Contribution of renewables in locally generated energy

This project has received European funding under contract n°ENER/C2/2016-487/SI2.742173

EurObserv'ER

With the development of decentralised energy production, cities have become important actors which may have their own policy, objectives and measures regarding energy and environmental issues.

European cities and capitals can be taken as relevant and symbolic cities representing the different Member States. Some cities have decided to put special efforts in renewable energy deployment in heat, electricity or transport uses. They have designed tailor made measure to get there and to manage their own energy transition.

This document is aiming to display examples of European cities where action plan are implemented and where renewable energies are expected to play an active role.

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Contribution of renewables in locally generated energy

Vienna

Country: Austria

Number of inhabitants: 1,9 million

50% Renewable energy in final energy in 2050

Contribution of renewables in locally generated energy :

Vienna

Current status	Targets	Action plan
• In 2014, the city has 11% of its gross energy needs covered by renewable energy (buildings, lighting, municipal vehicles, etc.).	• 20% Renewable energy by 2030 and 50% by 2050	• The energy framework strategy plans the integration of multiple renewable energy in Vienna • It serves as a frame for the long term strategy of the city

Main local actions

The Vienna Model

- This is the intelligent use of cogeneration and waste treatment, as well as fatal and renewable energy. The main challenges are the volatility of the gas and electricicty markets, as well as the current low CO2 prices
- Hot water heating system should be prefered for building because of their flexibility of energy sources, like centralised or decentralised renewable one.
- Frameworks must contain rules to decrease the use of fossil fuel and particularly natural gas in new urban development areas

Waste heat and renewables

- Increase the use of hot water heating network powered by renewable and waste energy
- Deep and near-surface geothermal, combined with high efficiency heat pump for thermal energy. Generation of biogas with waste and organic by-product. Developing existing facilities and electric network for the generation of photovoltaic pannels. Also develop renewable energy sources around the city through cooperation and electricity importation.

Sources

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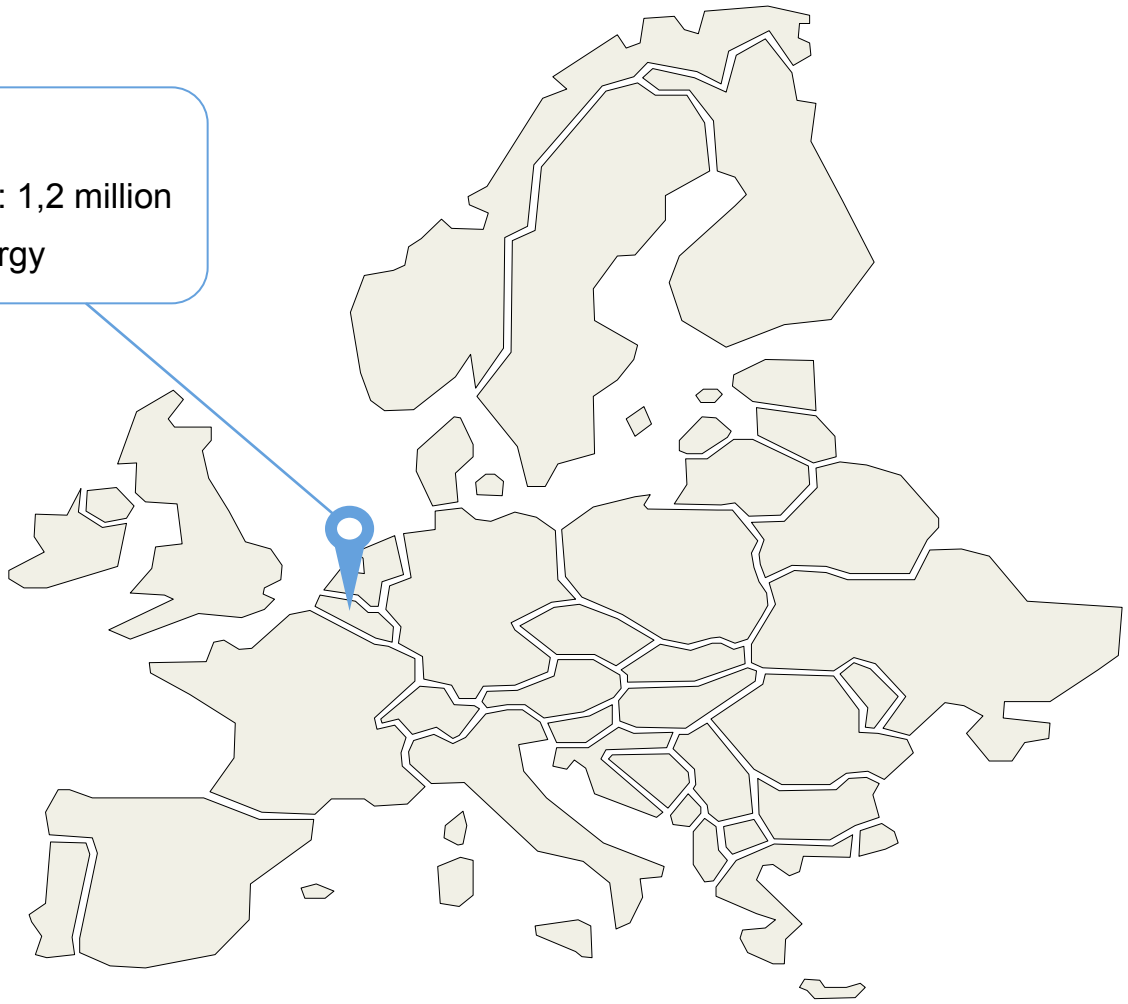
Contribution of renewables in locally generated energy

Brussels

Country: Belgium

Number of inhabitants: 1,2 million

100% Renewable energy



Contribution of renewables in locally generated energy :

Brussels

Current status	Targets	Action plan
• In 2013, the city has only 2% of its energy needs covered by renewable energy sources. • Most renewable electricity comes from biomass	• 27% of energy from renewable • Decrease by 40% CO2 emissions by 2030 (compared to 1990)	• Grouped purchases of green energy • Publication of an assesment for the city's current emissions and the potential of multiple renewable sources of energy

Main local actions

Grouped purchases of green energy

- Its purpose is to bring togather as many people as possible (4 000 in the process and 2 000 accepting the offer) to negociate prices reduction on 100% green supply contracts. It aims at strengthen the purchasing power of little consumers, and reduce the environmental impact of electricity
- It will be followed by different indicators and the communication budget is 60 000€

Assesment of the current Brussels' emission and renewable energies' potential

- A repport has evaluated the impact of the city on the period 2008-2014, in order to identify the most polluting sectors, including the thermal and power generation.
- To reduce the energy sector impact, it has assessed the potential for the implementation of different sources such as biomass and geothermal to supply a heat network, as well as solar and heat pump for hot water. In the longer term, wind energy has also been studied.

Sources

- http://klimaat.brussel.be/sites/default/files/u18/pdf/bilan_des_emissions_de_ges.pdf
- http://klimaat.brussel.be/en/actions/grouped-purchases-green-energy

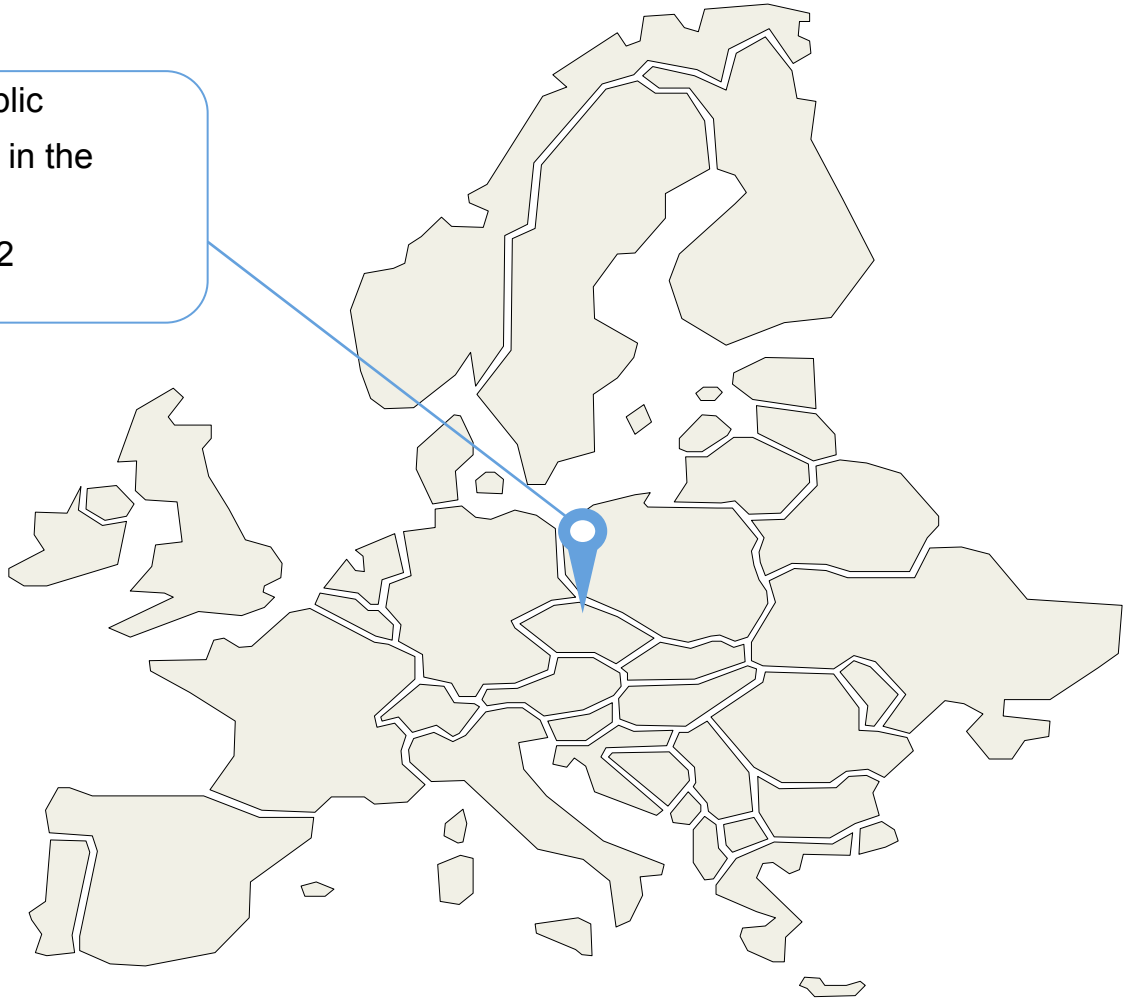
Contribution of renewables in locally generated energy

Liberec

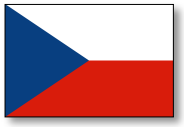
Country: Czech Republic

Number of inhabitants in the municipality : 102 800

Decrease by 40% CO2 emissions in 2030



Contribution of renewables in locally generated energy :



Liberec

Current status	Targets	Action plan
• Total final energy consumption in 2015 : 155 000 MWh • Total CO2 emissions in 2015 : 490 000 t	• Decrease by 40% CO2 emissions in 2030 in the areas of activities related with the mandate of the city	• Energy efficiency measures in municipal building and housing stock • Measure in non municipal tertiary sector • Measures in transport and electricity generation

Main local actions

Energy efficiency

- One shcool and 2 hostpitals have been renovated since 2015 in order to reduce CO2 emission by 1 200 tonnes per year, because they were the less expensive measures. A lot more are planned for municipal buildings.
- For housing, insulation program are planned as well as the replacement of old coil and gaz thermal equipments and domestic elelctrical appliances.
- Similar measures have been established in the other terciary sectors, but in a lesser extent.

