



CITIES HEADING TOWARDS 100% RENEWABLE ENERGY

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CLER, Energy Cities and Réseau Action Climat collaborated to prepare this publication. The aim is to provide guidance and solutions to French cities and metropolitan areas anxious to embark on a 100% renewable energy path. This report is based on the knowledge and experience of the authors' networks, as well as on around 30 interviews of councillors and city employees from about fifteen French local governments.

To provide a broader perspective, the authors have selected five European champions that are showing the way forward. They are all

signatories to the Covenant of Mayors for Climate and Energy. Despite different models, approaches and timetables, all these cities and regions aim to develop a coherent energy system based on energy efficiency and the optimum use of renewable and interconnected energy. Their policies and action plans rely on robust, flexible partnerships capable of mobilising local stakeholders around a collective project. The second part of the report is composed of five theme-specific factsheets illustrating the path towards 100% renewable energy with French examples of completed or on-going projects.

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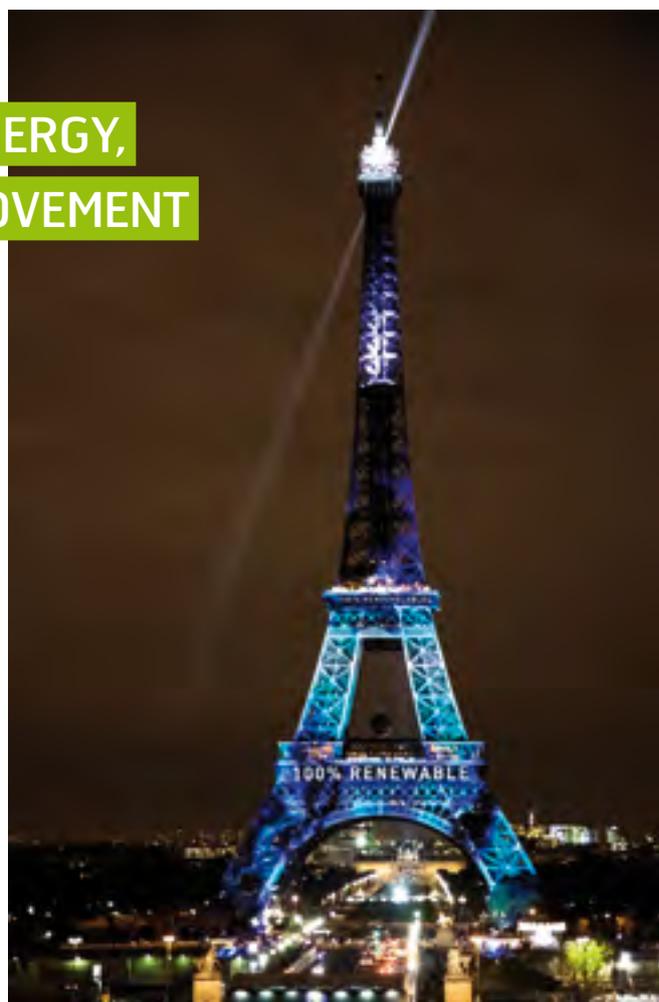
TOWARDS 100% RENEWABLE ENERGY, A GLOBAL, FAST-EXPANDING MOVEMENT

The Paris Agreement at COP21, the engagement of local authorities and civil society and the adoption of the law on energy transition in France marked 2015 out as a pivotal year. The question now is not whether the world will resolutely embrace energy efficiency and renewable energy, but how to conduct this transition so that it will bring benefits to all.

Renewable energy has become an essential part of the solution to a number of issues, from climate change and air pollution to geopolitical risks, price volatility and local and regional economic development. The sustained decrease in production costs means that renewable energy is already a competitive source of energy in many regions of the world and is set to become so in most very soon.

Developing renewable energy changes the decision-making process and the stakeholders involved. Adapted to local resources (wind, sun, geothermal energy, biomass wood and hydraulic power) and often produced in smaller units compared to conventional energy production facilities, renewable energy can rely on local companies, farmers and citizens to support its development. This local focus provides cities with an opportunity to regain control of energy issues and make decisions that benefit their area. Many rural communities are already engaged in 100% renewable energy programmes in France – where they are called “Territoires à Energie Positive” or Positive Energy Communities – and in Europe. The trend is more recent in urban areas.

However, if we look at the pioneering cities, regions and communities engaged in a 100% renewable energy approach worldwide, we can see that their motivations are clearly linked to local socio-economic development opportunities. City councils promoting renewable energy



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and energy efficiency want to reduce their territory's energy bill, to the benefit of the inhabitants and local economic players, as well as their dependence on polluting energy sources.

On 4th December 2015, over 700 city leaders from around the world joined Paris Mayor Anne Hidalgo at the Paris City Hall in committing to 100% renewable energy by 2050. Cities are responsible for 67% of global energy use and 70% of greenhouse gas emissions¹ – a level which is expected to reach 75% by 2030 when 2/3 of the world's population will live in cities – but they are also the first victims of pollution and rising sea levels. They are therefore the best placed to come up with practical solutions adapted to the local context and which meet the needs of their citizens. By setting an example and showing that it is possible, French cities and metropolitan areas can spark off a wider movement in France and in Europe in favour of an ambitious energy transition based on reduced energy use and the development of renewable energy.



IN A NUTSHELL

No two cities or metropolitan areas are alike. The path towards 100% renewable energy will be different depending on what natural resources are available in the territory and in neighbouring areas and on the priority given to energy efficiency, to particular energy sources (electricity, gas, heat), uses (buildings, mobility) or players (large energy companies, digital businesses, cooperatives). Although there is no right or wrong path, the pioneering authorities, all members of the international Global 100 RE² campaign, and the French stakeholders interviewed for this publication as well as literature reviews provided the authors with sufficient material to identify five major recommendations.

5 RECOMMENDATIONS TO BEAR IN MIND

1. A VISION OF THE FUTURE

INTEGRATING THE 100% RENEWABLE ENERGY OBJECTIVE INTO A BROADER PERSPECTIVE

Adopting a 100% renewable energy objective exemplifies and draws attention to the city council's political will to commit to a vision of the future that brings hope. It also lays down an official framework for taking action, involving stakeholders and allocating the necessary technical, administrative and financial resources. Such a publicly avowed objective also creates a secure environment for investments. But it will not be understood or shared by local stakeholders unless it is part of a broader perspective: reducing greenhouse gas emissions, resilience, economic development, social justice, reducing vulnerabilities like fuel poverty, quality of life or making the area more attractive.

Although a 100% renewable energy target may be viewed as being related to energy generation, energy savings should not be overlooked. Many cities which have adopted such a target even identify energy savings, a sector that is often forgotten, as their main resource, representing up to 50% of the energy currently used. Buildings, transport and even industry have a huge energy saving potential.

2. THE URBAN-RURAL LINKAGE

COOPERATING WITH NEIGHBOURING RURAL COMMUNITIES

In most cases, a city or metropolitan area, due to its density, will not be able to cover its energy needs with 100% renewable energy produced on its territory, even after markedly reducing them. It will therefore have to outsource wood, electricity and biogas, as it already does for food. Here lies an opportunity to create a win-win relationship between urban and rural land area. Cities have an interest in providing financial or technical support for the development of renewable energy production in neighbouring rural areas, thereby cementing local economic development and resilience.

Likewise, rural communities, some of which are already engaged in a positive energy community approach, or, in French, "Territoire à énergie positive"³, may also develop relations with cities, offering them access to their resources whilst keeping control of the projects and benefiting from locally generated revenue. In this context, regional councils have a crucial role to play: they can facilitate or coordinate the tools and governance necessary to avoid conflicts regarding access to resources (e.g. wood) and ensure a balance of powers between rural communities and growing metropolitan areas.

2 - www.go100re.net

3 - www.territoires-energie-positive.fr

3. TAKING ACTION

ILLUSTRATING SUCCESS STORIES WITH PROJECTS ON THE GROUND

Long-term objectives need to be backed by short-term actions offering tangible results. A 2050 target may be useful to set a course but will seem like hollow words if it does not go along with immediate measures. This is particularly the case of a 100% renewable energy target which requires massive changes to be made as quickly as possible.

Experimenting means starting small, to facilitate general acceptance. Tangible projects and results also help rally stakeholders and keep the momentum going. These actions may take many forms, from demand-side management measures in buildings and the transport sector – no city can achieve 100% renewable energy without drastically reducing its energy use – to the installation of renewable energy generators within its boundaries or municipal and community investments in renewable energy projects in neighbouring areas.

4. CO-CONSTRUCTION

INVENTING NEW WAYS OF ENGAGING LOCAL STAKEHOLDERS

Setting a 100% renewables course involves not only completely changing the energy model, but also the practices and stakeholders involved. It is a chance to give local stakeholders wider opportunities to participate, co-create and develop new economic models in relation to the energy transition. Success will depend on the diversity of the solutions, on the capacity of city council departments to work together and on the degree of involvement of local players, a pre-condition for better accepted and accomplished projects.

Co-construction and the sharing of benefits with all will help obtain the best results, whilst ensuring wider support.

The desire to participate and get involved is also exemplified by cooperatives and their values of solidarity, durability, transparency and proximity.



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5. FACILITATION

HUMAN RESOURCES, THE KEY TO SUCCESS

Whatever the objectives are, it is people who will get the job done. Involving and engaging citizens and local stakeholders, supporting the community and helping new projects emerge, all will require human resources.

Without this public engineering, projects will not be able to grow, whether they are private, public or mixed projects. It is therefore essential that the appropriate level at which such engineering can be created or at least made available within the city council is quickly identified.



