a successful and sustainable ecological transition, while enabling it to report on its progress in a transparent and structured way.

table B.3-2: Indicators	
Indicator name	**A1: Greenhouse gas emissions**
Indicator unit	Tons of CO2 equivalent
Definition	Level of GHG directly emitted in the territory, excluding indirect imported emissions
Calculation	Activity data * Emission factor
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	- Residential - Commercial - Industrial - Transport (road and off-road) - Waste - Agriculture - Energy (excluding the production of electricity, heat and cooling for greenhouse gas emissions, whose corresponding emissions are accounted for at the consumption stage).
Does the indicator measure indirect impacts (i.e., co-benefits)?	no
If yes, which co-benefit does it measure?	-
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	All NZC trajectories
Is the indicator captured by the existing CDP/ SCIS/ Covenant of Mayors platforms?	yes
Data requirements	
Expected data source	INSEE, Air Pays de La loire (Basemis)
Expected availability	On request and production of Basemis

	report
Suggested collection interval	annual
References	
Deliverables describing the indicator	Ademe
Other indicator systems using this indicator	-

Indicator name	**A2- Carbon sinks**
Indicator unit	kteqCO2
Definition	GHG emissions and absorption in the Land Use, Land-Use Change and Forestry (LULUCF) sector.
Calculation	Explained in *European Commission (2021) Evaluating the Impact of Nature-based Solutions: Appendix of Methods* (p.22)
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	All sectors
Does the indicator measure indirect impacts (i.e., co-benefits)?	No
If yes, which co-benefit does it measure?	
Is the indicator useful for monitoring the output/impact of action(s)?	no
If yes, which action and impact pathway is it relevant for?	-
Data requirements	
Expected data source	Air Pays de La loire (basemis)
Expected availability	Report
Suggested collection interval	annual
References	
Deliverables describing the indicator	Ademe, European Commission (2021) Evaluating the Impact of Nature-based Solutions: Appendix of Methods.
Other indicator systems using this indicator	-

Indicator name	**B1- Local renewable energy production**
Indicator unit	MWh/year
Definition	Electricity generated from renewable

	sources in the within the administrative boundaries of Nantes Métropole
Calculation	Annual electricity production
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	-electricity
Does the indicator measure indirect impacts (i.e., co-benefits)?	no
If yes, which co-benefit does it measure?	-
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Electricity
Data requirements	
Expected data source	Air Pays de La loire (basemis)
Expected availability	Rapport
Suggested collection interval	annual
References	
Deliverables describing the indicator	Ademe
Other indicator systems using this indicator	GHG emissions

Indicator name	**B2- Energy consumption**
Indicator unit	MWh/year
Definition	Total energy consumed by end-users such as households, industry and agriculture
Calculation	Sum of different types of energy consumed
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	All sectors
Does the indicator measure indirect impacts (i.e., co-benefits)?	no
If yes, which co-benefit does it measure?	-
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Construction and heating
Data requirements	
Expected data source	Air Pays de la loire (basemis), INSEE

Expected availability	online
Suggested collection interval	annual
References	
Deliverables describing the indicator	Ademe
Other indicator systems using this indicator	GHG emissions

Indicator name	**D1- Collected waste**
Indicator unit	kg/capita/year
Definition	Level of waste generated on the territory and collected by the local authority.
Calculation	Total waste collected across the metropolis
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	-
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Increase recycling, reduce the proportion of waste going to landfill and promote the circular economy
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Waste
Data requirements	
Expected data source	TEO, annual waste report (Nantes Métropole)
Expected availability	Online
Suggested collection interval	Annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly to *resources: reduce imported emissions #Nantes, terre de réemploi*
Other indicator systems using this indicator	-

Indicator name	**D2- Re-use**
Indicator unit	Qtt of diverted/reused objects

Definition	All systems and channels for recovering objects before they are thrown away, to give them a second life.
Calculation	Total number of objects that could be reused and avoided recycling or destruction
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	Saving resources by not manufacturing new products and saving energy by recycling them
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Enables social interaction
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Waste
Data requirements	
Expected data source	Annual waste report (NM)
Expected availability	online
Suggested collection interval	annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly to resources: reduce imported emissions #Nantes, terre de réemploi
Other indicator systems using this indicator	-

Indicator name	**D3- Compost**
Indicator unit	In number
Definition	The indicator measures the number of biowastes composted
Calculation	Number of biowaste items composted in the metropolitan area
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	-
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes

If yes, which co-benefit does it measure?	Creation of social links, less transport (DIB of waste)
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Waste
Data requirements	
Expected data source	Waste Management (NM), TEO
Expected availability	Report
Suggested collection interval	Annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly to resources: reduce imported emissions #Nantes, Terre de réemploi
Other indicator systems using this indicator	-

Indicator name	**E1- Water consumption by habitat - volumes abstracted from watercourses**
Indicator unit	L/day/capita - m^3
Definition	Total water consumed by households, industry and agriculture
Calculation	Total water consumption ÷ 365 ÷ number of inhabitants - total m^3
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	-
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Impact on biodiversity and ecosystems
Is the indicator useful for monitoring the output/impact of action(s)?	no
If yes, which action and impact pathway is it relevant for?	-
Data requirements	
Expected data source	Nantes Métropole annual water report, INSEE, AELB
Expected availability	online
Suggested collection interval	Annual
References	
Deliverables describing the indicator	*The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030,*

	and more specifically to resources: reduce imported emissions #water
Other indicator systems using this indicator	-

Indicator name	**E2- Ecological status of water bodies**
Indicator unit	In quality index
Definition	The quality (biological, physical, chemical, etc.) of the main bodies of water in the region.
Calculation	Measurements of various physico-chemical indicators (02, T°C, pH, nitrates, phosphates), biological indicators (IBG, IBD, I2M2) and the presence of specific pollutants (e.g. copper, zinc, glyphosate, Metazachlor, Toluene, Metaldehyde, etc.).
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	-
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Improving biodiversity and ecosystems
Is the indicator useful for monitoring the output/impact of action(s)?	no
If yes, which action and impact pathway is it relevant for?	-
Data requirements	
Expected data source	Agence de l'eau, Water annual report
Expected availability	online
Suggested collection interval	Annual
References	
Deliverables describing the indicator	*The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly to more specifically to the section Natural carbon sinks: preserving and developing*
Other indicator systems using this indicator	-

Indicator name	**F1- Changes in natural, agricultural and forest areas (ENAF)**

Indicator unit	In hectares
Definition	Area characterized both by the presence of forest trees and by the absence of any other land use, not artificialized, not agricultural or forested, not explawed.
Calculation	*Expliqué dans European Commission (2021) Evaluating the Impact of solutions basées sur la nature : Annexe des méthodes.*
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	Yes, can be used for CO2 sequestration
If yes, which emission source sectors does it measure?	Every sectors
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Air quality, reducing heat islands, improving ecosystems
Is the indicator useful for monitoring the output/impact of action(s)?	no
If yes, which action and impact pathway is it relevant for?	-
Data requirements	
Expected data source	Biodiversity atlas, the open-ground plan, BDMOS
Expected availability	Report / map
Suggested collection interval	Annual
References	
Deliverables describing the indicator	European Commission (2021) Evaluating the Impact of Nature-based Solutions: Appendix of Methods.
Other indicator systems using this indicator	Carbon sinks

Indicator name	**G1- Public transport use**
Indicator unit	In km/100 000 capita
Definition	Distribution of residents' usual modes of transport identified on public transport
Calculation	Total km travelled by public transport / 100,000
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	-

Does the indicator measure indirect impacts (i.e., co-benefits)?	no
If yes, which co-benefit does it measure?	-
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Transport
Data requirements	
Expected data source	NM, travel observatory
Expected availability	Report
Suggested collection interval	Annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly more specifically to the section Sobriety: reducing our #mobility needs
Other indicator systems using this indicator	Modal share

Indicator name	**G2- Carpooling**
Indicator unit	By number of passengers
Definition	Breakdown of residents' usual modes of transport identified as carpooling
Calculation	Number of passenger
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	Reduction in ges / inhabitant
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Improving air quality
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Transport
Data requirements	
Expected data source	NM, travel observatory
Expected availability	online
Suggested collection interval	Annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030,

	and more particularly more specifically to the section Sobriety: reducing our #mobility needs
Other indicator systems using this indicator	Modal share

Indicator name	**G3- Cycling facilities**
Indicator unit	Millions of journeys/year
Definition	Distribution of residents' usual modes of transport identified on cycle paths
Calculation	Nombre de voyage effectués en vélo sur l'année
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	no
If yes, which emission source sectors does it measure?	-
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Improving the quality and health of residents
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Transport
Data requirements	
Expected data source	NM, travel observatory
Expected availability	online
Suggested collection interval	Annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly more specifically to the section Sobriety: reducing our #mobility needs
Other indicator systems using this indicator	Modal share

Indicator name	**G4- Modal share**
Indicator unit	In %
Definition	Breakdown of residents' usual modes of transport
Calculation	Trips by means of transport over period X / total trips over the same period X

Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	-Mobility/transport
Does the indicator measure indirect impacts (i.e., co-benefits)?	no
If yes, which co-benefit does it measure?	-
Is the indicator useful for monitoring the output/impact of action(s)?	yes
If yes, which action and impact pathway is it relevant for?	Transport
Data requirements	
Expected data source	NM, travel observatory
Expected availability	Rapport
Suggested collection interval	Annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly more specifically to the section Sobriety: reducing our #mobility needs
Other indicator systems using this indicator	GHG emission

Indicator name	**H1- Organic and vegetarian products in municipal canteens**
Indicator unit	In %
Definition	Growth in the number of organic and vegetarian meals in municipal school canteens
Calculation	Total meals distributed in school canteens
Indicator context	
Does the indicator measure direct impacts (reduction in greenhouse gas emissions?)	yes
If yes, which emission source sectors does it measure?	-food (scope 3)
Does the indicator measure indirect impacts (i.e., co-benefits)?	yes
If yes, which co-benefit does it measure?	Improving young people's health and nutrition
Is the indicator useful for monitoring the output/impact of action(s)?	no
If yes, which action and impact pathway is it relevant for?	-

Data requirements	
Expected data source	
Expected availability	Report
Suggested collection interval	Annual
References	
Deliverables describing the indicator	The indicator refers to the strategy of Nantes Métropole's PCAET 2024-2030, and more particularly resources: reduce imported emissions #food
Other indicator systems using this indicator	-

As the CCC was adopted at the same time as the Climate Plan, it will follow the mandatory evaluation stages of the Climate Plan, i.e. updating the indicators once a year and an overall evaluation of the trajectory and progress of the actions after 3 years (2027) before starting to prepare the 2030-2036 Climate Plan in 2029.

4. Part C – Enabling Climate Neutrality by 2030

C-1 Governance Innovations Interventions

Table C.1-1: Facilitating organizational and governance interventions				
Action	**Description**	**In charge**	**Stakeholders**	**Impact**
Direction for Ecological Transition Management at Nantes Métropole	Service dedicated to the construction and implementation of the ecological transition to achieve carbon neutrality at the Nantes Métropole level. The directorate addresses topics such as energy, agriculture, air, food, and carbon neutrality.	Nantes Métropole	- Technicians - Employees	Structures public policies and integrates the ecological transition into each department (collaborative work)
Internal Organization (COTEC)	Meeting between experts and technicians from all departments of Nantes Métropole, focused on public and municipal policies. The current cycle aims to revise the PCAET and develop the Climate City Contract, mobilizing each department to promote the ecological transition and implement concrete actions.	Nantes Métropole	- Technicians	Development of public policies to achieve carbon neutrality in collaboration with each expert technician for a better understanding of the issues
Collaborative Work with Elected Officials (COPIL)	Consultation with elected officials on climate-related topics to present progress towards carbon neutrality. This aims to enhance understanding of the issues and facilitate arbitration of public policies.	Nantes Métropole and elected officials	- Technicians - Elected officials	Contribute to the implementation and development of the action plan for the Territorial Climate Air Energy Plan and the Climate City Contract

Climate Council	Continuous dialogue forum bringing together various actors (associations, businesses, local authorities, and elected representatives of the metropolis). The main objective of this council is to enable rigorous monitoring of public climate policies, as well as to systematically assess their effectiveness and impact. By promoting collaboration among different stakeholders and ensuring transparency in decision-making processes, this new structure demonstrates Nantes Métropole's commitment to placing the fight against climate change at the heart of its concerns and actions.	Nantes Métropole	- Associations - Private businesses - Local authorities - ...	Analysis of public policies

C.1-2: Description of organizational and governance interventions

The metropolis has introduced new forms of organization and governance to facilitate both horizontal and vertical, as well as sectoral and cross-sectoral interventions. Horizontal interventions foster collaboration between various departments and local players, while vertical interventions ensure cooperation between different levels of governance, from local to national. Sectoral initiatives target specific areas, such as energy or transport, while cross-sectoral interventions integrate several fields for global solutions. This new governance encourages the active participation of all stakeholders, guaranteeing year integrated and adaptive approach to the ecological transition.

COTEC air-energy-climate

Meeting between Nantes Métropole experts/technicians from all departments. These meetings focused on the public and municipal policies to be put in place. The current cycle began in autumn 2023, with particular focus on the revision of the PCAET and the drafting of the Climate City Contract. Each department is therefore mobilized to promote the ecological transition in all sectors of the economy and implement concrete actions within the community.

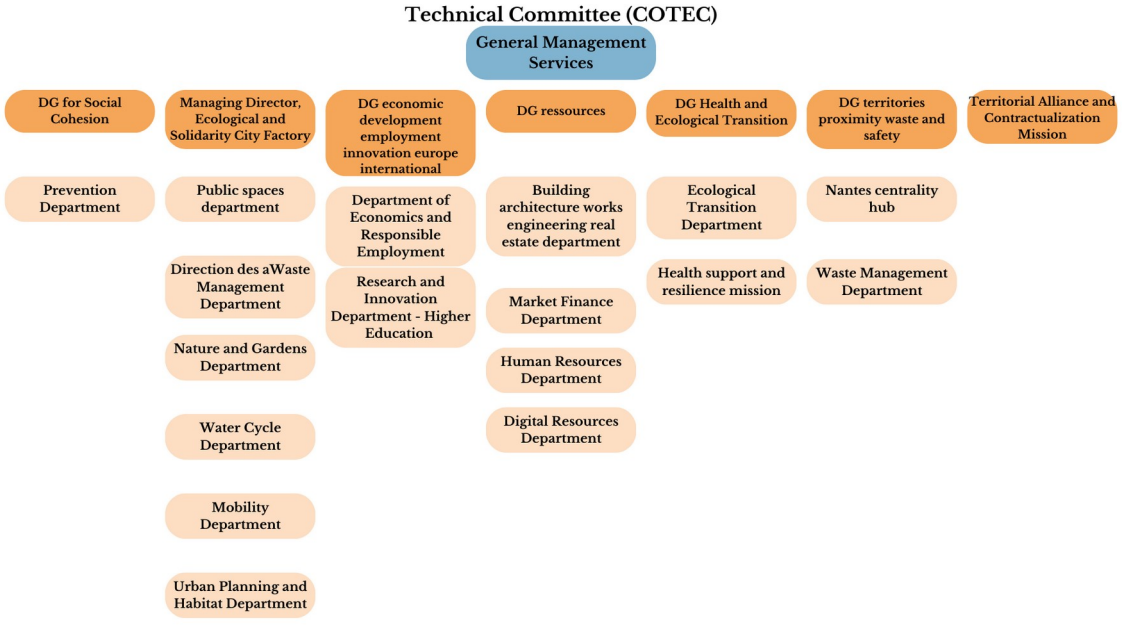


Figure 22 - Technical committee organization chart (COTEC)

COPIL

Nantes Métropole's Energy-Climate Steering Committee (COPIL) is made up of some twenty elected representatives in charge of cross-cutting issues and themes relating to climate, air and energy. Exchanges are organized every 2 months. They are chaired by Tristan RIOM, Vice-President of Nantes Métropole in

charge of Climate, Energy Transitions, Agriculture, Food Transition, Resilience (pollution and urban forests) and Economic Change.

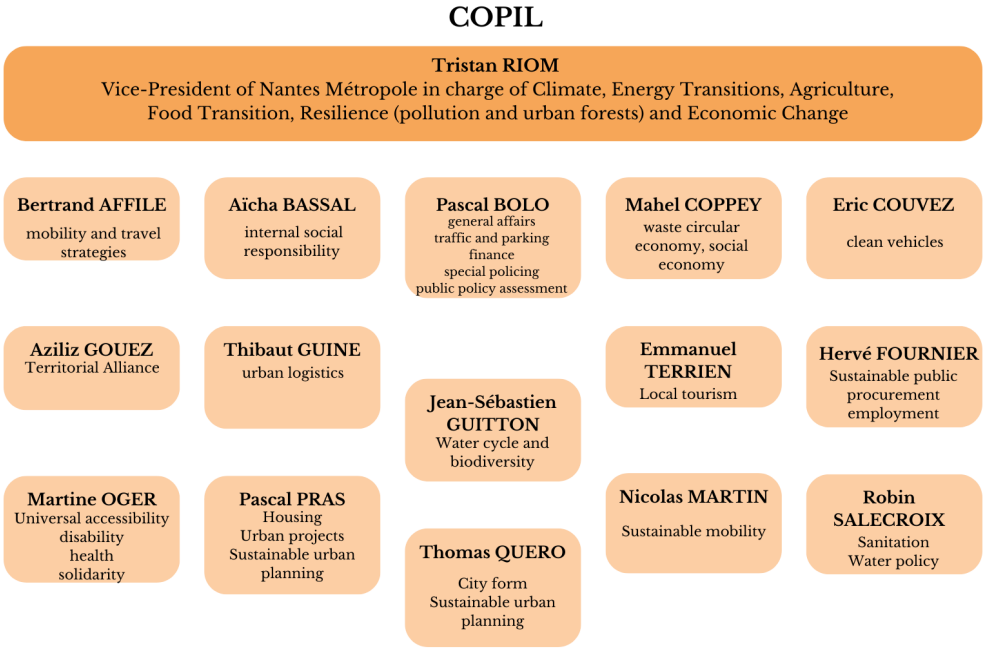


Figure 23 - Representative diagram of the steering committee's organization

Health and Ecological Transition Division

In year innovative move, Nantes Métropole is reinventing itself as a driver of change, embracing year integrated vision where public health and ecological transition are inseparable. In concrete terms, the local authority is reorganizing its internal structures to merge the departments dedicated to health and ecology, under the guiding principle of “ONE HEALTH”. This cross-functional approach aims to create significant synergies between these two fundamental areas, fostering the emergence of a collective dynamic and a shared vision. The main objective of this initiative is to establish a true symbiosis between health and the environment, going beyond the traditional boundaries of public policy to encourage in-depth reflection on the interaction between these two fields. This new approach demonstrates Nantes Métropole's resolute commitment to rethinking existing paradigms and placing sustainability at the heart of its priorities. By adopting a holistic perspective, the metropolis aspires to create a future where the health of the population and ecological balance are intrinsically linked.

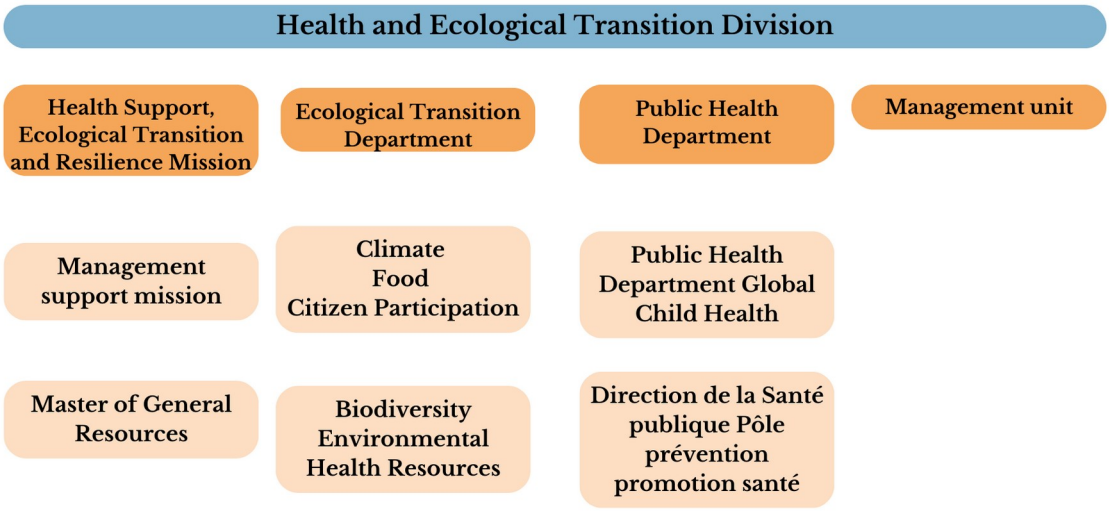


Figure 24 - Health and Ecological Transition organization chart

Conseil pour le Climate (Climate Council)

To accompany the Energy Transition roadmap and ensure a follow-up to the Grand Débat, COTE, year open conference on energy transition, was set up in 2018. It delivered a report in June 2021, delivering a mixed assessment of its first mandate.

Following this report, a diagnostic and analysis of stakeholder networks was conducted to define new modalities for open governance on climate issues.

The proposal is to establish a space for ongoing dialogue to enrich public policies and projects in the region. This description fits well with the framework set by the metropolis in 2021 as part of the Metropolitan Citizenship Pact. This new body could join the 25 active open governance bodies in the community.

The main missions proposed for the “Climate Council” would be as follows:

- working together, building capacity: monitor the implementation of structuring/partnership actions under the Climate Plan (continuing the work of the the Turning point workshops). AURAN could support us in producing data on the actions selected by the Climate Council.

- monitoring and forecasting, identifying initiatives and providing inspiration: contribute to the programming of the annual Climate Rendezvous

These avenues were tested in informal interviews with some of the participants in the the Turning point workshops. The missions were generally well perceived by the partners, with a few points of attention: take the time to better define/clarify the objectives, which sometimes still appear vague to some, and be careful to define concrete objects of work: “it's time to take action”. In their view, the Climate Council must not be: “a place for lobbying or politics”, “blah blah blah”, “yet another consultative body producing reports”, “a fact-checking body”, “a place to promote individual interests”.

It is proposed to continue the prefiguration work until the adoption of the PCAET (early 2025) to clarify the mandate, launch the call for participation... and thus be in a position to install the new body in early 2025.

In summary, the Climate Council, a new open governance body, appears necessary for the animation of the territorial climate air energy plan for the following reasons:

- Benefiting from local expertise (from committed citizens and partners) is year asset for enriching/improving certain public policy actions.

- The challenge of carbon neutrality calls for collective responses and a forward-looking vision, with particular attention to emerging initiatives.

- Nantes Métropole needs to animate a network of partners to encourage new local collaborations, with a view to joint responses to national or European calls for projects.

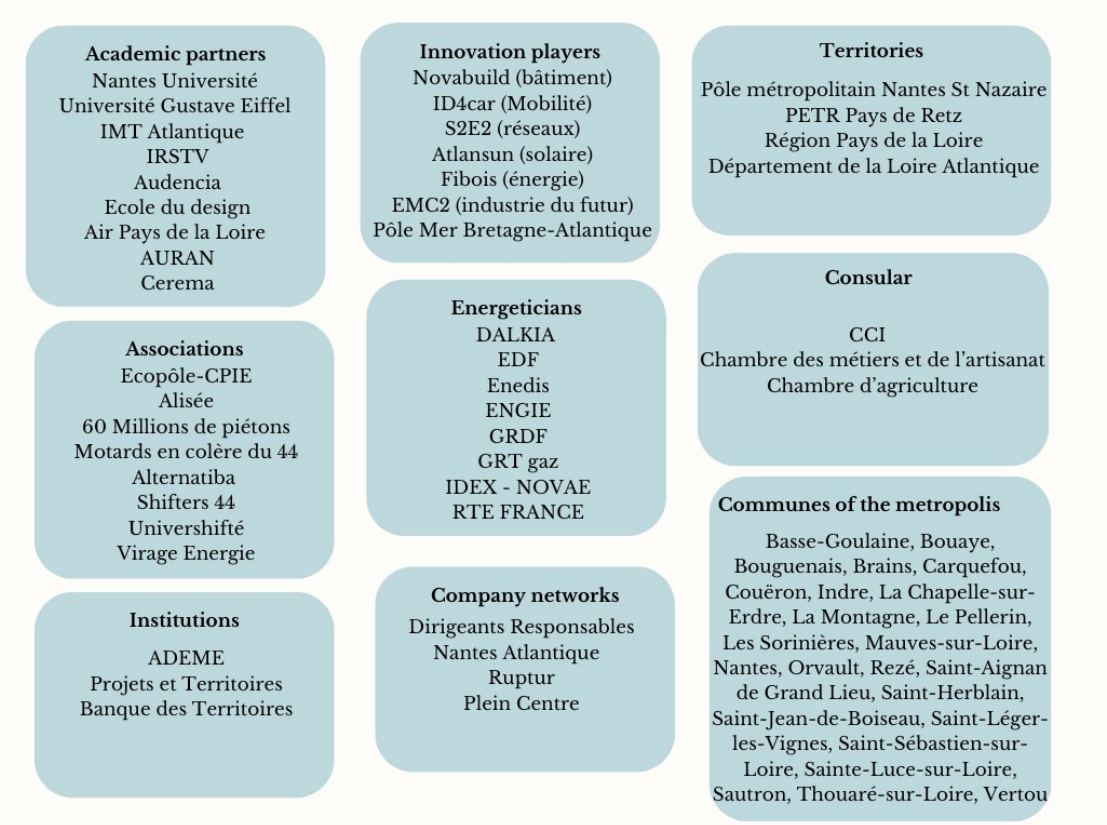


Figure 25 - Diagram of the partners involved in drawing up the Climate City Contract

A larger number of partners than those presented at the beginning of this action plan are included here, as they have participated in a broader way in the development of the City Climate Contract 2030 and the PCAET 2024-2030.