Transition in transport and electricity generation

- There is a lot to do for transport in Czech Republic at both national and regional level. The city of Liberec has decided to support cycling by extending the cycling infrastructures. Since 2017, measures have been planned to support pedestrian traffic as well, and important investment were supposed to be made for public transports, such as gas and electric buses. By 2020 the city plans to construct a public transport hub at the Liberec bus and train stations, including charging station for bicycle and cars, and parking house.
- Given the city's potential in renewable energy, the purchase of green electricity from outside is one of the main measure announced. But some PV project on private and public buildings are also on tracks.

Sources

- https://mycovenant.eumayors.eu/storage/web/mc_covenant/documents/8/GMCqH2Bk6DJBJQLhOGW4lpGVmjHGkh8h.pdf

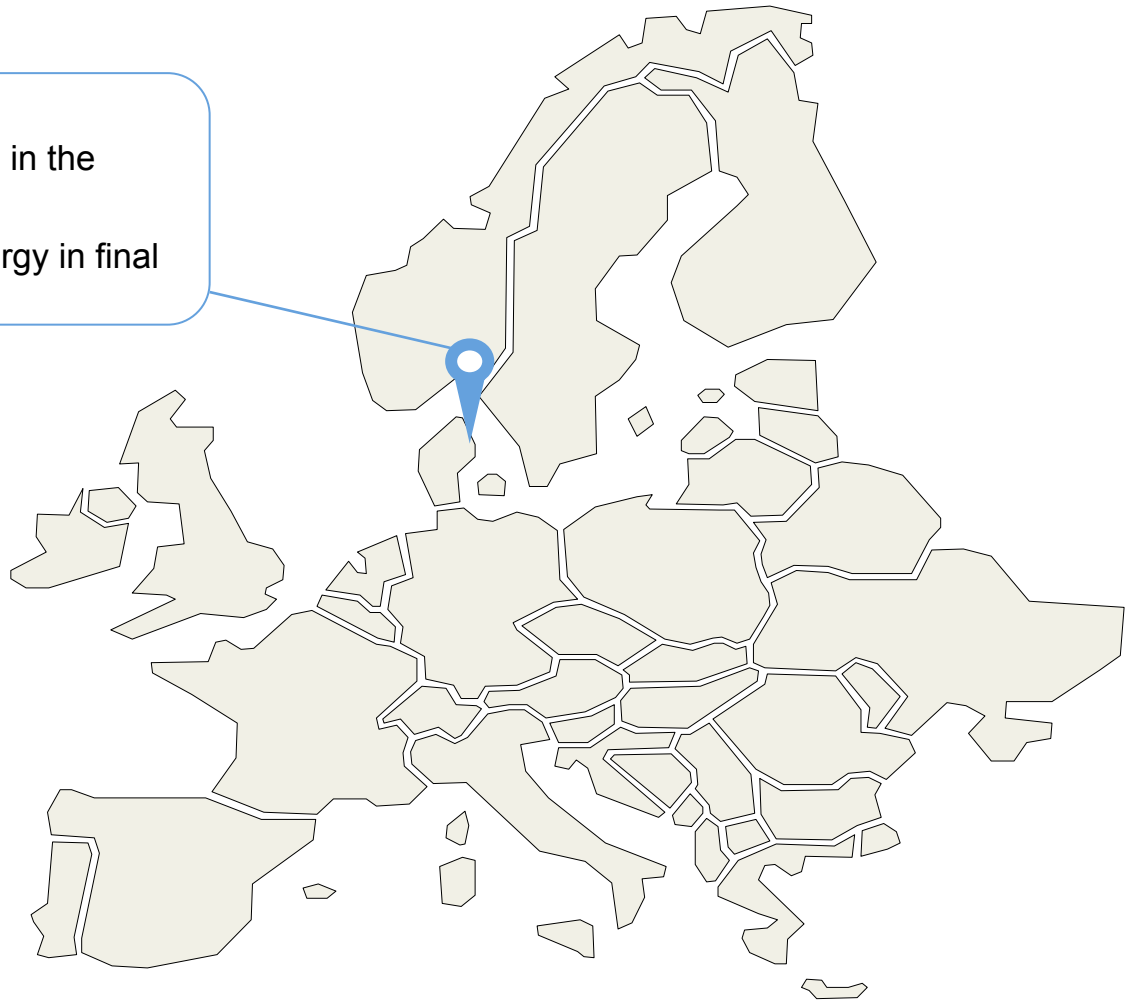
Contribution of renewables in locally generated energy

Frederikshavn

Country: Denmark

Number of inhabitants in the municipality : 61 000

100% Renewable energy in final energy in 2030



Contribution of renewables in locally generated energy :

Frederikshavn

Current status	Targets	Action plan
• In the city, renewable energy contributes 27% of its total consumption, which has decreased by 5,8% between 2010 and 2015	• 100% Renewable energy in final energy in 2030 • 23% energy efficiency increase by 2030	• Modeling by the University of Aalborg to plan the objectif for each type of sources, counting the opportunity given by the biomass surrounding Frederikshavn • Make the citizens and actors of the area be part of the prject. « My Energy Town » was created in 2016

Main local actions

Renewable energies action plan

- Implementation of renewable energy in all municipal climate and energy planning, including urban planning, municipal plans, local plans in cities and rural areas.
- Conversion to renewable energy production in the form of wind energy, biogas, solar energy, wave energy in Frederikshavn.
- Expansion and optimization of district heating supply throughout the municipality.
- Implementation of renewable energy in public transportation and in the municipality's own fleet as well as facilitation of renewable fuels and infrastructure for sustainable mobility

Local support

- The 2030 Masterplan and the Energy City project were favourably received by the population. The inhabitants were able to contribute to both projects by attending workshops organised by the municipality. A website was created to keep citizens abreast of the progress. 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.
- The city has also set up multiple partnerships with businesses sectors in order to develop new technologies. The creation of a network of local tradespeople is expected to make energy retrofitting of buildings more systematic. The network also works with local banks on the development of financing schemes for retrofitting projects.
- The city expects to receive a 60 million € help from the ELENA (European Local Energy Assistance)

Sources

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- https://energy-cities.eu/wp-content/uploads/2018/11/publi_100pourcent_final-web_en.pdf
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- Action Plan for EU Covenant of Mayors
- Evaluation of the Action Plan for EU Covenant of Mayors

Contribution of renewables in locally generated energy

Samsø

Country: Denmark

Number of inhabitants: 3 750

CO_2 reduction target: 20% by 2020, baseline 2001

Main RES target: 100% renewable energy island

Contribution of renewables in locally generated energy :

Samsø 2.0 fossil free island

Current status	Targets	Action plan
• Samsø Island had achieved to become 100% self-sufficient with local renewable energy sources for electricity and 70% of heat come from renewable energy sources	• To become fossil-fuel free by 2030 • CO_2 reduction target: 20% by 2020, baseline 2001	• Deployment of biogas plant and and sustainable fuel for transport • Energy efficiency in heat and electricity consumption • Place citizen's in the core of the project as pro-active players

Samsø 2.0 fossil free island project

Targets for 2020

- Fuel for transport on Samsø and from the island to the mainland will come from renewable energy.
- **50%** of the local public fleet of cars will be electric and **40-50%** of the local commercial transport i.e. transport carried out by entrepreneurs, the agricultural sector, taxies, etc. will switch to bio-fuels
- Energy consumption for heating in industry will be reduced by **5%**

Targets for 2030

- The energy consumption for heating will be reduced by 30%.
- Substantial savings on the electricity consumption: the electricity use for heating in homes will not rise throughout the period until 2030 compared to consumption in 2009.

Main project actions

- With 100% of its electricity demand being met through renewable energy, Samso is now devising its path to a totally fossil free future. “Samsø 2.0” foresees banning fossil fuels, decarbonizing the transport sector, introducing decentralized and flexible energy systems and increasing energy efficiency in heating.
- Intraduction of a biogas Ferry calls for an investment of approximately €40 million. The investment is needed in order to create a market for renewable energy fuel based on biomass, which produces methane to be used in transport. The total cost for the biogas plant and the accompanying infrastructure facilities is €10 million, while operation is foreseen during 2018.
- The Fossil Free Island Master Plan is a citizens’ project at its core. The local municipality implements the projects and Samsø Energy Academy engages citizens towards being more active and claiming ownership of the projects. For this to happen the academy develops campaigns and visual material so that information is effectively communicated towards local people.

Sources

- www.energiakademiet.dk/en
- www.energy-cities.eu
- www.renewables-networking.eu

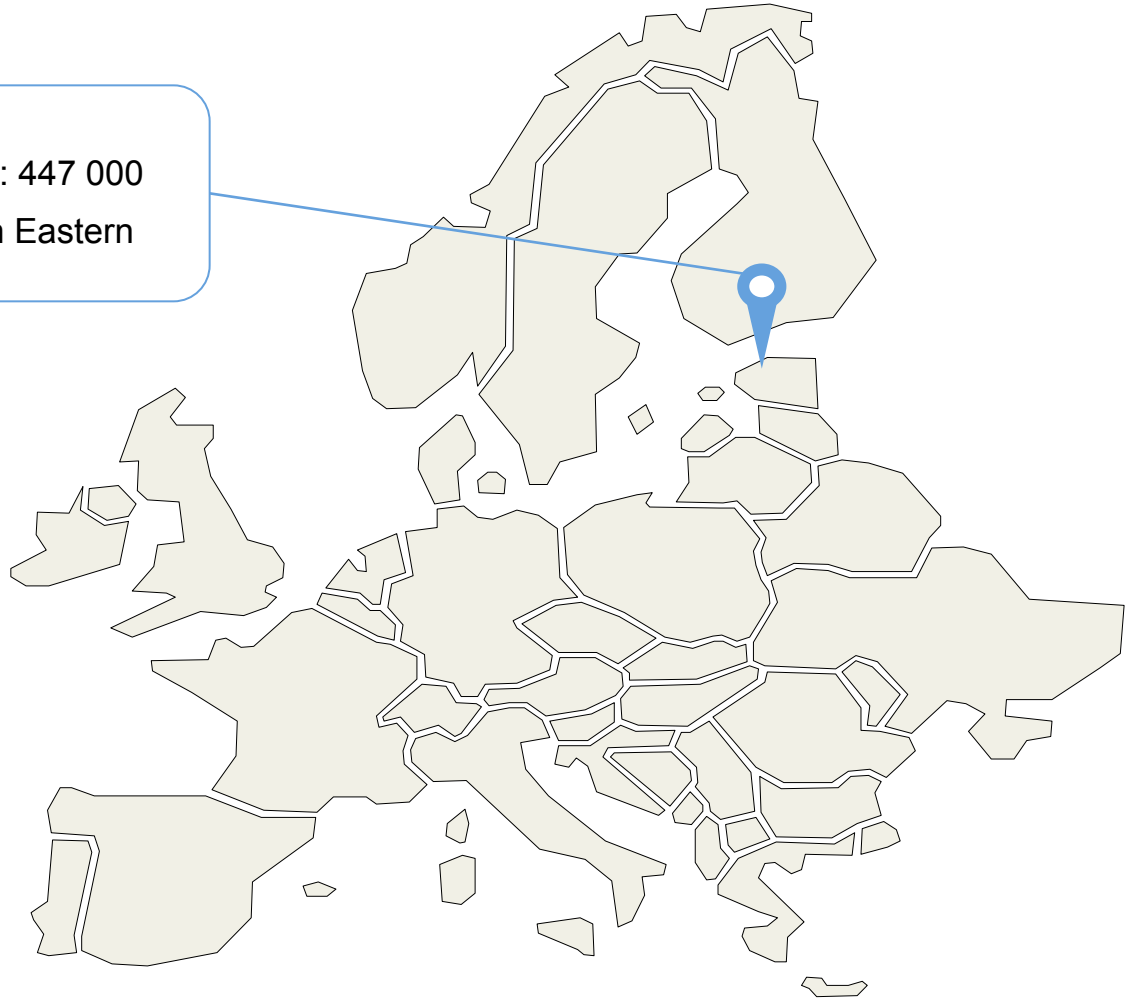
Contribution of renewables in locally generated energy

Tallinn

Country: Estonia

Number of inhabitants: 447 000

First low-carbon city in Eastern Europe by 2050



Contribution of renewables in locally generated energy :

Tallinn

Current status	Targets	Action plan
• 3 523 kT CO_2 emitted in 2015 • Joined the Covenant of Mayors in 2009	• First low-carbon city in Eastern Europe by 2050	• Tallinn estimated a budget of 300 million € for 2011-2021 • It would need 900 million € for 2020-2050 to reach its objectives in renewables and energy efficiency by a detailed action plan is still to come

Main local actions

Investment in the building sector

- Since 2010, « Fix the Facades » is a project which aims to support residential renovation, by granting 10% of the amount needed for the renovation. 1,7 million € were used by the city for 123 apartment between 2010 and 2014.
- 37,5 million € from sales of CO2 quotas was invested in municipal buildings to save 3,370 MWh per year

Renovating heating and cooling systems

- In 2014, the share of renewable and local biofuel in heat generation was 42% and the city has a policy of reducing natural gas consumption in heating, which has felt from a 80% in 2007 to a 58% share in 2015 in the total energy supply.
- The city support the extension of the heating and cooling syste. Provided by Utilitas, the district heating is powered by a new plant since 2016, it uses local wood chip and peat, along with Tallinn Power Plant, the Iru Thermal plant using waste and Mustamäe boiler house. The potential for renewable energy is still important.

