



Project no. IEE/09/250661

Project acronym: ENNEREG

Full title of the action:

ENNEREG - Regions paving the way for a Sustainable Energy Europe

Intelligent Energy – Europe (IEE)

Type of action: Sustainable Energy Communities

Key action: Horizontal

D2.2 and D2.5:

Regional energy survey and establishment of initial goals

“Conclusions document”

Date: 20.02.2011

Issue: 1

Prepared by:

EVE – Ente Vasco de la Energía



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INTRODUCTION AND SUMMARY

This document summarizes the regional energy surveys provided by the partners of the 12 different regions in the ENNEREG project. There are important differences among these regions with respect to their size and population (from 70.000 to 6 million), or with respect to the energy sources they use.

Madeira Autonomous Region and Cyclades Region are composed by a group of islands. Both Regions face similar and specific problems regarding energy supply due to their geographical isolation and the land split. As a consequence of the distance and the lack of connections to continental grids, they are very dependent on oil products and have additional costs due to the sea transport and the small size of their markets.

The level of decision making and competences in energy issues is very different in the regions within the project. Whereas the Basque Country is the responsible to establish its own energy policy since the early 80s the rest of the regions have some limited competences to define and handle energy and climate related issues. Nevertheless, it seems that the work and documents generated within the ENNEREG project will help the regions to present proposals to regional authorities in this regard.

In most of the regions, economy is reliant on fossil fuels, however, steps are being taken to switch this situation to cleaner energy sources such natural gas or renewable energies.

The use of natural gas is quite different in the regions. On one hand it is Triangle Region, who extracts gas from the North Sea and consumes it for heat production. On the other hand there are Madeira and Silistra which are creating conditions in these days for natural gas use. While in the Basque Country the use of this source is increasing to currently become in the most demanding source of energy, Wales is decreasing its use in a continuous pace. Wielkopolska uses very little natural gas and Kaunas region has suffered a decline in gas usage by 10% in volume from 2007 to 2008. All the gas imported to this Lithuanian region comes from Russia. In Rhône-Alpes, gas is present in most of the sectors. In Pomerania, natural gas is supplied to 54% of the urban population and just a very low percentage, 1.5%, to rural areas.

Coal has a significant presence in Wales, as historically they have operated coal mines and currently, together with natural gas, is the most widely used fuel in power stations. Coal has also an important role in electricity production in Wielkopolska, and in the building sector in Silistra, while it has been almost abandoned in other regions. It is also relevant the situation in Rhône-Alpes and nuclear power stations given that the trend at national level is on a slight downward trajectory and production in the region, increases.

Blekinge is the region with the most renewable energy consumption of the regions in this project. Almost 50% of the energy consumption comes from renewables, and the main source is biomass. It is true, in general, that regions are making significant efforts to increase the share of renewables in their final energy consumptions but nowadays, some spectacular increases in the percentage of renewable energy in the total consumption start from a very low base.

District heating is much extended largely for residential heating in the Nordic Kaunas, Wielkopolska, Pomerania, Blekinge and Triangle regions and only in very specific points of Upper Palatinate or Wales.

Some regions have an excess capacity for electricity production, so they export to the grid they belong to, while others are importers. In the exporter group are Wales, Wielkopolska, Rhone-Alpes. In the other hand, the Basque Country, Silistra and Blekinge regions are importer of electricity. Others, being closed systems, just balance their loads: this is the case of the Cyclades and Madeira.

Wind energy is under development in most of the regions and even mature in some of them. In the Basque Country, in the year 2009, 31% of the renewable electricity production came from wind energy. Wales is the region with both on-shore and off-shore wind farms. Madeira and Wielkopolska, with 2% and 1.10% of wind energy production out of the total RES, are developing plans to increase this share. Triangle Region is in similar situation, with already identified potential for wind-turbines and carrying out a spatial planning. Blekinge has set a target of 0.19 TWh of wind energy production by 2015.

