CURRENT ENERGY SITUATION IN THE BASQUE COUNTRY

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Abstract

Debido al papel importante que la energía ocupa dentro de la sociedad como motor de competitividad industrial, generadora de riqueza y de nuevas inversiones para un mayor desarrollo tecnológico, la UE y los diferentes Estados Miembros, han creado un marco legal, encaminado a controlar y reducir la intensidad energética, reducir la dependencia, facilitar otras posibles aportaciones y mejorar el suministro

La Comunidad Autónoma Vasca se caracteriza, en lo referente a la problemática energética, por su escasez de recursos y la fuerte implantación industrial. Por lo que desde la década de los 80 se han establecido programas de estrategia energética intentando garantizar la disponibilidad de energía en las mejores condiciones de seguridad, suministro, coste e impacto ambienal.
Ddentro de estos planes se han tenido en cuenta factores como:

- La preocupación social por preservar el entorno y las necesidades de bienestar de la sociedad.
- Estudios de ahorro y eficacia energética
- La aportación de las energías renovables, que se han convertido en un punto importante por el nivel de desarrollo tecnológico y su utilización dentro de la vida cotidiana.

Debemos destacar tambien la utilización de los ciclos combinados a gas natural y la cogeneración.

Key words

Estrategia energética, balance 2001, energías renovables.

1. Introduction

In order to study the development of the renewable energy sources in the Basque Country, it is necessary to outline the situation and prospects of the Basque Autonomous Community both in Spain and in Europe.

To start with, it is advisable to offer an overview of the current legislation and to review the energy models, both national and European, taken as a reference.

It is also important to mention the limitations of the B.A.C. with respect to soil, water, sun, wind, biomass, etc.

2. European legal framework

Europe firmly supports renewable energy sources, as the Green Book on Security of Energy Supply, published by the European Commission in November 2000, shows. This book sparked a debate over Energy Policy unheard of in the last thirty years, and it has opened an ongoing debate in most member states, establishing itself as a referent for other countries. It exposed the structural weaknesses of the energy supply and its environmental and social fragility, especially when viewed within the framework of the European commitment to the Kyoto Protocol.

Subsequently, and as a result of the controversy caused by the Green Book, The White Book of Energy was published. The latter's main goal is the doubling of the renewable energy share to reach 12%. It puts forward several arguments in favour of an energy policy within the community directed to reducing, through the use of renewable energy sources, Europe's dependence on imports and to increasing the security of energy supply. It also predicts positive effects in relation to emissions of CO_2 and to employment, as well as an improvement in co-operation among member states; it includes a working programme for the next few years.
The European Parliament EU Council published, based on previous experience, the

Guideline 2001/77CE on September 27, 2001. It concerned itself with the promotion of the generation of electricity from renewable energy sources within the internal electricity market (Official Journal L 283, 27/10/2001). It concludes that only within a solid, coherent EU framework, with common objectives, can the initiatives undertaken by EU members achieve the desired degree of efficiency.

This guideline establishes that all EU members must take adequate measures to promote an increase in the consumption of electricity generated from renewable energy sources. Besides, they must submit and make public their national objectives for the consumption of electricity generated from renewable sources, as well as the proposals for achieving their goals. These must be compatible with all the agreements signed by the EU, such as the Kyoto Protocol on Climate Change.

The national indicative objectives will be compatible with the global indicative objective of a 12% of the gross national energy consumption by 2010, and specifically with an indicative part of the 22,1% of the electricity generated from renewable energy sources out of the total electricity consumption in the EU by 2010.

3. National frame of reference

After the second international oil crisis, a law was passed in Spain in 1980 (Law 80/1980) for energy conservation which had as its main objective the design of a plan to improve energy efficiency. This law encouraged electric self-generation and energy production in small hydroelectric power stations.

The National Energy Plan 1991-2000 set up a program to stimulate the production of energy through co-generation and from renewable sources, setting the goal of an increase from 4,5% to 10% by 2000.

In 1997, the law 54/1997 of November 27, made an energy policy based in the liberalisation of the market compatible with the achievement of other objectives, such as an improvement in energy efficiency, a reduction in consumption or the protection of the environment.

