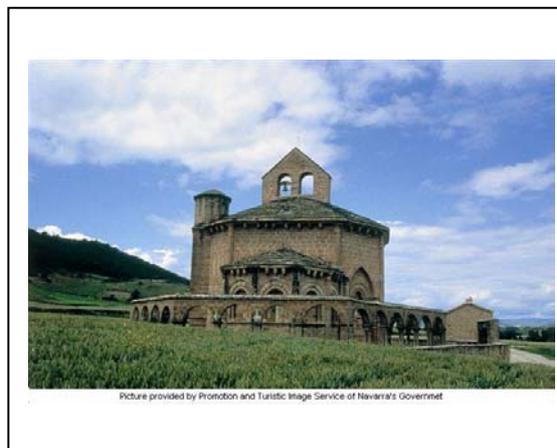


Navarra

Regional RES-e Map: Electricity from renewable energy sources (RES-e)



The region	Navarra
Number of inhabitants	0,570 Mio
Size (in km²)	10,000
Capital	Pamplona

Short description:

Navarra it's situated in the Northern part of Spain. It is a strongly industrialised region as it proved by the Gross Added Value of industrial sector that is 32.3% in front of 21.5% of average in Spain. The total rate of unemployment in Navarra is 6.30% in front of 10.20% of the average in Spain. Besides Navarra is a world benchmark for renewable energies. In addition to the new companies created in this sector, an industrial fabric has been generated that has created more than 4.000 jobs in the region.

By 2001 Navarre was already the second Spanish region in the generation of electricity from the wind. In 2004, 60% of the total electricity consumed in Navarre came from renewables.

	Number of plants	Total installed Capacity (MW)	Typical installation size	Main present funding mechanism	Mid/long-term perspective (2010)	Main barriers
Wind	28	938	20-49,5 MW	Feed-in-tariff	high	(1)
Small Hydro < 10MW	107	195	< 5.000 kW	Feed-in-tariff	low	renovation only
Biomass	2	33	-----	Feed-in-tariff		insuficient feed-in tariff for large installations
Biogas	2	1,8	- -----	Feed-in-tariff	low	limited potential
PV	≅ 1.500	8,5	5 kW	Feed-in-tariff	high	High investment cost, justification of high feed-in tariff

(1) In the Energetic Plan 2005-2010 it will be fixed the foreseeable maximum power in 2010.

Wind

The past: Wind Energy development started in Navarra in 1994. The installations (wind farms), in general are located in lands from municipalities.

The present: Actually there are working 28 wind farms (installations). The first machines had a power of 0.5 MW and actually are of 2 MW.

Wind energy has also generated an active industrial and productive sector in the region, one with a bright future and a clear export-led orientation. The need to encourage the creation of a wind-power-led industrial sector in Navarra was envisaged from the outset. Industrial plants to produce this type of equipment cover turbine assembly, the manufacture of blades, turbines, towers and control equipment and a wide range of wind turbine components.

Care for the environment is something that is given special attention in the development of wind power in Navarra. Wind farms are subject to environmental studies and the Government of Navarra applies changes to their design before they are authorised. Certain sites have been ruled out as a result of their impact on the environment, and the location of some turbines has been modified in projects that have received approval.

Navarre has some of the most advanced legislation in Spain on the environmental monitoring of wind farms. The minimum distance between turbines in the most recently authorised facilities is 200 metres, to ensure that there is space for birds to pass. Each wind farm has its own environmental monitoring programme to assess the impact of the turbines on bird life. Experiments have also been carried out in the form of turbine shutdowns at times when there are a large number of birds, to facilitate their flight paths. The aim is to develop wind power with the minimum effect on the environment.

The energy development model of the Government of Navarra, based on electricity generation from renewables, is acting as a reference for a number of countries. In 2003 alone the region received visits from representatives of the Environment Ministries of the Czech Republic, Hungary and Slovenia and different regions in Ireland, Rumania, Slovakia, Italy and Belgium, as well as the Energy Ministry of Tasmania (Australia).

Main funding: The main funding mechanism is a guaranteed feed-in tariff.

Important companies: Corporación Energía Hidroeléctrica de Navarra (EHN); Eólica Navarra, S.A. y Desarrollo de Energías Renovables de Navarra (DERSA). (Promoter of wind farms).

Fiberblade, S.A. (production of wind turbine rotor blades)

Ingeteam, S.A. (production of electronic materials for wind turbines).

Mid/long-term perspectives (until 2010): The aims of installed power to 2010 will be fixed in the Navarre's Energy Program 2005-2010.



Biomass

The past: Biomass was very important in Navarre for generation of heat in the homes (fireplaces), and to be used as residue in the wood industry of the wood, up to the implantation of the natural gas in 1989, moment in which biomass consumption begins to be reduced.



The present: An electricity generation plant from the combustion of waste cereal (straw) with a combustion capacity of 160,000 tonnes/year. Located in Sangüesa, it has installed capacity of 25 MW, produces 200 GWh/year and represents an investment of 51.9 million euros.

It is the biggest plant of these features in South Europe.

In addition, from the 80s a paper company produces electric energy by means of a plant of co-generation with wood residues.

Main funding: The main funding mechanism is a guaranteed feed-in tariff.

Important companies : Corporación Energía Hidroeléctrica de Navarra (EHN) y Papelera Navarra, S.A.

Mid/long-term perspectives (until 2010): In the Navarre's Energy Program 2005-2010 the aims of installed power will be fixed to 2010, though the execution of possible projects will be realized when the price of the tariff - now in review – was viable to execute such projects.