C-2 Social Innovation Interventions

Table C.2-1: Enabling social innovation interventions					
Action	**Description**	**Responsible**	**Involved Stakeholders**	**Expected Impacts**	**Co-benefits**
Pilot Cities – Climate Challenges	Challenges proposed to citizens (1000 households) to support individual behavior changes through collaborative workshops and achievable goals.	Nantes Métropole	- Relay associations - Citizens - Nantes Métropole	Support and anchor behavioral changes	-Financial gain -Improved health -Improved social cohesion
Private/Public Partnership (Turning Point Workshops)	Three monthly meetings brought together partners of Nantes Métropole. Development of concrete projects led by partners. These workshops fostered constructive exchanges and facilitated meetings between various stakeholders.	Nantes Métropole	- Associations - Private businesses - Local authorities (communes)	- 4 working groups with participants knowledgeable on the topic: - Natural carbon sinks - Construction/renovation - Mobility - Renewable energies	
Academic and Research Partnership	• Examine the functioning of the system (target audience, initiative results, communication, etc.) to inform decisions on its continuation after the EU-funded experimental phase. • Leverage lessons learned from this approach on barriers and incentives to behavior change to enrich the metropolis' reflections on lifestyle changes, in line with its public policies contributing to the ecological transition.	Nantes Métropole and the University of Gustave Eiffel	- Researchers	Policies more aligned with carbon neutrality	
Great Debates	Nantes Métropole organized two Grand Debates over the last decade: the first on energy	Nantes Métropole	- Citizens - Businesses	Contributes to developing and implementing solutions	-better understanding of citizens' expectations and desires

	transition in 2016-2017, and the second on the Fabric of Our Cities in 2023. These debates brought together residents and professionals to discuss these topics, and their proposals are reviewed by elected officials to guide metropolitan policies, in a direct citizen consultation approach.			for a sustainable metropolis by and for the citizens	

C.1-2: Description of organizational and governance interventions

Pilot Cities – Défis Climate

From 2011 to 2023, the metropolis ran citizen ecological transition challenges for over 2,000 households on 3 themes: food, energy and waste. Led by local associations (Alisée, GAB44, Ecopole and Les boîtes vertes), these challenges really did have the effect of changing participants' habits.At the end of 2022, in connection with the Mission Cities, a call for projects entitled Pilot Cities was opened to support experimental approaches to achieving carbon neutrality. We responded by proposing a new formula for citizen challenges: **carbon neutrality challenges.**

These new challenges, known as “climate challenges”, aim to help 1,000 households a year move towards a low-carbon lifestyle. This experiment, made possible by European funding, is being carried out with a number of local partners: the Samoa, Nantes University and Dirigeants Responsables Nantes Atlantique for the animation, as well as Gustave Eiffel University for the evaluation and Alisée for the Déclics application.

Similarly, the city is striving to share its vision for the city with its citizens and to take account of their aspirations and demands. In this way, action plans and public policies are directly derived from the recommendations made by citizens during the Great Debates and the Climate Challenges.

As well as helping citizens to reduce their carbon footprint and change their lifestyles, Nantes Métropole aims, through the Climate Challenges, to gather feedback from citizens and identify the obstacles they face in order to try to remedy them: by working with the partners concerned or by modifying public policies. **So, the conclusions and learnings of this study will inform the CCC development and iteration cycles.** This evaluation is being carried out by the Gustave Eiffel University as part of the Pilot Cities project.

Turning Point Workshops

Three monthly meetings were organized to bring together Nantes Métropole's partners. These 3 workshops focused on actions that could be implemented by the partners, while reflecting on how to accompany the current economic system towards its end, while building a new one. This breakdown enabled constructive exchanges between Nantes Métropole's various partners.

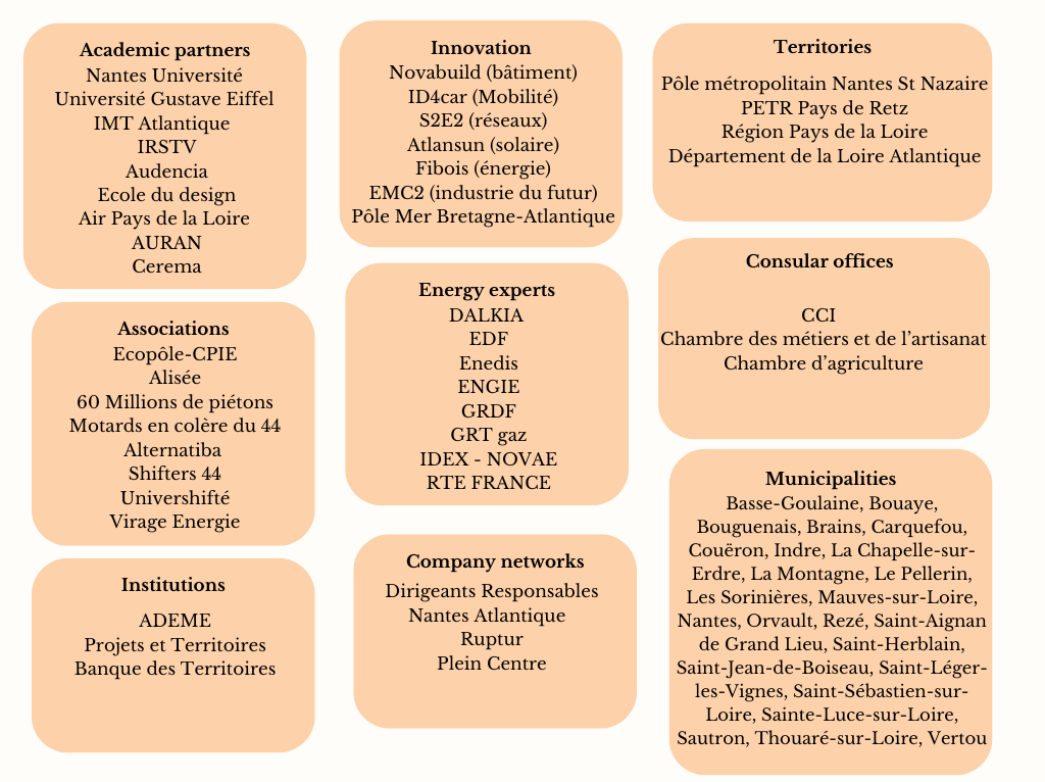


Figure 26 - Diagram of partners present at the the Turning point workshops

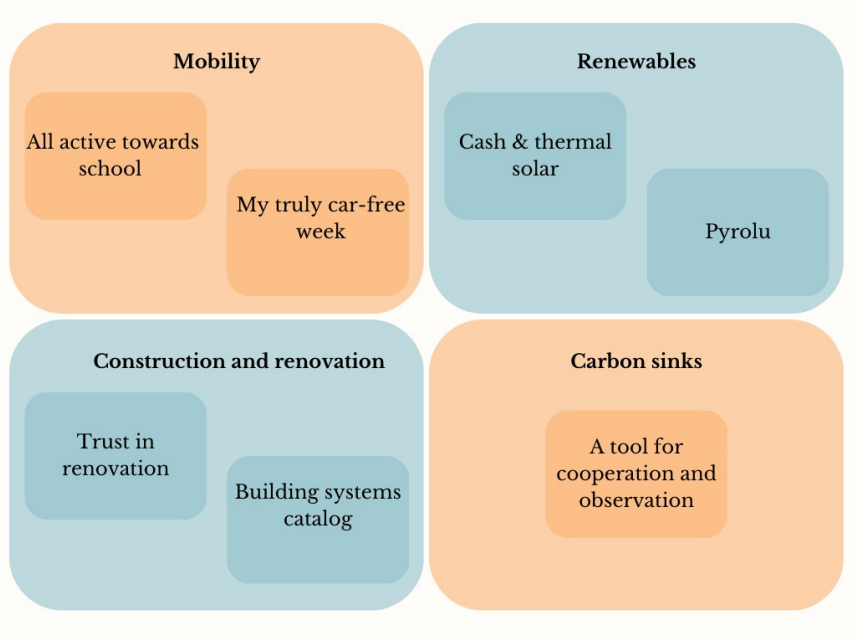


Figure 27 - Diagram of projects developed by theme at the the Turning point workshops

Dark Matter Labs and Democratic Society helped us organize and create the workshops on which the participants then worked. This collaboration really enabled us to gain a better understanding of the exchanges as well as a better method of approach. It was in this context in particular that the Double-loop dynamic was evoked to fully integrate the players present in the area. This close collaboration enabled us to make use of the resources available on both sides of the table, and to offer the players present at the various workshops high-quality support and exchanges to help them make the ecological transition that is so necessary in our region today.

The aim of the the Turning point workshops was to encourage discussion between local players who are not accustomed to working together, and to include them fully in the ecological transition. It was really about creating projects in the private sphere to make stakeholders actors of change. We received excellent feedback on these workshops, which enabled us to develop projects and bring together people who don't usually rub shoulders.

Grands Débats (Great Debate)

Nantes Métropole has organized two Grands Débats over the past decade, the first in 2016-2017 focusing on the energy transition, and the second in 2023 dealing with the Fabrique de nos villes. These Grands Débats bring together residents and professionals to discuss how to implement the energy transition, or how to make our cities and live in them in the future. The proposals put forward are then analyzed and examined, so that elected representatives can make commitments and take direction. The aim behind this mobilization is to give citizens a real role in building the metropolis' commitments by consulting them directly.

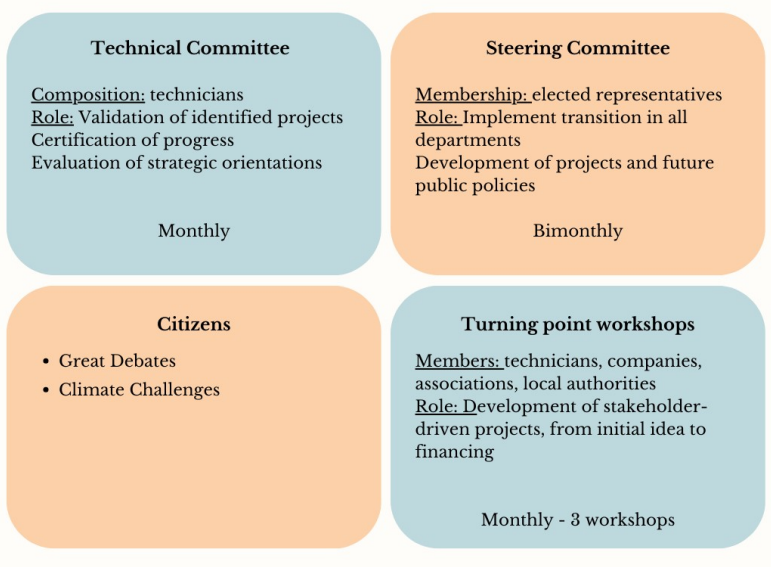


Figure 28 - Summary of working groups set up

Climate and culture

The guiding principle of this Climate City Contract, and the common thread running through Nantes Métropole's climate transition, is a strong political commitment, with the many changes fiercely supported by the city's elected representatives. In this sense, the transition to carbon neutrality is permeating all of the city's competencies and sectors, as can be seen in the case of culture. Nantes Métropole is intrinsically linked with culture, and the community wishes to use this link with culture to promote the transition. Indeed, citizen mobilization is a prerequisite for a successful transition, and this requires a clear understanding of the issues at stake. The metropolis wants to use culture to make the notions of bifurcation and ecological transition more accessible. In particular, through a comic strip that will be written to narrate the ecological transition on the scale of the metropolis, this collaboration with local artists will enable a better appropriation of the subjects by the inhabitants. In addition, the renovation of the Nantes Natural History Museum, scheduled for 2028, will focus on the ecological transition. Indeed, the museum aims to become a major player in a society ready to meet the challenges of climate, biodiversity and ecological transition, with the aim of "living on Earth tomorrow". This change will also provide year opportunity to renovate the building's energy efficiency. In this way, Nantes Métropole is taking on the subjects of transition in a fun and interactive way.

These social innovations have been instrumental in shaping Nantes Métropole's trajectory towards carbon neutrality. Actions within the action plan have directly emerged from the the Turning point workshops and the Grand Debates. These innovations have facilitated the creation of connections and networks that previously did not exist, bringing together stakeholders who were not accustomed to collaborating. This collaborative approach has enabled the development of technical and innovative pathways and actions through the cultivation of new ideas.

The Turning point workshops, for example, fostered a collaborative environment where various actors, including local associations, private businesses, and municipal authorities, could converge to address common challenges. This setting encouraged the cross-pollination of ideas, leading to the creation of targeted and effective solutions for the metropolis.

Similarly, the Grand Debates provided a platform for citizens and professionals to engage in meaningful dialogue about energy transition and urban development. The proposals generated from these debates were carefully reviewed by elected officials and integrated into metropolitan policies. This inclusive and participatory process ensured that the actions were not only technically sound but also socially accepted and supported by the community.

Overall, these social innovations have played a crucial role in aligning diverse stakeholders towards a shared vision of a carbon-neutral future, leveraging collective expertise and fostering a culture of cooperation and

innovation. This collaborative spirit has been essential in developing a robust and dynamic action plan, characterized by technical proficiency and creative solutions.

In the future, all these systems will provide feedback and learning that will be used to improve and develop climate policies (iteration cycle of Climate Plan and CCC).

5. Part D – Outlook and next steps

This City Climate Contract 2030 has been drawn up by a central team in collaboration with the various departments of the Metropole and City of Nantes, and also with the stakeholders present in the territory via collaborative working groups. This action plan is based on the action plan of the Metropole's recently renewed 2024-2030 Territorial Climate Air Energy Plan, as well as on green budgeting analyses, which provide decision-making support. The community's actions and responsibilities will be specified, elaborated and detailed in future iterations of this Climate City Contract 2030. The 2030 Climate Neutrality Action Plan will be updated in greater detail and developed on year ongoing basis, for example when new official governance documents are adopted. Every two years, year updated version will be sent to NetZeroCities and the EU.

Annual monitoring of the city's progress towards a positive climate will be carried out by Nantes Métropole teams.

The process of drawing up the PCAET 2024-2030 has served as a joint effort for the drafting of the Contrat Ville Climate 2030.

The ambition is to link the Contrat Ville Climate 2030 to the regular structures and organization of the Metropole's guiding documents.

6. Part E – Annexes

Annexe 1 – Action plan

(all titles are clickable)

Mitigation
A climate plan for the people
Sobriety: reducing our needs
Resources: reducing imported emissions
Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050
Natural carbon sinks: preserving and developing
Adaptation
Urban resilience: towards a natural and health-friendly metropolis
Natural carbon sinks: preserving and developing
Resilience and crisis management

Mitigation

1. A climate plan for the people

<table>
<tr><td rowspan="2">MITIGATION

A climate plan for the people

 
</td><td>stakeholders</td><td colspan="4">impacts / cobenefits (from - - to +++)</td><td>green house gas</td></tr>
<tr><td>Leader: Nantes Métropole

Potential partners: Alisée, Université Gustave Eiffel, Nantes Université, Samoa, DRNA, Hespul.
Ecopole and its network.
Local authorities.</td><td>Acceptability
Cost
Benefits/Cost
Local dynamics
Climate change adaptation</td><td>+++
++
+
++
+</td><td>Health
Resources
Climate
Biodiversity</td><td>+++
+
+++
-</td><td>+
Will be evaluated during the trial</td></tr>
<tr><td colspan="7">1. Support 1,000 households a year with climate challenges</td></tr>
<tr><td rowspan="2">key contextual factors
● action 88 of the roadmap of the "Grand Débat Fabrique de nos villes

indicators and goals
● reach 1,000 households
● recruit a wide range of relay structures (in terms of target audience and location within the region)

Cost
● ++ : 1,5M€ (trial)</td><td colspan="6">Description of the action</td></tr>
<tr><td colspan="6">Initiated as part of a European project, the Climate Challenges aim to help 1,000 households a year change their lifestyles. Relying on piloting partners and a network of relay structures located throughout France, and with the help of a mobile application, the challenges enable everyone to test new low-carbon daily practices.

The Bifurcation workshop has proposed working on a "my week really without a car" challenge: this proposal is to be explored and integrated into future itineraries to be offered to participants.</td></tr>
<tr><td></td><td colspan="6">Implementation schedule</td></tr>
<tr><td></td><td colspan="6">Committed / start in March 2024
Medium-term: European financing ending in May 2025, arbitration to be carried out for continuation of program until 2030</td></tr>
</table>

state of progress - to amplify links to go further • https://metropole.nantes.fr/participer/agir-pour-le-climat/les-defis-climat	success factors and obstacles
	A person living in Nantes emits around 9T of CO2/year. To achieve carbon neutrality, we would need to reduce our emissions to 2T of CO2/year, which means radically changing our lifestyle. Individual action has year impact on 25% of carbon emissions alone.

MITIGATION A climate plan for the people	stakeholders	impacts / cobenefits (from - - to +++)				green house gas
	Leader: Nantes Métropole **Potential partners:** Ecopole and its network . Communes.	Acceptability Cost Benefits/Cost Local dynamics Climate change adaptation	+++ ++ + ++	Health Resources Climate Biodiversity	+ + + +	+ Difficult to quantify
	2. Raising awareness of the ecological transition among 10,000 children a year					
key contextual factors • 7 thematic programs: energy, mobility, waste, biodiversity, water, food, inodation risk. indicators and goals • number of events (target +800) • number of classes (target +350) • number of communes (target24) • number of students (target 10,000) Cost • 560 k€ per year	Description of the action					
	Since the mid-2000s, Nantes Métropole has offered a multi-themed educational package to schools in the metropolis. In 2018, following the Grand Débat Transition Énergétique, a territorial educational offer around 5 themes was proposed. Since then, new themes have emerged: food and then inodation risk. At the end of the year, classes involved in the "challenges" can share their experiences and celebrate their successes (energy savings, waste reduction, etc.).					
	Implementation schedule					
	Committed					
	success factors and obstacles					

state of progress - To amplify - Planned - To commit **links to go further** ● https://www.calameo.com/read/00459045801b45e4abd88?page=1	**Success factors :** - activities carried out by qualified animators, - good coordination with proposals put forward by local authorities. **Obstacles :** - every year, there are far more requests than places available, especially for biodiversity activities

MITIGATION **A climate plan for the people**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader: Nantes Métropole **Potential partners:** associative stakeholders, citizen collectives, municipalities	Acceptability Cost Benefits/Cost Local dynamics Climate change adaptation	+++ + +++ +++	Health Resources Climate Biodiversity	+ + + +	+ Not easily quantifiable
	3. Developing and supporting popular education in link with sustainability					
key contextual factors ● Numerous local initiatives to promote the concrete adoption of new lifestyles **indicators and goals**	**Description of the action**					
	Nantes Métropole is keen to listen to local citizens' collective initiatives, in order to amplify the movement of local stakeholders. These initiatives can find year echo in the various schemes proposed by Nantes Métropole: > "Neighborhoods in transition" is one of the 4 priority orientations of the new City Contract, signed at the end of 2023 and marking the ambition and working framework for Nantes Métropole's 15 priority neighborhoods for the period 2024-2030. In 2024, 38 "transitions" projects were submitted to the City Contract's call for projects.					

• number of projects supported • number of beneficiaries • amount of financing **Cost** • + **state of progress** - to amplify - Planned - To commit	> support for one-off initiatives (e.g. support for the Alternatiba Tour Grand Départ in June 2024 at Les Dervallières) > the possibility for collectives to get involved in leading a "climate challenge".
	Implementation schedule
	Committed
	success factors and obstacles
	Success factors : - locally rooted projects Obstacles : - ultra-transversal projects that sometimes struggle to find the "right" thematic funding

MITIGATION **A climate plan for the people**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader: Nantes Métropole **Potential partners:**	Acceptability Cost Benefits/Cost Local dynamics Climate change adaptation	+++ ++ + +++	Health Resources Climate Biodiversity	+ + + +	Not easily quantifiable
	4. Raising agent awareness and training					
key contextual factors	**Description of the action**					

• local authority employees who have been made aware of and trained in ecological transition issues are likely to modify their professional practices and disseminate best practices. **indicators and goals** • introduce a regular program of frescoes and workshops to appeal to as many employees as possible • reach out to all departments and job categories **Cost** • training a network of in-house Climate Fresco facilitators • external service providers for other workshops **state of progress** - **to amplify** - **Planned** - **To commit**	Since January 2024, a program of awareness-raising workshops on the cross-cutting challenges of the ecological transition has been launched internally for all local authority employees. This wide-ranging training program will help consolidate a shared culture of energy/climate issues and make the links between global climate challenges and the day-to-day actions taken by our employees, with the aim of continuously improving our public policies. **Implementation schedule** Registration launched in January 2024 for all local authority employees, with the first sessions starting in March 2024. Regular sessions of the Fresque du Climate and the Fresque du Numérique with free registration, and a desire to expand to other types of workshops and other themes in a second phase. **success factors and obstacles** - Adapt workshop content to our territory and community. The participants' reflections must relate to our challenges and the community's fields of action. - Communicate with managers to widely relay the information and encourage their teams to participate via regular sessions or sessions dedicated to their department. - Maintain a regular schedule of workshops to reach as many employees as possible, and maintain the cohesion and knowledge of the group of internal facilitators.

MITIGATION **A climate plan for the people**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole, DGERI (event strategy missions) in co-piloting with DATE and the Equality Department	Acceptability Cost Benefits/Cost	+++ ++ ++	Health Resources Climate	+ ++ +++	Not easily quantifiable

	Potential stakeholders : REEVE	Local dynamics Climate change adaptation	+	Biodiversity	-	

5. Developing a 100% eco-event strategy

key contextual factors

- Eco-events challenge contract ending in September 2025
- 23 co-contractors mobilized since 2021 to support the region
- Events: demonstrating and exploring transitions, and no longer exceptional events no-concerned by transitions

indicators and goals

- Number of events certified by REEVE
- Number of events supported in eco-event management by the challenge
- Number of people trained

Cost

- 65K€ / year

state of progress

- to amplify
- Planned
- To commit

links to go further

Description of the action

→ Accelerate transitions through the development of eco-events via a reinforced incentive policy (conditionality of funding, technical support, training, etc.).
→ Obtain and maintain certifications (DID in particular) and internationally-recognized rankings (GDS Index) to federate local stakeholders and position Nantes Métropole as a host and organizer of responsible and sustainable events.
→ Support the development and transition of the region's event industry (particularly in terms of training and the development of emplaws in this sector)
→ Federate stakeholders around a dedicated experimental common space (e.g. on the "Min de rien" site managed by Samoa on the île de Nantes [former MIN flower market area])
→ Develop permanent facilities in public spaces to limit and reduce environmental impact:

- supply points for energy, water, IT networks, etc.
- creation of equipment storage areas,
- safety street furniture

→ integrate deliveries of temporary and ephemeral equipment into urban logistics systems ("last km")
→ develop local re-use of event equipment (Ressourcerie project)

Implementation schedule

Already underway:
→ labeling of business tourism, charter for sustainable development of professional events (conventions, trade shows, seminars, etc.) carried out by the Convention Bureau (part of the Nantes Saint-Nazaire Développement agency)
→ support for non-profit events
→ support for 6 ERP / year hosting events
→ structuring the industry, in particular by setting up a local events recycling center
→ experimentation with a branch of the Montaigu cultural and events ressourcerie in Nantes (à MiN de rien)

•	To be undertaken: → eco-conditionality for hosting events in public spaces → develop a charter for ethical and responsible events in the metropolis → mapping of locations (public spaces and parks & gardens) capable of hosting eco-events
	success factors and obstacles
	Difficulty for organizers to integrate costs linked to changes in practices (equipment in particular).

MITIGATION **A climate plan for the people**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader: Nantes Métropole, DATE **Potential partners:** DGCAV, artists, municipalities	Acceptability Cost Benefits/Cost Local dynamics Climate change adaptation	+++ ++ +++ +++	Health Resources Climate Biodiversity	+ + + +	Not easily quantifiable
	6. Promoting climate-related cultural creations					
key contextual factors • The challenge of carbon neutrality must go hand in hand with a renewal of imagination to support changes in practices. **indicators and goals**	**Description of the action** Artists can help us anticipate and project ourselves into a desirable future. That's why Nantes Métropole has chosen to organize the 2024 Climate Rendezvous at ONYX, the theater in St-Herblain, proposing to open this final stage in the co-construction of the territorial climate air energy plan, with a show: "Ce qui m'est dû" by the Débordante Compagnie. Subsequently, it is proposed to take advantage of the consultation period for the climate plan, between the project's final approval in June 2024 and its adoption in early 2025, to test different artistic forms with local artists, in order to reach as many people as possible. These events will be included in the city's climate agenda.					

• number of artistic proposals • number of spectators • Diversity of artistic proposals **Cost** • ++ **state of progress** - to amplify - Planned - To commit	**Implementation schedule** First actions envisaged: - September / October 2024: Improv theater and ecological transition (2 dates) - September 2024: participative climate fresco (1 date) - November 2024: participation in Utopiales **success factors and obstacles** **Success factor :** - A variety of artistic proposals to appeal to a wide range of audiences - Cultural stakeholders already sensitive to the challenges of ecological transition **Obstacles**: - A wide range of cultural offerings in the region: carefully consider how to promote these proposals.

