REPORT BY THE KINGDOM OF SPAIN ON THE ACHIEVEMENT OF NATIONAL INDICATIVE TARGETS FOR RENEWABLE ELECTRICITY CONSUMPTION IN 2010

2005

Report by the Kingdom of Spain as required by Article 3(3) of European Parliament and Council Directive 2001/77/EC of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.

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CONTENTS

1. INTRODUCTION

This report has been drafted pursuant to Article 3(3) of European Parliament and Council Directive 2001/77/EC of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market.

On 26 August 2005, the Spanish Council of Ministers adopted the 2005-2010 Renewable Energy Plan (2005-2010 REP). This new Plan to promote sources of renewable energy replaced the previous one, which had been adopted by the Spanish Government in December 1999 for implementation by 2010.

The new Plan amended the objectives for renewable energy consumption for thermal and electricity production, and took account of the extent to which the objectives of the previous plan had been achieved in each area. The overall objective for renewable energy consumption in 2010 was kept at 12% (or 12.1% to be precise). In terms of electricity production from renewable sources, the objective of the new Plan remained at 30.3% of gross electricity consumption in 2010.

The first report, which was drafted pursuant to Article 3(3) of Directive 2001/77/EC and submitted in October 2003, included the estimates contained in *"Planning in the Electricity and Gas Sectors. Development of transport networks, 2002-2011"* regarding new electricity generation capacity from renewable sources. This document, which was published in 2002, laid down the guidelines for indicative planning of the activities needed to develop electricity and gas transport infrastructure, and the necessary coordination. *Planning* (which is currently being reviewed) revised upwards the capacity envisaged for certain technologies, basically wind and biomass, in the 2000-2010 Renewable Energy Development Plan which was adopted by the Government in 1999. The new 2005-2010 Renewable Energy Plan now revises the previous objectives and lays down a general framework for the development of renewable energy up to 2010.

The 2000-2010 Renewable Energy Development Plan created a Planning Office, based at the Energy Diversification and Conservation Institute (IDAE), which was given responsibility for drawing up annual reports on the Plan's progress. The monitoring and analysis of the investments made in the 1999-2004 period, as well as of the production and consumption of renewable energy year on year and of the public support provided, made it possible to identify and explain differences in the various areas between the original objectives and actual production and consumption.

The new 2005-2010 REP was drafted on the basis of the monitoring and progress reports in accordance with the monitoring system's emphasis on the need for the best possible information to be available in 2004 with a view to establishing new economic and financial perspectives for the period up to 2010.

This second report to the Commission, as required by Article 3(3) of the Directive, is based on the aforementioned reports and the new Plan, and summarises the development of renewable energy from 1999 to 2004 in both general and specific terms for each technology, and expressly states the extent to which the objectives have been achieved.

In addition, Chapter 4 provides information about the contribution of renewable energy to the energy balance, with provisional closing data for 2005, including data on

electricity generation capacity from renewable sources and renewable energy consumption for thermal uses [although this report basically meets the obligation stipulated in Directive 2001/77/EC for the Member States to evaluate their success in achieving the indicative objectives for renewable electricity consumption, it also includes an assessment of the achievement of the renewable energy consumption objectives for thermal production laid down in the Plan adopted in 1999].

This second report to the Commission also sets out the new objectives established by the 2005-2010 Renewable Energy Plan in August 2005 and the main measures proposed to achieve them, based on experience acquired in implementing the previous Plan and familiarity with the barriers which restrict the development of certain technologies to exploit renewable energy sources. With the new Plan, the Spanish Government maintains its objective of meeting 12% of energy demand in 2010 from renewable sources, as indicated in Law 54/97 on the Electricity Sector.

2. SITUATION REGARDING RENEWABLE ENERGY IN 2004: RESULTS TO DATE OF THE *PLAN TO DEVELOP RENEWABLE ENERGY, 2000-2010*

In 1998, renewable energy consumption totalled 7.2 million toe (7.1 million for an average water, wind and solar year), with primary energy consumption of 114 million tep. Renewable sources accounted for 6.3% (6.2% in an average year) of the total energy consumption for that year.

The 1999 Development Plan set objectives which entailed renewable energy consumption of 16.6 million toe in 2010, an increase in the consumption of such sources of 9.5 million toe by that year.

Since the Plan was adopted towards the end of 2004, overall renewable energy consumption in Spain has increased by 2.7 million tep, an increase which is significant but insufficient to achieve the objectives set for 2010, especially given the high rates of growth in energy demand and the estimates for the next few years[1]. This increase in renewable energy consumption resulted in 28.4% of the overall objective being achieved at the end of 2004.

In March 2004, the Spanish Government adopted R.D. 436/2004, which amended the legal and economic framework for the production of electricity under the so-called Special Regime. This new Decree, which superseded Decree 2818/98, introduced important changes to the legislative framework for electricity under the now more stable and predictable Special Regime, which make it possible to increase the development of renewable energy and facilitate the transferral to the electricity grid of increasing volumes of renewable electricity.

One of the most important changes introduced by the new Decree is the opportunity for electricity producers under the Special Regime to choose between selling their production or surpluses to the distributor under the regulated tariff arrangement and selling them on the open market. The tariffs for producers which sell to the distributor and the incentives and subsidies for those which opt for the market are based on percentages of the average or reference electricity tariff for each year.

