NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

C limate City Contract

# Action plan for climate neutrality d' Angers Loire Métropole


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

# Table of contents



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

# Summary

This document is the result of an iterative, multi-partner process designed to accelerate the region's ambition to achieve climate neutrality by 2030. It is based on existing planning and operational tools, both regulatory (such as the PCAET) and in progress (such as the energy and climate master plan). Notably, it has been adapted to meet the mission's requirements and enhanced using the University of Madrid's economic model.

This chapter outlines the key courses of action with the greatest impact on reducing emissions while considering their repercussions and co-benefits—environmental, economic, and social.

The Community Council's recognition of the climate emergency in January 2022 committed ALM to this cause and called on all local stakeholders—citizens, associations, businesses, and local authorities—to adopt the same level of commitment and intensify efforts to cut greenhouse gas emissions and mitigate climate disruption.

The collective objective, encompassing all actors across the entire region, is to reduce greenhouse gas emissions by 60% by 2030 (compared to 1990 levels) and achieve carbon neutrality by 2050. However, under the Climate City Contract, these ambitions have been revised upward, now aiming for full carbon neutrality by 2030. Forward-looking scenarios have been developed to operationalize these objectives, outlining an action plan and estimating the necessary financial investments.

Four strategic objectives have been defined based on sectoral emissions. The two largest sources of emissions—transport and mobility (49%) and buildings (34%)—together account for 83% of total emissions, with 59% directly linked to residents' activities (housing and mobility).

- **Objective 1:** Improve energy efficiency and resource sobriety in the built environment.
- **Objective 2:** Promote low-carbon transportation, new energy solutions, and alternative mobility options.
- **Objective 3:** Accelerate the development of renewable energy and the transformation of energy systems.
- **Objective 4:** Use land-use planning as a transition tool, integrating urban planning to anticipate and guide the region's development.

In general, through their policies and public services, local authorities have the capacity to influence between 10% and 30% of the region's total emissions. Therefore, broad engagement and inclusivity are crucial to the success of the ecological and energy transition.

The Climate City Contract aims to unify the actions, financial resources, and human capital of our local authority and, in the long term, mobilize all regional stakeholders in an unprecedented effort to drive this ambitious transition.

# List of figures

# List of tables

# Abbreviations and acronyms

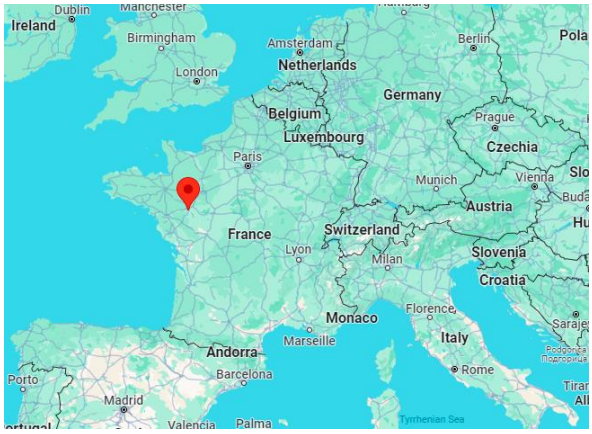
| Abbreviations and acronyms | Definition |
|---|---|
| ADEME | Ecological Transition Agency |
| AIRPDL | Air Pays de la Loire |
| ALDEV | Angers Loire développement |
| ALM | Angers Loire métropole |
| Alter | Anjou Loire territory |
| AMBITION | Action for multifamily buildings for innovation and transition towards neutrality |
| AURA | Urban planning agency for the Anjou region |
| BTP | Building and civil engineering |
| CCC | Climate city contract |
| CODEV | Development Council |
| COP | Conference of the parties |
| CRTE | Contract for recovery and ecological transition |
| DSP | Public service delegation |
| EC | Circular economy |
| ESR | Higher education and research establishments |
| GHG | Greenhouse gases |
| GIEP | Integrated stormwater management |
| PCAET | Territorial climate, air and energy plan |
| PMLA | Loire Angers Metropolitan Cluster |
| PLUi | Intercommunal local urban development plan |
| SDEC | Energy master plan |
| Siéml | Maine-et-Loire Intercommunal Energy Syndicate |
| SRADDET | Regional plan for spatial planning, sustainable development and territorial equality |
| TE | Ecological transition |
| HEAD | Territory committed to ecological transition |
| TI | Intelligent territory |
| EPZ | Low-emission zone |

# 1 Introduction

### 1- The Angers Loire Métropole area

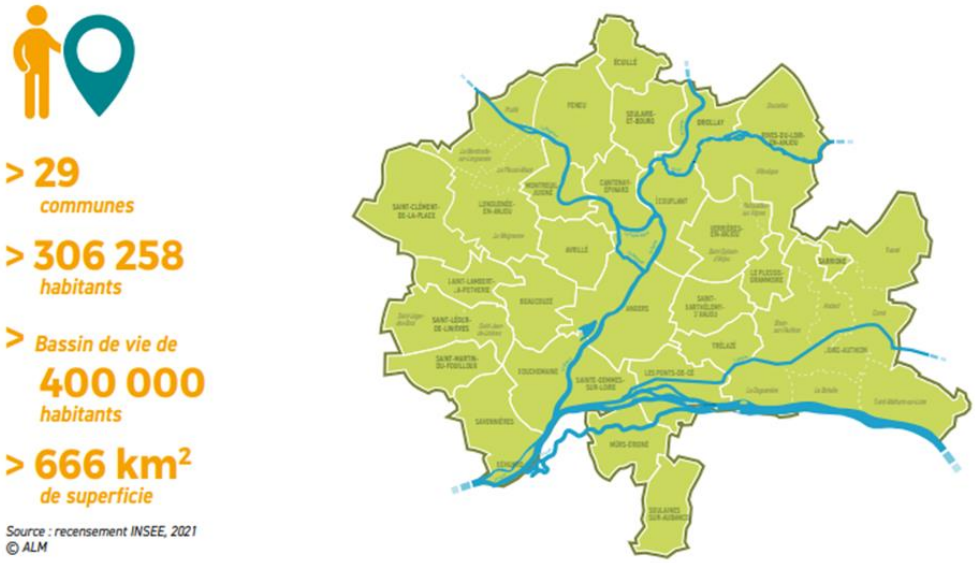
Angers Loire Métropole (ALM) is an urban authority in north-western France with a catchment area of **306,617 inhabitants**.

**Figure1 - Map of the geographical location of Angers Loire Métropole**




At the heart of the region's 28 communes lies the city of Angers, home to half the population (nearly 155,000) and voted **France's most livable city for** the second year running in 2024 (https://www.villesetvillagesouilfaitbonvivre.com/). Thanks to the diversity of its agricultural and horticultural production, the Anjou region is often referred to as **the "capital of plants"**, a fact that has earned it many accolades: Biodiversity Capital in 2023, greenest city in France (102 $m^{(2)}$ of green space per inhabitant), etc. The Loire, France's longest river, flows through the area, forging its identity and its emblematic link with nature.

**Figure2 - Map of the 29 communes of Angers Loire Métropole**



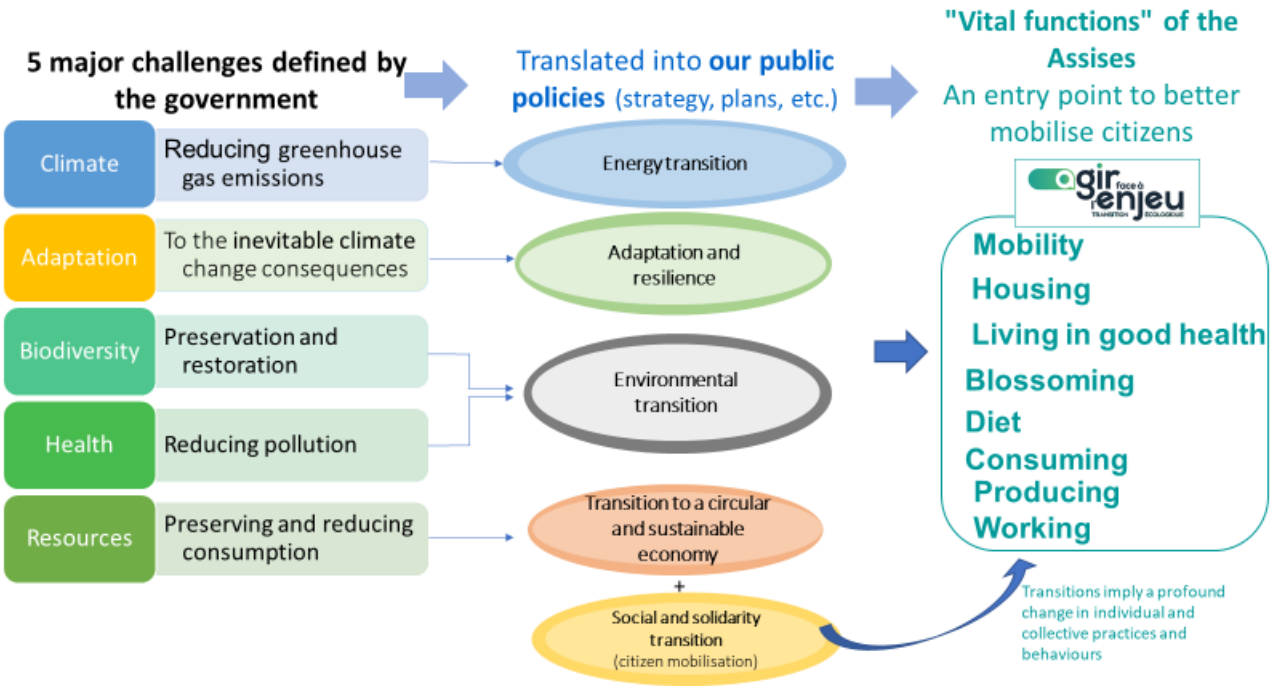

### 2- An overall ecological transition strategy broken down by sector

As French local authorities are required by law to be carbon-compatible, the region's carbon-emitting activities have been known and monitored for several years. As a result, in 2021 1,193,000 teq $CO_2$ were emitted within the boundaries of ALM. Since 2008, these emissions have fallen by 9%, the result of policies implemented over several years to reduce greenhouse gas emissions and of all the technical and societal developments, changes in behaviour and economic activities.

In order to structure local policy in this area, in June 2019 ALM's elected representatives adopted **ecological transition and energy transition strategies** aimed at reducing greenhouse gas emissions and adapting to climate disruption.

In December 2020, ALM also adopted a joint **Territorial Climate Air Energy Plan (PCAET)** with two other inter-municipalities to set its regulatory path to carbon neutrality. This approach has enabled French local authorities to get their act together, on the basis of a common reference framework, for more than a decade now. The following diagram shows the major challenges set by the government, how they are reflected in our strategies and the link made with citizens in the vital day-to-day functions through an approach that is more concrete than those of public policies.

**Figure3 - Overall architecture of Angers Loire Métropole's ecological transition policies**



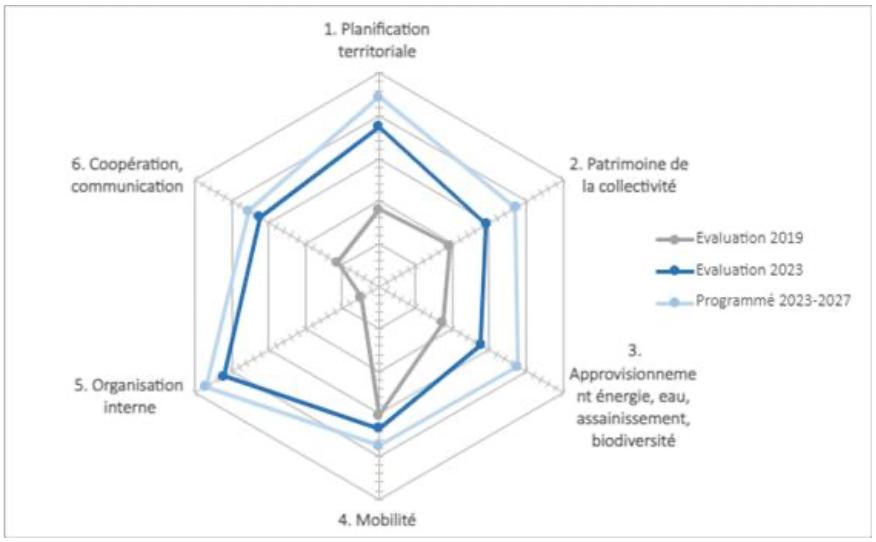

➢ **Numerous initiatives and national recognition**

For more than ten years, ALM has been implementing numerous actions and public policies in favour of the ecological transition: PCAET, CRTE, Assises citoyennes de la transition écologique, development of public transport and soft modes of transport (tramway, cycling plan, pedestrian plan, etc.), changes to the vehicle fleet (biogas, electric, hydrogen), thermal renovation of public buildings (building energy plan) and private buildings (Mieux chez moi platform, etc.), heating network scheme, development of the energy mix: photovoltaic solar energy (Ferme de la Petite Vicomté), wood energy cogeneration (Biowatts plant), methanisation of sewage plant sludge, carbon capture, PLUi integrating bioclimatic recommendations, nature in the city plan and biodiversity and landscape plan, territorial food project, Intelligent Territory, major water cycle strategy, waste circular economy objectives contract, etc. The services have been structured and developed by integrating the challenges of the ecological transition, which are now fully supported on a cross-cutting basis and with the guidance and support of all the elected representatives and, more specifically, a dozen or so vice-presidents on these issues under the impetus of the Mayor-President of ALM.

TETE label logo

The consolidation of strategies and territorial ecological planning, materialised by hundreds of actions, has been rewarded by the award of the label "Territoire Engagé pour la Transition Ecologique" ex-Cit'ergie (French name for the European Energy Award) from 2019. On 14 November 2023, the National Label Commission decided to **award a 4th star out of 5 jointly to ALM and the city of Angers**, demonstrating the significant progress made in terms of commitments, results and organisation.

**Figure4 - The region's progress in terms of ecological transition as seen from the TETE benchmark. Progress by area between 2019 and 2023, and outlook for 2027**




- **Inclusion of citizens and local players**

The ecological transition and the decarbonisation of the region cannot take place without a change in behaviour and lifestyles. In 2020, at the start of the new term of office and despite the pandemic, in order to accelerate and mobilise all the stakeholders in the region (local authorities, associations, businesses, residents, etc.), ALM launched a wide-ranging citizen participation initiative with the support of its 29 local authorities: **the "Assises de la Transition écologique" (Conferences on Ecological Transition), entitled "Taking action to meet the challenge"**

Eight months of consultation and work with more than 1,000 citizens resulted in hundreds of proposals summarised in 135 concrete action proposals. Nearly 9,000 voters then cast their ballots during the summer of 2021, to prioritise 63 actions spread across the 7 vital functions that will be implemented between now and 2026 to accelerate the region's ecological transition.

This process was a great success in terms of participatory democracy, both in terms of its scope and its method. The progress of these measures was assessed in January 2023 by a group of citizens (all the information is available on the Angers Loire Métropole website). A second review is planned for 2025.

**Figure 5 - Evening to launch the Assises de la Transition Ecologique, 23 October 2020, at the Centre des Congrès**


### 3- A political commitment at local, national and European level through the CCC

At the end of the Assises, in January 2022, the ALM Community Council voted unanimously to reaffirm ALM's ambition by recognising the urgency of climate change and adopting a commitment to reduce emissions by 60% by 2030 and to become climate neutral by 2050.

With the aim of becoming a pilot region, in 2024 ALM is drawing up a Climate and Energy Master Plan (SDEC), a voluntary initiative based on a local and operational transition scenario inspired by ADEME's forecasting work. The aim is to describe different scenarios for decarbonising the region, defining the technical and financial resources needed to achieve this.

In addition to the involvement of local residents and stakeholders that began in 2020 through the Assises and continued through various bodies, ALM has also contributed to the work of the regional COP, which sets out the national objectives in an operational roadmap.

She is involved in this planning work with the General Secretariat for Ecological Planning, which reports to the Prime Minister, and is actively pursuing the development of tools with other local authorities (see the "J'agis" website).

ALM is involved with a number of national bodies such as France Urbaine, France Ville Durable, AMORCE etc., and is also a member of innovative structures such as the Groupe Interdisciplinaire d'Experts sur le Climat en Pays de Loire.

At European level, in 2021, the Community Council will make a commitment to the climate by joining the **Green City Accord** and the **Covenant of Mayors for the Climate**.

Having been selected as part of the "**Mission 100 climate-neutral and intelligent cities**" in 2022, ALM can count on this new recognition to affirm its ambition to be among the exemplary and driving European cities that want to accelerate the decarbonisation of lifestyles, strengthen the ability of territories to adapt and preserve the environment and health.

With the aim of becoming a demonstration area **through its CCC,** the Urban Community of ALM **has embarked on a process of consolidating and improving its objectives, by defining the necessary financial resources.**

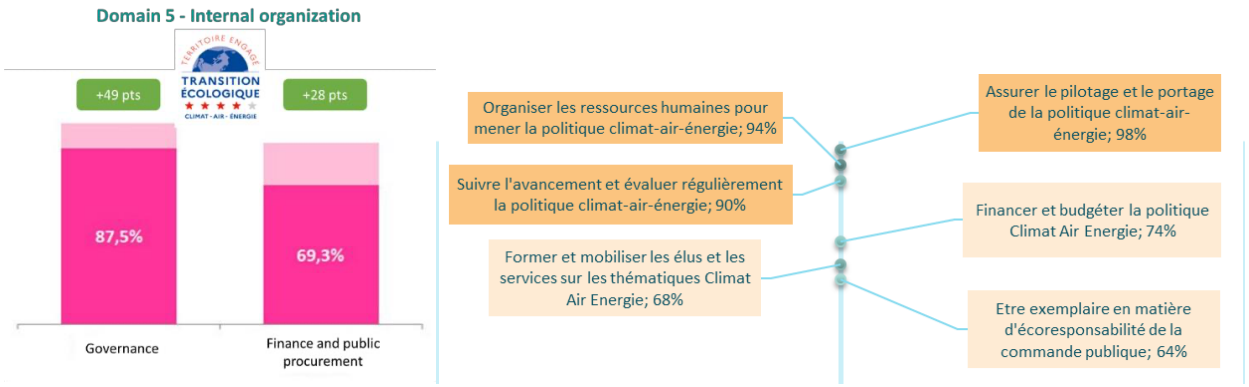
### 4- A strong political commitment reflected in the organisation

In 2020, when the Community Council was renewed, a number of new vice-presidencies were created, including Ecological Transition and Mobility, Biodiversity, Circular Economy and Water Cycle.

The Vice-President for Ecological Transition brings together the 8 Vice-Presidents as part of the Ecological Transition Steering Committee, with the participation of the President depending on the topic. Specific steering committees are also organised with the President as and when required. Finally, the Ecological Transition Commission meets monthly with elected representatives from the member municipalities and the vice-presidents. It should be emphasised that at the start of the new term of office, ecological policies were given priority. This is reflected in the priority given to the agendas of community councils and standing committees (bringing together mayors and vice-presidents). This highly structured approach means that elected representatives from the 29 municipalities can be involved and mobilised in a variety of ways.

The Territoire Engagé pour la Transition Ecologique (Territory Committed to Ecological Transition) label and assessment (the French version of the European Energy Award) led to the award of a 4th star at the beginning of 2024. This assessment is carried out by an external third party. In the area of internal organisation, a very significant 40-point improvement was recognised, bringing the ALM level to 80/100.

**Figure6 - Extract from TETE label rating Dec. 2023**




In the figure above, we can see in the details of the rating that the steering and leadership of the policy is evaluated at 98/100, the organisation of human resources at 94/100, and evaluation and monitoring at 90/100.

Angers Loire Métropole created the Ecological Transition department in 2018, bringing together and creating a number of services to provide coherence and a capacity to deal with all the issues involved in the ecological transition.

This department is responsible for:

- Design, management, evaluation, reporting and forecasting missions are essential for ecological planning, with a high level of production of multi-domain plans and strategies.
- Cross-functional support and coordination missions (interdepartmental and associated bodies) across a wide area: a recognised and valuable resource and advisory function for cross-functional policy dynamics
- Operational missions: numerous projects underway in the fields of energy transition (heat networks, solar energy, changing car fleets, etc.), the environment (biodiversity, dykes, adapting to climate change, air quality, etc.) and the circular economy (implementation of the roadmap adopted in June 2022).

- Support for elected representatives in charge of ecological transition issues. Leading the eco-transition committee and steering bodies.

A functional organisation within the department is made up of 6 to 8 project managers (indicated with an asterisk *) who form an ecological transition unit. The Director steers and coordinates this functional unit with the support of the Ecological Transition Project Manager, who reports to him in the hierarchy. This task force is mobilised for major one-off assignments (in project mode, e.g. Assises, CTE, TETE, etc.) and cross-functional support/reporting/evaluation assignments.

The department's resources department is involved in drawing up the green budget and financial forecasting work with the support of the Finance and Public Policy Evaluation Department (see financing plan).

## 5- ALM's objectives for decarbonising the region

The recognition of the climate emergency in January 2022 by the Community Council commits ALM and invites all stakeholders in the region - citizens, associations, businesses and local authorities - to adopt the same commitment to intensify efforts to reduce greenhouse gas emissions and mitigate climate disruption.

The collective objective (all players, the whole territory, and without exclusion) adopted at the beginning of 2022 was to aim for a 60% reduction in greenhouse gas emissions by 2030, compared with 1990 emissions, and carbon neutrality by 2050. However, through the CCC, ALM is committed to raising its ambitions in order to do its utmost to achieve carbon neutrality by 2030.

There is considerable momentum for transition in all areas, but particularly in the energy renovation of buildings and the decarbonisation of transport (two sectors that account for 83% of the region's greenhouse gas emissions), with the aim of drastically reducing dependence on fossil fuels by developing renewable energies.

Figure 7 shows ALM's commitments on the basis of European and national targets raised to 60% reduction by 2030 in accordance with the political commitments made by the Community Council in January 2022. The annual effort up to 2030 is 7.6%.

**Figure7 - ALM's emissions target trajectory - Scope: SCOPE 1 and 2 - Data source: BASEMIS® projected trajectory National Low Carbon Strategy**

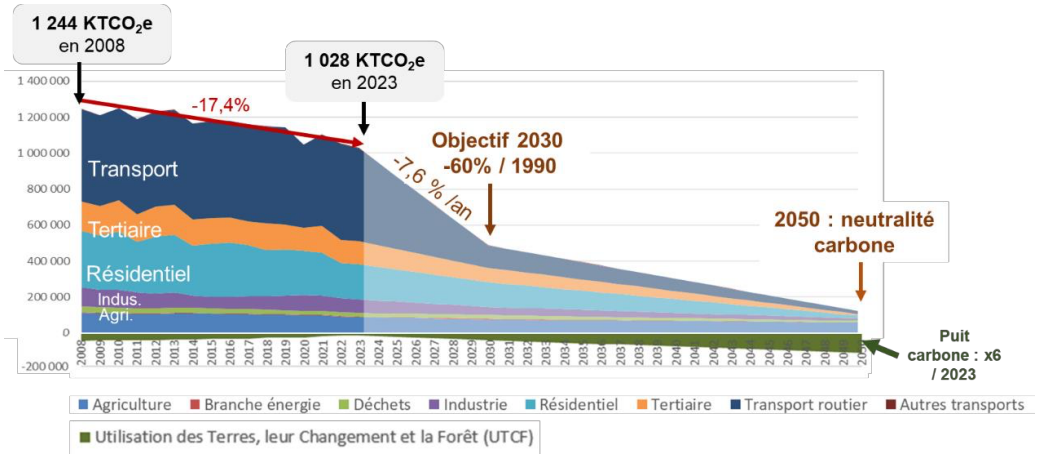
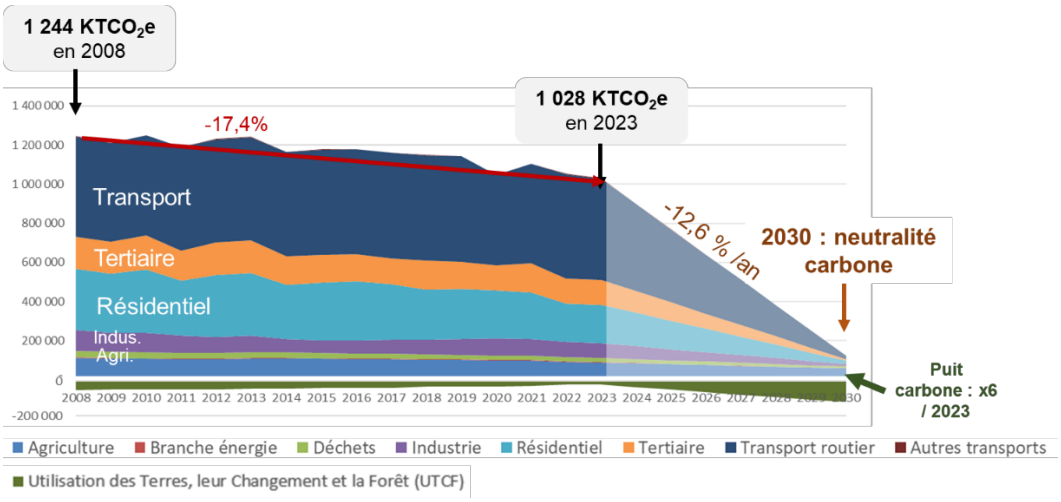


Figure 8 shows the enhanced targets through the Cliamte City Contract for achieving carbon neutrality. An overall reduction in emissions and cumulative emissions of 12.6% per year is required to achieve carbon neutrality.

**Figure8 - ALM's emissions target trajectory - Scope: SCOPE 1 and 2 - Data source: BASEMIS® projected neutrality 2030**




Differentiated sectoral objectives linked to local specificities are necessary and are being defined through the planning work and regulatory processes (regional COP, PCAET, master plan, PLUi) underway, because the pace differs according to the sectors and players responsible, as do the resources to be committed.

Scenarios have been built up to the end of 2024 as part of the prospective work to make these objectives more operational. It turns out that achieving a -60% reduction is already a very ambitious goal in terms of the financial resources to be made available (see financing plan), but the aim is still to go further and achieve carbon neutrality. This is due in particular to the massive, multi-level investments required from all of the region's stakeholders, with ALM only having the levers at its disposal within the framework of its own powers, which only affect part of the region's emissions. Through their public policies, local authorities are acting on levers that account for 10 to 30% of the region's emissions (according to very general estimates), e.g. via the modal shift induced by the public transport service on offer, incentives through financial aid for renovation, the purchase of electric bicycles, access to heating networks, a low-carbon energy source in place of natural gas, etc.

As a result, the ALM region does not have any of the major industrial or energy production sectors that are responsible for the most rapid acceleration in the reduction of emissions on a national scale (an overall reduction of -5.8% in 2023 compared with 2022, thanks in particular to the energy (-17.9%) and industrial (-8.7%) sectors). These effects are felt at local level for 2023, but mainly on the national trends of -3.4% for transport and -6% for the residential-tertiary sector. As a result, between 2021 and 2022 the drop observed in the ALM region is -4.7%, a trend confirmed between 2022 and 2023 with a drop of -2.4%.

With a predominance of emissions linked to daily mobility and residential use, the practices of residents account for 59% of emissions, compared with 6% for industry, 12% for the tertiary sector and 12% for freight. Efforts must therefore be concentrated on two major sectors: transport and buildings (residential and tertiary), which together account for 83% of emissions. While the transport sector is likely to undergo more rapid change, with greater use of electric vehicles, public transport and soft mobility, the renovation of buildings is a more passive sector, linked above all to the willingness and financial capacity of owners to commit to investment.

Finally, it is important to remember that the population of the urban community has grown by 44,000 since 1990, which puts a strain on the territory's overall reduction, despite an individual GHG emissions ratio that has fallen by 18% since 1990. Per capita emissions were 4.8 t CO2 eq/capita in 1990, 4.5 t in 2008 and 3.3 t in 2023.

As a result, there will be a -30% reduction in GHG emissions per inhabitant between 1990 and 2023, compared with a -16.6% reduction in total GHG emissions for the region. This figure shows that the real intensity of the effort is partly offset by the increase in population due to the area's strong economic appeal and quality of life.

**Carbon neutrality** must also be **determined in the light of the decarbonised energy** that will be produced and consumed **and the carbon sinks** needed to offset the remaining emissions, which depend on the specific characteristics of the land use and forest stands in the area (which are low).

In parallel with the reduction in emissions and associated energy consumption (linked to renovation efforts, modal shift and changes in vehicle engines, etc.), the share of renewable energies to cover consumption will have to be multiplied by 2.5 by 2030 in order to aim for a share of 75% of final consumption to be covered by renewable energies (the remainder being electricity produced by the nuclear sector).

The **aim of** the Mission ville initiative **is to speed up the process already underway, and is part of a desire to experiment and to be able to set out a decarbonisation trajectory scenario** and facilitate the transition to action with the **operational implementation of** objectives in the sectors concerned, in particular **transport, building, development and renewable energies.**

### 6- Scope of emissions accounting

The objective of accelerating the reduction of emissions applies to local GHG emissions. Local emissions are monitored annually by a regional emissions assessment system: the BASEMIS inventory. ®

Led by the AIRPDL association, it is based on national methodologies and assesses ALM's energy consumption and production, as well as its emissions of greenhouse gases and atmospheric pollutants. It meets French regulatory requirements and is the measurement tool for the PCAET and the region's action plans. As a member, ALM benefits from a set of personalised, accurate and up-to-date data. It covers the following emission sectors: residential, tertiary, industry, transport (road and off-road), waste, agriculture and energy (excluding the production of electricity, heat and cooling, which are recorded at the consumption stage).

BASEMIS® also assesses changes in carbon stocks in the region.

The inventory covers direct emissions (Scope 1) and indirect GHG emissions linked to heat and electricity consumption (Scope 2). Due to the complexity of the methodology used, Scope 3 is not taken into account, except for waste. The development of reference methodologies may eventually make it possible to close this gap between territorial emissions and carbon footprint.

**Finally, it is important to stress that the agriculture and industry sectors will subsequently be excluded from the action plan and the investment plan.** At this stage, the local authority and its partners have very little room for manoeuvre in the agricultural and industrial sectors, which are outside its remit, unlike the other sectors. Financial incentives, local regulations or any other form of action are forbidden at the level of municipalities and inter-municipalities. Only the Regions, which have jurisdiction under the General Local Authorities Code, and the State can intervene. Nevertheless, data is included in the following tables whenever possible, so as not to lose sight of the fact that efforts must also be made in these sectors.

### 7- Stakeholders involved in achieving climate neutrality

The stakeholders essential to achieving climate neutrality are represented by the following main categories: public players, local and decentralised networks, private players, civil society, residents and RSEs. They act together, in synergy, to move forward collectively and in the same direction to achieve the region's ambitions. They are described in the *Figure 13 - Map of key stakeholders for achieving carbon neutrality*.

## 8- Planning frameworks

The CCC action plan incorporates a number of formal procedures and planning frameworks. On the one hand, it is aligned with European, national and regional frameworks in favour of neutrality (whether the European Green Deal, the national Climate and Resilience Act or the regional SRADDET, to name but a few).

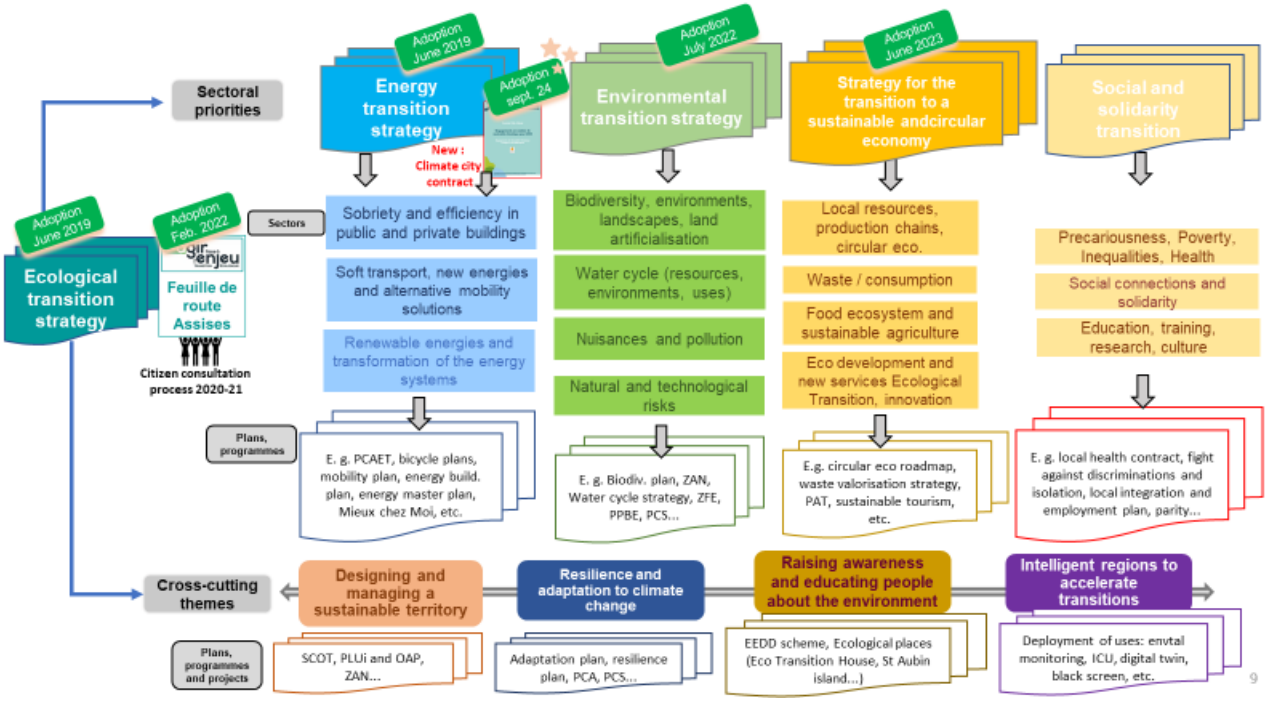
The CCC is consistent with ALM's ecological transition policies, which are structured into several sectoral and cross-cutting areas as shown in the diagram below. All areas of ecological transition are dealt with by ALM within the framework of its competencies, including those shared with its 29 municipalities.

The transition strategy was adopted by the Community Council in June 2019 and the PCAET in December 2020 (deadline 2026) by the PMLA.

The CCC has therefore come at just the right time to review this energy transition strategy, 5 years after its adoption and in advance of the revision of the PCAET. **The aim is not to bring it into line with existing plans and frameworks, but rather to raise their ambitions**.

The **aim** of ALM's CCC **is therefore to promote understanding of the mechanisms and levers (technical and financial) available to the various players in the region to encourage and accelerate the reduction of GHG emissions** generated by local activities. Without forgetting to work on other related challenges, in particular **adapting to climate change and preserving biodiversity and our resources.**

**Figure9 - Overall architecture of ALM's ecological transition policies**



The energy transition strategy, and the CCC which will enable it to be updated as indicated in the plan and eventually replace it, interact with various strategies and plans:

- The PCAET, which sets out the regulatory trajectories and action plans for GHG mitigation and adaptation in the region, and the objectives for improving air quality.
- The TETE label action plan, which is linked to the PCAET action plan
- The CRTE will be adopted in 2021
- The Assises de la Transition Ecologique roadmap, adopted in
- The PLUi will be revised in 2024

In addition, around fifty policies, strategies and action plans contribute to the ecological transition by including actions: the Territorial Food Project, for sustainable production and consumption, the scheme to promote socially and environmentally responsible public purchasing (SPASER) for responsible public purchasing, the Intelligent Territory market to use technology and innovation to reduce the energy consumption of public buildings and lighting, etc. The action plan takes account of all these strategies in order to centralise the actions in this document.

Finally, in line with the DSHN principle and nature-based solutions, the CCC action plan is aligned with other local strategies, in particular

- A plan to adapt to climate change, with the aim of making the region more resilient
- The biodiversity, environment and landscapes plan, with the aim of maintaining the richness of the local natural heritage and preparing/adapting tomorrow's nature areas to the new trends at work
- The circular economy roadmap, for more responsible consumption and production patterns
- The water cycle strategy, for the sustainable management of water resources (small and large water cycle)

## 9- Coordination between the CCC and local initiatives

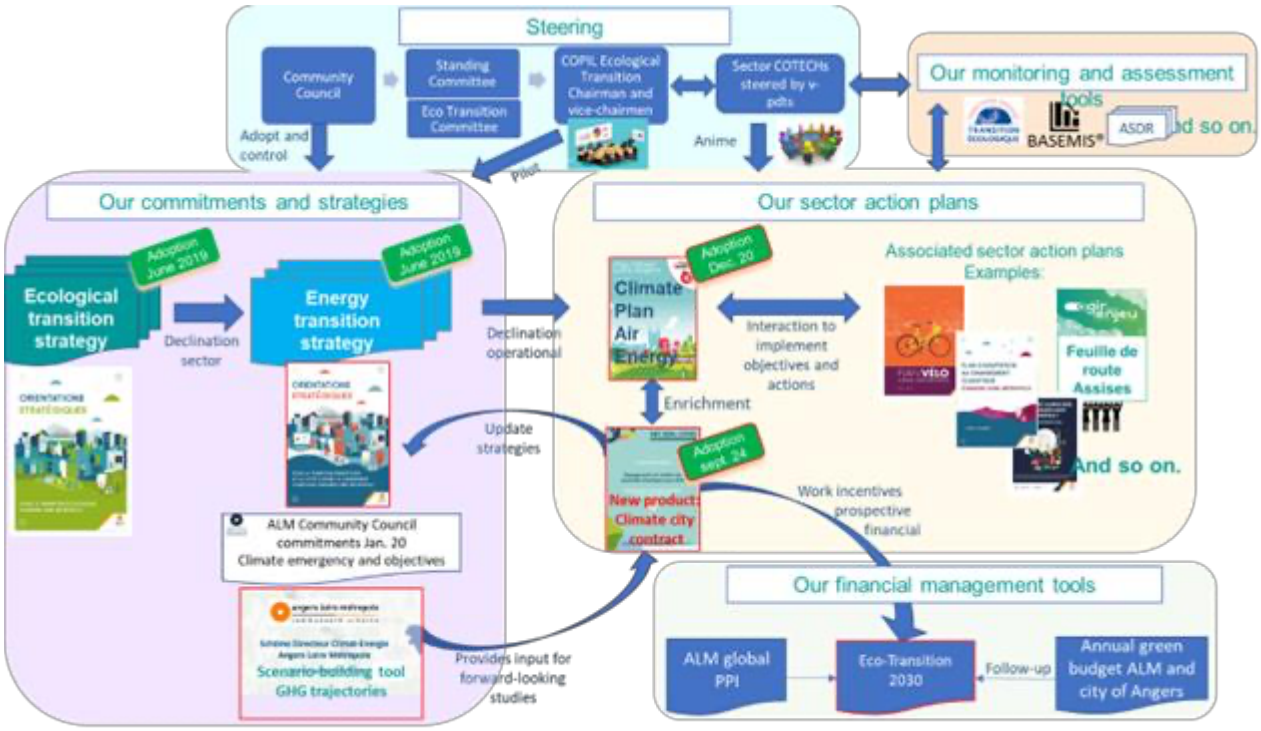
The CCC's approach involves both a continuous improvement process for the community and a forward-looking approach to strengthen planning, prioritise actions and identify financial and human resources.