Free public transport

- For residents, public transportation is free since 2013, they only need a 2 € green card and it is finaced by their local taxes. Then, the use of those public transport had a 14% increase in 2014, but they were mostly pedestrians taking the bus, because it remains difficult to convince car users to make the transition to public transport.

Sources

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- Estonian Environmental Strategy 2030 -Tallinn University of Technology

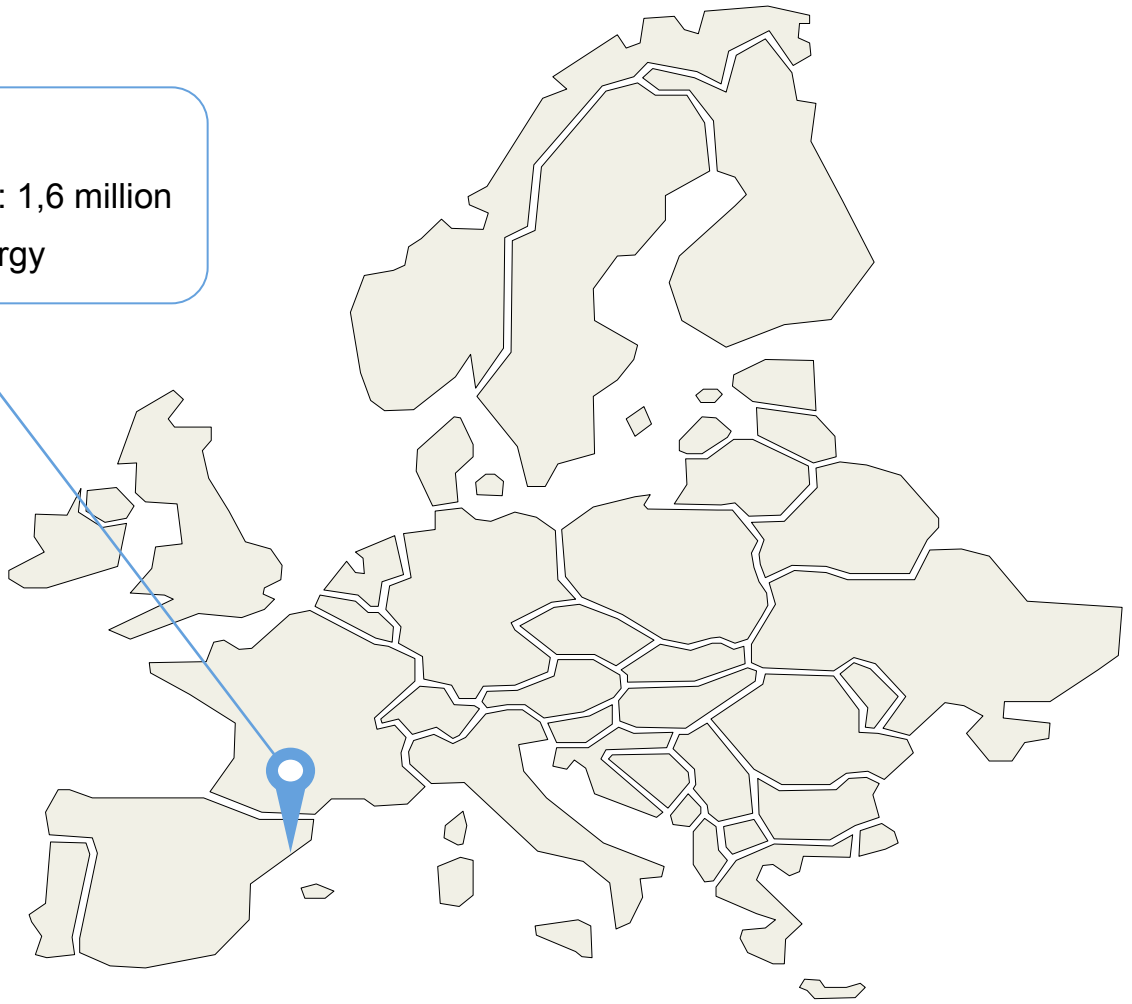
Contribution of renewables in locally generated energy

Barcelona

Country: Spain

Number of inhabitants: 1,6 million

100% Renewable energy



Contribution of renewables in locally generated energy :

Barcelona

Current status	Targets	Action plan
• In 2015, the municipality has 50% of its internal electricity needs covered by renewable energy (buildings, lighting, municipal vehicles, etc.).	• 100% Renewable energy by 2050	• Deployment of biomass, solar energy, district heating and heat recuperation • set up a power supply company to sell renewable energya and promote mechanisms aimed at developing new energy generation units in the city

Main local actions

Incentive Programme for Solar Energy Generation

- This programmeaims to leave energy poverty behind thanks to a service that guarantees a basic supply of energy while preventing greenhouse gas emissions. Barcelona has a surface area of almost 8 million m2 for capturing sunlight, through which around 1 191 GWh/year of solar photovoltaic energy and 5 945 GWh/year of solar thermal energy can be generated.-
- The Incentive Programme for Generating Solar Energy in Barcelona will use private and public investment in order to use roofs/public and private spaces to install solar energy during the 2017-2019 period. The goal is to achieve 950 kWp of installed power by encouraging city residents to invest in generation elements in their particular buildings.
- The City Council expects to facilitate these investments through incentives such as redevelopment grants and subsidies or tax allowances. It will also give city residents access to the support and accompaniment necessary for enabling, as far as possible, any citizen keen to generate energy from their home to become familiar with all the procedures and tools they have at their disposal.

Barcelona Energia power supply companie

- It’s the market representative of energy generated by municipally-owned solar panels at the waste recovery plants in Sant Adrià and El Garraf. The company is expected to supply power to the city council by Summer 2018 and to city residents from 2019.
- Barcelona Energia will offer locally-produced 100% green energy. The goals are to achieve energy sovereignty, comprehensively manage the public and private generation of electricity from renewable sources and sell consumption surpluses to households and municipal entities.
- Barcelona Energia will also offer comprehensive energy services: advising city residents, supporting energy-efficiency and energy-generating projects, maintaining and managing generation facilities, promoting energy renovation and fostering a smart energy culture among Barcelona’s residents.

Sources

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- www.energy-cities.eu
- www.renewables-networking.eu
- www.ajuntament.barcelona.cat

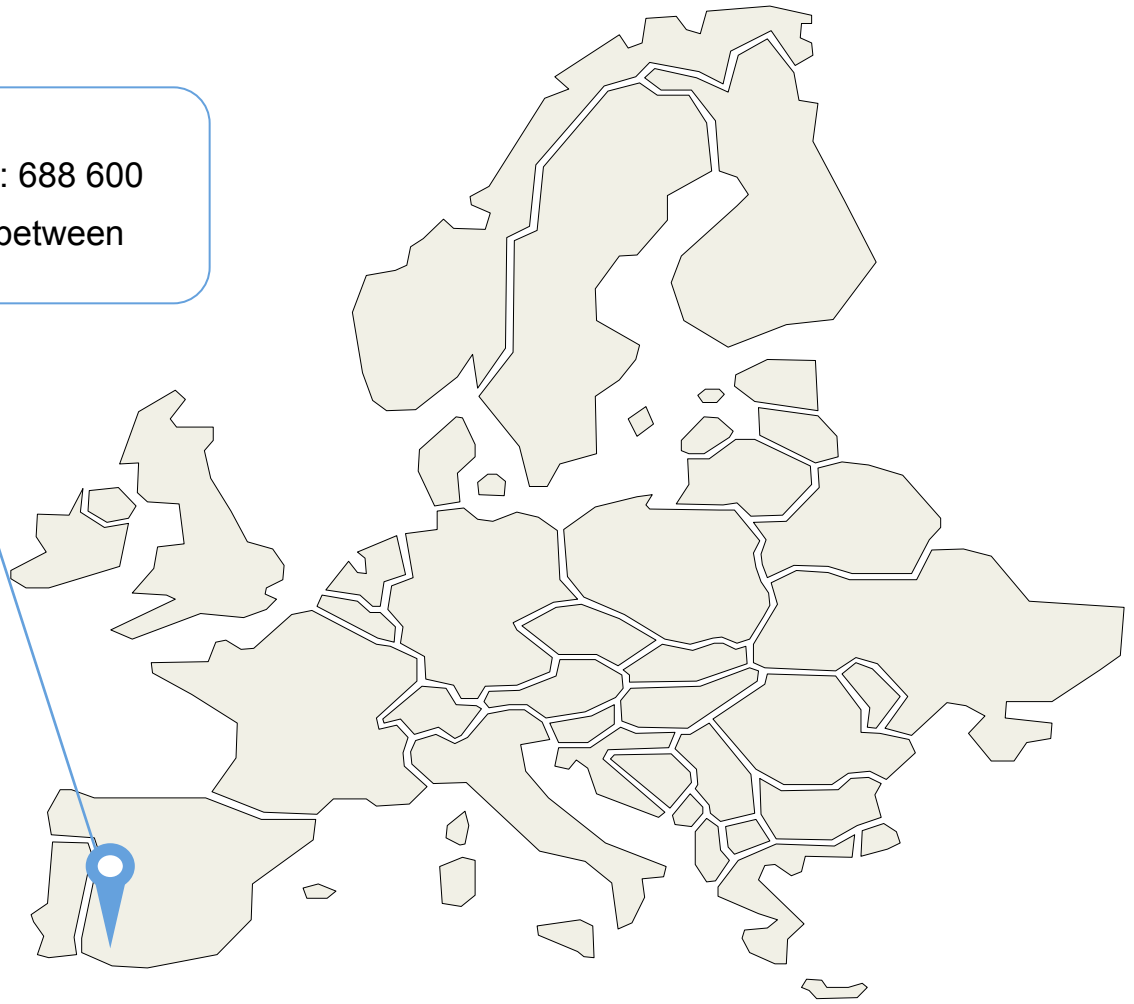
Contribution of renewables in locally generated energy

Sevilla

Country: Spain

Number of inhabitants: 688 600

1 billion € action plan between 2020 and 2050



Contribution of renewables in locally generated energy :

Sevilla

Current status	Targets	Action plan
• 3 523 Kt CO_2 in 2015	• Reduce by 40% its emission by 2020 (according to 2016) • Becoming a role model for sustainable mobility	78 initiatives are included in a plan focus on four top-priority action lines: - Improving energy efficiency of municipal buildings. - Developing and sustainable mobility model. - Promoting renewable energies and energy saving. - Raising awareness on and promoting responsible consumption.