In this context and largely as a result of the action taken since the Plan was adopted in 1999, 28.4% of the objectives had been achieved in 2004, although with quite different results for the different types of energy.

Three renewable sources are developing satisfactorily: wind, biofuels and biogas. Mini-hydro power is progressing more slowly than planned and biomass is developing at a much slower pace than required, especially given the relative importance of their objectives. Solar energy is also developing at an appreciably slower pace than is needed to achieve the final objectives, although there is scope for improvement.

Wind energy has experienced the greatest development. At the end of 2004, it had achieved almost 90% of the objective for 2010 and 63% of the objective set in *Planning in the Electricity and Gas Sectors, 2002-2011*, which envisaged wind capacity of 13 000 MW for 2011.

[1] Precisely to ensure moderate growth in energy demand, the *Energy Conservation and Efficiency Strategy for 2004-2012* (E4) was drafted in 2003 and, more recently, the *E4 Action Plan for 2005-2007*, which was adopted on 8 July 2005. This Plan aims to achieve a total saving equivalent to 8.5% of primary energy consumption in 2004 over the 2005-2007 period.

Mini-hydro power, which uses consolidated technology, continues to encounter significant administrative barriers which hamper its development. Since the Plan was introduced, capacity below 10 MW has progressed somewhat more slowly than envisaged and hydro-electric capacity between 10 and 50 MW has also seen a slight progression. By the end of 2004, 33.2% and 11.2% respectively of the objectives envisaged for 2010 had been achieved.

As regards solar thermo-electric energy, no new facilities have been built to date, although Decree 436/2004 introduced an amendment which significantly increases payments for electricity produced using this technology. It is therefore envisaged that several new facilities will come on line in the next few years.

In the low-temperature solar thermal and solar photovoltaic fields, the volume of facilities created each year continues to increase but their growth is still much lower than needed to achieve the objectives of the Plan, especially in the solar thermal field. In this area, a total of 8% of the overall objective of the Plan for 2010 had been achieved by the end of 2004. Low-temperature solar thermal energy requires prompt approval of the *Technical Construction Code* (CTE)[2] in order to achieve the related objectives.

In the solar photovoltaic field, 21.2% of the objective for 2010 had been achieved by the end of 2004. In the short and medium terms, solar photovoltaic facilities will also receive significant impetus from approval of the CTE, thereby adding to the positive effect of the changes introduced by Decree 436/2004 as regards the funds available for such facilities.

Biomass was the main venture of the 1999 Development Plan. The objective set for biomass was an increase in consumption of 6 000 ktoe in 2010 when compared with 1998 (5 100 in electrical applications and 900 in thermal applications), an objective which was increased by *Planning in the Electricity and Gas Sectors 2002-2011*. From the introduction of the Plan until the end of 2004, only 9% of the total objective for the area for 2010 had been achieved, although the figure was somewhat higher for electrical applications (11.8%).

In 2004, biogas grew much more than in previous years, with the opening of several facilities which, in terms of electricity generation capacity, added 16 new MW. At the end of 2004, biogas had achieved 124% of the objective envisaged in the Plan.

Biofuels continue to make good progress and in 2004 three new biodiesel plants came on line with a total production capacity of 44 ktoe, an achievement of 45.6% of the overall objective for 2010 by the end of 2004.

The figures for the objectives achieved in each area in terms of installed capacity for electrical areas and primary energy production and consumption for thermal areas are shown in the following table and correspond to the figures given in previous paragraphs. From the increases in renewable energy consumption expressed in terms of primary energy, a percentage may be obtained for the overall achievement of the 2000-2010 Renewable Energy Development Plan by the end of 2004, i.e. 28.4% of the increase in renewable energy consumption planned for 2010.

[2] The *Technical Construction Code* (CTE) is one of the regulations which will implement Directive 2002/91/EC on the Energy Performance of Buildings.

DATA FOR INSTALLED CAPACITY/ENERGY (1999-2004)

Technological area	Unit	Objectives	Objectives	Attainment 1999-2004								
		1999-2006	1999-2010	1999	2000	2001	2002	2003	2004	Total 1999-2004	Percentage of 2006 obj.	Percentage of 2010 obj.
Mini-hydro power (<10 MW)	**MW**	439	720	**36**	**43**	**42**	**36**	**37**	45	**239**	**54,5%**	**33,2%**
Hydro-electric (10-50 MW)	**MW**	210	350	**0**	**0**	**20**	**0**	**0**	19	**39**	**18,6%**	**11,2%**
Wind (1)	**MW**	4.779	8.140	**642**	**815**	**984**	**1.615**	**1.344**	1.920	**7.321**	**153,2%**	**89,9%**
Biomass (2)	**ktoe**	2.886	6.000	**34**	**28**	**73**	**218**	**140**	**45**	**538**	**18,7%**	**9,0%**
	MW	803	1.708	**6**	**3**	**23**	**115**	**44**	13	**202**	**25,2%**	**11,8%**
Biofuels	**ktoe**	250	500	**0**	**51**	**0**	**70**	**63**	44	**228**	**91,3%**	**45,6%**
Biogas	**ktoe**	66	150	**25**	**11**	**9**	**36**	**87**	**19**	**186**	**280,4%**	**124,2%**
	MW	35	78	**12**	**5**	**5**	**18**	**52**	16	**108**	**311,5%**	**138,0%**
Solar photovoltaic	**kWp**	61.196	135.000	**759**	**2.380**	**3.860**	**4.965**	**6.617**	**10.000**	**28.580**	**46,7%**	**21,2%**
Solar thermoelectric	**MW**	98	200	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0,0%**	**0,0%**
L.T. solar thermal.	**m^2**	1.504.350	4.500.000	**22.716**	**41.565**	**56.510**	**65.101**	**83.272**	**90.000**	**359.164**	**23,9%**	**8,0%**
Solid waste (3)	**MW**	101	168	0	0	50	6	0	26	**82**	**81,1%**	**48,7%**
Mixed facilities	***kW***			***42***	***57***	***290***	***482***	***256***	***0***	***1.127***		

(1) Includes capacity from mixed facilities.