The CCC's action plan incorporates and updates the actions arising from the PCAET, which is a regulatory document and a Territoire engagé transition écologique (French version of the European Energy Award). It is, however, refocused on priority actions to reduce greenhouse gas emissions and does not completely overlap with it (on improving air quality, adapting to climate change, etc.).

The CCC's contribution is the reflection carried out to consolidate the match between the objectives to be achieved in the area, the responsibilities of the players to accelerate the transition and the technical and financial interventions required. As illustrated in the previous figure, the CCC is part of a network of interacting systems. The 3rd financial section provides a new vision of the investments required and the efficiency of the actions. The financial elements are derived from related work (SDEC territoire, ALM's multiannual investment plan), with the exercise extending to 2030 (and even 2050 for the work mentioned).

The following diagram shows how the CCC fits into the internal organisation, at the crossroads of our commitments and strategies, our sectoral action plans, our financial management, monitoring and evaluation tools and, of course, the local authority's internal governance for controlling and monitoring the ecological and energy transition process.

**Figure10 - Organisation and interactions between bodies, strategies, action plans and funding**

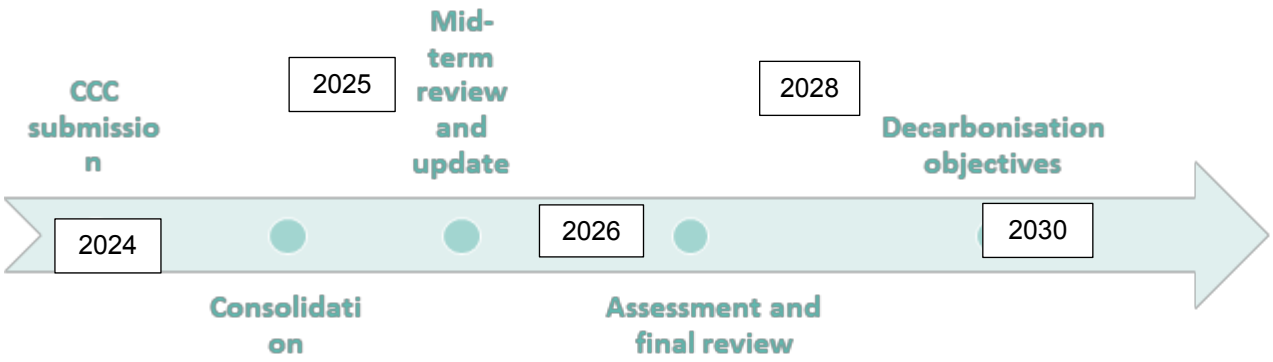



This work will make it possible to strengthen existing management tools, without replacing them. ALM, like all French local authorities, is required to draw up a territorial climate, air and energy plan, which sets out energy production and consumption reduction trajectories and action plans in compliance with European directives. ALM has signed up to the TETE label because, at national level, it provides a benchmark for assessing commitments and objectives, actions taken and results achieved, with a view to Measuring, Reporting and Verification. At administrative level, ALM and the City of Angers are also obliged to produce a Greenhouse Gas Emissions Report on their assets and services every 3 years, in order to implement internal measures to reduce energy consumption and associated greenhouse gas emissions.

### 10- The main stages of the CCC

In addition to annual monitoring by the bodies described above, the major stages illustrated in the following diagram will run concurrently with the revision of the PCAET (2026) and the revision of the TETE Label (2028). The CCC will be continually enriched in areas requiring the development of new approaches and tools (efficiency of actions, impacts, etc.).

Figure11 - The CCC, an iterative tool



# 2 Part A - Current state of climate action

## 2.1 Module A-1 Baseline inventory of greenhouse gas emissions

**Baseline inventory of GHG emissions**

### 1- Link with emission inventories from other European initiatives

ALM has not yet declared an inventory in MyCovenant or CDP/ICLEI Tracker. In fact, the inventory published as part of the CCC will feed into the inventories relating to the Covenant of Mayors and the Green Cities Accord.

### 2- Aligning the neutrality objective with the coverage of the emissions inventory

There is no discrepancy between the climate neutrality objective set by ALM and the coverage of the territorial inventory carried out by AIRPDL (see BASEMIS methodological guide): the carbon neutrality objective set by ALM is based on this inventory. Nevertheless, this inventory may be subject to change depending on developments in the national method (developed by CITEPA - see OMINEA methodological report) on which it is based, which may lead to changes in the perimeter taken into account for the purposes of carbon neutrality.

### 3- Alignment with the requirements of the Mission Ville information kit

The GHG emissions inventory published as part of the CCC meets the requirements set out in the Mission's information kit for cities.

The GHGs included in BASEMIS® emissions are those covered by the Kyoto Protocol: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O) and fluorinated gases (HFCs, PFCs, NF3, SF6).

The substances inventoried are the seven greenhouse gases covered by the Protocol: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), the two families of halogenated substances - hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) - as well sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The Global Warming Potential (GWP), an indicator of global warming over 100 years, is used to express GHG emissions in CO2 equivalent units. The GWP values currently used for BASEMIS® are those defined by the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2013).

Figure12 - *GWPs used in BASEMIS®*

| GES | $CO_2$ | $CH_4$ | $N_2O$ | HFC | PFC | $SF_6$ | $NF_3$ |
|---|---|---|---|---|---|---|---|
| PRG | 1 | 28 | 265 | 4 à 12 400 | 6 630 à 11 100 | 23 500 | 16 100 |

### 4- The role of ALM's emissions inventory in achieving neutrality

ALM has a territorial inventory of its GHG emissions (BASEMIS, managed by AIRPDL), in accordance with the national reference methodology. This data is updated every two to three years, with the aim of updating it annually in the near future, to enable regular sectoral monitoring of changes in decarbonisation indicators.

This baseline inventory is used for planning and implementing carbon neutrality in the region. In particular, it is used to draw up and monitor the PCAET, which sets out the ambitions and strategies for carbon neutrality by emissions sector, and as part of the ESDP, which operationalises the decarbonisation trajectories for four key sectors (buildings, mobility, renewable energies, sequestration) using different decarbonisation scenarios for 2030 and 2050. Other sectoral policies and plans (mobility, housing, etc.) also refer to BASEMIS data when devising their strategy

Another example is the Mission Ville AMBITION pilot project for the carbon neutrality of private collective housing, which also uses BASEMIS to monitor its indicators. In this way, ALM's carbon neutrality planning tools are in line with each other in terms of methodological references.

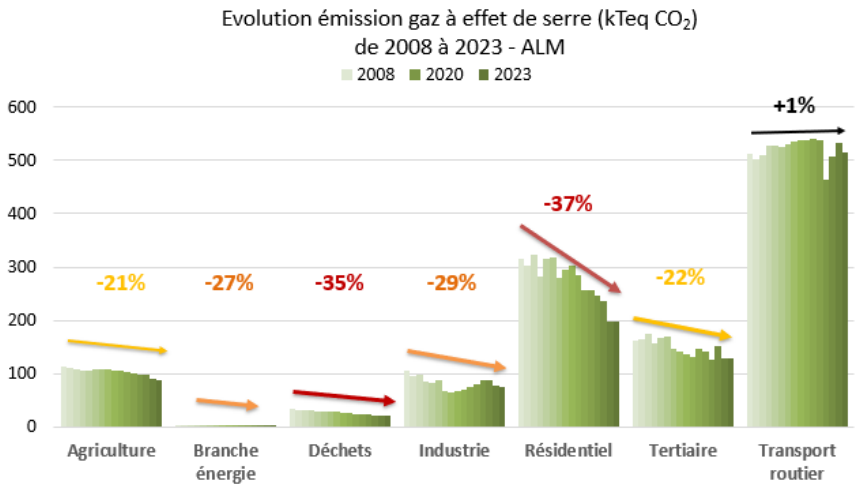
Greenhouse gas emissions are broken down by sector: mobility, residential, tertiary, agriculture, waste and industry. The data is published on the association's website. The inventory has a history going back to 2008.

This reference inventory is central to the development and implementation of the ecological transition strategy. It feeds into all the reference documents, enabling local policies to be prioritised with a view to achieving climate neutrality.

Greenhouse gas emissions in the ALM region will amount to 1,193,000 teq CO2 in 2021 (and 1,028,243 teq CO2 in 2023, updated February 2025). They have fallen by 17% since 2008.

Trends in all emission sectors are shown below.

**Figure13 - Change in GHG emissions ($kTeqCO_2$) from 2008 to 2023 in the ALM region**




As the data is used in the forward-looking exercise carried out as part of the ESDP, it is possible to identify the monitoring of the trajectory and the gap with the targets.

## A-1.1: Final energy consumption by source sectors

The table below shows the breakdown of final energy consumption by source sector, for the reference year 2021. A total of 5,860 GWh was consumed over the year, almost half of which was by the transport sector, and more specifically light passenger and commercial vehicles (which alone account for 76% of the energy consumed by transport). The table does not include energy consumption data for the waste sector, as it was not possible to estimate this.

**The data in the following tables relate to SCOPE 1 and 2 only.**

**Table1 - Final energy consumption in Angers Loire Métropole, in GWh, for the year 2021 (Source: BASEMIS V7)**

| | Other renewable energies | Other non-renewable | Wood energy (renewable) | Network heat and cooling | Electricity | Natural gas | Petroleum products | Grand total |
|---|---|---|---|---|---|---|---|---|
| **TOTAL- Angers Loire Métropole** | **166** | **0** | **146** | **201** | **1553** | **1257** | **2537** | **5860** |
| **Agriculture** | | | | | **40** | **22** | **73** | **135** |
| *Energy consumption - farm buildings* | | | | | *40* | *22* | *34* | *95* |
| *Forestry* | | | | | | | *0,3* | *0,3* |
| *Tractors* | | | | | | | *39* | *39* |
| **Industry (excluding energy)** | | **0** | **8** | **1** | **242** | **96** | **134** | **482** |
| **Waste** | *Not estimated for energy consumption but estimated for greenhouse gases* | | | | | | | |
| **Residential** | | | **105** | **97** | **597** | **794** | **138** | **1730** |
| *Gardening equipment* | | | | | | | *7* | *7* |
| *Main residences - multi-family dwellings* | | | *0* | *96* | *219* | *314* | *24* | *653* |
| *Main residences - detached houses* | | | *104* | | *375* | *477* | *106* | *1062* |
| *Second homes - multi-family dwellings* | | | *0,01* | *0,3* | *2* | *2* | *0,1* | *4* |
| *Second homes - detached houses* | | | *0,5* | | *2* | *2* | *1* | *5* |
| *Residential - heat pumps* | | | | *1* | | | | *1* |
| **Tertiary** | | | **33** | **103** | **651** | **345** | **79** | **1212** |
| *Offices* | | | *0* | *31* | *224* | *58* | *7* | *321* |
| *Cafés, hotels, restaurants* | | | *0* | *2* | *84* | *26* | *4* | *115* |
| *Shops* | | | *1,28* | *4* | *167* | *49* | *21* | *242* |
| *Street lighting* | | | | | *15* | | | *15* |
| *Teaching* | | | *1,96* | *8* | *32* | *50* | *15* | *106* |
| *Community habitat* | | | *0* | *8* | *29* | *26* | *9* | *72* |
| *Leisure, sport, culture* | | | *29* | *10* | *37* | *59* | *2* | *137* |
| *Health and social care* | | | | *37* | *55* | *69* | *15* | *176* |
| *Transport* | | | | *4* | *10* | *9* | *5* | *28* |
| **Road transport** | **166** | | | | **2** | **0,4** | **2110** | **2278** |
| *Buses and coaches* | *4* | | | | *0,001* | *0,08* | *45* | *49* |
| *Two-wheelers* | *1* | | | | *0,04* | | *19* | *20* |
| *Heavy goods vehicles* | *36* | | | | *0,00* | | *448* | *484* |
| *Light commercial vehicles* | *29* | | | | *0,1* | | *369* | *398* |

| | Other renewable energies | Other non-renewable | Wood energy (renewable) | Network heat and cooling | Electricity | Natural gas | Petroleum products | Grand total |
|---|---|---|---|---|---|---|---|---|
| *Passenger cars* | *96* | | | | *2* | *0,4* | *1229* | *1327* |
| **Other transport** | | | | | **22** | | **3** | **25** |
| *Trams* | | | | | *4* | | | *4* |
| *Rail transport* | | | | | *17* | | *3* | *20* |
| *River transport* | | | | | | | *1* | *1* |

## A-1.3: GHG emissions by source sector

By source sector, ALM's GHG emissions in 2021 are broken down as shown in the table below. We find the total of 1.192 mteq$CO_2$ emitted over the year, distributed mainly over transport, followed by residential and tertiary sectors.

**Table2 - Greenhouse gas emissions in teqCO2, year 2021 - Source: BASEMIS v7**

* In this table, scopes 1 and 2 are taken into account and all sectors are represented. However, the agriculture and industry sectors will be excluded later in the work. At this stage, the local authority and its partners have very little room for manoeuvre in the agriculture and industry sectors, which are outside its remit, as indicated on page 14.

| | Energy source | Non-energy origin | Grand total |
|---|---|---|---|
| **TOTAL excluding LULUCF - Angers Loire Métropole** | **1 021 573** | **171 159** | **1 192 732** |
| **Agriculture *** | **25 127** | **74 548** | **99 675** |
| *Energy consumption - farm buildings* | *13 552* | | *13 552* |
| *Culture* | | *21 160* | *21 160* |
| *Breeding* | | *53 388* | *53 388* |
| *Forestry* | *76* | *0,00E+00* | *76* |
| *Tractors* | *11 500* | *0,00E+00* | *11 500* |
| **Industry (excluding energy) *** | **64 423** | **11 160** | **75 583** |
| **Energy branch** | | **2 566** | **2 566** |
| **Waste** | | **28 484** | **28 484** |
| **Residential** | **236 850** | **25 186** | **262 036** |
| *Gardening equipment* | *1 804* | *0,00E+00* | *1 804* |
| *Green waste fires* | | *128* | *128* |
| *Main residences - multi-family dwellings* | *89 090* | | *89 090* |
| *Main residences - detached houses* | *144 836* | | *144 836* |
| *Second homes - multi-family dwellings* | *460* | | *460* |
| *Second homes - detached houses* | *660* | | *660* |
| *All homes (use of solvents and fluorinated compounds)* | | *25 058* | *25 058* |
| **Tertiary** | **127 959** | **11 189** | **139 148** |
| *Offices* | *25 746* | | *25 746* |
| *Cafés, hotels, restaurants* | *9 845* | | *9 845* |
| *Shops* | *22 923* | *6 946* | *29 869* |
| *Street lighting* | *638* | | *638* |
| *Teaching* | *16 315* | | *16 315* |

| | | | |
|---|---|---|---|
| *Community habitat* | *9 715* | | *9 715* |
| *Leisure, sport, culture* | *15 189* | | *15 189* |
| *Health and social care* | *23 717* | *350,5881* | *24 067* |
| *All (use of fluorinated compounds)* | | *3 892* | *3 892* |
| *Transport* | *3 871* | | *3 871* |
| **Road transport** | **565 878** | **17 925** | **583 803** |
| *Buses and coaches* | *12 130* | *21* | *12 151* |
| *Two-wheelers* | *5 141* | *0,00E+00* | *5 141* |
| *Heavy goods vehicles* | *119 838* | *240* | *120 077* |
| *Use of fluorinated compounds* | | *16 853* | *16 853* |
| *Light commercial vehicles* | *101 520* | *805,8443* | *102 325* |
| *Passenger cars* | *327 249* | *6,39* | *327 256* |
| **Other transport** | **1 336** | **100** | **1 437** |
| *Trams* | *99* | *0,00E+00* | *99* |
| *Rail transport* | *1 081* | *100* | *1 182* |
| *River transport* | *156* | | *156* |
| ***Land Use, Land Use Change and Forestry (LULUCF)*** | | ***-51 425*** | ***-51 425*** |
| *Forest growth* | | *-70 592* | *-70 592* |
| *Change in land use: Forestry* | | *323* | *323* |
| *Change in land use: Grassland* | | | |
| *Change in land use: Cultivated land* | | *500* | *500* |
| *Change of land use: Wetlands* | | *-3 806,3* | *-3 806,3* |
| *Change in land use: Urbanised areas* | | *4 100* | *4 100* |
| *Wood harvesting* | | *18 050* | *18 050* |
| ***Issuers not included in the total ** Issuers not included in the total ** Issuers not included in the total*** | | ***1 424*** | ***1 424*** |
| *Agricultural biotic sources* | | | |
| *Wetlands* | | *1 424* | *1 424* |

# 2.2 Module A-2 Assessment of current policies and strategies

## A-2.1 : Description and assessment of policies

### 1- Political and strategic frameworks for carbon neutrality

The political and strategic frameworks surrounding ALM's climate neutrality are numerous. ALM's membership of the Covenant of Mayors and the Green City Accord, and more recently its participation in the Mission of 100 Climate Neutral Cities, provide a European framework for exchange and support. At national level, the French government has been quick to take up the issue of climate change. In fact, the issue is now reflected in legislation and is present at all geographical and organisational levels of the public authorities. At local level, in addition to its regulatory obligations, ALM has committed to complementary voluntary initiatives, thereby strengthening its strategy and action plan to achieve climate neutrality. Below is a table summarising the main frameworks (policies, regulations, strategies, action plan) affecting ALM's ambition to be climate neutral.

### Table3 - Political and strategic frameworks surrounding ALM's climate neutrality

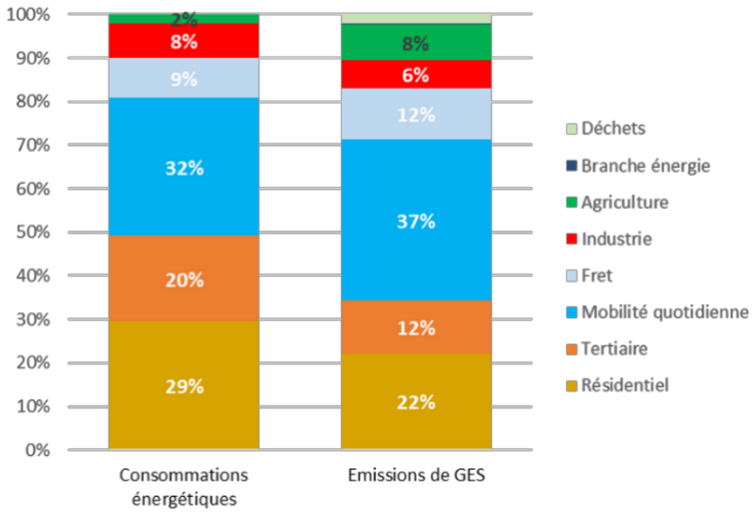
| Type | Scale | Name | Date | Description |
|---|---|---|---|---|
| Strategy | Europe | **Green Deal** | 2020 | The Green Deal is the EU's policy to ensure that net greenhouse gas emissions cease by 2050 and that economic growth is decoupled from resource use |
| Agreement | Europe | **Covenant of Mayors** | 2011, UPDATE 2021 | ALM joined the Covenant of Mayors in 2011, bringing together local and regional authorities in a voluntary commitment to promote local action in favour of climate and energy. |
| Agreement | Europe | **Green city agreement** | 2021 | In 2021, ALM signed up to the Green City Accord, demonstrating the Mayor-President's commitment to a more sustainable region. |
| Policy | Europe | **Mission Ville** | 2022 | In 2022, ALM was selected to be part of the Mission Ville, enabling it to accelerate its actions in favour of a territory on the road to neutrality. |
| Regulations | National | **Law on Energy Transition for Green Growth (LTECV)** | 2015 | The LTECV, published in the Journal Officiel on 18 August 2015, and the accompanying action plans aim to enable France to make a more effective contribution to combating climate disruption and preserving the environment. |
| Strategy | National | **Ecological planning and the national low-carbon strategy (SNBC)** | 2015, MAJ 2018, MAJ 2024 | Introduced by the LTECV, the National Low-Carbon Strategy (SNBC) is France's roadmap for combating climate change. It sets out guidelines for implementing the transition to a low-carbon, circular and sustainable economy in all sectors of activity. |
| Strategy | National | **Multiannual energy planning (PP)** | 2016-2023, 2019-2028, MAJ 2024 | The EPP expresses the guidelines and priorities for action of the public authorities for the management of all forms of energy in mainland France, in order to achieve the objectives of the energy policy. |
| Regulations | National | **Climate and Resilience Act** | 2019 | As well as being a democratic innovation, the law accelerates the transition of our development model towards a carbon-neutral, more resilient, fairer and more caring society. It aims to involve and support all the players in this transition. |
| Diagram | Regional | **Regional Plan for Spatial Planning, Sustainable Development and Equality (SRADDET)** | 2021 | The SRADDET is the planning document which, at regional level, sets out the strategy, objectives and rules laid down by the Region in several areas of regional development, including the fight against climate change. |
| Strategy | Regional | **Pays-de-la-Loire regional COP** | 2024 | Inspired by the Conferences of the Parties (COPs), which bring together the States that are party to the United Nations Framework Convention on Climate Change (UNFCCC), the regional COPs aim to define, within a region, the levers for action that will enable national targets for reducing greenhouse gases and protecting biodiversity to be achieved. |
| Diagram | Inter-territorial | **Territorial coherence scheme (SCOT)** | 2016, UPDATE 2025 | The SCOT is the reference framework for the various sectoral policies of three inter-municipal bodies, including ALM, particularly those focusing on spatial organisation and urban planning, housing, mobility, commercial development and the environment, including biodiversity, energy and climate. |
| Plan | Inter-territorial | **Intercommunal Climate Air Energy Plan (PCAET)** | 2020, UPDATE 2026 | The PCAET is a regulatory territorial planning tool. It is being implemented at the level of three inter-municipal bodies, including ALM. It defines a strategy and an action plan at local level to achieve the decarbonisation objectives. |
| Project | Local | **Regional project** | 2020 | The regional development plan is a strategic document that sets out the vision that elected representatives have for the development of their region and for the implementation of public policies. |

| | | | | |
|---|---|---|---|---|
| | | | | It is drawn up for several years and sets the course for the policy as a whole. |
| Political ambition | Local | **Deliberation on the climate emergency** | 2022 | In January 2022, ALM deliberated on the climate emergency, raising its climate ambitions to aim for a 60% reduction in emissions by 2030. |
| Plan | Local | **Intercommunal Local Planning Scheme (PLUi)** | 2020, UPDATE 2026 | ALM's PLUi is a regulatory document that sets out the conditions for land-use planning that respects the principles of sustainable development, in particular by managing space sparingly and responding to local development needs. |
| Master plan | Local | **Energy and climate master plan (SDEC)** | 2024 | The ESDP is a voluntary tool that is currently being drawn up with the aim of defining forward-looking scenarios that will enable the region to achieve carbon neutrality by 2050, and putting these scenarios into practice. |
| Action plan | Local | **Assises de la Transition Ecologique and its roadmap** | 2020-2026 | In February 2022, ALM adopted its citizens' roadmap for the ecological transition. The result of extensive public consultation and more than 1,000 contributions, it aims to put citizens at the heart of the ecological transition of the region. |
| Contract | Local | **Ecological Transition Contract (CRTE)** | 2021 | The CRTE is a bespoke 6-year contract that is drawn up and implemented with the help of all local players - the State, local authorities, businesses, socio-economic players and residents. It is agreed between ALM and the State and aims to generate a new mode of collaboration between the two players in order to accelerate the ecological transition. |

### 2- Sectoral targets for achieving neutrality

4 strategic objectives have been defined due to the weight of emissions linked to these sectors. The following diagram shows the 2 main emission sectors: transport and mobility (49%) and buildings (34%), i.e. 83% of emissions, 59% of which are directly related to the activities of residents (housing and mobility). The 3rd objective concerns the production of renewable energy. The last objective is cross-cutting and concerns land use and urban planning, as it enables us to anticipate and guide the development of the region and its needs.

**Figure14 - Breakdown of consumption and emissions by sector - 2018 - Source: BASEMIS, Air Pays de la Loire, Energie Demain**



**Objective 1 - Improve energy efficiency in the built environment**

With almost 141,000 homes (54% of which are multi-family dwellings and 46% detached houses), 37% of which have an EFG energy label and 32% a D label, and 13,100 commercial buildings, 45% of which are subject to a regulatory renovation target, the challenge of energy renovation and energy efficiency is a major one if we are to achieve carbon neutrality.

a. Public heritage

The “Communauté Urbaine” and the City of Angers are working to set an example in the management of their public assets (around 450 buildings and 46,000 public lighting points) through the renewal of equipment, the technical management of buildings and the implementation of works. In 2022, they adopted a Building Energy Plan. This aims to reduce energy consumption by 40% by 2030 compared with 2010. It sets a renewable energy target of 32% for 2030.

With regard to public lighting, the Intelligent Territory initiative is targeting the renovation of 30,000 LED lighting points and the installation of 3,600 presence sensors to reduce energy consumption by 66%. By the end of 2023, 15,200 streetlights had already been replaced. Energy savings are averaging 70%. The targets are to be met by 2026.

Angers Loire Métropole has also set up a 3-year energy transition fund to support its 29-member communes in speeding up the energy renovation of their public buildings, in addition to government funding (green funds and other schemes).

b. Housing (social and private) and services

The current rate of energy renovation is in the region of 1,500 to 1,600 homes per year in the residential sector, and more than 3,400 per year will be needed to achieve the neutrality targets, half of which will be low energy consumption. Nearly 110,000 homes will need to be renovated over the long term, around half of them low-energy. **The priority objective over the next few years is therefore to speed up the thermal renovation of housing.**

Angers Loire Métropole has embarked on a major urban renewal programme for the Belle-Beille and Monplaisir districts, with its social landlord partners (ALH, SOCLOVA, PODELIAH, etc.), who are already committed to improving thermal performance. The projects are aimed at achieving the Eco-quartier label, with 2,768 targeted renovations, and 930 homes will also be rebuilt. Landlords have made relatively good progress, but 85% of their housing stock (27,000 homes) will have to be renovated to achieve neutrality, which will require new impetus from these players and new funding to be mobilised.

More than 35,000 privately-owned multi-family dwellings will have to be renovated, with a major objective of facilitating collective decisions to renovate homes, which is the main obstacle given the investment involved. The AMBITION project, winner of the PilotCities AàP, aims to experiment with this facilitation/incentive to decision-making in around 10 condominiums over the next two years, in conjunction with researchers, landlords, associations, etc.

More than 48,000 single-family homes will have to be renovated, half of them to BBC standards. Since the decision to carry out the work rests solely with homeowners, schemes such as "Mieux Chez Moi" (Better at Home), co-funded by the Pays de la Loire Region and run by partners such as Alisée, Citémetrie, ADIL and CAUE, make it possible to deploy financial aid and engineering tools to complement government schemes (Francerénov' and Maprimrénov'). The scheme is due to be renewed in 2025, incorporating these ambitions.

In the tertiary sector (excluding local authority property), 45% of buildings in the region are subject to the decree requiring energy consumption to be reduced by 40% by 2030. At this stage, there are no public support measures in place, as local authorities are themselves subject to these targets and have to meet their own investment needs. Consideration is being given to bringing in partners, in particular consular chambers.

In the end, a reduction of almost 60% in emissions will be required from the built environment, which will reduce the energy bill by 14%. The remaining energy consumption will have to be largely carbon-free (renewable and nuclear electricity, biomass heat, biogas, etc.).

**Objective 2: Sober transport, using new energies and an alternative mobility offer**

Transport is the main sector to emit greenhouse gases in the region, accounting for 49% of emissions, divided between the daily mobility of residents (37%) and freight transport for economic activities (12%). ¾ of journeys are internal to the region, but daily inbound/outbound journeys are nonetheless significant in terms of distances travelled and energy consumption in the sector.

**Several levers need to be activated to achieve the** national **objectives** of complete decarbonisation by 2050. ALM is aiming for a more ambitious target of -55% GHG emissions by 2030.

The following levers must therefore be mobilised jointly: decarbonising the energy consumed by vehicles and adapting the associated infrastructure; improving the energy performance of vehicles; controlling the growth in demand (for passenger and freight transport); modal shift (for passenger and freight transport) towards the most energy-efficient and lowest-emission modes; optimising the use of vehicles (for passenger and freight transport). As in the building sector, these developments are linked to individual and collective action to change behaviour (practices, purchasing, etc.), which needs to be encouraged and supported, in particular by developing appropriate infrastructures and incentives, etc.

Angers Loire Métropole is working in partnership with its 29 local authorities, the Pays de la Loire Region and its delegate RATP Transdev, which runs the IRIGO service, and local businesses that have signed up to a company travel plan.

As part of its commitment to the transition in mobility, Angers Loire Métropole is implementing various programmes to strengthen the public transport offer, intermodality and the development of new practices (cycling, walking, car-sharing, etc.) and to upgrade vehicle fleets to low-carbon energies

**The actions and priorities for the coming years are as** follows:

a. Continuing to improve public transport services

The region already has 15 urban lines (for the districts of Angers and the 1st suburbs), 6 express lines and 13 suburban lines.

Tramway line "A" on the north-south axis (opened in June 2011) has been supplemented by two new tramway lines B and C in 2023, representing 10.1 km of new track. The tramway will serve 100,000 inhabitants, i.e. 33% of the population of Angers Loire Métropole. Two park-and-ride facilities have also been added. With this investment of €245m (excluding VAT), the effects of modal shift will be of vital importance in achieving the targets for reducing greenhouse gas emissions. By 2023, more than 39 million journeys will have been recorded. This transition to electric transport is also being accompanied by a gradual change in the bus fleet (see §c. below).

**The aim** is to make it easier to use the Irigo network, to reduce the use of private cars. The 2023 network offers a range of adapted services: the ABC tramway network, the reinforcement and creation of new express lines, improved services to communes in the outer suburbs, a test of transport services in business parks, transport on demand, continued support for car-sharing via partner BlablaCar Daily, and an increase in the number of secure cycle parking spaces.

Finally, building on its success, the Citiz car-sharing service, operated by Alter Services and supported by Angers Loire Métropole, already has 20 stations, around 30 vehicles and more than 1,150 subscribers.

As far as freight is concerned, ALM's priority is to optimise the movement of goods (transport and storage) in towns and cities and to examine the entire organisation of the urban logistics chain. Angers Loire Métropole has been involved in the INTERLUD+ programme with CEREMA since 2022 and, in consultation with economic players, will be defining an action plan and a charter of commitment to encourage all stakeholders over the next 2-3 years.

b. New forms of mobility and modal shift

Angers Loire Métropole is working with other local players, first and foremost the City of Angers, to encourage alternative modes of transport to the use of private cars and self-driving cars. Among these, cycling plays a key role. With its 625 km of cycle network (up 22% since 2019), including 397 km of dedicated cycle paths, Angers Loire Métropole is one of the most advanced cities. ALM and the city of Angers adopted a cycling plan in 2019. They are developing actions in terms of :

- A range of services (the "Vélo cité" bicycle loan service for the city of Angers): 2,700 bicycles on free long-term loan and almost 6,000 users a year, 70% of whom are young people (aged 18-24).
- Bicycle parking and links with the Irigo public transport network: "Vélo+gare" (all stations in the conurbation are equipped with individual, secure, self-access bicycle lockers), 4 "Vélo-parc" (222 secure bicycle parking spaces), "Vélo box": more than 300 individual, secure lockers, 35 covered collective bicycle shelters, 4 park-and-ride facilities along the tramway lines.
- Encouraging the purchase of bicycles: to encourage the purchase of electrically-assisted bicycles (EABs) and conventional bicycles, since 2021 more than 13,300 grants have been paid for the purchase of a conventional bicycle, totalling almost €2.4 million.
- Developments to make the cycling and pedestrian network safer and more extensive (cycle lanes, pedestrian areas, etc.). An infrastructure master plan provides for 100 km of safe intercity cycle paths. Planned investment averages €3m a year.
- Helping companies to set up cycle plans (around 20 so far) and mobility challenges.

Finally, to ease traffic congestion, as part of the pedestrian plan provided for in the PLUi, consideration is being given to extending the pedestrian area to make it easier to get around. At the same time, a number of projects are underway to upgrade public spaces and give greater space to pedestrians and cyclists.

c. New energies for public service vehicle fleets

Through a comprehensive, systematic and ambitious approach, Angers Loire Métropole is undertaking the conversion of all the vehicles in its fleet, i.e. 934 vehicles. This commitment should also help to support the development of infrastructure (electric and gas recharging), which will also benefit economic players and local residents.

**- electric vehicles**: the rate of renewal of electric vehicles is twice as high (60%/year) as the regulatory targets. To date, investments have resulted in 35% of light vehicles being electric (193 city cars, saloons and vans). Our objective is to acquire a further 221 vehicles. In addition to the desire to reduce the number of vehicles in the fleet by developing pools and leasing, and by choosing smaller vehicles with a lower carbon impact, this acceleration of the changeover will make it possible to reduce greenhouse gas emissions by 60%, with a reduction in fuel consumption of 5% per year.

**- Angers Loire Métropole is switching its bus fleet** from diesel to biogas and electric engines. There are already 17 biogas buses in service on the Irigo network, rising to 41 by 2026. The biogas used is locally certified, as it is a guarantee of origin linked to the production of biomethane from the La Baumette wastewater treatment plant in Angers. There are 2 public stations and private stations (Irigo) offering BioGNV. In accordance with European regulatory requirements, it is planned to switch part of the bus fleet to electric power, with the acquisition of 91 electric buses up to 2034. This acquisition will begin in 2027 for 12 buses. The adaptation of depots for bus charging is also already under study.

**Objective 3 - Accelerate the development of renewable energies and the transformation of systems**

The current national objective is to achieve a 33% share of renewable energy in the energy mix by 2030, rising to 42.5% once the European REDIII directive has been transposed. Nearly 15% of local consumption is covered by renewable energy, mainly from wood energy (43%) used by private households, but also from heat production plants supplying urban networks and heat pumps used in the residential and tertiary sectors (32%).

With a view to achieving carbon neutrality, the aim is for energy consumption to be essentially decarbonised, involving 2/3 renewable electricity and 1/3 renewable heat (biomass, biogas from methanisation, aerothermal energy and geothermal energy). As part of the work of the March 2023 law on accelerating the production of renewable energy and planning, the region's potential has been estimated at 3,521 GWh (66% electricity and 33% heat).

- **Renewable electricity**

In addition to the consumption of electricity from nuclear power plants, it will be necessary to develop the production of renewable electricity by multiplying current production by 9. **Photovoltaic solar power** (power stations, shading, roofing) is the main sector targeted. It will be necessary to create 20aine ground-based power plants, more than 200 shading sites, several thousand installations on residential roofs and n agricultural or tertiary buildings. There are already three solar power plants in the region, producing almost 17 GWh (and 3 more in the pipeline), equivalent to the consumption of 10,000 people.) There are already around 10 car park shading systems, and 14 GWh produced on roofs ...

**The priority for the next 2 years is to develop a multi-targeted solar plan** (private and public tertiary, agricultural, residential) to encourage and support projects by building on the existing ecosystem (the ALTER énergie SEM, the support of the Alisée association in the Mieux chez Moi public scheme and dedicated project companies) and by developing new partnerships and legal vehicles to encourage public investment.

- **Renewable heat**

**Biomethane production** is also a priority for the region. The joint contractual objective set with the ALM gas network operator (GRDF) is to supply 100% biogas to the network by 2050, reducing consumption by 60%. Between 4 and 6 units will need to be installed in the region, in addition to the two existing ones. ALM has invested in a unit to produce biomethane by treating wastewater to supply the gas network.

Production, estimated at 1.5 million cubic metres a year, represents the average consumption of 1,800 households and generates almost €2 million a year in revenue, which is reinvested in energy transition projects.

**The increase in the capacity of urban heating networks** should meet the region's renewable heating needs (by accompanying the reduction in the use of gas). Deployment of ALM's heating network master plan is continuing, with 5 public networks, 7 private networks, 6 biomass heating plants and one cogeneration plant (saving 55,000 tCO2/year). The ambition is to double the network by 2032 compared with 2017, i.e. from 70 to 150 km, and to increase the heat supply to almost 400 GWh/year (residential and tertiary sector combined), i.e. almost 60,000 housing equivalents.

Structural and innovative renewable or recovered heat projects will be studied, such as a heat recovery unit for waste water from the La Baumette wastewater treatment plant (potential 55 GWh/year), data centres, flooded slate quarries, etc. A study is underway for a tempered water loop (potential 29 GWh/year) in tertiary districts currently undergoing restructuring (St Serge, Faubourg actif, etc.).

**Objective 4 - Spatial planning to prepare for and support change**

With the population having increased by 17% over the last 30 years, efforts to reduce the region's overall greenhouse gas emissions are progressing less quickly than necessary, despite an 18% reduction in emissions per inhabitant. The emissions trajectory to be achieved requires more than the technical and supply-side measures developed in the previous sections.

Energy and climate objectives are already integrated into ALM's planning documents, but will be significantly reinforced, particularly in the inter-municipal Local Urban Plan (29 communes), which is entering the revision phase for adoption in 2026. The plan includes constraints on efficient renovation, connection to heating networks and the production of renewable energy, as well as bioclimatic construction. The plan includes objectives for housing and the Urban Mobility Plan, setting targets for modal shift (public transport, soft modes) and the means to achieve them.

The zero-net-artificialization (ZAN) objectives will be strengthened because soil and forest biomass are the main stocks of carbon sequestration with a view to achieving neutrality (offsetting residual emissions).

The practical application of these principles is integrated into the new development projects undertaken in partnership with the main development operator ALTER: through the 12 large-scale mixed projects (Cours St Laud, Quai St Serge, NPNRU, Plateau de la Mayenne, etc.), housing, business parks, and two major urban renewal projects (Monplaisir and Belle-Beille districts) mentioned above.

**In conclusion**, over and above the priority objectives and technical projects to be developed and described above, it is the entire ecosystem of players and, in particular, citizens that must be mobilised. ALM has undertaken work with nearly 80 partners to better identify the levers for behavioural change and make actions more coordinated and effective. The "Assises de la transition écologique" (ecological transition conferences) and the winning project of the Net Zero Cities pilot cities call are illustrations of this desire to experiment with new approaches with local residents.

Each of these frameworks includes sectoral objectives. The following table summarises the main objectives for 2030 (or as close as possible to that date):

**Table4 - ALM's sector objectives for achieving carbon neutrality**

| Domain | Objective | Target year | ALM scope |
|---|---|---|---|
| Global GHG | Reduce GHG emissions by 60%. | 2030 | Territory |
| Artificialization | Halve the rate of land artificialisation | 2030 | Territory |
| Building | Reduce final energy consumption by 40% compared with 2010 | 2030 | Heritage |
| Building | Triple the rate of renovation | 2030 | Territory |
| Building | Achieve 32% consumption of renewable energy in buildings | 2030 | Territory |
| Mobility | Achieve the PLUi modal share: 30% pedestrian, 6% bicycle, 13% public transport, 48.5% car, 2.5% other | 2027 | Territory |
| Energy systems | Achieve a 54% share of renewable energies in the energy mix (PPE France) | 2030 | Territory |
| Energy systems | Reduce gas consumption by 35% compared to 2020 and multiply biogas production by 4 to 6 compared to 2017 | 2030<br>2028 | Territory |
| Agriculture and food | Achieve 40% of land under sustainable agriculture (AB, HVE, MAEC) | 2030 | Territory |
| Agriculture and food | Achieve 13% food self-sufficiency | 2030 | Territory |
| Waste | Reducing the volume of waste (HHW) by 1% per year | - | Territory (excluding commercial waste) |
| Water | Maintain drinking water network efficiency at 92%. | - | Territory |
| Storage | Triple carbon stocks | 2050 | Territory |

### 3- Link between local sectoral objectives and strategic frameworks and policies

The challenge of reducing greenhouse gas emissions, cutting energy consumption and using renewable energy is systematically addressed in all the sectoral policies concerned. This global and centralised approach is relatively complex, but the 2023 assessment of the TETE label and the score awarded to the organisation demonstrate ALM's progress in this area, 77/100 compared with 40/100 in 2019.