MITIGATION **A climate plan for the people**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole (DCEI+DATE) **Potential stakeholders :**	Acceptability Cost Benefits/Cost Local dynamics Climate change adaptation	+++ ++ + +	Health Resources Climate Biodiversity Other ?	+++ ++ +++ -	en kteq CO2
	7. *"Place aux actes"*, a web magazine to support changes in practices					
key contextual factors • Approximately 600,000 visits per month to metropole.nantes.fr	**Description of the action** Creation of a dedicated section on the corporate website. Publication of two articles per week and distribution of content on the local authority's social networks. Editorial line: practical articles, advice, testimonials from local residents and stakeholders to facilitate changes in behavior (food, waste,					

indicators and goals • 2 news items per week • target of 1000 to 1500 views per article **state of progress** - to amplify - Planned - To commit **links to go further** • https://metropole.nantes.fr/participer/agir-pour-le-climat/place-aux-actes	water, energy, gardening, consumption, etc.), with a light, playful tone. Highlighting the community's aids and programs to support these changes. Freelance journalist and DCEI coordination. **Implementation schedule** Committed Short term **success factors and obstacles** Success factor : - editorial offer adapted to users' needs and identifiable by search engines, the main sources of traffic. Barriers : - Large offer on the subject. Need to offer differentiating content

MITIGATION **A climate plan for the people**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :** Maison Fumetti, Communes	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ + ++ +++ +	Health Ressources Climate Biodiversity	+ + + +	Not easily quantifiable
	8. Create popularization/communication tools on climate issues					
key contextual factors • The need to popularize the highly technical content of the PCAET	**Description of the action** Objectives : - democratize energy/climate issues for the general public, thanks to accessible, simplified and visual deliverables - reconcile art and science by approaching the PCAET from the angle of fiction and by featuring real residents of our region, in well-known locations, highlighting concrete actions.					

indicators and goals • number of copies distributed • number of document downloads **Cost** • + **state of progress** - to amplify - Planned - To commit	First deliverable envisaged : - a comic strip, also featuring the work of various local cartoonists. Collaboration with Maison Fumetti is underway to produce this book.
	Implementation schedule
	Committed Short term: initial dissemination for adoption of the Territorial Climate, Air and Energy Plan in the 1st half of 2025.
	success factors and obstacles
	Success factor : - Association of local artists Obstacles: - Editorialisation to be worked on to reach as many people as possible: show the difficulties we face collectively but don't be too pessimistic. Be honest without demoralizing. - Distribution to be anticipated

2. Sobriety: reducing our needs

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders : municipalities, companies, public-private partnerships, energy network operators, etc.**	Acceptability Cost Benefits/cost local dynamic Confort Adaptation	+++ ++ + +++ +++ ++	Health Ressources Climate Biodiversity	+++ ++ +++ -	in kteq CO2

	9. Continuing to lead and implement the sobriety plan
key contextual factors • Sobriety plan launched by Nantes Métropole in 2022 to reduce consumption by 10% across the territory • Thermal regulations, tertiary eco-energy decree, BACS decree, **indicators and goals** • From 2022 to 2024: 10% reduction • Every two years from 2024: 5% reduction every two years **Cost** • ++ **state of progress** - to amplify - Planned - To commit	**Description of the action** Action plan implemented in November 2022 with a territorial objective of reducing consumption by 10% in two years: lowering the temperature in swimming pools, applying regulatory temperatures in public buildings, but also switching off public lighting for longer in the middle of the night, raising awareness among employees, businesses and residents. Sustaining energy-saving actions to maintain the momentum of a 5% reduction in consumption every two years. Supporting local authorities and providing them with specific advice on actions to be implemented, and setting up working groups on long-term investment issues to meet regulatory requirements and energy efficiency targets. **Calendrier de mise en œuvre** Start in November 2022, 1st assessment in summer 2023. 2nd assessment in summer 2024 Sustainability of the sobriety plan: territory-wide review every 2 years. **success factors and obstacles** Success factors : - Acceptability of sobriety actions / First actions requiring no specific investment / Involvement of all stakeholders Obstacles : - Difficulty sustaining changes in usage over the long term when the urgency factor kicks in / Difficulty maintaining a positive long-term dynamic - managing to maintain a positive dynamic over the long term / Difficult to involve all users / - lack of human and financial resources in some communities

MITIGATION

Sobriety: reducing our needs

stakeholders	impacts / cobenefits (from - - to +++)				Gaz à effet de serre
Leader : Nantes Métropole **Potential stakeholders :** mobility operators	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	+++ ++ + +	Health Ressources Climate Biodiversity	+++ ++ +++ -	284 kteq CO2 (=PDU)

Key action

10. Reducing car use to make more room for active mobility

key contextual factors

- The transportation sector is the main emitter of greenhouse gases (GHGs).

indicators and goals

- Modal share of bicycles
- km of pedestrian and cycling infrastructure

Cost

- ++

state of progress

- to amplify
- Planned
- To commit

Description of the action

Generalize the concept of a calm city on a pedestrian and cyclist scale

Limit the use of new road infrastructures

Study the evolution of delivery conditions in downtown Nantes

Support the electrification of the vehicle fleet (deployment of charging stations)

Calendrier de mise en œuvre

Committed
In the medium to long term

success factors and obstacles

Success factors:
- Human and financial resources to be maintained.
- Ambitious goals to be maintained and gradual implementation.
- Education.

Barriers: Acceptability of changes to the role of the car.

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :** Naolib	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	+++ ++ + +	Health Ressources Climate Biodiversity Other ?	+++ ++ +++ -	43 kteq CO2 (Increase the modal share of bicycles)
	11. Prioritize the development of alternatives to individual car use					

key contextual factors

- The transportation sector is the primary emitter of greenhouse gases (GHGs).

indicators and goals

- Modal share of bicycles
- Kilometers of pedestrian and cycling infrastructure

Cost

- ++

state of progress

- to amplify
- Planned
- To commit

Description of the action

Increase the modal share of bicycles to 15%

Strengthen the integration of urban planning and transportation for local trips using active modes

Organize connections between territories on the scale of the mobility basin

Transform the car into a daily collective transport option (development of carpool lanes and lines, car-sharing, etc.)

Amplify actions to promote behavior change

Implementation schedule

Committed
Short term / medium term / long term

success factors and obstacles

Success factors:
- Acceptance of the city at 30 km/h
- Overall desire for expansion of pedestrian areas

Barriers:

	• Difficulty in behavior change, barriers to carpooling • Necessary prioritization of issues in public space (mode sharing, urban nature...)

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**Gaz à effet de serre**
	Leader : Région Pays de la loire **Potential stakeholders :** Nantes Métropole, SNCF, CARENE, Etat	Acceptability Cost Benefits/cost local dynamic	+++ ++ + +	Health Ressources Climate Biodiversity	+++ ++ +++ -	11 kteq CO2 (=Cars express)
	12. Propose a structured, simple, and clear mobility offer to all residents of the metropolitan living area.					
key contextual factors • action 54 of the roadmap of the Grand Débat "Fabrique de nos villes **indicators and goals** • number of lines • number of passengers • fréquence moyenne **Cost** • +++	**Description of the action**					
	SERM Nantes Métropole Saint-Nazaire: a mobility offer for the whole mobility basin - multimodal (train, tramway, coach, bus, carpooling) - intermodal (articulation of TCU/Aleop networks, including high-service level buses/P+R/bike/carpooling routes, etc.) - cadenced (regular and multiple time intervals throughout the day) - integrated (high value-added, easy-to-use digitalized range of services combining passenger information, ticketing and fares). Services to facilitate access to this offer and user journeys					
	Implementation schedule					
	Engagé Short term / medium term / long term					

state of progress - to amplify - Planned - To commit	**success factors and obstacles**
	Success factor: SERM governance and funding **Barriers**: human resources

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**Gaz à effet de serre**
	Leader : Nantes Métropole **Potential stakeholders :**	Acceptability Cost Benefits/cost local dynamic	+++ ++ + +	Health Ressources Climate Biodiversity	+++ ++ +++ -	Not easily quantifiable
	13. Develop school ecomobility					
key contextual factors ● Distances between homes and 1st grade schools are generally less than 1 km, making them ideal for walking and cycling. ● In rural areas, where distances may be greater, a combination of public transport and walking should be promoted. **indicators and goals** ● Number of schools supported per year and number of pupils involved (complete approach and/or educational activities)	**Description of the action**					
	Objective: to develop a common culture to encourage families and children to change their travel habits in favor of active modes (walking, cycling) and public transport. The approach is intended to be comprehensive, so as to act on all the levers needed to create the right conditions for ecomobility: - appropriate infrastructure (public spaces - forecourts, school streets, routes - and school premises), - awareness-raising and education in sustainable mobility. To this end, the metropolis has renewed its offer in 2023 to support communes and their schools in co-constructing action plans tailored to the needs and resources of each player (commune, school, metropolitan services).					
	Calendrier de mise en œuvre					
	year initial approach between 2016 and 2021 supported 57 1st grade schools.					

• Number of school streets (permanent or being tested) **Cost** • 200k/year (dedicated operating budget - excluding investments in public spaces) **state of progress** - to amplify - Planned - To commit	Committed - year AMO was appointed at the end of 2023. The Bifurcation workshop identified school ecomobility as a priority issue. **success factors and obstacles** Success factor: Willingness and capacity to mobilize all stakeholders involved: local authorities, schools including parents, metropolitan services including local hubs. Obstacles: Resources available (human and financial) to intervene in public spaces and on school premises.

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**Gaz à effet de serre**
	Leader : Mobility Department Nantes Metropole **Potential stakeholders :** agents, operators, associations, citizens	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	+++ ++ + +	Health Ressources Climate Biodiversity Other ?	+++ ++ +++ -	in kteq CO2
	14. Co-construction and testing of “mobility stations”					
key contextual factors • action 93 of the roadmap of the "Grand Débat Fabrique de nos villes	**Description of the action** The aim is to provide complementary solutions to help achieve the objectives of the Metropole's public mobility policy, i.e. to support behavioral change towards sustainable mobility and make attractive alternatives to the private car by facilitating multi-modality.					

indicators and goals ● 1st experiment late 24 / early 25 **Cost** ● service design support: €40,000 + cost of implementing the experiment **state of progress** - to amplify - Planned - To commit	The aim is to propose solutions based on a strong multimodal and user-oriented approach, taking into account the challenges of ecological transition and the issues raised by citizens and associations during the "Fabrique de nos Villes" major debate (living spaces, spaces adapted to children, accessibility, etc.). To define the precise form/function/use of these stations, a "user-centric" method will be used, co-constructed with stakeholders (agents, operators, associations, citizens), namely service design. A reference framework will be drawn up, proposing possible modules/solutions to be implemented/articulated in the area. Some solutions will be tested in late 24-early 2025, before being rolled out more widely.
	Implementation schedule
	Underway co-design work begun in late 2023; diagnostic phase completed in February 2024 (with field immersion and collective workshops for agents, operators, citizens, associations); solution design phase underway until end of June 24. Field testing late 24-early 25.
	success factors and obstacles
	- a "user-centered" design, co-constructed with stakeholders; user needs should guide thinking to avoid "out of ground" solutions, and facilitate innovative and creative thinking about stations "à la nantaise", beyond "known" solutions such as PEM (Pôle d'Echange Multimodal). - solutions tailored to local conditions

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : DM **Potential stakeholders :** DEP, operators…	Acceptability Cost Benefits/cost local dynamic Confort Adaptation	+++ ++ + +++ +++ ++	Health Ressources Climate Biodiversity	+++ ++ +++ -	Not easily quantifiable

	15. Developing a frugal, low-carbon reference framework
key contextual factors • action 30 of the roadmap of the Grand Débat "Fabrique de nos villes • decarbonization of development and construction roadmaps **indicators and goals** • to be specified **Cost :** + **state of progress** - to amplify - Planned - To commit	**Descriptif de l'action** The aim is to develop a decision-making tool: a frugal, low-carbon reference framework for urban development and new and refurbished buildings, to reduce the carbon, water, energy and materials footprints of projects... Sobriety is becoming the new compass for building and development. The challenge for our region no longer lies in experimentation or the implementation of demonstration projects, but in the widespread adoption of climate-friendly development and rehabilitation practices. This PCAET application tool will be co-constructed with local stakeholders. It will aim for sobriety and frugality in projects, while remaining economically sustainable. **Implementation schedule** Underway medium term **success factors and obstacles** **Success factor**: partnership approach, test phase before relocation **Barriers:** real estate crisis

MITIGATION

Sobriety: reducing our needs

stakeholders	impacts / cobenefits (from - - to +++)				Gaz à effet de serre
Leader : NM - DATE, DUH **Potential stakeholders :** Anah, Region, professional networks, banks, social landlords, municipalities, Anah-approved operators	Acceptability Cost Benefits/cost local dynamic Confort, Adaptation	+++ +++ ++ ++ +++ +++	Health Ressources Climate Biodiversity Creation of job accessibility	++ ++ ++ + +++ ++	120 kteq CO2 for houses, 71 kteq CO2 for condominiums, 30 kteq CO2 for social rental properties

Key action

16. Double the number of energy-efficiency renovations to 10,000 homes per year in the region.

key contextual factors

- The residential sector is the 2nd largest GHG emitter (24%)
- *Mon Projet Rénov* and PLH 2019-2025:
  - 3,500 private housing units/year
  - 1,500 social housing/year

indicators and goals 2024-2030

- 7,000 private housing units/year
- 3,000 social housing units/year

Cost

- +++

Description of the action

Massive energy renovation and climate change adaptation projects for buildings and homes must be part of the zero-carbon trajectory, with 10,000 homes per year (social and private housing stock), i.e. x2 compared with the target set out in the current PLH.
The key to success lies in mobilizing the entire ecosystem: homeowners and co-owners, social landlords, heating network operators, initial and continuing training centers, companies (small, medium and large), industrialists and manufacturers, architects and project managers, BETs, auditors, banks, real estate agents and property managers, Anah-approved operators, adil, aid and land-rights departments, social workers, homeowners...
Renovation of 3,000 social housing units per year, half of which to BBC standards
Renovation of 3,500 private homes per year under the Mon Projet Rénov scheme (see action 21)
Support for 3,500 individual projects per year via the public renovation service or other assistance (maprimerénov' Anah...)

Implementation schedule

A new public service for the renovation of private housing starting in 2025
A new financial support offer by 2027/28 (third-party financing company)
Delegation of government and Anah grants (2025)
Renewal of the *Energy Sprong* ?

state of progress	success factors and obstacles
- to amplify - Planned - To commit	**Success factor :** - A network of stakeholders, a success factor. - The evolution of the Maison de l'habitant to strengthen reception and territorial coverage. - Massive mobilization of financial resources: public aid, social landlords' own funds, subsidized loans, etc. **Obstacles** : - Stability and legibility of systems - Increased human resources for support

MITIGATION Sobriety: reducing our needs	stakeholders	impacts / cobenefits (from - - to +++)				Gaz à effet de serre
	Leader : NM - DATE, DUH **Potential stakeholders : Anah, Region, professional networks, banks, social landlords, municipalities, Anah-approved operators**	Acceptability Cost Benefits/cost local dynamic Confort, Adaptation	+++ +++ ++ ++ +++ +++	Health Ressources Climate Biodiversity Creation of job accessibility	++ ++ ++ + +++ ++	120 kteq CO2 for houses, 71 kteq CO2 for condominiums,
	17. Strengthen the *Mon Projet Renov'* scheme					
key contextual factors ● action 29 of the roadmap of the Grand Débat "Fabrique de nos villes **indicators and goals** ● 3,500 private housing units/year with assistance	**Description of the action**					
	Under the 2019-2025 local housing program, Nantes Métropole's Mon Projet Rénov grants will help 1,000 private homes and condominiums with their energy renovation projects each year. The scheme, set up in partnership with the region's energy transition stakeholders, is aimed at all individuals wishing to carry out renovation work on their home or condominium. In order to achieve the target of 3,500 low-energy consumption homes per year, or at least 35% energy savings, we need to step up our human and financial support for projects, and pay particular attention to the role of biodiversity in project quality. The study of a new method of financing projects via third-party financing is to be initiated, in conjunction with the evaluation of the current MPR system and the next 2026-2031 PLH.					

from NM and Anah **Cost** • Average job cost :50K€ • 2024/2031: 1,2 Mrd€ (total investment **state of progress** - to amplify - Planned - To commit **links to go further** • https://metropole.nantes.fr/renover-logement	**Implementation schedule** Evolution of MPR regulations 2024/2025 Reinforcement of human resources as of 2025 Third-party financing: study to be initiated in 2024/25 for implementation in 2027/28 Agreement with the Region to be renewed/mobilization of professionals (?) **success factors and obstacles** **Success factor :** - Budget mobilization Nantes Métropole, Anah - Mobilization of professionals **Obstacles** : - Workforce training - Third-party financing

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**Gaz à effet de serre**
	Leader : BATII Nantes Métropole **Potential stakeholders :** heritage department ; DATE	Acceptability Cost Benefits/cost local dynamic Confort, Adaptation Creation of job accessibility	+++ ++ + +++ +++ ++	Health Ressources Climate Biodiversity	+++ ++ +++ -	Decrease of GHG emissions Decrease of energy consumption
	18. Invest in the renovation of public buildings to meet the requirements of the tertiary sector decree.					
	Description of the action					

key contextual factors ● accelerate to 3% annual renovation target ● prioritize renovation of the most urgent properties (classification in progress) **indicators and goals** ● multiply the current rate of renovation by 3 ● 1M° m² covered by the tertiary sector decree ● increase the level of complete, high-performance renovations (BBC/passive envelopes) **Cost** ● +++ **state of progress** - **to amplify** - **Planned** - **To commit**	DEE energy efficiency directive: 1.9%/year reduction in asset consumption; annual renovation of 3% of floor space Complete, high-performance renovations: Identify the assets to be renovated as a priority (underway); identify the pace of action required (to be underway); schedule the completion of comprehensive, high-performance renovations; Deployment renewable energies on local authority property Energy actions with a short payback period: take action on the maintenance of buildings and equipment. Undertake work campaigns such as insulation, lighting renovation, etc. Actions on use and floor space: take a more effective approach to the notion of building occupancy by analyzing usage through pilot departments (occupancy rate, awareness, densification, etc.), but also integrate usage more finely into maintenance and explawtation; question the evolution of floor space as we move forward in analyzing the conditions for achieving the objectives of the tertiary sector decree and the challenges of reducing energy consumption and greenhouse gas emissions.
	Implementation schedule
	Committed: study and reflection - To be undertaken: planning and budgeting of operations and HR investment Undertaken: reflection on renewable energies. Short term for the first actions / medium term to submit the action plan in 2026 / long term: to implement the entire action plan (deadlines in 2030, 2040 and 2050). To be undertaken: Consideration of m² optimization
	success factors and obstacles
	Success factor: - The "high-performance renovation of local authority property" action was identified as a priority during the major Energy

	Transition debate; in line with political commitments to reduce consumption, cut GHG emissions and achieve carbon neutrality by 2030. - Use low-cost actions to get the ball rolling: adjustments, densification of uses, etc. **Barriers :** - program recalibration of operations to be launched - greater financial investment in operations (increased cost per m² and renovated surface areas) - HR requirements for management to be validated - number of operations to be carried out at the same time (maintenance of activities, capacity of craftsmen, recruitment for management to be carried out)

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : DEER/SET **Potential stakeholders :** - CCI/CMA - State /DEETS - business groups (local clubs - retailers' and craftsmen's associations) - Local authorities	Acceptability Cost Benefits/cost local dynamic Confort Adaptation	+++ ++ + +++ +++ ++	Health Ressources Climate Biodiversity	+++ ++ +++ -	Not easily quantifiable
	19. Promote CSR solutions to VSEs, SMEs and business groups					

key contextual factors	Description of the action
In 2023 61,399 business establishments Of which 45,000 with fewer than 10 employees (TPE) Of which 12.5% SSE 5.3% unemployment rate 1st in the ranking of France's most CSR-friendly cities 39% of companies in the region committed to CSR (over 200 employees) Business collectives in the metropolis (in 2023) - 73 collectives, including 26 regional clubs - 3,300 member companies (i.e. 15% of companies in the region) - Total number of local events with collectives: 108 local events - Number of participants reached: 4,590 participants reached - Number of business groups reached: 20 sensitized + 5 supported via the scheme **indicators and goals** Emerging and spreading ready-made solutions to encourage and support businesses in their drive towards responsible, less resource-intensive and more inclusive economic development.	The approach is organized as follows: Work on the offer to design a territorialized offer by theme and oriented towards VSE-SME users (shopkeepers, craftsmen, ETI...). From 2022 onwards, the aim is to design this offering around the transition topics deemed to be priorities by the stakeholders of the Nantes metropolitan area's CSR platform. Solutions provided by public stakeholders and private stakeholders of general interest have been targeted. It covers Corporate Social Responsibility (CSR) solutions in areas such as: "1st CSR step", sober energy consumption in the tertiary and commercial sectors, sober water consumption, sober land use, biodiversity, photovoltaic production, the mobility pack, local currency, "Solution partage", grouped collection of professional waste (office waste, electrical and electronic equipment (D3E), bio-waste, etc.), responsible digital, etc.). ...), responsible digital technology, zero plastic, territorial sponsorship, inclusive recruitment including the employment of senior citizens, 3rd year internships (and qualifying internships for disadvantaged groups), and gender equality. The aim is to facilitate contact with solution providers, whether public stakeholders or private stakeholders of general interest. Work on demand to help business groups mobilize their members on transition issues The aim is to enable business groups to better inform their members about the range of local transition services on offer, to encourage them to take action and to disseminate solutions throughout the metropolis. Setting up a new financial support scheme for business groups Nantes Métropole would also like to help business groups to identify the right people in their companies to work with, and to mobilize them to take part in awareness-raising or training sessions on the subject of transitions. To this end, Nantes Métropole is proposing a new scheme (co-constructed with the CCI Nantes Saint-Nazaire, the CMA de loire-Atlantique, business collectives and local authorities) to provide funding to business collectives, based on a shared roadmap, to animate their member networks on transition topics. The scheme offers different options to business groups, enabling them to outsource this network management, notably via the CCI Nantes-Saint-Nazaire, or by pooling year employee between two business groups to tackle transition issues collectively. 5 business collectives (representing 300 members and 15,000 employees) have been involved in this experimental scheme since the end of 2023: Odyssée Jules Verne in Bouguenais, Sainte Luce active, Nant'EST Entreprise, Club Titan, Club Euronantes. A call for expressions of interest will be launched in 2024 to extend the experimentation to other corporate collectives (more than 8

Nantes Métropole has resolutely invested in the subject of the last km to inform businesses of the regional offer for transitions, CSR solutions that help limit the impact of economic activity on living ecosystems and the climate. In practical terms, this means putting CSR solution providers (public and private sector organizations whose offerings are deemed to be in the public interest) in touch with the right people in VSEs and SMEs (targeted approach). With all the economic developers based in the local hubs, we are building - together with business collectives - local economic programs on the subjects of transitions and sustainable development. **state of progress** - to amplify - Planned - To commit	collectives are already keen to get involved in the subjects of transitions, with a priority on mobility, energy, inclusive recruitment...). Nantes Métropole is mobilizing year annual budget of €100,000 to finance this experiment. **Implementation schedule** Committed: - a range of events organized by local associations for groups, subsidized and evaluated by Nantes Métropole - 5 business groups benefiting from a subsidy of €12,000/year/collective for 2 years to finance a CSR coordinator - raising funds from the French government to finance more groups in the coming years To be undertaken: - finalize and communicate the AMI to include other collectives (short term) - evaluate the actions and impact of the first 5 collectives (medium term) - formalize a range of energy-related activities (short term) **success factors and obstacles** **Success factors :** - motivated teams - financial support from the French government - collaboration with the CCI and CMA - a variety of motivated associations **Obstacles:** resistance to change within groups

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : transition economy department Nantes Métropole **Potential stakeholders :** CMA, CCI,	Acceptability Cost Benefits/cost local dynamic	+ + + ++	Health Ressources Climate Biodiversity		Not easily quantifiable

	Plein Centre, UNACOD					

20. Promote responsible retail chains

key contextual factors :

- The textile industry is one of the most polluting, especially with the rise of fast fashion.

indicators and goals

- 60 eco-friendly retailers in the town center (out of nearly 2,000 businesses)

Cost

- ++

state of progress

- to amplify
- Planned
- To commit

Description of the action

Initially, the aim is to promote responsible businesses throughout the city, based on objective criteria. The Plein Centre association already counts some 60 businesses that have signed the eco-committed charter. In addition to this local charter, there are around a hundred ecolabels, but independent retailers are poorly represented in these labels. In order to better identify responsible independent retailers in Nantes, and to promote this commercial offer to Nantes residents as a means of more rational consumption, we are planning to put together a guide listing and promoting good, committed addresses, based on a call for applications.

Implementation schedule

To get underway: the first working meetings will start in June to define the action, objectives and issues involved, as well as how to set up a competition (rules, promotional measures (guidebook or other?)), communication, prizes, budget, etc.
Deployment in the short term (2025 - before the reserve period) or medium term.

success factors and obstacles

Success factor: network of eco-committed retailers
Barriers: consumption of ready-to-wear, sportswear, home furnishings, decorative items, lawsuits, etc. has evolved considerably in recent years, with more extreme practices (100% local frugal consumption versus consumption of disposable products produced on the other side of the world, ordered online or purchased locally).

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : DEER (DGERI) **Potential stakeholders :** CINA, clubs	Acceptability Cost Benefits/cost	+++ ++ ++	Health Ressources Climate	++ ++ +++	Not easily quantifiable

	entreprises	local dynamic Confort Adaptation	+++ +++ ++	Biodiversity	+	

21. Accelerate densification of business parks to improve the employment/surface area ratio

key contextual factors

- action 29 of the roadmap of the Grand Débat "Fabrique de nos villes

indicators and goals

- to be defined

Cost

- +

state of progress

- to amplify
- Planned
- To commit

Description of the action

New regulatory and societal requirements are having a major impact on the ability of regions to produce economic land. In order to meet the new or reinforced challenges of land sobriety and transitions (ecological, economic, uses), we need to increase densification and land optimization in business parks.

Transform business parks to accommodate more companies and emplaws within year efficient framework adapted to new challenges.

Implementation schedule

Short term and ongoing: ZA densification initiative: identification of land reserves
Short term and ongoing: Meeting with landowners
Medium and long term: creation of new dense economic programs

success factors and obstacles

Landowner commitment
Controlled land charges

	stakeholders	impacts / cobenefits (from - - to +++)	green house gas

<table>
<tr><td rowspan="2">MITIGATION

Sobriety: reducing our needs</td><td>Leader : Nantes Métropole

Potential stakeholders :</td><td>Acceptability
Cost
Benefits/cost
local dynamic
Confort
Adaptation</td><td>+++
++
+
+++
+++
++</td><td>Health
Ressources
Climate
Biodiversity</td><td>+++
++
+++</td><td>47 kteq CO2</td></tr>
<tr><td colspan="6">22. Set up local initiatives to accelerate the ecological and energy transition of the most energy-intensive businesses (industry, construction).</td></tr>
<tr><td rowspan="6">key contextual factors
• the industrial sector is responsible for 11% of Nantes Métropole's GHG emissions

indicators and goals
• to be defined

Cost
• +

state of progress
- to amplify
- Planned
- To commit</td><td colspan="6">Description of the action</td></tr>
<tr><td colspan="6">Create a network of the most energy-intensive companies, in conjunction with the Territoire d'industrie initiative and inspired by a "mini-ZIBAC" type methodology (low-carbon industrial zone, Ademe call for projects).

Planned stages:
Identify and contact companies
Structuring and coordinating the network,
Identification of collective actions (industrial and territorial ecology)
Application to Ademe's "mini-ZIBAC" call for projects, if applicable.</td></tr>
<tr><td colspan="6">Implementation schedule</td></tr>
<tr><td colspan="6">To be committed
Medium term</td></tr>
<tr><td colspan="6">success factors and obstacles</td></tr>
<tr><td colspan="6">Involvement of the companies concerned in a collective scheme
Ademe published a call for mini-ZIBAC projects and selected Nantes Métropole as a candidate.</td></tr>
</table>

MITIGATION

Sobriety: reducing our needs

stakeholders	impacts / cobenefits (from - - to +++)				green house gas
Leader : Nantes Métropole	Acceptability	+	Health	++	55 kteq CO2
	Cost	+	Ressources	+++	
	Benefits/cost	+	Climate	+++	
Potential stakeholders :	local dynamic	+++	Biodiversity	+++	
	Confort	+++	Adaptation	++	

23. Open dialogue on the transition from heated industrial greenhouses to low-energy and resource-consuming systems.

key contextual factors

- 10% of Nantes Métropole's gas consumption
- And even 25% of gas consumption in the entire catchment area.

indicators and goals

- Exchange with stakeholders

Cost

- +

state of progress

Description of the action

Market gardening in heated greenhouses: a major feature of the region.