Main local actions

Several action plans

- The latest action plan for climate and renewable erngy of 2016 presented a budget of 264 million € for the 2012-2020 period, including some project cofinanced by the EU. It follow the renewable energy action plan revised in 2013 for the period 2017-2020 for a budget of 402 million €.
- But the superposition of plans seems to create some confusion about the vision for the city's future, and its strategy towards 2030 and 2050 established yet, but could lead to 1 billion € investments. The priorities are energy efficiency in municipal buildings, the sustainable mobility, the use of renewable energy, the promotion of energy saving and responsible consumption.
- The EU also recommended that Sevilla invest in the renovation of its heating and cooling systems

Promoting renewable energies

- Production of renewable energy in the photovoltaic plants located in Parque Este and the San Diego vacuum waste collection facility.
- Recovery and use of the biogas generated in the landfill.
- Solar photovoltaic plant on the roofs of Tussam's workshops and offices.
- biogas filling station in Tussam.

Sources

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- http://aguapaisajeyciudadania.com/en/2016/06/29/plan-accion-clima-plantea-78-medidas-reducir-53-las-emisiones-co2-2020
- https://www.themayor.eu/en/seville-breathes-will-be-launched-by-the-city-council-in-2020

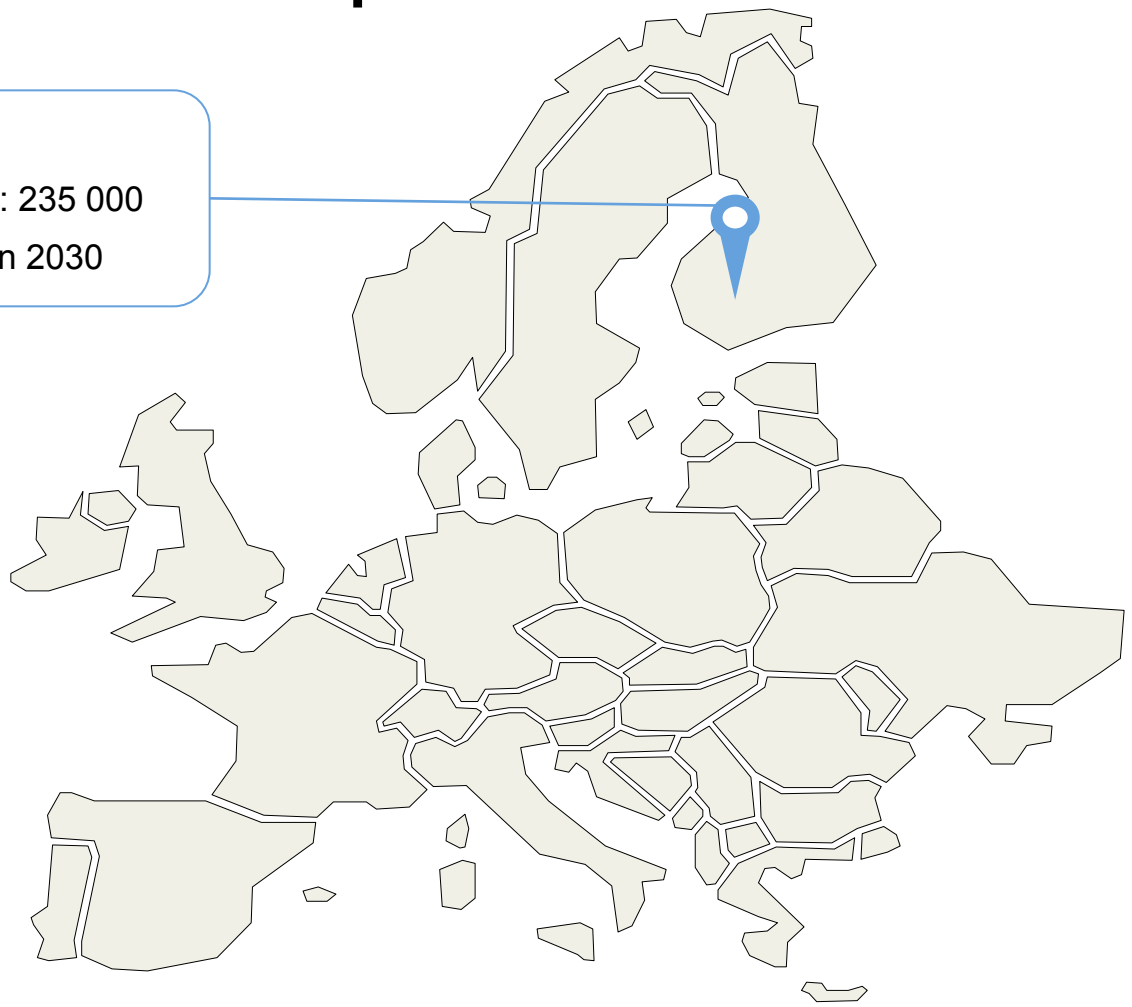
Contribution of renewables in locally generated energy

Tampere

Country: Finland

Number of inhabitants: 235 000

100% carbon neutral in 2030



Contribution of renewables in locally generated energy :

Tampere

Current status	Targets	Action plan
• 914 kt CO_2 eq were emited in 2017, 29% less compared to 1990 • 1,7% RES share in city consumption in 1990 • 43,4% RES share in city consumption in 2016	• Carbon neutral by 2030	• Urban planning for sustainable mobility • Promote low emission sources and energy efficiency • Renewal of hydropower plants • Investment in wood chips and pellets plants for district heating

Main local actions

Sustainable infrastrucure and mobility

- The city council want to make the different area of the city more coherent to reduce mobility needs. The urban growth will be directed to public transport zone and populated center. Low carbon vehicle will be prefered above current uses.
- Houses in the planning process will be evaluated according all the material and processes needed for their construction. House will be energy efficient. Environmental risks will be taken into account to make them more resilient too

Production and consumption of energy by 2030

- Centralised energy sources will have to be nearly carbon neurtal as well as fuel used in public transport
- The existing building will consume less thank to massive investment and individual fossil heating will have ceased
- Energy demand-side management will reduce the variability of the energy grid supply, so the use of the flexibilty of fossil power plants, and competence in those field will be shared and promoted in the society

Behaviours and circular economy

- Life cycle of product will be taken into account in the city's choices to a larger extent
- Re-use will be prefered above recycling for materials. Food and water wastes will be reduced and local services for citizen's will be enhanced simultaneously

Sources

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- https://smarttampere.fi/wp-content/uploads/2019/03/Sustainable-Tampere-2030-Guidelines-final.pdf
- https://smarttampere.fi

Contribution of renewables in locally generated energy

Lille

Country: France

Number of inhabitants: 1,2 millions

2030 target: 32% renewable

Contribution of renewables in locally generated energy :

Lille

Current status	Targets	Action plan
• Renewable electricity energy rate: 9% (2016)	2030: 32% renewable, 40% reduction in emissions, 20% reduction in consumption 2050: 70% of heating and cooling needs for overall building stock to be provided from renewable energy sources 70% of electricity consumption in overall building stock to be provided from renewable energy sources. 100% renewably sourced green electricity for public lighting.	• Project So MEL So Connected divided into 4 axes • District heating network fueled with household wastes

Project So MEL So Connected

- An electric charging station is located next to the St. Philibert metro station
- With the help of associations in the concerned neighbourhood an experiment has been launched in order to reduce fuel poverty in social housing
- 4 sites have been selected to host self-consumtion energy project
- And studies are underway to identify the potential for exploiting fatal energy

A project for disctrict heating network

- Announced in 2017, the project aims to transport hot water from a biomass boiler on 20km
- It will replace the coal plant of Mont de Terre and will result in a significant reduce in emissions
- It will transport water at 117°C and cost € 75 M, of which € 13 M financed by the EU.

Sources

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- https://www.lillemetropole.fr/votre-metropole/grands-projets/grands-projets-dequipements/lautoroute-de-la-chaleur

Contribution of renewables in locally generated energy

Paris

Country: France

Number of inhabitants: 2,25 millions

2050 target: 100% renewable and carbon neutrality

Contribution of renewables in locally generated energy :

Paris

Renewable energies

Current status	Targets	Action plan
• Renewable electricity rate: 18,7% (2015) • Heat network including at least 50% of renewable energy	2050: 100% Renewable energy (20% locally produced), & carbon free	• Evolution of the local urbanism plan • Deployment of geothermal, solar energy and heat recuperation

Promoting solar energy

- In 2013, the city financed and created a website presenting the solar irradiation of every building (including houses) and several data such as the surface of roofs. These data are the first information to grab for whom wish to carry a solar project.
- The city of Paris already counts 25 000 m^2 of solar (photovoltaic and thermal) on its roofs. One of the most important is located on the Halles Pajol and produces 496 MWh each year. The number of solar project should rise with the construction of eco-neighbourhoods.
- The city aims to support local projects for the solarisation of public real estate heritage, by promoting the deployment of photovoltaic panels by launching a call for private initiative in metropolitan France

A regional climate, air and energy action plan to implement

- In 2012, Paris Region established regional energy and air guidelines, with three goals for 2020 :
- To improve buildings energy efficiency with a target of doubling the pace of non-residential building refurbishment and tripling it for residential buildings;
- To develop district heating powered by renewable and recovered energies, with a target of increasing the number of connected equivalent housing units by 40%;
- To reduce greenhouse-gas emissions from road traffic by 20% in combination with a significant reduction in air pollutants.
- To carry out an inventory of renewable energies such as solar and recovery on the territory to assess their development potential

Sources

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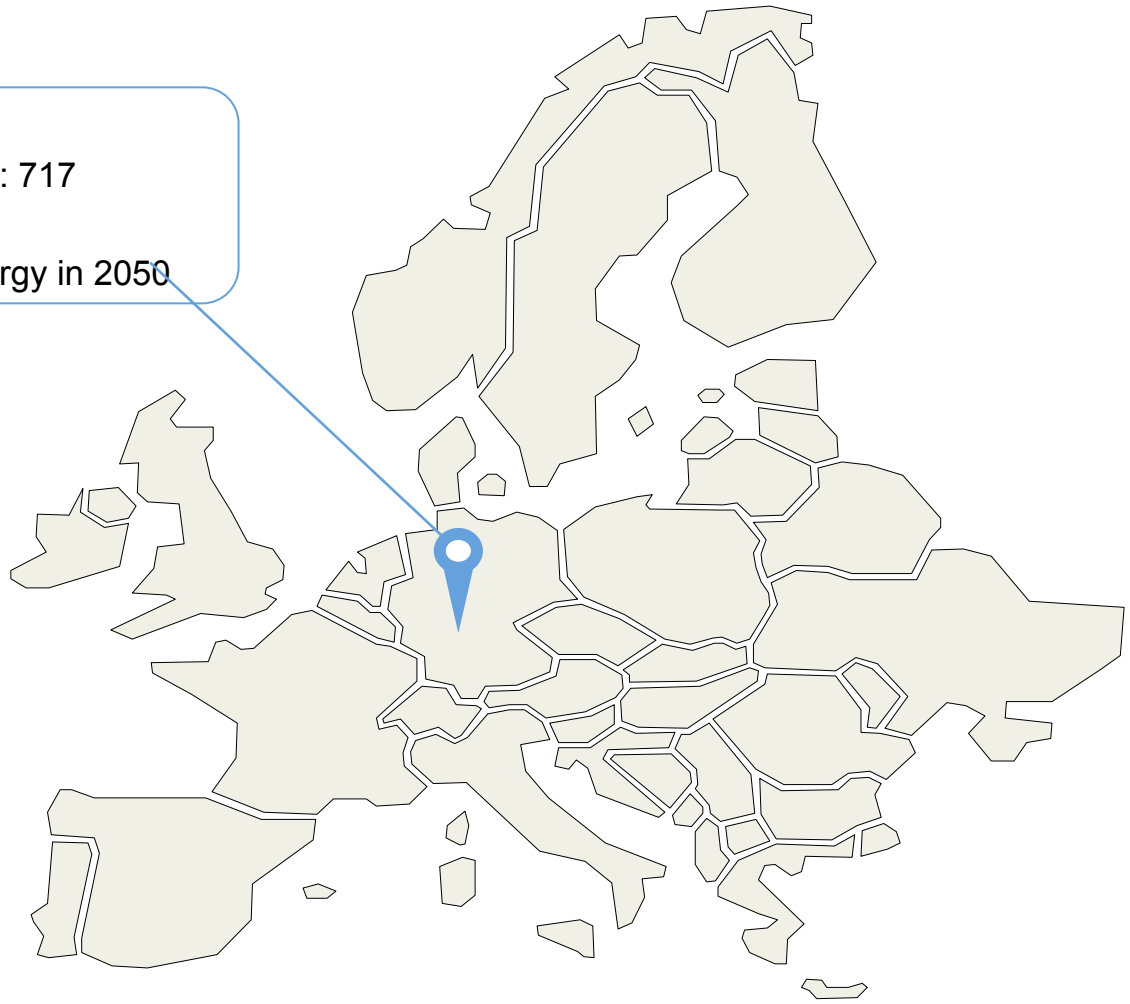
Contribution of renewables in locally generated energy