(2) All biomass consumption of operational electricity-generating facilities is counted as new biomass consumption.
Part of this consumption at some facilities could be due to a switch from thermal to electrical uses; the quantities concerned are neither evaluated nor deducted.

(3) In 2001 a new 50 MW USW plant came on line and in 2002 the capacity of an existing plant increased by 6 MW.

Technological area (Unit: Ktoe)	PRODUCTION IN TERMS OF PRIMARY ENERGY ATTAINMENT BY 2004										
	Objectives 1999-2006	Objectives 1999-2010	1999	2000	2001	2002	2003	2004	Total 1999-2004	Percentage of 2006 obj.	Percentage of 2010 obj.
Mini-hydro power (<10 MW)	117	192	10	11	11	10	10	12	64	54,5%	33,2%
Hydro-electric (10-50 MW)	36	60	0	0	4	0	0	3	7	18,6%	11,2%
Wind	986	1.680	132	168	203	333	277	396	1.511	153,2%	89,9%
Biomass (1)	2.886	6.000	34	28	73	218	140	45	538	18,7%	9,0%
Biofuels	250	500	0	51	0	70	63	44	228	91,3%	45,6%
Biogas	66	150	25	11	9	36	87	19	186	280,4%	124,2%
Solar photovoltaic	8	17	0	0	0	1	1	1	4	46,7%	21,2%
Solar thermoelectric	89	180	0	0	0	0	0	0	0	0,0%	0,0%
L.T. solar thermal	103	309	2	3	4	4	6	6	25	23,9%	8,0%
Solid waste (2)	261	436	0	0	83	8	0	43	134	51,3%	30,7%
Geothermal	-	-	1	3	0	0	0	0	4		
TOTAL	4.803	9.525	204	276	388	680	583	570	2.701	56,2%	28,4%

(1) All biomass consumption of operational electricity-generating facilities is counted as new biomass consumption.
Part of this consumption at some facilities could be due to a switch from thermal to electrical uses; the quantities concerned are neither evaluated nor deducted.

(2)) In 2001 a new 50 MW USW plant came on line and in 2002 the capacity of an existing plant increased by 6 MW.

As regards the payment scheme and support for renewable sources, both of which are fundamental to the development of such sources, it should be pointed out that the system of subsidies and fixed prices envisaged for the generation of electricity from renewable sources is the main support mechanism currently used to encourage the development of these sources. In this context, 12 March 2004 saw the adoption of Decree 436/2004 which superseded Decree 2818/98 and which lays down a new legal and economic framework for renewable energy under the Special Regime.

Another of the bases for the development of renewable energy is public funding and aid. In 2004 the ICO-IDEA budget heading became available again and already included the old aid programmes for solar thermal and photovoltaic energy. The adoption of an adjustable zero rate of tax until the end of 2012 for biofuels under the special hydrocarbons tax provides fundamental support for the development of this type of fuel.

An analysis of the investments envisaged in the Plan until 2006 shows that 83.5% were implemented from 1999 to 2004, a figure which is high in relation to the amounts originally planned. As regards the public aid made available over the 1999-2004 period (not including production subsidies and tax exemptions), the overall balance is somewhat lower than the figure initially envisaged in the Plan.

The following table shows the final figures for each area at the end of the financial year 2004 in terms of the capacity, production and consumption of primary energy.

	Production from renewable energy in 2004 (1)		
	Capacity (MW)	**Production (GWh)**	**Production in terms of Primary Energy (ktoe)**
Generation of electricity			
Hydro (> 50 MW) (2)	13.521	23.673	1.863
Hydro (from 10 to 50 MW)	2.897	5.097	438
Hydro (< 10 MW)	1.749	4.729	407
Biomass	344	2.193	680
SUW	189	1.223	395
Wind	8.155	15.056	1.295
Solar photovoltaic	37	57	5
Biogas	141	825	267
Solar thermoelectric	-	-	-
TOTAL ELECTRICAL AREAS	**27.032**	**52.852**	**5.350**
Thermal uses	**m^2 I-temp. sol. thermal**		**(ktoe)**
Biomass			3.487
Biogas			28
Low-temperature solar thermal	700.805		51
Geothermal			8
TOTAL THERMAL AREAS			**3.574**
Biofuels (Transport)			
TOTAL BIOFUELS			**228**
TOTAL RENEWABLE ENERGY			**9.152**
PRIMARY ENERGY CONSUMPTION (ktoe)			**141.567**
Primaryenergy/ renewable energy (%)			**6,5%**

(1): Data for 2004 (real, provisional) as of 4 March 2004
(2): Includes pure pumped productton.