In Nantes Métropole, 7 sites account for 10% of the region's total gas consumption.
On a wider scale, that of the catchment area, market gardening in heated greenhouses accounts for 25% of total gas consumption.

It is proposed to transpose the approach tried and tested initially with the region's 20 biggest industrial emitters, deployed in the Territoire d'industrie program.

Implementation schedule

To be committed
Medium term

success factors and obstacles

- to amplify - Planned - To commit	Dealing with this issue at the right scale (it's also a topical issue raised by PETR de Retz)

MITIGATION **Sobriety: reducing our needs**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :** SSE stakeholders, companies, economic activity-based integration structures, ESATs (establishments or services providing assistance through work)	Acceptability Cost Benefits/cost local dynamic Confort Adaptation	+++ ++ + +++ +++ ++	Health Ressources Climate Biodiversity	+++ ++ +++ -	Not easily quantifiable
	25. Prendre en compte les enjeux de transition écologique dans les démarches d'achats					
key contextual factors • some 1,300 contracts for a financial volume of 530 million euros awarded by NM-Ville de Nantes and CCAS • to which can be added annual sales of 500 million euros from public service delegations. • This represents around 10% of the Region's total	**Description of the action**					
	Nantes Métropole's Sustainable Purchasing Scheme (SPAR) is a tool designed to take greater account of the social and environmental impact of public purchasing. It is broken down into 8 issues: 1. Promoting a healthy environment 2. Curbing and adapting to climate change 3. Promote thrifty resource management (move towards a city with zero single-use plastic) 4. Improve food quality (Offer 100% "home-cooked" meals in school canteens and nurseries, with 75% organic and local produce by the end of the mandate). 5. Protect and restore nature and biodiversity 6. Develop employment, integration and a responsible economy (minimum 600,000 hours of integration per year in the metropolitan area)					

procurement. **Objectifs 2026** ● 100% of contracts include a consideration environnementale et/ou sociale ● 100 % d'acheteurs de la collectivité sensibilisés et formés aux enjeux du SPAR **Indicateurs** ● number of contracts including environmental and/or social considerations ● number of local authority buyers aware of and trained in SPAR issues **state of progress** - to amplify - Planned - To commit **links to go further** ● SPAR Nantes Métropole : https://metropole.nantes.fr/files/live/sites/metropolenantesfr/files/delib/deliberations/conseil-municipal/2022/06-24/documents/8_20220624_DELA.pdf	7. Combat discrimination and promote equality (100% of contracts include a reminder of legal obligations in terms of non-discrimination). 8. Commit to a responsible digital approach (Join the Agec law with at least 20% reconditioned and recycled IT equipment) **Implementation schedule** 1st version of the SPAR in 2017-2021 2nd version of SPAR in 2022-2026 **success factors and obstacles** **Success factor :** - Buyer training - company acculturation **Obstacles :** - Lack of resources for monitoring and complying with purchasing regulations - Lack of tools for drafting shared contracts with ecological transition clauses

Resources: reducing imported emissions

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : DUH - DATE - BATII **Potential stakeholders :** to be defined	Acceptability Cost Benefits/cost local dynamic Confort Adaptation	+ ++ +++ +++ ++ ++	Health Ressources Climate Biodiversity	+++ +++ +++ +++	Not easily quantifiable
	26. Adopt circular urbanism as a metropolitan way of doing things					
key contextual factors ● 80% of the city of 2050 is already built ● The way the city is built has a considerable impact on GHG emissions (reduced distances, re-use of materials, etc.). **indicators and goals** ● number of ADS (soil rights authorization) departments where one of the agents has received training on the CAE OAP. **Cost** ● +++	**Description of the action** Change the way we look at what already exists and adopt a new grammar for urban action. Circular urbanism is a city-building process that involves : - recycling spaces - transforming what already exists - intensifying uses - renaturalize Four levers can be mobilized to accelerate this bifurcation: Evaluate and reinforce the application of the Climate Air Energy (CAE) thematic OAP The CAE OAP, which is taken into account in all development and construction projects in the area, encourages circular urban planning. - develop mixed and reversible uses - develop the reversibility, scalability and adaptability of buildings - encourage renovation rather than reconstruction - integrate the impact of materials by considering the entire life cycle - etc. Strengthen enforcement. The CAE OAP must be taken into account during the appraisal of building and development permits. It					

state of progress - to amplify - Planned - To commit **links to go further** https://metropole.nantes.fr/files/live/sites/metropolenantesfr/files/plum_appro/3_Orientations_d'Am%c3%a9nagement_et_de_Programmation/3-1_OAP_th%c3%a9matiques/3-1-3_OAP_Climate_Air_Energie/OAP_CAE.pdf	is therefore a municipal responsibility. Nantes Métropole, by coordinating the network of instructors in the 24 communes, will help to : - disseminate knowledge of the OAP CAE - organize training courses for the network of instructors in the 24 communes. Analyze the OAP and make recommendations to adapt its content to current issues. Monitor local resources required for construction and renovation. Analyze and put into perspective resource management as a lever for the development of low-carbon construction. year approach designed to extend the environmental and operational approach of city building to the low-carbon construction sector. low-carbon construction sector, with a focus on energy supply, production and consumption. This will be complemented by year increase in expertise in materials, the recycling of organic waste and the emergence of low-carbon concrete. The aim is to be able to integrate regulatory, technical and financial realities into urban projects in the interests of carbon neutrality and better resource management in the city. Prioritize rehabilitation and limit demolition-reconstruction (Action n°17 - marker 2 of the roadmap of the Grand Débat Fabrique de nos Villes) In the PLUm : > Adapt urban planning rules to facilitate rehabilitation projects. > Promote redevelopment within local authority planning permission departments. Initiate the conversion of obsolete and under-utilized offices into housing on 2 to 3 pilot sites.
	Implementation schedule
	Committed Medium - long term
	success factors and obstacles
	Success factor: partnership approach with stakeholders in the building and public works sector and re-emplaw (companies, network heads....)

	Obstacles: PLUm: Vigilance on making demolitions exceptions: demolition can enable other objectives to be met, such as land conservation, combating substandard housing, possible over-elevation, heritage).

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : BATII Nantes Métropole **Potential stakeholders :** asset-allocating departments	Acceptability Cost Benefits/cost local dynamic Confort	+ ++ +++ +++ +	Health Ressources Climate Biodiversity Adaptation	++ ++ +++ - +	Not easily quantifiable
	27. Intensify the use of space in existing public buildings					
key contextual factors • the building sector accounts for 37% of global CO2 emissions **indicators and goals** • Reflection in 100% of operations **Cost** • +++ **state of progress** - to amplify - Planned - To commit	**Description of the action** Every project for the construction of a new building or major refurbishment of existing premises, or for the development of new workspaces, must include consideration of the possibility of sharing workspaces. **Implementation schedule** Committed: there are already examples of shared spaces (a school courtyard open to the neighborhood, etc.), but they need to be systematized for each project. To achieve this, we need to show by example that it works (site visits, user surveys, etc.), organize the cross-referencing of needs between departments, provide project managers with toolkits, involve all users from the outset of the process, etc. Medium-term **success factors and obstacles** **Success factor**: desire for greater cooperation and cross-functionality **Obstacles**: acceptability of sharing space, changes in working methods					

<table>
<tr><td rowspan="2">MITIGATION

Resources: reducing imported emissions</td><td>stakeholders</td><td colspan="4">impacts / cobenefits (from - - to +++)</td><td>Gaz à effet de serre</td></tr>
<tr><td>Leader : Nantes Métropole

Potential stakeholders :</td><td>Acceptability
Cost
Benefits/cost
local dynamic
Climate change adaptation</td><td>++
++
+
+++</td><td>Health
Ressources
Climate
Biodiversity</td><td>+
++
++
+++</td><td>Not easily quantifiable</td></tr>
<tr><td colspan="7">28. Maintain a "basket" of essential services in town centers, village centers and neighborhoods: services, shops, healthcare professionals and crafts.</td></tr>
<tr><td>key contextual factors
• Action n°37 marker n°3 of the roadmap of the Great Debate "Fabrique de nos Villes
• PLUm identifies centralities (UMa - service hubs)

Cost
• +++
• add Cost of DUH studies

state of progress
- to amplify
- Planned
- To commit</td><td colspan="6">Description of the action

Economic programming :
- the Metropole has defined a strategy to strengthen the economic aspect of central areas, and has created a toolbox to achieve this objective
- to accompany urban projects in central areas, economic programming and complementary actions are being carried out to identify opportunities and implement solutions aimed at intensifying economic activities in line with the needs of residents and users
- additional work is underway on healthcare provision, led by the Public Health Department in conjunction with DUH and DEER.

development strategy :
- pursue or initiate studies on central areas and, if necessary, translate them into the PLUm, using tools designed to intensify the city (e.g.: UMa zoning - commercial/tertiary lines - sector-based development and programming guidelines (OAP) - reserved sites)

- conduct strategic studies on the development of central areas</td></tr>
</table>

	- the commercial OAP could evolve to pursue the objective of strengthening neighborhood and town centres, and more tightly control commercial development in major or intermediate centres - continue to reflect on cross-cutting rules to promote functional diversity, such as the reversibility of ground-floor units to encourage the installation of craftsmen or their conversion into artisanal premises, facilitate access to commercial centers by adapting parking and public space rules, and systematically integrate re-emplaw shops. SCoT: the SCOT is currently being amended to include a DAAC with specific guidelines for prioritizing commercial development in central areas. Public spaces
	Implementation schedule
	Studies on central areas underway: - integration of changes in modification no. 2 of the PLUm (committed 2023-2025) - next PLUm evolution procedure (to be initiated) 2026-2027 studies on town centers (to be undertaken in municipalities that have not already done so)
	success factors and obstacles

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :**	Acceptability Cost Benefits/cost local dynamic	++ ++ + +++	Health Ressources Climate Biodiversity	+++ ++ +++ +	Not easily quantifiable

	29. Strengthen local retailing by limiting the development of major and intermediate commercial zones.
key contextual factors • Action n°42 marker n°3 of the roadmap of the Grand Débat "Fabrique de nos Villes **Cost** • + **state of progress** - to amplify - Planned - To commit	**Description of the action** In addition to action 31 on the development of the local economy in town and neighborhood centers, the Metropole is focusing on controlling the development of retail in major and intermediate commercial centers. The main regulatory tools are - the PLUm, with a thematic OAP for commerce that defines development objectives for these polarities - the definition of urban projects in these commercial areas. As part of modification no. 2 of the PLUm, which will be approved in early 2025, it has been proposed to reinforce this orientation with a politically validated principle of no increase in retail space in major and intermediate commercial areas. As part of the metropolitan approach to urban entrances, the DUH is currently examining a number of urban transformation projects for certain major polarities. The implementation of these projects will also support actions 32 and 31. **Implementation schedule** Drafting of updated Commerce OAP: 2023 Procedure for modifying the PLUm: 2024 Approval of PLUm modification (with updated OAP Commerce): March 2025 **success factors and obstacles** **Success factors**: political support for new orientations, operational implementation of urban projects **Barriers**: acceptability to retail stakeholders and real-estate operators of a change of model

	stakeholders	**impacts / cobenefits (from - - to +++)**	**Gaz à effet de serre**

MITIGATION **Resources: reducing imported emissions**	**Leader :** Nantes Métropole **Potential stakeholders :** NSD, VAN	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	+++ + ++ +++ +	Health Ressources Climate Biodiversity	 + + +	Not easily quantifiable

30. Mettre en œuvre une strategy tourisme durable

key contextual factors

- 3,5 millions de nuitées dans les hébergements touristiques de Nantes Métropole à l'horizon 2023.
- A l'échelle nationale, le secteur du tourisme représente 11% des émissions de GES pour 7% du PIB.

indicators and goals

- Action completion rate

Cost

- +

state of progress

- to amplify
- Planned
- To commit

Description of the action

Nantes Métropole, Le Voyage à Nantes and Nantes Saint Nazaire Développement have jointly drawn up a strategy to promote more sustainable tourism in the metropolitan area.

This joint ambition, in a context of transition, reflects the desire to :
- adapt to climate change and the increasing scarcity of natural resources ;
- meet the new expectations of tourist customers;
- respond to recruitment pressures within the industry;
- preserve the uniqueness of a region "turned upside down by art and culture" and its positioning as a creative and committed destination.

The roadmap, drawn up in consultation with the region's stakeholders, is intended to be highly operational, with the aim of making tourism more sober, inclusive and virtuous.
As tourism is a cross-cutting skill, it will necessarily involve strong interactions with many areas of public action: economy, urban development, energy, green spaces, culture, heritage, sport, territorial cooperation, diversity and inclusion, community life, communication, etc.
This strategy will also address the issue of travel, in particular by carrying out a study of international and national mobility to and from Nantes.

Implementation schedule

Committed
A medium term (Start 2024)

success factors and obstacles

	- Success will depend primarily on the mobilization of all internal stakeholders (thematic public policy experts from the 3 structures) and the ability to bring on board external partners and economic stakeholders from the tourism ecosystem (tourist and event sites, hotels, caterers and restaurateurs, retailers, etc.).

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**Gaz à effet de serre**
	Leader : Nantes Métropole **Potential stakeholders :**	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++	Health Ressources Climate Biodiversity Other ?	+ ++ ++ +++	Not easily quantifiable
	31. Make reuse year economic priority with the opening of a totem pole and the experimentation of a partnership platform.					
key contextual factors • Action n°27 marker n°2 of the roadmap of the "Grand Débat Fabrique de nos Villes **indicators and goals** • to be defined **Cost** • ++	**Description of the action** While skills and practices are emerging in the region, a number of conditions still need to be met in order to achieve a real change of scale and ensure a viable economic model for the 3R sector (reuse, re-employment and recycling). The design of a multifunctional platform will enable materials from a construction site to be recovered and requalified for reuse or recycling. This approach will bring together all construction operators, R&D and the SSE world to structure the sector. **Implementation schedule** Engagé / À engager					

state of progress - to amplify - Planned - To commit	Short term / medium term / long term
	success factors and obstacles

MITIGATION **Resources: reducing imported emissions** Key action	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**Gaz à effet de serre**
	Leader : DEER **Potential stakeholders :** ICAM, NOVABUILD, CSTB, RÉGION, AURAN, MATC. Biosourced materials: Echobat, Fibois, le collectif du biosourcé, etc.	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++	Health Ressources Climate Biodiversity	+ ++ ++ +++	Not easily quantifiable
	32. Draw up a regional roadmap with local stakeholders to increase the use of construction waste and bio-sourced materials and structure year eco-construction sector.					
key contextual factors • Figures: €331.7 billion in sales for the construction sector, €9 billion in sales for materials production, 46 million tonnes of waste / year • Construction waste accounts for 3/4 of all waste produced in France. • 90% of construction waste comes from deconstruction and rehabilitation.	**Description of the action**					
	Project for a platform to reuse and recycle materials from building deconstruction and demolition sites, integrating all the functions in the industry's value chain: storage, requalification, reuse and recycling. A platform that also develops the R&D dimension, the integration and "training - skills enhancement" component, and the "incubation and development" function for solution providers, particularly SSE structures. The platform is part of the Alliance des Territoires, and relies on shared governance between economic stakeholders (conventional and SSE), local authorities, and higher education and research establishments.					
	Implementation schedule					
	Deposit study: underway Mobilization of potential stakeholders: underway, with support from the Novabuild network					

indicators and goals • to be defined **Cost** • ++ **state of progress** - to amplify - Planned - To commit	3R platform prefiguration study: underway, to be consolidated legal and financial study - economic model and governance - to be undertaken in the short term land feasibility study: to be undertaken in the medium term **success factors and obstacles** **Success factor:** - Deposit volume - Regulatory framework - political project **Barriers:** - land availability - project ownership and financing model - shared governance model

MITIGATION **Resources: reducing imported emissions** Key action	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : DEER - DD **Potential stakeholders :** Les Ecossolies, SCI Lieux Communs, Communes,	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++	Health Ressources Climate Biodiversity	+ ++ ++ +++	Not easily quantifiable
	33. Open a metropolitan recycling center (“ressourcerie”) and support the opening of second-hand stores in every commune and every urban district.					
key contextual factors • Action n°45 marker n°3 of the roadmap of the Grand Débat	**Description of the action**					
	In response to the challenges of waste reduction and prevention, solidarity, social cohesion and integration, Nantes Métropole has					

Fabrique de nos Ville **indicators and goals** ● number of projects realised **Cost** ● ++ **state of progress** - to amplify - Planned - To commit	adopted a strategy to support the solidarity-based reuse sector, organized around : - a territorial network that is as close as possible to local residents, in communes and disadvantaged neighbourhoods, with support for the establishment and development of second-hand stores (support for the emergence of projects, networking, etc.) - support for a metropolitan facility to enable the explawtation of a ressourcerie activity. This facility will be fed by the items collected in metropolitan waste collection centers, i.e. the equivalent of 270 tonnes of objects by 2023. The sorting, preparation, recovery and resale activities will be entrusted, within the framework of a public procurement contract, to a structure for integration through economic activity (SIAE).
	Calendrier de mise en œuvre
	Ressourcerie métropolitaine: in progress. programming study, real estate study, sourcing phase with SIAE, Reuse stores: under study Short term / medium term / long term
	success factors and obstacles
	For the metropolitan recycling center, **Success factors** - the availability of real estate that meets all the requirements of a commercial explawtation (accessibility and visibility, "open" commercial rights) - the volume of waste captured in metropolitan waste collection centers (270 tonnes per year minimum) - NM's political decision to finance the project - the presence of competent stakeholders in the metropolitan area, capable of structuring and supporting the development of a new solidarity-based reuse offer (territorial roots, experience, knowledge of stakeholders and procedures, etc.). **Obstacles** - funding for integration positions / political choice to target SIAEs - availability and conditions of access to land and real estate - explawtation's business models - level of public funding, limited to 300K€ over 3 years / de minimis rule For local reuse stores, - **Success factors**: pooling the resources of solidarity-based reuse stakeholders, political commitment of towns in the metropolitan area. - **Obstacles**: suitable land and real estate, investment financing, economic viability of explawtation and operating budgets.

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :** Chamber of Trades and Crafts, actors of Social and Solidarity Economy	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++	Health Ressources Climate Biodiversity	+ ++ ++ +++	Not easily quantifiable

34. Initiate discussions with SSE stakeholders to develop a new repair and maintenance service offering

key contextual factors

- Action n°46 marker n°3 of the roadmap of the "Grand Débat Fabrique de nos Ville

indicators and goals

- to be defined

Cost

- +

state of progress

- to amplify
- Planned
- To commit

Description of the action

The Social and Solidarity Economy (SSE) is a group of companies that seeks to reconcile social utility, solidarity, economic performance and democratic governance.
In order to limit the production of waste and combat the programmed obsolescence of certain products, a project will be launched with SSE stakeholders to develop a service offering that will enable better repairing and thus increase the longevity of goods.

Implementation schedule

to amplify
- Short term: action to be undertaken with the Chamber of Trades and Crafts (see NM/CMA action plan) to support companies involved in repair and reconditioning in the field of responsible digital technology, to make the existing offer in the region more visible.
- Medium-term: Structuring the 4R sector,

success factors and obstacles

Success factor:
- Cooperation with the Chambre des métiers et de l'artisanat, as part of the CMA/Nantes Métropole agreement and the "repar'stakeholders" approach.
- Maturity of the ecosystem to work together, inter-knowledge of stakeholders,

	- The AGEC law: year opportunity for SSE stakeholders, since reuse is now mandatory in certain purchasing families. - SPAR's ambition is to facilitate access to public procurement for SSE stakeholders, and there is year opportunity for them to join forces to create consortia and respond as a group. - Forum des Achats Innovants et Responsables (FAIR) to be held in November 2024: to encourage stakeholders to develop and structure offers in the fields of repair and maintenance, and to make them visible. - Filière 4 R: promote the role of SSE stakeholders who are already active in the field of maintenance and digital technology, and support cooperation between stakeholders (SSE and non-SSE) to roll out new collective offerings. **Obstacles:** - Numerous stakeholders of different sizes, who need support to structure their offerings and make them visible. - Stakeholders' ability to free up human and financial time - Locations with rents that are difficult or impossible for SSE stakeholders to access.

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : DEER/SET in close collaboration with the Climate Alimentation Participation citoyenne unit of the Direction de l'animation de la transition écologique (Ecological Transition Department) **Potential stakeholders :** agricultural cooperatives, producer associations, supermarkets	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++ ++	Health Ressources Climate Biodiversity	+ ++ ++ +++	Not easily quantifiable
	37. Structure production, processing and distribution in the agricultural sector, giving priority to short distribution channels.					
key contextual factors	**Description of the action**					

• Action n°47 marker n°3 of the Grand Débat Fabrique de nos Ville roadmap **indicators and goals** • to be defined **Cost** • + **state of progress** - to amplify - Planned - To commit	Contribute to the implementation of the metropolitan public policy on food and agriculture, in line with the Projet alimentaire territorial (PAT), with regard to downstream issues, i.e. food processing and distribution: this involves actions downstream from the act of agricultural production. The aim is to involve companies offering local, high-quality agricultural and agri-food products in collective and cooperative processing and marketing dynamics, based on short distribution channels. For processing and distribution Support the engineering of collective projects led by agricultural sectors and producers' organizations, in order to assist the emergence of cooperative actions that enable a market to be addressed collectively, and which may require collective investment in processing and distribution tools (Ex MACHE). On distribution - Work with stakeholder groups committed to a responsible economy and producer organizations to help them secure their logistical supply chain: optimize collection and distribution, pool refrigerated storage spaces, grouping/deconsolidation, shared rental of non-polluting refrigerated rolling stock, use of the MIN for its logistical functions, etc. - Support network leaders in the fight against food insecurity, within the framework set by the Inclusion Solidarités department.
	Implementation schedule
	To be committed to medium term with the creation of the Food in Transition position attached to DEER/SET - during 2024
	success factors and obstacles
	Obstacles: dedicated human resources

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :**	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++	Health Ressources Climate Biodiversity Other ?	+ ++ ++ +++	Not easily quantifiable

38. Lancer une réflexion sur les paysages alimentaires pour cartographier et renforcer la distribution des produits frais, locaux et de qualité sur le territoire

key contextual factors

- Action n°44 marker n°3 of the Grand Débat Fabrique de nos Ville roadmap

indicators and goals

- to be defined

Cost

- +

state of progress

- to amplify
- Planned
- To commit

Description of the action

Action n°44 marker n°3 of the The aim is to involve companies offering local, quality agricultural and agri-food products in collective and cooperative processing and marketing dynamics, based on the logic of short circuits.

Marketing

This involves

- Determining Nantes Métropole's interest in facilitating a meeting between supply and demand for local, quality agricultural products, by organizing a dialogue with retailers on the one hand, and producers' organizations on the other.

- Set up a collective of producers of fresh, high-quality, local produce to create year itinerant commercial offering that could complement Nantes' open-air markets.

- Raise awareness among companies to encourage the use of collective catering suppliers for their employees who value quality, local produce (drawing on the experience of public collective catering) and cooperation with inter-AMAP-type networks.

	- Cross-reference the social needs identified by the food landscape study with the observation of the potential for setting up food outlets in local commercial centers, in order to guide and encourage the occupation of active commercial ground floors to guarantee high-quality food accessibility for all.
	Implementation schedule
	To be committed to medium term with the creation of the Food in Transition position attached to DEER/SET - during 2024
	success factors and obstacles
	Obstacles: dedicated human resources

MITIGATION **Resources: reducing imported emissions**	**stakeholders**	**Impacts**				**green house gas**
	Leader : DCE **Potential stakeholders :** Agence de l'Eau Loire Bretagne, Département 44, other drinking water producers/distributors in 44, NM consumer departments, communes	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++ ++	Health Ressources Climate Biodiversity	+ ++ ++ +++	Not easily quantifiable
	39. Achieve a 10% saving in water consumption across the region					

	by 2030 by local authorities, individuals and businesses, and secure drinking water in the département and metropolitan area by 2050 through the Alliance des territoires
key contextual factors • Climate change / Drought • Access to water for all • Continuity of service **indicators and goals** • Distributed volume • Network performance • Volume consumed/subscriber type **Cost** • ++ on user/community savings actions • € PPI on network renewal • pending conclusion of master plans • AELB subsidies **state of progress** - to amplify - Planned - To commit	**Description of the action** Support for water consumption savings as part of a call for projects by the Loire Bretagne water agency, aimed at local authorities with a view to setting year example, and at users with a view to raising awareness and providing support for water saving (communication campaign, distribution of aerators, support for rainwater harvesters, etc.). Continued reduction of leaks in drinking water networks through explawtants and DCE, with leak detection and increased renewal of drinking water networks. Upstream, the challenge of securing the drinking water supply with the creation of a departmental master plan for securing the drinking water supply, piloted by the department, and the creation of a metropolitan plan for securing the supply, piloted by the DCE. **Implementation schedule** Committed Short term (actions by users and communities to reduce consumption) / medium term (actions by communities to reduce consumption and network renewal) / long term (implementation of security master plans) **success factors and obstacles** **Success factor :** - Mobilization of all stakeholders in the sobriety and reduction approach. **Barriers** : - Necessary human and financial resources, and water tariffs that have little impact compared with electricity/gas bills. - Difficulties in assessing the real impact of actions, especially at the level of target users, in terms of any reductions observed.

Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050

<table>
<tr><td rowspan="2">MITIGATION

Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050</td><td>stakeholders</td><td colspan="4">impacts / cobenefits (from - - to +++)</td><td>green house gas</td></tr>
<tr><td>Leader : Nantes Métropole

Potential stakeholders : Communes</td><td>Acceptability
Cost
Benefits/cost
local dynamic</td><td>++
++
+
+++</td><td>Health
Ressources
Climate
Biodiversity</td><td>+
++
++
+++</td><td>en kteq CO2</td></tr>
<tr><td></td><td colspan="6">40. Support regional development of renewable energies, particularly in acceleration zones</td></tr>
<tr><td rowspan="2">key contextual factors
• 9% of energy consumption from renewable sources by 2023

indicators and goals
•

Cost
• +++

state of progress
- to amplify
- Planned
- A engager</td><td colspan="7">Description of the action</td></tr>
<tr><td colspan="7">Various actions are underway or planned, to ensure coordination of the renewable energy projects mapped in the acceleration zones:

- Renewable network heat: follow-up to the master plan for heating networks adopted in December 2023;

- Solar energy on agricultural land: study of production capacities in line with the objectives of the territorial food project;

- Solar energy on public buildings and parking lots: support for the analysis of cross-cutting issues (land reserves, renaturation and solarization) and the choice of operational ownership methods, including the creation of a territorial SAS EnR by the end of 2024;

- Wind power: coordination between communes to ensure concerted action in conjunction with Territoire d'énergie 44 from the second half of 2024.