The simultaneous implementation of these policies at the most appropriate level within the operational departments and under the aegis of the vice-presidents in charge of these policies guarantees the involvement of all departments. However, it should be emphasised that ALM's policies as a whole are not sufficient to trigger all the necessary levers, which are the responsibility of companies, associations, residents, etc. ALM has various levers that act on 10 to 30% of the territory's emissions.

The policies implemented aim to achieve a 60% reduction in emissions in the region. In each of the sectors in which ALM can take action, objectives are set out and transcribed into the political roadmaps of the elected representatives and the operational roadmaps of the departments that implement the relevant actions.

The portfolio of actions in section B-2 includes all the actions mentioned and detailed above.

### 4- Gap between trend emissions and projected emissions towards neutrality

The table below projects the emissions reductions initially targeted for 2030, following the adoption of the deliberation on the climate emergency in January 2022, (columns 2 and 3) then enhanced by the targets renewed in the CCC (column 4) to arrive at the residual emissions and offset for neutrality in 2030 (column 5).

Column 1: 2021 reference emissions data from

Column 2: emissions reductions targeted by ALM in 2030 from its initial targets

Column 3: in order to achieve a 60% reduction in emissions by 2030, ALM must significantly reduce its emissions in the two sectors that emit the most, transport and buildings. By reaching -60%, additional efforts will be required to achieve carbon neutrality.

Column 4: additional emission reductions are targeted with the consolidated action plan to meet the ambitions of the Climate City Contract.

Column 5: Overall residual emissions will be 50,385 t CO2e and will have to be offset by carbon sinks. These will be reinforced by the Zero Net Artificialization programme, actions under the Biodiversity and Water Plan, renaturation and desilting, tree planting and support for increasing the number of linear hedges.

As previously mentioned, agriculture and industry have been excluded from the scope, but efforts are also essential in these economic sectors.

The data comes from the work of the energy and climate master plan completed in January 2025, which was designed to operationalise the objectives of carbon neutrality.

## Table5 - Projected emissions to 2030 - towards neutrality with CCC

| | 1<br>**Reference emissions** | 2<br>**Initial 2030 emissions reduction target** | 3<br>**Residual emissions / initial targets for 2030** | | 4<br>**Further reduction in emissions through the CCC Action Plan** | | 5<br>**Residual emissions to be offset in 2030** | |
|---|---|---|---|---|---|---|---|---|
| | inventory | 60% reduction by 2030 and carbon neutrality by 2050 (adopted in January 2022 by the ALM Com. Council) | (3) = (1) - (2) | | Emissions reductions reviewed and linked to CCC objectives and scope (excluding industry and agriculture) | | Residual emissions | |
| Sectors | Year 2021<br>T CO2 eq | Reduction 2030<br>T CO2 eq | T CO2 eq | (%) reduction 2021 / 2030 | T CO2 eq | (%) Additional reduction / 2021 | T CO2 eq | (%) emissions / 2021 |
| Energy branch | 2 566 | -1 566 | 1000 | 0% | -508 | -20% | 492 | 19% |
| Waste | 28 484 | -18 484 | 10 000 | -65% | -674 | -2% | 9 326 | 33% |
| Residential | 262 036 | -144 717 | 117 319 | -55% | -100 539 | -38% | 16 780 | 6% |
| Tertiary | 139 148 | -74 630 | 64 518 | -54% | -56 459 | -41% | 8 059 | 6% |
| Road transport | 583 803 | -381 796 | 202 007 | -65% | -186 336 | -32% | 15 671 | 3% |
| Other transport | 1 437 | -835 | 602 | -58% | -545 | -38% | 57 | 4% |
| **TOTAL excluding agriculture and industry** | **1 017 747** | **-622 028** | **395 719** | **-60%** | **-344 516** | **-34%** | **50 385** | **5%** |
| **FOLU** / UTCF * | -25 106 | -35 000 | | | | | **- 50 385** | |
| **Population** | **Population: 303,535** | **Population: 319,525** | **+ 5%** | | | | | |

* Land use, land use change and forestry

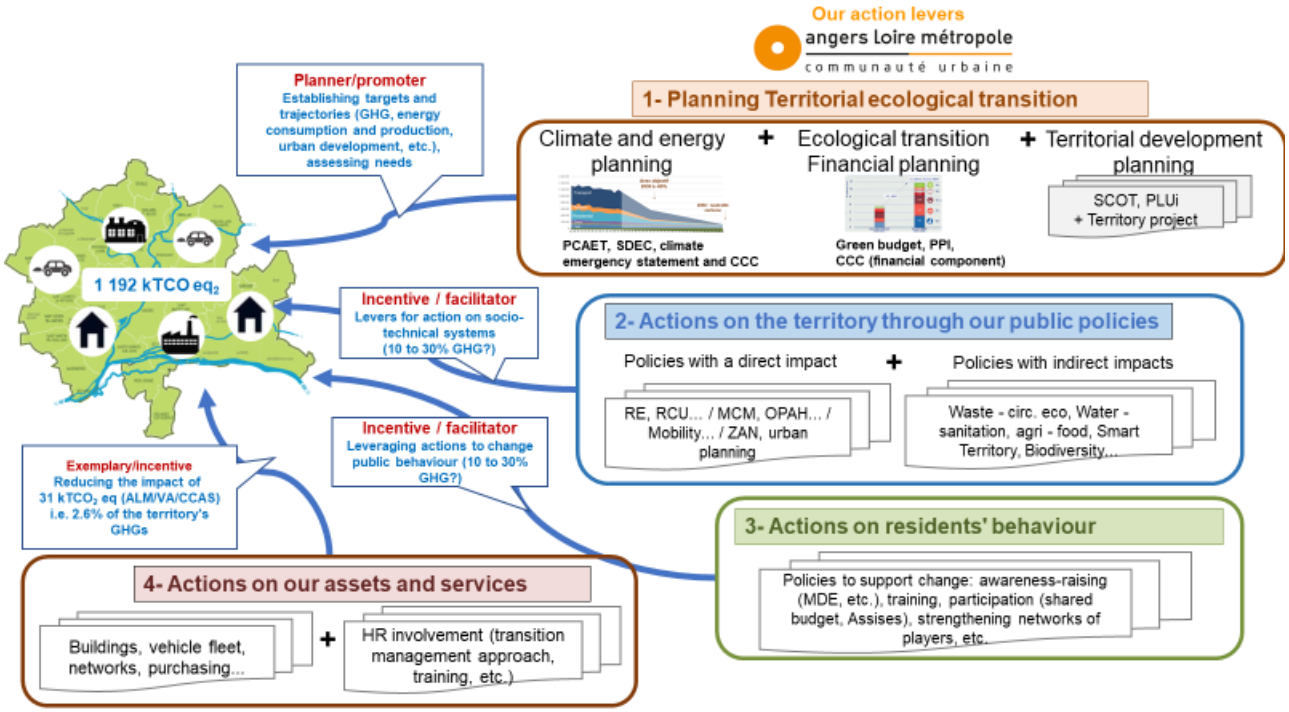
## 2.3 Module A-3 Systemic obstacles and opportunities for climate neutrality by 2030

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

#### 1- Systems contributing to ALM's neutrality objectives

Within the ecosystem of neutrality players, ALM's roles need to be clearly identified through its various missions and levers for decarbonisation actions on the territory with the players, so as to better qualify its intervention capacities.

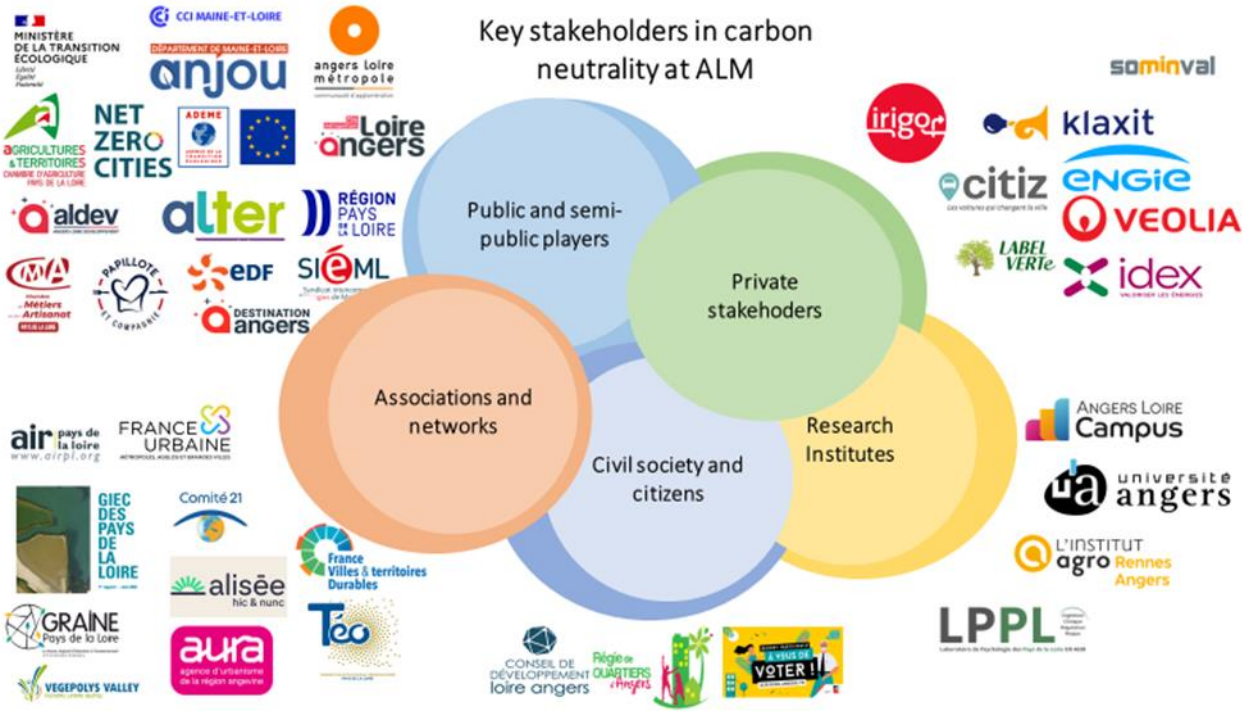
Figure15 - ALM's role in decarbonisation



## 2- Stakeholders involved in acheiving carbon neutrality

Over and above the role of the local authority, achieving carbon neutrality requires efforts to be shared between all players, whether public, semi-public, private, from civil society or from higher education. institutions.

**Figure16 - Map of key stakeholders for achieving carbon neutrality**




See the appendix for a complete map of ALM's stakeholders working to promote the ecological transition.

The relationship between the stakeholders is summarised below:

- **The public sector**

At national level, the **SNBC** was introduced by the 2015 Energy Transition Law for Green Growth. This strategy, supported by the **Ministry of Ecological Transition**, describes France's roadmap for leading the climate change mitigation policy. The 3(rd) edition of this strategy, SNBC 3, is scheduled for the end of 2024. In line with this strategy, in the summer of 2023 the government launched the **Green Fund**, a scheme with an annual budget of €2.5 billion to provide financial support for local public players in implementing the ecological transition in their areas (a scheme that will continue until 2027).

At regional level, the **SRADDET** and the roadmap drawn up as part of the current **regional COP** are two essential tools for specifying the strategy and the objectives and targets to be achieved. In addition, the Region is heavily involved in funding for the economic sector and also partly for the region's public assets in connection with the ecological transition (e.g. bioGNV bus subsidies).

Lastly, Angers Loire Métropole benefits from **structural funds** that are increasingly focused on ecological transition criteria, through the Metropolitan Development Contract signed between the Region and the Angevin region, which provides funding for the regional project, and the Energy Transition Fund to support actions undertaken by local authorities.

➲ **Private players**

Within the framework of various plans and contracts such as the PCAET and the SDEC, the ALM territory works in partnership with various players in the private sector. ALDEV, the ALM body with economic development powers, provides a link with and between economic players (e.g. running business clubs such as the tertiary club).

More broadly, the region's actions are carried out within the framework of public-private contracts or through public service delegations that contribute to the transition (for example, public service delegations in the heating networks - **Engie, Alter, IDEX**, etc. -; the sorting centre hosts the **Moulinot** company for the recovery of bio-waste, Alter Energies supports the development of renewable energy projects such as solar energy and methanisation, etc.). In terms of smart cities, the **Intelligent Territory** project is being carried out in the form of a global contract with a consortium **led by ENGIE**. The management of certain sites is entrusted to private players, such as the Baumette wastewater treatment plant, operated by **Véolia**.

➲ **Civil society**

The ALM Ecological Transition **Conference** was launched on 23 October 2020. The aim is to provide a collective response to the ecological and climate emergency by mobilising as many stakeholders in civil society as possible.

Six months of consultation and work with citizens were carried out on seven themes (housing, transport, consumption, food, production and work, living in good health and self-fulfilment) that cover all aspects of daily life and all have a strong impact on the environment and climate. The roadmap proposed was to come up with proposals and rethink our individual habits and the way we work together. At the end of the consultation process, over 1,000 contributions were received, which were analysed and summarised to produce 135 concrete proposals for action. These proposals were put to a vote by ALM residents throughout the summer of 2021. 63 proposals were prioritised by the 8,637 voters, forming a citizens' roadmap.

In addition to this wide-ranging participatory approach, ALM can count on a very active **network of associations** at local level (particularly in the areas of mobility, renewable energies, waste and food), as well as the **CODEV**, a consultative body for local policies.

➲ **Local and decentralised networks**

As a member of the European networks of "**100 neutral cities**" and "**Eurocities**", ALM actively participates in events organised between European cities and has close links with Net Zero Cities. Its commitment to the Covenant of Mayors and the Green Cities Accord also strengthens its ambition to accelerate policies for ecological transition.

The region is also a member of the national "**France urbaine**" and "**France ville durable"** networks, which are French organisations representing all of France's metropolises, urban communities, conurbation communities and major cities.

ALM is also involved in the network of the Pôle Métropolitain Loire Bretagne with the cities of Nantes, Brest and Rennes, and in its local offshoot, the Pôle Métropolitain Loire Angers, which brings together three intercommunal bodies to support planning tools that require greater synergy between territories.

➲ **Higher education and research establishments (ESR)**

ALM has been committed to the development of research for 20 years. Each year, the Urban Community supports various research projects in line with the challenges of transition, in conjunction with ALDEV, which has ESR competence.

For example, the AMBITION pilot project launched in summer 2024 is being conducted in partnership with the Laboratoire de Psychologie des Pays-de-la-Loire, and will incorporate various research bodies, such as the Espaces et Sociétés national research laboratory.

### 3- Obstacles and shortcomings in achieving ambition

To accelerate decarbonisation and achieve the targets set, many challenges remain.

➲ **Political and governance challenges**

- The cross-functional approach adopted by local players in the ecological transition could be improved, by pooling resources and energies to achieve the objectives set effectively and collectively.
    - Intensify collaboration between public players (State, local authority levels) to achieve greater synergy and efficiency in solutions developed on a larger scale.
    - Intensify collaboration between ALM and the RSEs, in particular to work on issues of behavioural change or adaptation to climate change (presence of local research laboratories linked to these issues). This essential link with the world of research currently exists, thanks in particular to ALDEV (which acts as ALM's ESR link), but it deserves to be developed.
    - Intensify collaboration between the public and private sectors and with associations, particularly as businesses play a fundamental role in complementing public services to give local users all the tools they need to make the transition.
- Internally, at the level of ALM's departments, a decompartmentalisation of the actions carried out in the local authority's public policies (transport, housing, waste, water, etc.) is underway, as cross-functionality and interaction between internal departments are necessary. The example of the strategy to support residents in the transition illustrates the harmonisation of practices to achieve greater efficiency.
- The results of the European elections in 2024 and the municipal elections in 2026 also represent a challenge, as they will have significant repercussions, both positive and negative, on the success of the decarbonisation objectives.
- The commitment of citizens is also essential to the success of neutrality. Progress must be made in the mechanisms for citizen participation in climate policies, plans and actions. In addition to involving local residents, reducing the obstacles to the participation of marginalised people is a major challenge, particularly in priority neighbourhoods.

➲ **Economic challenges**

- The funding currently mobilised by the region's players could be better coordinated; the lack of sharing and cross-functionality prevents access to certain financial opportunities, as well as certain synergies that could be achieved in projects.
- In addition, the actions needed to achieve neutrality require substantial funding, which the local authority and the area's private players cannot provide on their own. ALM and the local players would need support in seeking funding.
- Also, the search for innovative economic levers (e.g. crowdfunding, sponsorship) needs to be explored further, as the local authority and other players are making little use of them.

➲ **Socio-cultural challenges**

- Improving knowledge of the motivational drivers and processes that activate stakeholders' ability to act
- Lack of understanding of the issues, the causes and effects (impacts of its activities and uses) and the priorities for action in response; training must be developed for all stakeholders so that they have the same keys to understanding and are aligned on a common line.
- The low visibility of practical solutions and offers such as financial aid (abundant, inflexible funding) or advice (digital, human);
- Concrete obstacles such as: access to supply (e.g. public transport), the cost of actions (e.g. energy-efficient home renovation, electric vehicle), failing alternatives (switching to organic and local produce);
- The difficulty of getting local players to use the solutions available to them.

➲ **Sector challenges**

- On housing: barriers to renovation, such as the cost of the work, access to information and support, technical understanding of the work to be carried out; or psychological barriers, apprehensions about making a commitment, sometimes a short-term view...
- Transport: the obstacles to switching from the car to car-sharing or car-pooling, cycling or public transport. Identifying the obstacles linked to the offer (timetables, frequency for public transport), knowing the alternatives, the possibility of experimenting to be convinced...
- On consumption: the obstacles to changing one's diet, access to local and organic produce, the obstacles to managing bio-waste, transporting energy-efficient equipment, saving water, sorting packaging and bio-waste,
- On communal areas: to discourage greening projects, the creation of shared gardens or actions to improve the quality of life or biodiversity while adapting to the impact of climate change.

➲ **Communication and mobilisation challenges**

The visibility of practical solutions and offers such as financial aid (plentiful, inflexible funding) or advice (digital, human) needs to be consolidated so that stakeholders have all the information they need to take action. This lack of communication has been highlighted by citizens on a number of occasions. This is a pity because it means that the region's offer could be better exploited.

The finding shared by nearly a hundred stakeholders at the Assises de la transition écologique conference was that the range of services on offer is not very effective, and that the desired knock-on effect is not very far-reaching. This is despite greater ecological awareness, numerous existing support schemes, financial aid, human investment, etc. Identifying all the barriers and potential problems in greater detail, and understanding the relationships between sectors/areas, is therefore a decisive step towards the success of the ecological transition.

### 4- Opportunities for achieving ambition

To support the city's ambition for climate neutrality, a number of existing and future assets, resources and processes can be exploited.

- The **CCC is an opportunity in itself**, as its development and implementation will provide greater visibility of the links between existing strategies and action plans, and will accelerate action towards carbon neutrality by estimating the key actions and investments needed to achieve the objectives.
- **European projects** provide an opportunity to experiment with high-impact initiatives and replicate success stories. For example, the **AMBITION pilot project**, launched in September 2024, is a full-scale experiment on the ground in condominiums with a number of actions that have been little or never tried before. To achieve this, a partnership has been set up with university experts to test behavioural methods for driving change. In addition, a method for the technical assessment of carbon impacts at individual and building level will be consolidated in order to better determine the levers for action. A method of mobilising people by organising citizen challenges and collective intelligence work will be tested as innovative co-construction tools. The new methods of leadership and coordination between ALM's departments and with its partners to carry out this territorial project represent a key opportunity to test new approaches.
- **French regulations** represent an opportunity, as the existing frameworks are numerous and ambitious, providing local authorities with references and methods for planning, implementing, monitoring and evaluating the transition. In addition, **national networks** (e.g. France Urbaine) add to the dialogue between local and national public players and consolidate cooperation.
- The local authority's **planning and continuous improvement documents** and their revision (PCAET, PLUi, TETE...) are major opportunities to bring together all the stakeholders around carbon neutrality and define a common and shared vision for the area in the short, medium and long term.
- **The Mission ville's network of European cities** and its national dimension via the **mirror group** (ministerial network of 9 cities) enable local experiences to be shared and passed on.

- **Local partnerships (public, public/private, etc.)** are a major opportunity. ALM is fortunate to be able to count on a rich economic and associative fabric, which enables it to support or join forces with initiatives.

### 5- Opportunities for achieving ambition

It is not enough to propose a new awareness-raising scheme, an eco-neighbourhood, a range of local food products, an intelligent building or cycle paths for residents to change their practices. The transition cannot be achieved without mobilising users and supporting changes in practices on the ground, to positively induce new reflexes and virtuous behaviour, which will eventually become the norm.

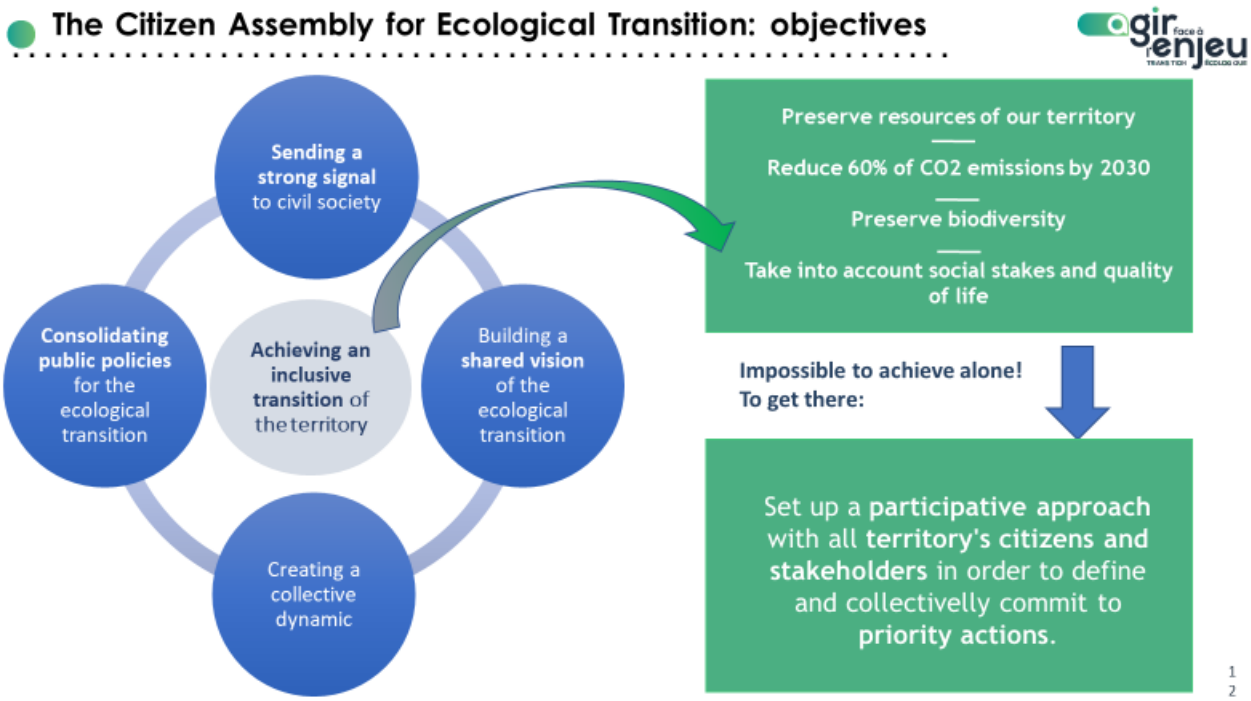
However, getting people involved is a headache for many areas: mistrust of public authorities, lack of time or interest on the part of local residents, difficulty in breaking out of familiar circles, mismatch between the mechanisms for getting people involved and the objectives, the scattering effect of certain actions, difficulty in measuring impact, the feeling that a great deal of energy is being expended for mixed results (in terms of effective participation, raising awareness, taking action), etc.

ALM communicates extensively on the ecological transition through its website, digital tools, publications, social networks and its support for local players who raise awareness and help citizens and businesses make the transition.

In the latest TETE evaluation, ALM and the city of Angers were awarded a score of 85/100 for their cooperation and communication strategy.

In particular, thanks to the ambitious and innovative approach of the Assises de la transition écologique presented in **part C-1.1: Description or visualisation of the participatory governance model for climate neutrality**. The aim of this approach was to get the players involved on a massive scale.

Figure17 - The Assises de la transition écologique, ALM's objectives



To achieve a collective understanding of the challenges of the ecological transition, it seems necessary to understand the determinants of the rationale for action of the various players, as well as the levers that are conducive to widespread changes in behaviour and approaches to the transition.

When used properly, however, mobilisation expertise is very powerful in positioning residents where they have something to contribute: expertise in use, experience and preferences, power to act, commitment... and numerous examples of co-construction of public policies and spontaneous citizen mobilisation are proof that, when it works, transformations, even profound ones, can be carried out.

An innovative process is being developed to raise awareness, provide information and encourage collective and individual action. It is described in **section C-2.2 Description of social innovation initiatives**.

### 6- Encouraging cooperation and cross-functionality

Co-construction approaches enable change to be taken on board, rather than giving rise to a feeling of something being imposed, which would lead to a lack of commitment or even rejection. In order to implement a process of ecological transition for condominiums, the AMBITION pilot project recommends, for example, involving users upstream and throughout the project so that their expectations can be taken into account in the development of public policies that concern the players in the ecosystem of collective private housing. In the same way, as part of the Intelligent Territory initiative, to avoid rejection by the general public, the DTPR system will first be tested in one of the city's neighbourhoods, with signage and a public information system that will make it possible to communicate transparently about the presence of a sensor, the nature of the data collected and its purpose. A QR code affixed to the right-hand side of the sensor will provide access to additional information, such as information on data storage via a smartphone....

Secondly, it is essential to draw on the ecosystems players to encourage change of scale. Research emphasises the need to link up the public, private and voluntary players in an area, and to strengthen partnerships as part of a cross-disciplinary approach. It reveals the importance of the systemic dimension, both in terms of governance issues and in terms of how best to adapt to individual approaches. The work on developing ALM's circular economy roadmap is a case in point, showing that bridges are possible between different areas (energy, waste, mobility), and opening up prospects for cross-functional frameworks for action. For example,

Another example is the intelligent territory, where the digital twin is a tool for reducing environmental impact and highlights the potential for synergy between different services and public policies (urban planning, water, waste, transport and mobility, etc.), with the possibility of developing digital uses for the general public. Work underway on urban heat islands and cooling islands will enable practical information tools to be developed for residents on cooling sites and routes during heatwaves.

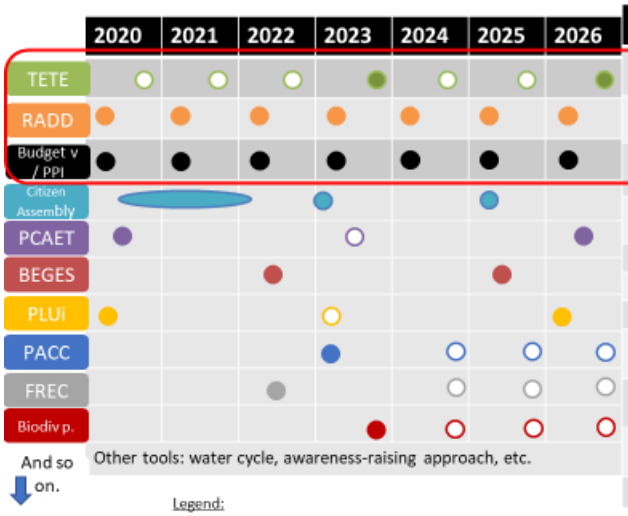
### 7- Monitoring and assessment

**The monitoring and evaluation of the** region's **ecological transition policies and actions and their effects** is carried out at several levels.

The*Figure9 - Overall architecture of ALM's ecological transition policies* and*Figure10 - Organisation and interactions between bodies, strategies, action plans and funding* present the organisation and interactions between bodies, strategies, action plans and funding, making it possible to understand the complex information flows used to monitor and evaluate strategies and action plans from a technical and financial point of view.

The following table provides a non-exhaustive list of the global monitoring and assessment tools and the sectoral approaches linked to the ecological transition that are also subject to monitoring and assessment. There are almost 30 plans devoted to the ecological transition.

Figure18 - Extraction from the inventory of approaches subject to monitoring and evaluation




| Themes | Perimeter | Target | Type |
|---|---|---|---|
| Ecolo. Trans. Global | Territory and heritage | Internal | Monitoring and assessment |
| Ecolo. Trans. Global | Territory and heritage | Mixed | Annual monitoring |
| Ecolo. Trans. Global | ALM and City Institution | Internal | Financial monitoring |
| Ecolo. Trans. Global | Territory | General public | Citizen participation. |
| Energy | Territory | Internal | Regulatory |
| Energy | ALM and City Institution | Internal | Regulatory |
| Planning | Territory | General public* | Regulatory |
| Adaptation | Territory and institution | Internal | Monitoring and assessment |
| Circ. Eco. | Territory and institution | Internal | Monitoring and assessment |
| Biodiversity | Territory and institution | Internal | Monitoring and assessment |
| ... | | | |

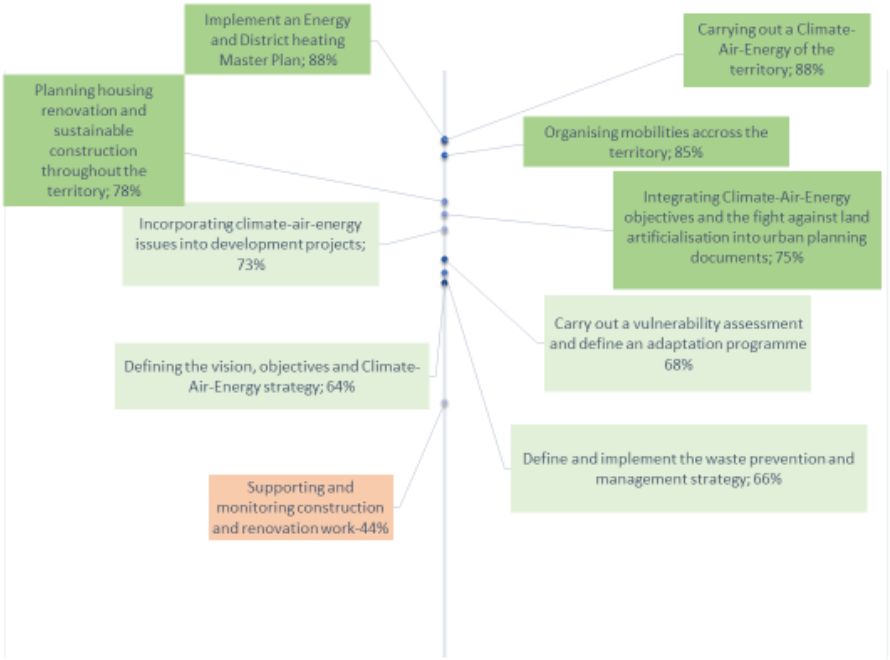
* with a general public valuation

*The red box indicates the global monitoring and evaluation tools for ecological transition policies.*

The TETE assessment and labelling tool can be used to monitor a large number of plans and lists a large number of data and indicators, making it the most successful tool to date, with the broadest scope. ADEME is currently developing an online application to monitor all of these plans, which will enable data to be shared and summary tools to be developed.

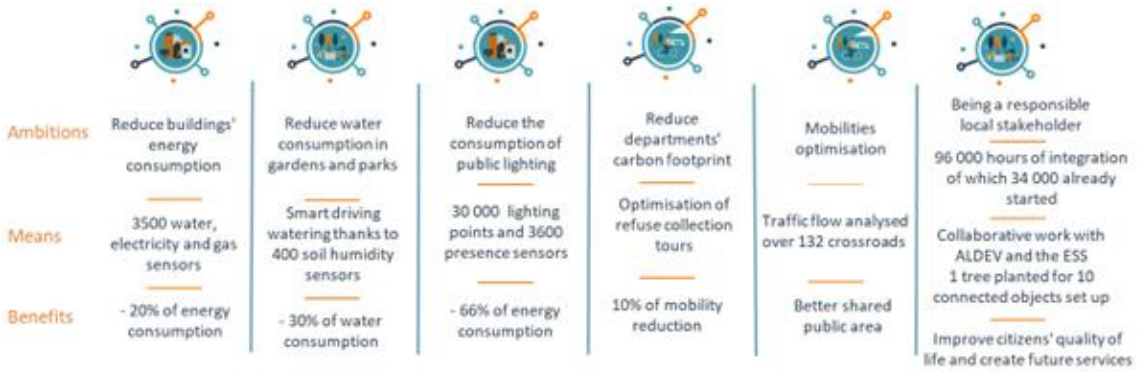
For example, the assessment of *Area 1 - Spatial Planning*, is scored in different sectors, allowing us to identify areas for improvement. Each framed element is the subject of a sub-detail. The level of monitoring is therefore particularly detailed.

**Figure19 - Illustration of a TETE evaluation in the field of territorial planning**



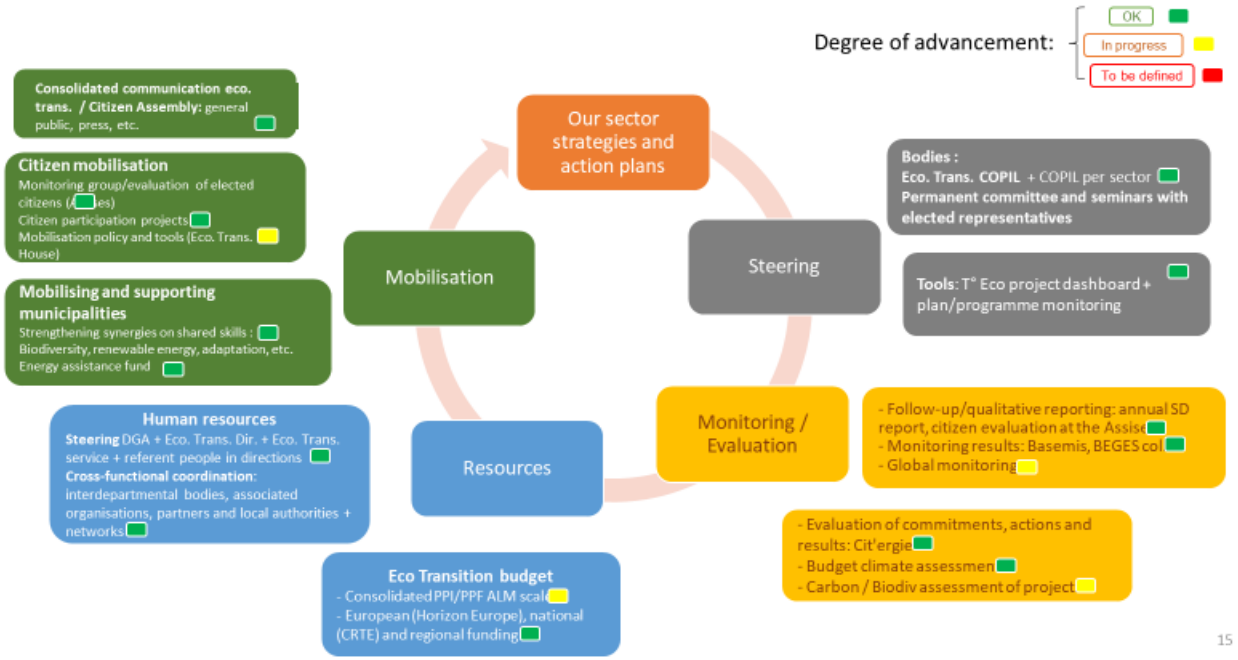

As part of the Intelligent Territory project, the tools developed for the local authority's uses (assets and consumption of energy, water, etc.) enable very precise and virtually continuous monitoring of consumption.

**Figure20 - Illustration of the objectives and means of monitoring through the intelligent territory approach**




Lastly, the Ecological Transition Steering Committee, which brings together the executive and departments, uses a set of processes presented below to ensure that progress is being made on the creation of structural steering tools.

**Figure21 - Organisation and interactions between bodies, strategies, action plans and funding**




In conclusion, ALM has a number of tools for measuring the progress of consumption and emissions in the region. The challenge is to optimise these tools and connect them so as to acquire different levels of vision, from overall monitoring to technical and operational monitoring. The complexity of this system of data flows still requires structuring work to achieve a systemic vision.

# 3 Part B - Pathways to climate neutrality by 2030

## 3.1 Module B-1 Climate neutrality scenarios and impact pathways

### B-1.1: Routes of impact

To achieve ALM's objective of carbon neutrality, it is necessary to massively reduce greenhouse gas emissions by focusing on the sectors with the highest emissions (transport, residential, tertiary, etc.), while at the same time increasing carbon storage capacity. Sobriety measures are the prerequisites for implementing measures to improve efficiency and develop renewable energies. This approach is essentially socio-cultural and involves profound changes in behaviour. This is why the social innovations described in part C.2.2 are essential and intrinsically linked to the implementation of this action plan.

The internal organisation set up and described in the introduction, as well as the stakeholder involvement and governance described in part C.1, consolidate the leadership needed to coordinate and accelerate the ecological transition.

