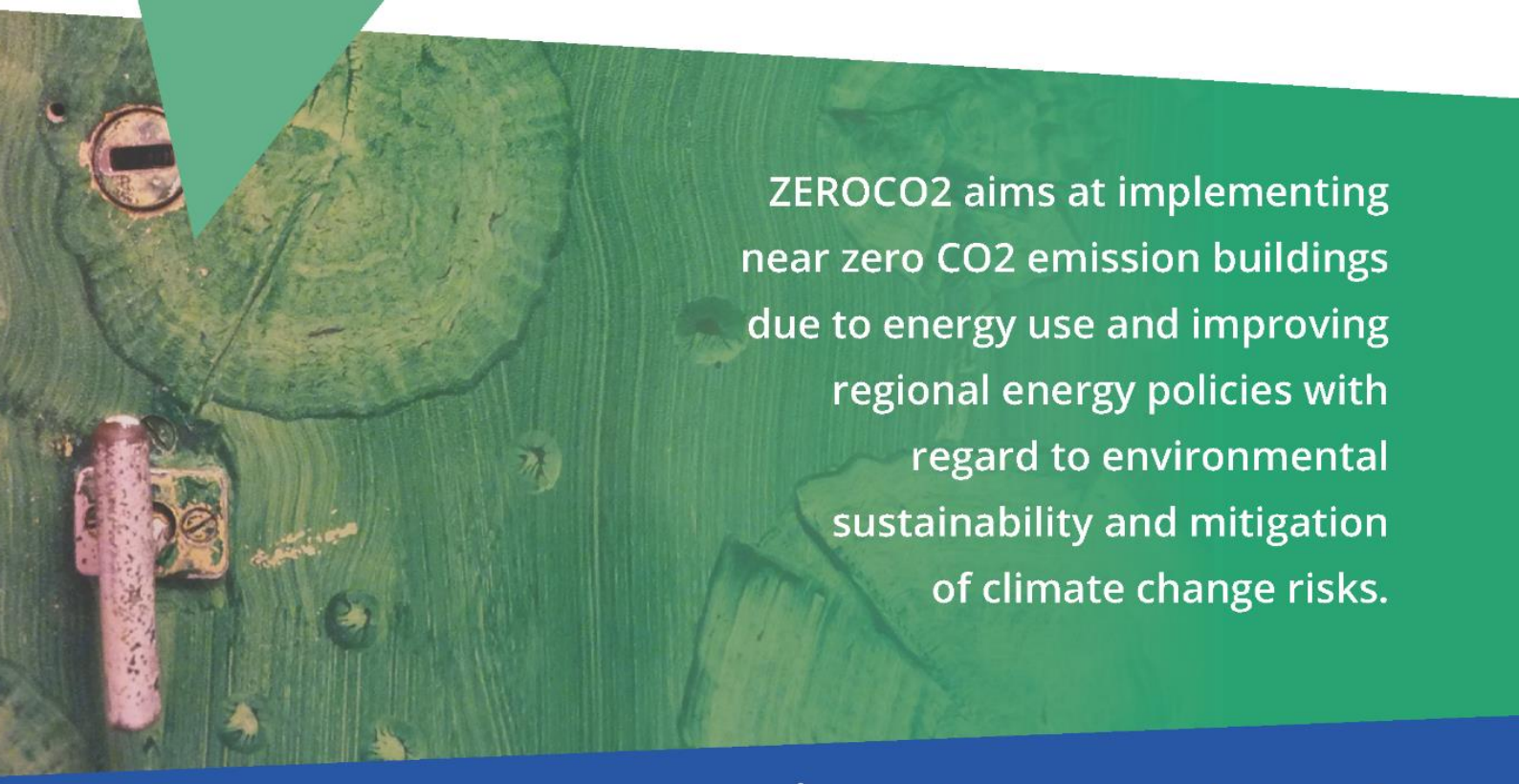
ZEROCO2

Interreg Europe



ZEROCO2 aims at implementing near zero CO2 emission buildings due to energy use and improving regional energy policies with regard to environmental sustainability and mitigation of climate change risks.

www.interregeurope.eu/zeroco2

An interregional cooperation project for improving low-carbon economy policies

Project Partners

European Institute for Innovation (DE)
Mediterranean Agronomic Institute of Chania (EL)
Thermopolis Ltd. (FI)
A.VI.TE.M – Agency For Sustainable Mediterranean Cities and Territories (FR)
Molise Region (IT)
Municipality of Kaunas District (LT)
Local Councils' Association (MT)
University of Malta (MT)
Local Energy Agency Spodnje Podravje (SI)

Low-carbon economy

€ 1.23 M ERDF

Apr 2016 Mar 2020

European Union
European Regional Development Fund

Promotion of near zero CO2 emission buildings due to energy use

ACTION PLAN

Agency for sustainable Mediterranean cities and territories

–

Operational programme ERDF-ESF PACA: Priority Objective 3, Energy transition and Sustainable valuation of resources. Thematic objective: Support the transition towards a low carbon economy in all sector.

TABLE OF CONTENT

1. INTRODUCTION

The aim of the project is to improve regional energy policies with regard to environmental sustainability and mitigation of climate change risk, with a special focus on greening the building sector through enhancement of various eco-friendly energy sources and technologies, stressing its importance as an incubator for new markets in the field of energy, technologies, services and business models.

The project represents and implements NEAR ZERO CO2 EMISSION BUILDINGS DUE TO ENERGY USE in policies addressed at the same level as had been done for NEAR ZERO ENERGY BUILDINGS, which means that the buildings do not produce CO2 emissions due their use. EU, national and regional policies do not define near zero CO2 buildings due to energy use.

A.V.I.TE.M – Agency for Sustainable Mediterranean Cities and Territories

The French Partner A.V.I.Te.M was created to design, experiment and assess best practices and innovative solutions in the field of sustainable urban and territorial development. In the project, A.V.I.Te.M envisage the improvement of policy on regional level.

The Provence-Alpes-Côte d'Azur Region is composed of 6 departments: Bouches-du-Rhône, Vaucluse, Var, Alpes-Maritimes, Alpes de-Haute-Provence and Hautes-Alpes. It includes both coastal zones and mountains.