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BARCELONA

Towards energy self-sufficiency by 2050

KEY FIGURES

INHABITANTS



1,6 MILLION

LONG-TERM VISION

AN ENERGY INDEPENDENT CITY BY 2050

Barcelona, Spain's second city in terms of population, economic development and activity, has been optimising its urban flows for years. Its political vision is to become energy self-sufficient by 2050. The associated roadmap makes the "100% renewable" objective an integral part of the city's official strategy by promoting energy savings and energy production based on solar energy, small-scale wind power and district heating.

📍 THE STARTING POINT

MANAGING URBAN DENSITY IN A SUSTAINABLE WAY

Barcelona's strategy is based on a two-fold observation: the high concentration of urban population is one of the major challenges of the 21st century, and the need for large urban areas to develop efficient energy solutions.

In 2015 this analysis led Barcelona to formally lay out its vision of a transition towards energy self-sufficiency. The municipality has set itself two objectives: reducing its greenhouse gas emissions by 40% by 2030 (compared to 2005) and producing enough energy locally to meet municipal needs.

The municipality is also playing a driving role in the city's transition towards 100% renewable energy by promoting low energy use and energy efficiency, the objective being to reduce energy end-use by 10% by 2020 (compared to 2008).

📝 THE APPROACH

SUPPLYING HIGH-QUALITY ENERGY SERVICES TO CITIZENS BY USING RENEWABLE ENERGY AS MUCH AS POSSIBLE

The City of Barcelona started tackling climate change some twenty years ago. In 1999, the municipality adopted a thermal solar ordinance (Ordenanza Solar Térmica). According to this bylaw, new and retrofitted buildings are required to use at least 60% of solar energy to cover their hot water needs. This legislation has proved to be effective: in 2000, the municipality anticipated the installation of 1,650 m² of solar panels, but in fact the figure had virtually reached 90,000 m² by the end of 2012. The ordinance was subsequently extended to PV solar energy in 2011. If all roofs were fitted with solar panels, Barcelona would be able to produce 5,500 GWh/year, thus covering the electricity requirements of its whole population. Currently, the municipality has 50% of its internal needs covered by renewable energy (buildings, lighting, municipal vehicles, etc.).



Brian Kinney shutterstock

Promoting renewable energy and energy savings has been part and parcel of Barcelona’s strategy since 2000. Its 2002-2010 integrated energy plan (PMEB) provided for quantification of the energy used and emissions generated per sector. It also suggested a number of measures aimed at promoting an environmentally-friendly city, reducing air pollution and the use of fossil fuels.

In 2010, Barcelona published its 2011-2020 “Energy, climate change and air quality plan” (*Pla d’Energia, Canvi Climàtic i Qualitat de l’Aire de Barcelona - PECQ*). Partly prepared on the basis of a participatory process involving local stakeholders, the plan reviews the results obtained in the previous period, takes stock of local stakeholders’ energy use and CO₂ emissions and proposes 108 new measures aimed at promoting the development of renewable energy and energy savings. The plan became the city’s SEAP (Sustainable Energy Action Plan) when Barcelona joined the Covenant of Mayors in 2008, thus committing to reducing its CO₂ emissions by 23.5% by 2020.

After the 2012 municipal elections, a new political vision emerged, providing for Barcelona’s energy independency by 2050. Although never formally adopted by the City Council, an interim technical target of 10% of renewable energy by 2024 is the first step in achieving this vision.

A political change in 2015 brought with it new ambitions: the city’s energy policy was aligned with European and international objectives and a 40% CO₂ emission reduction by 2030 target was introduced. The main objective remained an increase in the share of renewable energy and making energy more affordable. The roadmap towards self-sufficiency made the “100% renewable” target part of the city’s official strategy. It reflects the desire to put citizens’ needs at the centre of the energy policy and to use the city’s roofs to produce renewable energy.

The 22@Barcelona district and Fórum area have been equipped with district heating and cooling networks, leading to one of the major transformations of the city in the past few years. These networks cover 24 km and supply 105 GWh per year. They use waste heat from the Besos incinerating plant as well as biomass waste from the city’s public parks.

THE URBAN-RURAL LINKAGE

COOPERATING WITH RURAL COMMUNITIES TO ACHIEVE THE OBJECTIVES

Barcelona is a densely populated city with few opportunities for expansion, and with limited resources. To supplement the energy generated within the city limits, the municipality plans to cooperate with the wider metropolitan area. The partnership and scope have not yet been defined.

INVOLVEMENT OF LOCAL AND REGIONAL STAKEHOLDERS

CIVIL SOCIETY, A DRIVING FORCE FOR THE ENERGY TRANSITION

Since the new political mandate begun in 2015, energy has truly become a structural and cross-cutting issue for the municipality. A new form of governance is emerging in Barcelona, with an authority responsible for coordinating the city’s energy policy by involving all stakeholders. Anxious to develop the solar roundtable (“*mesa solar*”) initiated some years ago, the municipality intends to create forums and citizens’ advice organisations to make civil society an active player of the city’s energy and climate policy.

Barcelona also plans to set up a power supply company. In addition to selling renewable energy, the company will promote mechanisms aimed at developing new energy generation units in the city, thus linking energy production and consumption for the very first time and making energy a public service accessible to all.

The “self-sufficient Barcelona” website was launched to raise public awareness of the issue. This platform provides citizens with information and advice on local renewable energy production and energy efficiency.

For further information
<http://ajuntament.barcelona.cat/>



FRANKFURT

A German pioneer with a "100% renewable" roadmap

KEY FIGURES

INHABITANTS



717,000

LONG-TERM VISION

100% RENEWABLE ENERGY BY 2050

50% ENERGY SAVINGS

25%
renewable energy produced within the city

25%
renewable energy produced in the region

Frankfurt is a flourishing city with a strong tertiary industry and ranks 4th among European financial centres. The city has been actively fighting climate change for several decades and was among the first German cities to adopt a Masterplan aimed at achieving a 100% renewable energy supply by 2050.

THE STARTING POINT

THE INCLUSION OF CLIMATE PROTECTION IN THE CITY'S ORGANISATIONAL CHART

Frankfurt's commitment to fighting climate change is not new, as demonstrated by the creation of an energy office within the municipality's Building Department as early as 1983, a commitment renewed in 1990 with the establishment of the *Energiereferat*, the local energy agency and department.

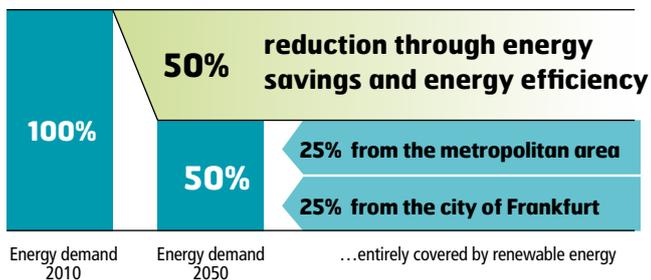
In 2008, the city council adopted a list of 50 measures intended to fight climate change and reduce energy use. Encouraged by a call for projects launched by the German federal government in 2012, the City of Frankfurt developed the "100% efficient and renewable FrankfurtRheinMain" concept. The regional

agency was later associated with the project to add a regional dimension.

The City of Frankfurt was one of the first German cities to adopt a 100% renewable energy supply roadmap. Prior to defining the roadmap, a feasibility study was entrusted to the Fraunhofer research institute. A simulation of the energy needs by 2050, taking into account current and future energy use in all the sectors as well as foreseeable changes in prices and population growth was used to identify several possible scenarios.

Frankfurt's "Masterplan 100% Klimaschutz" (100% Climate Protection Masterplan) adopted in 2015 identifies the strategies and instruments for achieving the objective by 2050. Implementation of the Masterplan is supervised by the municipality's energy department.

100% CLIMATE PROTECTION MASTERPLAN



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Source: Frankfurt Green City

THE APPROACH

ENERGY EFFICIENCY FIRST

With its “Masterplan 100% Klimaschutz”, the municipality aims to have all its energy needs covered by renewable energy by 2050. This will require reducing energy use by 50% through building retrofitting, the use of new technologies and further efforts at developing the circular economy. The remaining 50% will be covered by renewable energy produced within the city (25%) and in the metropolitan area (25%). To achieve these objectives, the plan assesses the energy needs, greenhouse gas emissions and areas for improvement in each sector and suggests a number of measures to be implemented in the electricity, heating and transport areas.

The identified renewable energy sources include solar thermal and PV energy, biomass, and, to a lesser extent, wind power produced in the metropolitan area. But the centrepiece of this energy future is heat, Frankfurt planning to massively build up cogeneration units and to further extend its ten district heating (and cooling) networks.

THE URBAN-RURAL LINKAGE

CREATING A WIN-WIN SITUATION

Preliminary studies show that the city of Frankfurt cannot achieve its “100% renewable” target on its own. To meet its energy needs, the city will have to use resources from the metropolitan area and even the wider Land (regional level) for wind power and biomass.

It is a win-win situation: the metropolitan area has renewable energy resources (which should cover 184% of its power needs by 2050) and has developed many good practices whereas the city has expertise in energy efficiency and a longstanding experience with the passive building standard.

INVOLVEMENT OF LOCAL AND REGIONAL STAKEHOLDERS

SHARING AND CONSOLIDATING THE CITY'S VISION OF THE FUTURE

The municipal team was able to convince local stakeholders of its ambitious objective by involving them and by clearly communicating to the general public the results and implications of its energy and climate policy. Pilot projects also helped raise public awareness.

In 2013 and 2014, as part of the preparation phase of its masterplan, the City of Frankfurt organised workshops with economic stakeholders (businesses, banks, etc.) as well as public consultations involving over 800 inhabitants. These workshops made it possible to integrate their needs and ideas into the plan and to convince them of the project's added value for the whole region.

The city council has also set up a steering committee with 30 well-respected persons from very different backgrounds. Its stated mission is to provide advice and evaluate the implementation of the plan by the municipality. Monitoring will also be provided by a regional monitoring structure responsible for publishing energy data on the Frankfurt Rhine-Main metropolitan region based on contributions from the Land of Hesse, municipalities and associations of municipalities as well as energy suppliers and network operators.