Hydro electricity is also available in many regions, although the orography has great influence on the potentials; in this way, Rhone-Alpes has the highest installed hydro power capacity, more than 10,000 MW. There are also hydro pumped storage plants in Pomerania and Wales.

Upper Palatinate is the Ennereg region where the photovoltaic energy is most developed, as it covers more than 5% of the total consumption of electricity.

In the majority of the regions there are difficulties to collect data on energy production and consumption, as big companies related to it are reluctant to provide them. The ENNEREG project wants to create conditions for reliable regional energy studies and resulting energy strategies at regional level. It is expected that the work carried under the project will lead to a formulation of objectives and a commitment of the local/regional authorities to such targets.

1. BLEKINGE

Blekinge Region, in southeast Sweden, has 150.000 inhabitants in five municipalities. The region has a long industrial tradition, as energy figures show. Blekinge has already started working on an energy and climate strategy but there is not a completed SEAP yet.

The commitment to reduce oil dependency is strong in southeast region and Blekinge wants to be a frontrunner in the work for reducing emissions of greenhouse gases and for sustainable growth. Today, 50% of all energy used in the region is coming from renewable energy mainly produced in the region and this means that around 1.000 people is working on RES. The main part of that is biomass, with around 43 % in 2006 of all energy. The other parts are hydro power, small wind and solar.

Around 50% of the consumption goes to the industry and building sector.

The main targets for 2010 are that each municipality has a district heating based on biomass or waste energy, to produce 0,19 TWh from wind energy and to become in the future a fossil fuel free region.

2. MADEIRA

Madeira Autonomous Region is a Portuguese Archipelago with a population of about 250.000 inhabitants. The average temperature in summer is about 22°C and in winter, 16°C.

Due to its peripheral insular characteristics, Madeira presents some specific problems such as non continental networks connections. This issue makes Madeira very dependent on oil products.

Regarding regulatory framework, Madeira defined a Regional Energy Policy Plan 2002 with the main objectives of guaranteeing energy supply, increase the economic competitiveness and reduce the energy environmental impacts.

The main energy consuming economic sector is, by far, transport. It represents 58% of total final energy consumption. Concerning electricity consumption, the service sector is in the top of the list with a share of 62%. The electricity consumption per capita in Madeira was 3.500 kWh/inhabitant in 2008.

Concerning electricity production, most of it, 86%, is produced in thermal power plants which burn fuel oil. The remaining 14% of the production in 2008 came from renewable sources – hydro 8%, wind 2%, and urban solid waste 4%.

The most energy consuming economic sector, transport, is as well the highest CO₂ emissions producer.

3. TRIANGLE REGION

Triangle Region is located in the southern-central part of Denmark. It is an association of 6 municipalities with approximately 350.000 inhabitants. Due to its location, Triangle Region is a major transport hub.

Triangle is working on energy and climate field initiatives since 2008. Since 2009 it is joined to the Covenant of Mayors undertaking the 20-20-20 goals.

Denmark is the only country in the EU that is self-sufficient in energy; it produces 30% more energy than it consumes. This is due to the crude oil and natural gas production from the North Sea.

Electricity consumption in Triangle Region is, as average, 8,90 MWh per inhabitant. Heat consumption represents about 60% in residential buildings and 26% in industries. Nearly 40% of total heat consumption comes from district heating systems; 50% of residential buildings and almost 100% of public and municipal buildings are supplied in this way.

At the same time, 20% of heat production comes from renewable sources (52% individual heating from biomass, 30% district heating from biomass and heat surplus from industries, 18% based on waste burning and the rest is solar and heat pumps).

CO₂ emissions are distributed in the following way; 32% transport, 26% households, industrial production 23% and commerce and services 19%.

The goals for the Triangle Region are to reduce 15% the use of fossil fuels and to increase up to 30% the renewable energy consumption by 2025. To achieve the set goals for 2020, the region wants to increase saving initiatives by 1,25% annually.

4. SILISTRA

Silistra municipality is located in the north-east of Bulgaria. This region has neither local conventional energy sources nor power generation plants and the natural gas energy distribution network is under construction. It is expected to be operative by the beginning of the 2013.