The Provence-Alpes-Côte d'Azur Region is among the most energy consumers in France. Industry sector is more pregnant than at national level with large infrastructure within its territory, especially around the Berre pond. The transportation sector remains also a large consumer due to the national and international logistic roles of the Region, resident's mobility – in which public transport is weak – and tourist flows. Finally, the residential-tertiary sector represents an energy use share lower than the national one, but still important.

The energy mix is dominated by fossil energies, with oil products ranking first (transport, heat and industrial processes), gas and coal. Another regional characteristic is the strong penetration of electric heat.

2. REGIONAL ANALYSIS

2.1 Presentation of the Region Provence-Alpes-Côte d'Azur/France

Name of the region	Provence---Alpes---Côte d'Azur
Country	France
Area	31400 km^2
Population	
- **Number**	4 989 435
- **Density**	159 inhabitants/km2

The Provence-Alpes-Côte d'Azur Region is composed of 6 departments: Bouches-du-Rhône, Vaucluse, Var, Alpes-Maritimes, Alpes de-Haute-Provence and Hautes-Alpes. It includes both coastal zones and mountains. Two main axes structure the region and contribute to positioning the region as a European critical strategic economic hub, which allows for a high traffic of people and merchandises: Rhone and Durance Valley (North-South axis) and Mediterranean coast (East-West axis). The Marseille agglomeration is the 3rd French urban area, making the Provence-Alpes-Côte d'Azur the 2nd most urbanized region. The Region accounts for almost 5 millions inhabitants: 90% of them live in 3

metropolis (Marseille, Toulon, Nice) and in +20.000 inhabitants middle---sized cities.

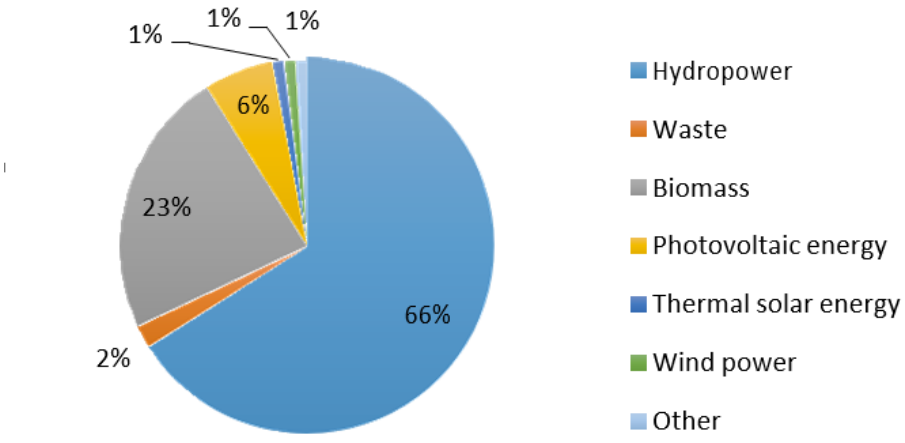
The Provence-Alpes-Côte d'Azur Region is among the most energy consumers in France. Industry sector is more pregnant than at national level with large infrastructure within its territory, especially around the Berre pond. The transportation sector remains also a large consumer due to the national and international logistic roles of the Region, residents' mobility – in which public transport is weak – and tourist flows. Finally, the residential---tertiary sector represents an energy use share lower than the national one, but still important.

The energy mix is dominated by fossil energies, with oil products ranking first (transport, heat, and industrial processes), gas and coal. Another regional characteristic is the strong penetration of electric heat.

The regional primary energy production is exclusively renewable but, with 1.3 Mtep in 2007, it only covers 10% of regional final use. Main renewable energy sources are hydropower and biomass. Solar energy has also been highly developed, putting the Region at the forefront of this field. Therefore, it ranks at the first place in France in terms of installed capacity with 724 MW connected to the grid (as of June 30, 2014).

The scheme below shows the regional primary energy production as of 2014:

Regional primary energy production in 2014



2.2 Use of energy

Energy source	Building sector Consumption GWh	Residential* GWh (2014)	Non---residential* GWh (2014)	Commercial* GWh
Electricity	26 251	14 700	11 550	
Including				
Hydro	*7980*	*4469*	*3511*	
Wind	*79*	*44*	*35*	
PV	*735*	*412*	*323*	
From gaz	*630*	*353*	*277*	
From coal	*578*	*323*	*254*	
Waste	*184*	*103*	*81*	
Nuclear	*14806*	*8291*	*6514*	
Other	*1260*	*706*	*554*	
Oil Products	5 699	5 699		
Gaz	11 321	7 472	3 849	
Wood	4 310	4 310	0	

2.3 Use of renewable resources in building

Energy source (2014)	Region/country %	Building sector in %	Residential* %	Non---residential* %	Commercial* %
Electricity	24%	55%	46%	75%	
Including					
Hydro	*7%*	*17%*	*14%*	*23%*	
Wind	*0%*	*0%*	*0%*	*0%*	
PV	*1%*	*2%*	*1%*	*2%*	
From gaz	*1%*	*1%*	*1%*	*2%*	
From coal	*1%*	*1%*	*1%*	*2%*	
Waste	*0%*	*0%*	*0%*	*1%*	
Nuclear	*14%*	*31%*	*26%*	*42%*	
Other	*1%*	*3%*	*2%*	*4%*	
Petroleum	42%	12%	12%		
Gaz	13%	24%	23%	25%	
Wood	4%	9%	13%	0%	

2.4 CO2 emissions

	CO2 Emission in tons (2014)				
Source	Region/country	Building sector	Residential*	Non---residential*	Commercial*
Coal	8 100 000	3 400 000	2 300 000	1 100 000	
Oil products	20 300 000				
Gaz	4 500 000				
Waste	300 000				

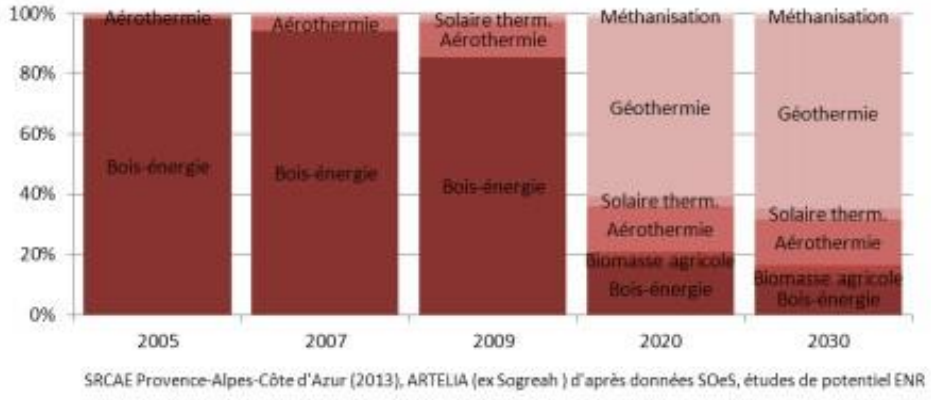
2.5 Potential of using RES in Region Provence-Alpes-Côte d'Azur/France