The CCC action plan described below in table 6 is an extension of the ALM priorities and main objectives described in section A.2.1. This table presents the main lines of action, the actions and their correspondence with the CCC architecture for all practical purposes and to facilitate cross-referencing between existing plans and the CCC

**Table6 - Pathways to carbon neutrality**

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| Transport - mobility | Urban public transport (bus) | Implement the mobility strategy:<br>> Developing the bus network and modal shift<br>> Develop intermodality<br>> Greening the bus fleet<br>> Reduce speed, regulate traffic and enhance public space<br>> Encourage new working practices to reduce travel: teleworking, coworking sites, etc.<br>> Support and encourage employers to improve the impact of their employees' journeys, or even reduce them through new solutions<br>> Develop a real-time car-sharing service for journeys to and within the conurbation. | Electrification of buses and tramway<br><br>Shift to public & non-motorized transport | Investment<br>Infrastructure<br>Governance<br>Supporting behavioural change<br>Innovation | Developing and consolidating public transport services<br><br>Increasing the use of public transport<br><br>Switching bus fleets to electric vehicles | Reducing car use | see table 8 | Improved air quality<br>Reduced noise pollution<br>Improved overall health<br>Creation of social links<br>Improved dialogue between stakeholders<br>Lower overall energy bills in the region and reduce fuel poverty linked to transport |
| | Urban public transport (tramway) | Implement the mobility strategy:<br>> Develop the tram network and modal transport (build or extend tram lines, develop and maintain the network, equip passengers with shelters, etc.)<br>> Develop intermodality<br>> Combating car use and developing car sharing<br>> Reducing speed, regulating traffic and enhancing public space<br>- Encouraging new working practices to reduce travel: teleworking, coworking sites, etc.<br>- Support and encourage employers to improve the impact of their employees' journeys, or even reduce them through new solutions<br>- Develop a real-time car-sharing service for journeys to and within the conurbation. | | | Extension of tramway networks completed<br><br>Increased use of public transport | Reducing car use | see table 8 | |
| | Cycling plan | Implement the cycling plan :<br>- Promoting and educating people to use bicycles<br>- Develop and share public space<br>- Develop and support cycling services<br>- Supporting and encouraging businesses and establishments<br>- Monitor and evaluate the cycling plan | Shift to public & non-motorized transport<br>Reduced motorized passenger transportation need | Investment<br>Infrastructure<br>Governance<br>Support for change behaviour<br>Innovation | Creation of suburban and interurban cycle networks<br>Improved safety<br>Increased number of cyclists | Increase in the number of cyclists<br>Reduction in car use | see table 8 | |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| | Car-pooling, car-sharing and alternative modes of transport | Promoting the development of alternatives to the use of private cars by supporting the local offer (citiz, etc.)<br>- Combating car-free driving and developing car-sharing<br>- Develop car-sharing areas<br>- Making alternative mobility tools accessible and visible<br>- Support the implementation of mobility plans for companies and local authorities | Reduced motorized passenger transportation need<br>Increased car pooling | Investment<br>Infrastructure<br>Governance<br>Supporting behavioural change<br>Innovation | Encouraging car-pooling and car-sharing<br>Increased parking for car sharing | Reducing car use<br>Increased use as a knock-on effect | see table 8 | |
| | Calming the public space | - Develop pedestrianisation:<br>* Rethink the layout of roadways<br>* Implement tools to monitor and evaluate pedestrian policy.<br>* Redesign public spaces (e.g. square plan)<br><br>- Rethink parking policies:<br>* Park-and-ride facilities<br>* Extend the green parking zone<br>* Charging points for electric vehicles<br>* Develop car-sharing areas<br>* Parking guidance systems<br>* Remove spaces<br>* Change the pricing system<br>* Allocate revenues from paid parking to sustainable mobility<br>* Set up a low-emission zone<br><br>- Develop the area by promoting local centres (shops, health services, etc.) | Reduced motorized passenger transportation need<br><br>Increased car pooling | Investment<br>Infrastructure<br>Governance<br>Supporting behavioural change<br>Innovation | Revision of the PLUi ,<br>Renewed parking policy<br>Increased pedestrianisation (safety, paths, signage, etc.) | Reduced car use<br>Reduced need for transport thanks to local services | see table 8 | |
| | Developing the use of rail | - Encouraging modal shift from passenger transport to rail<br><br>- Develop rail freight:<br>* Initiate consultation with local stakeholders to identify freight flows and needs.<br>* Include guidelines for optimising freight transport at regional level in planning documents.<br>* Rethink the parking strategy for goods vehicles<br>* Encourage and support local players within a formalised framework | Shift to public & non-motorized transport<br>Reduced motorized passenger transportation need | Investment<br>Infrastructure<br>Governance | Visibility of services and development of intermodal facilities | Reducing the use of cars for long journeys | see table 8 | |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| | Urban logistics and freight | Optimise the logistics and management of urban goods flows in the first and last mile:<br>- Inform and raise awareness of the challenges of sustainable urban logistics among local authorities and economic players<br>- Implement a sustainable urban logistics charter to promote increasingly energy-efficient and carbon-free urban goods transport<br>- Rethink the parking strategy for goods vehicles | Optimized logistics | Investment<br>Infrastructure<br>Governance<br>Innovation | Development of best practice in optimising carbon-free/soft mobility in the last mile<br>Consultation with freight operators and economic players to optimise loads | Reducing the use of vehicles in the last kilometre | see table 8 | Improved air quality<br>Reduced noise pollution<br>Improved traffic flow<br><br>Lower overall energy bills in the region |
| | Mobility and renewal of local authority car fleets | Reducing the carbon impact of staff travel: rolling out the internal mobility plan<br>- Build up a fleet of electric vehicles Ü Cover the cost of public transport and soft modes of transport<br>- Business trips: distribute public transport tickets, encourage car-sharing<br>- Introduce a sustainable mobility package (FMD) to provide financial support for sustainable practices<br>- Encourage car-pooling<br>- Facilitate teleworking<br>- Encouraging residents and businesses to switch to less GHG-emitting vehicles<br>Community initiative: electric charging points + parking spaces, etc. | Electrification of cars + motorbikes | Investment<br>Infrastructure | Reduction of the fleet (optimised)<br>Increase in the purchase of electric vehicles<br>Reduction in vehicle size | Reducing vehicle use | see table 8 | |
| | Electrification of private car and motorbike fleets | Encourage residents and businesses to invest in electric vehicles<br>Strengthen the network of charging points | Electrification of cars + motorbikes | | Increase in the purchase of electric vehicles<br>Reduction in vehicle size | Reducing the number of carbon-intensive vehicles | see table 8 | |
| | Electrification of private HGV fleets | Encourage companies to invest in electric vehicles<br>Strengthen the network of charging points (ultra-fast) | Electrification of trucks | | Increase in the purchase of electric heavy goods vehicles | Reducing the number of carbon-intensive vehicles | see table 8 | |
| Building renovation and sustainable | Public support for the **renovation of** private and social housing | - Social housing stock: encouraging energy renovation and urban renewal in eco-districts<br>- Improving the efficiency of thermal improvement schemes in private housing: developing a one-stop public service for assistance and support with energy renovation of residential buildings | Building renovations (envelope) | Investment<br>Governance<br>Innovation | Increasing the rate of energy renovation through incentives and advice | Accelerating the pace of renovation and the quality of | see table 8 | Lower energy bills<br>Reduce fuel poverty<br>Improved comfort |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| urban planning | Energy-efficient renovation of homes and commercial buildings | Investment by residents and businesses in energy-efficient renovation of homes and commercial buildings | Building renovations (envelope) | Investment<br>Support for behavioural change<br>Innovation | Strengthen financing for residents and businesses for their energy renovation projects | operations<br>Reducing energy demand | see table 8 | |
| | Public action for sustainable urban development | - Gradually reduce the rate at which land is artificially developed, with the aim of achieving zero net artificialisation by 2050<br>- Favour urban renewal over urban expansion<br>- Incorporate the zero net artificialisation (ZAN) objectives into urban planning documents, in particular SCOTs, SRADDETs and PLUils.<br>- Develop the conditions for exemplary development and property operations (encourage dialogue between players, provide training, define a framework/guide for sustainable construction). | New energy-efficient buildings | Investment<br>Infrastructure<br>Governance | Reducing the number of projects that contribute to artificialisation<br>Incentives for densification<br>Changes in planning and urban development practices and greater control | Improving projects and their energy efficiency and the use of renewable energies<br>Elimination of oil-fired heating and reduction in gas-fired heating | see table 8 | Improved quality of life<br>Positive impact on biodiversity<br>Improvement of carbon sinks |
| | Efficient new construction in the private sector (housing and commercial buildings) | Investment by residents and businesses in new construction of efficient, bioclimatic housing and tertiary buildings using renewable energy. | New energy-efficient buildings | Investment<br>Governance<br>Innovation | Better compliance with thermal regulations and connection to heating networks<br>Encouraging ambitious projects energy-efficient buildings and bioclimatism<br>Encouraging the | Widespread use of quality projects and energy efficiency and the use of renewable energies<br>Reducing energy demand | see table 8 | Lower energy bills<br>Improved comfort<br>Favourable impact on biodiversity |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| | Renovation of public service buildings and intelligent buildings<br><br>Efficient new buildings | Implement Building Energy Plans, focusing on 3 areas (users, assets and ecological transition) and 6 actions:<br>- Raising awareness among occupants<br>- Raising awareness among children<br>- Property strategy - optimising floor space<br>- Intelligent Territory - improving the management of energy equipment<br>- Investment - implementing environmental requirements<br>- Investment - develop renewable and bio-sourced energies<br><br>Implement the Intelligent Territory project to reduce the area's energy consumption:<br>- Renovate public lighting and introduce intelligent lighting / encourage private lighting companies to renovate<br>- Reduce energy consumption in public buildings through precision control<br>- Develop precision watering of green spaces to reduce water consumption<br>- Optimising waste management and collection by installing sensors<br>- Monitor the drinking water network in real time (quantity/quality) | Building renovations (envelope)<br>New energy-efficient buildings | Investment<br>Innovation | reuse of materials and bio-sourced materials | Improving projects and their energy efficiency and the use of renewable energies | see table 8 | Lower energy bills<br>Improved comfort<br>Favourable impact on biodiversity |
| Energy systems | Public district heating networks | - Continue to roll out the master plan for heating networks:<br>* Interconnect heating networks<br>* Continuing to develop the various districts and outlying municipalities<br>* Innovate by identifying new sources of energy recovery | Decarbonizing heating generation | Investment<br>Infrastructure<br>Governance<br>Innovation | Massive development of connections to district heating networks<br>Development of the heat energy mix (recovery, etc.) | Massive development of connections to district heating networks<br>Development of the energy mix (recovery, etc.) | see table 8 | Lower energy bills<br>Reduce fuel poverty<br>Improved comfort |
| | Decarbonisation of heating in the private sector | Initiatives by residents, businesses and energy suppliers to decarbonise their heating systems (gas, oil, etc.) (not connected to public heating networks) | Decarbonizing heating generation | Investment<br>Support for behavioural change | | | see table 8 | Lower energy bills<br>Reduced fuel poverty<br>Improved air quality |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| | Gas and electricity networks | Actions concerning gas :<br>- To cover gas consumption with renewable gas, enabling the department to be self-sufficient in gas.<br>- Massively reduce gas consumption for building needs, by around -35% between 2020 and 2030 and by 60% between 2030 and 2050 (a reduction of 4% per year), through the combined effects of energy sobriety, energy efficiency and substitution of energy sources.<br>efficiency and energy substitution<br>- Develop the growing use of biogas in the transport sector<br>- Reduce the carbon footprint of the network operator's activities in the region by 30% by 2030 (compared with 2009).<br><br>Actions concerning electricity :<br>- Involve energy distribution stakeholders across the board<br>- Implement a localised energy management programme with network operators/concessionaires<br>- Encourage the purchase of renewable electricity<br>- Develop energy management and renewable energy services offered by energy players | Decarbonizing heating generation | Investment<br>Infrastructure<br>Governance | Reducing energy consumption<br>Increasing the share of renewable energies in the energy mix<br>Modernising networks | Reducing energy consumption<br>Use of electricity for domestic purposes rather than heating<br>Significant reduction in the use of non-renewable gas | see table 8 | Improving the region's energy bill |
| | Energy efficiency of lighting and equipment | - Implement the Intelligent Territory project in order to reduce the area's energy consumption - Renovate public lighting and implement intelligent lighting / encourage those involved in private lighting to renovate<br>- Action to reduce electricity consumption (digital, centralised management, etc.) > Treated in public buildings | Efficient lighting & appliances | Investment<br>Infrastructure<br>Governance | Reducing energy consumption | Reducing energy consumption | see table 8 | Lower energy bills<br>Reduce light pollution for health and biodiversity |
| | Energy efficiency of private equipment | Energy efficiency of lighting and equipment | Efficient lighting & appliances | Supporting behavioural change<br>Innovation | Reducing energy consumption | Reducing energy consumption | see table 8 | Lower energy bills |
| | Development of renewable energy production in the region | - Supporting the local production and consumption of renewable energies: biomethane, biomass, solar energy, wind power, waste-to-energy and hydrogen, in particular:<br>* Identify areas to accelerate the development of renewable energies.<br>* Draw up a solar plan | Decarbonizing electricity generation | Investment<br>Infrastructure<br>Governance | Acceleration of solar PV projects on buildings, on the ground, in shaded areas, etc.<br>Increase in solar electricity production | Massive increases in production | see table 8 | Improving the region's energy bill |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| Green infrastructure and nature-based solutions | Revegetation and renaturation of public spaces (parks and gardens) | - Increasing carbon sinks through urban forests and the preservation/vegetation of spaces, desoiling schoolyards, canopies, etc.<br><br>- Implement the biodiversity plan (ALM perimeter):<br>* Discovering, raising awareness and training to improve collective action<br>* Sharing and pooling to improve knowledge<br>* Preserve and restore to protect our natural heritage<br>* Innovate and experiment to meet new challenges (adaptation to climate change, invasive alien species, soil conservation, etc.).<br><br>- Implement the Angevins landscape master plan and the Urban Nature Plan (within the boundaries of the City of Angers):<br>* Strengthen the area's landscape identity.<br>* Sustainable design and management<br>* Knowing, preserving and developing the tree heritage<br>* Raise awareness and bring people together<br>* Promote, monitor and evaluate the scheme | Not taken into account in the CCC method | Investment<br>Infrastructure<br>Governance | Implementing conditions to improve carbon sinks | Improving carbon sinks | see table 8 | health and quality of life<br>Preserving biodiversity<br>Greater social involvement |
| | Environmental protection and adaptation to CC | - Implement the climate change adaptation plan:<br>* Ensure the resilience of natural environments, production and infrastructure<br>* Ensure the resilience of residents and communities<br>* Ensure the resilience of organisations and communities<br><br>- Raising public awareness of the ecological transition (general public, elected representatives, employees, businesses, etc.)<br><br>- Implement the water cycle strategy for better resource sharing and management:<br>* Slow down the water cycle and preserve the environment.<br>* Organise sober use of water for all stakeholders<br>* Optimising availability and substituting resources<br>* Preserve water quality and prevent pollution<br><br>- Prevent risks: flooding, pollution, noise, air quality, etc. | Not taken into account in the CCC method | Investment<br>Infrastructure<br>Governance<br>Supporting behavioural change<br>Innovation | Improving environmental impact<br>Preservation of resources | Improving environmental impact<br>Preservation of resources | see table 8 | health and quality of life<br>Improving the region's resilience to climatic shocks<br>Preserving biodiversity<br>Greater social involvement |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| | Agriculture and the Territorial Food Project | - Implement the regional food project:<br>* Agriculture and the region (e.g. identifying farms that are close to being handed over, carrying out a technical and economic study of the region's organic sectors, adapting training needs, etc.).<br>* Commodity chains and the region (e.g. improving information on local supplies)<br>* Spatial accessibility (e.g. drawing up an inventory of the spatial supply of food, etc.)<br>* Food culture (e.g. raising awareness among children, taking part in local events, etc.)<br>* Social accessibility (e.g. carry out anti-waste initiatives, collaborate on food insecurity projects, study the needs and support solutions of collective catering, etc.). | Not taken into account in the CCC method | Investment<br>Infrastructure<br>Governance | Lower emissions SCOPE 3<br>Implementation of conditions to improve carbon sinks<br>Improved environmental impact<br>Preservation of resources | Lower emissions SCOPE 3<br>Implementation of conditions to improve carbon sinks<br>Improved environmental impact<br>Preservation of resources | see table 8 | health and quality of life<br>Improving the region's resilience to climatic shocks<br>Preserving biodiversity<br>Greater social involvement |
| Waste, circular economy, water and sanitation | Waste recycling and the circular economy | - Implement the circular economy roadmap:<br>* Strengthen local sorted collection solutions for household and business waste.<br>* Setting an example for the local authority: public procurement, responsible digital technologies, development and construction projects, sustainable tourism and events, etc.<br><br>- Modernising collection and processing facilities to improve energy efficiency and performance<br><br>- Deploy bio-waste sorting/treatment solutions | Increased waste recycling | Investment<br>Infrastructure<br>Governance<br>Supporting behavioural change<br>Innovation | Developing bio-waste management solutions in the region<br>Increased sorting and recycling at waste collection centres<br>Improving the impact of waste transport and treatment<br>Reducing waste through prevention, reuse and recycling | Developing bio-waste management solutions in the region<br>Increased sorting and recycling at waste collection centres<br>Improving the impact of waste transport and treatment<br>Reducing waste through prevention, reuse and recycling | see table 8 | Reducing the impact on natural and mineral resources<br>Improving the CSR performance of local companies<br>Improve environmental nuisance (plastic pollution, etc.) |

| Axes | Sub-axis | Actions to achieve carbon neutrality | Correspondence with CCC typology | Systemic levers | First changes (1-2 years) | Late results (3-4 years) | Direct impacts (reductions in emissions, see Tab. 8) | Indirect impacts (co-benefits) |
|---|---|---|---|---|---|---|---|---|
| | Helping citizens and stakeholders to change their practices and reduce waste | - Implement the circular economy roadmap:<br>* Acting on key economic sectors: food/bio-waste, construction and public works, repair/reuse, etc.<br>* Cross-functional actions: developing research and innovation, supporting initiatives and projects, promoting inter-company relations and virtuous approaches, providing information and training in the ET professions, etc.<br>* Setting an example for local authorities: public procurement, responsible digital technologies, development and construction projects, sustainable tourism and events, etc.<br><br>- Strengthen the waste prevention and management strategy local residents | Increased waste recycling | Investment<br>Infrastructure<br>Governance<br>Supporting behavioural change<br>Innovation | Reducing waste through sorting, prevention and reuse | Reducing waste through prevention, reuse and recycling | see table 8 | Reduced impact on natural and mineral resources<br>Reduced environmental impact (plastic pollution, etc.)<br>Greater social involvement |
| | Improving water and wastewater networks | - Optimising water and wastewater systems at all levels:<br>* Drinking water production and distribution systems (detecting and reducing leaks, reducing consumption, etc.)<br>* Wastewater treatment systems (increasing renewable energy production, optimising energy performance, etc.)<br>* Promoting integrated rainwater management (GIEP) (reducing waterproofing, promoting water management at plot level, etc.). | Not taken into account in the CCC method | Investment<br>Infrastructure<br>Governance<br>Supporting behavioural change<br>Innovation | Reducing water consumption and discharges by residents | Reduced energy and water requirements for drinking water and treatment before discharge | see table 8 | Improved impact on receiving environments and biodiversity<br>Reducing diffuse pollution<br>Improved management of water resources |

## B-1.2: Description of impact pathways

The national strategic framework is based primarily on two key documents: the National Low-Carbon Strategy (SNBC) and the Multiannual Energy Programme (PPE). These tools define the guidelines to be followed to achieve the structuring objective of carbon neutrality at national level.

Carbon neutrality is based on a balance between residual greenhouse gas emissions, which could not be avoided, and their compensation by carbon sequestration, i.e. an equivalent absorption thanks to carbon sinks. This ambitious objective guides all public policies in the field of energy and ecological transition.

At regional level, the SRADDET, adopted in December 2021, will flesh out these national ambitions by setting specific targets for the region: a 47% reduction in greenhouse gas emissions by 2030 compared with 2012, and carbon neutrality by 2050.

The ALM context is as follows:

2019 : Adoption of the Territorial Climate-Air-Energy Plan (PCAET) for the PMLA.

2021: Implementation of the "Acting on the Ecological Transition" participative process.

April 2021: Drawing up of an Ecological Transition Contract, transformed into a Regional Ecological Transition Contract (CRTE) in February 2022, integrating the local authorities and the socio-cultural aspect of the transition.

January 2022: ALM deliberation reinforcing climate objectives: -60% reduction in greenhouse gas emissions by 2030 (compared with 1990) and carbon neutrality by 2050.

July 2022: ALM is selected as a member of the "Mission 100 smart, climate-neutral cities", affirming its ambition to be one of the leading European cities aiming for carbon neutrality by 2030, by accelerating the decarbonisation of lifestyles, improving natural carbon sinks, strengthening local adaptation capacities and protecting the environment and health

The objective of carbon neutrality for Angers Loire Métropole in 2030 implies a residual emission level of 52,393 teqCO2 excluding the agriculture and industry sector (and 121,070 teqCO2 including them) for a population that will have increased by 5% to reach 319,525 inhabitants.

This residual level will have to be offset by an equivalent level of carbon sink, which will have to be doubled compared with 2021.

ALM drew up an energy-climate master plan following commitments made by its Community Council in January 2022. This plan did not include the objective of energy neutrality by 2030, but by 2050. Nevertheless, the results obtained for 2050 remain relevant.

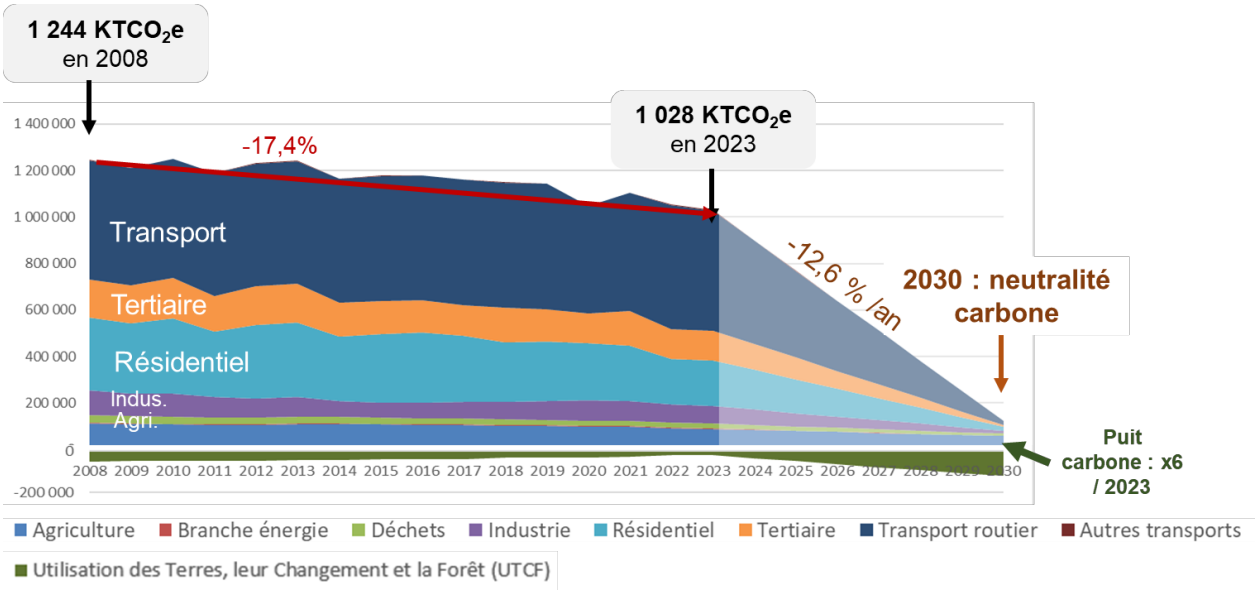
The approach consisted in comparing 4 scenarios, one trend-based, 2 scenarios developed according to a "feasibility" constraint, inspired by the work of ADEME Transition(s) ( https://www.ademe.fr/les-futurs-en-transition/ ), in particular the "Territorial Cooperations" and "Green Technologies" scenarios. The 4th scenario aimed to achieve the objectives of -60% by 2030 and carbon neutrality by 2050.

The main results are presented below. It should be emphasised that the agriculture and industry sectors have been included in this forward-looking work.

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

## ➢ Overall trajectory towards neutrality

Figure22 - ALM's emissions target trajectory (Scope: SCOPE 1 and 2)




This scenario leads to a 67% reduction in energy consumption to achieve carbon neutrality, from 5907 GWh/year in 2019 to 1946 GWh/year. The most significant efforts would be focused on daily mobility, as well as on freight, with an 82% reduction in consumption. The residential and tertiary sectors would aim to reduce their consumption by 63% and 55% respectively,

As a result of this work, GHG emissions would be reduced by 85%.

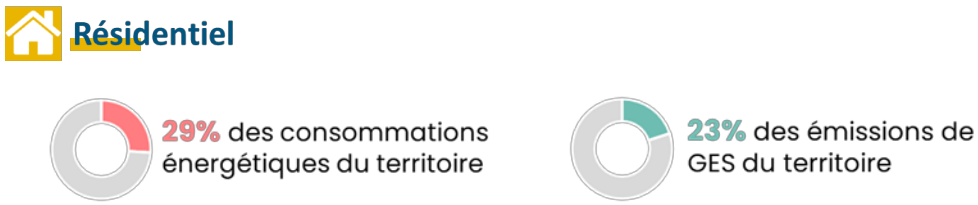
With regard to the different types of energy, petroleum products would virtually disappear, while natural gas would be reduced by 90% (with 90% of the gas circulating in the networks being biogas). Electricity consumption would be relatively stable.

## ➢ Sectoral approaches

The elements presented below by major emission sector are broken down into 3 blocks:

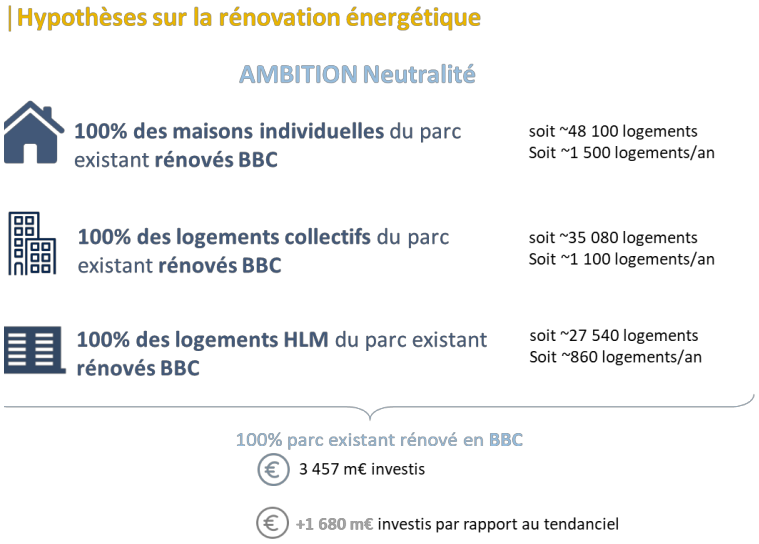
- an overview of the sector, including key regional data,
- technical assumptions about the choices made to achieve carbon neutrality,
- And finally, the results in terms of reducing GHG emissions and energy consumption, with the investments evaluated and the change in energy bills.

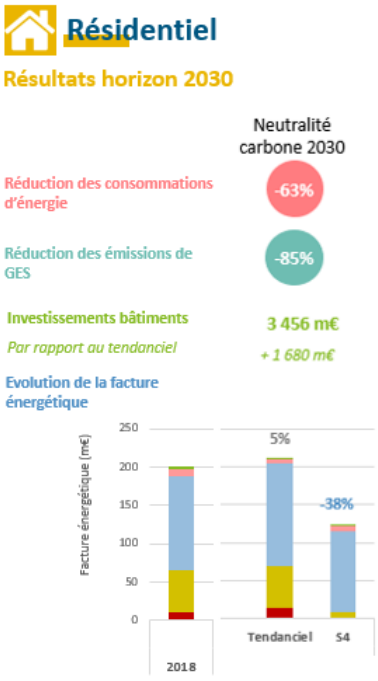
## ➢ For the buildings sector




**Situation in the sector :**

- 141,256 homes in the area, including 25% social housing, 46% single-family homes and 54% multi-family homes.
- Heating (space heating and domestic hot water) accounts for around 80% of energy consumption. Energy-efficient renovation of homes is therefore a priority.
- The energy mix in this sector is 54% fossil-fuel based, and is largely dominated by gas (46% of consumption).
- The regulations have recently been tightened, with a gradual ban on the letting or sale of "thermal flats" (homes rated E, F and G) between 2023 and 2034.
- Thermal renovation of homes labelled E, F and G represents a major source of energy savings. It is more cost-effective, and meets the challenge of fuel poverty.
- Opportunities exist thanks to the “Plateforme Territoriale de Rénovation Énergétiqu”e (Territorial Energy Renovation Platform), the France Rénov' space managed by ALM and the “ANAH” renovation grants.
- Some obstacles remain, such as in areas of outstanding architectural interest and town centres.



## Tertiaire

**20%** des consommations énergétiques du territoire

**12%** des émissions de GES du territoire

**Situation in the sector :**

- The tertiary sector is highly heterogeneous. The CEREN classification considers 6 branches of activity (offices and administrations; cafés hotels restaurants; shops; education; community housing, health, sport culture leisure; transport).
- A distinction must also be made between public and private tertiary sectors, as well as between large tertiary sectors subject to the Tertiary Sector Decree (over 1000m²) and small tertiary sectors (under 1000m²).
- Context: the tertiary sector decree sets ambitious targets for reducing consumption in tertiary sector buildings of over 1000m², which must achieve a 60% reduction in consumption by 2050.
- There is also a need to define support measures and targets for small tertiary buildings not subject to the tertiary decree (property units of less than 1,000m²)

### Hypothèse sur la rénovation énergétique : Tertiaire public

AMBITION Neutralité

**100%** du parc **tertiaire privé assujetti au décret tertiaire** rénové niveau BBC

soit ~2 270milliers m²
soit ~70 milliers m³/an

**100%** du parc **tertiaire privé non-assujetti au décret tertiaire** rénové niveau BBC

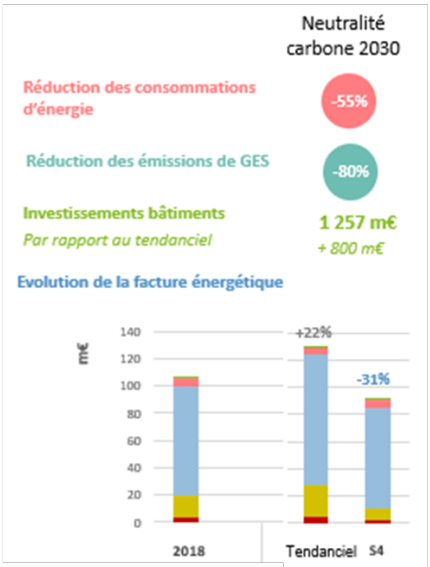
**100%** du parc **tertiaire public** rénové niveau BBC

100% parc existant rénové en **BBC**

1 257 m€ investis

**+800 m€** investis entre 2018 et 2050 que dans le tendanciel

### Résultats horizon 2030

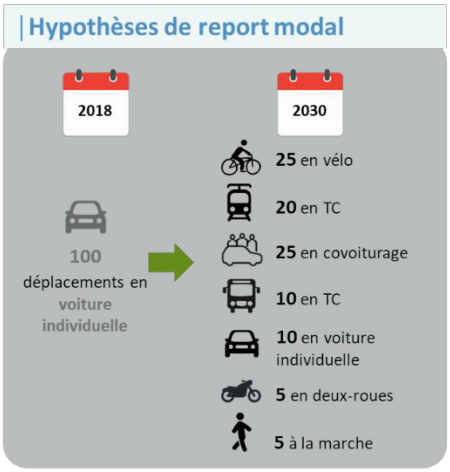


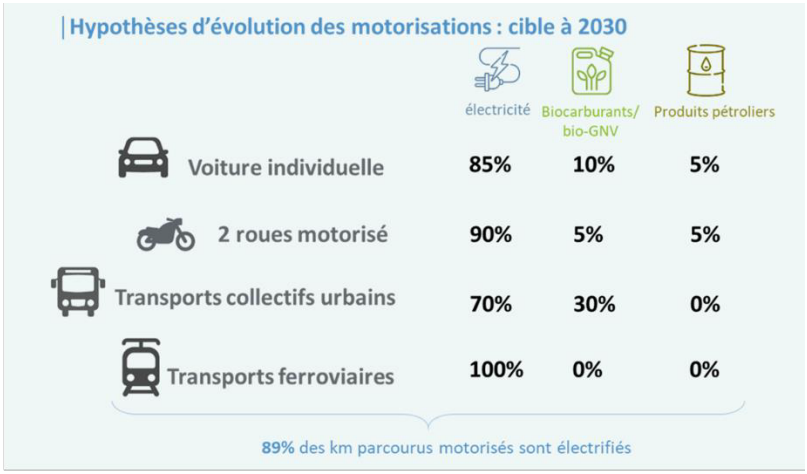
➢ **For the mobility, transport and freight sector**

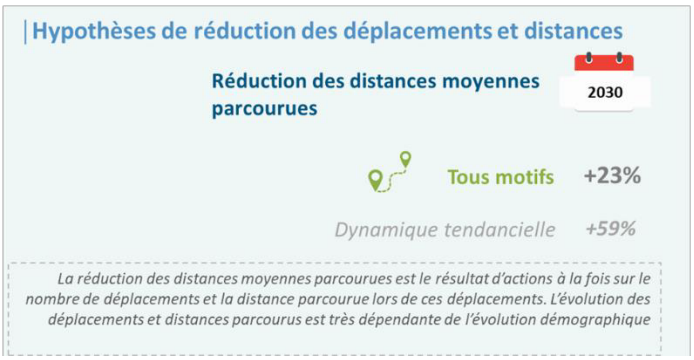

**Situation in the sector :**

- Daily mobility accounts for 81% of energy consumption in this sector (average distance of 10km per trip).
- Cars are used predominantly, leading to heavy dependence on petroleum products. Private cars account for 88% of emissions.
- Two methods can be used to account for mobility-related energy consumption: the cadastral method and the flow method. The cadastral method accounts for journeys measured within the area (journeys passing through it), while the flow method accounts for journeys generated by the area (e.g. commuting from outside the area).
- The ESDP uses the cadastral method in order to maintain continuity with previous studies. However, an approach based on responsibility (flow method) is important for this sector, as **incoming/outgoing journeys account for 62% of the km travelled**.
- Context: European regulations providing for the end of sales of internal combustion engines by 2040 > both a lever and a brake, as it would prevent the development of biofuels.

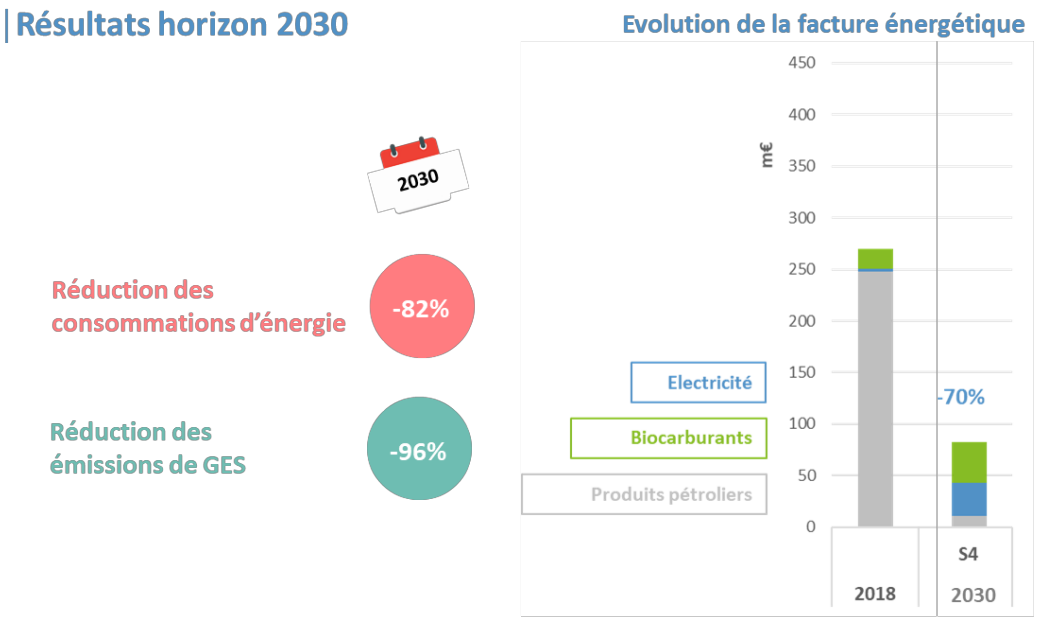
Angers Loire Métropole is the Organising Authority for Mobility in its area, and has significant powers to organise public transport, infrastructure and soft mobility services.




Significant modal shift: for every 100 journeys made by car today, 25 will be made by bicycle and 25 by car sharing by 2030. Only 10% of current car journeys will still be made by private car in 2030.




➢ **For renewable energy systems and energy production**

## Energies Renouvelables

**Situation in the sector :**

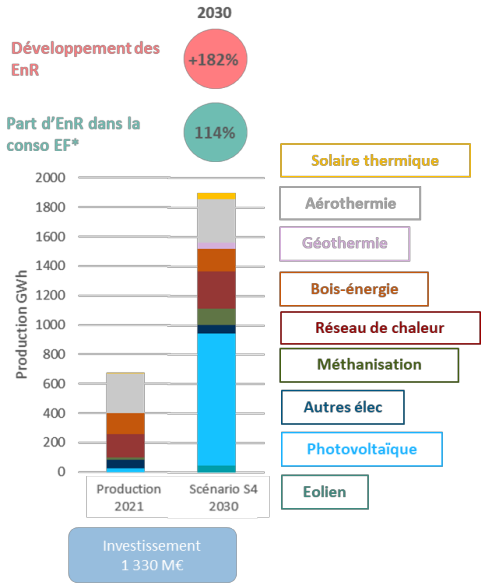
- In 2018, Angers Loire Métropole's energy balance represented 12.2% of the region's consumption (compared with 16% at national level).
- Photovoltaics currently account for 1% of the region's renewable energy production. However, it is the energy source with the greatest development potential in the region (64% of the net potential) and has been identified as the key sector for development, with different types of project to be considered (roof, car park shade, ground).
- The region has 12 district heating networks (4 public and 6 private) with an average biomass coverage rate of 72%. The region is very committed to the development of district heating networks, and in 2017 it produced a district heating network master plan.
- On the origin of wood energy in the region, there is room for improvement to ensure that the resource is sourced locally aka Take into account resources within a 100 km radius of ALM
- Origin of wood energy: There is still room for improvement to ensure that the majority of the resource comes from local sources, ideally within a 100 km radius of ALM.
- The consumption reduction scenarios forecast a very sharp reduction in heating consumption as a result of the energy renovation effort.
- The deployment of wind power is severely restricted in the region, in particular due to heritage protection zones.
- Acceptability of projects: Some projects, particularly those relating to wind power and methanisation, are finding it difficult to gain acceptance among local populations.

## Scénario global de production d' EnR&R

Une part croissante d'électricité
Une quasi disparition des énergies fossiles
Un vecteur gaz qui conserve un talon de consommation

Effort de maitrise des consommations
Développement massif des EnR

**2030**
Taux EnR cible sur le mix énergétique : **81-87%**

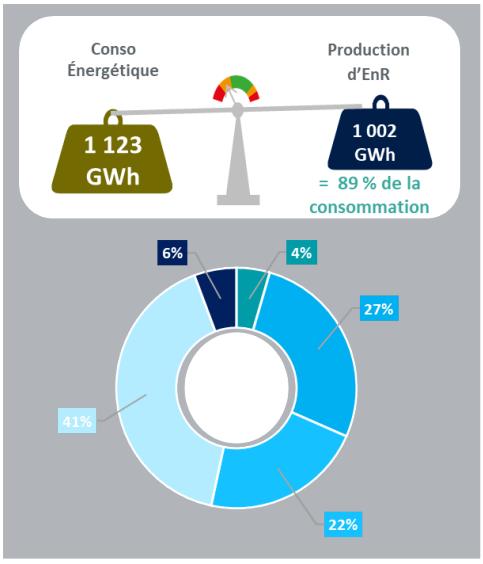



## Electricité

Développement massif des EnR : PV et éolien terrestre
Grands parcs minimisant les coûts

- Capacités nouvelles d'EnR + modulation taux EnR par recours aux EPR (et éolien flottant)

**2030**
Taux EnR cible sur le mix électrique : **77-87%**



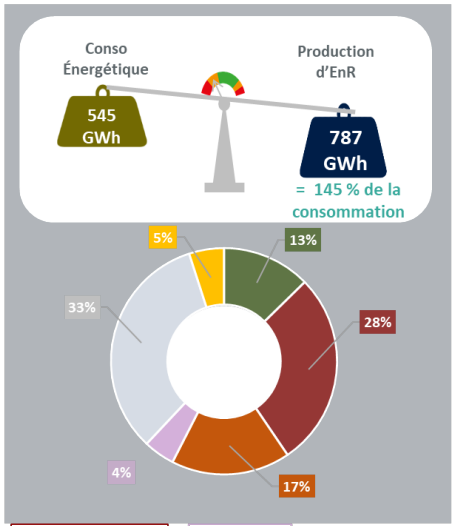

Eolien | Photovoltaïque au sol | Photovoltaïque en ombrière | Photovoltaïque en toiture | Autres élec

## Chaleur

Développement massif des EnR : notamment biomasse, aérothermie et biogaz
Développement des réseaux de chaleur : 15% de la chaleur avec un taux de 90% d'EnR&R

- Recours plus important à la géothermie en RCU et hors RCU

**2030**
Taux EnR cible sur le mix chaleur : **72%**




Réseau de chaleur | Géothermie | Solaire thermique
Bois-énergie | Aérothermie

## 3.2 Module B-2 Designing a climate neutral portfolio

The portfolio of impact actions that will enable us to achieve our climate neutrality objectives is shown in table 7 below.