The metropolitan region Regionalverband FrankfurtRheinMain is the city's main partner for implementing the “100% renewable” measures. This cooperation opens up new opportunities: whereas previously the city and region were simply energy users, they now create value and have become renewable energy prosumers, like many other stakeholders in the region.

For further information

www.frankfurt.de/sixcms/detail.php?id=3077



© Frederikshavn Kommune



FREDERIKSHAVN

A territory anxious to create a new energy system

KEY FIGURES

INHABITANTS



61,100

LONG-TERM VISION

100% RENEWABLE BY 2030

FOR THE WHOLE AREA

Frederikshavn, a town in north Denmark previously centred on port activities, started to concentrate on attracting green enterprises and technologies some 10 years ago. With its port zones, its proximity to agricultural areas and its willingness to promote innovative activities, Frederikshavn's focus is not on developing one technology or activity in particular, but a new, coherent energy system based on renewable energy.

THE STARTING POINT

A CALL FOR PROPOSALS THAT TRIGGERED A PIONEERING MIND

It all started in 2006 with an offer from energy experts for Frederikshavn to take part in a pilot project called "Energibyen" (Energy City) and to become the first 100% renewable energy city in Denmark. The strategy implemented the next year, and supported by all political parties, allowed for a significant increase in the share of renewable energy in the town's energy production and use (20% in 2007, 40% in 2009 and 100% in 2015), combined with a reduction in heating (-25%) and electricity (-25%) requirements. In 2014, the 100% renewable energy target was extended to the Greater Frederikshavn area and 2030 was defined as the new deadline, thus anticipating the 100% renewable energy by 2050 objective set by the national government, in order to create new green jobs as quickly as possible.

THE APPROACH

A CONTINUOUS MONITORING PROCESS TO STAY ON COURSE

A new 3D modelling and visualisation model developed by the University of Aalborg was used to launch the initiative on the basis of data and scenarios. The same software is also used as a communication tool and to raise awareness of partners and the general public.

In order to have 100% of the area's energy needs (electricity, heating and transport) covered by renewable energy, the plan sets the following objectives: completing the share of renewable energy of 27% currently by achieving 14% of energy savings, 49% of wind energy and the remaining part of energy mostly produced from other local renewable sources or technologies (biomass, biogas, heat pumps, etc.).

If measures continue to be implemented at the same pace, energy efficiency will be up 23% by 2030 (compared to 2010). This will involve reducing building energy use, optimising transport flows and adopting sustainable public tendering procedures. Large-scale projects are in the pipeline to replace natural gas and oil with renewable resources, including the construction of a number of wind turbines, thus boosting power generation from 34 to 130 GWh. PV and thermal solar energy will also be promoted (4 GWh and 1 GWh respectively) and new biogas producing units and waste incinerating plants will be built, producing heat, electricity and biogas. Heat will be conveyed to consumers via a dense district heating network.

As regards the transport sector, Greater Frederikshavn is creating infrastructure encouraging cleaner forms of mobility, including charging and transfer stations for electric, biogas or hybrid vehicles, bike-friendly road infrastructure and car-sharing facilities.

The action plan for 2030 will be reviewed every year to “keep up with the ambition of a 100% renewable energy conversion”. The continuous monitoring process will make it possible to integrate new renewable technologies already in the pilot phase but not included in the master plan, such as wave energy, the Frederikshavn bio-refinery or water electrolysis to produce hydrogen.

THE URBAN-RURAL LINKAGE

ENERGY CONVERSION AND ECONOMIC OPPORTUNITIES

In 2013, a local government reform led to the merger of many Danish municipalities. Greater Frederikshavn was then created by merging the former municipalities of Skagen, Sæby and Frederikshavn. 70% of the population of the new municipality of Frederikshavn live in urban areas and 30% in the rural part.

The ambitious 100% renewable energy objective will not be attained without converting the resources available in the area surrounding Frederikshavn into energy. Biomass is viewed as an opportunity to boost the agricultural sector by developing a new activity as energy supplier. Off-shore wind power is also harnessed, partly through DONG Energy, an 80% state-controlled company.

INVOLVEMENT OF LOCAL AND REGIONAL STAKEHOLDERS

BRINGING PARTNERS OF ALL KINDS ON BOARD

The University of Aalborg is one of Frederikshavn’s key partners in this project.

The Energy City project and the 2030 Masterplan were favourably received by the population of Frederikshavn. The inhabitants were able to contribute to both projects by attending workshops organised by the municipality. A website and a Facebook group were also created to keep citizens abreast of project progress. To reinforce this participative approach, a group of citizens known as «My Energy Town» involving people from Skagen in the North to Voerså in the South was created in 2016.

Frederikshavn has also set up multiple partnerships with businesses and private investors (banks, property developers, craftsmen, landlords, public transport companies, agricultural sector, trade and industry) in order to develop new renewable technologies. The creation of a network of local tradespeople is expected to make energy retrofitting of buildings more systematic. In addition to training courses, the network also works with local banks on the development of financing schemes for retrofitting projects.



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For further information
<http://energycity.dk>



© Alain Grandchamp



GENEVA

En route for 100% renewable energy in municipal buildings

KEY FIGURES

INHABITANTS



201,100

LONG-TERM VISION

100% RENEWABLE ENERGY AND ZERO EMISSIONS BY 2050

FOR PUBLIC BUILDINGS

Geneva is the seat of numerous international organisations and has conducted a recognised and acknowledged energy policy since the first oil crises in the 1970s. The objective of the City of Geneva is to have all its municipally-owned buildings heated with renewable energy by 2050.

THE STARTING POINT

TACKLING ENERGY EFFICIENCY IN MUNICIPAL BUILDINGS

The successive increases in oil prices and their extreme volatility over the 2004-2006 period, as well as the prospective depletion of fossil energy resources, revealed Geneva's strong energy and financial dependence on fossil fuels. Already engaged in a systematic rationalisation of its energy use over the last 30 years, the city council decided to step up its action and to engage in an energy transition.

In 2006, the adoption of the "100% renewable by 2050" municipal strategy applicable to municipal building heating requirements clearly changed the thrust of its energy policy. This still on-going strategy identifies buildings which would benefit most from retrofitting/rehabilitation work from both an environmental and energy point of view. This will significantly increase the energy performance of the city's own stock of buildings, which is composed of about 800 public, administrative and social housing buildings.

The municipality also runs a fleet of 500 vehicles and is responsible for the water used in public buildings and places, large sections of the sewage system and all public lighting within the city limits. It is engaged in a comprehensive approach to reducing its energy and climate footprint, as demonstrated by changes made to its vehicle fleet, the development of soft mobility solutions for its employees and the promotion of rational use of water and electricity savings.

The City of Geneva aims to take an active part in the energy transition of its territory. In 2008, it was awarded the European Energy Award Gold for the comprehensiveness and consistency of its approach, reflected in its energy and climate policy.

The objectives of this policy are carried out in a number of areas: urban planning, mobility and transport, procurement, waste management, information and communications and even economic promotion and tourism. They are also taken into account when defining investment and planning priorities.

THE APPROACH

EXTENDING THE PUBLIC BUILDING OBJECTIVE TO TERRITORIAL ENERGY PLANNING

The first building work to which the “100% renewable” method was applied showed that it was possible to significantly reduce heating requirements whilst preserving the financial integrity of the projects and improving building management cost efficiency. Improving energy efficiency also brought about social benefits by significantly reducing heating costs for tenants and noticeably improving indoor comfort.

However, acting on new and retrofitted buildings alone will not be enough to rapidly achieve the territory’s energy transition objectives and renewable energy penetration remains well below the gradual progress target set by the City of Geneva. The implementation of the strategy also revealed that many unused local energy resources could potentially be harnessed.

Relations were established between energy specialists and the planners in charge of urban planning. This cooperation resulted in the adoption of the Canton energy law and the obligation to set up Territorial Energy Concepts (Concepts Energétiques Territoriaux -CET). These methodological tools identify the energy issues at district level, ensure their integration at an early stage of the project and encourage local and renewable solutions.

Before harnessing the local resource, its presence in the area must be assessed precisely to optimise implementation costs and ensure its competitiveness compared to fossil energy. The rapid, massive deployment of renewable energy solutions also requires pooling local resources and building collective distribution infrastructure in the various districts.

The first example of this ramping-up was CADéco Jonction. The project, carried out in collaboration with the Canton and Geneva Industrial Services (a semi-public partner responsible for distributing grid-bound energy) will heat twenty or so large buildings with water from Lake Geneva by 2019. Upon completion of the project, the City of Geneva will have 14% of its total heating requirements covered by renewable energy and will get back on track with its renewable energy target. The project will also be used to demonstrate the potential of “surface water” as a credible, efficient alternative to fossil energy sources.

THE URBAN-RURAL LINKAGE

CREATING A REGIONAL WOOD BIOMASS SECTOR

The City of Geneva is located at the centre of a cross-border urban area which is home to almost 1 million people and its energy policy is systematically placed in the context of Swiss and European partnerships. Its main relations, however, are with

the Canton of Geneva and its main partners. As regards wood biomass, the municipality has contributed to creating a brand-new local industry which benefits from the city’s own resources through municipal forestry and from a partnership with the Geneva association of private forest owners. This partnership ensures that wood biomass is sold at a fair price whilst guaranteeing private owners sustainable, free of charge management of their forests. It also promotes local jobs and a short supply chain.