It appears necessary to trigger a break with current policies in order to speed up the overall renewable energy sector trend beyond the traditionally developed energy sectors. Improving the energy performance of buildings is one of the region priorities. Indeed, existing buildings are slowly rehabilitated, and most of the efforts should concentrate on building renewal and equipment. In doing so, the renewable energy sector should be greater developed so as to reduce the regional energy dependency. One precondition is to control the energy demand to achieve a decrease in regional energy use.

Overall, the Region's objective is for buildings energy use to decrease by 30% and GHG emissions by 40% by 2030 as of 2007. Achieving theses objectives requires the following challenges:

- Reinforce staff capacities and tailor training processes.
- Develop and improve conditions to use biomass energy.
- Disseminate and spread the use of geothermal energy.
- Develop wind power while considering challenges at stake regarding environment and heritage.
- Sustain and optimise the regional hydropower high potential.
- Support solar energy sector expansion.
- Contribute to electric safety of the Eastern part of the Region.
- Mobilize necessary financial resources.
- Improve projects social buy---in.

Share of current renewable energy heat production and potential in PACA

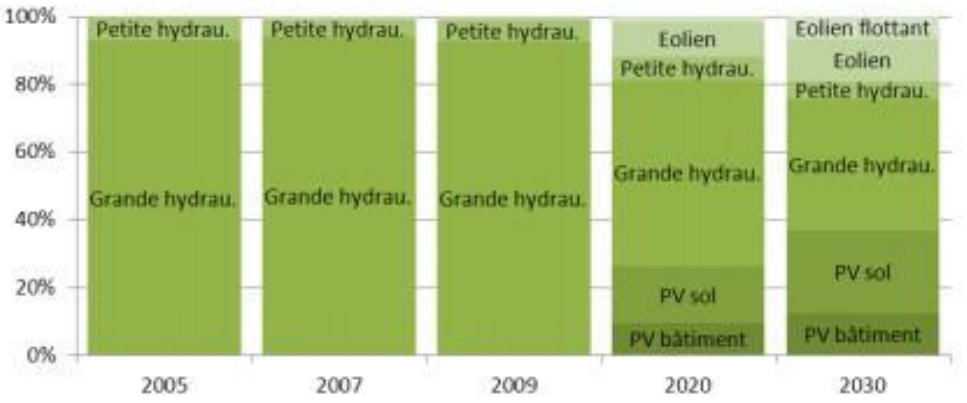


SRCAE Provence-Alpes-Côte d'Azur (2013), ARTELIA (ex Sogreah) d'après données SOeS, études de potentiel ENR

These % share refer to the following absolute values:

	2009	2020	2030
Biomass	1650 GWh/year	5200 GWh/year	5600 GWh/year
Agricultural biomass		230 GWh/year	660 GWh/year
Aerothermal		1400 GWh/year	2200 GWh/year
Thermal solar		620 GWh/year	1400 GWh/year
Geothermal	113 998 MWh/year	288 794 MWh/year	569 988 MWh/year
Methanation		550 GWh/year	1100 GWh/year

Share of current electricity renewable energy production and potential in Region Provence-Alpes-Côte d'Azur



SRCAE Provence-Alpes-Côte d'Azur (2013), ARTELIA (ex Sogreah) d'après données SOeS, études de potentiel ENR

These % share refer to the following absolute values:

	2009	2020	2030
Large---scale hydropower	8900 GWh/an	9000 GWh/year 3000 MW	9300 GWh/year 3100 MW
Small---scale hydropower	900 GWh/an	1100 GWh/year 250 MW	1200 GWh/year 270 MW
Photovoltaic park		1380 GWh/year	2600 GWh/year
Photovoltaic building		1380 GWh/year	2680 GWh/year
Wind power	45 MW	725 MW	1305 MW
Floating wind turbines		260 GWh/year	1560 GWh/year

2.6 Policies already promoting use of RES and EE:

At national level, the **Law on Energy Transition for Green Growth** was enacted in 2015 and aims at efficiently contributing to the fight against climate change. The objectives target:

- 500.000 major renovations of housing / year;
- All new buildings labelled “Low Consumption Building” by 2050;
- Creation of 75.000 jobs.

Among the key actions that are embedded in the Law, the following financial incentives aim at encouraging individuals to engage in energy renewal of their housing:

- Tax Credit for Energy Transition
- Ecocredit at zero rate
- Living better program
- Reduced VAT
- Exemption from real estate tax

As such, it provides a global framework that also encompasses the other policies and aids at national level that are described in the table.

The **Low Carbon National Strategy** is part of the implementation of the Law on Energy Transition for Green Growth. It was elaborated in 2015 and defines a roadmap to reduce GHG emissions towards a low---carbon and

sustainable economy. It facilitates the management by public decision makers of GHG emissions policies. It is articulated around the main objectives:

- Implementation of RT 2012 and future RT 2018 based on environmental impacts analysis during new buildings lifecycle.
- Building Park completely renewed by 2050.
- Speed up control/ management of energy use.

Some policies described in the below table allow for achieving these objectives:

- Guarantee Fund for Energy Renewal
- Positive Energy Building and High Environment Performance Building
- Third---party financing companies

The “Grenelle 1” Law, enacted in 2009, established the **2012 thermal regulatory framework**. This framework aims at limiting primary energy use in new buildings up to 50 kWhEP/(m².year) while encouraging:

- A significant technology and industrial evolution of all buildings and equipment sectors;
- A high level of building energy quality;
- A technical and economic balance between energy used for heating and domestic hot water, with low GHG emissions.

The **Industry Plan** comprises a component dedicated to energy renewal in building. The objective is to structure this field at technical and organisational levels, in order to propose a global offer for building energy renewal at affordable costs for housing to engage in. It targets the objectives falling under the Law on Energy Transition for Green Growth that are below mentioned.