As relates to energy consumption, industry is very dependent on heavy fuel oil and electricity, as it is the public municipal buildings, where fuel oil costs represent 80% of total energy costs. Households are mainly heated by coal and briquettes of wood.

Currently, there are no data on RES energy production for Silistra region as there are only a few pilot plants on solar thermal or solar PV.

The preliminary regional objectives are not set out at regional level but it is expected that ENNEREG project will help in their definition.

5. CYCLADES

Cyclades Region comprises a group of approximately 220 islands at South Aegean Sea, of which 24 are inhabited with a population of 120.000 inhabitants. The geographical isolation causes severe communication and access obstacles in Cyclades.

In the year 2009, commercial and domestic sectors were the most electricity consuming having far behind the industrial sector.

Energy production is mainly based on fossil fuels with a production in 2008 of around 1.6 million MWh. The renewable energy sources accounted 14,810 MWh.

Cyclades has since the year 1995 an energy office dealing with energetic issues.

6. KAUNAS

Kaunas Region is located in the central part of Lithuania. It is formed by 6 municipalities and has a population of 666.319 inhabitants.

In Lithuania, there is no regional energy legislation and unfortunately there is no energy statistics available neither on regional nor on municipal level. Nevertheless some data is available.

Tertiary and residential buildings are the most electricity consuming sectors in Kaunas region followed by industry, agriculture and transport. Concerning natural gas, industry is the most demanding sector, with 67% of the consumption followed by energy sector, 26%.

As regards to energy production, the largest energy generators are Kaunas hydro power plant, with a capacity of 100,8 MW and a pump storage power plant, capacity 900 MW. There are also seven large district heating companies in the main cities in the region. The main renewable source for heat generation is biomass used in the form of firewood, by individual solid boilers, and mainly wood chips in district heating sector.

Thanks to the emission inventory can be said that in 2008 the amount of pollutants into atmosphere from stationary sources was 16.5 kg / ca.

The preliminary objectives to 2020 are a 30% RES share in final energy consumption, 11% in total energy efficiency savings and +8% of CO₂ emission reduction compared to 1990.

7. RHÔNE-ALPES

Rhône-Alpes is a region located in the south-east of France. With 6 million inhabitants, it represents around 10% of total France population.

Rhône-Alpes is a major electricity producer region in France with more than 15 nuclear power plants. At the same time, the region holds many oil refining plants and is linked to the Fos-sur-Mer harbour from which natural gas is provided.

In Rhône-Alpes, each inhabitant consumed in 2008 an average of 2,7 toe of final energy. Oil products are less and less used over the last years but still the most important source of final energy consumption. The highest energy consuming sector is industry (32%) closely followed by transport (29%), residential (25%) and tertiary and primary. In every sector consumption went down in the last years except in transport, where oil products are almost the only energy used.

Electricity production has gone down 2% in 2009 respect to the previous year. This is because hydroelectric power plants produced 13,2% less as well as thermal power plants, 5,4% decrease. In the other hand, nuclear power plants experimented an increase of 1,5%, contrary to the national trend, and renewables, consisting basically of biomass, wind and solar energy increased very strongly, 20,7% though remain low in absolute values, 0,6% of total production.

Analysing the main renewable sources, Rhône-Alpes is the first region in terms of hydro power production in France (10.522 MW installed in 2008). In the same year, the installed power of wood-energy was about 495 MW and wind energy capacity was in the 2009, over 140 MW. On the subject of solar energy, PV production was multiplied by 15 between 2005 and 2009 and reached an installed capacity of 20 MW last year. Solar thermal's production in 2009 reached a production of 74.000 MWh.

The Regional Council has developed its own strategy for GHG observation a reduction. Probably due to this fact, global GHG emissions are slightly in decline in the over the last years.

Currently a SEAP is being elaborated in Rhône-Alpes and it will be available around mid-2011

8. WIELKOPOLSKA

Wielkopolska Region has a population of 3,4 million people and the capital is Poznan. According to regulatory framework at regional level, there is an Operational Programme in which the RES use is promoted.