INVOLVEMENT OF LOCAL AND REGIONAL STAKEHOLDERS

COLLABORATIONS PROMOTING THE LOCAL ECONOMY AND LOCAL, NON-OUTSOURCEABLE KNOW-HOW

The City of Geneva has only a partial ability to act on its territory due to the way power is shared between the Canton and the main public and semi-public partners (municipalities, Geneva Industrial Services, Geneva Public Transport operator, etc.). It can, however, influence a number of decisions and facilitate the deployment of infrastructure projects within the city’s boundaries. In fact, Geneva ensures that its energy and climate policy and action are reflected in the various collaborations and partnerships involving local stakeholders by adopting the role of a planning authority or through incentives.

The energy and climate policy coordinators also strive to reinforce links with other municipal projects such as the Municipality Masterplan, the Covenant of Mayors and Agenda 21.

The City of Geneva wants to project a dynamic, positive and forward-looking vision of energy and climate issues able to transform a desirable future into a common objective. According to this vision, local partners and citizens will work together and adhere to the objectives set through the collective commitment of civil society and all relevant stakeholders.

The processes and relations between the stakeholders involved in implementing the 2050 vision are new and therefore complex. This is why a successful planning process leading to innovative projects requires identifying the relevant stakeholders and activating them at the right moment, in the right place and with the right function. The CADéco Jonction project showed that the scenario that is needed to promote the local economy and local, non-relocatable know-how is played out at three levels: the density of “clients” who adhere to the project, local industrial partners able to invest, influence and create local expertise, and commercial partners for disseminating the project.

For further information

www.ville-geneve.ch/themes/developpement-durable-energie/energie



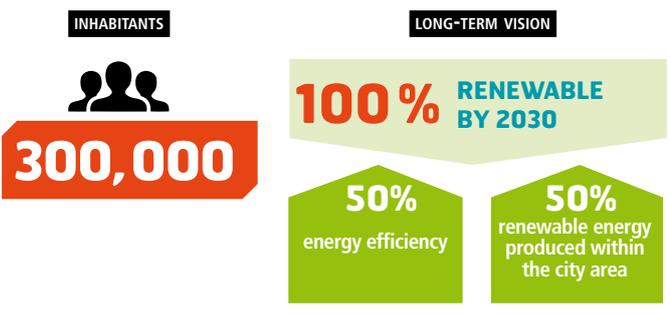
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MALMÖ

From an industrial to a renewable capital

KEY FIGURES



Malmö, the economic mainstay of Southern Sweden and a former industrial city, has transformed itself into a technological innovation, culture and sustainable development centre. The municipality aims to cover 100% of its energy needs by renewable energy by 2030, an objective it intends to achieve by halving energy use.

THE STARTING POINT

INJECTING NEW LIFE AFTER THE CRISIS

Following the industrial decline in the 1990s, Malmö lost close to 40,000 inhabitants who left the city in search of a job. The future of Malmö, formerly specialised in shipbuilding, was seriously thrown into doubt. With the arrival of Ilmar Reepalu as mayor in 1994, Malmö started to reinvent itself by promoting local know-how, culture and sustainable development. The city thereby regained its title of Southern Sweden’s economic hub.

As of 1998, Malmö embarked on a policy of sustainable development and green energy solutions. Today, two of its districts, Augustenborg and Västra Hamnen, already are supplied by 100% renewable energy (biogas, solar, wind and hydraulic power) and have demonstrated Malmö’s energy transition potential. The municipality first transformed the Augustenborg district, a former flood-prone area. The district’s regeneration

programme included adaptation measures (rainwater collection system), the introduction of 9,000 green roofs and the creation of a system using food waste to produce biogas for public buses. In 2001, the industrial district of Västra Hamnen (Western port) was also regenerated. 350 flats made of sustainable materials were built and an innovative district heating and cooling network was introduced, as well as sustainable mobility solutions (e.g. free five-year car-sharing subscription for residents).

But Malmö wanted to go further by adopting a more systematic approach to further accelerate its energy transition. In 2007, the municipality set up 5 workgroups composed of staff from different municipal departments to identify local environmental challenges and come up with sustainable solutions. Two years later, in 2009, a strategic energy and environmental plan targeting a 100% renewable supply, called “Energistrategi för Malmö”, was prepared on the basis of this study. The plan was unanimously adopted by the city council in the same year.

 **THE APPROACH****HARNESSING ALL AVAILABLE LOCAL RESOURCES**

With its “Energistrategi för Malmö”, the city aims to have 100% of its energy needs covered by renewable energy by 2030, an objective it intends to achieve by halving energy use. Recommended measures include energy retrofitting, smart grids, efficient waste management and developing public transport and cycle paths. The remaining needs will be covered by renewable energy produced within the city (50%). Malmö has prepared a roadmap describing the urban development required to achieve this deployment of renewable energy.

Malmö’s plan, which the municipality also submitted as its Sustainable Energy Action Plan for the Covenant of Mayors, clearly identifies those sectors (transport, building, energy production) with energy efficiency and renewable energy potential. In the building sector for example, an energy mapping of the city has helped the municipality determine how to retrofit buildings in a cost-effective way.

Malmö has also set interim milestones for achieving 100% renewable energy:

- Energy use will be reduced by 20% by 2020 compared to 2001, and then by 50% by 2030.
- Greenhouse gas emissions will be reduced by at least 40% by 2020 compared to 1990. This target was almost already reached by 2014.
- The share of renewable energy will increase from 50% by 2020 to 100% by 2030.

Malmö intends to become a 100% renewable energy city by developing solar, wind, hydro-power and biogas. The municipality already has the largest solar farm in the country, Sege Park, a farm with 1,250 m² of PV panels which will soon be equipped with the first solar-powered Stirling engine. Malmö is also close to Sweden’s largest offshore wind farm, Lilgrund, which produces 0.33 TWh and supplies energy to 60,000 households. The municipality is simultaneously developing small-scale wind power close to the port area in order to ensure a more diversified and secure energy future and create new local jobs. It also plans to have the world’s largest biogas unit (300 GWh) built in the port area in cooperation with E.ON, its main energy supplier. In the long-term, Malmö plans to have it converted from a biogas to a hydrogen unit supplying electricity and heat to municipal buildings and a more sustainable fuel to the transport sector.

 **THE URBAN-RURAL LINKAGE****REGIONAL CROSS-BORDER COOPERATION**

Compared to other cities, Malmö has “direct access” to a wide range of renewable sources (wind power, biogas, wave and tidal energy, etc.). It can therefore meet its energy needs with its own resources, without having to resort to surrounding areas.

This does not prevent Malmö from engaging in regional and international cooperation. Within the Öresund cross-border region, which comprises the cities of Malmö and Copenhagen, as well as the regions of Zealand (Denmark) and Skåne (Sweden), Swedish and Danish municipalities are encouraged to cooperate to become the first carbon-neutral European region. Malmö contributes to making Skåne carbon-neutral and therefore plays a pivotal role in eliminating fossil fuels in the region.

 **INVOLVEMENT OF LOCAL AND REGIONAL STAKEHOLDERS****A SHARED POLITICAL AMBITION**

Right from the start, Malmö has been proactively seeking to motivate and engage local and regional stakeholders in its energy and climate policy in order to obtain their support and commitment. Its “Energistrategi för Malmö” was submitted for public consultation from July to September 2009. Malmö has also conducted educational programmes on sustainable lifestyles in secondary and driving schools (“Eco-driving” programmes). Smart sensors installed on traffic lights give right of way to public transport and cyclists. A structured dialogue involving all stakeholders was organised by the municipality in order to create a truly Smart City in the Hyllie district in South Malmö.

Cooperation is also deeply rooted within the city’s administration: the various departments (architecture, environment, etc.) systematically work together and with local stakeholders (businesses, universities, NGOs and citizens) to achieve the common objective of a low-carbon future. The political ambition and continuous support of the municipality, even after the departure of the “instigating” mayor in July 2013, explain the progress made towards the 100% renewable energy objective.

For further information

<http://malmo.se/Bo-bygga--miljo/Boende--narmiljo/Energi--uppvarmning.html>



1 FORESIGHT

Giving long-term planning its rightful place

Having an ambitious vision of a desirable future and setting a course towards 100% renewable energy encourages and facilitates the engagement of the various local stakeholders and opens up new opportunities. It is important that long-term planning is given its rightful place in municipal action. Obviously, this long-term course must not be used to postpone measures aimed at reducing energy use and developing renewable energy. On the contrary, its purpose is to trigger a paradigm change whilst not losing sight of the desired objective. To be credible, this political message must be backed up with “no-regret” short-term measures and medium-term planning documents defining interim targets, for example a Territorial Climate, Air and Energy Plan or an energy masterplan. This entails adding a foresight dimension to one of these tools by considering a 2050 time horizon, a 100% renewable energy target and, therefore, a territorial area extending beyond the city’s boundaries. Although cities already carry out planning exercises, covering 100% of a territory’s energy needs with renewables requires going much further.

LONGER-TERM PLANNING

For most French cities and metropolitan areas, a 100% renewable energy target involves making plans for the medium or long term. 2050 is a time horizon that matches the timeframe required for energy and urban transitions (given the inertia) with the need to take immediate action to tackle climate change and the depletion of natural resources. This time horizon also makes it possible to anticipate future changes such as demographic trends or the impacts of climate change. The city of Frankfurt in Germany has developed a Master plan that includes the possibility of halving energy use by 2050. Energy needs will then be covered by 100% renewable energy, of which 50% will be produced in the city and 50% in surrounding areas (see p. 8).

Although a longer-term scenario is less accurate than a 10-year one, it encompasses the ultimate target and distinguishes the long-term solutions from the more transitional ones. A more distant horizon also makes it possible to consider and better integrate structuring issues like urban planning as opposed to focussing on the most efficient measures in the short or medium-term. This foresight approach may be combined with other tools, like a Territorial Climate, Air and Energy Plan, an energy masterplan or a ScoT (territorial strategic planning document in France) to avoid multiplying initiatives and consultations, and consists of defining a “desired future” and then using “backcasting” methods to determine what measures should be taken now to move towards this vision⁴.