The special legal framework for electricity generation promotes Demand Management programs as well as renewable energy use.

This law acknowledges free entrepreneurial initiative when directed to electric energy supply, provided that any activities be carried out with the principles of objectivity, transparency and free competence in mind (RD2818/1998, 23 December).

The National Energy Committee published a report on energy purchasing under special conditions, giving the most relevant information about this activity, such as its contribution to the satisfaction of the demand and its evolution in terms of technology, power and prices.

In December 1999, the Spanish Government approved the Plan for the Promotion of Renewable Energy in Spain, which includes the necessary initiatives to ensure that the growth in each area concerned with renewable energy can, when added up, cover at least 12% of the consumption of primary energy in 2010. This percentage agrees with the EU established, as shown in the White book of Energy.

The Plan for the Promotion of Renewable Energy in Spain for the year 2010 presents serious challenges.
Firstly, it is necessary to double energy production from renewable sources because of the predicted increase in demand. The greatest part of the current contribution comes from Hydroelectric power and biomass (95% jointly); the former has rather limited prospects for development, while the latter must adopt news ways of utilisation and of obtaining resources if they are to achieve their share.

Secondly, a grater technological development is needed in order to reduce operative problems in the system and to avoid having to use conventional power.

4. The“ Energy 2000” Plan in Denmark

Due to its traditional implementation of active energy policies, Denmark constitutes a referent for energy planning in the Basque Country. This can be clearly seen in plans such as “Danish Energy Policy 1976”and “Energy 81”.

The “Energy 2000” Plan champions sustainable growth in the energy sector and advocates an increase in the use of renewable energy sources in order to reduce CO_2 emissions in the period 1995 – 2005.
International challenges and the opening of the energy markets within the EU made it necessary to lay new foundations to ensure, among other things, the achievement of environmental goals.

5. " White Paper" Plan in Holland

The "White Paper" bill on energy policy defends sustainable growth as a way of fighting against the increasing use of fossil fuels and climate change, and of guaranteeing an energy offer.

6. Energy Plan 2005 in the Basque Country

The Basque Energy Plan for 2005 fixes the new objectives, programs and investments for the period 1996—2005 using as a reference what was achieved in the 1991-1995, the updating of prospective energy needs, the increasing competence in the field and the analysis of energy possibilities.

The selection of alternative energies was made according to energy, economic and environmental criteria.

Since 1982 there has been a continuing attempt at reducing primary energy demand. Thus, during the period 1982 – 1990 there was a reduction of 838.000 tep, which represents 12% of the demand for primary energy at the beginning of this period. This figure exceeds the initial objective of 11%.

At the end of 2000 the objectives came near 13%, always taking into account economic development and the increase in the standard of living at the time.

The Simulation Model for Long-term Energy Demand EVE2000S made it possible to outline the different scenarios for the evolution in consumption by 2005 according to each previously established hypotheses. Of these, three scenarios were chosen as the most representative.

A. Final Energy Consumption

The predictions for final energy consumption for 2005 range between 3.890 – 4.470 Ktep a. With respect to the situation in 1996, the most consumerist scenario shows an increase of nearly 7%, whereas the most conservative marks - 7% –7%.

A tendency can be observed towards less solid fuel consumption and a greater final demand for electricity and derivative energies (mainly thermal exploitation in co-generation processes). The rest of energies present less variation.

The increase of consumption of derivative energies has a negative repercussion on natural gas and renewable sources, as these are most frequently used in co-generation processes.

All scenarios clearly show a decline in both the industrial and primary sectors, which contrast sharply with the expected growth in services, building and transport.

B. Energy Intensity

By 2005 the total final per capita energy consumption will show values similar to those of 1995, while Energy Intensity, in pesetas since 1995, will fall by 25% for an increase in the Basque gross domestic product of 30%.