This table has been designed to compare the investments made and projected by the local authority between 2020 and 2030 (within its sphere of action) with the investments modelled using the Madrid model financed by the Mission Ville.

It therefore presents two different approaches with slightly different types of action, which makes it more difficult to read. But the comparison was considered very instructive.

Columns 2 to 6 present the action plan and investments made and planned between 2020 and 2030 using ALM's internal forecasting method. These are only investments made by the local authority.

Column 2 distinguishes between investment in the region through its public services and investment in its assets.
Column 3 shows the sub-areas of the ALM plan presented in section 3.1 above.
Column 4 gives the title and column 5 the numbers of the related and appended action sheets.

Unlike the Madrid model, the investments of other players are not evaluated.
In addition, an area was added by ALM but not requested in the CCC: green infrastructure and nature-based solutions. The choice was made to include this as well, but the amounts indicated are excluded from the overall total.

Column 6 presents data from local authority investments projected for 2025-2030 (see tab 5 - B.1.1 - STATUS OF THE ALM-VILLE ANGERS 2025-2030 INVESTMENT PLAN in the investment plan) to which have been added data from investments made over the period 2020-2024. This makes it possible to compare the investments from the local authority's PPI with the investment costs resulting from the modelling of Madrid's model for the local authority.

Column 7 compares the typology of sectors and sub-sectors used in the investment plan with the Madrid model and the CCC architecture. Given the differences, it is only possible to compare the sub-total lines for each major sector (transport, buildings, etc.).

Columns 8 to 10 show the results produced by the Madrid model. Column 8 shows the investments made by the local authority and column 9 shows those made by all the other players in the area (mainly residents and businesses).

Column 10 shows the remaining emissions in 2030 after implementation of the action plan

The main lesson to be learned is that the methods need to be refined. The investment totals for each sector shows significant differences. At this stage of the work, it was not possible to decide on the most convincing method.

## Table7 - Action plan for neutrality and correspondence of data between action plan and investment plan

Reader alert: please read the comments carefully before reading this table.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| **ALM areas of action** | **ALM share target** | **Sub-domains ALM** | **Actions to make ALM carbon neutral** | **ALM action sheet attached** | Cost to City - Investment Expense CAPEX *Completed and 2020-30* | **Correspondence between investment plan sectors.** *CCC sub-sectors* | Cost to City - Investment Expense - CAPEX *(Madrid model 2020-30* | Cost to Other Stakeholders - Investment Expense - CAPEX *(Madrid model* 2020-30 | **Year 2030 Remaining emission kton CO2e** |
| **Transport - mobility** | Territory | Urban public transport (bus) | Implementing the mobility strategy :<br>□ Developing the bus network and modal transport<br>□ Developing intermodality<br>□ Combating car-free travel and developing car-sharing<br>□ Greening the bus fleet<br>□ Reducing speed, regulating traffic and enhancing public space<br>□ Encourage new working practices to reduce travel: teleworking, coworking sites, etc.<br>□ Support and encourage employers to improve the impact of their employees' journeys, or even reduce them through new solutions<br>□ Develop a real-time car-sharing service for journeys to and within the conurbation. | ENE7<br>ENE7B<br>ENE7C<br>ENE9b<br>ENE10 | *66 M€* | Electrification of | 4 M€ | | |
| | Territory | Urban public transport (tramway) | Implementing the mobility strategy :<br>□ Developing the tram network and modal transport (building or extending tram lines, developing and maintaining the network, equipping passengers with shelters, etc.)<br>□ Developing intermodality<br>□ Combating car use and developing car sharing<br>□ Reducing speed, regulating traffic and enhancing public space<br>□ Encouraging new working practices to reduce travel: teleworking, coworking sites, etc.<br>□ Support and encourage employers to improve the impact of their employees' journeys, or even reduce them through new solutions<br>□ Develop a real-time car-sharing service for journeys to and within the conurbation. | ENE7<br>ENE7A<br>ENE7B<br>ENE7C<br>ENE9b | *333 M€* | Shift to public & non-motorized transport | 220 M€ | 43 M€ | |
| | Territory | Cycling plan | Implement the cycling plan :<br>□ Promoting and educating people to use bicycles<br>□ Develop and share public spaces<br>□ Develop and support services<br>□ Support and encourage companies and establishments to use bicycles<br>□ Monitor and evaluate the cycling plan | 8A | *68 M€* | Reduced motorized passenger transportation need | - | - | |
| | territory | Calming public spaces Road renewal | □ **Develop**<br>* Rethinking the design of roadways<br>* Implement tools to monitor and evaluate pedestrian policy<br>* Redesign public spaces (e.g. squares)<br><br>□ **Rethink policies**<br>* Park-and-ride facilities<br>* Extend the green parking zone<br>* Charging points for electric vehicles<br>* Develop car-sharing areas<br>* Parking guidance systems<br>* Remove spaces<br>* Change the pricing system<br>* Allocate revenues from paid parking to sustainable mobility<br>* Set up a low-emission zone | 8B<br>9A | *96 M€* | Increased car pooling | - | - | |

| 1<br>**ALM areas of action** | 2<br>**ALM share target** | 3<br>**Sub-domains ALM** | 4<br>**Actions to make ALM carbon neutral** | 5<br>**ALM action sheet attached** | 6<br>Cost to City - Investment Expense CAPEX *Completed and 2020-30* | 7<br>**Correspondence between investment plan sectors.** *CCC sub-sectors* | 8<br>Cost to City - Investment Expense - CAPEX *(Madrid model 2020-30* | 9<br>Cost to Other Stakeholders - Investment Expense - CAPEX *(Madrid model* 2020-30 | 10<br>**Year 2030 Remaining emission kton CO2e** |
|---|---|---|---|---|---|---|---|---|---|
| | Territory | Developing the use of rail | □ Encouraging modal shift from passenger transport to rail<br><br>□ Develop rail freight:<br>* Initiate consultation with local stakeholders to identify freight flows and needs.<br>* Include guidelines for optimising freight transport at regional level in planning documents.<br>* Regulate, supervise, support and enforce the optimisation of goods flow management in the area.<br>* Rethink the parking strategy for goods vehicles<br>* Encourage and support local players within a formalised framework | NO ACTION SHEET but financing | *1,5 M€* | | | | |
| | Territory | Urban logistics and freight | Optimise the logistics and management of urban goods flows in the first and last mile:<br>□ Inform and raise awareness of the challenges of sustainable urban logistics among local authorities and economic players<br>□ Implement a sustainable urban logistics charter to promote increasingly energy-efficient, low-carbon urban freight transport.<br>*Action not included in section 3 because the financial requirements have not been assessed at this stage.* | ENE10 | *0,5 M€* | Optimized logistics | | | |
| | Community assets | Mobility and renewal of local authority car fleets | Reducing the carbon impact of staff journeys: rolling out the internal mobility plan<br>□ Build up a fleet of electric vehicles□ Cover the cost of public transport and soft modes of transport<br>□ Business trips: distribute public transport tickets, encourage car-sharing<br>□ Introduce a sustainable mobility package (FMD) to provide financial support for sustainable practices<br>□ Encourage car-pooling<br>□ Facilitate teleworking<br>□ Encouraging residents and businesses to switch to less GHG-emitting vehicles Community initiative: electric charging points + parking spaces, etc. | ENE7A | *9 M€* | Electrification of cars + motorbikes | 1 M€ | | |
| | Territory | Electrification of private car and motorbike fleets | Encouraging residents and businesses to invest in electric vehicles | | | Electrification of cars + motorbikes | | 75 M€ including €6M for businesses | |
| | Territory | Electrification of private HGV fleets | Encourage companies to invest in electric vehicles | | | Electrification of trucks | 2 M€ | 143 M€ | |
| | | | **TOTAL** | | ***574 M€*** | | **227 M€** | | **24 Kt** |

| 1<br>ALM areas of action | 2<br>ALM share target | 3<br>Sub-domains ALM | 4<br>Actions to make ALM carbon neutral | 5<br>ALM action sheet attached | 6<br>Cost to City - Investment Expense CAPEX *Completed and 2020-30* | 7<br>**Correspondence between investment plan sectors.** *CCC sub-sectors* | 8<br>Cost to City - Investment Expense - CAPEX *(Madrid model 2020-30* | 9<br>Cost to Other Stakeholders - Investment Expense - CAPEX *(Madrid model* 2020-30 | 10<br>**Year 2030 Remaining emission kton CO2e** |
|---|---|---|---|---|---|---|---|---|---|
| Building renovation and sustainable urban planning | Territory | Public support for the renovation of private and social housing | □ Social housing stock: encouraging energy renovation and urban renewal in eco-districts<br>□ Improving the efficiency of thermal improvement schemes in private housing: developing a one-stop public service for assistance and support with energy renovation of residential buildings<br>□ Combating fuel poverty | ENE3<br>ENE3a | *16 M€* | Building renovations (envelope) | | | |
| | Territory | Energy-efficient renovation of homes and commercial buildings | Investment by residents and businesses in energy-efficient renovation of homes and commercial buildings | | | Building renovations (envelope) | | 549 M€ | |
| | Territory | Public action for sustainable urban development | □ Gradually reduce the rate at which land is artificially developed, so that by 2050 there will be no net artificialisation.<br>□ Favour urban renewal over urban expansion<br>□ Incorporate zero net artificialisation (ZAN) objectives into urban planning documents, in particular SCOT, SRADDET and PLUi.<br>□ Develop the conditions for exemplary development and property operations (encourage dialogue between players, provide training, define a framework/guide for sustainable construction). | ENE1<br>ENE4 | *317 M€* | *New energy-efficient buildings* | Not rated | | |
| | Territory | Efficient new construction in the private sector (housing and commercial) | Investment by residents and businesses in new housing and commercial buildings | | | *New energy-efficient buildings* | | 231 M€ | |
| | Community assets | Renovation of public service buildings and intelligent buildings<br><br>Efficient new buildings | Implement Building Energy Plans, focusing on 3 areas (users, assets and ecological transition) and 6 actions:<br>□ Raising awareness among occupants<br>□ Raising awareness among children<br>□ Property strategy - optimising floor space<br>□ Intelligent Territory - improving the management of energy equipment<br>□ Investment - implementing environmental requirements<br>□ Investment - develop renewable and bio-sourced energies<br><br>Implement the Intelligent Territory project to reduce the region's energy consumption:<br>□ Renovate public lighting and introduce intelligent lighting / encourage private lighting companies to renovate<br>□ Reduce energy consumption in public buildings through precision control<br>□ Develop precision watering of green spaces to reduce water consumption<br>□ Optimising waste management and collection by installing sensors<br>□ Monitor the drinking water network in real time (quantity/quality) | T6<br><br>ENE5 | *93 M€* | Building renovations (envelope)<br><br>New energy-efficient buildings | 29 M€<br><br>26 M€ | | |
| | | | **TOTAL** | | ***426 M€*** | | **55 M€** | **780 M€** | **15 kt** |

| 1<br>ALM areas of action | 2<br>ALM share target | 3<br>Sub-domains ALM | 4<br>Actions to make ALM carbon neutral | 5<br>ALM action sheet attached | 6<br>Cost to City - Investment Expense CAPEX *Completed and 2020-30* | 7<br>**Correspondence between investment plan sectors.** *CCC sub-sectors* | 8<br>Cost to City - Investment Expense - CAPEX *(Madrid model 2020-30* | 9<br>Cost to Other Stakeholders - Investment Expense - CAPEX *(Madrid model* 2020-30 | 10<br>**Year 2030 Remaining emission kton CO2e** |
|---|---|---|---|---|---|---|---|---|---|
| Energy systems | Territory | Public district heating networks | □ Continue to roll out the master plan for heating networks:<br>* Interconnect heating networks<br>* Continue to develop the various districts and outlying municipalities<br>* Innovate by identifying new sources of energy recovery | ENE11 | *175 M€* | Decarbonizing heating generation | 177 M€ | | |
| | | Decarbonising heating in the private sector | Initiatives by residents, businesses and energy suppliers to decarbonise their heating systems (gas, oil, etc.) (not connected to public heating networks) | | | Decarbonizing heating generation | | 209 M€ | |
| | Territory | Gas and electricity networks | **Key areas for gas**:<br>* Increasing the use of renewable gas (aiming for 100% by 2050 and 25% by 2030)<br>* Reduce energy consumption by 60%.<br>**Major actions concerning gas**:<br>□ To cover gas consumption with renewable gas, thereby providing a low-carbon energy mix that will enable the department to be self-sufficient in gas.<br>□ Massively reduce gas consumption for building needs, by around -35% between 2020 and 2030 and by 60% between 2030 and 2050 (a reduction of 4% per year), through the combined effects of energy sobriety, energy efficiency and energy saving.<br>efficiency and energy substitution<br>□ Develop the growing use of biogas in the transport sector<br>□ Reduce the carbon footprint of the network operator's activities in the region by 30% by 2030 (compared with 2009).<br><br>**Key areas for electricity**<br>□ Involve energy distribution stakeholders across the board<br>□ Implement a localised energy management programme with network operators/concessionaires<br>□ Encourage the purchase of renewable electricity<br>□ Develop energy management and renewable energy services offered by energy players | NO RELATED ACTION SHEET but contracts with ENEDIS and GRDF that include action plans | *2 M€* | Decarbonizing heating generation | CLEAR | *28 M€*<br>*(investment by GRDF in the gas network between now and 2030)* | |
| | Heritage | Energy efficiency of lighting and equipment | □ Implement the Intelligent Territory project in order to reduce the area's energy consumption - Renovate public lighting and implement intelligent lighting / encourage those involved in private lighting to renovate<br>□ Action to reduce electricity consumption (digital, centralised management, etc.) > Treated in public buildings | T6a sheet | *52 M€* | Efficient lighting & appliances | 10 M€ | | |
| | T ar | Efficiency of private equipment | Energy efficiency of lighting and equipment | | | Efficient lighting & appliances | | 186 M€ | |
| | Territory | Development of renewable energy production in the region | □ Supporting the local production and consumption of renewable energies: biomethane, biomass, solar energy, wind power, waste-to-energy and hydrogen, in particular:<br>* Identify areas to accelerate the development of renewable energies.<br>* Draw up a solar plan | ENE6 sheet | *1 M€* | Decarbonizing electricity generation | 2 M€ | 49 M€ | |
| | | | **TOTAL** | | ***230 M€*** | | **189 M€** | **444 M€** | **1 kt** |

| 1<br>**ALM areas of action** | 2<br>**ALM share target** | 3<br>**Sub-domains ALM** | 4<br>**Actions to make ALM carbon neutral** | 5<br>**ALM action sheet attached** | 6<br>Cost to City - Investment Expense CAPEX *Completed and 2020-30* | 7<br>**Correspondence between investment plan sectors.** *CCC sub-sectors* | 8<br>Cost to City - Investment Expense - CAPEX *(Madrid model 2020-30* | 9<br>Cost to Other Stakeholders - Investment Expense - CAPEX *(Madrid model* 2020-30 | 10<br>**Year 2030 Remaining emission kton CO2e** |
|---|---|---|---|---|---|---|---|---|---|
| Green infrastructure and nature-based solutions | Territory | Revegetation and renaturation of public spaces (parks and gardens) | □ Increasing carbon sinks through urban forests and the preservation/vegetation of spaces, desoiling schoolyards, canopies, etc.<br><br>□Implement the biodiversity plan (ALM perimeter):<br>* Discovering, raising awareness and training to improve collective action<br>* Sharing and pooling to improve knowledge<br>* Preserve and restore to protect our natural heritage<br>* Innovate and experiment to meet new challenges (adaptation to climate change, invasive alien species, soil conservation, etc.).<br><br>□ Implement the Angevins landscape master plan and the Urban Nature Plan (within the boundaries of the City of Angers):<br>* Strengthen the area's landscape identity.<br>* Sustainable design and management<br>* Knowing, preserving and developing the tree heritage<br>* Raise awareness and bring people together<br>* Promote, monitor and evaluate the scheme | ENV 2a sheet<br>ENV2B sheet | *28 M€* | Not taken into account in the CCC method | | | |
| | Territory | Protecting the environment and adapting to CC | □ Implement the climate change adaptation plan:<br>* Ensure the resilience of natural environments, production and infrastructure<br>* Ensure the resilience of residents and communities<br>* Ensure the resilience of organisations and communities<br><br>□ Raising public awareness of the ecological transition (general public, elected representatives, employees, businesses, etc.)<br><br>□ Implement the water cycle strategy for better resource sharing and management:<br>* Slow down the water cycle and preserve the environment.<br>* Organise sober use of water for all stakeholders<br>* Optimising availability and substituting resources<br>* Preserve water quality and prevent pollution<br><br>□ Prevent risks: flooding, pollution, noise, air quality, etc. | Sheet T3<br>Sheet T4<br>ENV3a sheet | *30 M€* | Not taken into account in the CCC method | | | |

| 1<br>**ALM areas of action** | 2<br>**ALM share target** | 3<br>**Sub-domains ALM** | 4<br>**Actions to make ALM carbon neutral** | 5<br>**ALM action sheet attached** | 6<br>Cost to City - Investment Expense CAPEX *Completed and 2020-30* | 7<br>**Correspondence between investment plan sectors.** *CCC sub-sectors* | 8<br>Cost to City - Investment Expense - CAPEX *(Madrid model 2020-30* | 9<br>Cost to Other Stakeholders - Investment Expense - CAPEX *(Madrid model* 2020-30 | 10<br>**Year 2030 Remaining emission kton CO2e** |
|---|---|---|---|---|---|---|---|---|---|
| | territory | Agriculture and the Territorial Food Project | □ Implement the regional food project:<br>* Agriculture and the region (e.g. identifying farms that are close to being handed over, carrying out a technical and economic study of the region's organic sectors, adapting training needs, etc.).<br>* Commodity chains and the region (e.g. improving information on local supplies)<br>* Spatial accessibility (e.g. drawing up an inventory of the spatial supply of food, etc.)<br>* Food culture (e.g. raising awareness among children, taking part in local events, etc.)<br>* Social accessibility (e.g. carry out anti-waste initiatives, collaborate on food insecurity projects, study the needs and support solutions of collective catering, etc.).<br><br>*Action not included in section 3 because the financial requirements have not been assessed at this stage.* | ECO4 sheet | NC | Not taken into account in the CCC method | | | |
| | | | **TOTAL** | | **58 M€** | Not taken into account in the CCC method | | | |
| Waste, circular ecology, water and sanitation | Territory | Waste recycling and the circular economy | □ Implement the circular economy roadmap:<br>* Strengthen local sorted collection solutions for household and business waste.<br>* Setting an example for the local authority: public procurement, responsible digital technologies, development and construction projects, sustainable tourism and events, etc.<br><br>□ Modernising collection and treatment facilities to improve energy efficiency and performance<br><br>□ Deploy biowaste sorting and treatment solutions | ECO3 sheet<br>ECO2 sheet | 38 M€ | Increased waste recycling | 1 M€ | | |
| | | Helping citizens and stakeholders to change their practices and reduce waste | □ Implement the circular economy roadmap:<br>* Acting on key economic sectors: food/bio-waste, construction and public works, repair/reuse, etc.<br>* Cross-functional actions: developing research and innovation, supporting initiatives and projects, promoting inter-company relations and virtuous approaches, providing information and training in the ET professions, etc.<br>* Setting an example for local authorities: public procurement, responsible digital technologies, development and construction projects, sustainable tourism and events, etc.<br><br>□ Strengthen the waste prevention and management strategy for citizens | ECO3 sheet<br>ECO2 sheet | 3,5 M€ | Increased waste recycling | | | |
| | Heritage | Improving water and wastewater networks | □ Optimising water and wastewater systems at all levels:<br>* Drinking water production and distribution systems (detect and reduce leaks, reduce consumption, etc.)<br>* Wastewater treatment systems (increasing renewable energy production, optimising energy performance, etc.)<br>* Promoting integrated rainwater management (GIEP) (reducing waterproofing, promoting water management at plot level, etc.). | ENV3B sheet | 208 M€ | Not taken into account in the CCC method | | | |
| | | | **TOTAL** | | **253 M€** | | **1 M€** | | **9 kt** |

| 1<br>**ALM areas of action** | 2<br>**ALM share target** | 3<br>**Sub-domains ALM** | 4<br>**Actions to make ALM carbon neutral** | 5<br>**ALM action sheet attached** | 6<br>Cost to City - Investment Expense CAPEX *Completed and 2020-30* | 7<br>**Correspondence between investment plan sectors.** *CCC sub-sectors* | 8<br>Cost to City - Investment Expense - CAPEX *(Madrid model 2020-30* | 9<br>Cost to Other Stakeholders - Investment Expense - CAPEX *(Madrid model* 2020-30 | 10<br>**Year 2030 Remaining emission kton CO2e** |
|---|---|---|---|---|---|---|---|---|---|
| | | | **TOTAL FOR THE ENTIRE PLAN (2020-2030)** | | **1 483 M€ *** | | **470 M€** | **1 485 M€** | **50 kt** |

* 1,541m including Green Infrastructure and nature-based solutions

| | | |
|---|---|---|
| ***Sub-total linked to the Intelligent Territory project*** ** *(extracted from the above amounts)* | | ***82 M€*** |
| *Energy efficiency in public lighting* | | *52 M€* |
| *Green spaces intelligent watering, supervisor...* | | *21 M€* |
| *Buildings : BMS, sensors, remote monitoring* | | *6 M€* |
| *Waste: collection, waste collection centres, waste management* | | *3 M€* |

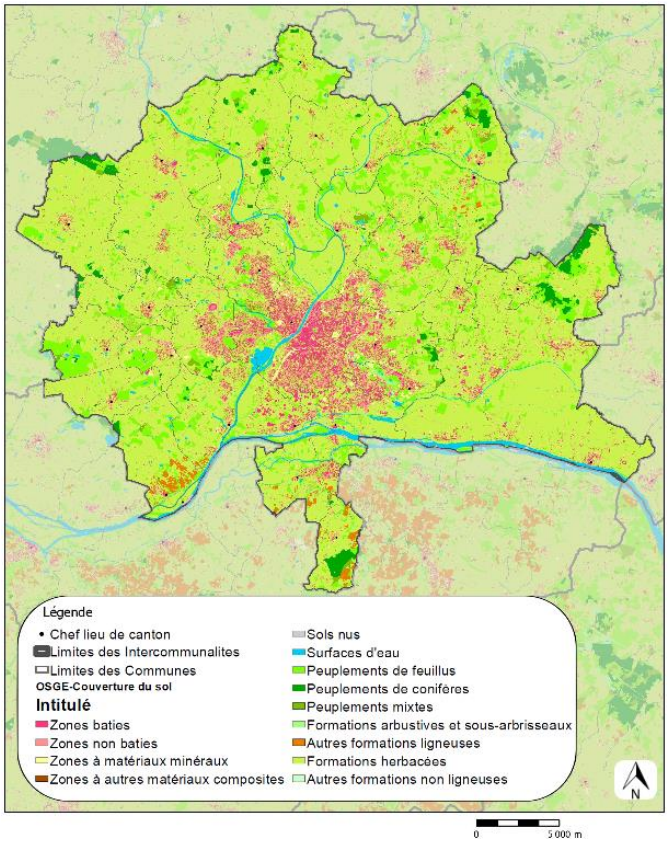
** This extraction makes it possible to identify (without complicating the reading) the investments made as part of the Intelligent Territory approach. This is an innovative and ambitious initiative designed to accelerate the ecological transition, and is presented in part 2.3, figure 20.

The action sheets linked to the action portfolio are presented in the appendix to this document.

## B-2.3: Summary strategy for residual emissions

Residual emissions are presented in table 6. They come from all sectors, as none of them will achieve complete decarbonisation by 2030. And for the neutrality objective, there will still be emissions linked to the production and consumption of energy in the various sectors. It will therefore be necessary to increase storage flows.

Figure23 - Type of land use in ALM territory - Source: Portrait Environnement du Territoire d'ALM 2023, Pays de la Loire Region




Storage flows in the region are mainly driven by the **net increase in forest biomass** (annual growth greater than removals). The variation in soil carbon (soil organic matter) is small, with a tendency to de-stock as a result of soil artificialisation

Nearly 70% of ALM's territory is occupied by agriculture and 16.6% is urbanised. The scope for development is relatively limited.

The solutions envisaged are **natural sequestration solutions**, making it possible to store carbon **on a long-term basis**, even if there is less room for manoeuvre than for reducing emissions. In fact, the levers for improvement are limited by the area's land-use profile: the high proportion of grassland (26% of the area) constitutes a soil carbon reservoir that is not very amenable to improvement, while the low level of forest cover (8.1%) and the low rate of harvesting mean that it cannot be used as a significant lever.

**Changes in farming practices** are the key lever. Thanks to their soils and hedgerows, farmers have the greatest responsibility in terms of carbon storage. In fact, the fight against artificialisation is a key factor in enabling agricultural and natural areas to offset the region's emissions. The scenario calls for a change in farming practices to increase carbon storage in soils and hedgerows: widespread use of intermediate cover cropping techniques, a 50% increase in hedgerow planting, and a doubling of the current rate of conversion to agroforestry,

**The increase in urban woodland** (which also fulfils other roles: urban cooling, biodiversity, living environment, etc.), while producing limited results, is another solution that should be pursued. A target of 150,000 trees planted in urban areas by 2030.

Below are the different levers envisaged to increase carbon sequestration in the region.

**Table8 - Levers for carbon sequestration in the ALM region - Source: SDEC**

| Types of levers | Levers | Assumptions/objectives neutrality |
|---|---|---|
| **Changes in farming practices** | Intermediate cover on field crops (CIPAN type) | 100% of cultivated land, i.e. around 15,000 ha |
| | Planting hedges on arable land | Planting of 4.5 km/year compared with 3 km/year today |
| | Agroforestry on livestock meadows | x2 current rate to reach 3 ha/year converted |
| **Change in land use** | Afforestation of agricultural plots | 1.5 ha/year (current rate maintained) |
| | Planting urban forests | Target of 150,000 trees planted (City Nature Plan) |
| **Timber harvesting in the forest** | | Maintaining the initial rhythm |

These measures would enable an increase of 35% compared to the initial state, but are still insufficient to achieve neutrality. Changes in the local climate will be a major variable in biomass growth.

Carbon neutrality therefore needs to be considered on a wider scale than that of ALM, at the level of the département or the region, given the concentration of economic activities, jobs and all the emitting functions, however small, associated with human activities in an area with more than 300,000 inhabitants

To compensate for this, the scenario calls for an ambitious reduction in energy consumption and greenhouse gas emissions. However, this approach remains insufficient. It will be necessary to define a more global vision, in partnership with more rural neighbouring areas, if we hope to achieve carbon neutrality on a broader scale.

## 3.3 Module B-3 Monitoring, evaluation and learning indicators

### B-3.1 : Routes of impact

The monitoring and evaluation indicators linked to the climate neutrality action plan are shown and categorised in Table 9. Each action to achieve climate neutrality has at least one monitoring/results indicator. Regular reporting of this data is also carried out thanks to the numerous strategic documents (Territorial Climate Air Energy Plan, Territory Committed to Ecological Transition, Intercommunal Local Town Planning Plan, etc.) and action plans (e.g. cycling plan, nature in the city plan, circular economy roadmap, etc.) and the annual reports of the Urban Community's public services (waste, water, heating network, etc.) which refer to it.

The following is a summary list of the indicators.

**Table9 - Impact pathway monitoring indicators - Source: Ecological Transition Department, ALM**

| Axes | Sub-axis | Actions to achieve carbon neutrality | Indicators | 2030 target values |
|---|---|---|---|---|
| Transport - mobility | Urban public transport (bus) | Implement the mobility strategy:<br>- Developing the bus network and modal shift<br>- Develop intermodality<br>- Greening the bus fleet<br>- Reduce speed, regulate traffic and enhance public space<br>- Encourage new working practices to reduce travel: teleworking, coworking sites, etc.<br>- Support and encourage employers to improve the impact of their employees' journeys, or even reduce them through new solutions<br>- Develop a real-time car-sharing service for journeys to and within the conurbation. | Greenhouse gas emissions from transport (teq CO2) and by modal split<br><br>Modal share public transport (%)<br>Pedestrian modal share (%)<br>Modal share cycling (%)<br>Modal share cycling (%)<br><br>Public transport use: journeys/inhab/year<br>Total number of journeys<br><br>Greenhouse gas emissions from transport (teq CO2)<br>Share of electrified buses in total fleet (%)<br><br>*Cf. annual reports from delegated operators (transport, parking, services, etc.)* | 20% reduction in motorised passenger transport<br>45% of passenger km by car by 2030<br>33% electrification of buses |
| | Urban public transport (tramway) | Implement the mobility strategy:<br>- Develop the tram network and modal transport (build or extend tram lines, develop and maintain the network, equip passengers with shelters, etc.)<br>- Develop intermodality<br>- Combating car use and developing car sharing<br>- Reducing speed, regulating traffic and enhancing public space<br>- Encouraging new working practices to reduce travel: teleworking, coworking sites, etc.<br>- Support and encourage employers to improve the impact of their employees' journeys, or even reduce them through new solutions<br>- Develop a real-time car-sharing service for journeys to and within the conurbation. | | |
| | Cycling plan | Implement the cycling plan :<br>- Promoting and educating people to use bicycles<br>- Develop and share public space<br>- Develop and support services using bicycles<br>- Supporting and encouraging companies and establishments | Modal share of cycling (%) | |

| | | | | |
|---|---|---|---|---|
| | | - Monitor and evaluate the cycling plan | | |
| | Car-pooling, car-sharing and alternative modes of transport | Promote the development of alternatives to the use of private cars by supporting the local offer (citiz, etc.)<br>- Combating car-free driving and developing car-sharing<br>- Develop car-sharing areas<br>- Making alternative mobility tools accessible and visible<br>- Support the implementation of mobility plans for companies and local authorities | Modal share of alternative modes (%) | |
| | Calming the public space | - Develop pedestrianisation<br>* Rethinking the design of roadways<br>* Implement tools to monitor and evaluate pedestrian policy<br>* Redesign public spaces (e.g. square plan)<br><br>- Rethink parking policies<br>* Park-and-ride facilities<br>* Extend the green parking zone<br>* Charging points for electric vehicles<br>* Developing car-sharing areas<br>* Parking guidance systems<br>* Remove spaces<br>* Change the pricing system<br>* Allocate revenues from paid parking to sustainable mobility<br>* Set up a low-emission zone<br><br>- Develop the area by promoting local centres (shops, health services, etc.) | Pedestrian modal share (%)<br>Modal share cycling (%) | |
| | Developing the use of rail | - Encouraging modal shift from passenger transport to rail<br><br>- Develop rail freight:<br>* Initiate consultation with local stakeholders to identify freight flows and needs.<br>* Include guidelines for optimising freight transport at regional level in planning documents.<br>* Rethink the parking strategy for goods vehicles<br>* Encourage and support local players within a formalised framework | Passenger numbers :<br>Journeys/capita/year<br>Total number of journeys | |
| | Urban logistics and freight | Optimise the logistics and management of urban goods flows in the first and last mile:<br>- Inform and raise awareness of the challenges of sustainable urban logistics among local authorities and economic players<br>- Implement a sustainable urban logistics charter to promote increasingly energy-efficient and carbon-free urban goods transport .<br>- Rethink the parking strategy for goods vehicles | Number of companies that have signed up to the charter<br>Number of companies investing in electric vehicles and proportion of company fleet (%) | |

| | | | | |
|---|---|---|---|---|
| | Mobility and renewal of local authority car fleets | Reducing the carbon impact of staff journeys: rolling out the internal mobility plan<br>- Building up a fleet of electric vehicles<br>- Cover the cost of public transport and soft modes of transport<br>- Business trips: distribute public transport tickets, encourage car-sharing, etc.<br>- Introduce a sustainable mobility package (FMD) to provide financial support for sustainable practices<br>- Encourage car-pooling<br>- Facilitate teleworking<br>- Encourage residents and businesses to switch to less GHG-emitting engines<br>- Community incentives: electric charging points + parking spaces, etc. | Change in the internal fleet towards electric vehicles (%)<br>Fuel consumption<br>GHG emissions from vehicle fleet<br>Number of in-house electric charging points Number of teleworking days per year<br><br>*See annual fleet report* | Renewal of the annual electric fleet in excess of 60%. |
| | Electrification of private car and motorbike fleets | - Encourage residents and businesses to invest in electric vehicles<br>- Strengthen the network of charging points | Number of charging points in the region<br>Percentage of electric vehicles in the local fleet | 18% of the fleet electrified |
| | Electrification of private HGV fleets | - Encourage companies to invest in electric vehicles<br>- Strengthen the network of charging points (ultra-fast) | Road transport consumption (GWh)<br>GHG emissions linked to road transport and freight in the region and trends | |
| Building renovation and sustainable urban planning | Public support for the renovation of private and social housing | - Social housing stock: encouraging energy renovation and urban renewal in eco-districts<br>- Improving the efficiency of thermal improvement schemes in private housing: developing a one-stop public service for assistance and support with energy renovation of residential buildings | Greenhouse gas emissions from the private tertiary sector (teq CO2)<br>Energy consumption in the private tertiary sector (GWh)<br>Greenhouse gas emissions from the public sector / social housing stock (teq CO2)<br>Energy consumption in the public sector / social housing stock (GWh)<br>Final energy consumption of public buildings (based on the surface area of the buildings, in kWh/m²)<br>Final energy consumption of public buildings (per capita, in kWh/inhab) (PCAET = not per capita (MWh) + "local authority assets")<br><br>Number of homes renovated for energy efficiency (no. of homes renovated/100 existing homes) by type of property (condominiums, social housing, detached houses)<br>Number of renovations in the public and private tertiary sectors<br><br>*Cf. data from the housing observatory, OPAH, etc.* | 3.5% annual renovation rate for<br>80% of new buildings with high energy performance<br>4% of efficient lighting and household appliances<br>16% |
| | Energy-efficient renovation of homes and commercial buildings | Investment by residents and businesses in energy-efficient renovation of homes and commercial buildings | | |
| | Public action for sustainable urban development | - Gradually reduce the rate at which land is artificially developed, with the aim of achieving zero net artificialisation by 2050<br>- Favour urban renewal over urban expansion<br>- Incorporate the zero net artificialisation (ZAN) objectives into urban planning documents, in particular SCOTs, SRADDETs and PLUiIs.<br>- Develop the conditions for exemplary development and property | | |

| | | | | |
|---|---|---|---|---|
| | | operations (encourage dialogue between players, provide training, define a framework/guide for sustainable construction). | | |
| | Efficient new construction in the private sector (housing and commercial) | Investment by residents and businesses in new construction of efficient, bioclimatic housing and tertiary buildings using renewable energy. | | |
| | Renovation of public service buildings and intelligent buildings<br>and efficient new buildings | Implement Building Energy Plans, focusing on 3 areas (users, assets and ecological transition) and 6 actions:<br>- Raising awareness among occupants<br>- Raising awareness among children<br>- Property strategy - optimising floor space<br>- Intelligent Territory - improving the management of energy equipment<br>- Investment - implementing environmental requirements<br>- Investment - develop renewable and bio-sourced energies<br><br>Implement the Intelligent Territory project to reduce the area's energy consumption:<br>- Renovate public lighting and introduce intelligent lighting / encourage private lighting companies to renovate<br>- Reduce energy consumption in public buildings through precision control<br>- Develop precision watering of green spaces to reduce water consumption<br>- Optimising waste management and collection by installing sensors<br>- Monitor the drinking water network in real time (quantity/quality) | | |
| Energy systems | Public district heating networks | - Continue to roll out the master plan for heating networks:<br>* Interconnect heating networks<br>* Continue to develop the various districts and outlying municipalities<br>* Innovate by identifying new sources of energy recovery | Number of homes connected to district heating networks<br>Number of establishments connected to district heating networks<br>Total heat production and delivery per network (GWh)<br>Network efficiency<br>Share of renewable energy in production (%)<br>Length of networks (km) and heat density (MWh / ml,year)<br>*See heating network annual reports* | Decarbonisation of district heating (16% of heating):<br>*10% of district heating produced from fossil fuels<br>*20% of district heating produced using electric heat pumps<br>*80% of district heating produced from biofuels |

| | | | | |
|---|---|---|---|---|
| | Decarbonising heating in the private sector | Initiatives by residents, businesses and energy suppliers to decarbonise their heating systems (gas, oil, etc.) (not connected to public heating networks) | Greenhouse gas emissions from the residential and tertiary sectors (teq CO2)<br>Percentage of renewable energy consumed for heating and cooling in the region (%)<br>Share of energy sources in the consumption of residential and tertiary buildings<br>Rate of oil-fired heating in the building stock and change in the number of oil-fired buildings | Decarbonisation of local heating (84% of heating):<br>*30% share of local heating produced from fossil fuels<br>*45% of local heating is produced using electric heat pumps<br>* 25% of local heating produced from biofuels |
| | Optimising gas and electricity networks | Actions concerning gas :<br>- To cover gas consumption with renewable gas, enabling the department to be self-sufficient in gas.<br>- Massively reduce gas consumption for building needs, by around -35% between 2020 and 2030 and by 60% between 2030 and 2050 (a reduction of 4% per year), through the combined effects of energy sobriety, energy efficiency and substitution of energy sources.<br>efficiency and energy substitution<br>- Develop the growing use of biogas in the transport sector<br>- Reduce the carbon footprint of the network operator's activities in the region by 30% by 2030 (compared with 2009).<br><br>Actions concerning electricity :<br>- Involve energy distribution stakeholders across the board<br>- Implement a localised energy management programme with network operators/concessionaires<br>- Encourage the purchase of renewable electricity<br>- Develop energy management and renewable energy services offered by energy players | Gas consumption (Gwh)<br>Consumption per m²<br>Percentage of biogas consumed<br>Change in number of customers (and by category)<br>Length of network<br><br>Same for electricity<br><br>*See GRDF and Enedis annual reports*<br><br>Financial indicators for energy prices<br>Percentage of households in fuel poverty | |
| | Energy-efficient lighting and public facilities | - Implement the Intelligent Territory project to reduce the area's energy consumption - Renovate public lighting and implement intelligent lighting / encourage private lighting companies to renovate<br>- Action to reduce electricity consumption (digital, centralised management, etc.) > treated in public buildings | Public lighting consumption (kWh/inhab/year)<br>Rate of renovation of streetlights | |
| | Energy efficiency of private equipment | Energy efficiency of lighting and equipment | Electricity consumption / uses (Enedis data) | |