Frankfurt

Country: Germany

Number of inhabitants: 717 thousand

100% Renewable energy in 2050



Contribution of renewables in locally generated energy :

Frankfurt

Current status	Targets	Action plan
• In 2017 about 72 TWh were consummed in the area of the city. Of which 46% is heat; 29% fuel and 25% electricity	• 50% decrease in energy consumption to reach 100% renewable energy in 2050 (50% in the city / 50% in the Länder)	• To develop solar potential as well as biomass. To extend the city's heat networks • To work hand in hand with the Regionalverband FrankfurtRheinMain

Main local actions

Energy efficiency and renewable

- 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. Solar thermal and PV energy, biomass, and, to a lesser extent, wind power could be implemented. The city is planning to build up cogeneration units and to further extend its district heating (and cooling) networks.

Local and regional party

- In 2013 and 2014 the City of Frankfurt organised workshops with economic stakeholders as well as public consultations involving over 800 inhabitants. These workshops made it possible to convince them of the project's added value for the whole region.
- The city council has also set up a steering committee which stated mission is to provide advice and evaluate the implementation of the plan by the municipality. Monitoring will be provided by a regional structure responsible for publishing energy data on the Frankfurt Rheine-Main metropolitan region based on contributions from the Land of Hesse, municipalities and associations as well as energy experts

Sources

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- (Em)powering cities in the European UnionWorld Future Council Foundation

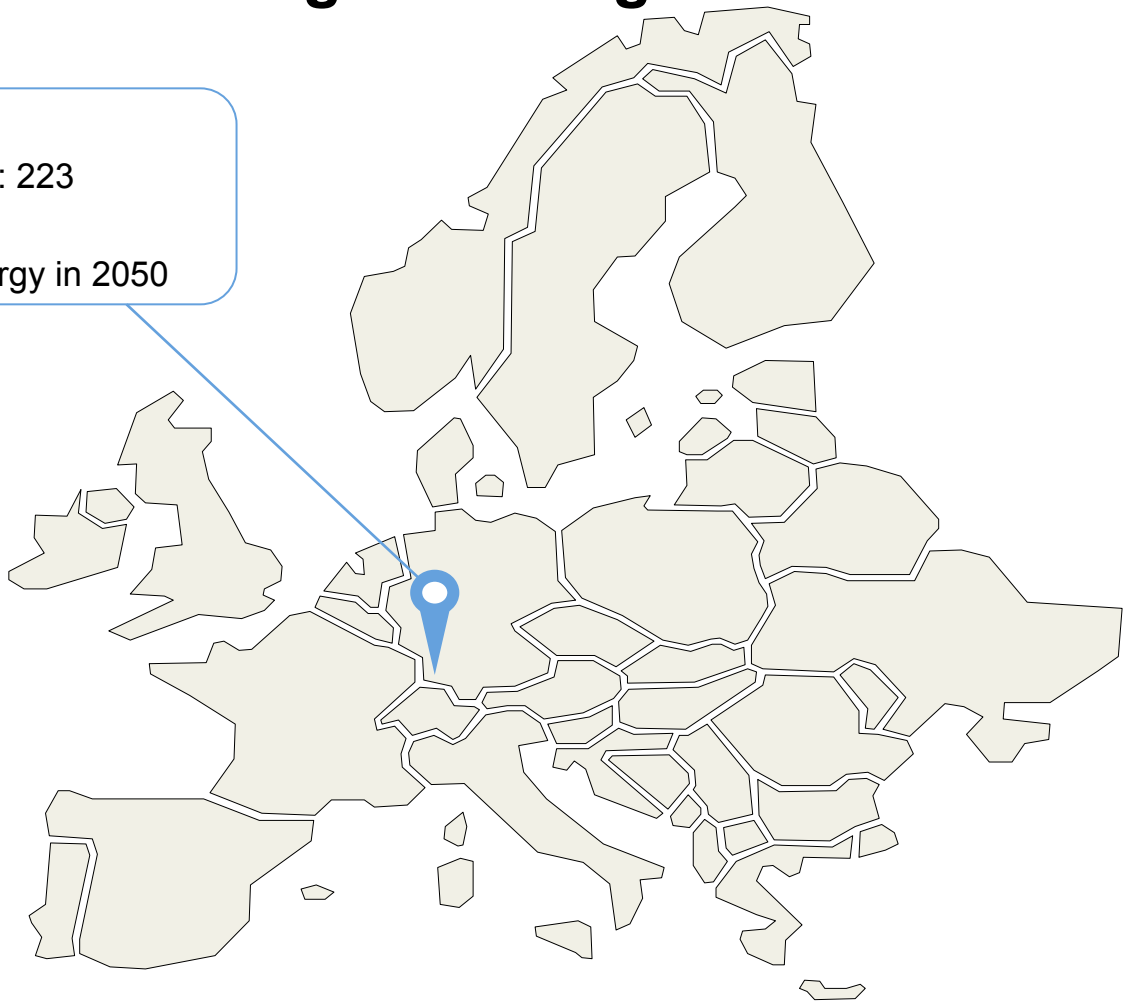
Contribution of renewables in locally generated energy

Freiburg im Breisgau

Country: Germany

Number of inhabitants: 223 thousand

100% Renewable energy in 2050



Contribution of renewables in locally generated energy :

Freiburg

Current status	Targets	Action plan
• 50% of the city's electricity comes from cogeneration plant, using biomass, biogas, geothermal but also natural gas	• Reduce CO2 emissions by at least 50% by 2030 and 100% by 2050 • 100% renewable energy by 2050	• Local alternative energy strategy and climate protection plans with urban plan, existing building stock and sustainable transport • The city promote sustainable lifestyle and local low impact products

Main local actions

Climate protection and energy efficiency in Industriegebiet Nord

- The « Green Industry Park Freiburg » initiative launched in 2014 aims to make collaboration project in energy and ressource-efficient business between several old industries. The German Federal Environment Ministry gave 50% of the funding for this concept of optimization. The objective is to know where energy waste can be reinjected in the processes, or neighbouring companies.

Sustainable Urban Development

- The Vauban district are low energy building for 5 500 inhanbitants. 170 units were built as « passive hause » and 70 as energy-plus homes, equiped with renewable energy systems.
- The « Energy-aware renovation » funding programme focus on the building envelope to reduce their energy needs. It exists since 2002, more than 39 million euros of investment have been made and more 70 000 tCO2 have been saved.
- The « Krafwerk Wiehre » aims to promote the use of combined heat and power plants (cogeneration), as well as the development of individual solutions and financial support.

Sources

- https://www.freiburg.de/pb/site/Freiburg/get/640888/Green-City-Brochure_English.pdf
- http://www.ecotippingpoints.org/our-stories/indepth/germany-freiburg-sustainability-transportation-energy-green-economy.html

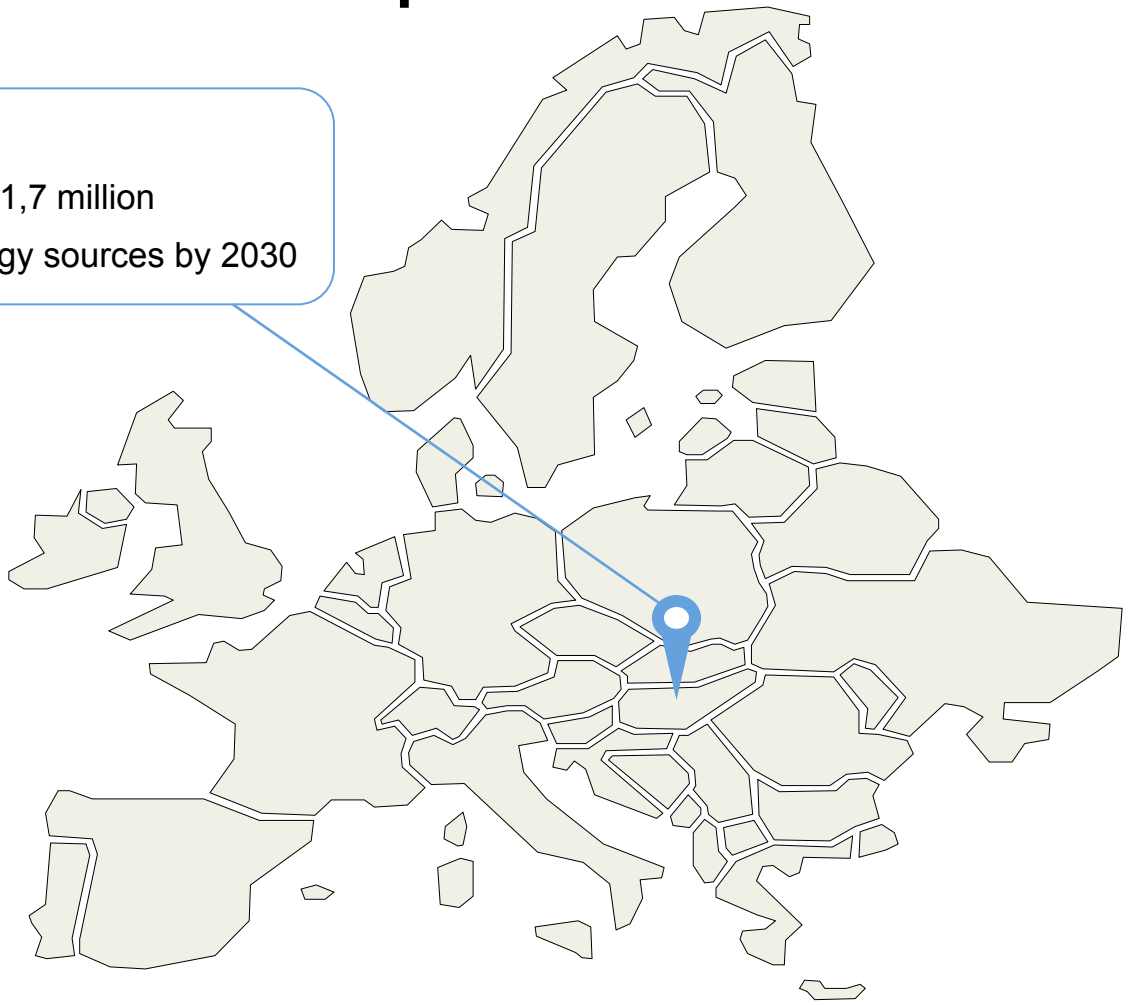
Contribution of renewables in locally generated energy

Budapest

Country: Hungary

Number of inhabitants: 1,7 million

20% of renewable energy sources by 2030



Contribution of renewables in locally generated energy :

Budapest

Current status	Targets	Action plan
• Budapest has developed district heating system since the XIX centuries and help homes renovations	• 20% of renewable sources in Hungary by 2030	• Energiahatéony Wekerle to encourage citizens to reduce consumption, help them renovate their homes, and by solar panels • The Smart city Budapest ais to showcase the best practices

Main local actions

Energy Efficient Wekerle

- In 2011 families and local citizens of the Wekerle neighbourhood decided to take action on climate change and energy poverty. It was the begining of Energy Efficient Wekerle, as part of the local Transition Towns initiative.
- It is about both circular economy, short distribution channels for food, improving energy efficiency and promote environmentaly neutral energy sources.