As regards the indicative objective for 2010 which Directive 2001/77/EC set as 29.4% of gross national electricity consumption, the contribution of renewable electricity to gross national consumption in 2004 was 19.4%, a figure lower than anticipated due to low rainfall in 2004. In an average year, the figure would be 22%, a steady increase of around half a percentage point a year in the coverage of electrical consumption from renewables when compared with hydroelectric production for an average year.

CONTRIBUTION TO GROSS NATIONAL ELECTRICITY CONSUMPTION OF ELECTRICITY GENERATED FROM RENEWABLE SOURCES (1)

	1997	Indic. objective 2010	Actual production data (2)				Renewable produced in an average year of rainfall (3)			
			2001	2002	2003	2004	2001	2002	2003	2004
Gr. Nat. Consumption. (TWh)	186,7	—	241,4	252,0	264,1	272,5	241,4	252,0	264,1	272,5
Generation from renewables	37,15	—	52,5	38,4	59,4	52,9	44,6	48,6	52,2	60,0
Contribution of renewables	**19,9%**	**29,4%**	**21,7%**	**15,2%**	**22,5%**	**19,4%**	**18,5%**	**19,3%**	**19,8%**	**22,0%**

Source: IDEA, based on information and data provided by the Ministry of Industry, Tourism and Trade and the National Energy Commission

Notes

(1): Compared with the original situation and indicative objectives of Directive 2001/77/EC.

(2): Provisional data.

(3): In an average year of rainfall, the annual operating hours for hydroelectric stations are as follows: 3 100 for capacity < 10 MW, 2 000 for capacity of 10-50 MW and 1 850 for capacity of > 50 MW.

3. OBJECTIVES AND MEASURES TO PROMOTE RENEWABLE ENERGY IN THE 2005-2010 PERIOD: NEW *2005-2010 RENEWABLE ENERGY PLAN*

3.1. Overall objectives of the 2005-2010 Renewable Energy Plan (2005-2010 REP)

As the growth of renewable energy consumption was insufficient to achieve the 12% objective in 2010, the 2000-2010 Development Plan for Renewable Energy, which was adopted in December 1999, had to be revised. The following reasons explain why the increase in renewable energy consumption was insufficient (especially when compared with the increase in overall energy demand) and justify the need to revise the Plan.

Firstly, primary energy consumption[3] and energy intensity have increased much more than anticipated, largely as a result of the significant increase in demand for electricity and in fuel consumption for transport.

Secondly, since the Development Plan was adopted in 1999 another two indicative objectives have been set for the generation of electricity from renewable sources (Directive 2001/77/EC) and the consumption of biofuels (Directive 2003/30/EC), and need to be incorporated into the instruments for planning the development of renewable energy in Spain.

Lastly, consideration must also be given to the potential contribution of renewable energy to new environmental commitments, in particular those set out in the National Plan for Allocating CO_2 Emission Rights (PNA).

Accordingly, the overall objectives of the new 2005-2010 Renewable Energy Plan stipulate a contribution by renewable sources of 12.1% of primary energy consumption in 2010, electricity production from such sources of 30.3% of gross electricity consumption and biofuel consumption of 5.83% of petrol and diesel consumption by transport in the same year.

The significant contribution envisaged for wind energy stands out, increasing to 20 155 MW the objective for installed capacity in 2010, with an estimated production of 45 511 GWh in the same year.

Biofuel objectives also increase significantly from the 0.5 million toe envisaged in the Development Plan to 2.2 million toe in 2010. In the case of solar photovoltaic, the objective is now 400 MW installed by 2010 and for solar thermoelectric the objective has increased to 500 MW. Biogas has seen a similar increase.

In the case of biomass, a distinction must be made between biomass for electricity generation and biomass for thermal uses. In the first instance, the growth objective for the 2005-2010 period is 1 695 MW, the implementation of which depends on three main factors:

- the introduction of a co-combustion programme for the joint combustion of biomass and coal at existing coal-fired power stations;

[3] From 2000 to 2004, the average annual increase in primary energy consumption was more than 3.2%.

- an appreciable increase in payments for the electricity generated at electrical biomass facilities;

- support from the existing *Interministerial Biomass Committee*.

As regards thermal biomass, the target increase by 2010 is 583 ktoe, a figure which includes, among other measures, improving waste-supply logistics and new funding for the non-refundable investment proposed in the new Plan.

The following table includes the objectives for the various areas (thermal and electrical), an estimate of primary energy consumption in 2010 and the objective for renewable energy consumption as a percentage of total energy demand, i.e. 12.1% for the year in question.

During the planning stage, various scenarios for renewable energy penetration were evaluated. The objectives for renewable energy production and consumption were set assuming a scenario of trend economic and energy growth based on the most recent increases in economic activity and energy demand, and a likely scenario of technological development in each renewable area. The resulting scenario (on the basis of objectives were set) is the REP Scenario (2005-2010 Renewable Energy Plan Scenario), a combination of the trend energy scenario and the likely technological development scenario.