| | | | | |
|---|---|---|---|---|
| | Development of renewable energy production in the region | - Supporting the local production and consumption of renewable energies: biomethane, biomass, solar energy, wind power, waste-to-energy and hydrogen, in particular:<br>* Identify areas to accelerate the development of renewable energies.<br>* Draw up a solar plan | - Total renewable energy production in the region (MWh)<br>- Total renewable energy production in the region (% of consumption)<br>-Renewable energy coverage rate - local authority assets<br>- Rate of renewable and recovered energy (RRE&R) for heating networks in the area (%)<br>- Rate of renewable energy production for heating and cooling in the area (%)<br>- Renewable electricity production (MWh)<br>*See annual data from the Energy Observatory currently being developed.* | |
| Green infrastructure and nature-based solutions | Revegetation and renaturation of public spaces (parks and gardens) | - Increasing carbon sinks through urban forests and the preservation/vegetation of spaces, desoiling schoolyards, canopies, etc.<br><br>- Implement the biodiversity plan (ALM perimeter):<br>* Discovering, raising awareness and training to improve collective action<br>* Sharing and pooling to improve knowledge<br>* Preserve and restore to protect our natural heritage<br>* Innovate and experiment to meet new challenges (adaptation to climate change, invasive alien species, soil conservation, etc.).<br><br>- Implement the Angevins landscape master plan and the Urban Nature Plan (within the boundaries of the City of Angers):<br>* Strengthen the area's landscape identity.<br>* Sustainable design and management<br>* Knowing, preserving and developing the tree heritage<br>* Raise awareness and bring people together<br>* Promote, monitor and evaluate the scheme | Annual artificial surface area<br>Annual surface area desilted<br>Number of trees planted<br><br>*See existing Biodiversity Plan and Urban Nature Plan indicators* | |
| | Environmental protection and adaptation to CC | - Implement the climate change adaptation plan:<br>* Ensure the resilience of natural environments, production and infrastructure<br>* Ensure the resilience of residents and communities<br>* Ensure the resilience of organisations and communities<br><br>- Raising public awareness of the ecological transition (general public, elected representatives, employees, businesses, etc.)<br><br>- Implement the water cycle strategy for better resource sharing and management:<br>* Slow down the water cycle and preserve the environment. | Net sequestration of carbon dioxide from soils and forests (teq CO2)<br>Change in surface area of forests and undeveloped areas<br>Number of people affected by heat island effects<br>Monitoring of meteorological events<br><br>*See existing climate change adaptation plan indicator* | |

| | | | | |
|---|---|---|---|---|
| | | * Organise sober use of water for all stakeholders<br>* Optimising availability and substituting resources<br>* Preserve water quality and prevent pollution<br><br>- Prevent risks: flooding, pollution, noise, air quality, etc. | | |
| | Agriculture and the Territorial Food Project | - Implement the regional food project:<br>* Agriculture and the region (e.g. identifying farms that are close to being handed over, carrying out a technical and economic study of the region's organic sectors, adapting training needs, etc.).<br>* Commodity chains and the region (e.g. improving information on local supplies)<br>* Spatial accessibility (e.g. drawing up an inventory of the spatial supply of food, etc.)<br>* Food culture (e.g. raising awareness among children, taking part in local events, etc.)<br>* Social accessibility (e.g. carry out anti-waste initiatives, collaborate on food insecurity projects, study the needs and support solutions of collective catering, etc.). | Greenhouse gas emissions from agriculture (teqCO2)<br>Energy consumption by agriculture (GWh)<br>Proportion of agricultural area certified as organic or in conversion and of high environmental value (%) (+MAEC for PAT) (AB only for CRTE)<br>Share of organic food in school catering<br><br>*See Territorial Food Plan assessment* | |
| Waste and circular ecology | Waste recycling and the circular economy | - Implement the circular economy roadmap:<br>* Strengthen local sorted collection solutions for household and business waste.<br>* Setting an example for the local authority: public procurement, responsible digital technologies, development and construction projects, sustainable tourism and events, etc.<br><br>- Modernising collection and processing facilities to improve energy efficiency and performance<br><br>- Deploy bio-waste sorting/treatment solutions | Greenhouse gas emissions from waste (teq CO2)<br>Change in quantities of waste collected by type and material (tonnes and ratio per inhabitant)<br>Recycling rate by material (%)<br>Energy consumption of collection and treatment systems<br>Recovery rate by material<br>Number of households sorting their bio-waste (via survey)<br><br>*See annual waste report* | Recycling target by material :<br>* 85% paper<br>* 85% metal<br>* 80% plastic<br>* 85% glass<br>* 90% organic matter |
| | Helping citizens and stakeholders to change their practices and reduce waste | - Implement the circular economy roadmap:<br>* Acting on key economic sectors: food/bio-waste, construction and public works, repair/reuse, etc.<br>* Cross-functional actions: developing research and innovation, supporting initiatives and projects, promoting inter-company relations and virtuous approaches, providing information and training in the ET professions, etc.<br>* Setting an example for local authorities: public procurement, responsible digital technologies, development and construction projects, sustainable tourism and events, etc.<br><br>- Strengthening the waste prevention and management strategy for local residents | Recovery rate by material<br><br>Number of awareness campaigns<br>Number of participants in zero waste challenges<br><br>Percentage of public contracts including environmental clauses (%)<br>Percentage of public contracts including social clauses (%)<br><br>*See circular economy roadmap and annual report* | |

| | | | | |
|---|---|---|---|---|
| | Improving water and wastewater networks | - Optimising water and wastewater systems at all levels:<br>* Drinking water production and distribution systems (detecting and reducing leaks, reducing consumption, etc.)<br>* Sewerage systems (increasing renewable energy production, optimising energy performance, etc.)<br>* Promoting integrated rainwater management (GIEP) (reducing the waterproofing of areas, promoting water management at plot level, etc.). | Energy consumption of distribution and treatment systems (Mwh)<br><br>Number of km of water networks renovated<br>Number of km of wastewater networks renovated<br>Number of health checks on water<br>Number of compliance checks on wastewater networks<br>Efficiency of drinking water supply system (catchment/treatment/distribution) (PCAET: drinking water network efficiency %)<br>Percentage of water bodies in good condition (= ecological condition + chemical condition)<br><br>*See annual water report and assessment of the major water cycle strategy.* | To be entered in the database |

# 4. Part C - Achieving climate neutrality by 2030

## 4.1. Module C-1 Innovative interventions in governance

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

**1. Existing governance structure within ALM and interaction with the local ecosystem**

The climate agenda is taken into account in the various sectoral policy steering structures and the ecological transition steering committee, which brings together elected representatives and departments. Reports are presented to the Executive via the annual sustainable development report, the annual TETE report and the multi-year assessments of the various plans and strategies.

Given the cross-cutting nature of the issues involved in the energy transition and the fact that they are intertwined with many of Angers Loire Métropole's policies and missions, and given the need to ensure that the guidelines are consistent, while taking care not to duplicate the frameworks, the CCC will be steered by the existing bodies and will interact with the tools for forecasting, steering, monitoring and evaluation, developed in particular as part of the PCAET and TETE. This presentation is shown in the diagram in the introduction to this document **(§ 8, figure 8 - Organisation and interactions between bodies, strategies, action plans and funding**).

ALM has developed a range of steering and assessment tools, which the label Territoire Engagé pour la Transition Ecologique (TETE, formerly Cit'ergie) has rated 73/100, the governance model implemented has been rated 87.5/100 and the cooperation strategy has been rated 85/100. These assessments show the care and quality given to these structural elements for the proper management of the ecological transition.

- **The ecological transition is embodied in the delegations of the community's elected representatives**

A **vice-president** is dedicated to the ecological transition and mobility issues. Each area of ecological transition is then overseen by a vice-president: waste and the circular economy, biodiversity, energy, the water cycle, agriculture, town and country planning, heating networks, etc.

In order to bring them together, ALM has set up the Ecological Transition **Steering Committee,** a key body dedicated to working across the board with the executive on the subject of ecological transition. This committee meets twice a year, in the presence of all the vice-presidents managing a policy linked to the ecological transition, to enable climate-air-energy issues in particular to be dealt with across the board.
The steering committee is a permanent part of the local authority's organisation and political decision-making bodies. Depending on the issues addressed, the steering committee brings together other local players: ALDEV, AURA, ALTER, the SIEML, etc. The committee ensures that the decisions taken are implemented, through project reviews and monitoring of progress indicators.

In addition to this cross-functional steering committee, other thematic steering committees are set up at least once a year: biodiversity steering committee, circular economy steering committee, water steering committee, etc.

**The Ecological Transition Commission** meets every month before the Community Council meeting. Led by 7 vice-presidents (water, energy, waste and circular economy, etc.) and open to members of the Council and representatives of the local authorities, this committee discusses and gives its opinion on the decisions to be taken in future debates relating to the ecological transition.

A post of **technical advisor** was created in 2023 within the office of the Mayor-President to support elected representatives specifically on the issue of ecological transition and facilitate the link between elected representatives, departments and civil society.

Figure24 - The main local bodies led by ALM on the ecological transition

**ALM governance**

**COMMUNITY COUNCIL** (elected members)

**STANDING COMMITTEE** (elected representatives)

**ECOLOGICAL TRANSITION COMMITTEE** (elected representatives)

Debate /

eco-transition **steering committee** (elected representatives and departments)

**TECHNICAL COMMITTEE (services, partners)**

Operational unit: indicator monitoring, coordination, sharing

**Governance and citizen participation**

**LOIRE ANGERS DEVELOPMENT COUNCIL** (200 citizens and organisation representatives)

**PARTNERSHIP BODIES**

E.g.: Angers and communes neighbourhood council, RCU subscribers' committee, mobility partners' committee, etc.

**Co-development bodies** (regional players)

Involvement of partners in projects (citizen mobilisation strategy for transition, Paln Biodiversity, Adaptation...), citizen consultation ANRU operation...

**CITIZEN DYNAMIC**

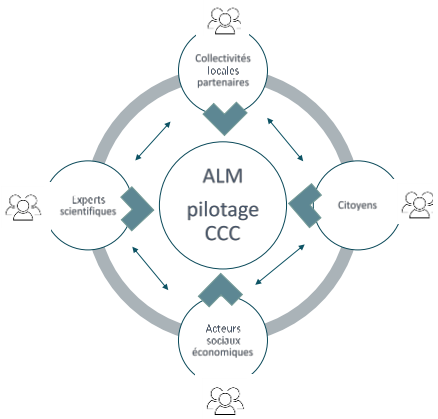
Assises de la transition écologique, Avan'cé climatiques, participative budgets for local authorities...

**Representation of ALM in territorial bodies (elected representatives)**

There are a large number of regional bodies, most of which interact with each other. The diagram above shows those run by ALM or the member municipalities. But the last block shows that the presence of elected representatives in a large number of regional bodies also makes it possible to forge a strong link with civil society on transition issues.

The diagram opposite simplifies the processes at work for most of the initiatives led by ALM, and the line that will also be taken to involve stakeholders in the CCC. This steering will be combined with that of the Climate Air Energy Plan to avoid duplicating the bodies involved in the planning exercises. Consistency will therefore be ensured.

Figure25 - CCC governance



## 2. Entities with responsibilities for climate change mitigation policies and cross-sectoral coordination

### ➢ Angers Loire Métropole

In order to successfully implement climate change mitigation policies and, more broadly, the ecological transition, ALM has the necessary competences in terms of energy and climate transition within its territory (PCAET, heat networks, organising authority for gas distribution, development of renewable energies, etc.), as well as transport and mobility, home improvement, waste management, water and sanitation, etc.

Under the guidance of the relevant vice-presidents, **the departments responsible for implementing these policies are grouped together within the "Ecological Transition and Development" DGA**, which promotes consistency and cross-functionality between departments.

In 2018 an **Ecological Transition Unit** (70 staff) was created within this DGA, which is responsible for:

- Cross-functional design, steering, evaluation, reporting and forecasting tasks, which are essential for ecological planning, and support for the vice-presidents.
- Operational missions in the field of ecological transition: energy - climate (heating networks, renewable energy, adaptation), biodiversity, circular economy, environment (air, noise, environments and water cycle), natural and technological risks, health and safety, raising awareness and supporting residents in the eco-transition, managing the car fleet, etc.
- Cross-functional support and coordination missions (interdepartmental and orga. associated with the local authority) across a wide area: a valuable resource and advisory function for cross-functional policy dynamics (recognised by the TETE label)

The department is responsible for chairing the ecological transition committee (a body of elected representatives responsible for advising on deliberations), the ecological transition steering committee and various sectoral steering committees.

The internal and external cross-functionality of the actions undertaken is ensured by an **ecological transition unit** made up of project managers and department heads, who act as a link with the departments, elected representatives and partners on their subjects.

In addition to the Ecological Transition Division, there is a network of **contacts** in each department to facilitate cross-functional action and exchanges, as well as reporting and evaluation of the many action plans underway.

ALM's elected representatives and departments are working in coordination with the following bodies to implement its climate agenda (PCAET, SDEC and CCC).

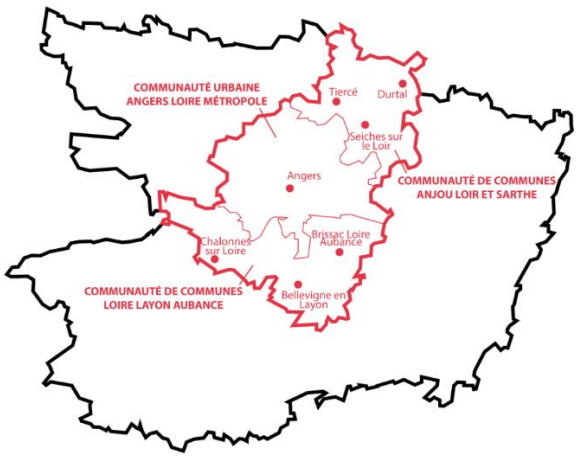
### ➢ Metropolitan Cluster

The Pôle Métropolitain Loire Angers brings together 3 public establishments for intercommunal cooperation (EPCI), including Angers Loire Métropole.

Its purpose is to implement its Schéma de Cohérence Territoriale (SCoT) and its Plan Climat Air Energie Territorial (PCAET) on a wider scale, covering the catchment area around the central city of Angers. It carries out studies, coordination, communication and contractualisation activities of metropolitan interest and supports the operation of the Loire Angers Development Council, a consultation body.

Elected representatives from the 3 EPCIs run the structure and its teams manage their joint PCAET.

**Figure26 - Map of the PMLA**



- **Syndicat intercommunal d'énergies de Maine-et-Loire (Siéml) and Alter Energies**

Siéml is a player in the public energy service in the department and in the ALM area. As the organising authority for the public distribution of electricity, in constant dialogue with the network operator Enedis, the syndicate works alongside the latter on some of the work on the network and operates the charging infrastructure for electric vehicles in the ALM area. As an aggregator of public funding and project developer, it also provides support, services and advice to local authorities, helping them with their energy efficiency and renewable energy projects. It also contributes to the development of renewable energy production tools such as methanisation.

SEM ALTER énergies invests in renewable energies by operating photovoltaic power stations, developing wind power and opening up to all sources of renewable energy in the region. The company's €12 million capital is divided between public (75%) and private (25%) shareholders, including ALM. The company's activities range from project feasibility studies (landscape, environment, etc.), through the development phase (financing, public participation, etc.) and the construction phase (tender management, monitoring, planning, etc.), to site management and operation. Some projects are managed directly by the SEM, while others may be carried out through the creation of specific project companies. ALM has entrusted it with the development of car park shaded areas, the construction of solar power plants, etc.

- **The Pays de la Loire Region**

The region is recognised as the level and leader for coordinating studies, disseminating information and promoting actions in the field of energy efficiency. It encourages the deployment of regional energy efficiency platforms in the EPCI. It steers the SRADDET (Schéma Régional d'Aménagement de Développement Durable et d'Égalité des Territoires), which defines all sustainable development policies, including those relating to climate, air and energy. It implements specific support and funding schemes.

The Schéma régional d'aménagement, de développement durable et d'égalité des territoires (SRADDET) sets ambitious targets: to make Pays de la Loire a positive energy region by 2050. To achieve this, in addition to reducing energy consumption, the Region is supporting the development of an electricity and gas energy mix that harnesses natural resources such as wind power (onshore and offshore), solar power (thermal or photovoltaic) and biomass (wood energy and methanisation).

- **State services (DREAL, DDT)**

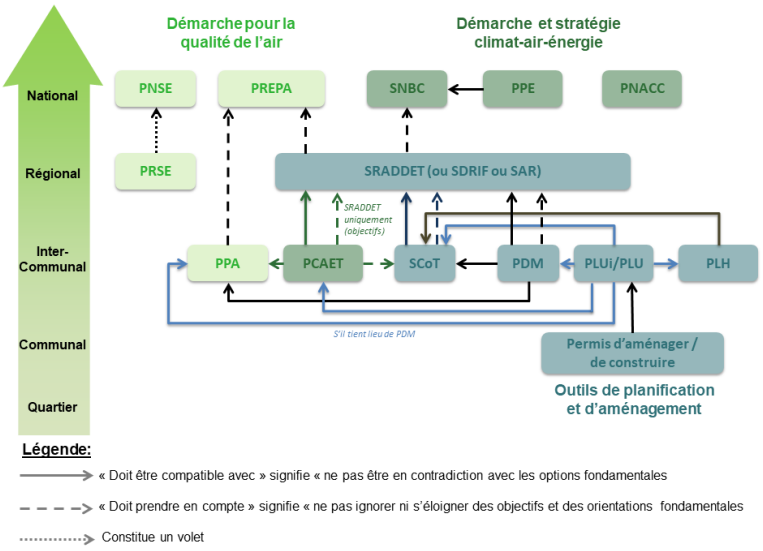
Under the responsibility of the Prefect of the Region, the Regional Department of the Environment, Planning and Housing (Dreal) coordinates the Prefect's action on public policies in favour of the climate and air quality with departments and partners. It participates in departmental committees with the DDT(M), energy associations, the TEO energy-climate observatory, ADEME and Air Pays de la Loire. In particular, it checks that the PCAETs comply with the regulatory objectives.

At departmental level and under the responsibility of the Prefect of the department, the Departmental Directorate of Territories is responsible for monitoring, supporting and assisting the State in matters of transport and travel, the development of renewable energy, town planning, housing, etc.

- **Complex but precise coordination**

The interaction of the various levels from national to local in terms of planning can be summarised in the diagram below.

Figure27 - Relationship between energy and climate planning documents in France




The Territorial Climate Air Energy Plan (PCAET) is a framework document for the energy and climate policy of local authorities. It must be coordinated with existing documents, in particular :

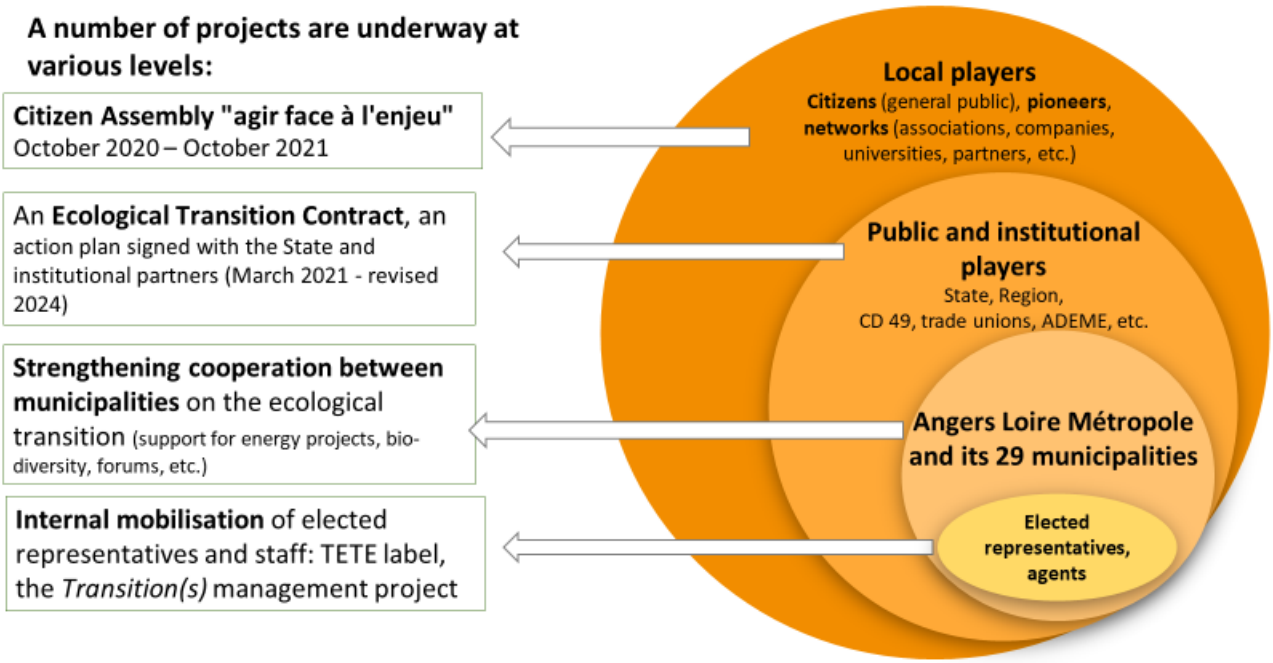
- ✓ The PCAET must be compatible with the SRCAE or the rules of the SRADDET
- ✓ The PCAET must take account of the SCoT, the objectives of the SRADDET and the national low-carbon strategy as long as the regional plan has not itself taken account of it.
- ✓ The PCAET must be compatible with the PPA
- ✓ The PLU / PLUi must take account of the PCAET

This complex interaction between planning approaches requires strong coordination to ensure that ALM's policy objectives for climate neutrality are consistent and correctly transcribed.

## 3. Mechanisms for interaction and involvement between stakeholders

The stakeholders and partnership mechanisms are mapped and detailed in **section A-3 and the previous section**.

Figure28 - Some tools for involving people at different levels




In addition, inter-territorial cooperation with neighbouring areas is ensured via the Pôle métropolitain (PMLA), with governance at the level of three EPCIs of the climate plan (PCAET) and the territorial coherence plan (SCOT).

ALM works in cooperation with representative bodies and professional federations such as the consular chambers (agriculture, commerce, trades and crafts) through its associated bodies (economic development with ALDEV, tourism with ALTEC, and planning with ALTER). It participates in specific information platforms for the various players in the region, notably as part of the preparation of the PAT or the FREC.

LM is a member of the departmental air-energy-climate network. This network is run by the SIEML, the DDT49 and the CD49, which has set up a dedicated department. This network works on the coordination of PCAETs, commitment charters for the development of renewable energy, etc.

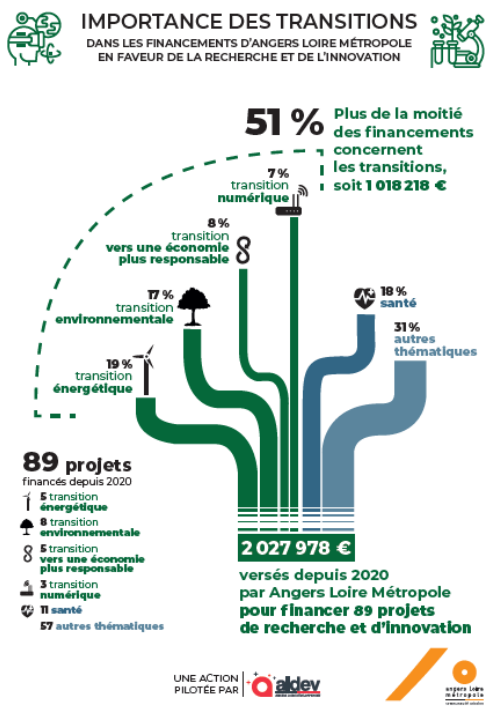
ALM cooperates at regional level with other metropolitan areas within the Loire Bretagne metropolitan cluster (Nantes, Rennes, Le Mans, Brest, Angers): there is a cooperation and exchange programme with an eco-transition strand to share experience on energy and waste.

ALM is also in contact with the Region and the State, participating in the work of the SRADDET and the regional COP, with the aim of territorialising ecological planning.
ALM is a member of and finances AIRPDL, a recognised regional body for monitoring the region's climate, air and energy indicators.
ALM is a member of France ville durable (an association whose mission is to accelerate the sustainable and resilient transformation of territories based on 4 action levers - sobriety, resilience, inclusion and creativity) and France Urbaine (the national reference association for large cities, metropolises, communities and urban agglomerations). ALM is also a member of Comité 21 and funds the regional IPCC, which promotes studies and knowledge on climate change in the Pays de la Loire region. It is also a member of the FNCCR, the Scot federation and the PLUi club,

Figure29 - ALM funding for the higher education and research sector

At national level, as part of the 100 neutral and intelligent cities mission, a working group, the "Mirror Group", has been set up at national level with the 9 French cities selected for the scheme. Regular meetings are held to encourage exchanges between regions and the sharing of knowledge and know-how

ALM is formalising partnerships through the ESR (higher education and research), working on major emitting sectors (housing, mobility, IT, etc.) as well as on nature-based solutions. For example, through the ALM / University of Angers agreement to carry out ecological diagnostics on the Basses Vallées Angevines; the ALM / Ecole supérieure des agricultures agreement to create an observatory on the impact of agroecological measures. Since 2020, ALM, via its economic development body ALDEV, has financed more than €2 million for projects contributing to transitions.




There is also an abundance of relationships/partnerships with associations, to name but a few: Solidarifood (Food), Place au vélo (Mobility), Alisée (Energy), Ligue de protection des oiseaux (Biodiversity), etc.

A cartography of all the entities in relation with ALM (not presented here) has been drawn up.

The mechanisms for interaction are complex and governed by regulations or voluntary partnership agreements. The implementation and monitoring of these partnerships are carried out by the departments under the guidance of their elected representatives.

Overall coordination is carried out by the DGA and the DGS, with the support of the Ecological Transition Division, which is responsible for cross-functional coordination, monitoring and coordination, particularly in the areas of climate and energy, as described above and in section A-3.1.

➢ **An ecological transition contract**

An important illustration of ALM's action to involve stakeholders in cooperation is the development of the Ecological Transition Contract, revised in 2022 and soon to be reformed as the **Contract for the Success of the Ecological Transition**.

This 4-year ecological transition contract reflects the profound and essential changes that Angers Loire Métropole has undertaken in recent years to promote a sustainable economic and social system. In addition to pursuing global objectives such as reducing greenhouse gas emissions, the aim is to speed up the transition by implementing more responsible and sustainable practices in the local authority's projects and the initiatives of the main players in the area.

Angers Loire Métropole's ecological transition contract is based around 3 strategic areas and includes a total of 12 framework actions (broken down into 29 operational actions):

- **Guideline 1: A resource-efficient and innovative economy**
  ↳ 6 framework actions, worth an estimated 225.8 million euros
- **Guideline 2: Diversified renewable resources drawn as close as possible to**
  ↳3 framework actions, worth an estimated €41.3 million
- **Guideline 3: An area that regenerates natural ecosystems, which provide resources, biodiversity and well-being**
  ↳ 3 framework actions worth an estimated €35.9 million

Co-signed in May 2021 with the State, ADEME, the Region, the Department, the Banque des territoires and the City of Angers, and 8 structures (landlords, developers, etc.), it is the fruit of a partnership effort.

## 3. Mechanisms for involving citizens in bringing about change

- **The ecological transition conference**

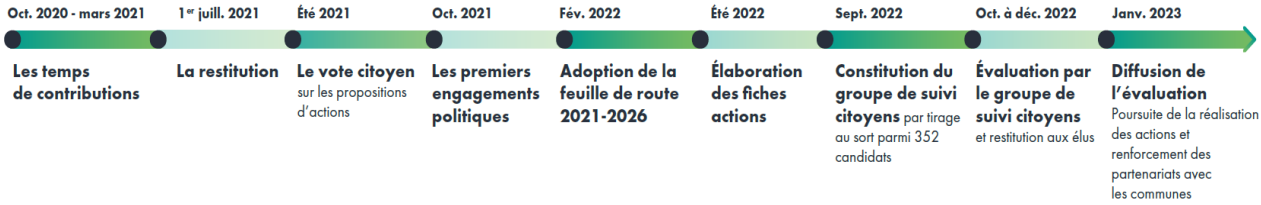
The conference process is presented on the  website.

The year 2021 was marked by a major step forward in terms of citizen participation, thanks to a new and ambitious project: the Assises de la transition écologique.

The mobilisation of citizens over more than 6 months was illustrated by the collection of almost 1,000 contributions. These were studied and summarised into 135 proposals were put to the vote in the summer of 2021. 54 actions were selected by the 9,000 voters and 9 "wildcard" actions by the elected representatives of Angers Loire Métropole, enabling existing actions in the area to be given a boost and new ones to be implemented.

This project, which involves close collaboration with local residents, new and experimental. In fact, its implementation and its monitoring and evaluation process are fuelled by current events in the area, the ideas of all the stakeholders and the commitment and determination of the local authority's departments.

Figure30 - The main stages of the conference




Three evenings were organised: to launch the conference, report on the work and launch the vote, and present the results and commitments (nearly 600 participants per evening).

Various forms of participation were implemented to receive contributions: workshops, contribution booklets, internet platform.

Over a period of almost 18 months, intense mobilisation, communication and awareness-raising efforts have been put in place to encourage the participation and commitment of citizens, associations, businesses and community groups around key priorities such as climate change.

- **Supporting citizen involvement**

An innovative process is being developed to raise awareness, provide information and encourage collective and individual action. It is described in the **following section C-2.2 Description of social innovation initiatives.**

The aim of this approach is to involve citizens, local stakeholders and local authorities on a much larger scale, and to ensure that the issues are understood and taken on board so that action can be taken to bring about the changes needed for the transition.

- **Development Council**

A body for policy consultation and concertation, with a dedicated ecological transition committee and the presence of citizens on this body.

It brings together the main local economic, educational, social and environmental players. As a forum for participatory democracy at the level of the Anjou catchment area, the Development Council encourages dialogue between all components of civil society, inviting them to work together to devise solutions to all issues affecting the future of their area. This citizen's perspective, which complements technical and political expertise, aims to inform the choices made by elected representatives on the policies to be implemented.

As a permanent participatory body, the Development Council has contributed over the last 5 years, through referrals, self-referrals, direct exchanges with elected representatives and departments or through notes sent to ALM, to the following themes: Climate, air, energy, Mobility, Biodiversity, Food, Urban planning and development, Actions to adapt to climate change, Overall territorial strategy, Citizen participation, Indicators for monitoring strategies and actions. Contributions were made to the development of the PACET, and then to its implementation

Link: https: https://conseil-dev-loire.angers.fr/publications/

- **Public consultation and participation**

Civil society is also mobilised on a daily basis, particularly in neighbourhoods undergoing urban renewal or in urban projects. Depending on the project, involvement takes a variety of forms: project cafés, post-it notes, etc. The local authority has realised that it needs to broaden its methods for seeking out and capturing user control, and this can be done using digital tools such as Ecrivons Angers.fr (for example, over 400 contributions have been collected on the Belle Beille swimming pool).

The neighbourhood councils are also involved in the various initiatives. The local authority relies on these neighbourhood councils and citizens' councils, with a structure that has evolved to include a single citizens' council and several neighbourhood councils with citizen intermediaries.

These bodies can take up the issues themselves, or be mobilised as part of projects (e.g. new transport network in 2023, Belle-Beille eco-district in 2022, etc.).

The citizen participation mission (City of Angers) is dedicated to consultation, including the “Ecrivons Angers.fr” platform, the participatory budget, etc.: Participatory budget There have been 5 editions of the participatory budget, and among the winning projects the first theme is the environment, although not necessarily the energy transition. The participatory budget has been the subject of a review, an overhaul and a COPIL with the mayor. It is moving in the right direction, not breaking with the past. It represents an investment budget of €1 million in addition to the €50-90 million annual PPI, and is dedicated to local residents.

The budget is made available to departments on the basis of elected projects, in addition to their respective budgets. 80% of the projects contribute to ET: waste, thermal cameras, transport, mobility, gardens, vegetation, fauna/flora. 6-7 municipalities other than Angers also have a participatory budget (Trélazé, Beaucouzé, etc.) which has the same ecological flavour. There is a desire to hold a joint meeting to share experiences. The list of winning projects is available [To download].

To put citizens at the heart of regional planning, a participatory budget has been launched in several municipalities: Angers (6th edition), Avrillé, Beaucouzé, Briollay, Les Ponts de Cé, Saint Léger de Linière and Trélazé. All residents can submit their ideas online, which are then put to the vote after a feasibility analysis. 80% of the winning projects in Angers in 2022 are linked to the ecological transition, demonstrating the strong involvement of local residents in achieving carbon neutrality for their city.

On the climate-air-energy theme, occasional surveys are carried out by the departments, for example in the city's parks and gardens, with questionnaires sent to users to improve usage and anticipate any changes.

Lastly, citizens are consulted on a number of specific projects: revision of the PLUi (2025-26), establishment of the RE Acceleration Zone (2024), etc.

## 4. Mechanisms for involving citizens in bringing about change

Below are the governance structures for addressing and existing barriers and opportunities:

**Table10 - Description of governance structures and processes**

| Name of intervention | Description | Leadership and stakeholders involved | impact | Co-benefits |
|---|---|---|---|---|
| (Indicate the name of the intervention) | (Describe the content of the intervention) | (List of managers and all stakeholders involved and affected, with reference to the stakeholders mapped in module A3) | (Describe how the intervention will achieve climate neutrality) | (Indicate how the intervention contributes to achieving the impact listed in module B-1) |
| **ALM Community Council** | A deliberative body that meets monthly, in public, to study strategic orientations and general issues, including TE issues. | Chairman<br>15 vice-presidents<br>Mayors of municipalities<br>Designated community councillors (90 elected) | Definition of policies, voting on decisions, monitoring, debates read on a regular basis. | Controls objectives, adopts plans, policies and resources (budget) |
| **Standing Committee / Executive Board ALM** | A deliberative and consultative body that meets monthly to debate and define policy orientations that have been studied in advance. | Chairman<br>Vice-Chairmen,<br>Mayors of municipalities and designated community councillors | Debate on the Eco-transition guidelines then presented to the Com. | Discussion of guidelines and reporting of results, assessments, etc. |
| **Ecological Transition Commission ALM** | A consultative body of elected representatives that meets monthly before the Community Council and the Standing Committee to discuss Eco-transition issues. | Chaired by the vice-presidents with ET-related delegations. | Opinion before the decision-making body. | Debate on the policies, projects and actions presented |
| **COPIL TE ALM** | A body that meets twice a year to monitor ecological transition policies and actions | ALM vice-presidents with links to ET and directorates | Promoting cross-functionality between elected representatives and departments and with stakeholders | Review of projects, proposals and consolidation of new initiatives |
| **Loire Angers Metropolitan Pole** | Syndicate committee and commissions meeting on the SCOT and the PCAET | Elected representatives of the 3 EPCIs | Defines the guidelines of the PCAET | Evaluate the PCAET and revise it in coordination with the 3 EPCIs |
| **Regional COP State Region Local authorities and civil society representatives** | Adaptation of the model of the Conference of the Parties to the regional level to promote consensus between the territories of the region. | Local authorities<br>Departments<br>Regions | Territorialisation of national ecological planning.<br>Alignment of national and regional objectives. | Exchanges and sharing between localities. |
| **National and European networks (neutral cities, Covenant of Mayors) to combat climate change** | A local authority committed at both national and European level to promoting the sharing of experience. Pioneering commitment. | Mayor<br>Elected representatives<br>Local authority employees<br>Other local authorities<br>France Sustainable city<br>Urban France<br>Comité 21<br>Mirror Group / Network of 100 neutral towns | Share and replicate good local practice in other areas. | Multiscalar coordination.<br>Highlighting the community's actions. |

## 4.2. Module C-2 Social innovation interventions

The table below lists the actions taken by ALM and the City of Angers to support and encourage social innovation initiatives and, more broadly, to overcome systemic barriers.

**Table11 - Relationships between social innovations, systems and impact pathways**

| Name of intervention | Description | Systemic obstacles/opportunities addressed | Leadership and stakeholders involved | impact | Co-benefits |
|---|---|---|---|---|---|
| (Indicate the name of the intervention) | (Describe the content of the intervention) | (See the obstacles and opportunities identified in module A-3) | (List of managers and all stakeholders involved and affected) | (Describe how the intervention will achieve climate neutrality) | (Indicate how the intervention contributes to achieving the impact listed in module B-1) |
| **Participatory process for the ecological transition conference** | A major participative initiative that has resulted in a roadmap (2022-2026) of 63 concrete actions for the city on seven themes of ecological transition | The need to raise awareness and mobilise a greater number of citizens into action.<br>An opportunity for the community and its citizens to express themselves freely and constructively.<br>Prioritisation of actions by citizens in addition to those led by the local authority | Citizens and all civil society stakeholders<br>ALM | Deployment of solutions tailored to needs.<br>Adoption of 63 measures in progress. | Innovation and a new democratic experience.<br>Increased environmental awareness.<br>Increase in individual commitments/ |
| **Strategy for raising public awareness of ET and providing support** | Project to create a citizen's pathway to change and develop tools to facilitate access to information and mechanisms on ET, for all players. | Moving beyond a purely informational role to provide support in the process of taking action<br>Aim for a mass transition.<br>Mobilise the driving forces behind this support (80 identified) | ALM - Municipalities<br>Citizens<br>Associations and companies raising awareness and taking action | Massive awareness-raising and mobilisation targeted at local residents, leading to a multiplicity of projects and results across the region. | Experiments that can be replicated in different areas and on different ET themes. Coordination created between awareness-raising players and reinforcement of Concrete results in terms of action taken. |
| **AMBITION project** | Experimental project launched over a two-year period from September 2024 for the transition of condominiums | Innovative project to mobilise residents of apartment blocks to take action.<br>The experiment is limited to a few copros at first because of the experimental aspect.<br>A project that can be multiplied and exported. | Citizens<br>TE trainers and support staff | Direct action on the transition of the residential sector. | Raising awareness.<br>Maximising impact.<br>Help with decision-making and concrete action on consumption and emissions. |

### C-2.2: Description of social innovation initiatives

Based on the observation shared with the players involved in the region's ecological transition, that despite a rich and active ecosystem of players, covering a wide variety of themes and offers and based on a network of hyper-proximity with residents, with whom links of trust have been established, the desired knock-on effect on changes in behaviour towards greater sobriety, efficiency and more virtuous alternative practices has not been achieved.