The obligatory share of RES in the electricity sales in Poland is set out in 8,7% and in the year 2009 there was a lack of 1,2 TWh in order to meet the target without the substitute payment by all energy suppliers for final consumers. Most of the RES energy comes from the big power plants applying co-combustion of biomass and coal. In Wielkopolska, the demand of electricity in 2008 was 11,368 GWh while the production was 13,169 GWh. The contribution of RES was 30.6 GWh from water sources and 43.2 GWh from other RES sources.

There are two main energy producers in the region and local energy production comes from several entities processing agricultural biomass, biogas use and some forest biomass. Wind power capacity has increased during the last years; in mid 2009 it was around 180 MW, while hydro power capacity was almost 11 MW.

There is an important market for energy uses of biomass in Wielkopolska, as it is used for power production, bio-ethanol, heating bricks and direct heating. There are also plants using biogas from sewage treatment, and from landfill.

There are good conditions for geothermal energy use in some areas of Wielkopolska, and there is a constant increase in installed power and energy production.

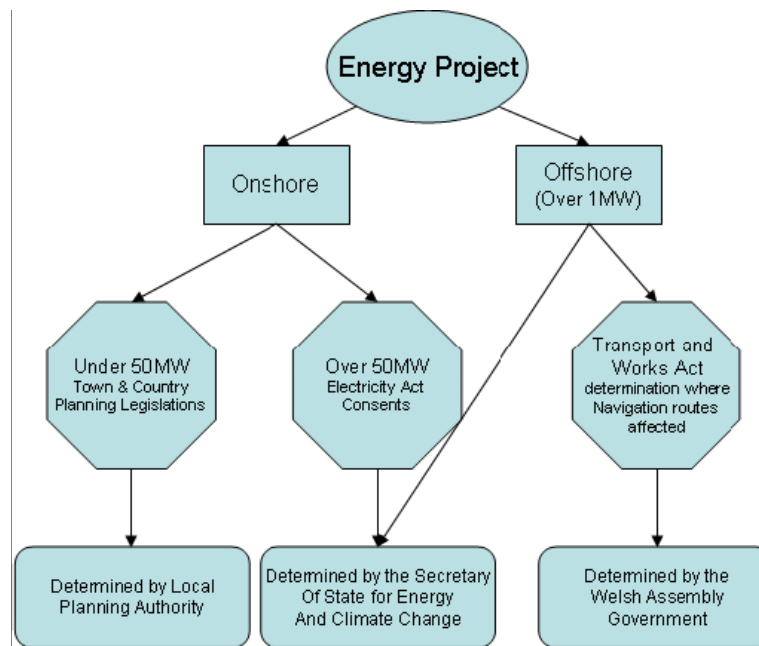
CO₂ emission inventory is not available for the region and the preliminary regional objectives will be based on national aims for 2020.

9. WALES

Wales has strongly participated in many energy transformations over the last 100 years included those associated with coal and gas, and this has given secure, resilient and diverse sources of energy.

Energy in Great Britain is largely the responsibility of the UK government, but Welsh Assembly Government is formally consulted on some consent of power stations.

Wind farm projects at sea within Welsh territorial waters can also be consented by Welsh Ministers under Transport and General Works Act powers. The key path for determining energy projects is shown in the figure on the next page:



Welsh Ministers also have significant powers relevant to delivering wider aspects of a low carbon economy such as responsibilities for transport, economic development, skills and education, housing, regeneration and local government

By the year 2020, Wales’ oil import dependence is likely to be in the region of 45%-60% and some estimate gas import dependency could be 70% or more.

The energy consumption data shows that:

- The use of coal is dominated by electricity production, but there are also coal based “manufactured fuels” (coke and similar products) used in steel works.
- Oil consumption in industrial, commercial and domestic sectors is decreasing slowly but the use for transport continues to grow; there are no electrified rail lines in Wales, so all trains use diesel,
- The use of natural gas and electricity is reducing in all sectors, reflecting the efforts being exerted to improve energy efficiency
- The energy derived from renewable and “energy from waste” increased by 67% between 2005 and 2007, but from a very low base.