The **Housing Energy Renewal Plan** provides incentives for households to engage in energy renewal works. Local authorities are also encouraged to support local initiatives of energy renewal. The Plan aims at:

- Facilitating the decision---making process in providing advice and support to individuals;

- Financing the renewal works through incentives, tools and solutions;
- Mobilizing the professionals to guarantee renewal quality.

Launched in 2009, the **Sustainable Building Plan** gathers a broad range of stakeholders from building and real estate sectors. The objective is to reach the energy efficiency objectives that are set within the Law on Energy Transition for Green Growth, above described, by implementing and managing energy performance buildings plan.

At regional and local level, the «Grenelle II» Law enacted in 2010 established 2 regional schemes that are complementary, in order to facilitate renewable energy sources development:

- The **Regional Scheme on Climate---Air---Energy** sets regional objectives by 2020 – 2050 regarding GHG emissions reduction, renewable energy sources development and climate change adaptation. It includes the Regional Scheme for wind power. Within this framework, the Territorial Climate---Air---Energy Plan described in the table implements these public policies. The Positive Energy Territory for Green Growth Label is also part of this strategy.
- The **Regional Scheme for connecting to Renewable Energy Electric Network,** which is described in the table.

3. MARKET NEEDS REPORT - TOWARDS ZEROCO2 EMISSION BUILDINGS

3.1 Introduction

The following review has been produced as an outcome of bilateral meetings with regional and local stakeholders in Provence Alpes Côte d'Azur (PACA) Region. These exchanges explored the current status and quality of energy efficiency projects in public buildings in the PACA region, and, in particular, the funding measures available to support them from the public sector. It also allowed for discussing the impact of financial instruments available in France for energy efficiency measures within public buildings. The grounds for this review are therefore based on the visible data available on the internet dealing with funding options for energy efficiency projects in public buildings, whose target is zero CO2 emissions. Based on these inputs, AVITEM formulated recommendations that could improve regional and local public policies in terms of funding opportunities. These recommendations were discussed and amended during a local stakeholders' group meeting gathering all concerned actors in Marseille.

Therefore, this report ambitions to better understand market needs in France with respect to energy efficiency in public buildings, and how best these can be addressed with improvements to public policy and funding measures. This requires practical improvements in the infrastructure and systems for public buildings' energy consumption, using technologies both existing and new. But these depend on a public policy framework supported by investment.

However, it seems necessary to underline that the different investments policies presented in this report only concern building operation and energy use. Indeed, the ZEROCO2 project focuses on the building operation phase. PACA Region Local stakeholders reminded the following limits of such approach during the previous group meetings:

- The renovation works, and all the more so the construction works, may have more weight than the sole operation. The concept should thus apply to the building life cycle, recognizing that optimized choices in terms of design can

prove counterproductive at the operational level and vice versa. Only a global approach would allow obtaining systematically a satisfactory compromise.

- The « sobriety-efficiency-renewable energy » trio should lead both our energy and carbon policy.

  Consequently, the best way to reach a non-carbon operation is to tend towards passive buildings, which brings out the importance of the construction or renovation phases.
- Regarding the climate issue, the stake lies in an optimal development of a building or territory energy potential, which is not contradictory with the ZEROCO2 concept but which gives it a greater ambition.
- The nuclear issue is not addressed by the ZEROCO2 concept, which remains a pending issue.

3.2. Main support mechanisms in PACA region

The Energy Transition for Green Growth Act of 17 August 2015 contains several investment support mechanisms.

This support comes in different shapes: tax credit, guarantee funds for low-income households, support for the creation of third companies for funding, and purchase subsidies.

Communities and social landlords can benefit from subsidised loans of the Caisse des Dépôts et Consignation (Deposits and Consignments Fund).

Besides, guaranteed feed-in tariffs for a 20-year long period constitute an investment aid for renewables energies.

Regarding PACA region, the following mechanisms should be noted:

3.2.1 The Regional RHEA[1] programme

Launched 10 years ago, and relying on a political consensus, this programme greatly contributed to the improvement of social housing in PACA.

The mobilisation of ERDF allows carrying on with the mechanism while increasing energy requirements (BBC renovation).

[1] Housing Rehabilitation Energy Improvement Program

Main strengths:

Capitalization on achievements thanks to the partnership with the ARHLM[2] and BDM[3] (training, technical guidebooks, etc) in a works massification perspective.

Works assessment based on a consumption monitoring.

Inhabitants' involvement is a programme added value insofar as projects results are linked to use criteria and to a sociological approach which is often insufficiently taken into account.

Main weaknesses:

Very few public buildings in spite of objectives set by ERDF.

Weak requirements in terms of renewable energy and lack of carbon dimension.

For this programme, and also in general terms, primary energy consumption is the main criteria. This is sometimes inconsistent with the costs of using.

3.2.2 The heat fund

The heat fund is carried out by ADEME[4], is complementary to the Regional Council grants as part of the CPER[5] which concerns small facilities. It finances thermal renewable energies rollout: biomass, solar hot water, geothermal, geothermal heat pump, district heating.

All targets, such as social housing, public buildings, businesses and enterprises are eligible to this programme. Private individuals are excluded because they can benefit from tax credit.

Projects are selected in the regional call for proposals on size criterion (i.e. for wood: higher than 100 TEP, for solar power: higher than 25 square meters; Beyond €1,5 millions in aid the application goes through national selection committee), on cost-effectiveness criterion (investment payback between 5 and 15 years) and energy efficiency criterion.

[2] Regional Association of Social Housing
[3] Mediterranean Sustainable Buildings
[4] Agency for Environment and Energy Management
[5] Planning agreement between the national and regional governments

A local and heritage approach is promoted by territorial or heritage contracts gathering various projects and enabling economies of scale.

Despite the trend initiated by the CPER, the PACA Region remains below its theoretical contribution to renewable energy production. The initiatives of local authorities stay remain low especially due to more attractive prices of carbon energy.

3.2.5 Platforms of renovation and shared energy advisors.

If the platforms target private individuals, their action on the structuration of the channel (referencing, organization, etc.) indirectly contribute to supporting local authorities. They are part of an awareness and support function which must be better developed with PACA local authorities.

3.3 Policy background

3.3.1 The inclusion of the energy and carbon dimensions in national regulation

3.3,1.1 New buildings

So far, the French Thermal Regulation RT 2012 does not take into account the carbon dimension, but sets a primary consumption lower to 50 kwhEP/m/year in average as a limit.