Smart City Budapest's Initiative

- SCB Initiative aims to introduce best practices for business, institutions, and the people of Budapest in every fields. It is a knowledge transfert to support citizens to take action for smart investments in capital and communication infrastructure, for a high quality of life and and efficient use of natural resources
- Deep and near-surface geothermal, combined with high efficiency heat pump for thermal energy. Generation of biogas with waste and organic by-product. Developing existing facilities and electric network for the generation of photovoltaic pannels. Also develop renewable energy sources around the city through cooperation and electricity importation.

Sources

- https://energy-cities.eu/budapest-joins-energy-cities/
- https://www.foeeurope.org/cutting-energy-consumption-Budapest-160120
- https://smartcitybudapest.eu/about-us

Contribution of renewables in locally generated energy

Kaposvàr

Country: Hungary

Number of inhabitants: 68 000

Main RES target: 100% renewable by 2050

Contribution of renewables in locally generated energy :

Kaposvàr

Current status	Targets	Action plan
• The city implemented PV installations for electricity, biogas for thrapnsoportation, and improves district heating for the heat.	• 100% renewable energy by 2050	• Use the solar energy • Deploy smart solutions

Main local actions

Aiming to 100% Renewable Energy

- The city of Kaposvar aims to 100 % and already took action for electricity, transport and heat :
- As it is located in the south of Hungary, the city has a very high solar yield. Sun resources being high, the city wants to develop photovoltaic and solar thermal. 900 kW of photovoltaic have already be installed on 19 public buildings. The next step would be to implement solar farms in areas surrounding the city. The city alsi integrated electric buses and electric bicycles to the local transport.
- Local busses are powered by the biogas produced by a local factory.
- As for the heat, the city would like to expand the district heating sector, and install wood-fired biomass heaters. The biogas produced by the local factory is also used to heat up buildings such as the public swimming pool.
- Moreover, the city is developing a strong network of smart energy-management systems. The city launched a Smart City Program in 2014, with a focus on the implication of local citizens in the decisions. As an example, public lighting sector is using smart technology in order to be more efficient and also to measure air pollution and traffic.

Sources

- www.renewables-networking.eu
- www.eurosolar.de/en/index.php/sections-eurosolar/hungary/779-city-of-kaposvar
- www.energy-cities.eu

Contribution of renewables in locally generated energy

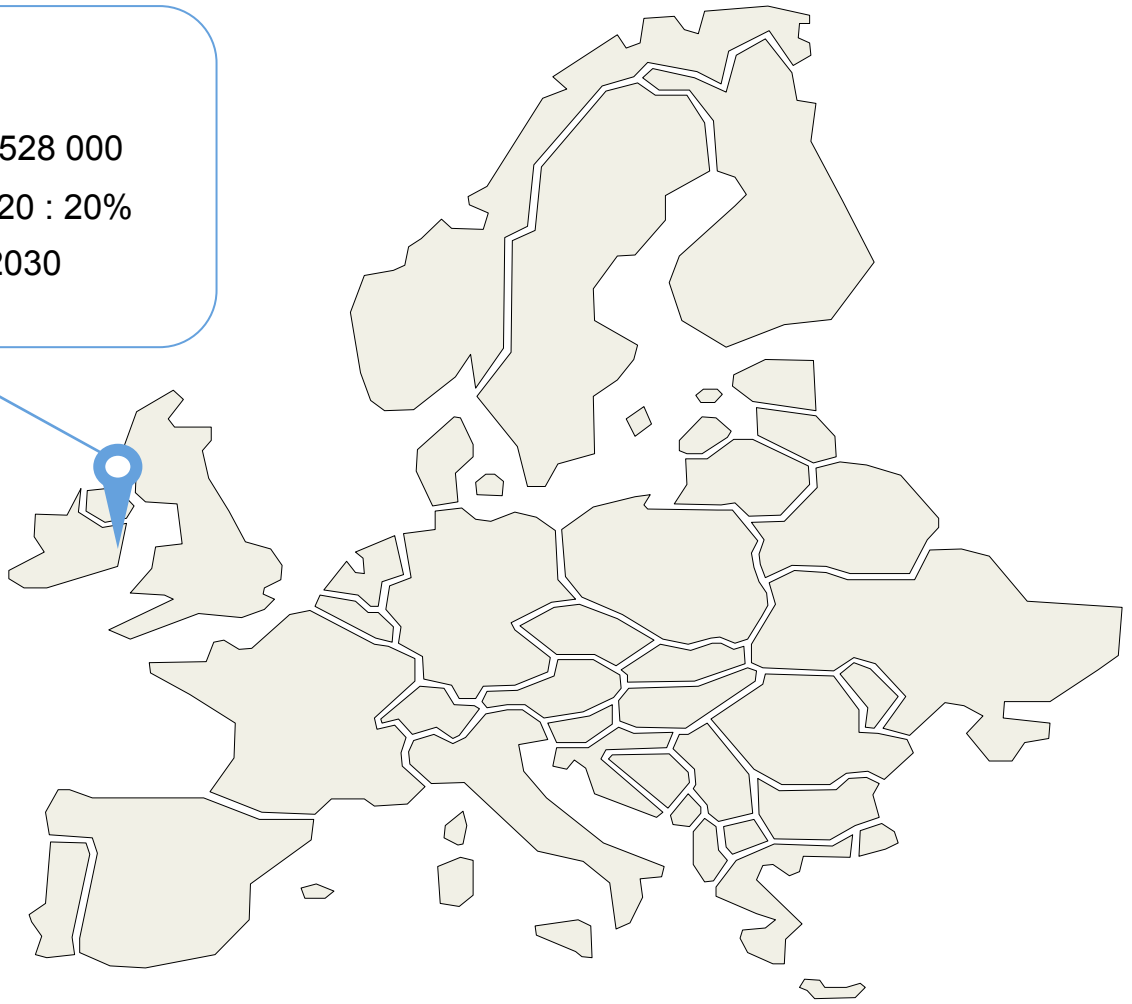
Dublin

Country: Ireland

Number of inhabitants: 528 000

Energy reduction by 2020 : 20%

Being a Smart City by 2030



Contribution of renewables in locally generated energy :

Dublin

Current status	Targets	Action plan
• In 2013, the total renewable capacity installed in the city is 62 MW, made from biomass, wind, solar and hydropower. • The production is 130GWh/year	• 33% of energy reduction by 2020 • Become an energy smart-city by 2030	• Developing district heating and energy efficiency • Developing deep geothermal energy • Developing small-scale CHP, solar, hydro and urban wind.

Main local actions

Mapping renewable energy potential

In order to promote renewable energy, Codema, the Dublin's Energy Agency created an interactive map highlighting renewable energy sites in Dublin, in 2012. This map was extended to the region around Dublin.

This map helped to prepare a Market Assessment of Renewable Energy in 2013 and a Spatial Energy Demand Analysis (SEDA) in 2015-2016, which aims at the identification of areas suitable for renewable energies.

Dublin District Heating System (DDHS)

In 2015, Codema showed that 75% of Dublin City has heat demand densities suitable for district heating. Therefore, Codema published a financial appraisal of the DDHS in 2017, and a Market Research Report in 2018.

As of 2018, Codema asked an Economic Operator to examine various strategies for managing, administrating, developing and financing the DDHS. The next step, according to the results of the studies and the approbation process will be to implement the DDHS.

Sources

- www.codema.ie
- www.energy-cities.eu
- www.dublincity.ie

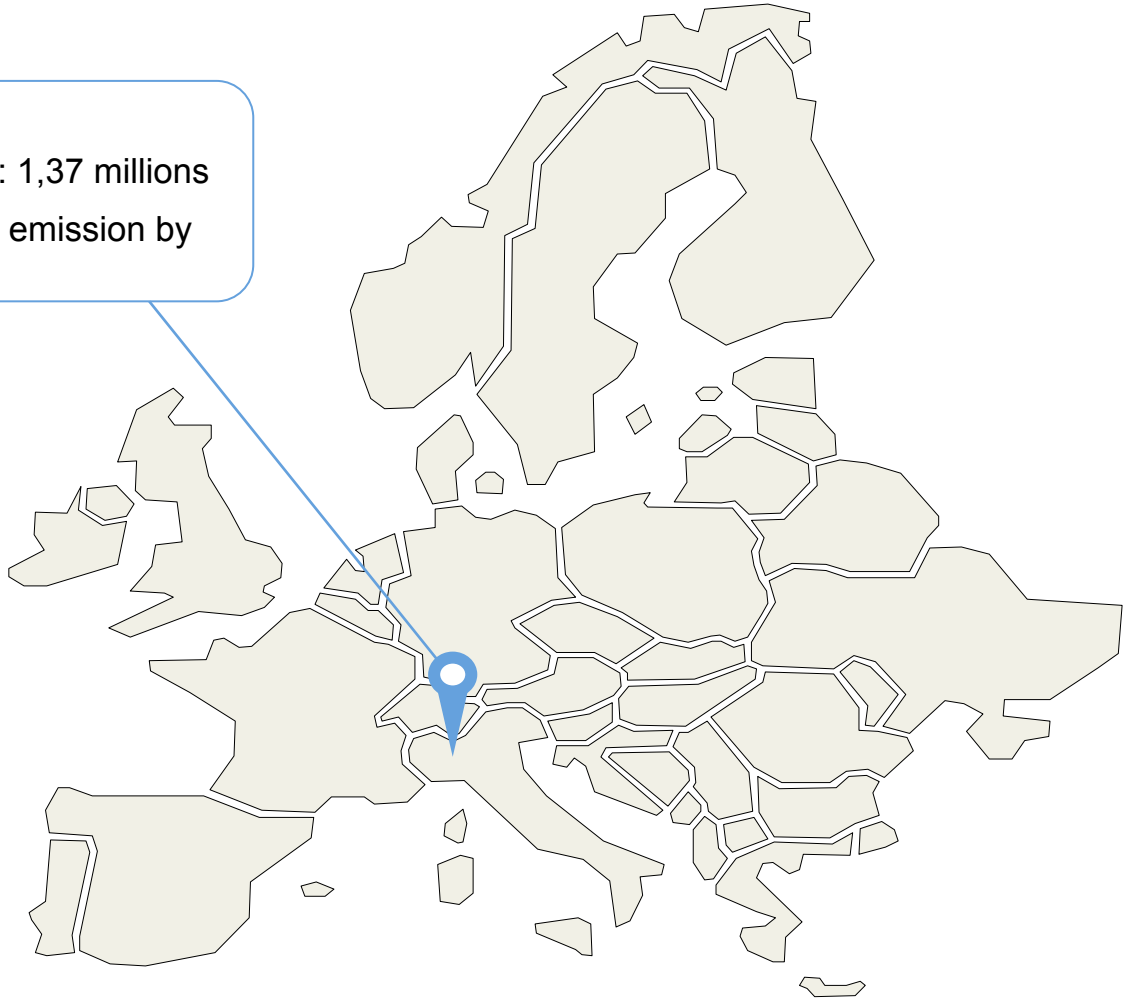
Contribution of renewables in locally generated energy

Milan

Country: Italy

Number of inhabitants: 1,37 millions

40% reduction of CO_2 emission by 2030



Contribution of renewables in locally generated energy :

Milan

Current status	Targets	Action plan
• 7 000 kt CO2eq were emited in 2013, -20% referred to 2005	• 40% reduction of CO2 emission by 2030	• Sustainable mobility plan since 2013 • Regulation and incentives for energy efficiency in buildings

Main local actions

Mobility

- The city works on the regional rail service, the undergrounds and tram extension, the bus transit and integrated fares. It promotes innovation to make accessible the transport to any public.
- The public space is considerred as a public good, so the street safety is a priority, thanks to 30km/h zones, and a focus on cycling and pedestrian traffics.
- Particular vehicles are also concerned by the plan, by the promotion of low carbon vehicles, the charging schemes and the increase use of sharing mobility.