Wales produces considerably more electricity than it consumes and the generation capacity is dominated by coal and gas. The installed capacity of pumped storage is 2080 MW and represents the whole of the UK capacity.

Because the population and current generation capacity is concentrated in the north and south of the country there is a significant constraint in terms of grid infrastructure in the extensive but largely rural central region of Wales. This is proving to be a barrier to wind-power development.

There is currently very limited district heating infrastructure in Wales.

The estimations of CO₂ emissions fall into 4 main sectoral groups; industry/commercial, domestic, transport and Land use, Land Use Change and Forestry. By far, industry/commercial

sector in the greatest CO₂ emitter, followed by domestic and road transport. Per capita emissions in 2007 in Wales were 11,1 ton.

The preliminary objectives for Wales are to achieve annual carbon reduction-equivalent emissions of 3% per year by 2011 and a target of 4TWh per annum renewable electricity production by 2010 and 7TWh by 2020.

10.BASQUE COUNTRY

The Basque Country is located in the north of Spain, bordering with France. With its 2,1 million inhabitants has a high level of industrialization and amongst the highest per capita income of any region in Spain.

The Basque Country has established its own energy policies since the early 1980s. Currently the Energy Strategy 2001 – 2010 is in force but the government is working and defining the 2011 – 2020 Plan.

At present, the energy in most demand in the Basque Country is natural gas, accounting for 47% of the total, followed by oil products at 40% and with a representation of the renewables of 6%. Industry and transport are the two sectors with the highest energy consumption, 44% and 34% respectively, while the building sector consumes just 20%.

Renewable power generation in 2009 covered 6% of total power demand. This chiefly came from three sources, in similar proportions: hydroelectric power, wind power and renewable thermoelectric power (CHP, MSW, biogas). Photovoltaic energy accounts for only 2% of all renewable power generation, despite mayor growth in recent years. Production from renewable sources in 2007 came to only 41% of the target set in the current Energy Strategy for 2010, meaning that overall compliance at this time is still low.

Electricity demand in the Basque Country in 2009 came to 17.840 GWh, of which two thirds were consumed in the industrial sector. Power consumption grew continuously to 2008, but from the third quarter of that year, the effects of the economic downturn began to be evident.

The region has more than 2,000 MW power generating capacity in one coal-burning power stations and three natural gas combined-cycle plants. Production from classical thermoelectric power stations has been greatly reduced in recent years as production from combined cycles increased, to cover 46% of consumption. There is also nearly 800 MW installed capacity in industrial CHP and renewable energy, including around 150 MW of wind energy and 170 MW of hydro. There is no district heating systems, although there are plans to implement these in a small scale in some new urban developments. CHP and renewable energy sources represent 16.4% of the power supply, and around a third of consumption is imported from other regions.

Regarding CO₂ emissions, it is true that they have been increasing steadily since 1990 but thanks to more drastic measures a slight downward trend in recent years is appreciated. Total CO₂ emissions from fuel combustion in 2009 were 13% over the 1990 value.

Although the regional objectives for 2020 are at present under discussion several scenarios have been set with the following results:

	Business as usual	Active energy policies	Optimistic scenario
Primary energy demand	15% increase	8% increase	3% increase
Primary energy saving	0 tep	770,000 tep	1,490,000 tep
Energy intensity	12% improvement	19% improvement	25% improvement
Renewable energy use	580,000 tep, 22% increase in 10 years	720,000 tep, 52% increase in 10 years	1,020,000 tep, 105% increase in 10 years
Renewable energy, % FC	8,9%	11,7%	17,1%
Wind energy	+0 MW	+155 MW	+1,350 MW
Electricity from biomass	+0 MW	+ 60 MW	+110 MW
Wave energy	+0 MW	+ 20 MW	+60 MW