OBJECTIVES OF THE 2005-2010 SPANISH RENEWABLE ENERGY PLAN

REP scenario

	Situation in 2004 [average year (1)]			Target increase 2005-2010 (2)			Status of objective for 2010		
	Capacity (MW)	Production (GWh)	Primary energy production (ktep)	Capacity (MW)	Production (GWh)	Primary energy production (ktep)	Capacity (MW)	Production (GWh)	Primary energy production (ktoe)
Generation of electricity									
Hydro (> 50 MW) (3)	13.521	25.014	1.979	0	0	0	13.521	25.014	1.979
Hydro (from 10 to 50 MW)	2.897	5.794	498	360	687	59	3.257	6.480	557
Hydro (< 10 MW)	1.749	5.421	466	450	1.271	109	2.199	6.692	575
Biomass	344	2.193	680	1.695	11.823	4.458	2.039	14.015	5.138
Biomass power stations	344	2.193	680	973	6.787	2.905	1.317	8.980	3.586
Co-combustion	0	0	0	722	5.036	1.552	722	5.036	1.552
RUW	189	1.223	395	0	0	0	189	1.223	395
Wind	8.155	19.571	1.683	12.000	25.940	2.231	20.155	45.511	3.914
Solar photovoltaic	37	56	5	363	553	48	400	609	52
Biogas	141	825	267	94	592	188	235	1.417	455
Solar thermoelectric	-	-	-	500	1.298	509	500	1.298	509
TOTAL ELECTRICAL AREAS	**27.032**	**60.096**	**5.973**	**15.462**	**42.163**	**7.602**	**42.494**	**102.259**	**13.574**
Thermal uses	m^2 l-t solar thermal		(ktoe)	m^2 l-t solar thermal		(ktoe)	m^2 l-t solar thermal		(ktoe)
Biomass			3.487			583			4.070
Low-temperature solar thermal	700.805		51	4.200.000		325	4.900.805		376
TOTAL THERMAL AREAS			**3.538**			**907**			**4.445**
Biofuels (Transport)									
TOTAL BIOFUELS			**228**			**1.972**			**2.200**
TOTAL RENEWABLE ENERGY			**9.739**			**10.481**			**20.220**
PRIMARY ENERGY CONSUMPTION (ktoe) (Energy scenario: Trend/REP)			**141.567**						**167.100**
Renewable energy/primary energy (%)			**6,9%**						**12,1%**

(1): Provisional data for 2004. Hydro, wind, solar photovoltaic and solar thermal energy include production for an average year, based on the capacity and area in service on 31 December and on the nature of the existing facilities, rather than the actual data for 2004. Thermal biogas and geothermal, which in 2004 accounted for 28 and 8 ktoe, are not included.

(2): In the target increases for 2005-2010, production corresponds to an average year based on the capacity and nature of existing facilities. For hydro-electric and wind energy, only half of the capacity installed in the final year (2010) is shown as production in the corresponding columns.

(3): Includes pure pumped production.

As regards the objective for electricity generation from renewables, renewable energy will contribute more than 100 000 GWh to the system in 2010, an estimated 30.3% of gross electricity consumption for that year.

	2010
GROSS ELECTRICITY CONSUMPTION	**337.407**
Total generation from renewables (GWh)	102.259
Renewable electricity as % of gross electricity consumption (2)	**30,3%**

The contribution of biofuels (2 200 ktoe) to anticipated petrol and diesel consumption for transport will be 5.83% in 2010, a figure which also meets the indicative objective of 5.75% stipulated for that year by Directive 2003/30/EC.

FINAL ENERGY CONSUMPTION **REP SCENARIO**	**2010 (ktoe)**
TOTAL FINAL CONSUMPTION	**127.330**
Of final energy consumption	
Biofuels	2.200
Petrol and diesel in transport	37.735
Biofuels as a % of petrol and diesel in transport	**5.83%**

As regards the economic aid in question, as a general point regarding electricity generation it should be noted that the main support available is still the system of subsidies currently applied in Spain, albeit with a number of changes. In order to achieve the proposed objectives, current levels of payment need to be maintained in some cases and increased in others, as proposed.

The Plan involves investment during the 2005-2010 period of 23 599 million euro, with total aid for renewable energy of 8 492 million, consisting of 3 536 million of public aid in the strict sense (i.e. funding from the national budget of 681 million in investment aid and 2 855 million in tax incentives for the production of biofuels) and 4 956 million euro of total aid during the period for electricity generation from renewables through the system of subsidies.

TARGET INCREASES IN THE 2005-2010 RENEWABLE ENERGY PLAN (ktoe)

ELECTRICAL AREAS	
Mini-hydro power (≤ 10 MW)	109
Hydro (from 10 to 50 MW)	59
Wind	2.231
Biomass power stations	2.905
Co-combustion	1.552
Biogas	188
Solar photovoltaic	48
Solar thermoelectric	509
TOTAL ELECTRICAL AREAS	**7.602**
THERMAL AREAS	
Solar thermal (low temperature)	325
Thermal biomass	583
TOTAL THERMAL AREAS	**907**
BIOFUELS (TRANSPORT)	
Biofuels	1.972
TOTAL BIOFUELS	**1.972**
TOTAL RENEWABLE ENERGY	**10.481**

RENEWABLE ENERGY PLAN (2005 – 2010)	
PARAMETERS	**TOTAL RENEWABLE AREAS**
Public aid (*)	**8 492.24 million €**
Investment	**23 598.64 million €**
Total energy production (**)	**10 480 526 toe**
Jobs created	**94 925 net jobs**
Emissions avoided compared with Gas-Fired Combined Cycle (***)	**2005 - 2010 period: 76 983 254 tCO_2**

(*) 4 956.21 million euro of this amount corresponds to total electricity production subsidies for the 2005-2010 period received by facilities which come on line during the life of the Plan; the remainder corresponds to aid and tax exemptions.
(**) Total energy in terms of primary energy for all renewable areas during the 2005-2010 period.
(***) Except for co-combustion plants, where emissions are calculated on the basis of coal replaced by biomass.