The regulatory performance is based on buildings technical characteristics but also on conventional data on building use and its climate environment Most of the time, post-construction results prove remote from the initial set standards of regulatory performance. The latter is often considered as a forecast whereas the regulatory framework is only designed to assess the set-up of buildings' characteristics in standardized conditions of functioning.

However, labels with stronger requirements (Effinergie+, Bepos effinergie 2013, etc.) exist but most of them do not take into account the carbon dimension except the BBCA label (about 750 kg of CO2 by square meter built).

The low carbon national strategy established in 2015 in the wake of the French energy transition for green growth Law (TECV) includes for the building sector, which represents around 25% of carbon emissions, the following objectives:

- Reducing carbon emissions by 54% by 2030 and 87% by 2050.
- Reducing energy consumption by 28% in 2030.

The new thermal and environmental regulation scheduled for 2018-2020 will rely on the results of the experimentation launched in November 2016 among voluntary contracting authorities. The objective of this experimentation is to test the technical practicability and the economic sustainability of the levels of ambition enabling the reduction of non-renewable energy consumptions, the spreading of renewable energy at the building and district level and the use of materials, energy systems or low carbon footprint building methods. Coming out from this experimentation, **the E+C- label takes into account the carbon dimension.** It relies on the Energy-Carbon reference document, and takes into account GHG emissions on the whole lifecycle. The label thus promotes energy-efficient buildings. Therefore, it will enable voluntary contracting authorities which followed the reference guidelines as a whole (energy performance and environmental performance) and willing to engage in a labelling process, to promote energy-efficient buildings (participation to experimentation is not a pre-requisite for enrolling in the labelling process). The experimentation management relies on the observatory whose mission is to carry out an inventory of the technical and economic characteristics of operations which participate to the experimentation, capitalising on the lessons learnt and analysing the results to fine-tune levels and assessment method As an illustration, for a level 2 tertiary building, the total carbon will have to reach maximum 1000 kg CO2.

The analysis of the experiences feedback, via the observatory data, will allow tuning the energy and carbon levels of the future regulatory framework.

However, nor the French Thermal Regulation RT 2012 or other schemes and the regional climate and energy plan (PCET) rely on mandatory results.

It should also be noted that in spite of quality achievements, new buildings performances are often remote from the theoretical calculations, or even lower to those of the replaced equipment.

There are many different causes: non-adapted regulation, non-binding administrative tools, lack of political attention to energy and carbon challenges, fluctuating costs and lower costs of carbon energy, especially gas the last few years, lack of technical skills at the various steps of the production line: (design, building, operation, maintenance), lack of resources for technical project management, no willing from contracting authorities for assessment, etc.

Each new building is, due to scattered competences and decision-making processes, a prototype which does not benefit from the advantages of a certain standardization; if the architecture of the early 20th century primary schools could be identified easily in villages, that is no longer true for 21st century ones which size and technical expertise increased dramatically. As a result, the lessons-learned process is affected.

3.3.1.2 Public buildings and social housing renovation: a weak constraining regulation which does not explicitly take into account the carbon dimension.

Concerning public buildings, the TECV Law in its article 17 extends the obligation to renovate these buildings until 2050, with performance levels reassessed every 10 years. The decree project related to the obligations for improving energy performance in existing buildings for tertiary use, currently at the consultation stage, should contribute to improving energy performance of each building while optimizing the works cost / energy saving ratio. As an illustration, the tertiary buildings are concerned beyond 2000 square meters, and according to return on investment time.

Regarding social housing, the TECV Law provides for obligations of renovating the housing stock for the energy-high consuming buildings (F and G rated) and on-board works in case of important renovation. Tertiary buildings are also concerned by this obligation (Article 14 TECV law).

Yet, due to the importance of the existing housing stock (30 million of housing to compare with 300 000 new buildings yearly), the energy and carbon renovation

remains a major challenge. All the more so when we compare the carbon balance between new and renovated buildings. Without a thorough regulation, which seems recommended, **public authorities play a major role in terms of exemplarity and considering their potential impact on economic trend of some sectors.**

3.3.2 Regional policy in PACA Region

The building stock in PACA region counts 227 million m², that represented 30% of the regional final consumption in 2014 and 10% of greenhouse gas emissions related to final energy consumption. This building stock is characterised by a dominance of heating-related consumption (60% for the housing stock) as well as an overrepresentation of electric heating (44% of housing buildings), together with a peak demand for electricity in winter, a development of air conditioning and an increase of the electricity peak demand in summer. More than half of the housing stock was built before 1975 and nearly 31% display EPC ratings of E, F or G.

The regional programme for energy efficiency has identified three main intervention axes:

- The energy retrofit of private buildings, which is to be boosted through the following actions:
- Assisting co-ownerships in the decision-making, technical monitoring and financial engineering. The Region also supports the development of shared global audits, project management assistance, and financial engineering assistance through a regional energy retrofit platform.
- The massification of energy retrofit thanks to energy retrofit territorial platforms.
- The assistance to private individuals through a support to restoration works
- The energy retrofit of tertiary buildings:
- Encouraging communities to implement energy management systems
- Support tools for tourist accommodations and shops

- Supporting the structuring of the building sector facing regulation and technological issues:

- The Region should support the E+C- experimentation

- It should also promote the use of eco-materials and the recourse to local sectors

The Region supports structuring initiatives for the sector (trainings, feedbacks, innovative funding, etc.).

3.4. Current local and regional investment projects

The annex presents three ongoing investments in the field of energy efficiency and renewable sources in public sector and their measures.

3.5. Policy/Funding compatibility and market need to support public investment in ZEROCO2 buildings

The exchanges derived from the work of the local working group allowed the development of recommendations related to the improvement of public policies. These recommendations will help respond to market needs:

Recommendation 1: In order to take into account PACA regional specificities, there is a challenge to arouse a sample of experimentations representing different types of buildings, including public ones, and regional microclimates. In order to ensure a good representation of the Mediterranean coast, it should make sure that there will be sufficient applications in the H3 (/RT2012) climate zone.

Summer comfort should especially be taken into account in the national specifications.

PACA Regional Council and local authorities could commit to establishing this list. A partnership support mechanism (ADEME, DREAL, Region, liaising with CEREMA and BDM) is currently being set up and should foster the emergence of Mediterranean experimentations

Recommendation 2: Leading a strong awareness-raising campaign of local authorities in order to trigger operations on public buildings under passive renovation.