C. Objectives 2005

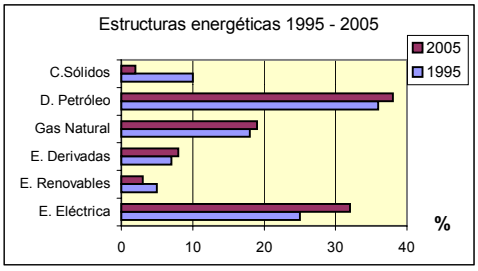
The use of renewable resources in 1995 was 214.000 tep, and it concentrated mainly in the exploitation of biomass –wood waste products accounted for 95% of the total- and mini-hydroelectric power plants. In spite of these important limitations, the objective is set at 404.000 tep.

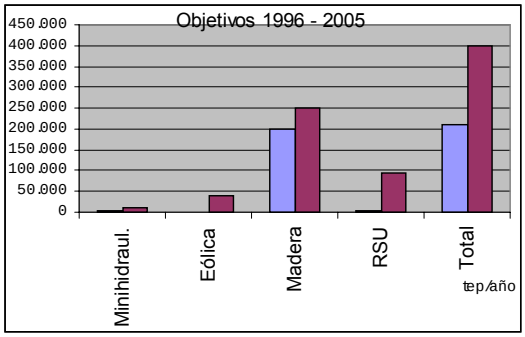
To this end, 64.150 million pesetas (Mpts) were allocated for supporting the Basque Wind Power Plan, the energy assessment of wood and urban waste products and the promotion of solar power, both thermal and photovoltaic.

Table 6.1 .Objectives 1995 – 2005

Concept	Situation 1995	Objectives 2005	Ratio (%) 1995/2005
Renewable	214.000	404.000	+89%
Investments Mpts	-	64.150	-

Table 6.2 Mini-hydroelectric. Objectives 1996 – 2005





concept	Situation 1995	Objective 2005	Ratio 2005/1995
Power MW	82.1	97.1	+18%
Production MWh/a	104.000	155.000	+50
Investments Mpts		3.000	

Table 6.3 Solar Energy. Objectives 1996 – 2005

concept	Situation 1995	Objective 2005	Ratio 05/95
Solar-heat Collectors m^2	140	2.140	
Photovoltaic Panels Wp	17.180	37.180	+116%
Saving tep	27	310	
Investments Mtps	-	450	

Table 6.4 Wind Power. Objectives 1996 _ 2005

Concept	Situation 1995	Objective 2005	Ratio 05/95
Power MW	0.004	175	
Production MWh/a	8	437.500	
Investments Mpts		23.750	

Table 6.5 Biomass – Wood Waste Products. Objectives 1996- 2005

Concept	Situation 1995	Objectives 2005	Ratio % 05/95
Use (tep)	203.100	257.600	+27
Investments Mpts		1.450	

Table 6.6 Biomass –Urban Waste Products. Objectives 1996 – 2005

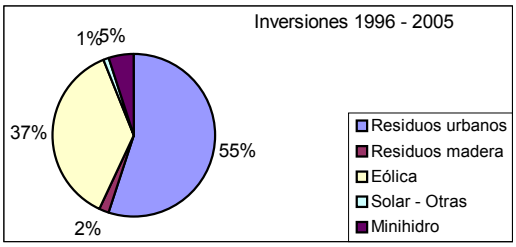
concept	Situation 1995	Objective 2005	Ratio 05/95
Use RSU tep	94.800		na
Power MW	2.2	193,8	na
Production MWh/a	11	1.309	na
Investments Mpts		35.420	

Table 6.7 Biomass - Agricultural Waste Products. Objectives 1996 – 2005

concept	Situation 1995	Objective 2005	Ratio 05/95
Use RSU tep		70	
Power MW		50	
Production MWh/a		250	
Investments Mpts		80	

D. Investments 2005

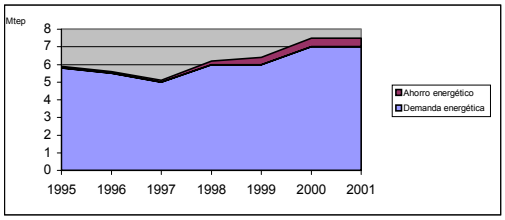
The global analysis of the 64.150 Mpts. for investments during the period 1996 – 2005 shows that the programs with the highest technical – economic potential were allotted the largest share of the investment. They are, as can be seen in the chart, the use of solid urban waste products –biogas and burning for energy recovery– and the Main Wind Power Plan.