3.2. Measures by technological area

(a) Wind

The national legislative framework, regional legislation and the maturity and competitiveness of continually developing technology have led to the successful results obtained by the 1999 Plan in terms of wind power.

The measures proposed in the new Plan aim to improve wind-generator technology so as to maximise performance on the grid and remove technical obstacles to greater penetration of wind power in the Spanish electricity market.

The new Plan also considers it essential to preserve the current legislative framework without substantial variations over the 2005-2010 period, including payment for generated electricity which should remain more or less at current levels.

The following table shows the most important measures envisaged in the Plan to achieve the objectives set. It also indicates the body responsible for undertaking each proposed measure, as well as the years when each measure should be implemented and maintained:

Barriers	Measures	Responsibility	Timetable
- Inadequate evacuation infrastructure.	- Develop transport networks.	REE	2006-2010
	- Review of "Planning in the Gas and Electricity Sectors".	REE and Ministry of Industry	2006
- Connection regulations, access to the grid and obsolete operating conditions (M.O. of 5.9.1985).	- New Royal Decree on the connection of facilities under the Special Regime.	Ministry of Industry	2006
-Inadequate management of wind-generated electricity production.	- Create a single centre for operations under the Special Regime.	REE and Ministry of Industry	2005-2006
- Limits on current subsidies and tariffs up to 13 000 MW.	- Keep the provisions of R.D. 436/2004, but increase the limit of the legal framework to 20 000 MW.	Ministry of Industry	2005

The only public aid required in this area is continued payment in the form of subsidies. The subsidies to be received from 2005 to 2010 for wind facilities which come on line during this period amount to 2 599 million euro and the value of subsidies linked to the new facilities (i.e. which come on line during the life of the Plan) in 2010 is 815 million euro.

(b) Hydroelectric power

On the basis of the considerable hydroelectric potential which is technically feasible in Spain, a series of measures would need to be introduced so as to ensure that new facilities come on line more quickly.

In short, the main measures for achieving the proposed objectives for hydro-electric power are the preservation of tariff support for the Special Regime (in line with current legislation) over the 2005-2010 period, and those shown in the following table:

Barriers	Measures	Responsibility	Timetable
- Public infrastructure which does not use hydroelectric power	Promotion of invitations to tender for state infrastructure	Ministry of the Environment	2005-2010
	Hydro-electric use of ecological assets		
Legislation governing connection, access to the grid and obsolete operating conditions (M.O. of 5.9.1985)	New Royal Decree on access to the grid and operating conditions	Ministry of Industry	2006

The only public aid required in this area is continued payment in the form of subsidies. The subsidies to be received from 2005 to 2010 for hydro-electric facilities which come on line during this period amount to 189 million euro and the value of subsidies linked to the new facilities (i.e. which come on line during the life of the Plan) in 2010 is 60 million euro.

(c) Solar thermal

The measures proposed are intended to overcome existing economic, technological, legislative and social barriers. The main means of ensuring the success of low-temperature solar thermal energy is the prompt adoption of the Technical Construction Code, but other important measures should also be emphasised. They are summarised in the following table:

Barriers	Measures	Responsibility	Cost	Timetable
Solar thermal energy far-removed from the construction sector.	Adopt the Technical Construction Code in 2005*, the effects of which will be felt from 2008-2010.	**Adoption:** Ministry of Housing **Implementation:** Town halls	--	2005
Need for circulation to town halls	Support more intensive implementation of Municipal Solar Ordinances through circulation to town halls.	IDAE	Currently being evaluated	2005-2010
Not sufficiently viable unless complemented by investment subsidies.	Provide public investment aid totalling 348 million € during the period in question. This total will be reached through the simultaneous implementation of national and regional budgets. If the previous measures are implemented, 35% fewer facilities should receive aid. The current conditions for ICO IDEA funding will remain.	MITT and ARs	348 M€	2005-2010
Need to inform potential users.	Carry out major public awareness campaigns.	IDAE	Currently being evaluated	2005-2010

* The *Technical Construction Code* should be adopted in 2006.

Public aid for low-temperature solar thermal energy amounts to 348 million euro in investment aid over the lifetime of the Plan.

(d) Solar thermoelectric

Although the first demonstration projects (200 MW) have continued because the legislative limit was increased to 500 MW[4], capacity should be reached without any other type of additional measure.

However, other measures may make it easier to achieve the objectives for solar thermoelectric energy. They are summarised in the following table:

[4] The current level of subsidies stipulated in R.D. 436/2004 will be maintained until national installed capacity reaches 200 MW. This limit needs to be raised to 500 MW.