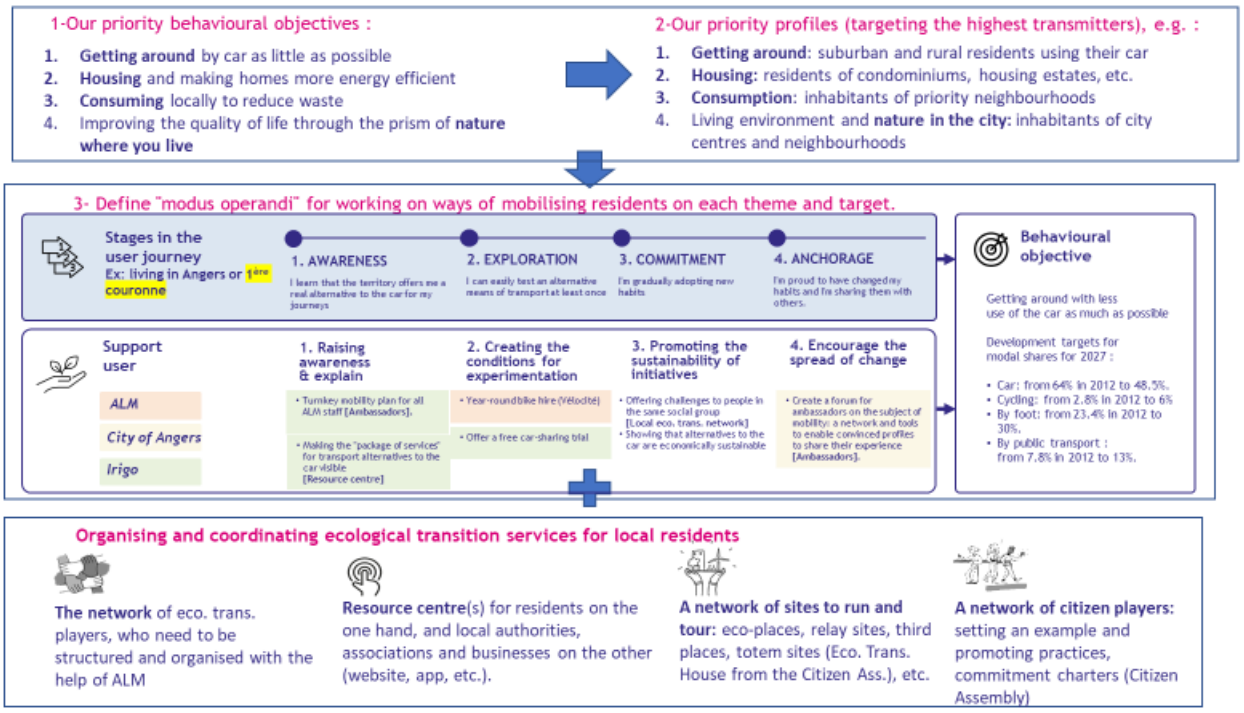
Angers Loire Métropole undertook work from June 2023 to April 2024 to define a mobilisation strategy with 77 partners (120 participants): 47 public, private and voluntary partners (70 participants), 15 municipalities (26 participants), 15 ALM-City of Angers departments (24 participants).

The project involved several approaches:
1. Using behavioural science to identify the obstacles and levers that prevent people from taking action, by highlighting the cognitive biases that prevent people from making totally rational decisions.

2. Relying on collective intelligence to build on the ideas of others, developing and improving them, taking advantage of the richness of the ecosystem.
3. An internal and external partnership approach to ensure effective coordination with the services of the conurbation, municipalities, institutional partners, associations and citizens' groups.
4. An experimental approach to testing together, iterating and improving on the basis of initial experience

The proposed innovation consists of :
- designing awareness-raising and action-taking programmes, based on the concerns of the targeted segment of residents and focusing the incentive to change on key moments in their lives, when they are most receptive to the issues.
- into a methodological framework to be shared with the City-ALM departments (and elected representatives) and then with the municipalities, to ensure a common language, to examine more effectively and collectively the levels of support proposed (awareness-raising > anchoring), and to think about pooling.

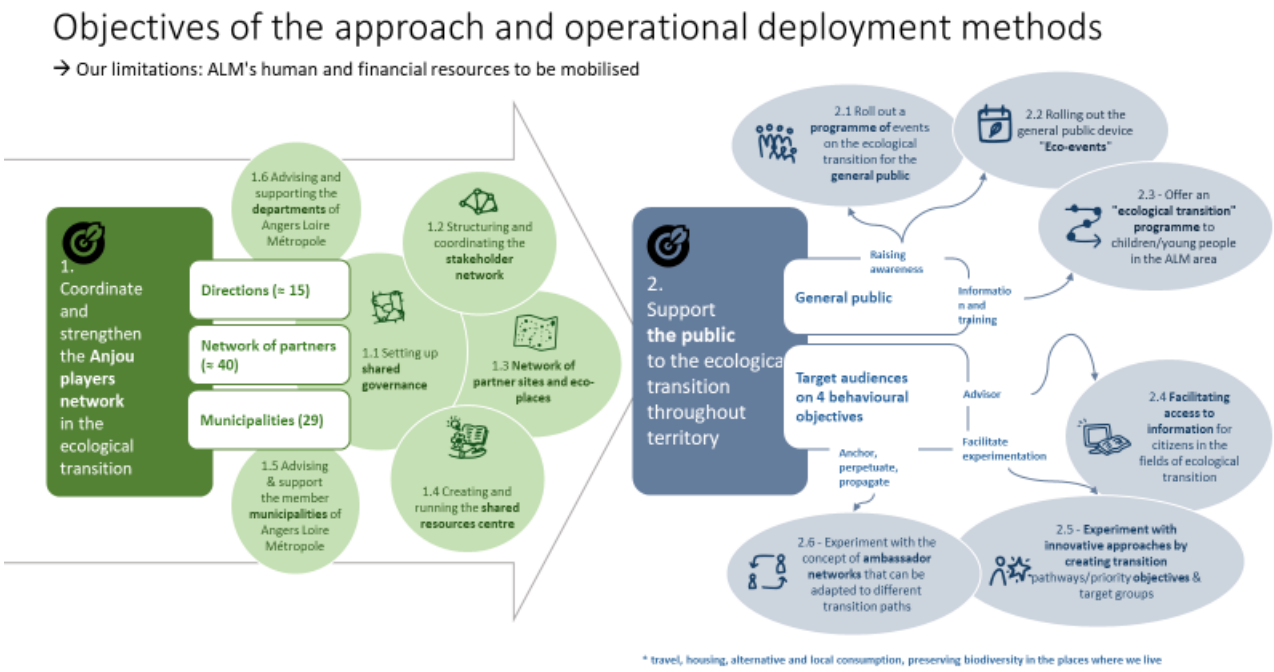
**Figure31 - Our framework for involving the public in the ecological transition in the region**




The role of these innovations is both to raise awareness and to put into action concrete results that take into account all stakeholders. The stakeholder and citizen participation strategy at the heart of the projects uses a variety of methodologies and tools to ensure that a wide range of interests are considered. The various field trials ensure that these innovations are perfected and explored with a view to achieving sustainable climate neutrality.

The actions focus on two areas, as described below.

**Figure32 - Areas of action to be developed to coordinate and consolidate the players involved in the offer and support the public in the ecological transition**




This approach, which focuses on the human link (and in parallel with current socio-technical developments in mobility, etc.), should help to reduce the obstacles to group participation. These innovations, by identifying the targets of the actions upstream, enable support to be tailored to each individual. The prior identification of target groups means that support can be tailored to each individual's level of commitment.

This approach, which would be used by all the players in the supply chain and would enable action to be coordinated, is part of a long-term timeframe to produce knock-on effects and intensification.

On the one hand, changes in the regulatory framework imposing technical developments (transport, construction, housing, etc.), the volatility of energy prices and the increase in the cost of goods purchased, among other factors, mean that people are looking for new and practical solutions in their daily lives. This is why the functions of transport, food, housing, etc., used in the approach are at the heart of the general public's approach.

In addition, the intensification of activities will be made possible by the deployment of financial tools (subsidies, including European subsidies, crowdfunding, participative financing, sponsorship, etc.). The example of projects such as AMBITION (see table above) also opens the door to large-scale replication of projects with convincing results.

# 5. Outlook and next steps

**Plans for the next iteration of the CCC and the CCC Action Plan**

Because of the progress planned in terms of planning and implementing the ecological transition, this document will be consolidated on an iterative basis.

At the level of the Urban Community, the **energy-climate master plan** currently being drawn up and the use of models such as that of the city of Madrid will from 2025, make it possible to better operationalise decarbonisation trajectories in the main sectors at stake for the region.

The **PCAET**, based on data from 2014 and an action plan from 2020, is now entering the revision phase and will be updated at the end of 2026. The **inter-municipal Local Urban Plan** has also been revised, and the new document will be published in 2026. The second citizen assessment of the roadmap **for the Ecological Transition** will be carried out at the end of 2025.

TETE's annual review is an ideal opportunity to observe the progress made over the past year and to update the indicators for monitoring the progress of projects and results (consumption, emissions, etc.). It is due to be revised in 2028. ALM and the city of Angers will be updating their greenhouse gas emissions assessment at the beginning of 2025, incorporating scope 3 (assessment of the greenhouse gases emitted by our property and services)

Data on greenhouse gas emissions and energy consumption will be updated more frequently by Air Pays de la Loire.

Lastly, the implementation of **ecological planning on a national scale**, and its regional translation in particular via the **territorial COPs**, will have to be considered in the next version of the CCC. The revision of the CTE into a Contract for the Success of the Ecological Transition will also be an opportunity to involve the region's institutional players to a greater extent.

Angers Loire Métropole's commitment to the Mission Ville, reflected in the regular sharing between European cities and implemented locally via the **AMBITION pilot project** (implemented from September 2024 for a period of 2 years), will feed into the CCC.

These structuring elements in terms of carbon neutrality will therefore have an impact on the CCC's action and investment plan, which will be adjusted as the work progresses.

The main stages are illustrated in figure 9. The CCC will be continually enriched in areas requiring the development of new approaches and tools (efficiency of actions, impact, etc.).

**In particular, section B-1-2 Description of impact pathways will be reworked for the next version of the CCC.**

NET ZERO CITIES

EU MISSION PLATFORM | CLIMATE NEUTRAL AND SMART CITIES

## City Climate Contract

# Commitments to climate neutrality by 2030

## Angers Loire Métropole's climate neutrality commitments




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

## INTRODUCTION

By initiating work on this Climate City Contract (CCC), Angers Loire Métropole (ALM) is delivering an ambitious response to the climate emergency we face. The ALM CCC's climate policy is driven by three key objectives: accelerating the ecological transition to achieve climate neutrality, building a resilient metropolis capable of withstanding the effects of climate change, and fostering an inclusive transition that benefits all residents and stakeholders in the region.

Through this initiative, ALM is voluntarily aligning itself with international, European, and national efforts to combat climate change. While contributing to this broader framework, the CCC also aims to provide a tailored response to specific local challenges by leveraging the region's strengths—such as its strong potential for district heating networks and renewable energy development, evolving mobility solutions, and a dynamic circular economy ecosystem. At the same time, it takes into account key climate risks, including flooding, biodiversity loss, and urban heat islands.

The CCC is fully aligned with ALM's ecological transition strategy. It builds upon the ambitious greenhouse gas (GHG) reduction targets adopted by the Community Council in January 2022 and the Territorial Climate Air Energy Plan action plan adopted in 2020. This plan has been further strengthened through the *Territoire Engagé pour la Transition Écologique* initiative, an extension of the European Energy Award label. Notably, ALM and the City of Angers were awarded a fourth star at the beginning of 2024 in recognition of their efforts over the past four years.

The "Commitments to Climate Neutrality" document highlights the key sectors targeted for GHG emissions reductions: mobility and transport (including freight), residential and commercial buildings, the development of renewable energy, and land-use planning—an essential lever for adapting the region to ongoing changes.

While Angers Loire Métropole has the capacity to take action through its responsibilities and competences, achieving carbon neutrality will require the collective effort of all regional stakeholders, including the 29 municipalities, public-sector actors, the national government, businesses, associations, civil society, and—most importantly—local residents.

In fact, local residents' daily mobility and residential energy consumption account for 59% of total emissions, compared to 6% from industry, 12% from the tertiary sector, and 12% from freight. Meanwhile, the services and infrastructure managed by Angers Loire Métropole and the City of Angers contribute just 2.6% of total emissions. More broadly, through their policies and services, local authorities can directly influence between 10% and 30% of regional emissions. This underscores the critical need for widespread engagement and inclusion to ensure the success of the ecological and energy transition.

The purpose of the Climate City Contract is therefore to consolidate the actions, financial resources, and human capital of our local authority—and ultimately, all regional stakeholders—into a forward-looking framework. This unprecedented initiative will need to be further developed to address the systemic and multi-level transformations required. The approach will be closely coordinated with our continuous improvement initiative, *Territoire Engagé pour la Transition Écologique* (TETE).

The commitments made toward achieving carbon neutrality represent a first step in presenting the European Commission with ALM's objectives and proactive approach to climate action.

# Table of illustrations

# 1 Introduction

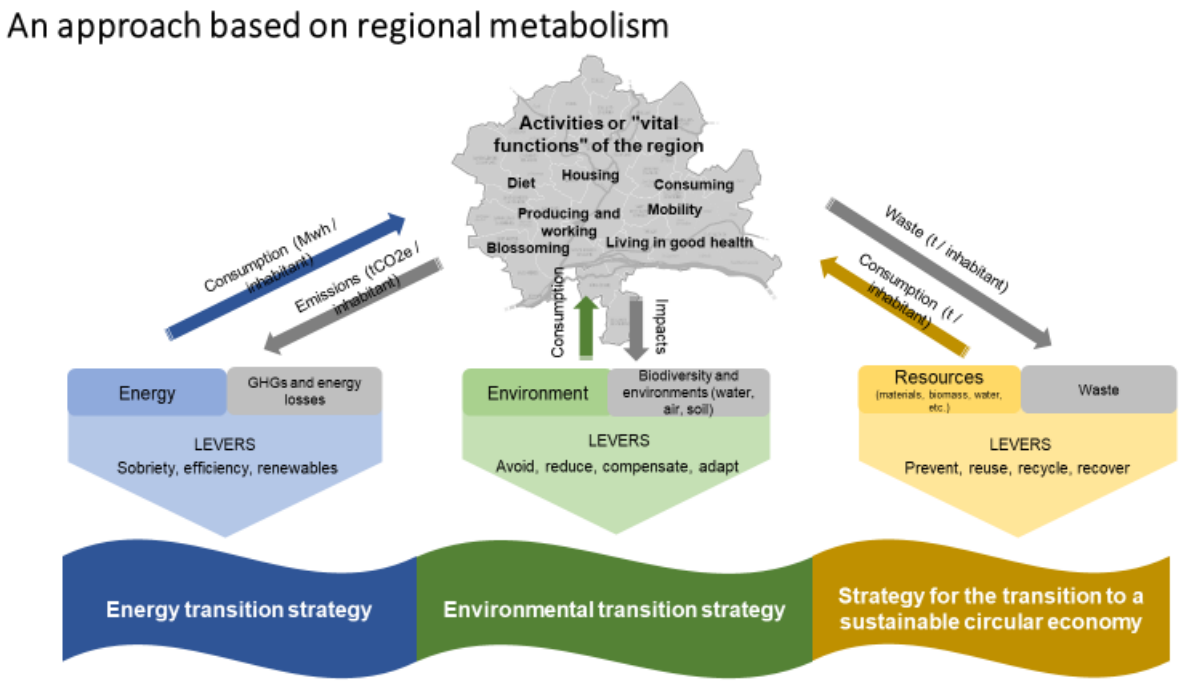
Angers Loire Métropole believes that local authorities have a key role to play in tackling the climate change emergency, by involving local citizens and stakeholders, and has placed the ecological transition at the heart of its policies and action programmes. This is reflected in the strong involvement of elected representatives and departments in the deployment of strategies and planning, strong actions and service offerings across the region, and massive investment (51% of investment in 2024) to accelerate this ecological transition.

- **A global strategy for ecological transition, numerous initiatives and national recognition**

To meet the new challenges of climate, the environment, the economy and society, and to help the region and its inhabitants move towards new ways of living, travelling and consuming, Angers Loire Métropole has defined its strategy based on a territorial metabolism approach to maintain its capacity to function sustainably, avoiding both excesses and shortages that could harm the region's major balances or vital functions.

This is illustrated in the diagram below and forms the basis of ALM's three-pronged ecological transition strategy.

**Figure1 - The metabolism of the ALM region, the basis for ecological transition strategies**




For more than ten years, ALM has been implementing numerous actions and public policies in favour of the ecological transition: territorial climate-air-energy plan, Contrat de Relance et de Transition Ecologique (CRTE) citizens' conference on the ecological transition, development of public transport and soft modes of transport (tramway, cycling plan, pedestrian plan, etc.), changes to the vehicle fleet (biogas, electric, hydrogen), thermal renovation of public buildings (building energy plan) and private buildings (Mieux chez moi platform, etc.), heating network scheme, development of the energy mix: photovoltaic solar energy (Ferme de la Petite Vicomté), wood energy cogeneration (Biowatts plant), methanisation of sewage plant sludge, carbon capture, PLUi integrating bioclimatic recommendations, nature in the city plan and biodiversity and landscape plan, territorial food project, Intelligent Territory, major water cycle strategywaste circular economy objectives contract, etc.

The services have been structured and developed by integrating the challenges of the ecological transition, which are now fully supported on a cross-cutting basis and with the guidance and support of all the elected representatives and, more specifically, a dozen or so vice-presidents on these issues under the impetus of the Mayor-President of Angers Loire Métropole.

Figure2 - Territoire Engagé Transition Ecologique logo

The consolidation of strategies and territorial ecological planning, materialised in hundreds of actions, has been rewarded by the award of the label "Territoire Engagé pour la Transition Ecologique" ex-Cit'ergie (French name for the European Energy Award) from 2019. On 14 November 2023, the National Label Commission decided to award a 4th star out of 5 jointly to Angers Loire Metropole and the city of Angers, demonstrating the significant progress made in terms of commitments, results and organisation.

- **Inclusion of citizens and local players**

The ecological transition and the decarbonisation of the region cannot take place without a change in behaviour and lifestyles. In order to mobilise all of the region's stakeholders, in October 2020 ALM launched a wide-ranging citizen participation initiative: **the Ecological Transition Conferences "Acting on the challenge".** In the space of a year, more than 1,000 participants and nearly 10,000 voters chose the actions they would prefer, resulting in the adoption of a roadmap of 63 actions to be implemented between now and 2026 to accelerate the region's ecological transition. The progress of these measures has been assessed by a group of citizens.

Figure3 - Group of citizens evaluating the consultation roadmap - autumn 2022

© WeAct

- **A strong political commitment at local, national and European level through the CCC**

At the conclusion of the “Assises” in January 2022, the ALM Community Council unanimously reaffirmed its commitment to addressing the climate emergency by adopting an ambitious goal: a 60% reduction in emissions by 2030 and achieving climate neutrality by 2050.

In its pursuit of becoming a pilot city, ALM is developing a Climate and Energy Master Plan (SDEC) in 2024. This voluntary initiative is based on a localized and practical transition scenario, drawing inspiration from ADEME’s forecasting studies. The plan aims to outline various decarbonization pathways for the region, identifying the technical and financial resources required to achieve them.

Beyond ongoing engagement with residents and stakeholders—initiated in 2020 through the “Assises” and reinforced through various participatory bodies—ALM has also contributed to the work of the regional COP, which translates national climate objectives into an actionable roadmap.

ALM is actively engaged in this planning effort alongside the General Secretariat for Ecological Planning, which reports to the Prime Minister. Additionally, it continues to develop practical tools in collaboration with other local authorities, such as the "J'agis" website. ALM also works closely with several national organizations, including France Urbaine, France Ville Durable, and AMORCE, and is a member of innovative structures such as the Groupe Interdisciplinaire d'Experts sur le Climat en Pays de la Loire.

Recognizing the importance of action at the European and international levels, the Angevin region plays an active role in European networks such as Eurocities, the Covenant of Mayors for Climate and Energy, and the Green Cities Accord. These collaborations enable ALM to build partnerships and share innovative practices.

ALM’s selection as part of the "Mission 100 Climate-Neutral and Smart Cities" further reinforces its ambition to be among the leading European cities driving decarbonization. This recognition highlights its commitment to accelerating the transition toward sustainable lifestyles, enhancing resilience to climate change, and protecting both the environment and public health.

Through its Climate City Contract (CCC), Angers Loire Métropole is committed to becoming a model territory, solidifying its objectives and defining the necessary resources for their achievement.

The work carried out within the CCC framework will also help better identify, empower, and support local stakeholders—first and foremost, residents, who account for 55% of the region’s emissions, but also economic and public actors responsible for another 30%.

The primary objective of ALM's CCC is to foster a deeper understanding of the mechanisms and levers—both technical and financial—available to local stakeholders, enabling them to accelerate greenhouse gas reductions in their respective areas. This effort also extends to addressing related challenges, including climate adaptation, biodiversity conservation, and resource management.

It is important to note that emissions directly linked to ALM’s operations and public services account for only 2.6% of the region’s total emissions. However, ALM has several key levers at its disposal: exemplary management of its assets and services to minimize its impact, along with planning, regulation, incentives, facilitation, and coordination with residents, businesses, and other public entities. Clearly defining responsibilities, roles, and resources is essential to catalyzing effective action.

These systemic interactions lie at the heart of the CCC’s approach. No single actor can achieve carbon neutrality alone. Therefore, stakeholder inclusion and open governance are fundamental to ensuring that actions and commitments are both meaningful and effective.

Illustrating this collaborative and innovative approach, ALM, through its participation in Mission Ville, has been selected for the Pilot Cities program. This opportunity allows ALM to develop its ambitious "AMBITION" project, which aligns fully with its climate neutrality objectives.

# 2 Objective: climate neutrality by 2030

➢ **Our objectives**

The recognition of the climate emergency in January 2022 by the Community Council commits ALM and invites all the stakeholders in our territory - citizens, associations, businesses and local authorities - to adopt the same commitment to intensify efforts to reduce greenhouse gas emissions and mitigate climate disruption.

The collective objective (all players, the whole territory, and without exclusion) was to aim for a 60% reduction in greenhouse gas emissions by 2030, compared with 1990 emissions, and carbon neutrality by 2050.

Through the CCC, **ALM is committed to raising its ambitions in order to do everything possible to achieve carbon neutrality by 2030**.

There is considerable momentum for transition in all areas, but particularly in the energy renovation of buildings and the decarbonisation of transport (two sectors that account for 83% of the region's greenhouse gas emissions), with the aim of drastically reducing dependence on fossil fuels by developing renewable energies.

Scenarios are developed as part of forward-looking studies to make these objectives more operational. The fact that ALM only has levers at its disposal within the scope of its own powers, and that these only affect a portion of the region's emissions. Local authorities, through their public policies, have levers that represent 10 to 30% of the region's emissions (according to very general estimates), for example via modal shift induced by the public transport service on offer, incentives through financial aid for renovation, the purchase of electric bicycles, access to heating networks, decarbonised energy instead of natural gas...).

With a predominance of emissions linked to daily mobility and residential use, the practices of residents account for 59% of emissions, compared with 6% for industry, 12% for the tertiary sector and 12% for freight. Efforts must therefore be concentrated on two major sectors: mobility-transport and buildings (residential and tertiary), which together account for 83% of emissions. While the transport sector is likely to undergo more rapid change, with more electric vehicles and greater use of public transport and soft mobility, the renovation of buildings is a more passive sector and, above all, acceleration is linked to the willingness and financial capacity of owners to commit to investment

It is important to remember that the population of the urban community has grown by 44,000 since 1990, which has a negative impact on the overall reduction in the area, despite an individual GHG emissions ratio that has fallen by 18% since 1990. Per capita emissions were 4.8 t CO2 eq/capita in 1990, 4.5 t in 2008 and 3.3 t in 2023.

As a result, there will be a -30% reduction in GHG emissions per inhabitant between 1990 and 2023, compared with a -16.6% reduction in total GHG emissions for the region. This figure shows that the real intensity of the effort is partly offset by the increase in population due to the area's strong economic appeal and quality of life.

Carbon neutrality must also be determined in the light of the decarbonised energy that will be produced and consumed and the carbon sinks needed to offset the remaining emissions, which depend on the specific features of the area's land use and forest cover (which are relatively low given its urban and agricultural characteristics).

In parallel with the reduction in emissions and associated energy consumption (linked to renovation efforts, modal shift and changes in vehicle engines, etc.), the share of renewable energies to cover consumption will have to be multiplied by 2.5 by 2030 to aim for an 80 to 87% share of renewable energies in the energy mix (the remainder being electricity produced by the nuclear sector).

ALM is committed to implementing all the necessary measures within its areas of competence to help the region achieve carbon neutrality by 2030.

Its role as a regional planner and developer, and as an incentive and facilitator for residents and businesses, is a lever, but the mobilisation of all parties is necessary, and this been set in motion through the Assises de la Transition Ecologique and is continuing on a daily basis.

### ➢ Scope of emissions

The objective of accelerating the reduction of emissions applies to territorial GHG emissions. Local emissions are monitored annually by a regional emissions assessment system: the BASEMIS® inventory. This inventory, managed by the AIRPDL association, is based on national methodological references and assesses ALM's energy consumption and production, GHG emissions and atmospheric pollutants. It meets French regulatory requirements and is the measurement tool for the PCAET and the region's action plans. As a member, ALM benefits from a set of personalised, accurate and up-to-date data. It covers the following emission sectors: residential, tertiary, industry, transport (road and off-road), waste, agriculture and energy (excluding the production of electricity, heat and cooling, which are recorded at the consumption stage).

BASEMIS® also assesses changes in carbon stocks in the region.

The inventory covers direct emissions (Scope 1) and indirect GHG emissions linked to heat and electricity consumption (Scope 2). Due to the complexity of the methodology used, Scope 3 is not taken into account, except for waste. The development of reference methodologies may eventually make it possible to close this gap between territorial emissions and carbon footprint.

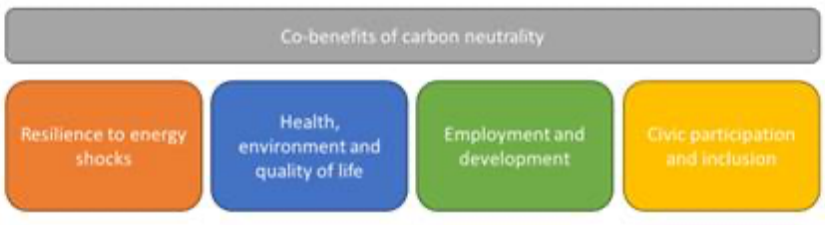
Important: the agriculture and industry sectors will subsequently be excluded from the action plan and the investment plan. At this stage, the local authority and its partners have very little room for manoeuvre in the agriculture and industry sectors, which are outside its remit, unlike the other sectors. Financial incentives, local regulations or any other form of action are forbidden at the level of municipalities and inter-municipalities. Only the Regions, which have jurisdiction under the General Local Authorities Code, and the State can intervene. Nevertheless, data is included in the action plan tables whenever possible, so as not to lose sight of the fact that efforts must also be made in these sectors.

### ➢ Co-benefits

As presented in the introduction, the systemic approach to ecological transition policies covers all the energy, environmental and resource sectors, along with the circular economy and the social and inclusive transition.

ALM's increased involvement in the ecological transition, and more specifically in the energy transition, is part of an integrated approach that generates various co-benefits in addition to mitigating climate change, the primary objective.

**Figure4 - Main co-benefits of carbon neutrality for ALM**



### 1- Greater resilience to energy shocks

Given the volatility of fossil fuel prices and our 66% dependence on fossil fuels (44% oil and 22% gas), mainly in the mobility and transport sectors (92% oil products) and the residential and tertiary sectors (almost 50% gas), the economic impact is considerable. Nearly a third of the region's energy bill is devoted to fossil fuels, and this is mainly borne by households, which increases their vulnerability, as well as that of businesses.

ALM's strategy focuses on 3 levers in this order: sobriety, the efficiency of energy systems and buildings, and the production of renewable energy. By aiming to reduce energy consumption and relying primarily on renewable energy sources, the vulnerability of residents and economic sectors will be reduced.

### 2- Improved health and quality of life

The co-benefits for human, animal and plant health will be very positive in terms of air quality. The limitation or absence of combustion greatly reduces atmospheric pollution. Air quality in Angers is already good overall, with a steady decline in all emissions since 2008, when the first measurements were taken. Pollution alerts have become rare and regulatory values are being respected. For example, emissions of PM10 (fine particulate matter) from the ALM area are relatively low in proportion to emissions in the département.

The development of active mobility helps to combat sedentary lifestyles, which are a triggering or aggravating factor in many diseases.

Renewable energy development projects are carried out in accordance with regulatory conditions to respect the natural environment, in line with the Avoid/Reduce/Compensate approach.

Efforts to offset carbon emissions by revegetating and desilting towns and cities, and the objective of zero net artificial development, meet the challenges of carbon storage and air quality, but will necessarily have an impact on the comfort of urban dwellers during heatwaves, and on their mental health, as environmental health studies have shown.

### 3- Employment and development

The transition objectives are based on stimulating and developing local eco-activities.

The targeted co-benefits are to stimulate innovation, by improving the capacity of our businesses and developing their skills, with support from public demand in particular; and to create jobs that cannot be relocated. One example is the adoption of a charter of commitment signed with 60 building industry operators to put in place the conditions for balanced and sustainable property development, suitable for as many people as possible and geared towards the ecological transition. Or a charter committing to the significant use of low-carbon and bio-sourced materials in the construction, renovation and fitting-out of buildings. On another subject, a charter of commitments to promote healthy, local food for all, with 41 signatories.

It is also through its contracts and purchases, a real lever for the local economy, that ALM sets ambitions for its economic partners (environmental clauses, environmental objectives) and positions itself as a leader in the region.

### 4- Civic participation and inclusion

Collaboration and citizen participation are the common thread running through the territory's actions, notably through the Assises de la transition écologique, a participatory democracy process launched in 2020, illustrating that the involvement of residents is at the heart of ALM's public policies.

The mobilisation of citizens over more than 6 months was illustrated by the collection of 1,000 contributions. These have been studied and summarised into 135 proposals, which will be put to the vote in the summer of 2021. As a result of the Assises, Angers Loire Métropole has drawn up an action plan comprising 63 measures designed to accelerate the ecological transition of the region, enabling existing initiatives to strengthened and new ones to be launched.

This roadmap is therefore an operational document resulting from the citizens' preferential vote and evaluated by citizens.

Raising awareness of the ecological transition is currently carried out by a rich ecosystem of players (companies and associations) in the region. ALM, for its part, has had a dedicated resource service, the "Maison de l'environnement", since 1990. Located at the heart of Lac de Maine in Angers, it welcomed 18,000 visitors in 2023, and deals with all aspects of the ecological transition. Through its various public services, it provides a wide range of support for citizens, covering housing (the "mieux chez Moi" service), waste, travel, greening and shared gardens, biodiversity, natural hazards, etc. This approach is deployed across the whole of Angers. This approach is deployed in each of its areas of responsibility.

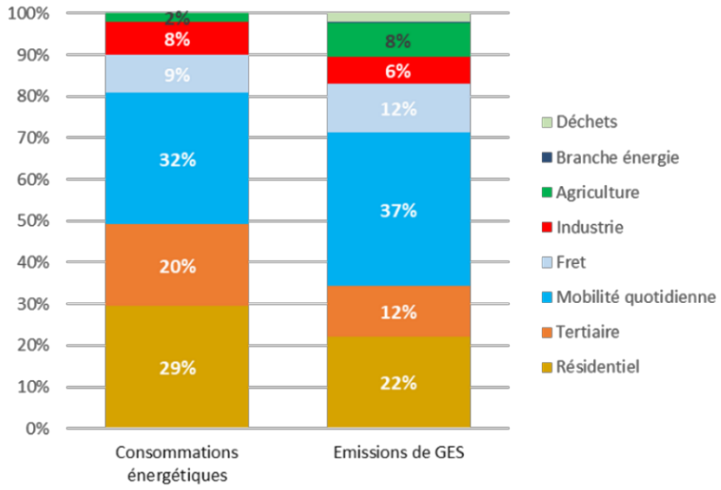
All this is illustrated in the annual sustainable development report of ALM and the city of Angers

# 3 Strategic priorities

ALM's energy transition strategy was adopted in June 2019, followed by the adoption of its Territorial Climate Air Energy Plan in Dec. 2020, and then by an increase in ambitions by deliberation of the Community Council in January 2022, which was integrated into our Territoire Engagé pour la Transition Ecologique (TETE ex-Cit'ergie declination of the European Energy Award label) approach.

4 strategic objectives have been defined due to the weight of emissions linked to these sectors. The following diagram shows the 2 main emission sectors: transport and mobility (49%) and buildings (34%), i.e. 83% of emissions, 59% of which are directly related to the activities of residents (housing and mobility). The 3rd objective concerns the production of renewable energy. The last objective is cross-cutting and concerns land use and urban planning, as it enables us to anticipate and guide the development of the region and its needs.

**Figure5 - Breakdown of consumption and emissions by sector - 2018 - *Source Basemis, Air Pays de la Loire, Energie demain***




### 1- Improving sobriety and efficiency in the built environment

With almost 141,000 homes (54% of which are multi-family dwellings and 46% detached houses), 37% of which have an EFG energy label and 32% a D label, and 13,100 commercial buildings, 45% of which are subject to a regulatory renovation target, the challenge of energy renovation and energy efficiency is a major one if we are to achieve carbon neutrality.

a. Public heritage

The Urban Community and the City of Angers are working to set an example in the management of their public assets (around 450 buildings and 46,000 public lighting points) through the renewal of equipment, the technical management of buildings and the implementation of works. In 2022, they adopted a Building Energy Plan. The plan aims to reduce energy consumption by 40% by 2030, compared with 2010 levels. It sets a renewable energy target of 32% for 2030.

With regard to public lighting, the "Intelligent Territory" initiative aims to replace 30,000 lighting points with LEDs and install 3,600 presence sensors to reduce energy consumption by 66%. By the end of 2023, 15,200 streetlights had already been replaced. Energy savings are averaging 70%. The targets are to be met by 2026.

Angers Loire Métropole has also set up a 3-year energy transition fund to support its 29-member communes in speeding up the energy renovation of their public buildings, in addition to government funding (green funds and other schemes).

b. Housing (social and private) and services

The current rate of energy renovation is in the region of 1,500 to 1,600 homes per year in the residential sector, and more than 3,400 per year will be needed to achieve the neutrality targets, half of which will be low energy consumption. Nearly 110,000 homes will need to be renovated in the long term, around half of them low-energy. **The priority objective over the next few years is therefore to speed up the thermal renovation of housing.**

Angers Loire Métropole has embarked on a major urban renewal programme for the Belle-Beille and Monplaisir districts, with its social landlord partners (ALH, SOCLOVA, PODELIHA, etc.), who are already committed to improving thermal performance. The projects are aimed at achieving the Eco-quartier label, with 2,768 targeted renovations, and 930 homes will also be rebuilt. The landlords are relatively well advanced, but to achieve neutrality, 85% of the housing stock (27,000 homes) will have to be renovated, which will require new impetus from these players and new funding to be mobilised.

More than 35,000 privately-owned collective dwellings will have to be renovated, with a major objective of facilitating collective decisions to renovate housing in condominiums, which is the main obstacle given the investment involved. The AMBITION project, winner of the PilotCities AàP, aims to experiment with this facilitation/incentive to decision-making in around 10 condominiums over the next two years, in conjunction with researchers, landlords, associations, etc.

More than 48,000 single-family homes will have to be renovated, half of them to BBC standards. Since the decision to carry out the work rests solely with homeowners, schemes such as "Mieux Chez Moi" (Better at Home), co-funded by the Pays de la Loire Region and run by partners such as Alisée, Citémetrie, ADIL and CAUE, can be deployed to provide financial assistance and engineering services to complement government schemes (Francerénov' and Maprimrénov'). The scheme is due to be renewed in 2025, incorporating these ambitions.

According to data from the Observatoire national de la précarité énergétique (ONPE)12.2% of households in Angers Loire Métropole are in fuel poverty. In addition to the impact on household budgets, this increases the risks to health and social isolation. Between 2020 and 2023, 900 very low-income and low-income owner-occupiers received personalised support, including advice on how to reduce their energy consumption, assistance with energy renovation work through the OPAH (housing improvement programme), social mediation with the CCAS and support from associations.

In the tertiary sector (excluding local authority property), 45% of the region's buildings are subject to the decree requiring a 40% reduction in energy consumption by 2030. At this stage, there are no public support measures in place, as local authorities are themselves subject to these targets and have to meet their own investment needs. Consideration is being given to bringing in partners, in particular consular chambers.

In the end, a reduction of almost 60% in emissions will be required from the built environment, which will reduce the energy bill by 14%. The remaining energy consumption will have to be largely carbon-free (renewable and nuclear electricity, biomass heat, biogas, etc.).

## 2- Sober transport, using new energies and an alternative mobility offer

Transport is the main sector to emit greenhouse gases in the region, accounting for 49% of emissions, divided between the daily mobility of residents (37%) and freight transport for economic activities (12%).

**Several levers need to be activated to achieve the** national **objectives** of complete decarbonisation by 2050. ALM is aiming for a more ambitious target of -55% GHG emissions by 2030.

The following levers must therefore be mobilised jointly: decarbonising the energy consumed by vehicles and adapting the associated infrastructure; improving the energy performance of vehicles; controlling the growth in demand (for passenger and freight transport); modal shift (for passenger and freight transport) towards the most energy-efficient and lowest-emission modes; optimising the use of vehicles (for passenger and freight transport).

As in the building sector, these developments are linked to individual and collective action to change behaviour (practices, purchasing, etc.), which needs to be encouraged and supported, in particular by developing appropriate infrastructures, incentive grants, etc.

Angers Loire Métropole is working in partnership with its 29 local authorities, the Pays de la Loire Region and its delegate RATP Transdev, which runs the IRIGO service, as well as local businesses that have signed up to a company travel plan. As part of its commitment to the transition in mobility, Angers Loire Métropole is implementing various programmes to strengthen the public transport offer, intermodality and the development of new practices (cycling, walking, car-sharing, etc.) and to upgrade vehicle fleets to low-carbon energies

**The actions and priorities for the coming years** are as follows:

a. *Continuing to improve public transport services*

The area already has a public transport network (bus and tram) with 15 urban lines (for Angers districts and the 1st ring road), 6 express lines and 13 suburban lines.

Tramway line "A" on the north-south axis (brought into service in June 2011) has been supplemented by two new tramway lines B and C in 2023, representing 10.1 km of new track. The tramway now serves 100,000 inhabitants, or 33% of the population of Angers Loire Métropole. Two park-and-ride facilities have also been added. With this investment of €245 million before tax, the effects of modal shift are of vital importance in achieving the targets for reducing greenhouse gas emissions. By 2023, more than 39 million journeys will have been made across the entire network. This transition to electric mode is also accompanied by a gradual change in the bus fleet (see §c. below).

The aim is to make it easier to use the public transport network, to reduce the use of private cars. The 2023 network offers a range of adapted services: the ABC tramway network, the reinforcement and creation of new express bus lines, improved services to the communes in the outer suburbs, a test of transport services in business parks, transport on demand, continued support for car-pooling via our partner BlaBlacarDaily, and an increase in the number of secure cycle parking spaces.

Finally, building on its success, the Citiz car-sharing service, operated by Alter Services and supported by Angers Loire Métropole, already has 20 stations, around 30 vehicles and more than 1,150 subscribers.

As far as freight is concerned, ALM's priority is to optimise the movement of goods (transport and storage) in towns and cities and to examine the entire organisation of the urban logistics chain. Angers Loire Métropole has been involved in the INTERLUD+ programme with CEREMA since 2022 and, in consultation with the economic players, will be defining an action plan and a commitment charter to encourage all stakeholders over the next 3 years.