A PERIMETER EXTENDED TO NEIGHBOURING TERRITORIES

Since most cities and metropolitan areas are densely populated, they will be unable to produce all renewable energy necessary to cover their needs within their own boundaries. They will therefore have to rely on neighbouring areas, especially rural ones, for their energy supply. Existing territorial climate and energy plans usually only consider the energy produced within the city limits or connected to its area of responsibility (e.g. wood used to fuel a boiler or an incinerator located outside the city but delivering heat to the urban area). For cities, the main priority will be low energy use and energy efficiency policies and then renewable energy produced in their territory, in the region or in neighbouring areas, whilst remaining connected to the national grid to benefit from its flexibility. This cooperation between urban areas (heavy consumers) and rural areas (surplus producers) will be crucial and mutually beneficial. It will encourage rational use of natural resources. It will also help improve -rather than compromise- the ecosystemic services cities receive beyond their territorial boundaries and will lay the foundations of future cooperation.

An assessment of future energy demand therefore needs to be made by a given time horizon, accompanied by strong demand-side management measures, identification of the perimeter required to cover these needs with renewable energy based on the resources available within the city limits and in surrounding areas (solar maps), and network development planning.

⁴ - www.energy-cities.eu/IMG/pdf/imagine_session5_waldron_fr.pdf

Saint-Etienne Métropole – Pilat Regional Nature Park

Saint-Étienne Métropole and the Pilat Regional Nature Park have jointly decided to reinforce their energy savings and renewable energy production policy through a Positive Energy Community scheme. The joint project aims to halve energy use in all sectors and to attain **70% of locally produced renewable energy in the energy mix by 2050**. This is a particularly ambitious objective, energy from renewable sources currently accounting for just 6% of total energy use (mainly wood biomass). To achieve this objective, studies are being carried out to consolidate and refine knowledge of existing resources and to determine the potential of the various energy sectors (wind power, biogas production, district heating, solar mapping, etc.). One specific sector per year will be studied until 2020 to spread costs and each study will lead to projects like the installation of biogas production units.

www.tousacteursduclimat.fr/decouvrir/territoire-a-energie-positive

Bordeaux Métropole

In February 2016, Bordeaux Métropole adopted the objective of becoming **one of the first French "Positive Energy" metropolitan areas by 2050**. This will be achieved by reducing energy use, especially in the transport and residential sectors, and by producing renewable energy in the metropolitan area and in neighbouring areas. This objective is part of a wider strategy aimed at decentralising, developing economic activities and producing food and energy locally. Interim targets will be defined in the Territorial Climate, Air and Energy Plan and energy masterplan. This long-term objective is associated with immediate measures like rolling out solar mapping to the whole metropolitan area or the development of wood biomass. As regards the latter, the Metropolitan Council is studying the possibility of signing long-term wood supply agreements with rural communities. Although trust may sometimes need consolidating between urban and rural areas, the main challenge will be to reconcile the interests of the various parties and be able to agree terms on cross-sectoral issues like land and biomass uses, biodiversity conservation and heat islands.

<https://participation.bordeaux-metropole.fr/participation/developpement-durable/construisons-une-metropole-durable>

Région Occitanie

The Occitanie Region (South-West of France) has set itself the objective of becoming **energy positive by 2050**. It is currently the second highest renewable energy-generating region in France, its production covering 22% of its needs. For the Region, the stakes are both social and economic. With the help of experts, a 2050 energy transition roadmap is being prepared (November 2016), defining a path based on ambitious, yet realistic objectives. One or two scenarios will then be prepared and discussed with local stakeholders, as well as with the French National Energy Agency ADEME and the State. Milestones will be defined and integrated into regional planning, economic development, vocational training and energy efficiency documents. Resources will then be allocated to ensure that the objectives are met, both in terms of governance and territorial coordination notably through positive energy communities for green growth schemes. Financial tools will also be used, like third-party financing and crowdfunding. The Region will concentrate its resources on territorial growth centres.

Grenoble

The City of Grenoble has embarked on a **100% renewable energy path**, leading to the development of ambitious projects, in particular as regards energy efficiency. The Local Urban Plan, for example, stipulates that the performance of new buildings must be 20% higher than the current thermal regulation requirements. 1,000 housing units are concerned by this measure, 18 months after it came into force in early 2015. The policy in favour of renewable energy reflects the city's desire to make Grenoble resource-efficient by developing district heating, wood biomass and waste energy recovery. Grenoble is also investing in renewable energy production projects and is now a shareholder of SAS Energy Citoyennes, a community energy initiative. It is to be noted that GEG, a local public company whose main shareholder is the municipality of Grenoble, produces, distributes and supplies electricity and gas to local residents. In December 2015, this semi-public company adopted a plan for investment worth 100 million euro by 2020 for renewable energy generation. This will triple the production of GEG's sectors (hydropower, wind power, PV solar energy and biogas) from 120 GWh currently to 300 GWh by 2020.



2 THE URBAN-RURAL LINKAGE

Creating new urban-rural partnerships

Local governments want to get involved and participate in the economic development of their area together with new, game-changing stakeholders, cooperatives and smaller businesses. Rural communities with sufficient resources (forest, wind, agricultural waste, etc.) and space will be able to produce energy, as they already produce food, and “export” their surpluses (electricity, biogas, wood, etc.) to energy intensive urban areas with insufficient resources to meet all their needs. New economic models and new players will thereby be able to enter the energy market.

Whereas cities and metropolitan areas have rarely kept themselves busy with their gas, electricity and fuel supplies in the past, the development of renewable and, therefore, more decentralised energy and increasing energy costs have changed the situation. Due to its density, a French city or metropolitan area will find it difficult to have all its energy needs covered by renewable energy produced within its boundaries, even after drastically reducing its energy demand. A 100% renewable energy target therefore involves cooperating with neighbouring land, usually rural, with capacity to produce more energy than they need for their own consumption. But such cooperation requires developing new forms of solidarity and smart systems.

EXPLOITATION OR NEW SOLIDARITY?

For rural communities, the growing appetite of cities for their resources may be perceived as a threat. Rural areas very often do not meet their own needs with locally produced energy; so how could they consider supplying other territories? And rural or suburban territories which have had to put up with city annoyances in the past (installation of an incinerator, landfill site or the spreading of sewage sludge) are unwilling to see their environment spoilt to satisfy the needs of city dwellers.

A win-win relationship between urban and rural territories must therefore be created to facilitate acceptance of the projects and ensure that all parties gain from them. Cooperation may take many forms: investment in renewable energy production projects by urban authorities, technical assistance, provision of shared tools or engineering that would be too costly for rural authorities to fund on their own (thermography, feasibility studies, etc.), involvement in setting up public transport systems to reduce pollution from commuting.

This cooperation is an opportunity for rural communities to benefit from new revenues, notably through taxation, as well as new jobs and technical support. As for cities and metropolitan areas, stronger links with rural communities ensure reliable local supplies and stable energy prices.

COMPETING FOR RESOURCES OR FAIR SHARING?

Whereas cities are starting to develop their own renewable energy supplies, pressure on resources may lead to tensions between urban and rural areas. Should timber be sold to fuel urban boilers or to heat country people? Will the wind of Northern Picardy be used to supply electricity to the metropolitan areas of the neighbouring Hauts-de-France region? Renewable energy production projects will only be supported by people in the countryside if they first meet their own energy needs. Cooperation must be seen as a way for rural communities to benefit from the support of urban areas and not simply as a solution for siting urban projects. The Region can and must play a coordinating role. There remains the counting issue: will electricity produced by a wind turbine in a rural area be counted as energy from the rural community or from the city which invested in the project? This is just a detail if both communities are able to collaborate in developing renewable energy production and avoid competing for resources.

Brest métropole and the Centre-Ouest Bretagne area

In March 2015, the French Interministerial Committee for rural affairs decided to pilot the first “city-countryside” reciprocity agreements between volunteering municipalities and associations of municipalities. These agreements are based on a “win-win” approach involving federative projects in the field of food supply, environmental protection or in agricultural and industrial sectors of excellence suited to territorial cooperation initiatives.

The General Directorate for Territorial Equality (CGET) is leading the experiment with volunteer territories including Brest métropole and the Centre-Ouest Bretagne (COB) area which are following two different, but complementary paths in terms of renewable energy. COB is relying on its wind farm and wood resources, whereas Brest métropole has developed an urban infrastructure in which the incinerator and the newly built wood boiler will help reinforce and extend the district heating network. The first step consisted in assessing renewable energy resources and reducing energy use and the territories should now be able to share and develop joint projects. One of these projects will consist of **creating a new outlet in Brest métropole for the wood biomass** sector being set up in the COB area.

 www.adeupa-brest.fr/nos-publications/vers-un-contrat-de-reciprocite-brest-metropole-pays-centre-ouest-bretagne-elements

The Auvergne-Rhône-Alpes Region and Greater Lyon (Eastern Central France)

Wood biomass is a strong energy transition driver for Greater Lyon. Its Territorial Climate and Energy Plan has set the objective of having by 2020 160 MW produced by biomass-fuelled boilers connected to a district heating network, which would need 200,000 tons of wood per year. To date, 70 MW of wood biomass energy has been connected to heating networks. If the regional sector fails to keep up with demand, district boiler operators will get their supplies from more distant sources, thus generating additional costs and pollution due to transport and only partial benefits for the local economy. Local stakeholders (foresters, nature conservation organisations, elected representatives, etc.) have decided to join forces and have developed a “**territorial forestry project**” specifying how the forest should be managed over the next 60 to 80 years. The Sylv'ACCTES association was set up to gain access to a number of financing schemes and ensure the promotion of adequate sustainable forest management whilst creating a link between the city and the countryside, with member cities, communities and organisations being given the opportunity to finance work in forested areas. Sylv'ACCTES will not pay forest owners directly but the companies in charge of planting, pruning, clearing, etc. This approach thereby contributes to preserving jobs in rural areas.