Barriers	Measures	Responsibility	Cost	Timetable
Current subsidies and tariffs limited until the 200 MW level is reached	Maintain the conditions of R.D. 436/2004 but increase the legislative limit to 500 MW, and maintain the conditions of R.D. 2351/04	MITT	559 M€	2005-2010
Investment subsidies needed for the first projects	Provide public investment aid for the first projects	ARs, EU	6.2 M€	2005-2010
Imprecise evaluation of the first projects, which made them more expensive	Support demonstration projects	IDAE	Currently being evaluated	2005-2010

Therefore, the main public support required in this area is continued payment in the form of subsidies and an increase in the current legislative limit to 500 MW. However, investment aid for the first projects was also considered important, totalling 6.2 million euro over the 2005-2010 period.

A total of 559 million euro in subsidies will be received between 2005 and 2010 by solar thermoelectric facilities which come on line over this period. In 2010 the subsidies linked with new facilities (which come on line during the lifetime of the Plan) will amount to 255 million euro.

(e) Solar photovoltaic

The measures proposed in the solar photovoltaic field are intended to overcome the economic, technological, legislative and social barriers which have been identified. The most important measures envisaged by the Plan for achieving these objectives are summarised in the following table:

Barriers	Measures	Responsibility	Cost	Timetable
Insufficient viability. Limits on project implementation, dependent on aid.	Keep the subsidies stipulated in Real Decree 436/2004.	MITT	499.4 M€	2005 - 2010
	Amend IDEA funding, keeping aid only for ISOLATED.	IDAE	42.6 M€	2005 - 2010
Solar photovoltaic energy far-removed from the construction sector.	Adoption of the Technical Construction Code.	Ministry of Housing	--	2005

Thus, the main public aid required in this area is payment in the form of subsidies. The subsidies to be received from 2005 to 2010 for solar photovoltaic facilities which come on line during this period amount to 499.4 million euro and the value of subsidies linked to the new facilities (i.e. which come on line during the life of the Plan) in 2010 is 200.8 million euro.

Investment aid is also important for the development of isolated facilities and will total 42.6 million euro over the whole period.

(f) Biomass

Diversity is the fundamental characteristic of the biomass sector and concerns the materials which can be used as fuel, as well as their energy potential. It is thus impossible to approach this area from a single perspective. The measures to be adopted are therefore also very diverse. Some are general in nature, such as that of the Interministerial Committee for the Production of Energy from Biomass, while others aim to develop the resource or to develop technology.

In order to achieve the proposed objectives, the 2005-2010 Renewable Energy Plan proposes a broad range of measures, some of the most important of which are shown below:

Barrier	Measure	Responsibility	Budget	Planning
No subsidies for co-combustion	Aid for coal and biomass co-combustion technology. (Amendment of Article 27 of Law 54/1997 and R.D. 436/2004.) Underway.	Ministry of Industry, Tourism and Trade. Ministry of Economics and Finance. National Energy Commission. Electricity companies.	283.15 M€ (total for the period) 118.72 M€/year (annual total at the end of the period)	2005-2010

Barrier	Measure	Responsibility	Budget	Planning
Lack of performance and economic viability of biomass electricity-generation plants.	Amendment of Article 30 of Law 54/1997 with a view to authorising higher subsidies for biomass. Underway	Ministry of Industry, Tourism and Trade. Ministry of Economics and Finance. National Energy Commission.	Budget included in the Proposed Amendment to R.D. 436/2004	2005-2010
Lack of performance and economic viability of biomass electricity-generation plants.	Amendment of R.D. 436/2004.	Ministry of Industry, Tourism and Trade. Ministry of Economics and Finance. National Energy Commission.	776.8 M€ (total for the period not including co-combustion) 359.8 M€/year (annual total at the end of the period not including co-combustion)	2005-2010
Competition between biomass and other fuels in domestic thermal applications.	Investment subsidy of 30% for equipment for the domestic use of biomass.	Ministry of Industry, Tourism and Trade. Autonomous Regions.	213.03 M€ (final total for the period)	2005-2010
Availability of biomass from forestry waste in quantity, quality and price.	Implementation of the Fourth Additional Provision of Forestry Law 43/2003.	Ministry of the Environment. Directorate-General for Biodioversity.	--	2005-2010
No pre-treatment to prepare the resource and high cost of forestry, agricultural ligneous and energy-crop waste.	Programme of aid to purchase collection, transport and processing machinery.	Ministry of Agriculture, Fisheries and Food. Ministry of the Environment.	71.01 M€ (final total for the period, charged as thermal biomass aid)	2005-2010

According to the table, the main sources of public aid for the development of biomass are:

- in the case of thermal applications for the domestic sector, investment aid (totalling 284.04 million euro for the 2005-2010 period) which itself comprises two components: subsidies for investment in equipment for domestic uses (213.03 million euro) and aid for the purchase of agricultural machinery to collect and process the biomass resource (71.01 million euro);

- subsidies for electricity generation, with certain improvements. The subsidies to be received from 2005 to 2010 by electric biomass facilities which come on line during the period total 1 059.9 million euro (283.2 million euro for co-combustion) and the value in 2010 of subsidies linked

to the new facilities, i.e. those which come on line during the lifetime of the Plan, will be 478.5 million euro (118.7 million euro for co-combustion).

(g) Biogas

The progress made in this area in recent years, although considerable, has a number of weak points which must be taken into account. Thus, progress consisted almost entirely of the implementation of projects linked to the degassing of landfill sites, while the energy use of biogas produced from other types of waste has seen little progress. This is especially true of the treatment of livestock waste by anaerobic digestion.