Implementation schedule</td></tr>
</table>

	Committed Short term / medium term
	success factors and obstacles
	Success factor : - Pooling and exchange of experience on a metropolitan scale - Tools for setting up and supporting projects in the metropolitan area (call for expressions of interest, SAS EnR) - Partnerships and citizen participation - Translation of acceleration zones in the PLUm **Barriers :** - Acceptability of visible renewable energy projects (wind power, methanization, ground-mounted solar power plants) - Lack of engineering resources to develop projects - Legal, regulatory and financial complexity of project set-up and implementation

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050**	**stakeholders**	**impacts / cobenefits (from - - to +++)**			**green house gas**
	Leader : DATE **Potential stakeholders :** Alisée, Récit, Communes	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++	Health Ressources Climate Biodiversity	+ ++ ++ +++	in kteq CO2
	41. Develop support for citizen renewable energy projects				
key contextual factors • MINaWatt: 1 emblematic project in 2018 • La Fraterne in Couëron, Ombrières du Zénith in St-	**Description of the action**				
	Membership of Récit (Réseau Energies Citoyennes en Pays de la loire) + Alisée grant of 30 k€ to support the development of citizen projects.				

Herblain, P+R Chantrerie in Nantes **indicators and goals** • Support 20 citizen projects in Nantes Métropole by 2026 **Cost** • + **state of progress** - to amplify - Planned - To commit	Positioning of citizens in the SAS EnR territoriale to be clarified, particularly on emblematic projects such as the Beaujoire sector. Work with NM municipalities to identify sites favorable to the relocation of citizen renewable energy projects. **Implementation schedule** Work in progress - reinforced from June 2024 with 1 DATE project manager in part on this action **success factors and obstacles** **Obstacles**: uncertainty about the future of car parks/land "competition **Success factor:** disseminate a common culture among local authorities/directorates to allay fears and share experience.

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :** Ville de Nantes, TE 44, SEMITAN, SEMINN, Saint Nazaire Agglo, loire et Sillon	Acceptability Cost Benefits/cost local dynamic	++ ++ + +++	Health Ressources Climate Biodiversity	+ ++ ++ +++	In kteq CO2
	42. Develop the purchase of renewable energies in our energy purchasing group.					
key contextual factors • CADER: a new opportunity opened up by the APER law to buy renewable energy in real time	**Description of the action** In addition to actions aimed at reducing energy requirements (energy savings, upgrading of assets, etc.), consuming differently (switching from gas to a heating network, improving efficiency, etc.) and producing (individual and collective self-consumption of PV), Nantes Métropole is taking steps to purchase renewable energy.					

indicators and goals • % RE purchases • % additional renewable energy purchases in real time • number of partners **Cost** • +++ **state of progress** - to amplify - Planned - To commit	As part of our exemplary approach to energy purchasing, we propose to study the feasibility of applying and exceeding the following territorial targets: 2030: between 30% and 40 2040: between 40% and 50 2050: at least 50%. year initial purchasing group will be set up to purchase electricity and gas, including renewable energies, with a view to monthly balancing. Scope: municipalities, partners (NMH, Cité des Congrès, SEMITAN, etc.). In addition, Nantes Métropole, the City of Nantes, TE 44, SEMITAN, SEMINN, the Saint Nazaire Agglo community and the Loire et Sillon community of communes have decided to join forces to pool the award and execution of direct renewable energy purchasing contracts (CADER). CADERs are renewable energy purchase contracts signed directly between a producer and year end consumer. They represent year alternative to the energy supply contracts used until now, in that they enable end consumers to purchase renewable energy from a producer over a long period of time, and for a pre-determined price. The first CADER is scheduled for 2024. This approach is also part of the OSER project (Outil de Simulation de systèmes multi-Énergies Renouvelables Patrimonial): a 30-month project in response to year ADEME call for projects. The aim is to simulate energy scenarios in order to diagnose the coverage of renewable energy needs as close as possible to real time. Scope : BATII (VdN, NM and CCAS)
	Implementation schedule
	Committed Short term - first CADER launched in 2024
	success factors and obstacles

	Success factor : - Mobilization of partners

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050** Key action	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : NM - DATE **Partenaires :** SEM EnR 44, Controlling, BATII, Mobility department, Communes	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ ++ +++ +	Health Ressources Climate Biodiversity	+ +++ ++ +	en kteq CO2
	43. Define new carrying tools, particularly for renewable electricity.					
key contextual factors • Share of renewable energy production in total energy consumption : ◦ in 2021 = 9% ◦ target 2030 = 20% ◦ target 2050 =50%. • RE roadmap - annual photovoltaic energy production:	**Description of the action**					
	Creation of a governance, technical and financial support tool for renewable energies: SAS EnR Territoriale, jointly owned with SEM EnR 44. The first cluster of projects focuses on photovoltaic shading systems on parking lots in the metropolitan area (3-4 GWh annual production). The SAS will then be able to take on other projects, such as rooftop or ground-mounted photovoltaic power plants (with priority given to polluted or wasteland sites), or wind farms. The SAS will integrate citizen participation on certain projects. In parallel : - continuation of the BATII department's project portfolios, based on a patrimonial logic (with self-consumption loop in particular) - development of projects in the form of calls for expressions of interest, notably on municipal land					

◦ + 340 GWh in 2030 ◦ + 930 GWh in 2050 **indicators and goals** ● First cluster of projects by 2026, starting with photovoltaic shading systems ● Expansion of projects from 2026 onwards **Cost** ● Creation of the simplified joint stock company and call for funds for the 1st project cluster: approximately €400,000 **state of progress** - to amplify - Planned - To commit	**Implementation schedule** Underway: - SAS EnR territoriale is currently being set up, with creation scheduled for late 2024. - first cluster of photovoltaic projects supported by the SAS in 2025-2026 **success factors and obstacles** **Success factor :** - integration of the various public policies and NM departments concerned by parking lot shading (rainwater management, permeabilization, vegetation, densification of ZACs) to guarantee greater acceptability - use of electricity produced as locally as possible (self-consumption) to improve acceptability and profitability. - partnership with a departmental player

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : NM - BATII **Potential stakeholders :**	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ +++ +++ +++	Health Ressources Climate Biodiversity	 ++ ++	in kteq CO2

44. Roll out the BATII roadmap for photovoltaic solar power on public property.

key contextual factors

- Target 50% local RE in 2050 / 20% in 2030

indicators and goals

- 2026: 3 661 kWc
- 2026: 17 726 m2

Cost

- 930 000€ /year, until 2026

state of progress

- to amplify
- Planned
- To commit

links to go further

https://metropole.nantes.fr/actualites/2024/dechets-proprete-eau-energie/acceleration-solaire

Description of the action

Encourage the creation of collective self-consumption loops to benefit locally from renewable, low-carbon energy, thereby helping to reduce carbon footprints and promote the local energy transition.

- 15-fold increase in photovoltaic energy production since 2020 (already 5-fold by 2024)
- Target 8 self-consumption loops by 2027
- Reach 57 photovoltaic installations by 2026, enabling production of 3,661 kWp (compared with 25 installations currently on City of Nantes and Nantes Métropole buildings).

Implementation schedule

Committed

- 2020: 3 plants / 1,385 m2 / 188 kWp
- 2024: 25 plants / 5,536 m2 / 1,022 kWp
- 2026: 57 plants / 17,726 m2 / 3,661 kWp (forecast)
- 2027: 8 collective self-consumption loops

success factors and obstacles

Success factor:

- A large number of public buildings available and usable
- The momentum is already there
- Self-consumption promotes acceptability while optimizing profitability

	stakeholders	impacts / cobenefits (from - - to +++)	green house gas

<table>
<tr><td rowspan="2">MITIGATION

Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050</td><td>Leader : NM - DATE

Potential stakeholders : Alisée, LAD, SEM EnR44, private-sector and public-sector project developers, PSD pilot departments</td><td>Acceptability
Cost
Benefits/cost
local dynamic
Climate change adaptation</td><td>++
++
+
+++
+</td><td>Health
Ressources
Climate
Biodiversity</td><td>+
++
++
+++</td><td>In kteq CO2</td></tr>
<tr><td colspan="6">45. Solarize the community's assets (excluding BATII)</td></tr>
<tr><td>key contextual factors
Identification of RE acceleration zones for photovoltaic shading systems
Regulatory obligation to solarize parking lots >1,500 m².
Share of renewable energy production in total energy consumption :
◦ in 2021 = 9%
◦ target 2030 = 20%
◦ target 2050 =50%
RE roadmap - annual photovoltaic energy production:
◦ + 340 GWh in 2030
◦ + 930 GWh in 2050
indicators and goals
Annual photovoltaic production on public property and land NM</td><td colspan="6">Description of the action

Integrate the obligation to solarize roofs and parking lots into the renewal of public service contracts: support for departments piloting public service contracts (ExpoNantes, Public Transport, etc.).

Monitor and support solarization projects for metropolitan parking lots:
- parking lot shading systems installed at P+R Chantrerie in Nantes (following spontaneous expression of interest, project led by SAS ENR Chantrerie - citizen project) - works 1st half of 2024
- parking lot shading systems planned as part of the extension of the Couëron P+R (following unsolicited expressions of interest, project led by Ombrières de loire-Atlantique) - work late 2024-early 2025

Support joint efforts to solarize parking lots and roofs:
- identification of parking lots to define their solarization potential, and support for local authorities in their choice of project ownership, in line with regulatory requirements (July 2028 for parking lots > 1,500m² / July 2026 for parking lots > 10,000 m²)
- 12 photovoltaic feasibility studies carried out by LAD on the roofs and parking lots of municipalities belonging to the Shared Energy Service (SEP).

Implementation schedule

In progress since spring 2024: identification of parking lots
2nd half of 2024: DATE to support local authorities in their choice of ownership structure for renewable energy projects
Photovoltaic feasibility studies SEP: 6 initial studies completed, 6 others in progress
success factors and obstacles</td></tr>
</table>

Cost ● + or +++ according to porting mode **state of progress** - to amplify - Planned - To commit	**Success factor :** - fast-track regulatory requirements (2026-2028 for parking lots) - integration of the various public policies and NM departments concerned by parking lot shading (rainwater management, permeabilization, vegetation, densification of ZACs) to guarantee greater acceptability - use of electricity produced as locally as possible (self-consumption) to improve acceptability and profitability. **Barriers** : - uncertainty about the future of parking lots / land "competition - resources to support projects (human/financial)

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : NM DATE / DGERI **Potential stakeholders :** Atlansun, Alisée, DRN, Cythelia Energy	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ + + +++ +	Health Ressources Climate Biodiversity	+ ++ ++ +	en kteq CO2

46. Support companies in solarizing their assets

key contextual factors

- Identification of RE acceleration zones for photovoltaic shading systems
- Regulatory obligation to solarize parking lots >1,500 m².
- Share of renewable energy production in total energy consumption :
  - in 2021 = 9%
  - target 2030 = 20%
  - target 2050 =50%
- RE roadmap - annual photovoltaic energy production:
  - + 340 GWh in 2030
  - + 930 GWh in 2050

indicators and goals

- Annual photovoltaic production of companies in NM

Description of the action

Agreement under study with Atlansun to acculturate companies to solar energy via local business clubs in conjunction with Nantes Métropole's economic developers.
Existing agreement with Alisée to provide pre-diagnostic services, including guidance on solar renewable energy solutions when well suited to the site.
Solar cadastre: continue to improve the tool, amplify communication.
Solar thermal: see renewable heat support sheet.

Implementation schedule

Committed:
- Agreement with Atlansun under study with DEER for occasional Atlansun presentations to business clubs.
- Solar cadastre Nantes Métropole

In progress:
- Agreement with Alisée: in force
- Solar thermal: in progress via CCRtphotovoltaics for companies in the NM area

success factors and obstacles

Success factor :
- fast-track regulatory requirements (2026-2028 for parking lots)

Cost • ++ **state of progress** - to amplify - Planned - To commit	- integration of the various public policies and NM departments concerned by parking lot shading (rainwater management, permeabilization, revegetation, densification of ZACs) to ensure greater acceptability. **Obstacles** : - difficulty in deploying sufficient human resources to support companies - competition for land

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050** Key action	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : Nantes Métropole **Potential stakeholders :** Ministry of Ecological Transition, DREAL, DDTM, Cerema, Direction Mobilités, SDIS	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ +++ + +++	Health Ressources Climate Biodiversity Noise	+ ++ ++ + +	In kteq CO2
	47. Initiate a study with the French government on a solar ring road					
key contextual factors	**Description of the action**					

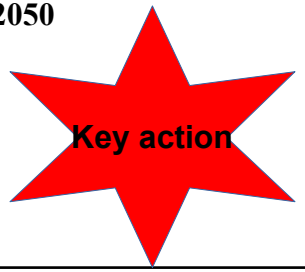
• Target 50% local RE in 2050 / 20% in 2030 **indicators and goals** • Opportunity study to be carried out by the end of 2025 ? **Cost** • + **state of progress** - to amplify - Planned - To commit	Study the opportunity/feasibility of solarizing part of the ring road, taking into account all the issues involved (technical, uses, regulatory, air quality, noise, financial, acceptability, etc.). Extend the scope of the study to include abandoned roads and railroad sidings, as well as vertical solutions such as noise barriers.
	Implementation schedule
	To be committed Medium / long term
	success factors and obstacles
	Success factor: land already developed **Barriers**: technical complexity / acceptability - consumption of materials for project implementation Project not identified in acceleration zones due to lack of study

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : NM-DATE **Potential stakeholders : Chamber of Agriculture**, CAP44	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ + +++	Health Ressources Climate Biodiversity	+ ++ ++ +++	in kteq CO2
	48. Manage solar energy production capacity in agricultural and natural areas in line with the objectives of the territorial food					

	project.
key contextual factors **indicators and goals** • production capacity • Definition of a doctrine **Cost** • + **state of progress** - to amplify - Planned - To commit	**Description of the action**
	Study renewable energy production capacities on agricultural land in line with the objectives of the territorial food project in two phases: 2nd half of 2024 - early 2025: - Solar energy on the roofs of existing farm buildings or new buildings: - Solar energy on former landfill sites, landfill sites, quarries, storage sites, etc., which cannot be returned to agriculture and on which it is not possible to produce renewable energy. that cannot be returned to agriculture, and on which photovoltaic power plant projects could be developed - Solar power on derelict agricultural land which, due to its shape, size, enclave and/or poor agronomic quality quality, are not suitable for agricultural use: 2nd half of 2024 - June 2025: Definition of a doctrine on agrivoltaics - objectives: - Clarify our ability to act locally to oversee agrivoltaic projects; - Define conditions for the development of agrivoltaics in metropolitan France - share of VA / main production production, type of crops (?), reversibility of installations, environmental clauses, position 0 of the future SAS NM-SEM ENR44 to regulate projects (opinion, possible equity investment); - Disseminate the doctrine throughout the NM territory/communes
	Implementation schedule
	Committed **Short term / medium term**
	success factors and obstacles
	Success factor: territorial dialogue with Nantes Métropole **Obstacles:** control difficulties

MITIGATION

Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050



stakeholders	impacts / cobenefits (from - - to +++)				green house gas
Leader : NM - DEP **Potential stakeholders :**	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	++ ++ +++ +++	Health Ressources Climate Biodiversity	 + ++ +	60 kteq CO2 per year in 2022

49. Implement master plan for heating networks

key contextual factors

- The French Law on Energy Transition for Green Growth (July 22, 2015) sets the target of multiplying by 5 the renewable and recovered heat delivered by heating networks by 2030.
- Today, 5 public heating networks in Explawtation, supplied by biomass boilers (wood-energy) and recovering heat from 2 technical waste recovery centers, deliver 448

Description of the action

Develop, extend and increase the density of existing networks to supply an additional 240 GWh of heat.

Studying interconnections between networks to enable better use to be made of the heat from the city's two waste treatment and recovery centres (CTVD).

Increase the production of renewable heat through the construction of specific equipment (boiler rooms, thermal storage) to maintain or even increase the renewable and recoverable energy rates of the networks.

Create new heating networks (12 zones identified) to supply 60 GWh of additional heat.

Apply the ENR Choix method to increase the ENR mix of networks.

GWh.

- Heating networks provide greater control over energy costs, thanks to stable tariffs.
- Master plan for heating networks has identified the potential for the development of heating networks in Nantes Métropole.

indicators and goals :

- +240 GWh from the extension/densification of existing networks
- +60 GWh with the creation of new heating networks
- 80% average annual renewable and recoverable energy rate

Cost

- +++

state of progress

- to amplify
- Planned
- To commit

links to go further

- https://metropole.nantes.fr/territoire-institutions/projet/grands-projets/les-reseaux-de-chaleurs

Implementation schedule

Committed and to be committed
A medium term et long term

success factors and obstacles

Success factor:

- Maintain the level of support from ADEME's Fonds Chaleur.
- Maintain vigilance over biomass resources on a regional scale.

Obstacles:

- Acceptability of the energy production equipment needed to develop heating networks.

<table>
<tr><td rowspan="2">MITIGATION

Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050</td><td>stakeholders</td><td colspan="4">impacts / cobenefits (from - - to +++)</td><td>green house gas</td></tr>
<tr><td>Leader : NM - DATE

Potential stakeholders : ADEME, FIBOIS, ATLANSUN, CIVAM 44, TE44, communes, NM-DEER</td><td>Acceptability
Cost
Benefits/cost
local dynamic</td><td>++
++
+
++</td><td>Health
Ressources
Climate
Biodiversity</td><td>+
++
+++
-</td><td>In kteq CO2</td></tr>
<tr><td colspan="7"><h2>50. Support the region in promoting renewable heat projects (including CCRt).</h2></td></tr>
<tr><td rowspan="2">key contextual factors
• Renewable heat = 90% of renewable energy production (Basemis 2021 p) with potential to double by 2030 (SDE)
• ¾ of potential in diffuse (the rest in RCU)

indicators and goals
• CCRt target: additional 9 GWh between 2023 and 2026

Cost
• CCRt: 2 FTEs with €70k annual funding
• adhésion ATLANSUN FIBOIS</td><td colspan="7">Description of the action</td></tr>
<tr><td colspan="7">Mobilizing and supporting local stakeholders in the deployment of renewable heat solutions: waste heat, solar thermal energy, geothermal energy and wood energy. This mobilization is achieved in particular by coordinating a Territorial Renewable Heat Contract (CCRt) with delegated management of ADEME Fonds Chaleur grants (€4.2 million over 3 years) and in liaison with the associations for the development of these sectors to which Nantes Métropole belongs:
- regional networking with the various stakeholders
- support for the emergence of projects: opportunity notes in conjunction with CIVAM 44 and referral to the right resources for support.
- support for quality implementation: financing of feasibility studies and project management.
- Support for project implementation through subsidies
- Project monitoring and dissemination of feedback and best practices.

The CCRt is under contract until 2026, and will be renewed thereafter.

The solar cadastre also raises awareness of the benefits of installing solar thermal panels.

Implementation schedule</td></tr>
</table>

filière géothermieBonus solaire thermique sur les aides à la rénovation des logements collectifs **state of progress** - to amplify - Planned - To commit **links to go further** • https://librairie.ademe.fr/energies-renouvelables-reseaux-et-stockage/6391-reseau-des-energies-renouvelables-des-pays-de-la-loire.html	committed Short term / medium term / long term **success factors and obstacles** **Success factor :** - continued support from Fonds Chaleur grants - fossil fuel prices remain high - emergence of year association to support the development of the geothermal sector. **Obstacles** : - capacity to adapt (pellet production on the one hand, drilling capacity on the other, number of qualified design offices, particularly for solar and geothermal energy) - high investments

MITIGATION **Energy mix: 20% local renewable production by 2030, 100% renewable consumption by 2050**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : NM-DATE **Partenaires :** NM-DEER / DG FVES / GRDF / GRT Gaz / AURAN / Air PDL / neighboring waste syndicates ...	Acceptability Cost Benefits/cost local dynamic Climate change adaptation	+ +++ + ++ 0	Health Ressources Climate Biodiversity Land	+ +++ ++ + +	15 kteq CO2 avoided by 2030 155 kteq CO2 avoided in 2050 (assumption 185 gCO2 avoided /kWh)
	51. Accompagner les porteurs de projet de gaz renouvelable du territoire dont innovation					

key contextual factors	Description of the action
• **indicators and goals** • quantity of gas produced in ◦ NM ◦ neighboring territories in connection with NM • target: ◦ +70 GWh methanization and 10 GWh pyrogasification in NM in 2030 ◦ +90 GWh methanization and 750 GWh synthesis gas (excluding metha) in 2050 **Cost** • +++ for the investment **state of progress** - to amplify - Planned - To commit **links to go further** • https://www.grtgaz.com/notre-transition-energetique/gaz-renouvelables-et-bas-carbone	Support the development of renewable gas production (methanization - pyrogasification - hydrothermal gasification, etc.) in the region: - monitor and support ongoing methanization projects from the earliest stages (CVD Prairie de Mauves, Biométhane des bords de loire, etc.) - identify, in conjunction with all the local stakeholders concerned, and in particular the extended producer responsibility (EPR) channels, the most relevant volumes of waste to be converted into gas and the appropriate technologies for doing so, and analyze their advantages/disadvantages - analyze the opportunities for hosting production units, taking into account production constraints (land, transport, environmental impact, connection to the gas network, etc.) and validate a guide plan - initiate action to encourage project developers to set up one or more syngas production facilities **Implementation schedule** To be committed Short term for studies - Medium term for new projects **success factors and obstacles** **Success factor :** - mobilization of the entire industry - ability to offer a competitive waste treatment cost compared with export or competing solutions. **Obstacles** : - no guaranteed feed-in tariff outside methanization - acceptability of these technologies - technologies (excluding anaerobic digestion) not yet widely deployed and still partially under development

Natural carbon sinks: preserving and developing

MITIGATION	stakeholders	impacts / cobenefits (from - - to +++)				green house gas
	Leader : NM - DST (SSDT)	Acceptability	++	Health	+	In kteq CO2

<table>
<tr><td rowspan="2">Natural carbon sinks: preserving and developing</td><td>Potential stakeholders :</td><td>Cost
Benefits/cost
local dynamic
Climate change adaptation</td><td>++
+
+++</td><td>Ressources
Climate
Biodiversity</td><td>++
++
+++</td><td></td></tr>
<tr><td colspan="6"><h2>52. Consume ⅓ less agricultural, natural and forest space than the PLUm 2019 target</h2></td></tr>
<tr><td rowspan="4">key contextual factors
In 2022, there will be 30,438 ha of natural, agricultural and forest areas (ENAF) in metropolitan France, i.e. 57% of the territory.
Since 2004, there has been a significant drop in the annual rate of consumption of ENAF:
2004-2014: 166.8 ha/year
2014-2018: 106 ha/year
2018-2022: 56.5 ha/year
Action 36 marker 2 of the "Grand débat Fabrique de nos villes" roadmap
indicators and goals
figures from Nantes</td><td colspan="6">Description of the action</td></tr>
<tr><td colspan="6">The 2019 PLUm has included in its Projet d'Aménagement et de Développement Durable (PADD) a target to reduce the annual rate of ENAF consumption by 50% by 2030 compared with the 2004-2014 period, i.e. to expect year annual ENAF consumption rate of 83.4 ha/year in 2030.
Action n°51 therefore proposes to set a target to reduce the rate of annual ENAF consumption to 56 ha/year by 2030, i.e. ⅓ less than the initial target.

Action n°51, consists in continuing the reduction in the rate of ENAF consumption observed for two decades now, notably through reducing the consumption of spaces in extension of the urban envelope, amplifying urban renewal, optimizing density, and protecting agricultural, natural and forested spaces.</td></tr>
<tr><td colspan="6">Implementation schedule</td></tr>
<tr><td colspan="6">Committed
Medium-term</td></tr>
<tr><td colspan="6">success factors and obstacles</td></tr>
</table>

Métropole's observatory on the consumption of natural, agricultural and forest areas **Cost** • + **state of progress** - to amplify - Planned - To commit	Invest in our observation capacities and our tools for analyzing the consumption of ZAN Reinforce the ZAN trajectory in the PLUm Systematize the ERC sequence at all levels and prioritize avoidance above all else Reinforce the exemplarity of the metropolis as a project owner Define strategies for areas where renewal/optimization is at stake Support stakeholders in regional development with a view to reducing land use.

MITIGATION **Natural carbon sinks: preserving and developing** Key action	**stakeholders**	**Impacts (de - - à +++)**		**Co-bénéfices**
	Leader : Nantes Métropole **Potential stakeholders** : Fibois Pays de la Loire, project aggregators (CRPF, Fransylva, CIVAM, FRC, AFAC, etc.), funding bodies (e.g. DR ONA), other local authorities in the Loire Atlantique region.	Acceptability Cost Benefits/cost local dynamic habits change	+++ ++ +++ +++ +++	Improving health and quality of life Protection of resources (biodiversity) Strengthening regional resilience CO2 storage Acculturation of businesses and the general public
	53. Create year administrative structure to store carbon and increase ecological resilience			
key contextual factors	**Description of the action**			

Action 12 of the Roadmap of the Grand Débat Fabrique de nos villes "Promote nature-based solutions to store carbon locally: agricultural practices, restoration of hedges, meadows, etc;"

Objectif: creation of the structure

Cost
HR and Research

links to go further:

La Rochelle carbon cooperative: https://larochelle.cooperativecarbone.fr/

state of progress
to amplify
Planifiée
A engager

- **Areas for development**

◦ Local financing of natural carbon storage (sinks) and environmental restoration/management (biodiversity, soil, water, etc.) projects that cannot be financed by existing public aid schemes, in particular to fund PES (Payments for Environmental Services).
◦ Aggregation of private funding (companies, individuals...) for redistribution to local projects, to complement mobilizable public funding.
◦ Provide consultancy in the form of engineering to help territories assess their existing carbon stocks and potentials.
◦ The carbon and ecological resilience structure's scope of action extends beyond Nantes Métropole, whose storage potential is limited: neighboring communities, the Nantes St Nazaire Metropolitan Cluster and even the 44 department.