 <http://blogs.grandlyon.com/plan-climat/2015/10/13/sylvacctes-des-forets-pour-demain>

Syndicat départemental des énergies de Seine-et-Marne

A project for the construction of a biogas production unit in Dammarie les Lys, in the Seine-et-Marne department, has been initiated by the Syndicat Départemental des Énergies de Seine-et-Marne (SDESM) to inject biogas into the gas distribution network. Built next to the wastewater treatment plant, the unit will handle two types of raw materials: agricultural waste (crop waste, horse dung, etc.) collected within a 30 km or so radius and sewage sludge from the Melun Val de Seine and Boissise-le-Roi urban communities. **This project has a genuine territorial dimension in that it uses local resources and is financed by a number of local governments of the Ile-de-France Region** which have taken stakes in the “Bi-métha-77” semi-public company in charge of the project. Shareholders include SDESM, the Melun Val de Seine urban community, as well as the Ile-de-France Region, the City of Paris and the Val-de-Marne department through the Energie Posit'if semi-public company.

 <http://sdesm.fr/service-energie/methanisation>

Saint Etienne Métropole – Pilat Regional Nature Park (Eastern Central France)

Saint-Étienne Métropole and the Pilat Regional Nature Park have jointly decided to reinforce their energy savings and renewable energy production policy through a Positive Energy Community scheme that makes use of their respective assets and complementary strengths as urban and rural territories. All energy sectors will contribute to achieving the target of 70% renewable energy by 2050: biogas production at farms and sewage plants, PV solar energy, district heating, hydropower produced with drinking water, etc. The potential is usually higher in rural areas, which have fewer inhabitants and therefore, reduced energy needs. But producing renewable energy in rural areas to supply part of an urban area's needs is not necessarily straightforward. Rural communities want to retain control over the projects developed in their area and ensure they get some local benefits from them, especially financial ones. Urban territories will be able to use part of the renewable energy produced in rural areas, in exchange for making resources available. **A “Mobility Mission” has therefore been created and an energy retrofitting platform is being implemented within the perimeter of the Positive Energy Community.** Cities can also provide technical support and engineering expertise. A governance associating local authorities and relevant stakeholders will help smooth out one of the potential drawbacks of urban-rural cooperation: the competition for local resources such as wood.

 www.tousacteursduclimat.fr/decouvrir/territoire-a-energie-positive

3 FINANCING AND INVESTMENT

Funding renewable energy production and energy efficiency

For cities and metropolitan areas, embarking on a 100% renewable energy path involves changing scale and supporting the development of renewable energy production in their own and surrounding areas. This support requires new tools. Capital contributions to renewable energy production projects enable the local authority to improve project viability by increasing the amount of equity, depending on the investment resources available to it. It also means that the local authority is involved in project governance and can ensure that the territory will benefit from the profits made. Opening capital up to citizen investment contributes to improving project acceptance. This is possible in the case of energy efficiency projects, like public lighting for instance.

Part of the revenues generated by renewable energy production projects may also be used to finance measures aimed at reducing energy use (supporting households with a home renovation project, improving public lighting energy efficiency, retrofitting public buildings, etc.), thus creating a virtuous circle towards achieving 100% renewable energy.

Cities and metropolitan areas (in France) wanting to invest in renewable energy production projects have a range of options.

SEM

A Société d'économie mixte (SEM) is a public limited company with a minimum of 7 public and private shareholders. Public shareholders (local governments or groupings of them) have a controlling interest, holding between 50 and 85% of the share capital. This structure ensures public control, admits local governments as shareholders at different levels (city council, metropolitan council, associations of municipalities, departmental and regional councils) and means that a partner, like a developer, can sit on the company's board. Shareholding can also be opened up to citizens. A SEM can invest outside its shareholders' territories (depending on the limitations set out in its articles of association).

SA OR SAS

The French energy transition for green growth act allows municipalities and their groupings, following a decision by their governing bodies, to take stakes in a SA (*société anonyme* or public limited company), or SAS (*société par actions simplifiée* or simplified joint-stock company), whose object is to produce renewable energy in their territory or in neighbouring areas contributing to the energy supply of their territory. Special attention needs to be given to the shareholders' agreement and the articles of association.

SPL

A *société publique locale* (SPL) is exclusively held by public stakeholders (local authorities and their groupings). The minimum number of stakeholders is two. The activities of an SPL are limited to the territories of its shareholders.

COOPERATIVE

A SCIC is a limited company (SA or SARL) with variable capital whose object is to produce or supply public interest goods and services serving a social purpose. The SCIC can be used to gather multiple players around a common project: employees, volunteers, users, local authorities, businesses, community organisations, private individuals, etc.



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Grenoble

In line with its Air, Energy and Climate Plan objectives and taking advantage of the opportunities offered by the new French Energy Transition Act, the Grenoble Metropolitan Council decided to invest in local and community renewable energy production projects. In June 2016, it agreed to **invest in SAS Energ'y Citoyennes**, a joint-stock company with local democratic governance whose aim is to promote and develop decentralised electricity production from renewable sources. The objective of the project is to provide all interested local residents and stakeholders with an opportunity to invest part of their savings, propose a roof or get involved in installing 100 solar roofs within the metropolitan area.

 <http://solairedici.org>

The metropolitan council is also involved in ParkoSol, a project promoting the installation of PV sun shades on Park & Ride facilities. The project had to comply with the tendering process for the promotion of renewables organised at national level which involved taking risks in the preparation phase as implementation was not guaranteed. Three 250 KWp projects were selected in the summer of 2016. An SAS bringing together the local energy company GEG Enr, the regional fund OSER, the metropolitan council and citizens through a crowdfunding platform will be created to install these sun shades.

Lorient

In order to reach 50% of renewable energy in its building stock by 2020, the City of Lorient also relies on the production of electricity for its own use via PV panels installed on its buildings (schools, city hall, etc.). For this project whose impetus came from the municipality, two tasks were carried out in parallel:

- Preparation of the rental terms and conditions between the municipality and the citizens' collective owning the panels.
- Setting up a citizens' collective able to submit a bid under the public tendering process launched by the city in early 2016.

The PV panels are bought by the OnCIMè collective and the city council rents them from it. As the city councillor in charge of energy transition says: "The objective is to produce for our own use rather than for sale. Producing our own energy is cheaper, makes us more independent and frees us from market prices". The OnCIMè SAS, created by the "Bretagne énergies citoyennes" (Béc) association was used as an interface for collecting the money necessary to buy the PV farm. "The panels rented to the municipality for 15 years were bought by 66 people for a total amount of €8,000". The share yields 1% tax-free interest plus inflation, i.e. more than the French tax-free savings account. OnCIMè also organises events and workshops three times a year for school and city hall staff, making this initiative a good example of community education about energy.

 <https://tisoenn.lorient-agglo.fr/article/des-panneaux-solaires-photovoltaiques-finances-par-l-epargne-citoyenne>

SEML Vendée Énergie

Since the early 2000s, local governments in the Vendée department (West-Central France) have been setting an example by becoming local renewable electricity producers. These municipalities have been able to benefit directly from the resulting economic spin-offs by adopting a number of land planning and development measures. A publicly-owned company was created in 2002 and transformed into Vendée Énergie, a local SEM (see p. 20), in 2012. The capital of this semi-public company is now 3.8 million euros with the following shareholding: Syndicat Départemental d'Énergie et d'Équipement de la Vendée (Sydev) for 75%, the Caisse des Dépôts for 10% and two other SEMs (Soregies and Sergies) for 15%. Vendée Énergie now owns 25% of the assets producing wind and PV generated electricity in Vendée, enough to cover the needs of 40,000 households.

SEML operates 6 wind farms (36 wind turbines) with a total capacity of 50 MW, 51 photovoltaic power stations mounted on the roofs of public and industrial buildings with a total capacity of 3.45 MWp and two ground-mounted PV power stations (6.8 MWp) on landfill sites. Four new ground-mounted PV power stations are ready to be built. They won the most recent CRE 3 tender launched by the French energy regulatory commission with a total capacity of 18.2 MWp (i.e. 10% of the national capacity allocated!) which will come on stream in December 2017.

When Vendée Énergie invests in a renewable energy production project, local governments and citizens are also allowed to acquire shares in the project company. Everyone therefore can contribute and get a return on their investment.

Vendée Énergie also has many innovative projects in the pipeline involving small hydropower, biogas production, smart electricity grids, hydrogen production, etc., and possibly in the future investing in an off-shore wind project or a joint project with Nantes Métropole to reinforce the links between rural communities and the city.

 www.sydev-vendee.fr/pages/vendee-energie.php

Greater Lyon

The "Toits en transition" (Roofs in transition) association was created to promote the development of community PV solar production units on public and private buildings in the Greater Lyon and surrounding areas with the support of Greater Lyon and in partnership with Énergie Partagée and Enercoop. The association was also instrumental in creating the "Un Deux Toits Soleil" project company responsible for installing, financing, operating and renting roofs to local councils and private stakeholders and for selling the electricity thus produced at the feed-in tariffs set by the State and guaranteed for 20 years.

 <http://toitsentransition.weebly.com/le-projet.html>

Engaging local stakeholders

Whether the impetus for setting a 100% renewable energy target comes from the public authority, elected representatives, private players, community organisations, farmers or citizens, it is of key importance to get all stakeholders on board. It is a prerequisite for obtaining significant, sustainable results. Each category of stakeholders brings its own complexity, but also reinforces the process with its own interests and skills. And because many aspects of everyday life will be impacted by this 100% renewable energy vision, including housing, lighting, mobility, new technologies and consumption, fully engaging citizens and the various local stakeholders from the urban, metropolitan and surrounding areas is essential to ensure ownership of the process.