Building

- There are reductions in infrastructure charges for energy efficient new and retrofitted buildings and for renewable energy production. Its percentages, up to 30%, is calculated on the base of the index of primary energy consumption for building heating in kWh per square meter per year.
- The new building code sets minimum energy performance requirements for new buildings, and provides incentives in terms of increased building volume for new and retrofitted buildings respecting some energy and sustainability performance.

Sources

- https://mycovenant.eumayors.eu/storage/web/mc_covenant/documents/8/MTHcv9xeldM_VR7BhHdfl4POnnyQWaSA.pdf
- https://www.asian-mayors.eu/wp-content/uploads/2018/02/07_Milan_Climate-Action.pdf

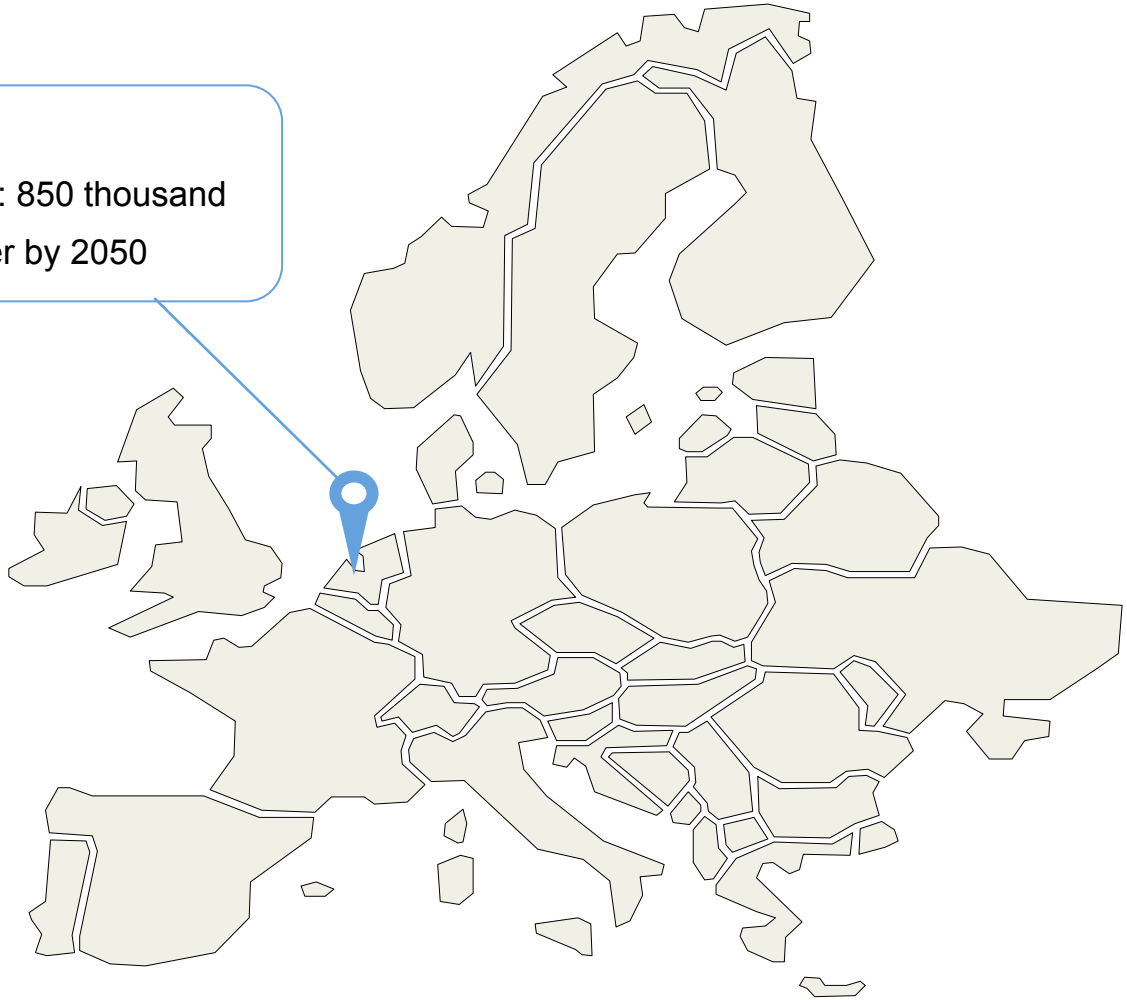
Contribution of renewables in locally generated energy

Amsterdam

Country: Netherlands

Number of inhabitants: 850 thousand

50% Renewable power by 2050



Contribution of renewables in locally generated energy :

Amsterdam

Current status	Targets	Action plan
• In 2015, renewable energies accounted for 5,8% of the energy production	• 20% more renewable energy production by 2020 • 25% renewable power by 2025, 50% by 2040 • 200 000 houses linked to renewable district heating by 2040	• Wind energy to power the urban rail fleet since 2019 • Extend the district heating network fueld with waste • Boost the number of household with solar panels

Main local actions

Promotion of renewable electricity sources

- The municipality announced all public transport will uses only wind power through a 10 years contract with Nuon/Vattenfall begininng in 2019. According to GVB (Amsterdam Municipal Transport) it will result in an 84 million tonne reduction in CO2 emissions.
- With subsidies and free advices, the city want to boost the number of households using solar pannels to 80 000 by 2020 and to 450 000 by 2040. Some urban rules have been simplified in order to reach the objectives.

Bigger district heating network running with renewable waste

- The waste company AEB Amsterdam associated with Vattenfall in a 400 million euros project of network expansion. It will connect the actual 2 heat networks to provide more water heated with renewable waste. 20 000 new homes will be connected by a 3.8 kilometre pipeline. A heat buffer of 3 600 m3 will also be constructed.

Sources

- https://mycovenant.eumayors.eu/docs/seap/280_1323080325.pdf
- https://www.amsterdam.nl/en/policy/sustainability/renewable-energy/
- https://group.vattenfall.com/press-and-media/news--press-releases/pressreleases/2019/vattenfall-invests-for-fossil-free-district-heating-in-amsterdam
- https://www.railjournal.com/passenger/light-rail/amsterdam-urban-rail-switches-to-renewable-energy/

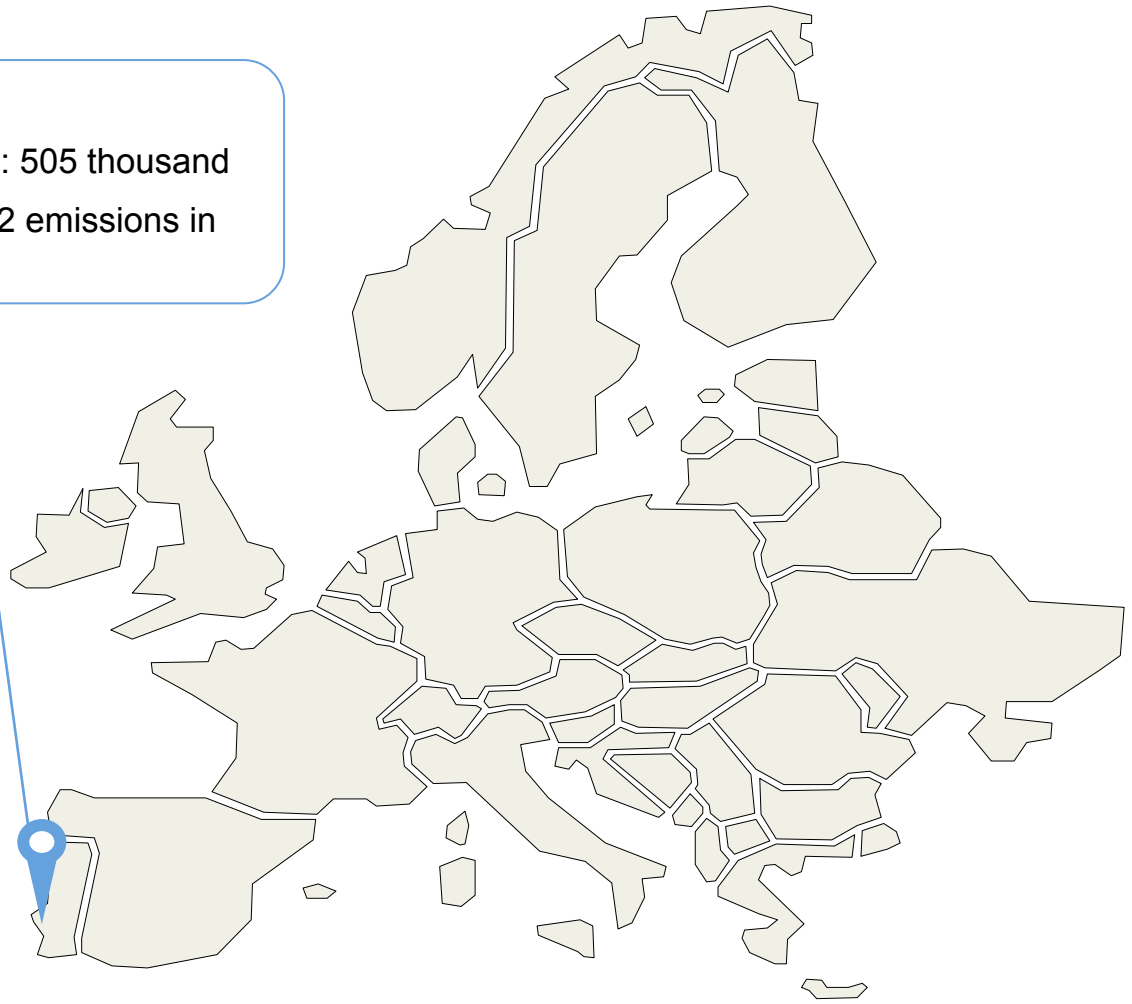
Contribution of renewables in locally generated energy

Lisbon

Country: Portugal

Number of inhabitants: 505 thousand

Decrease by 60% CO2 emissions in 2030



Contribution of renewables in locally generated energy :

Lisbon

Current status	Targets	Action plan
• Portugal generated 42% of its energy with renewable in 2015 • In 2016, the Lisbon emited 2180 kton of CO2	• Increase in electricity consumption will only be met through new renewable sources at national level • 17% of renewable power by 2020 • Decrease by 60% CO2 in 2030	• Supply public transport with renewable electricity, and promote carbon free transports with regulation and urban plans • Support local producer cooperative and coordinate the existing ones • Increase photovoltaic capacity