Recommendation 3: Better integrating the renewable energy and carbon dimensions in the project selection criterion, but also the cost of using and functioning of the equipment. In doing so, financing of quality engineering upstream and downstream of the project is crucial.

Recommendation 4: Going beyond thermal energy financing only, especially extending cogeneration at local level.

Recommendation 5: Better taking into account cold as a renewable energy.

Recommendation 6: Identifying the regional sectors which deserve an increased development: hot solar water, solar heating, etc., and set support mechanisms for these sectors.

Recommendation 7: In case of renovation project, conditioning the heat fund subsidies to carbon criteria.

Recommendation 8: Elaborating a simplified carbon and energy lifecycle analytical framework.

Recommendation 9: Establishing reference sources for spreading out passive renovation adapted to the Mediterranean context, in particular in view of summer comfort.

Recommendation 10: Commit PACA local authorities to use BDM approach for their public buildings renovation projects (cf. recommendation 10).

Recommendation 11: In the context of the region-wide roll-out of the platforms, in addition to their articulation with the other social operators and ANAH[6], they should include an adequate number of shared energy advisors. Apart from the awareness and advisor functions vis-a-vis local authorities, they should be able to lean on a collection of coherent measures coming out from the SRADDET and take into account the objective of spreading out these public policies which cannot only rely on the call for proposals approach.

[6] National Agency for Housing

Recommendation 12: Promoting, under the impulse of the Region, the emergence at different territorial scales of energy operators as provided by TECV Law, able to support the public contracting authorities on the design, construction, and performance monitoring functions, even third-party financing together with the Caisse des Dépôts et Consignations.

Recommendation 13: Commissioning should be more systematically required by public contracting authorities.

Recommendation 14: In view of the complexity of energy and carbon approaches, air quality, etc. to be considered at design and construction level of public buildings, a substantial aid for engineering funding would be necessary.

Recommendation 18: The territorial dimension is not covered by the ZEROCO2 project. However, it is suitable to emphasize the relevance of an energy approach, as well as a carbon approach, at a scale which exceeds buildings, and thus the interest to support TEPOS, QDM, and other similar approaches.

Focus on: The Mediterranean Sustainable Buildings[7] (BDM) approach

The BDM approach, which is carried out by an association gathering more than 350 professional stakeholders from the building sector, is a participative certification which allows a technical and human support on environmental, social and economic aspects of a building and taking into account the territory's special features.

The BDM approach is selected by local authorities for the management of their construction and renovation projects. It aims at favouring bioclimatology, minimizing the impact of materials, reducing water and energy consumption in order to protect inhabitants' comfort and health while taking into account social and economic issues.

This global, thorough, professional and participative approach is highly relevant to respond to market need due to the complexity of the energy and carbon approaches even though this last dimension is only considered indirectly.

[7] Bâtiment Durable Méditerranéen

3.6. Conclusion: strategies and the art of implementation

The near zero emission approach needs to differentiate between new buildings and restoration work, be it for public buildings or social housing.

In case of new buildings, the E+C- experimentation will allow the revision of the thermic regulation, through the integration of the Carbon factor in the building's life cycle. This future device, which should be closely followed in PACA region for the integration of comfort specificities in a Mediterranean climate, will give a satisfactory answer to the Carbon issue.

With regard to old buildings, which constitute the main issue concerning the existing stock, the regulation is still not very demanding. In the absence of a regulation modification, the solution does not reside in an adjustment of aid schemes but in the setting in motion of all actors from this sector.

The TECV Law strengthens the role of local authorities to mobilise their territories and the role of the region in the energy efficiency area completing Energy, Air and Climate Regional Scheme (SRCAE) with energy efficiency plans. It states that the regional climate and energy plans (PCAET) which now integrate the air quality issue, are only redefined at the inter-municipal level with an inter-municipal objective.

The ambition given to these strategic tools will be thus critical. The PACA region is on a path that does not allow achieving the energy transition objectives.

Yet, in order to tackle the complexity of energy and carbon approaches, **it is crucial to make available a full technical and financial support mechanisms for the contracting authorities**, from the design until the equipment management phases, whose experience shows it is often ineffective. Some mechanisms exist, even incomplete, yet a contracting authority support would be necessary.

In terms of carbon, due to the multiplicity of the issues at stake, which are sometimes contradictory, and due to the complexity of constructive and urban systems, depending on their facilities energy or not, contracting processes (of the building, of a city block, or even of the city in general) require **new skills and the emergence of a strong**

expertise, thus coupled with strong public authorities' incentive, across the different actors in order to take into account the interactions between their practices.

Validating experiences' feedback (on buildings, facilities, use, practices, functioning) and capitalising on this diffuse but rich and decisive knowledge, making them available to everyone: this should form a great part of the action plan, enabling to obtain better performances in terms of carbon and energy.

Commissioning is a quality insurance process, which aims at ensuring that a building, and particularly its systems, are designed, installed and tested according to the required performances by the contracting authority so that they can be well managed. Thus, this process allows guaranteeing energy and using performances to the contracting authority and building users. The commissioning contributes to the overall quality and energy global cost management.

4. POLICY CONTEXT

The Action Plan aims to impact:	☐	Investment for Growth and Jobs programme
	☑	European Territorial Cooperation programme
	☐	Other regional development policy instrument

Name of the policy instrument addressed: **Operational programme ERDF-ESF PACA:** Priority Objective 3, Energy transition and Sustainable valuation of resources. Thematic objective: Support the transition towards a low carbon economy in all sector.

Investment priority 4c : Support energy efficiency , the smart management of energy and the use of renewable energy in public infrastructure including public buildings.

4.1 ACTION 1

Background

An experimentation of the E+C- label is currently testing the technical feasibility and economic sustainability of the ambitious goals that will allow a reduction of non-renewable energy consumption, the deployment of renewable energy not only at building level but also at the neighbourhood level, and the use of low-carbon materials, energy systems and building techniques. This E+C- label takes into account a carbon dimension and lays the groundwork for the next French thermal regulation. It is based on the Energy-Carbon benchmark, and it includes emitted greenhouse gas calculations on the building lifecycle. Its testing was launched in November 2016 by contracting authorities that volunteered.