*b. New mobility and modal shift*

Angers Loire Métropole is working with other local players, first and foremost the City of Angers, to encourage alternative modes of transport to the use of private cars and self-driving cars. Among these, cycling plays a key role. With its 625 km of cycle network (up 22% since 2019), including 397 km of dedicated cycle paths, Angers Loire Métropole is one of the most advanced cities. ALM and the city of Angers have adopted a 25-action cycling plan for 2019. To this end, they are developing actions in the following areas:

- A range of services (the "Vélo cité" bicycle loan service for the city of Angers): 2,700 bicycles on free long-term loan and almost 6,000 users a year, 70% of whom are young people (aged 18-24).
- Bicycle parking and links with the public transport network: "Vélo+gare" (all stations in the conurbation are equipped with individual, secure, self-access bicycle lockers), 4 "Vélo-parc" (222 secure bicycle parking spaces), "Vélo box": more than 300 individual, secure lockers, 35 covered collective bicycle shelters, 4 park-and-ride facilities along the tramway lines.
- Encouraging the purchase of bicycles: to encourage the purchase of electrically-assisted bicycles (EABs) and conventional bicycles, more than 13,300 grants have been paid since 2021, for a total of almost 2.4 million euros.
- Developments to make the cycling and pedestrian network safer and more extensive (cycle lanes, pedestrian areas, etc.). An infrastructure master plan provides for 100 km of safe intercity cycle paths. Planned investment averages 3m € a year.
- Supporting companies in setting up cycle plans (around 20 so far) and mobility challenges.

Finally, to ease traffic congestion, as part of the pedestrian plan provided for in the PLUi, consideration is being given to extending the pedestrian area to make it easier to get around. At the same time, a number of projects are underway to upgrade public spaces and give greater space to pedestrians and cyclists.

As far as freight is concerned, in 2024 ALM will be carrying out studies into the creation of a rail freight platform to develop low-carbon freight transport.

*c. New energies for public service vehicle fleets*

Through a comprehensive, systematic and ambitious approach, Angers Loire Métropole is undertaking the transformation of all the vehicle fleets it owns. This commitment should also support the development of infrastructure (electric and gas recharging), which will also benefit economic players and local residents.

- **electric vehicles**: the rate of renewal of electric vehicles is twice as high (60%/year) as the regulatory targets. To date, past investments have resulted in 35% of light electric vehicles (saloon cars and vans), i.e. 193 electric vehicles. Our objective is to acquire a further 221 vehicles. In addition to the desire to reduce the number of vehicles in the fleet by developing pools and leasing, and by choosing smaller vehicles, this acceleration of the changeover will make it possible to reduce the carbon impact by more than 60%, with a reduction in fuel consumption of 5% per year.
- **Angers Loire Métropole is switching its bus fleet** from diesel to biogas and electric engines. There are already 17 biogas buses in service on the Irigo network, rising to 41 by 2026. The biogas used is locally certified, as it is a guarantee of origin linked to the production of biomethane from the La Baumette wastewater treatment plant. There are 2 public stations and private stations (Irigo) offering BioGNV. In accordance with European regulatory requirements, it is planned to switch part of the bus fleet to electric, with the acquisition of 91 electric buses up to 2034. This acquisition will begin in 2027 for 12 buses. The adaptation of depots for bus charging is also already being studied.

**3- Speeding up the development of renewable energies and the transformation of systems**

The current national objective is to achieve a 33% share of renewable energy in the energy mix by 2030, rising to 42.5% once the European REDIII directive has been transposed. Nearly 15% of local consumption is covered by renewable energy, mainly from wood energy (43%) used by private households, but also from heat production plants supplying urban networks and heat pumps used in the residential and tertiary sectors (32%).

With a view to achieving carbon neutrality, the aim is to consume energy that is essentially carbon-free, involving 2/3 renewable electricity and 1/3 renewable heat (biomass, biogas from methanisation, aerothermal energy and geothermal energy). As part of the work on the law on accelerating the production of renewable energy in March 2023, the region's potential has been estimated at 3,521 GWh (66% electricity and 33% heat).

- **Renewable electricity**

In addition to the consumption of electricity from nuclear power plants, it will be necessary to develop the production of renewable electricity by multiplying current production by 9. **Photovoltaic solar power** (power stations,, roofs) is the main sector targeted. It will be necessary to create 20aine ground-mounted power stations, more than 200 shaded sites and several thousand installations on residential roofs and agricultural or tertiary buildings. There are already three solar power plants in the territory producing almost 17 Gwh (with another 3 in the pipeline), equivalent to the consumption of 10,000 people.) There are already around 10 shaded car parks, and 14 GWh produced on roofs ...

**The priority for the next 2 years is to develop a multi-targeted solar plan** (private and public tertiary, agricultural, residential) to encourage and support projects by building on the existing ecosystem (the ALTER énergie SEM, the support of the Alisée association in the “Mieux chez Moi” public scheme and dedicated project companies) and by developing new partnerships and legal vehicles to encourage public investment.

- **Renewable heat**

**Biomethane production** is also a priority for the region. The joint contractual objective set with the ALM gas network operator (GRDF) is to supply 100% biogas to the network by 2050, reducing consumption by 60%. Between 4 and 6 units will need to be installed in the region, in addition to the two existing ones. ALM has invested in a unit to produce biomethane by treating wastewater and feeding it into the gas network. Production, estimated at 1.5 million cubic metres per year, represents the average consumption of 1,800 households and generates nearly €2 million per year in revenue, which is reinvested in energy transition projects.

**The increase in the capacity of urban heating networks** should meet the region's renewable heating needs (by accompanying the reduction in the use of gas). Deployment of ALM's heating network master plan is continuing, with 5 public networks, 7 private networks, 6 biomass heating plants and one cogeneration plant (saving 55,000 tCO2/year). The ambition is to double the network by 2032 compared with 2017, i.e. from 70 to 150 km, and to increase the heat supply to almost 400 GWh/year (residential and tertiary sector combined), i.e. almost 60,000 housing equivalents.

Structural and innovative renewable or recovered heat projects will be studied, such as a heat recovery unit for wastewater from the La Baumette wastewater treatment plant (potential 55 GWh/year), a data centre, flooded slate mines, A study is underway for a tempered water loop (potential 29 GWh/year) in tertiary districts undergoing restructuring (St Serge, “Faubourg actif” etc.)

## 4- Spatial planning as a method of transition

With the population having increased by 17% over the last 30 years, the reduction in the region's overall greenhouse gas emissions is moving more slowly than necessary, despite an 18% reduction in emissions per inhabitant. The emissions trajectory to be achieved requires more than the technical and supply-side measures developed in the previous sections.

Energy and climate objectives are already included in ALM's planning documents, but will be significantly strengthened, particularly in the inter-municipal Local Urban Plan (29 municipalities), which is entering the revision phase for adoption in 2028: objectives for efficient renovation, production of renewable energy, bioclimatic construction and constraints on connection to heating networks. This plan includes objectives for housing and the Urban Mobility Plan, setting targets for modal shift (public transport, soft modes) and the means to achieve them.

The zero net artificialisation (ZAN) objectives will be implemented, benefiting soil and forest biomass, which are the main carbon sequestration stocks with a view to achieving neutrality (offsetting residual emissions).

The practical application of these principles is integrated the new development projects undertaken in partnership with the main development operator ALTER: through the 12 large-scale mixed projects (Cours St Laud, Quai St Serge, NPNRU, Plateau de la Mayenne, etc.), housing, business parks, and two major urban renewal projects (Monplaisir and Belle-Beille districts) mentioned above.

**In conclusion**, over and above the priority objectives and technical projects to be developed and described above, it is the entire ecosystem of players and, in particular, citizens that must be mobilised. ALM has undertaken work with nearly 80 partners to better identify the levers for behavioural change and to make actions better coordinated and more effective. The "Assises de la transition écologique" (ecological transition conference) and the winning project of the Net Zero Cities pilot cities call are illustrations of this desire to experiment with new approaches with local residents.

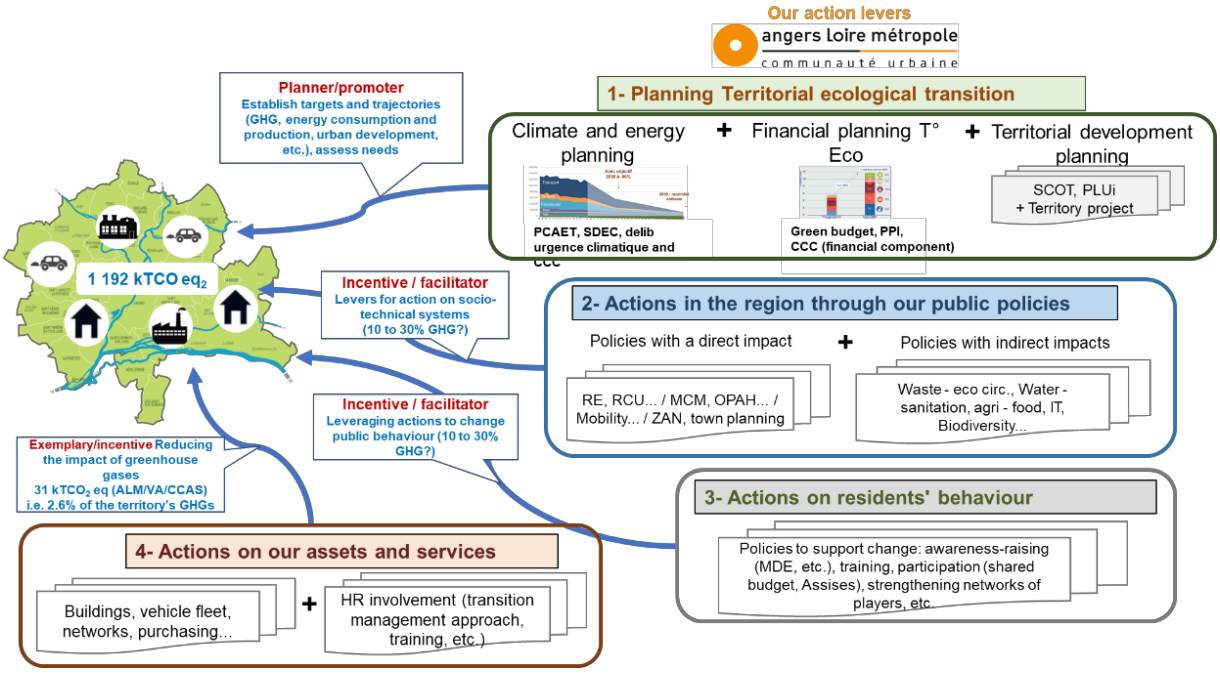
# 4 Processes and principles

➢ **Know your local area, the areas in which the local authority is active, its partners and the measures in place to promote the ecological transition using a systemic approach.**

Local authorities such as ALM have a key role to play in the process of accelerating the changes that need to be made in the region and among its residents. As part of a systemic approach, it is important to have a good understanding of the local authority's areas of activity and its relationship with the local ecosystem. ALM has several levels of action (see diagram below):

- A planning authority that defines the territorial strategy and action plans within the scope of its powers, and its financial and human resources to achieve the objectives adopted by its bodies or by regulation. It identifies the responsibilities and partnerships to be set up with local players.
- A local authority that provides public services as part of its compulsory responsibilities (transport, water, waste, heating, etc.) and its voluntary actions (e.g. aid to individuals, businesses, associations, local authorities, etc.) and that makes it easier to perform vital functions (housing, transport, food, etc.) and encourages people to take action.
- A local authority that works with local residents and businesses to encourage and support changes in practices and behaviour through awareness-raising, advice, access to information, experimentation, etc., so that change can take root over the long term.
- An exemplary local authority that acts on its assets and the public services it provides directly or by delegation, for Angers Loire Métropole and its 29 communes.

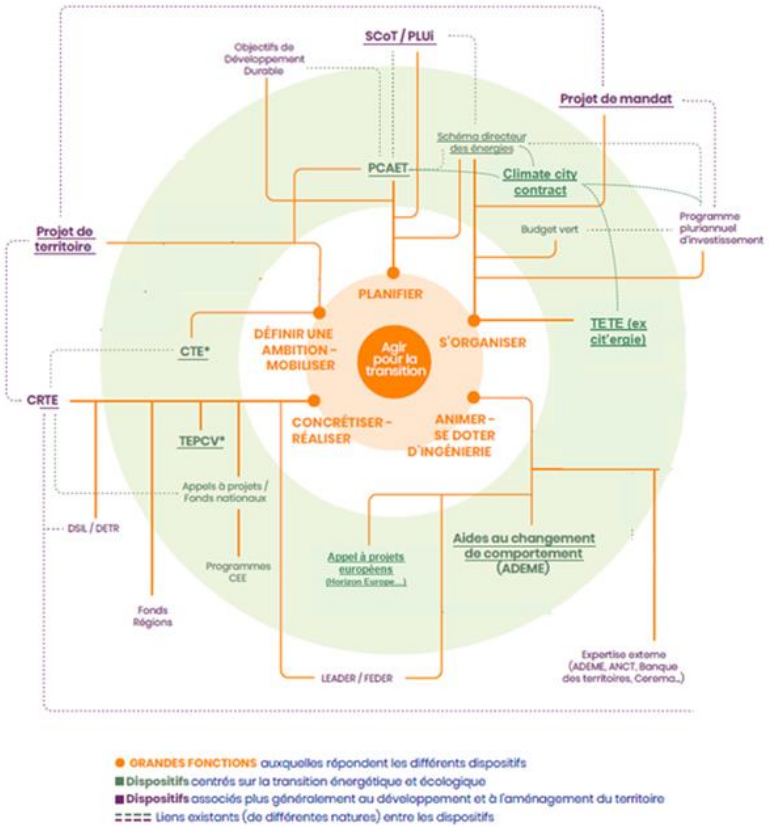
**Figure6 - Diagram of the different levels of action taken by Angers Loire Métropole in the region**




The many planning initiatives undertaken in the region are linked and coordinated. The sectoral plans include **maps of the players and areas of responsibility** to better determine the commitments to be made by the various players at their level and prioritise actions with systemic effects, and therefore more efficient.
The sector plan for the energy transition is currently being redefined in the light of changes in European and national regulations.

The following diagram shows the links between the measures taken by ALM to promote the energy and ecological transition.

**Figure7 - Schematic diagram of the mechanisms for action to promote transition**
**Source: CLER work, 2021, adapted by ALM, 2024**

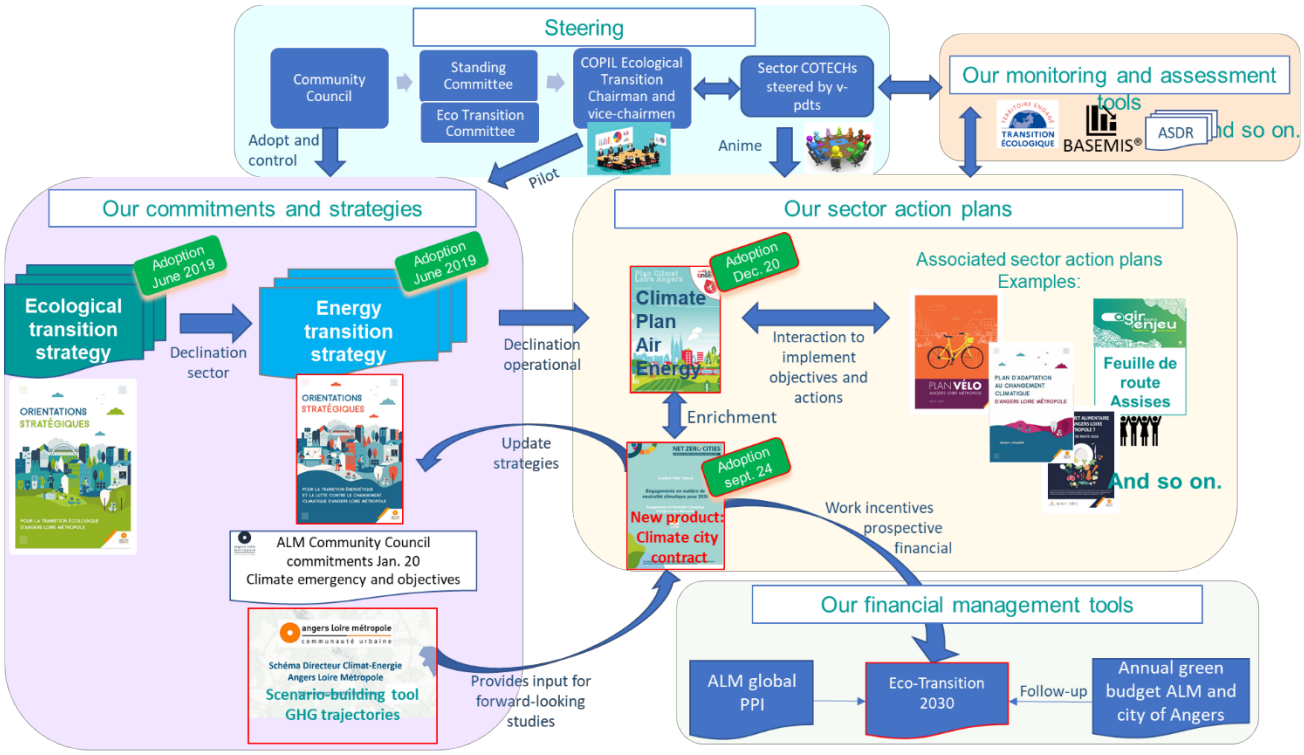



- **Steering and implementation principles for the CCC**

The CCC is both a continuous improvement process for the local authority and a forward-looking approach to strengthen planning, prioritise actions and identify financial and human resources. The CCC incorporates and updates the actions taken under the PCAET, which is a regulatory document and a “Territoire engagée transition écologique” (formerly Cit'ergie = European Energy Award). However, it has been refocused on priority actions to reduce greenhouse gas emissions and does not completely overlap with the PCAET (on improving air quality, adapting to climate change, etc.). The CCC's contribution is to consolidate the match between the objectives to be achieved in the area, the responsibilities of the players involved in accelerating the transition, and the technical and financial measures required. As illustrated in the diagram above, the CCC is part of a network of interacting systems.

The following diagram shows how the CCC fits into the internal organisation, at the crossroads of our commitments and strategies, our sectoral action plans, our financial management, monitoring and evaluation tools and, of course, the local authority's internal governance for controlling and monitoring the ecological and energy transition process.

**Figure8 - Organisation and interactions between bodies, strategies, action plans and funding**




6

Given the cross-cutting nature of the issues involved in the energy transition and the way in which they are intertwined with many of Angers Loire Métropole's policies and missions, and the need to ensure that the guidelines are consistent, while taking care not to duplicate the frameworks, the CCC will be steered by the existing bodies and will interact with the tools for forecasting, steering, monitoring and evaluation, developed in particular as part of the PCAET and TETE.

ALM has developed a range of steering and assessment tools, which were rated 73/100 by the “Territoire Engagé pour la Transition Ecologique” (TETE, formerly Cit'ergie) label, 87.5/100 for its governance model and 85/100 for its cooperation strategy. These assessments testify to the care and quality given to these structural elements for the successful implementation of the ecological transition.

- **Flexible governance to ensure follow-up, synergy and impetus**

The transition is based on modes of governance and mobilisation that demonstrate the ability to call on the region's driving forces, to strengthen cooperation within the urban community, and to apply a coherent and motivating framework within the administration. An effective organisation of relations between ALM and its local ecosystem is necessary.

A genuine strategy for cooperation, communication and mobilisation is being implemented, building on existing mechanisms and developing new processes for public participation, stakeholder involvement and communication.

The work process put in place for ALM's CCC is in line with the NZC's climate transition plan, shown opposite.

In addition to commitments, understanding systems, building action plans, carrying them out and evaluating them, learning within the community, from partners and stakeholders has been developed considerably in recent years, as have foresight exercises to improve planning.

**Figure9 - The climate transition as seen by Net Zero**


In 2020, when the Community Council was renewed, a number of new vice-presidencies were created: Ecological Transition and Mobility, Biodiversity, Circular Economy, Water Cycle, etc.

The Vice-President for Ecological Transition brings together the 8 Vice-Presidents as part of the Ecological Transition Steering Committee, with the participation of the President depending on the topic. Specific steering committees are also organised with the President as and when required. Finally, the Ecological Transition Commission meets monthly with elected representatives from the member municipalities and the vice-presidents. It should be emphasised that at the start of the new term of office, ecological policies were given priority. This is reflected in the priority given to the agendas of community councils and standing committees (bringing together mayors and vice-presidents). This highly structured approach means that elected representatives from the 29 municipalities can be involved and mobilised in a variety of ways.

Angers Loire Métropole created the Ecological Transition department in 2018 by bringing together and creating a number of services to provide coherence and a capacity to deal with all the issues involved in the ecological transition. The department's remits include: design, steering, evaluation and reporting; internal and external cross-functional support and coordination; operational missions in the fields of energy, the environment and the circular economy; support for elected representatives in charge of ecological transition issues, coordination of the Ecological Transition Commission and steering bodies. This organisation makes it possible to generate a high degree of coherence in all of the local authority's actions.

The Territoire Engagé pour la Transition Ecologique (Territory Committed to Ecological Transition) label and assessment (the French version of the European Energy Award) led to the award of a 4$^{th}$ star at the beginning of 2024. This assessment is carried out by an external third party. In the area of internal organisation, a very significant 40-point improvement was recognised, bringing the ALM level to 80/100.

In detail, as illustrated in the action plan (figure 6), the rating for steering and leading the policy is 98/100, the organisation of human resources is 94/100, and evaluation and monitoring is 90/100.

The practical organisation of CCC monitoring will be implemented as follows:

- **The Ecological Transition Steering Committee** will be mobilised. It provides guidance on the climate-air-energy policy and monitors actions and performance indicators across the board. It decides on proposals for new actions. It involves 8 vice-presidents and the Chairman, as well as directors and departments, and meets at least twice a year. It reports on its work to the Community Council and the Standing Committee.

- Other sectoral steering committees are set up for different policies and projects.
- **A technical committee**: chaired by the Director of Ecological Transition and Development and the Director of Ecological Transition, and bringing together the departments and contact persons for the areas covered. External partners are involved as necessary: the Pôle Métropolitain Loire Angers, as leader of the PCAET, associated organisations (ALTER, AURA, ALDEV, etc.) and contributing partners (Siéml, energy suppliers).
- ***A network of advisors***: within the departments, advisors have been identified to ensure the reporting required to monitor and evaluate the policies and actions contributing to the PCAET and TETE certification. They are also involved in the work of the CCC and its future monitoring. ***Working groups*** are organised to develop and implement the guidelines described in this document.

### Partnerships and stakeholder involvement

In an environment marked by rapid and numerous regulatory changes in the fields of energy and climate, and by the multiplication of actions by private and public players to meet these obligations, ALM is implementing **a multi-player and multi-level** (local, regional, national, European) **cooperation strategy** aimed at all the players involved.

Co-creation between the public sector, the research community and civil society to support the ecological transition is a key focus of ALM's CCC.

#### Involvement of national, regional and local public players

**Exchanges and cooperation with national and regional institutions are underway**, in particular with the **Pays de la Loire Region** and its associated bodies, to support Angers Loire Métropole's projects.

The same is true of key players such as **ADEME**, through commitments made as part of the Territoire Engagé Transition Ecologique programme.

This multi-level cooperation is part of a continuum of formalised partnership agreements, which will be strengthened on the basis of shared objectives for the ecological transition, within a framework of co-construction, dialogue and renewed collaboration with: **the Department of Maine-et-Loire**, the **trade unions, in particular the Syndicat des énergies du Maine-et-Loire (Siéml**), which is the organising authority for electricity distribution. It is also responsible for public lighting and the development of electric and CNG recharging facilities, and in particular for energy planning in the region (in support of the Pôle métropolitain), advising local authorities and developing strategies for the production of renewable energy (biogas, solar, wind, etc.).

**The EPL ALTER** is also a major player in several respects and under its various entities. By joining the ALTER Énergies semi-public company, Angers Loire Métropole has taken advantage of the opportunity to work with a competent partner in terms of technical and financial engineering to increase the number of renewable energy production projects in its area. ALTER Services is a key operator in implementing the master plan for heating networks defined by ALM. Finally, ALTER Cités, as a regional development operator, is a major player in translating the ambitions of the Energy Transition into current and future development operations (urban renewal, ZACs, business parks) and housing production (prospects of almost 20,000 homes to be built after 2020). The co-construction of the future energy development of the territory also involves ALTER's partners, its service providers, etc.

Lastly**, the associated organisations ALDEV, AURA, Destination Angers, social landlords** (ALH, SOCLOVA, Podeliha, etc.) and others are also involved in their respective fields.

#### Involvement of research players and competitiveness clusters

With 46,000 students, Angers Loire Métropole is the 3rd largest centre for higher education in the Grand Ouest and is experiencing a very positive dynamic.

In order to establish a strategy that brings together all the players involved, the Angers Loire Métropole Urban Community has adopted a metropolitan plan for Higher Education, Research and Innovation (ESRI).

Angers Loire Métropole is also involved in Angers Loire Campus, the group that brings together all the higher education and research establishments.

Through specific thematic working groups, of which the ecological transition is a central one, a number of collaborations and actions have been defined to provide a link between research work and public action.

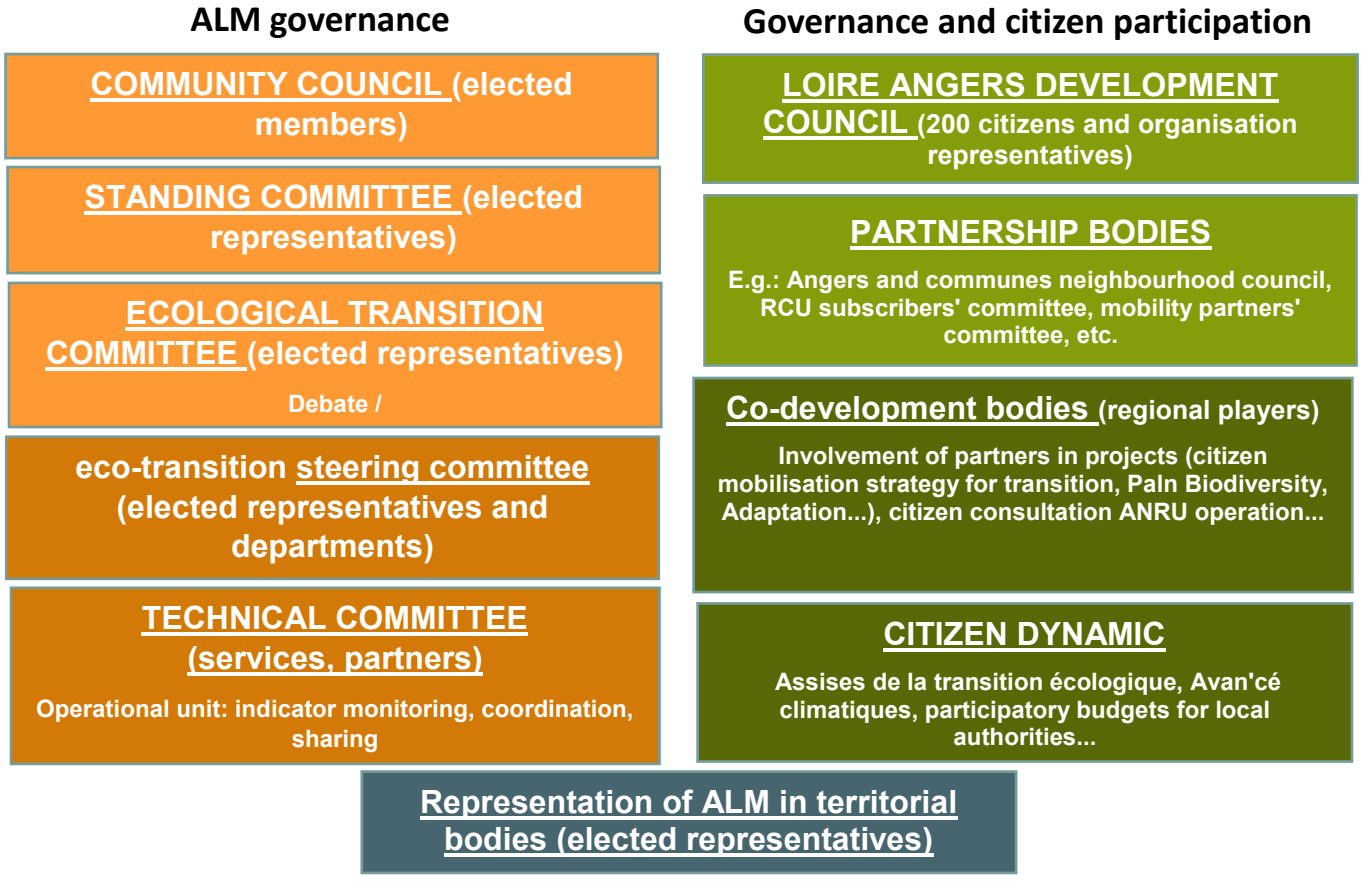
The region is also home to the Vegepolys Valley competitiveness cluster and the Plantes & Cités association, which specialises in green spaces and landscaping, both of which bring together scientific knowledge about nature in the city.

In this context, as part of ALM's CCC and its action plan, particular attention is paid to innovative projects, such as the AMBITION pilot project, which enable solutions to be tested and existing public policies to be adapted.

➲ **Citizen mobilisation**

Following on from the Assises de la transition écologique (ecological transition conference), raising awareness and mobilising residents and users to encourage virtuous practices and behaviour are included in the CCC as essential components of a successful local energy and climate policy. In addition, citizen participation is expressed through a number of mechanisms, such as neighbourhood citizens' councils, which help to identify improvements to services, facilities and developments in neighbourhoods, consultations as part of the New Urban Renewal Programme, and dedicated consultations or operations such as the participatory budget launched every year since 2018. The CCC's actions are part of the concrete proposals developed jointly within these various frameworks for expression and participation. By being better identified and valued, these contributions contribute to the dynamics of the area and to the deployment of actions for the ecological transition.

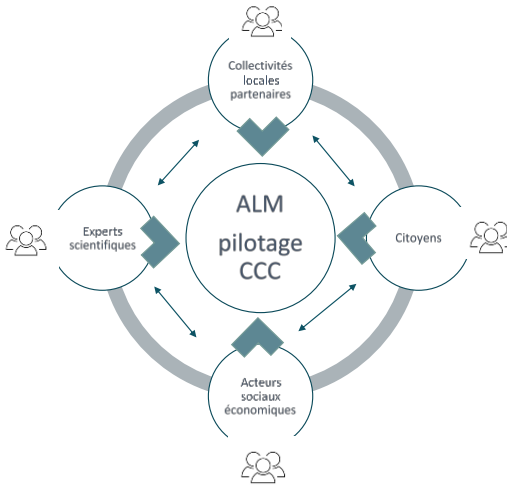
**Figure 10 - The main local bodies led by ALM on the ecological transition**



There are a large number of regional bodies, most of which interact with each other. The diagram above shows those run by ALM or the member municipalities. But the last block shows that the presence of elected representatives in a very large number of regional bodies also makes it possible to forge a strong link with civil society on transition issues.

The diagram opposite simplifies the processes at work for most of the initiatives led by ALM, and the line that will also be taken to involve stakeholders in the CCC. This steering will be combined with that of the Climate Air Energy Plan to avoid duplicating the bodies involved in the planning exercises. Consistency will therefore be ensured.

**Figure10 - CCC governance**




➢ **A CCC that is part of a continuous improvement approach**

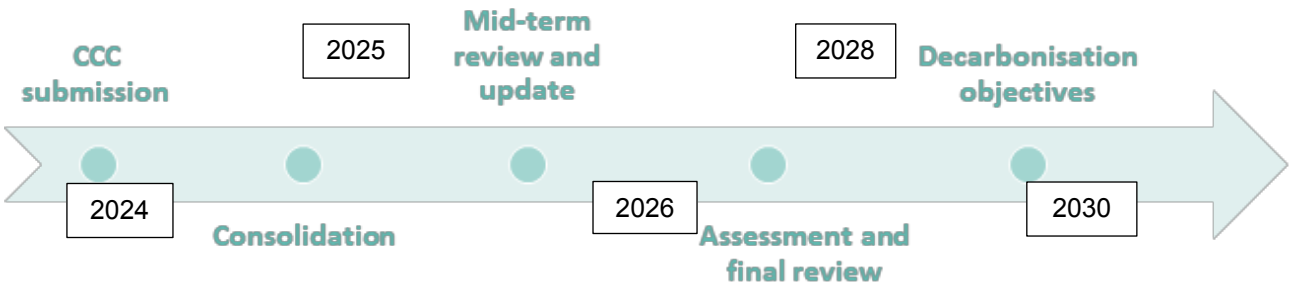
Within the framework of the CCC, ALM is committing itself to more than just its areas of competence. The principles will be as follows:

- **Guarantee a short-, medium- and long-term vision of the challenges of the region's energy transition and the continuity of planning efforts and actions**. It is by taking on this role that ALM is able to offer local stakeholders a non-partisan vision focused on the issues at stake.
- **Facilitate.** The local authority's scope for action may be limited, but it creates the right conditions for implementing transition actions. It prioritises actions, provides information and encourages players to develop their skills, organises contacts between players working in silos and with different cultures, and seeks to ensure the long-term viability of the actions of local players who, over time, become genuine partners for public action...
- **Mobilising and supporting.** The societal acceptability of these transitions is not guaranteed, given the ambitious objectives set and the paradigm shifts that this implies in lifestyles (socio-technical, cultural, etc.), the organisation of the territory, etc. The involvement of ALM, its elected representatives and departments, and its partners is constantly progressing through an increase in knowledge and empirical field applications, and experimentation.

➢ **The main stages of the CCC**

In addition to the annual monitoring by the bodies described above, the major stages illustrated in the following diagram will run concurrently with the revision of the PCAET (2026) and the revision of the TETE Label (2028). The CCC will be continually enriched in areas requiring the development of new approaches and tools (efficiency of actions, impacts, etc.).

Figure11 - The CCC, an iterative tool



# 5 Signatories

The table below lists the main players who are or will be involved in this CCC by getting involved in the actions that will be implemented, thereby helping the city to achieve its goal of climate neutrality by 2030.

Signing up to the CCC by these stakeholders will depend on the actions and commitment of the various stakeholders who are/will be involved through local partnership agreements signed between the various stakeholders and Angers Loire Métropole. Stakeholders are involved through various types of partnership: Public Service Delegation contracts; partnership agreements; allocation of subsidies; one-off contracts, etc.

Some players, such as the Pays de la Loire Regional Council, are not stakeholders as such, but have given their support to ALM and will be studying ways of supporting its actions (see letter of support attached to the CCC). The table lists the main stakeholders concerned and ALM's partners linked to the CCC's actions, either as institutional public partners; Public Service Delegation Contracts or having signed specific Partnership Agreements.

| Name of the organisation | Sector / Domain / Level of operation | Legal form | Responsible person | Position |
|---|---|---|---|---|
| **Conseil regional Pays de la Loire** | Crossways sectors<br>Regional scale | Collectivité territoriale | Christelle Morançais | President |
| **29 communes ALM** | Crossways sectors<br>City scale | Collectivité territoriale | 29 maires | Mayors of the 29 cities |
| **Pôle métropolitain Loire Angers (PMLA)** | Crossways sectors<br>Intercomunal scale | Syndicat mixte | Roselyne Bienvenu | Vice-President |
| **ALTER Services** | Energy - Heating networks under integrated service contracts (Public service delegation | Société publique locale | Michel Ballarini | Director |

| | | | | |
|---|---|---|---|---|
| | urban scale | | | |
| **ALTER énergie** | Transport/ Engery/Buildings<br>County scale | Public Service Delegation Contract | Marie-Josèphe Hamard | President |
| **RATP DEV (Irigo)** | Transports (tram / bus)<br>ALM scale | Public Service Delegation Contract | PASCAL DEBERTEIX | Director |
| **IRESA** | Network of social and solidarity econmy<br>Regional scale | Association | Simon Ecuyer | Director |
| **CHAMBRE COMMERCE ET INDUSTRIE** | Industry and trade<br>Regional scale | Public Entity | Matthieu Billiard | President |
| **ADECC (association d'entreprises pour le développement d'une économie circulaire et collaborative)** | County scale / environment | Association | Philippe LOHEZIC | Director |
| **CHAMBRE DES METIERS et de l'ARTISANAT** | Employment | Public Entity | Nadège DEKENUYDT | President |

| | | | | |
|---|---|---|---|---|
| | Regional scale | | | |
| **CHAMBRE D'AGRICULTURE** | Agriculture<br>Regional scale | Public Entity | François BEAUPERE | President |
| **Angers Loire développement (ALDEV)** | Crossways sectors and focus on circular economy and economic local development<br>ALM sclae | Local public society (SPL) | Jean-Baptiste Mantienne | Director |
| **AURA** | Urbanism agency<br>Regional scale | Public Entity | Roch Brancour | President |
| **Syndicat intercommunal d'énergies du Maine et Loire (SIEML)** | Energy | Public Entity - Organising authority for the public distribution of electricity | Jean-Luc Davy | President |

| | | | | |
|---|---|---|---|---|
| | County scale | | | |
| **Agence de la transition écologique (ADEME)** | Enregy and environement / Crossways sectors<br>National scale | Public Entity | Eric Prud'homme | Director |
| **GIEC PAYS DE LOIRE** | Climate<br>Regional scale | | | Director |
| **AMORCE** | Environment network<br>National scale | Association | Mr Gilles VINCENT | President |
| **ALISEE** | Renewal energies<br>Regional scale | Association Ligérienne d'Information et de Sensibilisation à l'Énergie et l'Environnement | Edith EMEREAU | President |
| **Conservatoire des espaces naturels (CEN)** | Biodiversity<br>National scale | Association | Alain LAPLACE | President |
| **Conservatoire botanique national de Brest (CBNB)** | Biodiversity<br>12 countys | Etablissement public | Frédérique Bonnard Le Floc'h | President |
| **Office national des Forêts** | Biodiversity<br>National scale | Etablissement public | Olivier Thibault | Director |

| | | | | |
|---|---|---|---|---|
| **Ligue pour la protection des oiseaux (LPO) Pays de Loire** | Biodiversity<br>County scale | Association | Reine DUPAS | President |
| **FDGDON 49** | Departmental Federation of Groups for the Defence against Harmful Organisms<br>County | Association | Raymond VINCENT, | President |
| **Etablissement public loire** | Water management and flood prevention<br>Basin of the Loire and its tributaries | Etablissement public | Daniel FRÉCHET | President |
| **Syndicat Mixte du Bassin de l'Authion et de ses Affluents (SMBAA)** | Water management and flood prevention<br>Authion watershed. | Etablissement public | Arnaud DECAS | Director |
| **Syndicat Mixte des Basses Vallées** | Water management and flood prevention | Etablissement public | Jean-Paul PAVILLON | President |

| | | | | |
|---|---|---|---|---|
| **Angevines et de la Romme (SMBVAR)** | The Syndicate's perimeter extends over five main hydrographic entities: Loir, Sarthe, Mayenne, Maine and Romme, representing a territory of approximately 1,500 km². | | | |
| **Syndicat loire Layon Aubance Louets** | Water management and flood prevention<br><br>Layon, Aubance, Louet and Petit Louet watersheds | Etablissement public | Yannick LOCHU | President |
| **Air Pays de Loire** | Climate<br><br>Regional scale | Association | David BREHON | Director |

Angers, 26th march 2025

~~Christophe Béchu~~

**Président Angers Loire Métropole**

ANGERS LOIRE METROPOLE communauté urbaine

# STAKEHOLDERS SCHEME