ANTICIPATING AND SUPPORTING THE ARRIVAL OF NEW STAKEHOLDERS

Energy transition and the 100% renewable energy vision are radically transforming our energy market. We are moving away from a highly centralised electricity production system based on the massive use of imported fossil fuels (petrol, gas, etc.) to a local production system based on locally available resources (sun, wind, wood, etc.). This shift, which also involves reducing our energy use, is paving the way for new players: local councils, cooperatives, digital companies, committed citizens. The new energy model that will emerge from this will be determined by the role played by these stakeholders.

Researchers have defined four possible energy coordination scenarios in urban areas by 2040⁵. Each scenario gives a vision of the future with, each time, the focus on one potential dominant player: local governments, large companies, cooperatives or central public authorities. The technological choices and the relations between the various territories and neighbourhoods differ significantly depending on the scenario considered. Cities and metropolitan areas therefore cannot forego a reflection on the role they want to play in the future, taking into account the various stakeholders involved, and on the energy model and underlying values they want to endorse. This role may take many forms depending on the projects and subjects under consideration: a leading role when the city council is behind the project, a facilitator of emerging projects or a partner for joint projects. Direct peer-to-peer exchange between elected representatives from different local governments committed to a 100% renewable energy target process may contribute useful insights to the discussions.

OPENING UP PARTICIPATION OPPORTUNITIES

In order to support the major changes induced by the transition towards 100% renewable energy and because the various players – citizens, businesses, farmers, administrative authorities, etc. – can contribute ideas and solutions, the participation of all stakeholders should be openly encouraged from the foresight phase. The objective is to co-build a new energy model, decompartmentalise policies and create a shared momentum. In the same way as achieving 100% renewable energy will rely on production from rural areas, the local players from these territories need to be involved in the discussions. Participation opportunities may take many forms, including investment in renewable energy production projects. Experience has shown that people are less tempted to adopt a NIMBY (Not in my backyard) attitude when they are involved in the decision-making process and have a financial interest in new projects. This will also contribute to reinforcing the new paradigm whereby citizens are given back control over their energy future. Finally, it is essential not to leave out certain groups. Households experiencing fuel poverty, for example, need to see that their concerns are being paid attention to but they will not necessarily take part in consultation meetings on energy transition. Methods such as selecting groups of citizens as participants at random may therefore be used to ensure that all stakeholders have their say.

INFORMING AND COMMUNICATING ON A REGULAR BASIS

Creating a momentum around a 100% renewable energy target can be quite easy. Keeping the momentum going over the long-term may prove more difficult, with a risk of running out of steam. It is therefore essential that all stakeholders receive regular progress updates, news of projects and reminders of the ultimate aim and benefits.

5 - www.ladocumentationfrancaise.fr/catalogue/9782110100252/index.shtml

Grenoble-Alpes Métropole

The Grenoble Metropolitan Council opted for consultation: a **panel of around thirty randomly selected citizens** collectively meditated on three specific questions:

- 1- How can citizens be involved in the energy transition?
- 2- What type of support measures do we need to reduce our energy use?
- 3- How can we participate in the development of renewable energy?

The panel met during three weekends and made proposals to the Metropolitan Council: one of the recommendations was that a 50% renewable energy target by 2030 should be integrated into the Metropolitan Air, Energy and Climate Plan.

 <http://participation.lametro.fr/media/default/0001/01/e9b9c315f0890662d-6594058d52aca269125a33a.pdf>

Nantes Métropole

A citizen dialogue rests on the principle and conviction that decisions are more easily accepted when they result from collective debate and are based on multiple contributions, expertise and recommendations by local residents and stakeholders. In June 2014, Nantes Métropole launched a first debate entitled "Nantes, la Loire et nous" (Nantes, the River Loire and us) which involved 40,000 citizens, generated 5,000 inputs and led to the adoption of 30 pledges by the Metropolitan Council in December 2015. A second **public debate on energy transition is being organised for the whole metropolitan area**, whose results will be published by mid-2017.

The debate focuses on four themes

- What transitions in terms of lifestyles?
- Territories in transition: what landscapes and new uses?
- How can local communities take ownership of energy issues, from production to consumption?
- Transition and the economy: what opportunities for innovation, jobs and social inclusion?

An independent commission ensures that the process is properly handled and prepares a final summary report for the elected representatives. This open debate is not just about informing, educating, gathering inputs and confronting viewpoints, but is also a "nuts and bolts" process. In other words, a debate that gives a lot of room for experiments and practical measures taken by stakeholders and local governments and aims to demonstrate that not only is energy transition desirable but can also become a reality if we all join forces.

 www.nantesmetropole.fr/institution-metropolitaine/dialogue-citoyen/notre-conception-du-dialogue-citoyen-a-nantes-metropole-26469.kjsp?RH=WEB

Saint Etienne Métropole – Pilat Regional Nature Park

As part of the Positive Energy Community Scheme jointly initiated by Saint Etienne Métropole and the Pilat Regional Nature Park (Central Eastern France), **theme-based workgroups** (mobility, renewable energy sources, housing, etc.) were set up to take stock of the situation, draw up a list of on going projects and help new projects emerge. This strong engagement of all stakeholders in preparing the positive energy community application was rewarded with regional and national recognition once the application was accepted. The challenge is now to keep this engagement alive through practical measures and discussions, especially as regards the obstacles encountered. It is by demonstrating tangible progress and the benefits perceived that the momentum will be maintained. A website and a newsletter are also used to keep stakeholders up-to-date with recent developments.

 www.tousacteursduclimat.fr/decouvrir/territoire-a-energie-positive

Bayonne

Bayonne organises **citizen dialogues called "portraits of neighbourhoods"** to better understand the needs and expectations of local residents and stakeholders. In each neighbourhood, between 200 and 250 participants on average meet four times at consultation workshops (kick-off meeting, urban experience, roundtable and recap meeting). The objective is to identify the neighbourhood's strengths and weaknesses and **lay down the main outlines of the "neighbourhood project"** consisting of a number of measures the City of Bayonne intends to implement in close collaboration with its citizens.

As regards energy transition, the main concerns are mobility, especially the place given to cars and the last mile issue for deliveries. The development of pedestrian streets has thereby become one of the issues of debate.

 <http://portraitsdequartiers.bayonne.fr>

Making smart cities places of collective intelligence

Digital technology is transforming our lives, our way of moving around (via navigation systems, public transport applications, etc.), our jobs and the way we interact with others. By giving us access to real-time information and multiple data, the possibility of controlling functions and by connecting us directly with people and organisations, it projects us forward into a transformed future. The energy and digital transitions are following parallel, occasionally intersecting paths, driven by different forces.

Energy transition can be facilitated by digital technology: simplified access to public, shared or active transport systems, control of energy use in a building, adaptation of street lighting to foot traffic, interactions between energy networks, etc. For its part, digital technology is a source of experiments, especially for “smart cities” programmes involving large IT and construction companies, utilities, telecommunications operators and a network of start-ups. New models are being invented, but perpetuating and rolling out these experiments requires true understanding of uses and a cross-functional vision. A purely technological solution will not have the expected beneficial transformative potential.

CONSIDERING USES FIRST

The digital transition will be truly beneficial and shared if it provides real added value. It will need to answer the basic question “what is it for?”. In a 100% renewable energy city or metropolitan area, digital technology is one way to reduce energy use in the transport, building and lighting sectors and strike a balance between energy production and demand. At the level of a neighbourhood or mixed development area, the so-called “smart grid” functions help increase power grid flexibility locally by improving the balance between locally available supply and real-time demand, thus facilitating optimised integration of renewable energy. Combined with energy efficiency measures, these functions contribute to limiting investment in new grid infrastructure. By creating added value for users in a broader context, the digital transition will not only improve its chances of finding its economic model, but it will also become a building block in an overall project.

TAKING A CROSS-FUNCTIONAL APPROACH

In cities and metropolitan areas, as elsewhere, breaking the “silo” mentality is not easy. As a matter of fact, digital technology is often associated with economic development only. Furthermore, projects launched generally concern a single sector (street lighting, energy, mobility). New, more cross-functional working methods integrating users should therefore be adopted not only by municipal teams, but also by public and private stakeholders. Smart cities cannot be reduced to a huge control

panel controlling and optimising urban flows. Neither is it a question of monitoring each individual’s activities. Smart cities will be what we collectively want them to be. Initiating a dialogue between digital specialists, community organisations and citizens, decompartmentalising, experimenting, encouraging creativity and engaging all stakeholders are all crucial issues. Although the energy transition would be difficult without digital technology, achieving the digital transition requires a shared vision and interest as well as integrating future lifestyles associated with a post-carbon city.

MONITORING OVERALL IMPACT

Digital technology and smart cities can help reduce energy use in many sectors and at different levels and facilitate the integration of renewable energy. But new technologies also mean more energy being used to satisfy new uses and greater use of natural resources. An overall assessment is therefore needed to make informed decisions. Social impacts must also be considered such as the risk of a digital divide or the impact of proposed solutions on employment.

Greater Lyon

A recurrent problem in large metropolitan areas is urban traffic congestion which limits mobility and negatively impacts the environment, the local economy as well as city dwellers' quality of life. At a time when alternative solutions are urgently needed, public, private and academic players from the metropolitan area have decided to pool their expertise in the *Optimod'Lyon* project with the encouragement of Greater Lyon. The Lyon metropolitan area is the first in France to have built a data warehouse pooling information about road traffic, urban public transport, departmental transport, regional express trains, car-sharing, carpooling, planes, travel times in real-time, 1-hour traffic forecasts and traffic logs.