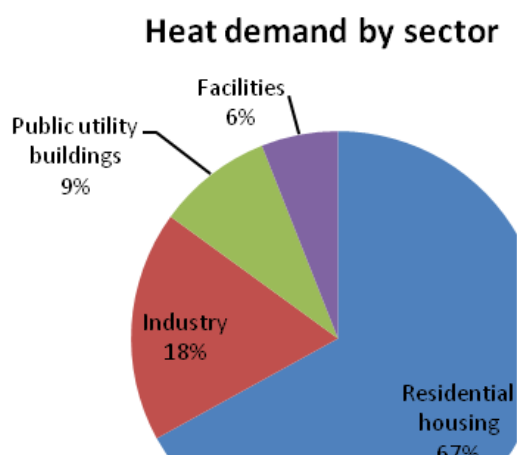
11.POMERANIA REGION

Pomeranian province is situated in the North of Poland, on the southern coast of the Baltic Sea. It has an area of 18.293 km² and a population of over 2 million people, representing 5.8% of Poland’s population.

Regarding regulation in energy issues, it is the role of the State to coordinate and propose energy policies. Major national documents are “Energy Law” dated 10 April 1997 and “Polish Energy Policy” until 2030.

Pomerania region has two public CHP plants and some cogeneration plants producing heat and electricity. Total energy production of the abovementioned plants is equal to 2.300 GWh. Moreover, there are over 10 wind farms in operation with the total power output of 150 MW.

Heat demand by sector is represented in the figure below.



In addition to the combined cycle plants mentioned above, the region has a hydro pumped storage plant. Existing natural gas network’s conditions are satisfactory and supply level in urban areas is 54% of inhabitants, whereas in rural areas it is much lower, 1.5%.

Statistic data necessary to establish baseline emissions inventory for Pomerania is missing. The energy Strategy for Pomerania Province prepared in 2009 defines goals for regional energy system development. For 2025:

1. Reduction of heat demand by means of energy efficiency improvement in residential and public buildings - by 23%;
2. Reduction of coal share in regional fuel balance—to 48%;
3. Increase in RES share in heat production— 19% (in rural areas - 42-52%, in municipalities - 10%).

12. UPPER PALATINATE

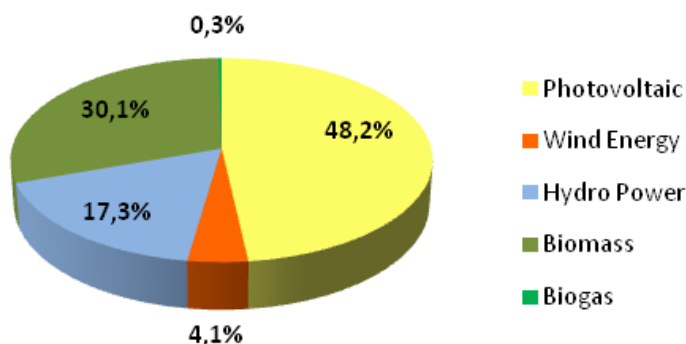
Upper Palatinate is located in the east of the Free State of Bavaria and has over 1 million inhabitants mainly living in rural areas.

Counties and cities of the Region differ considerably in policy competences and that is why the implementation of measures to achieve energy and climate targets is in unlike levels.

The main heat supplier in Upper Palatinate is the EON Wärme GmH. There is a district heating system in the city Regensburg.

Current data on renewable energy use in the region is poor, but the available numbers show the following figures:

- Annual electricity generation from renewable; 732,3 GWh
- Regional electricity consumption; 6.838 GWh
- Renewable energy share; 11%



Some potential is detected related wind and biogas sources.

Upper Palatinate wants to profit from ENNEREG project to solve this lack of information situation.

Bavarian Council of Ministers has shown interest to update the existing plan and convert it into the “Bavarian Climate Programme 2020” with clear targets in CO₂ emissions (below 6 tons per capita), double the share of renewable energies in final energy consumption (to become 20%).