In addition, the ZEROCO2 local working groups that were held in Project Phase 1 raised the need for taking into account PACA regional specificities throughout this experimentation. There is a challenge to arouse a sample of experimentations representing different types of buildings, in particular including public ones, and regional microclimates. In order to ensure a good representation of the Mediterranean coast, it should be ensured to the extent possible that there are will be sufficient applications in the H3 (/RT2012) climate zone. There is the need for fostering the emergence of Mediterranean experimentations.

Action

a. **Disseminate the E+C- label experience to the European partners**: CEREMA has produced a dissemination guide of the E+C- label implementation. This guide will be disseminated not only through the project but also to related bodies in Brussels.
b. Contribute to the evaluation process of the E+C- label while **disseminating the Mediterranean results of the ongoing experimentation in the PACA region, by particularly highlighting the summer comfort issues**. AVITEM will consult the external expert contracted by ADEME to determine if Mediterranean specificities will be taken into account as such in the results and lessons learnt. In addition, a cycle of seminars with all the involved actors are planned in March 2018, end of 2018 and mid-2019. AVITEM will monitor the organization of public events to present these results.
c. Effinergie will carry out a **critical analysis regarding material energy norms** whose values constitute elements to assess the carbon footprint related to the E+ and C- label.

Players involved

a. AVITEM will disseminate documents related to the label experimentation and results.
b. CEREMA and ADEME will organize seminars in PACA region to take stock of the testing of the E+C- label.
c. Effinergie will carry out a critical analysis regarding material energy norms.

Timeframe

a. June 2018
b. March 2018, beginning of 2019 and end of 2019.
c. 2018-2019

4.2 ACTION 2

Background

The analysis of regional policies carried out during Project phase 1 presents several lessons learnt regarding energy renovation of public buildings. Among them, regional policies do not propose sufficient requirements in terms of renewable energy and do not include the carbon dimension while financing such projects. The Action plan aims at filling this gap and encouraging regional authorities to supporting the integration of the carbon dimension into the renovation of existing buildings. However, the PACA Regional Council voted in December 2017 a Regional Climate Plan which includes a priority focus on carbon neutrality. In doing so, they aim at maximising the development of renewable energy in order to reduce fossil fuels use and at implementing buildings' energy rehabilitation including its carbon impact.

The HQE Association has worked on a framework to take into account the lifecycle analysis in renovation processes and has tested it. As conclusions are not easy to drawn on, a revision of this framework will be done. In parallel, the BBCA – Low Carbon Building Association is working on a framework exclusively dedicated to the carbon dimension in renovation processes.

Action

a. Integrate the carbon factor into the renovation procedure: Studies will be launched to see how the carbon dimension can be integrated into the renovation framework.
b. Influence regional policy making towards the definition of new frameworks for buildings renovation and renewable energy production and use: These standards will include a carbon dimension (energy use reduction, renewable energy, bio-based material).

Players involved

HQE et BBCA will carry out these works. AVITEM will monitor this activity.

The PACA Regional Council will launch a renovation Call for Projects where the carbon dimension will be an implicit (passive low-carbon buildings) or explicit requirement.

Timeframe

2018-2020

Costs

73 million Euros

Funding sources:

HQE, BBCA, PACA Region

4.3 ACTION 3

Background

The Côte d'Azur Smart Grids Club, hosted by the Chamber of Commerce Nice Côte d'Azur, is finalizing an assessment guidebook for Smart Grids Buildings. This guidebook includes recommendations and assessment grid dedicated to urban planning stakeholders impacted by the roll-out of smart grids. It responds to expectations by identifying:

- Modalities to define, quantify and qualify Smart Grids Buildings levels ;
- Values associated to the 3 Smart Grids Buildings levels.

Action

AVITEM will support this action by disseminating this guidebook to PACA local stakeholders, partners, and European stakeholders.

Players involved

AVITEM will disseminate the guidebook published by the Chamber of Commerce Nice Côte d'Azur.

Timeframe

2018

4.4 ACTION 4

Background

A Good Practice Catalogue was developed within the first phase of the Project ZEROCO2. It contains new and innovative Good Practice examples in terms of policy and methods of constructing and maintaining already existing near zero emission buildings. The catalogue is designed to provide new, specific ideas that can be transferred among the partners or to regions. The exchange of those examples, also beyond ZEROCO2, will help to improve local, regional or national policies in order to contribute to the competitiveness, sustainability and social cohesion of cities, regions, countries and the European Union as a whole. The first section of the Good Practice Catalogue introduces the ZEROCO2 project and its Conceptual Framework, which forms the basis for all deliverables. The next section gives a brief overview of the Good Practices exhibited in each partner region to give an idea of the characteristics and overall conditions for the improvement of the energy policy in the area.

Action

Disseminate the good practices guide related to low-carbon renovation to French regional and local stakeholders: Translate the good practice guide into French and upload it online, featuring the good practices selected among those identified in France and in the other project partner countries – these latter should be replicable in France.

Players involved

AVITEM will disseminate the catalogue.

Timeframe

2019 – 2020

4.5 ACTION 5

Background

The analysis of regional policies carried out during phase 1 allowed for raising a lack of low-carbon policies and incentives. Indeed due to the multiplicity of the issues at stake, which are sometimes contradictory, and due to the complexity of constructive and urban systems, depending on their facilities energy or not, implementation of related policies and contracting processes (of the building, of a city block, or even of the city in general) require new skills and the emergence of a strong expertise, thus coupled with strong public authorities' incentive, across the different actors in order to take into account the interactions between their practices. There is a lack of competences from consultancy and architects about the design of buildings for an exploitation and consumption estimation as realistic as possible.

Validating experiences' feedback (on buildings, facilities, use, practices, functioning) and capitalising on this diffuse but rich and decisive knowledge, making them available to everyone: this should also form a great part of regional policies, enabling to obtain better performances in terms of carbon and energy.

Action

Organization of training seminars: Strengthen and organise training activities dedicated to artisans and installers about the new products and technologies available on the market, so that they can more easily propose and apply them.