- **Levers for action :**

1- Diagnosis of projects carried out by local stakeholders
2- Analysis of existing aid schemes (e.g. afforestation and bocage, etc.)
3- Develop a financing system to supplement existing aid or financial support schemes (e.g. agri-cooperative agreement to maintain and develop hedgerows).
4 - Develop services for funders, for example:
- GHG emission reduction credits along the lines of voluntary carbon offsetting
- traceability of funding for sink and ecological restoration projects
- transparency of funding (guaranteed by the presence of public authorities in governance)
- localized programs

- **Tool / device**

Creation of a carbon & ecological resilience engineering and investment company (PSE) to develop project engineering and aggregate private and public funding:
◦ Local authorities
◦ Companies
◦ Institutions
◦ Individuals

The structure created could have a shared governance structure representative of funders and civil society (Development Council...)

Methods (human, technical and financial resources to be mobilized) and implementation schedule

	The creation of the structure takes place in 3 phases over 2.5 years 1- Prefiguration: 18 months Clarification of the region's needs on all carbon-related issues, inventory of the current situation, meetings with other regions, identification of existing schemes and benchmarking, identification of potential financial backers, definition of a robust legal and economic model for the next 15 years, etc. year acculturation phase for elected representatives, technicians, businesses and the general public, to raise awareness of the cooperative and understand its principles (using relay structures such as development councils). 2 - Creation of the structure: 6 to 12 months Drafting of legal documents and deliberations with public bodies involved, testing (e.g. maintenance and development of the hedgerow based on measures taken by Nantes Métropole). 3- Operational launch Project engineering prior to the creation of the structure dedicated to carbon and ecological resilience (PSE): a dedicated full-time position for phases 1 and 2.
	success factors and obstacles
	Beforehand, we need to carry out territorial diagnostics: quality of carbon sinks and ecological quality (biodiversity, water, soil, etc.). Work on governance Develop year initial emblematic scheme to meet the expectations of project developers.

MITIGATION **Natural carbon sinks:**	**stakeholders**	**impacts / cobenefits (from - - to +++)**				**green house gas**
	Leader : DCE - DNJ	Acceptability Cost	++ +++	Health Ressources	+++ +++	

preserving and developing	**Potential stakeholders :** Syndicats de bassins versants, Agence de l'eau loire Bretagne, Région Pays de la loire, Département loire Atlantique, Chambre Agriculture	Benefits/cost local dynamic Climate change adaptation	++ ++ ++	Climate Biodiversity	+++ +++	

54. Implement the action plan to restore the region's rivers, marshes and streams to a good ecological state.

key contextual factors

- 0 bodies of water with good ecological status
- 2 bodies of water close to good ecological status

indicators and goals

- Number of km of rivers restored
- Status of water bodies (WFD) (physico-chemical and biological indicators)
- Data from metropolitan river monitoring network

Cost

- 52 M€ over 2024-2033
- AELB / Region / Département subsidies
- GEMAPI tax revenue 3.5M€/year

state of progress

to amplify

Description of the action

The master plan for aquatic environments, drawn up following a two-year study, was approved by the Metropolitan Council on February 9, 2024. It establishes the following principles and objectives, for the part of the territory where Nantes Métropole directly exercises the GEMAPI competence:
- initiate programs to restore the quality of watercourses in all watersheds, in accordance with the territorial planning established by the master plan up to 2033
- set up a Territorial Water Contract for the loire tributaries, for the period 2028-2030, including actions in certain sub-watersheds of the loire marsh sectors.
- study the possibility of ensuring the management and maintenance of certain watercourses and marsh areas (étiers), in the public interest, with the aim of preventing flooding, restoring ecological integrity and stream functionality, by drawing up management plans
- pursue studies and hydraulic development work aimed at reducing the problems of inodation by runoff and overflowing of small watercourses
- acquire knowledge of the hydrological functioning of local streams
- acquire knowledge of the quality of watercourses through the continuation of Nantes Métropole's monitoring network and program.

Nantes Métropole will continue to provide financial support for the part of the territory for which jurisdiction has been transferred to the watershed syndicates, in line with the issues and needs at stake, and in a spirit of upstream-downstream solidarity.

Implementation schedule

Committed

Planned A engager	Short term / medium term / long term => studies and work by 2033 Including work already launched and continuing on Cens, Gesvres and Charbonneau, as well as Grande Vallée de Bouguenais and Marais nord loire.
	success factors and obstacles
	Human and financial resources (GEMAPI tax set up to finance these actions) Acceptability of continuity restoration/preservation work to local stakeholders (communities, farmers, local residents, etc.)

Adaptation

Urban resilience: towards a natural and health-friendly metropolis

ADAPTATION	stakeholders	Impacts (de - - - à +++)		Co-bénéfices
Urban resilience, towards a natural and health-friendly metropolis Key action	**Leader :** Nantes Métropole **Potential stakeholders :** AURAN, social landlords, condominium managers, public institutions	Acceptability Cost Benefits/cost local dynamic habits change	+++ + +++ ++ ++	Improving health and quality of life Protecting biodiversity Strengthening regional resilience CO2 storage

1. Make the 3-30-300 approach a guiding principle for all developments

key contextu actors

Action 14 of the Grand Débat Fabrique de nos villes roadmap "Make the 3-30-300 approach a principle of all development: that every inhabitant should be able to see 3 trees from their home, benefit from at least 30% tree cover, and finally have access to a tree-covered "Îlot de fraîcheur" no more than 300 meters away".

21% of Nantes metropolitan area's tree cover - vegetation over 5 m tall (source AURAN)

Description of the action

- **Areas for development**

  Against a backdrop of climate change and rising temperatures, the city's morphology, mineral nature and anthropogenic sources of heat (vehicles, air conditioning) release heat accumulated during the day at night: this is the Urban Heat Island phenomenon, characterized at night by a temperature difference of up to 10°C between the city and the surrounding countryside.

  During extreme weather conditions such as heatwaves, the city during the day can also be characterized by situations of thermal discomfort, degrading quality of life and potentially having year impact on people's health. During the day, people's experience of heat varies from one individual to another, ranging from simple discomfort to heat stress (dizziness, heavy sweating, etc.). In certain situations, thermal distress can lead to loss of consciousness or death. At high night-time temperatures, particularly during tropical nights (a night when the temperature never drops below 20 degrees), the body can no longer recharge its batteries, with a long-term impact on the physical and mental health of individuals.

  To adapt to the heat and limit its impact on health, we need to offer people places where they can cool off and stay hydrated: this is the principle behind the Urban Freshness Islands, i.e. outdoor spaces in the city accessible to all, which we need to develop.

Metropolitan Tree Charter validated in 2024

Indicators and goals

Objective: to develop more than 150 Îlots de fraîcheur

Indicateurs

- Number of cooling cluster referenced
- Number of cooling cluster equipped

Cost :
Equipment: signage, seating, drinking fountains

links to go further:

https://metropole.nantes.fr/fortes-chaleurs

https://metropole.nantes.fr/actualites/2024/environnement-nature/une-charte-pour-proteger-et-renf

state of progress

- to amplify
- Planifiée
- To commit

- **Tool / device**
  To provide a sanitary response to the heat, the aim is to reinforce the presence of Urban Freshness Islands in the city, i.e. to create a network of densely wooded outdoor spaces (around 250m2) both :
  - in public spaces
  - on intermediate spaces (e.g. social landlords)
  - private spaces

  Eventually, you'll be able to find year Îlot de Fraîcheur within 300 meters of your home. These Îlots de fraîcheur will be located in :
  - parks, gardens and squares
  - public spaces
  - landscaped natural areas
  - spaces accompanying social housing
  - condominium gardens

  Each "Îlot de Fraîcheur" will need to be able to accommodate people who need to recharge their batteries over a long period of time, with seating adapted to different audiences and access to a nearby water point for hydration (public health messages could also be broadcast there).

Methods (human, technical and financial resources to be mobilized) and implementation schedule

Nantes Métropole is mobilizing its expert services to :
- 2023 - 2024: identify and map existing and potential "Îlots de Fraîcheur" in the city of Nantes, based on geographical data and knowledge of how these areas are used by Nantes' field staff.
- 2025: identify and map Îlots de Fraîcheur (existing and potential) in the other urban communes of the Nantes metropolitan area, based on geographical data and knowledge of how these areas are used by the communes' field agents.

Potential "Îlots de Fraicheurs" are areas that are partly planted with trees and could be developed into full-fledged "Îlot de Fraîcheur".

The maps produced are dated and made available to the general public on the Nantes Métropole website, on the "Hot weather: the city adapts to protect users" pages. Only existing heat islands are publicized.

success factors and obstacles

Ability to mobilize geographic data
Ability to verify actual use of sites

<table>
<tr><td rowspan="2">ADAPTATION

Urban resilience, towards a natural and health-friendly metropolis</td><td>stakeholders</td><td colspan="2">Impacts (de - - à +++)</td><td>Co-bénéfices</td></tr>
<tr><td>Leader : Nantes Métropole (GD Health transition Écologique and GD Fabrique de la ville écologique et solidaire)

Potential stakeholders : Internal departments Nantes Métropole, in particular the urban planning and housing departments and their partners (concessionaires, SPL), the nature and garden department and the communes (via the Local Health Contract) and external operators (public companies, private developers, associations, etc.).</td><td>Acceptability
Cost
Benefits/cost
local dynamic
habits change</td><td>++
-
++
+++
+++</td><td>Improving health and quality of life
Protecting resources (biodiversity, economy)
Strengthening regional resilience
CO2 storage</td></tr>
<tr><td colspan="5">2. Build a health-friendly metropolis adapted to future climatic conditions, based on year assessment of and changes to urban planning documents.</td></tr>
<tr><td>key contextual factors

Plan Local d'Urbanisme Métropolitain 2019 - 2029 including Orientations d'Aménagement et de Programmation :
- Climate Air Energy
- Green and blue fabric and landscape

Objectif: updating the PLUm in 2029</td><td colspan="4">Description of the action

• Areas for development
Regional planning is based on a certain number of rules and prescriptions in terms of urban planning and housing, as set out in the Plan Local d'Urbanisme Métropolitain (PLum), which sets out a vision of how our cities should look by 2030. This horizon requires us to take into account major ecological issues such as climate change, which seems to be evolving more rapidly.

When it comes to climate change, the city is where the problems are concentrated (the urban heat island phenomenon accentuates urban overheating, while soil sealing favors inodization through runoff, etc.), yet the solutions to be implemented, such as nature-based solutions, also aim to preserve health and improve quality of life.

This intersection between climate change and health underscores the need to develop integrated approaches between different issues (e.g. climate, air, noise). For example, the current PLUm mentions cross-cutting actions such as "Îlots de ressourcement", i.e. local spaces with micro-climatic, sound, olfactory and landscape qualities conducive to the well-being of residents.</td></tr>
</table>

Cost : studies

links to go further

https://metropole.nantes.fr/plum

state of progress

- to amplify
- Planifiée
- To commit

This type of space, located in densely populated urban areas, enables local residents to enjoy a more peaceful, less polluted environment, with cooler temperatures.

with cooler temperatures in summer. The presence of plants and water is year important factor in meeting this requirement. On a neighborhood scale, it also means providing meeting places for residents.

- **Tool / device**

The current PLUm (20219 -2030) needs to be strengthened with a view to urban planning that is adapted to climatic hazards and promotes environmental health. The PLUm 2019 - 2030 is already part of this dynamic, as the Sustainable Planning and Development Project indicates that taking nuisances and pollution into account in the organization of urban development takes place at different scales and interacts with other environmental dimensions (energy, biodiversity, climate change...).

The aim today is to strengthen the constituent parts of the PLUm, to make them interact with each other and reinforce their practical scope.

The PLUm will have to be brought into line with the PCAET.

Methods (human, technical and financial resources to be mobilized) and implementation schedule

2024

- Analyse de l'Orientation d'Aménagement et de Programmation thématique Climate Air Énergie et renforcement de son application

2025-2026

- Bilan des règles et expertise des évolutions du PLUm à engager en termes de qualité de l'air (200 000€)
- Consolidation de la Trame Verte et Bleue
- Mise en comptabilité du PLUm avec le PCAET

success factors and obstacles

Réussite:

- développer une approche intégrée qui déclawsonne les politiques publiques.

ADAPTATION **Résilience urbaine, vers une métropole nature et favorable à la santé**	**stakeholders**	**Impacts (de - - à +++)**		**Co-bénéfices**
	Leader : Nantes Métropole **Potential stakeholders:** Institute for Research in Urban Sciences and Techniques - IRSTV	Acceptability Cost Benefits/cost local dynamic habits change	+++ ++ + + ++	Community-Research Cooperation Strengthening regional resilience
	3. Implement the urban micro-climate observatory			
key contextual factors Improve knowledge of urban heat/coolness on the physical side of the city, in addition to sociological studies on the uses, practices and perceptions of Nantes residents in relation to heat. **indicators and goals** Objectives: development of a network of micro-climatological sensors (air temperature, relative humidity and wind) in 2025.	**Description of the action** • **Areas for development** Faced with the foreseeable rise in average global temperatures, with year amplifying effect identified in Europe (Europe has warmed by 2.3°C since the pre-industrial era, compared with 1.3°C for the global average - source Copernicus), the Nantes metropolis will be confronted with extreme heat episodes in summer. In this context, the city, due to its morphology and mineral nature, releases the heat accumulated during the day at night: this is the Urban Heat Island phenomenon (night-time temperatures in the city are higher than in the surrounding countryside, by up to 10°). In extreme climatic conditions such as heatwaves, the city presents situations of thermal discomfort during the day that are difficult for individuals to bear. Heat has a health impact on the body, most often in the form of thermal stress (heavy sweating, dizziness, etc.), but can also lead to "heat stroke" (malaise, even death). For Nantes Métropole, this means being able to analyze the phenomena of urban overheating			

Use of 1st chronicle of data in 2026

Cost
Studies and equipment: urban weather stations

links to go further

Toulouse Métropole weather station network:

https://rapportannuel.meteofrance.fr/2017/innovation/2-2

https://data.toulouse-metropole.fr/explore/dataset/stations-meteo-en-place/information/

state of progress
- to amplify
- Planifiée
- To commit

that characterize the city, as well as locating cooler areas, based on real data.

By teaming up with the Institut de Recherche en Sciences et Techniques de la Ville - IRSTV - whose laboratories in Nantes work on urban micro-climatology, Nantes Métropole's objective is to contribute to the development and long-term installation of a climate observatory for the city and then the Nantes metropolitan area. year observatory capable of providing professionals and the public alike with fine-scale meteorological parameters such as air temperature, humidity and wind speed, and whose data can be grouped together in a single, public database, as yet non-existent.

These physical measurements from the Urban Micro-Climatology Observatory will complement information on the practices, usage and perceptions of Nantes' residents from a large-scale survey (sample of 1,300 people) carried out following the scorching summer of 2022.

- **Tool / device**

The aim is to establish a partnership between IRSTV and Nantes Métropole to set up year urban micro-climate observatory. IRSTV has the expertise and research experience to co-construct this observatory.

IRSTV already has a number of measurement stations in Nantes, installed as part of research projects (VegDUD, Urbio, Urbinat) or at year observation site called ONEVU (Observatoire Nantais des Environnements Urbains) located in the northeast quarter of the city of Nantes.

This observatory will be set up by pooling human, technical and financial resources. In particular, it will be based on a public health project called Synopse, which aims to structure public health data (temperature being considered as a factor influencing the health of populations).

Methods (human, technical and financial resources to be mobilized) and implementation schedule

Four-phase development of year urban micro-climate observatory set up in partnership with IRSTV

- 2022 / 2023 - Feasibility study for a network of micro-climatic measurement stations (state of the art of knowledge on the issue of urban heat and the use of micro-climatic data on a territorial scale, benchmark of local authorities that have set up year observatory based on a network of fixed sensors, pre-sizing of the Nantes/Metropole network; technologies).

	• 2024 - Network configuration Study carried out by Météo France to determine the location of the measurement stations, based on the existing stations of IRSTV). • 2024/2025 - Purchase of equipment Based on the chosen scenario, between 20 and 40 stations will be installed. • 2025 - Setting up the network Installation of sensors and storage infrastructure 2025
	success factors and obstacles
	Articulations technique et juridique entre Nantes Métropole et l'IRSTV

Natural carbon sinks: preserving and developing

MITIGATION **Natural carbon sinks: preserving and developing**	**stakeholders**	**Impacts (de - - à +++)**		**Co-bénéfices**
	Leader : Nantes Métropole **Potential stakeholders** : Fibois Pays de la Loire, project aggregators (CRPF, Fransylva, CIVAM, FRC, AFAC, etc.), funding bodies (e.g. DR ONA), other local authorities in the Loire Atlantique region.	Acceptability Cost Benefits/cost local dynamic habits change	+++ ++ +++ +++ +++	Improving health and quality of life Protection of resources (biodiversity) Strengthening regional resilience CO2 storage Acculturation of businesses and the general public
	4. Create year administrative structure to store carbon and increase ecological resilience			

key contextual factors	Description of the action
Action 12 of the Roadmap of the Grand Débat Fabrique de nos villes "Promote nature-based solutions to store carbon locally: agricultural practices, restoration of hedges, meadows, etc;" **Objectif:** creation of the structure **Cost** HR and Research **links to go further:** La Rochelle carbon cooperative: https://larochelle.cooperativecarbone.fr/ **state of progress** to amplify Planifiée A engager	**Areas for development** ◦ Local financing of natural carbon storage (sinks) and environmental restoration/management (biodiversity, soil, water, etc.) projects that cannot be financed by existing public aid schemes, in particular to fund PES (Payments for Environmental Services). ◦ Aggregation of private funding (companies, individuals...) for redistribution to local projects, to complement mobilizable public funding. ◦ Provide consultancy in the form of engineering to help territories assess their existing carbon stocks and potentials. ◦ The carbon and ecological resilience structure's scope of action extends beyond Nantes Métropole, whose storage potential is limited: neighboring communities, the Nantes St Nazaire Metropolitan Cluster and even the 44 department. **Levers for action :** 1- Diagnosis of projects carried out by local stakeholders 2- Analysis of existing aid schemes (e.g. afforestation and bocage, etc.) 3- Develop a financing system to supplement existing aid or financial support schemes (e.g. agri-cooperative agreement to maintain and develop hedgerows). 4 - Develop services for funders, for example: - GHG emission reduction credits along the lines of voluntary carbon offsetting - traceability of funding for sink and ecological restoration projects - transparency of funding (guaranteed by the presence of public authorities in governance) - localized programs **Tool / device** Creation of a carbon & ecological resilience engineering and investment company (PSE) to develop project engineering and aggregate private and public funding: ◦ Local authorities ◦ Companies ◦ Institutions ◦ Individuals The structure created could have a shared governance structure representative of funders and civil society (Development Council...)

	Methods (human, technical and financial resources to be mobilized) and implementation schedule
	The creation of the structure takes place in 3 phases over 2.5 years 1- Prefiguration: 18 months Clarification of the region's needs on all carbon-related issues, inventory of the current situation, meetings with other regions, identification of existing schemes and benchmarking, identification of potential financial backers, definition of a robust legal and economic model for the next 15 years, etc. year acculturation phase for elected representatives, technicians, businesses and the general public, to raise awareness of the cooperative and understand its principles (using relay structures such as development councils). 2 - Creation of the structure: 6 to 12 months Drafting of legal documents and deliberations with public bodies involved, testing (e.g. maintenance and development of the hedgerow based on measures taken by Nantes Métropole). 3- Operational launch Project engineering prior to the creation of the structure dedicated to carbon and ecological resilience (PSE): a dedicated full-time position for phases 1 and 2.
	success factors and obstacles
	Beforehand, we need to carry out territorial diagnostics: quality of carbon sinks and ecological quality (biodiversity, water, soil, etc.). Work on governance Develop year initial emblematic scheme to meet the expectations of project developers.

Resilience and crisis management

ADAPTATION	**stakeholders**	**Impacts (de - - à +++)**		**Co-bénéfices**
Resilience and crisis	**Leader :** Nantes métropole	Acceptability Cost	+ ++	Strengthening territorial resilience Improving quality of life

management	**Potential stakeholders** : associations (Ecopôle, CEPRI...) university, Natural History Museum, Voyage à Nantes...	Benefits/cost local dynamic habits change	++ ++ ++	

5. Strengthen the population's risk culture and memory

Eléments de contexte
Human impact / inodations :
Overflow: 16,864 people
Runoff: 36,292 people

Objectifs:
Actions "inodations" fléchées dans le cadre du PAPI loire aval (2023 -2029) - Construction de la strategy globale (2024-2025)

Cost : HR

state of progress
- to amplify
- Planifiée
- A engager

Description of the action

- **Areas for development**

A weak risk culture and the loss of memory of past events make a region's population more vulnerable to future crises. In the face of climate change, strengthening the culture and memory of risk is year essential factor in resilience.
The local authority has already launched a number of initiatives to raise awareness of the risk of flooding, as part of its Flood Prevention Action Plan for the Loire Aval (PAPI loire Aval), aimed at the general public: installation of 8 historical flood markers, 3 information panels and a water level gauge. These installations will continue in the coming years with "inodation" trails, information on historic floods on the Nantes patrimonia website, and a project for year artistic work to raise awareness of inodations in Nantes public spaces. The "Risques Inodation" school program for local schools has raised awareness among more than 1,500 pupils, and will continue over the next few years. Nantes métropole also supports the "Mobiliser les Imaginaires pour l'Adaptation par les Médiations scientifiques et culturelles" (MIAM) collective, working in the fields of adaptation to climate change and risks.

More generally, a risk culture strategy will be developed, integrating other risks as well, notably climatic and health risk

- **Tool / Device**
  - Actions inodation inscrites dans le PAPI loire Aval 2023-2029
  - Global strategy to be built by the community

Methods (human, technical and financial resources to be mobilized) and implementation schedule

Human resources: 2 inodation project managers and 1 risk culture project manager, working cross-functionally with numerous departments.
Financial resources: PAPI subsidies
Schedule: Committed - Short to medium term

success factors and obstacles

The subject can be sensitive in a context of "permanent crisis" and a source of anxiety for certain targets (e.g. young people, crossing with eco-

	anxiety). But it is also stimulating, as it opens the way to action.

Annex 2 – French cities framework

The memo is presenting the French framework and context in which French cities build their Climate City Contract (CCC) for the Cities Mission.
All acronyms are in French and full names are in English for a better understanding. At the end of the document, a glossary recaps acronyms in French and English.
This memo is a working document which is not exhaustive.

1. Cities vs metropolitan areas

The status of metropolis was created in France as part of the reform of local authorities in December 2010. The aim was to boost the attractiveness and influence of major cities. There are 22 metropolises in France and four of French mission cities participate as a metropolis: Nantes, Bordeaux, Dijon and Grenoble. Angers and Dunkerque are urban communities but it is very close to the metropolises, so we will talk about metropolitan areas for these six towns. Metropolitan areas are larger than cities because they gather several municipalities working together on a joint urban development and land-use planning project. Paris, Lyon and Marseille are also part of metropolises but they responded to the call for expression of interest of the Mission within the perimeter of the municipality.
Metropolitan areas exercise the powers transferred to them by their municipalities. Consequently according to the Maptam law (2014), metropolises are in charge of these policies on all their territories :

- Urban policy,
- Urban planning,
- Local housing policy,
- Protection and enhancement of the environment and living environment policy,
- Economic, social and cultural development,
- Management of services of public interest (for instance transport).

Before the Maptam law, this was the responsibility of the municipalities. The division of roles and responsibilities between cities and metropolitan areas can sometimes be unclear. It depends on each city and metropolitan area.
Metropolitan areas are responsible for urban planning and climate planning. The French framework detailed below only concerns metropolitan areas, as the cities have delegated this responsibility to them. But metropolitan areas work with cities.
Moreover, metropolitan areas are a subcategory of a specific French status concerning cooperation between municipalities called public establishments for intercommunal cooperation (EPCI). In 2024, there are 1,254 EPCI including 22 metropolises and 14 urban communities.

2. National, regional and local strategies for low-carbon targets

- **National low-carbon strategies and laws**

The energy transition law for green growth (LTECV, 2015) requires France to draw up a roadmap to fight global warming. The French climate plan (2017) strengthened targets of the energy transition law for green growth, to be compatible with the Paris agreement (carbon neutrality in 2050).

The national low-carbon strategy (SNBC, 2015 - SNBC 2, 2020) is the French roadmap for achieving carbon neutrality by 2050 and reducing the carbon footprint of French consumption. It sets out guidelines for implementing the transition to a low-carbon, circular and sustainable economy. The SNBC defines a trajectory in all sectors of activity for reducing greenhouse gas emissions until 2050 and sets short- and medium-term targets (carbon budgets). It has two ambitions: to achieve carbon neutrality by 2050 and to reduce the carbon footprint of French people. The national low-carbon strategy must be taken into account by local decision-makers at every scale, particularly when drawing up local climate plans because it is a legal obligation for local authorities. This national strategy also is the reference base to build the multi-annual energy plan (PPE, 2016 - PPE 2 , 2020).
In addition to the low-carbon strategy, a national climate change adaptation plan (PNACC) defines concrete actions to adapt French territories to climate change.

- **Ecological planning**

The Carbon print is addressed by the national strategy called “ecological planning” (among other issues that are also targeted: adaptation to climate change, biodiversity…). The strategy aims to:

- translate national objectives (reduction in CO2 emissions) into concrete, coherent and achievable measures (number of electric vehicles, building renovation surface areas, etc.)
- translate national objectives into local action, according to the specificities of each territory.

Objectives and action plans are defined by a dialogue between State and Region with the intermediary of regional COP (inspired by the international Conference of the parties system). Cities and metropolitan areas are not involved in the process. Every region launched their COP, except Ile de France and Bretagne regions but they will do it soon.
Regional COPs are following 3 steps:

Diagnosis phase
Debate phase with citizens, economic actors and local authorities
Regional roadmap

All COPs are currently in the diagnosis phase.

3. Regional level

The regional scheme for planning and sustainable development of territories (SRADDET) is the main document for French regions concerning ecological transition. The SRADDET is elaborated and voted by the regional council but the regional prefect (representative of the State in each region) must approve the document. It defines mid-term and long-term targets in many areas, including air quality, the fight against climate change, energy management and recovery, the development of renewable and recovered energy sources, and the protection and restoration of biodiversity. The SRADDET must follow the national low-carbon strategy. Then, the SRADDET objectives apply to local planning documents such as the PCAET, SCoT, PLU, etc. Indirectly, national objectives are implemented at the local level, via the regional level.

4. Local level

- **Territorial climate, air and energy plan (PCAET)**

The territorial climate, air and energy plan is a strategic and operational planning tool to deal with climate, air and energy issues in a territory. It is mandatory for public establishments for intercommunal cooperation (EPCI) with more than 20,000 inhabitants. Moreover, municipalities with more than 50,000 inhabitants must draw up year assessment of GHG emissions every 3 years and set up year action plan to reduce them. They can integrate their greenhouse gas emissions assessment and their transition plan into this territorial climate, air and energy plan.
Every French city from the Cities Mission is concerned by a territorial climate, air and energy plan.
The objectives of the plan are:

- To reduce the territory's greenhouse gas emissions ("mitigation" component) ;
- To adapt the territory to the effects of climate change, in order to reduce its vulnerability ("adaptation" component)
- To decrease energy consumption, improve energy efficiency and develop renewable energies.