7. Energy Balance in the Basque Country in 2001

The situation at the end of 2001 is as follows:

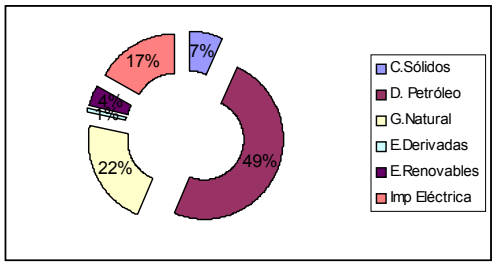
Global Annual Saving:	407.000 tep
Saving Level:	77%
Advance in Co-generation:	175 MW
Investments:	303 Me



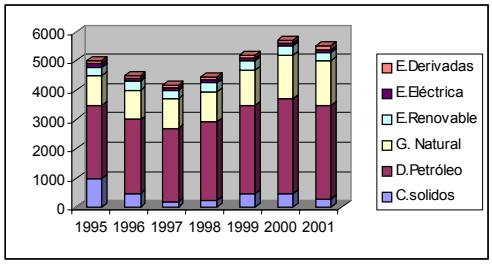
The parameter "Energy Intensity" (relation between final energy consumption and gross domestic product) is a good indicator of energy

efficiency. In the Basque Country, it shows a falling trend – thus, a positive evolution.

Energy Supply in 2001:



Energy Demand 1995 – 2005



To carry out the Plan for Renewable Energy, an assessment of the available renewable resources is conducted, and the hydroelectric, biomass, solar and wind potentials are evaluated.

In table 7.1 a comparison between provinces can be clearly seen.

Ratio area/population:

Alava : 3.037 Km^2 and281.821 inhab
Vizcaya : 1.140.026 Km^2 and2.221 inhab.
Guipuzcoa: 1.976 Km^2 and 676.208 inhab.

Table7.1 facilities in provinces

ALAVA	Biomass. Mini-wind power Hydroelectric Mini hydroelectric Solar Photovoltaic Solar Thermal Wind Farm of Elgea Nº of generators: 40 Power/ unit: 660/850 KW Total Power: 27MW	17 17 1 15 136 25
BIZCAYA	Biomass. Mini-wind power Hydroelectric Mini hydroelectric Solar Photovoltaic Solar Thermal	53 14 1 28 103 42
GUIPUZCOA	Biomass. Mini-wind power Mini hydroelectric Solar Photovoltaic Solar Thermal	41 17 63 125 57
EUSKADI	Biomass. Mini-wind power Hydroelectric Mini hydroelectric Solar Photovoltaic Solar Thermal	**111** **48** **2** **106** **364** **124**

Annual Use of Renewable E.: 4 % (270.000 tep)

When talking about the generation of electricity from natural gas, it must be pointed out that 23% of the energy used in the Basque Country is produced from natural gas; this figure doubles that of the national Spanish average. An increase to reach 28% is predicted for 2005.
It is also important the fact that 93% of households have access to this kind of energy. Demand presents a steady increase of 16% per year.

According to EVE, natural gas generates, for the same amount of energy supplied, less CO_2 than coal, 28% less than fuel oil, 27% less than diesel fuel, 23% less than petrol and 13% less than propane.

In this respect, it is important to bear in mind the EU proposals for reducing the emissions of greenhouse–effect gases, as seen in the communication sent by the Committee to the Council and European Parliament on March 8, 2000.

Table 7.2 Environmental Impact of electricity generation.

Generation System	Ecopoints
Oil	1.398
Coal	1.356
Nuclear	672
Solar Photovoltaic	461
Natural Gas	267
Wind	65
Mini-hydroelectric	5

The wind farm in Elgea is the first of its kind in the Basque Country. In its first year of use, its performance has been better than predicted, aided by very favourable weather conditions which meant a nearly continuous operation. The electricity generated has been equivalent to the consumption of approximately 125.000 people.

The electric production of Elgea throughout the year 2001 has meant:

26.8%	Domestic consumption in Alava
5.3%	Industrial consumption in Alava
3.6%	Total consumption in Alava

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