Main local actions

Mitigation actions in transport

- Increase in the carbon free transport alternatives like cycling network and social transport ticket discounts
- Promote electric vehicle with « Reduced emission zones », the renewal of the municipal fleet, and installation of electric charging points in the city
- Switch from fuel propulsion to electric propulsion for maritime transport

Renewable energy support

- Installation of 5 MW of photovoltaic on the municipal infrastructures until 2021, and promotion of 3 MW in private building. Organisation of the « Annual Solar Festival »
- Encouraging the setup of renewable energy cooperatives, also analysis and pilot projecting of aggregation systems of consumers, producers and consumers-producers
- Study the potential of micro-hydro plants, biomass energy and geothermal waters sources

Sources

- https://www.eurisd.org/renewables-in-cities-2019-global-status-report-preliminary-findings/
- http://www.cm-lisboa.pt/fileadmin/VIVER/Ambiente/Alteracoes_Climatericas/20180423_SECAP2030_Mitigation_EN.pdf

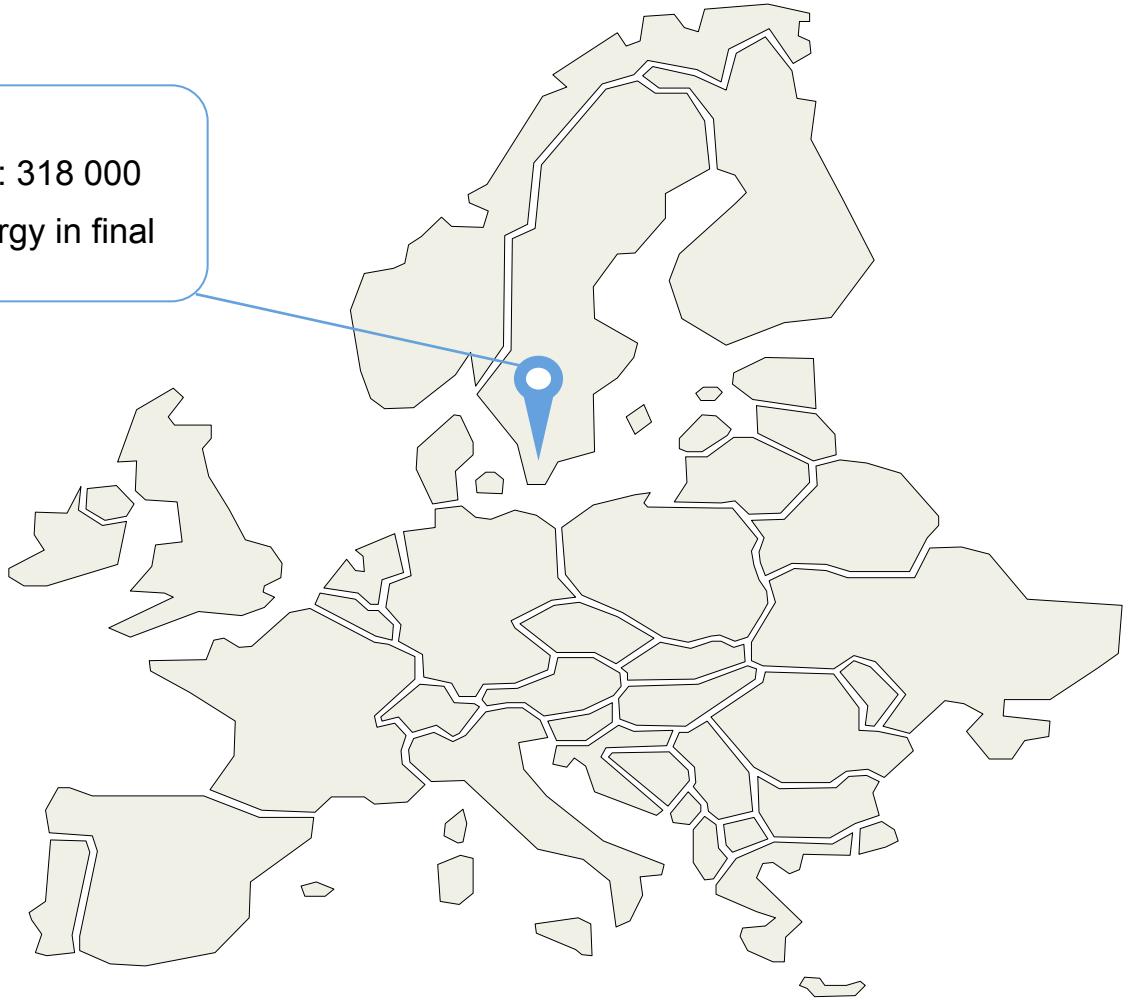
Contribution of renewables in locally generated energy

Malmö

Country: Sweden

Number of inhabitants: 318 000

100% Renewable energy in final energy in 2030



Contribution of renewables in locally generated energy :

Malmö

Current status	Targets	Action plan
• Compared to many other cities, Malmö has, "directly", a great potential of renewable sources (wind, biogas, marine energy etc.) • In 2018, more than 55 % of the city's energy comsumption came from renewables. • The greenhouse gas emissions reduction target was almost acchieved by 2017. • Malmö is surrounded by the largest swedish PV plant (sege park) and the largest wind offshore plant (lilgrund) .	• Energy consumption will be reduced by 50% by 2030 compared to 2001 • Greenhouse gas emissions will be reduced by at least 40 % compared to 1990 by 2020.. • The share of renewable energies will increase to 50% in 2020 and to 100% in 2030. • Malmö aims to achieve 100% renewable district heating supply by 2020	• Deployment of solar, wind, hydro power and biogas technologies. • Communication campaign all across the city and the region

Main local actions

Incentive Programme for Solar Energy Generation

- Malmö is implementing small-scale wind power, particularly near its port, to diversify and secure its energy future and create new local jobs.
- In cooperation with E.ON, its main energy supplier, the city will build one of the largest biogas plants in europe (300 GWh) at its port.
- In the long term, Malmö plans to transform this biogas-based system to switch to hydrogen to provide electricity and heat for its buildings and a more sustainable fuel for the transport sector.
- public and bicycle transport are prioritized thanks to intelligent sensors installed at traffic lights.
- Develop a new eco-car strategy – referring to cars in the municipal fleet that are powered by biogas, hydrogen or electricity (including plug-in hybrids). Expand the charging infrastructure for electric vehicles.
- Begin construction of a sustainable service station providing only biogas, hydrogen and charging infrastructure.

Sources

- www.malmo.se/Service/Bygga-och-bo.html
- www.energy-cities.eu
- www.irena.org/publications/2016/Oct/Renewable-Energy-in-Cities

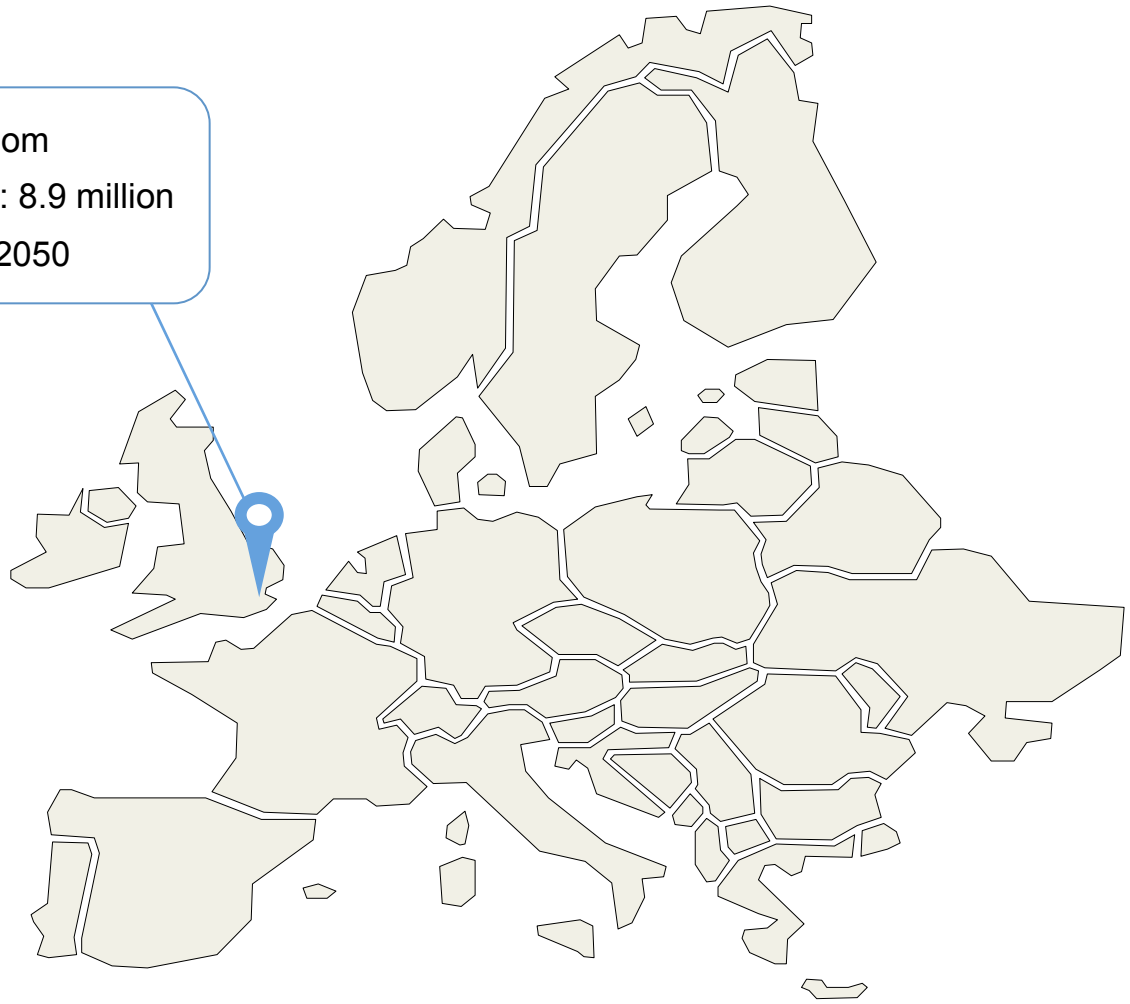
Contribution of renewables in locally generated energy

London

Country: United-Kingdom

Number of inhabitants: 8.9 million

2 GW of solar PV by 2050



Contribution of renewables in locally generated energy :

London

Current status	Targets	Action plan
• In 2016, 0.2 per cent of London's total electricity demand was generated by solar PV	• 1 GW of solar by 2030 and 2 GW by 2050	• Deployment of PV on the GLA buildings • Encourage solar through the London Plan • Assist landlord to provide PV on social housing

Main local actions

Deployment of solar PV on the GLA buildings and infrastructures

- The Grand London Authority group has already installed PV on several buidlings such as the City Hall and on the TfL sites. So the GLA has a good experience in managing PV installation. It will identify and prioritise potential infrastructures, setting a target, and update current urban program to plan it. Indeed there is a lot of underutilised spaces to valorize. Then, the Mayor will develop tools and share the best practices to the public and the business sector.

Encourage solar energy installations through the London Plan

- The Mayor will expect new development projects to include solar PV or thermal, as one way to reduce carbon emission. It will be attentive to the relevance of these solutions compared to that of energy efficiency for offset funds.
- On existing buildings, PV faces some problem because of certain local authorities, especially in conservation areas. The Mayor wants to work with borough to identify the best location of project for heritage consideration

Help Londoners to retrofit solar technologies for private buildings

- With the successor of the RE:NEW program, the city will incentive solar PV on social rented housing.
- It will encourage community energy groups which go further the pannel installation, by providing advices and energy management audits to the local community and businesses.

Sources

- https://www.london.gov.uk/sites/default/files/draft_solar_action_plan.pdf