The document is divided into 4 mandatory parts:

- **Diagnosis** and analysis of emissions, carbon sequestration, final energy consumption in the area, energy production and the territory's vulnerability to climate change.
- **Territorial strategy:** strategic and operational objectives in specific topics and their socio-economic consequences.
- **Action plan:** definition of all actions, all stakeholders involved, resources required, the target audiences, the desired partnerships and the expected results for the main planned actions.
- **Monitoring and evaluation system:** description of monitoring indicators and connection of indicators with those of the regional plans (mentioned below), public report on implementation after 3 years.

The PCAET must be revised every 6 years and currently, Grenoble Métropole, Nantes Métropole and Dijon Métropole are working on the revision of their PCAET.
The document is very close to the Climate City Contract from the Cities Mission, but there is no investment plan. It is the main difference between the two documents.

- **City climate plan**

Many French cities have launched voluntary initiatives to define climate strategies within their own boundaries, but it is not mandatory contrary to the PCAET for metropolitan areas.
Paris climate plan 2024-2030
The 4th climate plan for Paris reaffirms the ambition of carbon neutrality, following targets of the Paris Agreement. The climate plan is a collective work with a public consultation (started at the end of 2022). City council has voted for the plan in December 2023 and it will be implemented at the end of 2024.
Lyon 2030 climate contract and climate, air and energy plan

Lyon 2030 is year initiative which aims to mobilise all actors of cities (citizens, economic actors…) in the ecological transition. It was built by year assembly called Agora Lyon 2030, gathering 65 organisations representing the diversity of actors in the region. The goal of Lyon 2030 is carbon neutrality in 2030. To complete this climate plan made by citizens, the city is committed with the local social action centre in a climate, air and energy plan. Lyon 2030 and the climate, air and energy plan was voted in 2023.

Marseille

Marseille had a climate and energy plan from 2008 to 2020, with a revision in 2012. Currently, they do not have a climate plan and the Cities Mission is year opportunity to drive a dynamic concerning ecological transition.

- **Territorial coherence plan (SCoT)**

The territorial coherence plan is a strategic **urban planning document**, which defines the spatial organisation and main development guidelines of the territory. The SCoT serves as a framework for sectoral policies, such as those focusing on spatial organisation and urban planning, housing, mobility, commercial development, the environment, including biodiversity, energy and climate. The territorial coherence plan must follow objectives from the SRADDET but it also influences other local plans such as PCAET, which has to consider the SCoT.

- **Intercommunal local urban development plan (PLUI)**

The intercommunal local urban development plan is a **local document for urban planning** that sets out the rules for land use and development. The conditions for land use must respect the principles of sustainable development. The SCoT remains the major document concerning local urban planning, and the PLUI has to consider it.

5. Tools to support local authorities

- **Contractualisation between State and territories: Contract for a successful ecological transition (CRTE)**

One of the tools for ecological planning is the contract for a successful ecological transition, which aims to implement the national plan in a given territory. Contracts for a successful ecological transition are a joint roadmap of actions to be carried out at inter-municipal or multi-municipal level to provide a crosscutting response to the challenges of territorial cohesion and ecological transition. This document is signed between the State (prefect) and a metropolitan area, and not with a city.
The aim is to facilitate understanding of existing strategies and plans by bringing them together into a single roadmap.
Each metropolitan area is free in the elaboration of the CRTE. There is no mandatory item. However, there are recommendations to help them drafting CRTE with the following elements:

- Bringing knowledge about the territory with a territory project for instance
- Defining strategic orientations
- Building a multi-year action plan and describing the commitment of partners involved in the contract
- Adding annual financial protocol

Projects from CRTE can be financed by the French recovery plan (called France relance), or French Green Fund, European funds, etc.

- **Financing tools for ecological transition**
  - **Green fund**

One of the tools of ecological planning is the Green Fund which was created in 2023 to support local authorities in their fight against climate change and the protection of biodiversity. The budget in 2023 was 2 billion euros and it is the same in 2024. The fund is guaranteed until 2027. The priority of the Green Fund is to finance ambitious projects concerning ecological transition. The green fund can finance projects from the contract for a successful ecological transition (see above). A third of the projects financed by the Green Fund were part of these contracts but only a quarter of the Green Fund budget is dedicated to contracts for a successful ecological transition. The fund is the main tool of the French Ministry of Ecological Transition to help territories and cities in their transition.

  - **Other tools**

They are other tools and financial aid for ecological transition of territories in France. The National Agency for Territorial Coherence (ANCT) gathers on a website all the financial aid available for cities and local authorities.
The French Agency for Ecological Transition (ADEME) offers financial aid to local authorities such as a heat fund, circular economy fund or France 2030 (recovery fund). The aim of this financial aid is to support the planning of the ecological transition of territories, supporting change, studies, implementation, investments, innovation and the sharing of solutions between territories.
The Bank for territories (Banque des territoires) has a lot of offers concerning ecological transition. The specificity of this bank is to be exclusively working with territories. They offer loans or engineering assistance and the EIB is financing partially the bank for territories.
All these tools are not enough to finance ecological transition of French cities.

- **Support in defining strategies and action plans**
  - **Data and evaluation**

The Regional Energy and Climate Observatories (OREC) are the local authorities' point of contact for local energy and climate data. Their role is to support local authorities in implementing their energy and climate strategies, by producing status indicators and dashboards at regional and inter-municipal levels. All regional observatories are part of the network of regional energy and environment agencies (RARE). The network has initiated a project with its members and partners to work on the convergence of OREC calculation methodologies, to have local energy and climate indicators that can be compared and added together at a national level. The project is financed by the Ministry of Ecological Transition, the Agency for Ecological Transition (ADEME) and Régions de France (year association gathering all French regions).

  - **Certification: Territory committed to ecological transition (TETE)**

The French Agency for Ecological Transition (ADEME) created a certification ‘territory committed to ecological transition’ (TETE). It is not a mandatory program but cities or metropolitan areas that are involved in the process have to build a four-year action plan. After the implementation of the action plan, the agency undertakes year evaluation and delivers the certification. Cities or metropolitan areas receive a score out of 5 (5 is the highest) based on the level of ecological transition. The

certification aims to highlight the evolution and the commitment towards ecological transition. The program can finance ecological transition experts and it helps in implementing the action plan.
Scores of French Mission Cities: Bordeaux (5), Nantes (5), Angers (4), Dijon (3), Dunkerque (5), Grenoble (4), Lyon (4), Marseille (1).

- **EcoDistrict approach**

The EcoDistrict approach created by the Ministry of Ecological Transition more than 10 years ago is year operational tool available to communities. Based on a consensus framework, it allows local authorities to implement actions in favor of the ecological transition and obtain the EcoDistrict label. Furthermore, this approach makes it easier for communities to obtain funding from the green fund.

Glossary

ADEME - *agence de la transition écologique* : French Agency for Ecological Transition
ANCT - *agence nationale pour la cohésion des territoires* : National Agency for Territorial Coherence
CRTE - *contrat pour la réussite de la transition écologique* : contract for a successful ecological transition
EPCI - *établissement public de coopération intercommunal* : public establishments for intercommunal cooperation
LTECV - *loi de transition énergétique pour la croissance verte* : the energy transition law for green growth
OREC - *observatoires régionaux de l'énergie et du climat* : Regional Energy and Climate Observatories
PCAET - *plan climat-air-énergie territorial* : territorial climate, air and energy plan
PLUI - *plan local d'urbanisme intercommunal* : intercommunal local urban development plan
PNACC - *plan national d'adaptation au changement climatique* : national climate change adaptation change
PPE - *programmation pluriannuelle de l'énergie* : multi-annual energy planning
SCoT - *schéma de cohérence territorial* : territorial coherence plan
SNBC - *stratégie nationale bas carbone* : national low-carbon strategy
SRADDET - *schéma régional d'aménagement, de développement durable et d'égalité des territoires* : regional scheme for planning and sustainable development of territories
TETE- *territoire engagé pour la transition écologique* : territory committed to ecological transition

Table A.2-1: Current policies and strategies					
Type	**Level**	**Name**	**Description**	**Relevance**	**Actions**
Pact	European	Green Pact (2019)	Roadmap to Europe's carbon neutrality by 2050	Carbon neutrality by 2050	
Pact	**European**	**Climate Pact (2021)**	**55% reduction in GHG emissions by 2030 compared to 1990**	**GHG reduction**	**Establishment of a carbon border tax / action plan for the circular economy / development of climate law**
Agreement	European	European Agreement on the End of Hybrid Engines (2022)	Ban on the sale of diesel, petrol, or hybrid vehicles by 2035	GHG reduction	
Law	**National**	**Energy and Climate Law No. 2019-1147 (2019)**	**Incorporating the response to the ecological and climate emergency into the Energy Code and the goal of carbon neutrality by 2050: by reducing GHG emissions by at least six-fold by this date**	**GHG reduction**	**Stop coal-based electricity production by 2022 / renovate thermal sieves (F and G class housing) by 2029 / establish the High Council for Climate / reduce fossil fuel consumption by 40% compared to 2012 by 2030**
Law	National	Programming Law on Energy and Climate (LPEC)	From 2023, will set the major objectives of the PPE and SNBC	GHG reduction and low-carbon strategy	
Strategy	**National**	**National Low-Carbon Strategy V2 (SNBC)**	**Sets the national objective of carbon neutrality by 2050 and sectoral carbon neutrality objectives and associated carbon budgets (revised every 5 years)**	**Carbon neutrality by 2050**	
Program	National	Multi-annual Energy Program (PPE)	Expresses the orientations and priorities for the management of all forms of energy on the metropolitan territory		
Law	**National**	**Mobility Orientation Law**	**Moving away from car dependency / accelerating the**	**Carbon neutrality in land transport by**	**Tripling the modal share of cycling by 2024 / establishing a**

		("LOM" Law) No. 2019-1428 (2019)	**growth of new mobilities / succeeding in the ecological transition / programming investments in public transport**	**2050**	**sustainable mobility package / aiming to increase public charging stations five-fold by 2022 / deploying low-emission zones / redirecting railway investments towards daily commuting**
Law	National	Law No. 2023-175 on the Acceleration of Renewable Energy Production (2019)	Accelerate procedures, release necessary land, speed up offshore wind development, and improve project financing for renewable energy		
Law	**National**	**Climate and Resilience Law No. 2021-1104 (2021)**	**Translates the proposals of the Citizens' Convention for Climate: obligation to respect the European commitment to reduce emissions by 55% by 2030 compared to 1990**	**GHG reduction**	**Environmental labeling, development of bulk sales with year obligation by 2030: ban on domestic flights when a train alternative of less than 2h30 exists, end of sale of new highly polluting cars (emitting more than 95 gCO2/km) and new highly polluting trucks, buses, and coaches by 2040 / accelerate the renovation of thermal sieves / principle of Zero Net Artificialization in territories by 2050**
Law	National	Energy Transition Law for Green Growth (2015)	Strengthen energy independence while combating climate change and contributing to environmental preservation	Reducing GHG emissions	Reducing GHG emissions by 40% between 1990 and 2030 and reducing GHG emissions six-fold between 1990 and 2050 / reducing final energy consumption by 50% by 2050 compared to the 2012 reference / reducing primary fossil energy consumption by 30% by 2030 compared to the 2012 reference

Plan	**National**	**National Health-Environment Plan (PNSE)**	**Inform, educate, and raise awareness about the state of the environment and the right actions for health and ecosystems. Reduce environmental exposures affecting human health and ecosystems. Multiplying concrete actions carried out by communities.**	**Improving health and ecosystems**	
Plan	National	National Plan for the Reduction of Air Pollutant Emissions (PREPA)	Sets actions to be implemented to achieve national objectives for reducing anthropogenic air pollutant emissions (excluding certain emissions related to ruminant farming)	Reduction of air pollutant emissions	
Strategy	**Regional**	**Regional Waste Prevention and Management Plan (PRPGD) (2019)**	**Waste reduction and recovery**	**Prevention of waste production**	**Prevention target of -200kt produced in 2020 compared to the trend and -850kt produced in 2031 / increase in the recovery of household and similar waste by 22% in 2025 compared to 2015**
Strategy	Regional	Regional Ecological Coherence Scheme (2015)	Stop the loss of wild and domestic biodiversity, restore and maintain its capacity to evolve		1. Improve and value knowledge and know-how, 2. Raise awareness and encourage ownership around ecological continuity issues, 3. Integrate the green and blue network into planning documents and other territorial projects, 4. Maintain and develop agricultural practices favorable to biodiversity and the quality of terrestrial and aquatic environments, 5. Manage wooded areas sustainably and

					multifunctionally (forests and bocage complexes), 6. Restore and manage a functional blue network, 7. Preserve coastal and retro-coastal ecological continuities, 8. Preserve and restore ecological continuities within urban and peri-urban areas, 9. Improve the transparency of linear infrastructures.
Strategy	**Regional**	**Regional Development, Sustainable Development and Territorial Equality Scheme (SRADDET)**	**Combine attractiveness and balance of the Pays de la Loire, Succeed in the ecological transition while preserving territorial identities**	**Achieve carbon neutrality**	
Plan	Regional	Regional Health-Environment Plan (PRSE)	Adaptation to climate change, one health, reduction of social and territorial inequalities	Improving health and quality of life in the regional territory	1. Water and health, 2. Food and health, 3. Building, housing, and health, 4. Living environment, planning, and health, 5. Biodiversity and health, 6. Exposure to chemical pollutants
Strategy	**Metropolitan**	**Territorial Climate Air Energy Plan (PCAET) (2018 and revised for 2024)**	**Nationally mandated document: mitigation component, adaptation component, air component, voluntary inclusion of scope 3**	**Achieve carbon neutrality by 2030**	**Reduce per capita GHG emissions by 50% by 2030 / reduce per capita energy consumption by 50% by 2030 / 2030 objective of 20% (with 2003 as the reference year)**
Plan	Metropolitan	Metropolitan Local Urban Plan (PLUm)	Political vision of the territorial development project for 2030	Territory development	Develop a metropolitan area of well-being and solidarity, make the metropolis a reference territory for ecological and energy transition, act for year innovative, creative, attractive, and radiant

					metropolis
Plan	**Metropolitan**	**Urban Transport Plan (PDU)**	**Institutional document that determines the principles governing the organization of transport for people and goods, traffic, and parking within the territorial jurisdiction of the mobility organizing authority.**	**Reconciling mobile city and sustainable city**	**More efficient services, proximity mobility, soft and calm mobility, behavior change, easy and connected metropolis, rational and more collective use of cars**
Program	Metropolitan	Local Housing Program (PLH)	2019-2025: Support the evolution and rehabilitation of existing housing stock, both public and private		Enable energy renovation of several thousand housing units and accommodate new arrivals in the territory: objective to renovate 3,500 private homes and 1,500 social housing units, establish a unique brand "My Renovation Project" bringing together all schemes.

NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

Climate City Contract

2030 Climate Neutrality Commitments

Climate Neutrality Commitments of

Nantes Métropole

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

Table of contents

1 Introduction

In 2023, 6 of the 9 planetary limits, defined as the Earth's habitability limits, were crossed. The climate crisis, the erosion of biodiversity, the depletion of resources, water and air pollution, the artificialization and sterilization of soils.... are intrinsically linked and have the same origin: the pursuit of economic growth in a finite world. To resolve them, these crises need to be tackled together, in a global and systemic way.

Thus, the 2016 Paris Agreement set the achievement of global carbon neutrality by 2050 as a prerequisite for limiting temperature rise to 2°C by 2100. This implies a drastic and immediate reduction in greenhouse gas emissions and the search for carbon capture solutions for residual emissions.

The ambitious aim of the European mission “100 climate-neutral and intelligent cities by 2030” is to accelerate the momentum generated by the Paris Agreement and the European Green Deal, by helping Mission Cities to go even faster than their national regulatory obligations and achieve carbon neutrality by 2030.

Nantes Métropole is proud to be part of this program. This commitment proves the real determination of the Metropole and its stakeholders to implement the necessary actions to tackle the climate crisis, to push their commitments even further and to take their share of responsibility.

The drafting of Nantes Métropole's Climate City Contract was an excellent opportunity to reaffirm the region's determination to tackle the climate and energy emergency, and to actively involve public and private sector partners. The aim was to move up a gear and implement as many actions as possible to achieve carbon neutrality as quickly as possible, while setting an example and paving the way for future cities embarking on this process.

For Nantes Métropole, the climate is part of a more global transition, taking into account the demographic, social, economic and technological transitions that intersect to achieve a fair, equitable and successful transition for all.

Through this approach, Nantes Métropole is asserting its role as a regional leader in the transition to a low-carbon economy, demonstrating its determination to transform climate challenges into sustainable opportunities, thanks to a thoughtful and concerted approach with partners who are experts in the field.

The current situation

- Nantes Métropole has experienced significant population growth, posing challenges in terms of housing and infrastructure, with a view to achieving carbon neutrality by 2030.
- Rising temperatures and heat waves require decarbonization strategies for mitigation and adaptation.
- Air quality has improved, but remains a concern due to emissions from transport and housing.
- Heat waves are becoming more frequent and severe, impacting urban comfort and public health.

A moral and regulatory commitment

Nantes Métropole goes beyond its simple legal obligations by affirming its moral commitment to helping achieve carbon neutrality on a global scale, in accordance with the Paris Agreements. The metropolis is explicitly committed to working towards the creation of a healthier, more pleasant and more equitable city, as defined by Net Zero Cities.

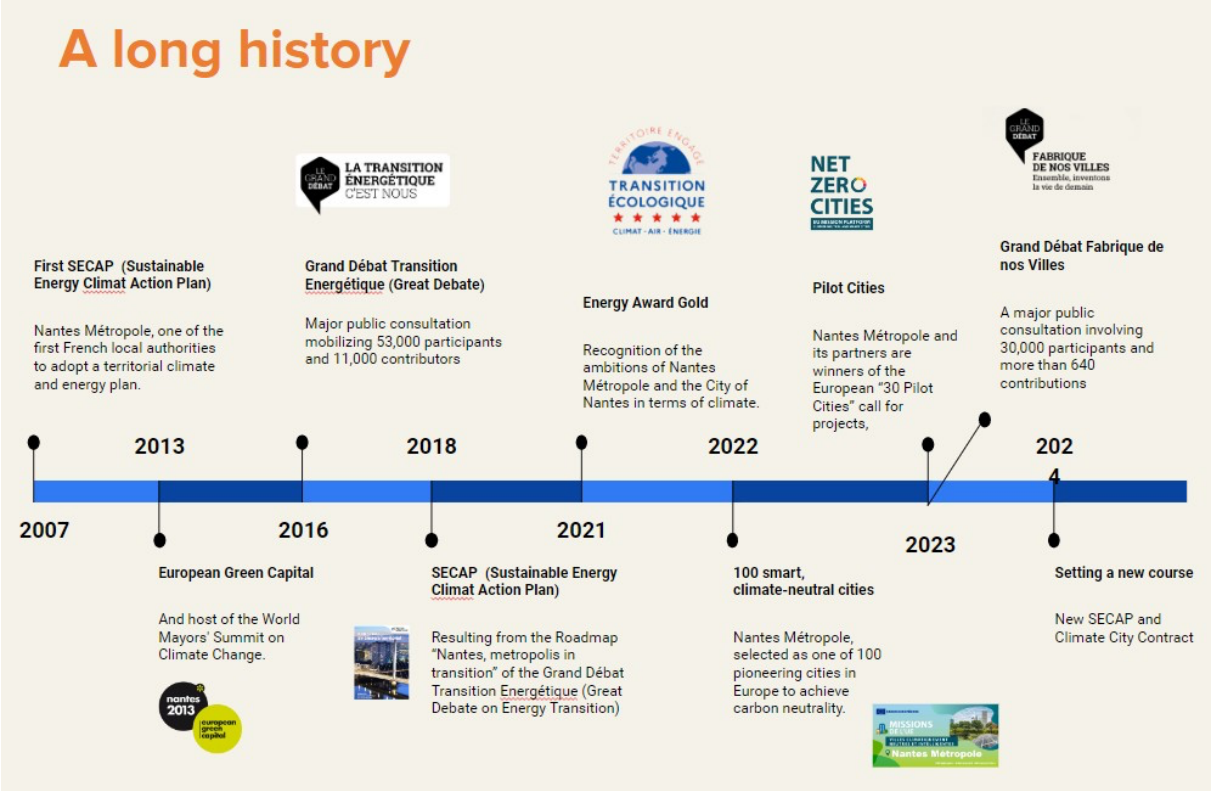
To give concrete expression to this commitment, Nantes Métropole has drawn up a SECAP (Sustainable Energy Climat Action Plan) that includes scope 3, thus going beyond mere regulatory requirements. This demonstrates a genuine desire for change and a willingness to go beyond national standards in the fight against climate change.

The metropolis has taken the initiative of working closely with elected representatives, metropolitan experts, local players and citizens by organizing working groups dedicated to the ecological transition. These working sessions are detailed in Part IV-Processes and organizational principles, as well as in the action plan. Nantes Métropole also works closely with the Intergovernmental Panel on Climate Change (IPCC) in Pays de la Loire. This collaboration enables a more in-depth and scientific approach to reducing the carbon footprint of the region. The Pays de la Loire IPCC is also examining strategies for adapting to climate change, with the aim of improving the quality of life of the region's inhabitants and enhancing the region's resilience.

A long-standing commitment

- **2006 Local Agenda 21:** Nantes Métropole commits to fighting the greenhouse effect
- **2007 First SECAP (Sustainable Energy Climat Action Plan)**: Nantes Métropole is one of the first French local authorities to adopt a territorial climate and energy plan.

- **2013 European Green Capital** and host of the Maries World Summit on Climate Change
- **2015 first Energy Award label:** label for the city of Nantes in recognition of its climate policy management process and resulting actions
- **2016 Grand Débat Transition Énergétique (Great Debate):** public consultation mobilizing 53,000 participants and 11,000 contributors
- **2018 SECAP (Sustainable Energy Climat Action Plan)**
- **2019 European Innovation Capital**: follow-up to the Energy Transition Debate
- **2021 *Energy Award Gold* label:** recognition of Nantes Métropole's and the city of Nantes' ambitions in the area of climate.
- **2021 signing of the new Covenant of Mayors**
- **2022 100 smart, climate-neutral cities**: Nantes Métropole selected as one of 100 pioneering cities in Europe to achieve carbon neutrality.
- **2023 Pilot Cities:** Nantes Métropole and its partners win the European “30 Pilot Cities” call for projects, and set up Climate Challenges.
- **2023 Tournée du Climat et de la Biodiversité (Climate and Biodiversity Tour):** various workshops led by scientists to raise awareness of climate and biodiversity issues.
- **2023 Grand débat fabrique de nos villes (Great Debate)**: a major public consultation mobilizing 30,000 participants and more than 640 contributions.
- **2024 New SECAP and Climate City Contract**



2 Goal: Climate neutrality by 2030

In addition to aiming for a drastic and immediate reduction in greenhouse gas emissions and a massive increase in carbon sinks, the goal of carbon neutrality enables the region and its inhabitants to benefit from numerous co-benefits. These include, for example, improved air quality and better human and environmental health. The co-benefits of each proposed action will be detailed in the action plan.

GHG emissions within the Nantes Métropole perimeter represent only 40% of the emissions actually generated as a result of our responsibility (2,448 kteqCO2). The remaining 60% are "imported" emissions (or Scope 3) generated outside our territory, but directly linked to our activities and consumption (waste management, food, tourism, digital, goods and services, etc.).

Nantes Métropole's action plan therefore aims to target both the sectors that emit GHGs within the territory and to implement proactive measures to reduce the share of imported emissions.

Nantes Métropole's scope for action will therefore focus on:

- **Scope 1:** direct GHG emissions, physically generated on the city's territory by local activity.

- **Scope 2:** indirect emissions, not physically produced on the territory, but associated with the consumption of electricity, heat and cold.

- **Scope 3:** indirect emissions originating in the area, such as those linked to waste management. Nantes Métropole has also chosen to include part of Scope 3 in its action sheets, particularly in the areas of digital technology, tourism and food.

In drawing up the Contrat Ville Climat, Nantes Métropole is committed to taking its share of responsibility towards reducing the territory's GHG emissions by 80% compared to a situation where no environmental measures would be put in place by 2030 (business as usual).

Achieving this ambitious objective will not be possible through the actions of the metropolis alone, but through a convergence of ambitious, coherent and aligned commitments on the part of all players. Indeed, not all the sectors that emit the most greenhouse gases are covered by the metropolitan authority's competences, and even when they are, public policies alone cannot remove all the obstacles. No area depends solely on metropolitan public policy. Every action taken by the metropolis is “constrained” by the system in which it evolves, by lifestyle habits, by resistance to change, by the legislative context, by societal choices and so on. The various levers to be used are as much at metropolitan, regional, national and European level, and as much at institutional as private level. Nantes Métropole has opted for a high level of ambition, backed up by a discourse of truth, in order to make the case for what is at stake (levers and barriers detailed in section A.2-3: Description of systemic barriers and opportunities in the Action Plan).

3 Strategic priorities

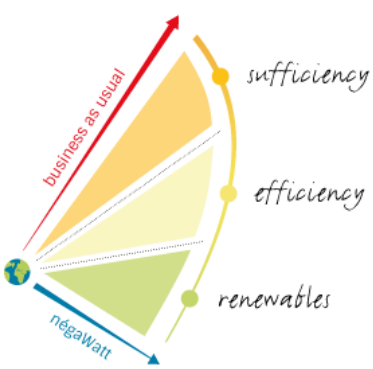
The strategy of the Nantes metropolis, based on the Négawatt scenario, is part of a global approach to sustainability. This strategy aims to respond to energy and climate imperatives, while moving us towards a more sustainable, equitable and resilient society, by also addressing the issues of biodiversity, precariousness, air pollution, etc. The scenario is based on the winning trio: sobriety, efficiency, renewables.

1. Sobriety

(eliminating waste, containing urban sprawl, opting for alternatives to the car, reducing packaging, etc.) The issue of sobriety is taken into account on a metropolitan scale, whatever the scope.

2. Energy efficiency

(insulating buildings, improving the efficiency of electrical appliances or vehicles, etc.)