Biodiesel: From 2004 the biodiesel manufacture plant located in Caparroso is operating, with a production capacity of 35,000 tonnes/year. Investment in this plant has reached 18.07 million euros.

The used oil in this plan is 100 % vegetable.

Biogas

The past: In the 90s two electricity generation plants were installed; this production come from methane gas produced in the municipal solid waste dump and in the waste water treatment plant of the city of Pamplona.

The present: Actually these two plants are working.

Main funding: The main funding mechanism is a guaranteed feed-in tariff.

Important companies: The “Mancomunidad de la Comarca de Pamplona” is the company that manages these two plants of biogas.

Mid/long-term perspectives (until 2010): The aims of installed power to 2010 will be fixed in the Navarre's Energy Program 2005-2010.

Solar PV

The past: From the 90s, isolated solar photovoltaic facilities have been realized. From 1998 the Government of Navarre establishes annual grants to this type of facilities.

The present: At the end of 2001 the largest photovoltaic solar energy plant in Spain, located in Tudela (Navarre), entered service with 1.2 MW capacity. This plant represents an investment of 12 million euros.

Actually more than 500 isolated solar photovoltaic facilities are working (0.4 MW) and more than 1.000 facilities are connected to the net (7.3 MW), besides the first one of 1.2 MW.



Main funding: For the isolated facilities the main funding are the grants and for the facilities connected to the net a feed-in-tariff.

Important companies: Corporación Energía Hidroeléctrica de Navarra (EHN) (owner of the plant of 1.2 MW) and Alternativas Energeticas Solares (AESOL), installer company.

Mid/long-term perspectives (until 2010): The aims of installed power to 2010 will be fixed in the Navarre's Energy Program 2005-2010.

Small hydro (< 10 MW)

The past: The electric energy from small hydro power plants has been used in Navarre from the end of XIX century. They are some plants of that time that still working.

The present: 107 small hydro power plants are in operation with a total capacity of more than 195 MW. The owners of the 50 % are two private companies, and the rest (the other 50%) are property of individuals. The potential for new plants is limited.



Main funding: The main funding mechanism is a guaranteed feed-in tariff.

Important companies: Corporación Energía Hidroeléctrica de Navarra (EHN) is owner of 24 small hydro power plants.

Iberdrola (main electric company of distribution in Navarre) has 26 small plants working.

Mid/long-term perspectives (until 2010): The aims of installed power to 2010 will be fixed in the Navarre's Energy Program 2005-2010, though the potential power for new small plants is limited.

Main market actors:

Besides the new companies created in the sector of the renewable energies, there has been generated an associated industrial fabric that has created more than 2.000 jobs in Navarra.

The main agents for the use of the renewable energies in Navarra are those companies that promote the wind farms, manufacture air generators, blades, electric supports and other necessary components for this kind of installations; and also, those that promote solar farms and finally those that carry out photovoltaic installations.

1) Most important companies:

- "Corporación Energía Hidroeléctrica de Navarra S.A. (EHN)" (Promoter of all renewable energies installations).
- "Eólica Navarra, S.L. (Promoter of wind farms).
- Gamesa Eólica, S.A. (Promoter of wind farms and manufacturer of aerogenerators)
- "Desarrollo de Energías Renovables, S.A. (DERSA)" (Promoter of wind farms)
- "M.Torres Diseños Industriales S.A." (manufacturer of air-generators)
- "Ingeniería de Turbinas Eólicas S.A. (Ingetur)" (manufacturer of air-generators)
- "Ecotecnia Navarra, S.A." (manufacturer of air-generators)
- "Fiberblade Norte S.A.U." (manufacturer of air-generators blades)
- "Apoyos Metálicos, S.A." (manufacturer of air-generators towers)
- "Ingeteam, S.A." (Manufacturer of electric supports for air-generators)

2) other companies and institutions

- "Centro Nacional de Energías Renovables (CENER)" – Renewable Energy National Centre. Research Centre.
- "Centro Nacional Integrado de Formación en Energías Renovables (CENIFER)"
- "Agencia Energética de Pamplona" (Energetic Agency of Pamplona)
- Administrative authorities
- Installation Companies
- Municipalities
- Active citizenx (Solar Photovoltaic installations owners)

Conclusions:

The Energy Planning of Navarra for period 2005-2010 is now under elaboration. This Planning will set up the targets for year 2010 both of installed power and of electricity generation by means of renewable energy sources.

Since year 1994, Navarra is carrying out investments projects for the production of electricity through the use of wind power, small hydro, biomass, biogas and solar photovoltaic energy.

As for wind energy, last windfarms, authorised by the Government of Navarra, are getting completed. However the installation of small farms devoted to R+D is still quite possible.

107 small hydro power stations (with less than 10 MW) are now in working order. The exploitation potential is not very high because river beds are usually well used and therefore, in the future, actions to be done will be focused on the repairs and on giving more power to the existing ones.

With regard to the biomass energy, the power used in our region is not very high. A plant using cereal waste (straw) as combustible is generating 25 MW.

The solar photovoltaic technology is now standing out at a national level. In the southern part of Navarra, it is located the largest plant in Spain connected to the grid with 1,2 MW. Also, more than 1100 people have installed small photovoltaic installations connected to the grid, using generally, the technology of solar followers to one or two axes, in the solar parks. The installed power at the end of year 2004 was amounting to 9 MW.