Players involved

EnvirobatBDM will organize training seminars. AVITEM will monitor the development and implementation of the action**.**

Timeframe

2018 – 2020

Costs

20000 Euros

Funding sources:

EnvirobatBDM

Project: ZEROCO2

Partner organisation: AVITEM

Country: France

NUTS2 region: Province-Ales-Cote d'Azur (PACA Region)

Contact person: Candice le Tourneur

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Date:

Signature: _____

Stamp of the organisation: _____

Annex
Current Local and Regional Investment Projects

1. Thalassothermie Euromediterranée

L'opération urbaine Euroméditerranée à Marseille a souhaité la mise en place d'un système de production d'énergie performant et renouvelable, associé à un réseau de chaleur, pour alimenter le quartier en réhabilitation.
L'objectif était d'avoir un système de production d'énergie pour des usages mixtes entre habitat et activités tertiaires avec donc une production de chaleur et de froid, et à faibles coûts en raison de la présence de logements sociaux.
Après analyse de plusieurs scénarios, seule la solution de thalassothermie permettait d'atteindre les performances environnementales souhaitées et pour des coûts production raisonnables.
Avantages de cette solution : production renouvelable, technologies simples et matures, permettant une production industrielle, permettant la production de chaleur et de froid, d'améliorer la qualité de l'air et de réduire l'effet îlot de chaleur, permet réduire le dimensionnement du réseau électrique sur le quartier desservi, permet de récupérer de la chaleur dans un bâtiment (en cas de surchauffe) pour en chauffer un autre.
Limites de cette solution : nécessite une densité urbaine importante pour assurer une bonne rentabilité du réseau de chaleur, nécessite une mixité fonctionnelle, difficulté de synchroniser le développement de l'installation/réseau de chaleur avec le développement du projet urbain, difficulté à convaincre les différents promoteurs présents sur le quartier de se connecter au réseau de chaleur.

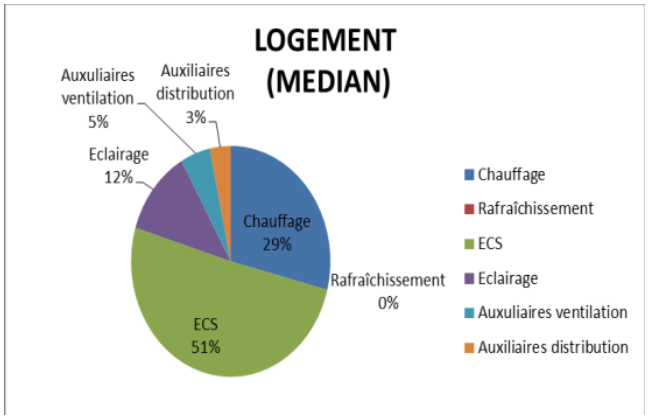
Deux opérations différentes ont finalement été développées dont la dernière vient juste d'être inaugurée. Il s'agit de 2 installations de production et de réseaux de chaleur de taille similaires (500 à 600 000 m² chacune, 30 à 35 millions d'euro chacune) mais avec des fonctionnements différents.

- L'opération **Thassalia** est développée et exploitée par Engie, assure le chauffage et rafraîchissement de la partie sud du quartier et fonctionne à 80 % par thalassothermie et à 20 % avec un appoint gaz lors des pointes de consommation. L'installation de production est centralisée (échangeur de chaleur sur boucle d'eau de mer, pompes à chaleur et chaudière appoint gaz) puis distribuée par le réseau de chaleur.
- L'opération **Massileo** est développée et exploitée par EDF, assure le chauffage et rafraîchissement de la partie nord du quartier, fonctionne à 100 % sur la boucle d'eau de mer, pour distribuer un réseau d'eau tempérée sur lequel viennent se brancher des pompes à chaleur réversibles à l'échelle des îlots ou des bâtiments.

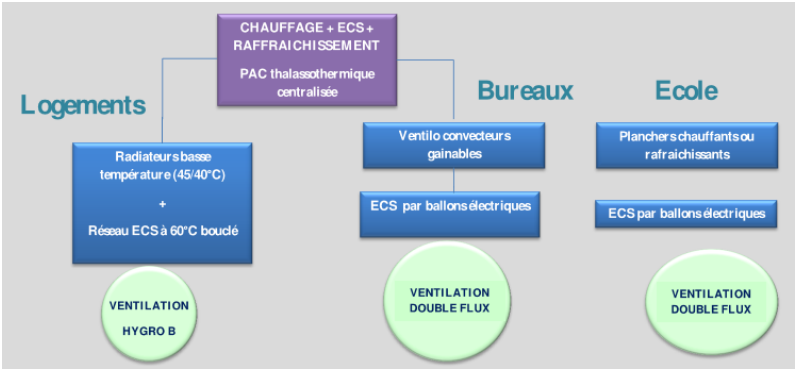
1.1 Ilot Allar C- Thalassothermie Euromed

Dans le cadre du programme Euroméditerrannée et au sein de l'Ilot Allar, labéllisé « Eco-Cité », l'Ilot C présente une surface totale de 10 232 m2 avec 154 logements et commerces au

rez-de-chaussée. Les objectifs de performance énergétique fixé par le cahier des charges de la ZAC vont au-delà de la réglementation (RT2012 -10% ; Bbio -20% hors compensation réseau énergie). Le bâtiment est raccordé au réseau de chaleur de thalassothermie.



1.2 Ilot Allar E - Thalassothermie Euromed



L'illot E présente une surface 9196 m2 pour 136 logements ainsi que 8 plateaux de bureaux et une école. Le bâtiment est raccordé à la boucle d'eau tempérée thalassothermique et équipé de pompe à chaleur.

2. La ferme de Beaurecueil – Grand site Sainte-Victoire

Le site de de la Ferme Grand Site Sainte-Victoire, ferme du XIXe siècle, a été totalement réhabilité avec des matériaux écologiques et de très basses consommations d'énergie. Les besoins en énergie sont assurés par un puit climatique associé à une ventilation double flux,

complété par une chaudière à granulés de bois (de 35 kW pour 1254 m2) et un chauffe-eau solaire pour l'eau chaude sanitaire.

Le niveau d'émissions de CO2 est très bas puisqu'il se limite aux émissions de la chaudière bois (33 gCO2/kWh) et des besoins en électricité.

3. Lycée Audiberti (06)

Construit en 1963, le lycée Audiberti à Antibes accueille 1500 élèves. Afin d'améliorer sa fonctionnalité et de suivre une démarche de qualité environnementale, il a fait l'objet d'une réhabilitation globale intégrant une amélioration de son efficacité énergétique :

- protection solaires extérieures
- ventilation passive + VMC
- isolation des paroies
- renouvellement du système de chauffage
- ECS solaire
- végétalisation