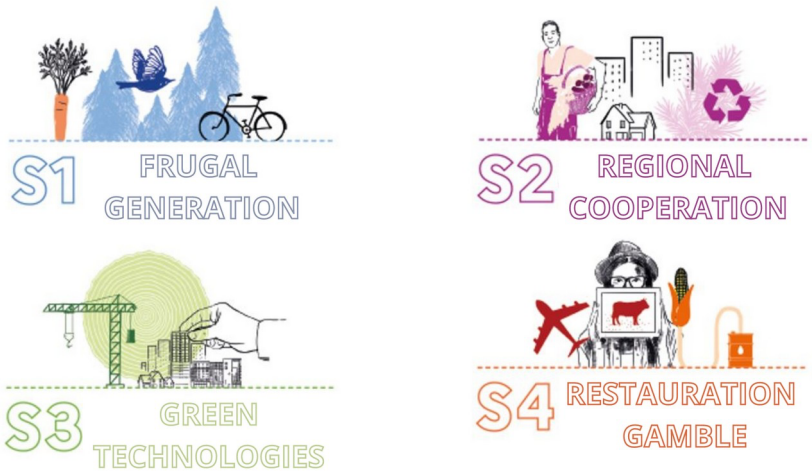
3. Favoring renewable energies for their low environmental impact and inexhaustibility

Sobriety is therefore at the heart of any energy-climate policy, which must first and foremost avoid energy consumption (sobriety), reduce it (efficiency) and then, as a last resort, consume renewable energies (renewables).

Ademe's Transitions 2050 report on scenarios for achieving carbon neutrality, published in November 2021, clearly illustrates the four different approaches: *frugal generation, territorial cooperation, green technologies or restorative betting.* These scenarios all convey a vision of tomorrow's world, and must be viewed through the prism of fairness here and elsewhere, and the impact on other ecological transition issues, notably biodiversity, health and natural resources (metals,...) . They are all coherent, contrasting, difficult and risky, with different collateral impacts. **The question arises of how to debate these different visions. Nantes' trajectory favors the principles of frugality (sobriety) and territorial cooperation.** It's a real political choice, entirely supported by the metropolis.

It's about transforming our societies and organizations, and not just adjusting our models by optimizing them as much as possible. It's also a question of supporting changes in our models, with a profound evolution in our lifestyles and the associated imaginations. The challenges of ecological transition are therefore also cultural. In this respect, cultural, educational and support policies for associations and young people are levers to be activated.

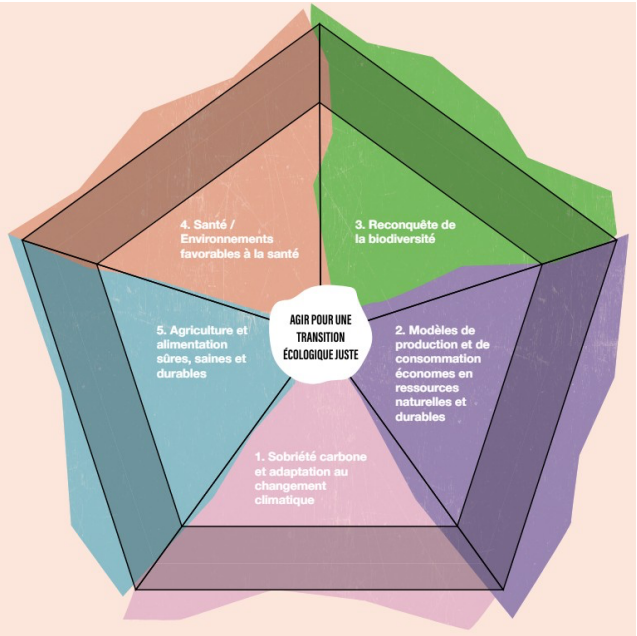
The metropolis' political orientations and Ademe scenarios 1 and 2 advocate a preference for natural carbon sinks rather than technical carbon sinks (with the exception of bio-sourced materials). And this is indeed the choice made by the metropolis.



The year 2021 saw the establishment of a new strategic framework for the ecological transition in the Nantes metropolitan area, inspired by the national roadmap of the 2030 Agenda, the

French translation of the United Nations' 17 Sustainable Development Goals. Schematically, it takes the form of a **pentagon with 5 axes**, used by the City of Nantes and Nantes Métropole, "*to define and monitor the actions undertaken in terms of ecological transition"*:

- carbon sobriety and adaptation to climate change
- sustainable production and consumption patterns that save natural resources,
- regaining biodiversity,
- health-friendly environments,
- safe, healthy and sustainable agriculture and food.



Given Nantes Métropole's high level of vulnerability to climate change, the city has set itself a number of key priorities in its carbon neutrality strategy. These key priorities were chosen on the basis of their weight in the current carbon footprint, and were then worked on in depth in the various working groups set up by the metropolis.

The proposed strategy must also enable us to achieve carbon neutrality, while building together a healthier, fairer, more sustainable and more resilient city (see part B - Trajectory towards carbon neutrality in 2030 of the Action Plan).

The breakdown of emissions by sector (figure below) highlights the fact that the sectors that emit the most greenhouse gases in Nantes Métropole are **transportation and buildings.**

Nantes Métropole's carbon footprint by sector, AURAN 2024

Transportation

Transport is Nantes Métropole's biggest emitter of greenhouse gases. In fact, it accounts for 44% of the territory's carbon footprint. As a result, it requires particular attention, both in terms of quantifying emissions and choosing priorities to achieve carbon neutrality by 2030. It is for this reason that Nantes Métropole has chosen to focus on actions aimed at reducing the role of the car in the city and developing alternative modes of transport (e.g. combating car ownership, increasing the modal share of cycling and public transport). Nantes Métropole has observed several elements in connection with the transportation item:

- The analysis of direct emissions (SCOPE 1) is not sufficient to take full account of the carbon footprint of electric vehicles or the issue of air travel, which account for 16% and 4% respectively of the total carbon footprint of a French person.

- The widespread electrification of transport has become inevitable, driven by national and European policies. It offers an emission-free mobility solution in sparsely populated areas. However, its implementation is not entirely under the control of metropolitan policies and remains subject to uncertainties as to its practical realization. There is a risk associated with the ability to reach this technological level. What's more, vehicle electrification adds to the territory's imported emissions (Scope 3) and represents a threat to resources.

- Mobility challenges focus on the impact of the car: space consumption, revegetation, and contribution to urban sprawl, among others. Achieving the objectives of the Plan de Déplacement Urbain (PDU) is not enough to align with a trajectory compatible with the national strategy for reducing carbon emissions. It is necessary to activate all available levers, including sobriety and behavioral changes, modal shift and technological advances.

- Favoring active modes of transport in city centers and immediate suburbs, as well as carpooling in peri-urban areas, are emerging as favorable solutions, offering multiple benefits and no regrets.

❍ **Buildings**

Buildings (including residential and offices/equipment) are the second biggest contributor to the city's carbon footprint, accounting for 38% of total GHG emissions. Along with transport, this is one of Nantes Métropole's two priority sectors. Nantes Métropole has learned several lessons from its analysis of the carbon footprint of the building sector:

- Social rental housing already benefits from high performance and substantial support (funds, technical governance, renovation methods). It is largely connected to the heating network, which predominates in multi-family housing, and therefore has relatively low emissions compared with private housing stock.

- The private housing stock, particularly single-family homes, remains the main target for achieving carbon neutrality goals. These homes are often more spacious, and natural gas is more widely used. Annual renovations need to be multiplied by 1.5 to 2, focusing mainly on energy-intensive housing (classes E, F, G) and taking advantage of regulatory deadlines.

- Promoting energy sobriety within private housing represents an effective and cost-effective lever. This approach could impact the 350,000 single-family homes and have a significant effect.

- It's crucial not to overlook the impact of greenhouse gas emissions from refrigerant leaks from domestic cooling equipment. Although this is more of a regulatory issue at manufacturer level, it's important to raise awareness of the need to reduce the use of such equipment.

- While 80% of the housing stock is already existing, energy renovation remains the main means of reducing greenhouse gas emissions in the residential sector.

❍ **Societal innovations:** with the integration of all stakeholders.

Nantes Métropole has set up in-depth, collective discussions as part of the renewal of the Territorial Climate Air Energy Plan and the drafting of the Climate City Contract. Various opportunities were created to foster collaboration between Nantes Métropole experts and those of partners such as associations, local authorities and businesses. Citizens have not been forgotten, notably through the Grands Débats (major debates) organized for several years within the metropolis. The aim of these debates is to include citizens in the city's major changes. In fact, Nantes Métropole has seized the opportunity offered by Net Zero Cities to work together in a systemic, holistic approach, to put an end to the siloed, compartmentalized work that was preventing the shared construction of concrete actions. Monthly meetings have been scheduled to promote this collaboration. These various meetings are detailed in Process and Calendar. These joint efforts have helped to ensure the coherence and robustness of the panel of action proposals presented in the report.

Nantes Métropole is also working closely with Université Gustave Eiffel on a public policy evaluation. Indeed, as a follow-up to the Climate Challenges set up under the Pilot Cities call for projects, Nantes Métropole wishes to monitor these Challenges, in particular to ascertain their impact on changing the behavior of local citizens. This evaluation has two objectives:

- Evaluate the scheme (target audiences, results of actions initiated, communication, etc.), to support decisions on its continuation after its experimental phase financed by the European Union.

- To capitalize on the lessons learnt from the approach on the obstacles and levers to behavioral change, in order to contribute to the metropolis' reflection on the evolution of lifestyles, in connection with its public policies contributing to the ecological transition marker.This evaluation does not directly aim to assess the replicability/transferability of the scheme to other European cities, but the lessons learnt from the evaluation may contribute to this reflection.

Natural carbon sinks

The metropolis is well aware that it is necessary to work on carbon sinks to achieve climate neutrality. However, it does not wish to rely entirely on them, but rather to concentrate first on reducing the territory's greenhouse gas emissions as much as possible, and then to capture the residual. In addition, as described above, Nantes Métropole has chosen to focus on Ademe scenarios 1 and 2, which implies using only natural carbon sinks - with the exception of biosourced materials. The metropolis was able to observe several components:

- To achieve carbon neutrality objectives, it is necessary to significantly increase the capture capacity of the Nantes Métropole territory, rising from 32 to 340 kTeqCO2 by 2030, i.e. a 10-fold increase.

- Currently, the carbon sinks present on the territory store around 15 million tonnes of carbon. It is crucial to ensure that the carbon stored in soils is not released excessively, either through human practices such as soil artificialisation, or by taking into account the impacts of climate disruption such as fires and drought.

- Even with full mobilization of the territory, the 340 kTeqCO2 target seems difficult to achieve. The question of surface availability raises serious questions about the link between different public policies, particularly agricultural projects. Many actions concern the management of spaces and practices.

- It is crucial to define a level of effort that is territorialized and planned over time, which raises the question of scale and cooperation between different territories.

The metropolis thus wishes to establish active collaboration between the various stakeholders to enable better management and conservation of the carbon sinks present in the territory. The question of collaboration with partners outside Nantes Métropole's territory is emerging as the solution for optimal storage and management of natural carbon sinks.

The investments needed to achieve carbon neutrality will come from a variety of sources, including both public and private players. This collaboration between the public and private sectors is essential to finance the vast projects required to reduce greenhouse gas emissions. Furthermore, it is important to emphasize that the financial co-benefits generated by this ecological transition will outweigh the associated costs. In other words, the savings made, the new economic opportunities created, and the gains in energy efficiency and public health will far outweigh the initial investments. This underlines not only the economic feasibility of carbon neutrality, but also the long-term economic benefits for society as a whole.

While aiming to achieve carbon neutrality by 2030 and working in depth on the areas mentioned above, Nantes Métropole will be paying very close attention to the following themes:

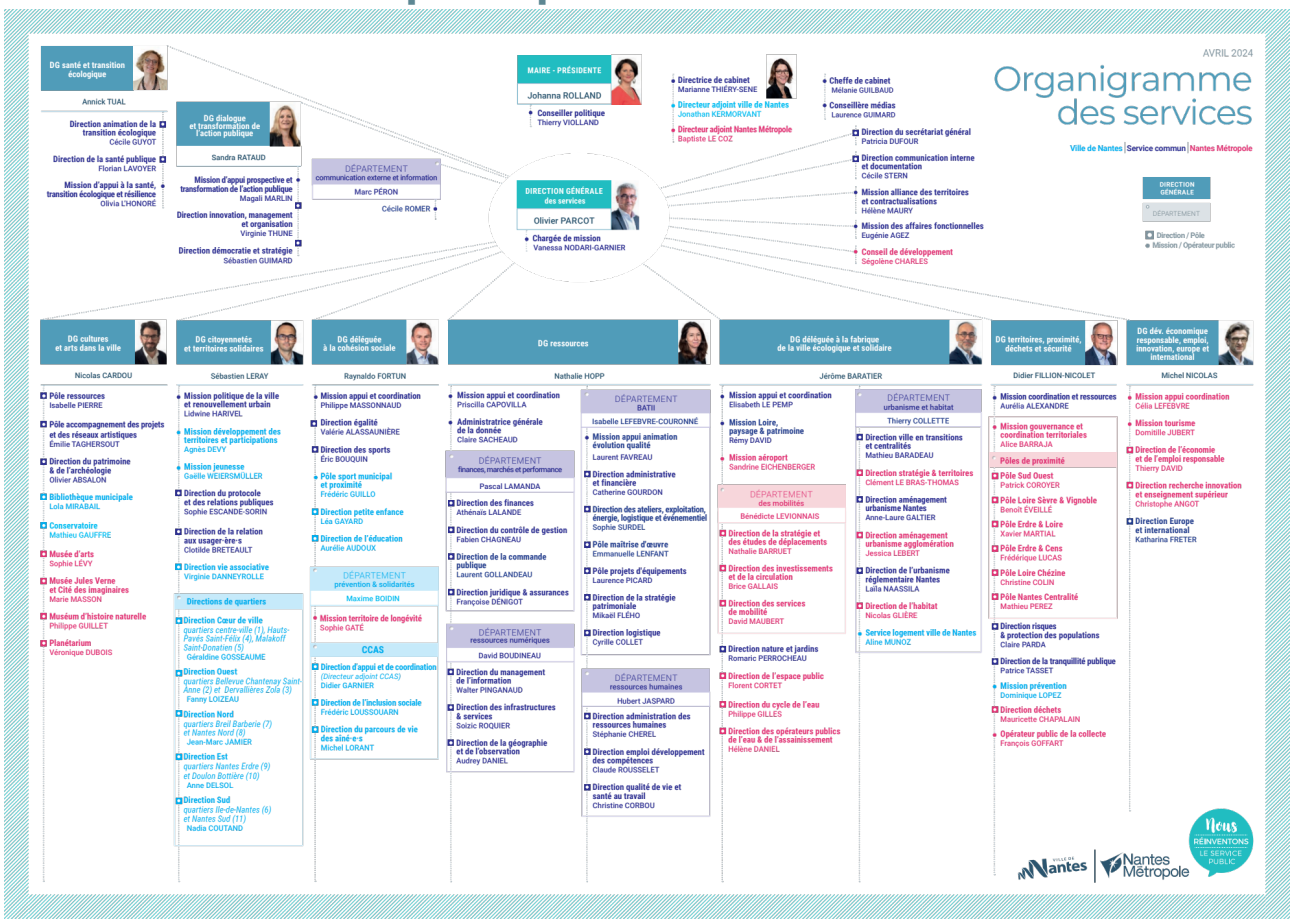
- Preserving health *ONE HEALTH*

- Improving quality of life and solidarity

- Protecting resources

- Promoting changes in practices
- Crisis management
- Reclaiming biodiversity

4 Process and principles



Nantes Métropole's internal organization - 2024

Mobilizing citizens is one of the fundamental pillars in achieving climate neutrality for Nantes Métropole, the aim being to drastically reduce the territory's emissions while creating the deep social bonds needed to transform society. The transformation of the metropolis is essentially based on social inclusion, which will be reinforced by a range of innovative schemes helping to create a participative ecosystem in transition. It is against this backdrop that Nantes Métropole has responded to Net Zero Cities' “30 Pilot Cities” Call for Projects and launched the Climate Challenges. These challenges offer a concrete opportunity to engage citizens in the ecological transition. From February 2024, Nantes Métropole is inviting citizens to contribute individually to this transition by proposing challenges that can be carried out at home via an application, as well as the possibility of establishing one's carbon

footprint. It is also possible to take part in collective challenges, notably by participating in group workshops. The aim of these initiatives is to raise citizens' awareness of climate issues and actively involve them in achieving carbon neutrality for Nantes Métropole.

Nantes Métropole is firmly committed to a proactive approach to sustainability and the fight against climate change. As part of this commitment, the city has chosen to work closely with the experts at Net Zero Cities. The partnership between Nantes Métropole and the experts at Net Zero Cities is of particular importance in the area of financing the transition to more environmentally-friendly practices. The crucial question of financing, often at the heart of sustainability issues, is thus being addressed in a proactive and concrete way. The aim is to establish clear and reliable financial mechanisms to ensure the effective implementation of the initiatives needed to reduce greenhouse gas emissions and promote sustainable lifestyles.

Ongoing discussions with Net Zero Cities experts aim to define robust financial strategies capable of fully supporting Nantes Métropole's transition to a more sustainable economy. In-depth discussions are underway to identify diversified and sustainable sources of financing, thus guaranteeing the sustainability of the actions undertaken as part of this ecological transition (action component).

The results of these discussions, and the conclusions drawn from this fruitful collaboration, will be recorded in the financing section of the Climate City Contract. This contract, as a formal instrument, will serve as a detailed operational framework, describing Nantes Métropole's specific commitments in terms of climate financing. It will thus become a reference document, setting out clear and detailed financial objectives, and spelling out the concrete measures that will be put in place to achieve the metropolis' climate ambitions.

In the interests of continuous improvement and monitoring the achievement of objectives, and provided that the Climate City Contract is an effective tool for steering the transition, the CCC will be updated by Nantes Métropole's Ecological Transition Department.

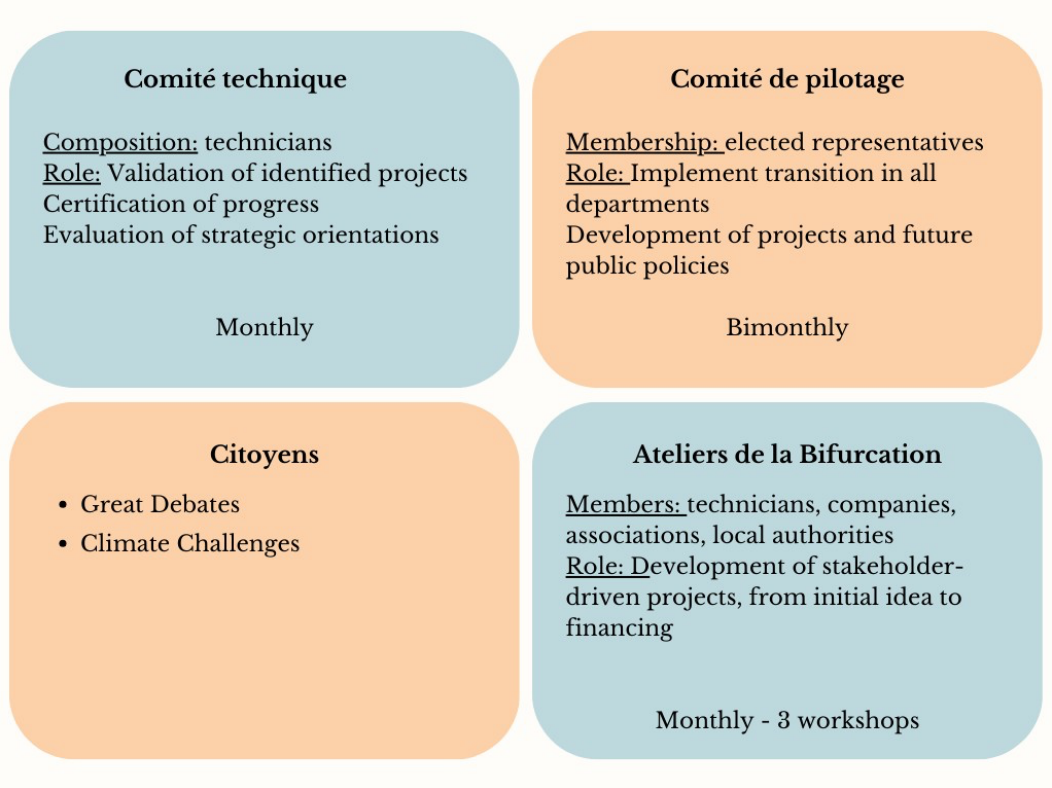
A desire for transversality

Nantes Métropole is firmly positioned as a driving force for change and a forerunner of innovative solutions. With this in mind, the community aims to explore and address all related themes in a comprehensive way, so as to integrate them coherently into its transition process. With this global perspective in mind, the “ONE HEALTH” principle has been integrated into Nantes Métropole's organizational structure. This concept is based on a strategic reconfiguration of the metropolis' internal organization by merging the departments dedicated to health and ecological transition. This innovative approach aims to establish significant synergies between these two crucial areas, creating a collective

dynamic geared towards the development of a shared vision. The main aim of “ONE HEALTH” is to establish a true symbiosis between public health and ecological transition. By bringing these two pillars together, Nantes Métropole aims to establish a holistic approach, where health and the environment interact intrinsically. This cross-cutting vision transcends traditional public policy boundaries to create interconnectivity, enabling deep and comprehensive reflection on how health and ecological transition can mutually enrich each other. With this visionary initiative, Nantes Métropole is taking a forward-looking approach, demonstrating its willingness to rethink existing paradigms and place sustainability at the heart of its concerns. *“ONE HEALTH”* thus embodies the city's concrete commitment to a future in which the health of the population is inseparable from ecological balance.

Iterative meetings

To create a solid, collective working approach, Nantes Metropole organized a series of iterative meetings between 2023 and 2024. These forums helped to forge links and generate ideas. The primary aim was to develop local institutional cooperation with the various partners (cf 2. Process for drawing up the City Climate Contract - p10 of the Action Plan).



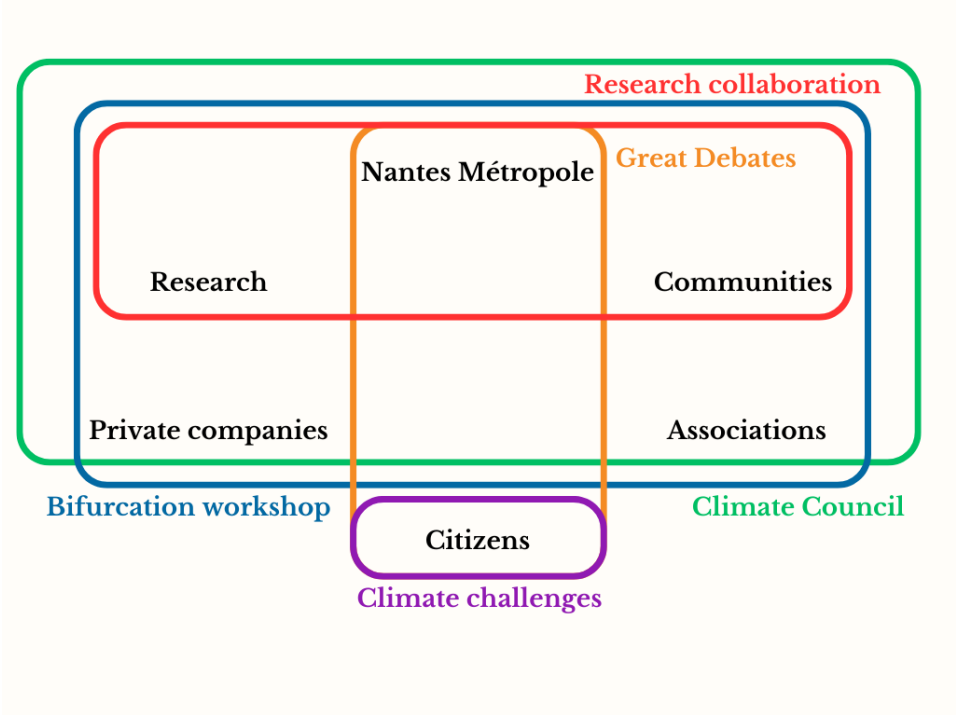
Summary of Nantes Métropole's working groups

Nantes Métropole's drive to achieve carbon neutrality is an illuminating example of the importance of engaging all stakeholders in the fight against climate change. By recognizing that this ambitious goal can only be achieved with the active participation and collaboration of a wide range of stakeholders, Nantes Métropole is demonstrating a visionary approach.

The establishment of new governance bodies reflects a desire to create structures that are adapted to the complexity of environmental and social issues. These bodies can serve as platforms where diverse knowledge, ideas and perspectives can be shared and integrated into the decision-making process. By fostering open and transparent dialogue, Nantes Métropole strives to create an environment conducive to innovation and cooperation. These innovations in governance will be described in greater detail in Part C of the action plan.

Similarly, the establishment of new working groups dedicated to the ecological transition demonstrates a willingness to tackle the specific challenges associated with this process. By bringing together experts, representatives of civil society, business and other stakeholders, these groups can provide a platform where different perspectives can be discussed and concrete solutions developed. This participatory and inclusive approach is essential to ensure that decisions are informed by a thorough understanding of local realities and the diverse needs of the community.

Ultimately, Nantes Métropole's approach illustrates the importance of community engagement and multi-sector collaboration in the fight against climate change. By adopting an inclusive and participatory approach, Nantes Métropole is leading the way towards a more sustainable and resilient future for all. These types of social innovations will be described in more detail in Part C of the Action Plan.



The crucial moments in the creation of the Climate City Contract are revealed through the submission of the bid in the call for expressions of interest in early 2022. This decisive act led to Nantes Métropole's selection as one of the winners in April 2022. The commitment then intensifies with planning for the submission of the final report, scheduled for September-October 2024, as well as the launch of the Pilot Cities project with Défis Climat in the first quarter of 2024. These key milestones underline the importance of Nantes Métropole's involvement in the development of the Climate City Contract, and mark crucial steps towards sustainable environmental goals.

5 Sample contract with signatures

The current document represents the first draft of the Climate City Contract, establishing an alliance between Nantes Métropole and its stakeholders in this voluntary, collective and ambitious initiative. The purpose of this document is to define the path to carbon neutrality, taking into account the multiple stakeholders and acting in favor of citizens.

The signatories undertake to respect the objectives, priorities and operational principles set out in this document. They also undertake to mobilize, with the support of the European Commission, human and financial resources in line with the ambitions defined and in collaboration with its partners.

Mr Tristan RIOM, Vice-President in charge of climate, energy transition, food transition, agriculture, resilience (pollution and urban forests) and economic change

Mr. Tristan RIOM has been delegated by Mayor-President Johanna ROLLAND to sign the Climate City Contract in line with his climate-energy responsibilities.