A mobile phone urban navigation system instantly provides real-time information about all modes of transport thus allowing people **to optimise their journeys depending on the situation.**

For freight, an **on-line optimisation tool for delivery rounds** helps improve goods deliveries. 30,700 tonnes of CO₂ are thus avoided each year thanks to the large-scale deployment of solutions developed as part of this project.

 www.optimodlyon.com

Rennes Métropole

A smart power grid project called *RennesGrid* is being developed at the Ker Lann business park in Bruz, a Rennes metropolitan area municipality. The objective is to produce electricity from PV panels installed on the ground, on roofs or as sun shades on car parks. The electricity produced will be used locally by student residences, higher education establishments and service industries. Active energy-demand management and storage devices will make it possible to use the electricity produced from renewable sources at peak hours. Recharging solutions for electric vehicles will improve mobility on the site. The project has been developed around **an innovative business model based on the sale of local renewable energy and energy efficiency services.** Local consumers who have opted for this renewable and highly local electricity will benefit from smart devices to help them reduce their energy use. RennesGrid is based on a cooperation agreement between the five partners of the project: Rennes Métropole, Schneider Electric, Enedis, the local green activity cluster EcoOrigin and the municipality of Bruz. The first solar panels will be installed in 2017.

 <http://metropole.rennes.fr/actualites/urbanisme-deplacements-environnement/environnement/un-reseau-electrique-intelligent-pour-la-gestion-energetique-de-la-zac-ker-lann>

Brest métropole

In early 2013, Brest métropole introduced an overall approach for better controlling electricity use on the right bank of the metropolitan area. This part of Brest hosts a number of regeneration and development projects involving housing units and economic activities, including the creation of a number of mixed development areas (ZAC). Energy issues are particularly tangible in these areas since new activities mean increased energy demand. Traditionally, these projects would have resulted in a significant increase in energy use, especially during peak hours, leading to the need to reinforce the high-voltage line serving the new ZAC des Capucins for an estimated cost of €610,000 borne by the local council. One of the ambitions of the energy loop is to change viewpoint, to consider that such reinforcement is not a fatality and to **demonstrate that urban development and densification can lead to reduced electricity use.** The approach is unique in that it involves multiple energy sources and uses. A smart grid component is planned: 800 PV panels will be installed on schools and on the tramway depot and by 2017 part of the electricity generated will be used to supply the cinema, the media library, shops and housing units. Volunteer professionals will be able to install a smart multi-energy metering system on their premises to monitor their energy use live via a web platform. This smart grid project is part of a broader approach including other projects like the construction of a thermal energy storage unit (hot water tank), outside insulation of buildings, the extension of the district heating network with a new wood-fired boiler and the installation of a cable car.

 www.brest.fr/assurer-la-transition-energetique/la-boucle-energetique-locale-3781.html

**100% renewable energy cities
and communities worldwide**

ALREADY A REALITY



Communities, cities, regions, islands and even countries across the world have embarked on a 100% renewable energy path. An increasing number of local authorities are proving that a 100% renewable energy target – of course combined with energy efficiency and low energy use policies – is not only technically feasible but also economically and socially beneficial.

Global 100% RE, a worldwide initiative, supports local governments committed to a 100% renewable energy target. This campaign builds on projects that are already taking place at national, regional and local levels and aims to demonstrate that 100% renewable energy is set to become the new normal at all levels and on all continents. The list of cities committed to 100% renewable energy is growing with new additions like Salt Lake City in Utah, Aspen in Colorado, Copenhagen, Munich, Agadir (Morocco), Kasese (Uganda), Takarazuka (Japan), and Sydney which has a 100% electricity, heating and cooling target from renewable sources by 2030.

Global 100% RE is the first global initiative that advocates 100% renewable energy. It links up energy transition promoters and local authorities across the world to build a global alliance, proving that a 100% renewable energy scenario is achievable and beneficial. The goal is to build capacity and educate policymakers about the opportunities, case studies and stories that are happening all over the world. To achieve this, the campaign aims to establish a global network of 100% RE cities and regions.

For further information

www.go100re.net

CRITERIA FOR CHARACTERISING 100% RENEWABLE ENERGY IN A LOCAL CONTEXT

Moving towards 100% renewable energy may take many forms. Each city or local authority defines its own strategy depending on its local context and priorities and develops its own tools. Common criteria and indicators are therefore necessary to measure, characterise and better share the various policies that are being implemented. With new members joining the Global 100% RE campaign, new questions arise: What does 100% renewable energy actually mean for a city? How do we measure progress and success? How do we ensure that the transition to 100% renewable energy is an instrument that leads to sustainable development?

The criteria proposed by Global 100% RE members aim to cover the full array of energy transition measures taken by local authorities, regardless of their size. They do not endorse any specific renewable energy technology and energy efficiency plays an essential part. The principles that underpin the development of the criteria are as follows:

- They describe the full scope of the energy used in the local authority area: electricity, heating and cooling, and transportation.
- They must link the 100% renewable energy target to a more general sustainable development vision.
- They must not overburden local authorities with intensive data collection and reporting.

The 12 criteria adopted range from the characterisation of the 100% renewable energy target to its application to the various energy uses, local stakeholders' engagement and the implementation of action plans.

For further information

www.worldfuturecouncil.org/inc/uploads/2016/03/WFC_2015_Kassel_International_Dialogue_on_100_Renewable_Energy.pdf

A selection of publications

CLER, NETWORK FOR THE ENERGY TRANSITION



CLER-Infos - the magazine of the Network for the energy transition (in French only)

CLER-Infos is a quarterly publication providing recent updates on the energy transition and aimed at local stakeholders involved in promoting energy savings, renewable energy and reducing fuel poverty. Special reports, opinion columns, best-practice stories... discover this publication (edited since 20 years) by subscribing (€35/year for 4 issues) or read previous issues in PDF format on the website:

www.cler.org



Énergies renouvelables: en finir avec les idées reçues! (in French only)

Renewable energies are expensive, they require more energy to generate than what they produce, they destroy jobs... We all have heard these assertions, often said in good faith by opinion or policy-makers. But they are very often wrong as demonstrated by CLER, Réseau Action Climat and the Hespul association in this publication – €5 per copy or 10 for €40.

www.cler.org/IMG/pdf/enf-2015-bat3-web.pdf

ENERGY CITIES



Four key recommendations for the European Renewable Energy Directive!

To strengthen the energy democracy process across the EU, Energy Cities published four key recommendations based on a local, renewable energy model.

www.energy-cities.eu/IMG/pdf/energy_cities_redii_position_paper_layouted-2.pdf



The Energy Transition Chronicles

Energy Cities provides local authorities with support for implementing their own energy transition process. In this document composed of five case reports, the European city network goes further and tells the tale of energy transition success stories. Because it is important to show that energy transition is "possible". Why, how, with whom, for what results? Energy Cities interviewed local players and decision-makers to find out more. Here are their stories...

www.energy-cities.eu/IMG/pdf/chroniquete_complet_fr.pdf



The energy transition: New dialogues between cities & local stakeholders

An exploratory study for cities and other project leaders who want to jointly initiate a long-term energy transition process in their territories. Energy Cities selected over ten European energy transition initiatives, as diverse as they are innovative, anticipating new modes of governance and new ways of acting and working together. This exploratory study does not just describe their implementation process, it also analyses the synergies between the different stakeholders, examines the role of the municipality and identifies the key factors behind their emergence, success and dissemination.

www.energy-cities.eu/IMG/pdf/dialogue_cities_stakeholders_energy_cities_leaflet.pdf

RÉSEAU ACTION CLIMAT



Nouvelles compétences climat-énergie des collectivités territoriales. Loi NOTRe, transition énergétique: quels impacts pour les territoires? (in French only)

In the summer of 2015, France adopted the Energy Transition for Green Growth Act, as well as the third part of its territorial reform, thereby changing local authorities' scopes and powers: who is responsible for tackling climate change, and therefore for energy, transport, building, farming and planning policies? What are the interactions between the various territorial levels? And above all, how can we go beyond the legal minimums in order to meet the local energy transition challenge?

<http://rac-f.org/Nouvelles-competences-climat-energie-des-collectivites-territoriales>



Les villes « Respire » de demain. Agir sur la mobilité face à l'urgence sanitaire et climatique (in French only)

Largely based on road infrastructure and private cars, our transport model has run out of steam. The primary greenhouse gas contributor in cities and the main cause of air pollution, this model comes with a cost to economic players, citizens and the local community as a whole. Luckily, local authorities have a number of tools they can use to take direct action and reduce the place given to motorised, polluting vehicles to the benefit of alternative modes, either active - like cycling and walking- or shared and collective ones. How is it possible to meet this challenge and build breathable cities whilst keeping the support of the local population? There are plenty of solutions just waiting for you to implement them in your local area!

<http://rac-f.org/Les-Villes-respire-de-demain-repenser-la-mobilite-face-a-l-urgence-climatique>



CLER, NETWORK FOR THE ENERGY TRANSITION

CLER, Network for the energy transition, is a recognised environmental protection association created in 1984 and empowered to sit on national bodies. Its aim is to promote renewable energy, energy savings and, more generally, the energy transition. Currently, CLER has a membership of around 300 professional organisations from all over France.

www.cler.org

 @assoCLER

 CLER - Réseau pour la Transition énergétique
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ENERGY CITIES

Energy Cities is the European network of cities in energy transition. For over 26 years, it has been advocating a democratic energy transition led by the local and regional levels. By showcasing inspiring examples from its member cities, supporting and facilitating exchanges between stakeholders committed to a low-carbon future, creating alliances and feeding the political debate in Europe, Energy Cities demonstrates that the energy transition road is paved with social, environmental and economic benefits for all.

www.energy-cities.eu

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RÉSEAU ACTION CLIMAT

Réseau Action Climat-France is an association specialising in climate change issues comprised of 15 national environmental protection, international solidarity, transport users and energy alternative promotion organisations. Réseau Action Climat France is the French member of Climate Action Network (CAN), a network of 1,100 member organisations worldwide.

www.rac-f.org

 @RACFrance

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