To achieve the biogas objectives, a series of measures were established. The most important were the preservation of payment levels through subsidies for biogas-generated electricity and the following:

Barrier	Measure	Responsibility	Budget	Planning
Technologically complex in view of the traditional activity of the producer of the waste	Circulate existing technologies to the areas concerned	Ministry of Agriculture, Fisheries and Food Ministry of the Environment Ministry of Industry, Tourism and Trade	Not evaluated	2005-2010

The main public aid for the development of the sector is the electricity subsidy. The subsidies to be received from 2005 to 2010 for biogas electricity-generation facilities which come on line during this period amount to 49.4 million euro and the value of subsidies linked to the new facilities (i.e. which come on line during the life of the Plan) in 2010 is 18.6 million euro.

(h) Biofuels

The application to biofuels of the zero rate of tax on hydrocarbons has been a key factor in helping the sector to take off in Spain in recent years. However, further action is needed if this new industrial sector is to develop consistently, which is why the Plan proposes the adoption of a series of measures, the most important of which are summarised in the following table:

Barrier	Measure	Responsibility	Budget	Planning
General tax exemption needed for a period of at least 10 years	Extend the current scheme of tax incentives for at least the first ten years of a project's life	Ministry of Finance	2 855 M €	2006
Need to decouple the production of the raw material from the CAP's variable compulsory set-aside percentages	Develop all the possibilities offered by the CAP, in particular as regards EU and national aid for the production of energy crops	Ministry of Agriculture, Fisheries and Food Ministry of Economics	No additional cost	2005-2010
High market price of food oils, which is more than the energy application can afford	1.- Development of logistics for collecting used vegetable oils 2.- Development and selection of new varieties of oilseeds suited to Spanish agriculture	Ministry of the Environment Ministry of Agriculture, Fisheries and Food Autonomous Regions	1.- No cost 2.-Currently being evaluated	2005-2010

In the case of the biofuels sector, the main public aid is the zero rate of tax on hydrocarbons. To achieve the objectives set by the Plan in this area, public aid for biofuels through the tax exemption totals 2 855 million euro throughout the entire 2005-2010 period.

4. THE SITUATION IN 2005 (PROVISIONAL RESULTS)

The 2005-2010 Renewable Energy Plan is the Spanish authorities' most important contribution to the promotion of renewable energy.

Renewable energy in 2005 accounted for 5.9% of total primary energy consumption. The percentage of demand covered by renewable sources fell when compared with 2004, when energy from renewable sources covered 6.4% of total primary energy consumption. This fall in the coverage of demand from renewable sources is largely the result of the significant drop in hydroelectric production, which was 40% lower than the previous year (2004).

Hydroelectric production in 2005 was less than 8% of gross electricity production. However, consumption of (non-hydro) renewable energy increased by almost 600 000 toe, an increase of 8.5% over 2004. Not including hydro, renewable energy covered 4.8% of total primary energy consumption in 2005, as opposed to 4.5% in 2004. As energy consumption in 2005 rose by 3.2%, this was only two tenths less than economic growth.

Wind production, which saw a greater increase, already meets 1.2% of total energy demand and 7% of electricity production. Electricity production at solar photovoltaic facilities also increased appreciably, although it still accounted for less than 0.1% of gross generated electricity. Altogether, in 2005 renewable energy accounted for 16.6% of gross generated electricity, a figure which, in terms of primary energy consumption, was lower than in 2004 because of low rainfall.

Although at the end of 2004, 28.4% of the objective of the previous 2000-2010 Renewable Energy Development Plan had been achieved, at the end of 2005 the figure was projected to be 34.2%.

The following headings provide the figures for each area (in some cases, the data also relate to the achievement of the objectives of the new Plan) and summarise the barriers or measures envisaged for 2006 to overcome the obstacles to greater penetration by these sources of energy in the overall balance. The following tables show the consumption of each renewable energy source in 2004 and 2005[5].

[5] It should be noted that the figures for consumption in 2004 differ slightly from those given in previous chapters of this report because the provisional data for 2004 which served as a basis for the objectives of the new Plan in mid-2005 were revised.

SITUATION IN 2005

	Unit	2004	Δ2005/2004	2005
Mini-hydro power (<10 MW)	MW	1.749	69	1.818
Hydro (10-50 MW)	MW	2.897	0	2.897
Wind	MW	8.155	1.773	9.928
Biomass	ktoe	4.137	16	4.153
	MW	344	n.d.	344
Biofuels	ktoe	228	37	265
Biogas	ktoe	253	31	284
	MW	141	17	158
Solar photovoltaic	kWp	38	20	58
Solar thermal	m^2	697.787	105.672	803.459
Solid waste	MW	189	0	189
Geothermal	ktoe	8	0	8

Source: IDAE

CONSUMPTION OF RENEWABLE ENERGY IN SPAIN, 2004-2005 (ktoe)

	2005		2004	
	ktoe	% of primary energy	ktoe	% of primary energy
Hydro	1.628	1,1%	2.714	1,9%
Wind	1.785	1,2%	1.338	0,9%
Biomass	4.152*	2,8%	4.137	2,9%
Biogas	284	0,2%	275	0,2%
Biofuels	265	0,2%	228	0,2%
Solar thermal	62	0,04%	54	0,04%
Solar photovoltaic	26	0,02%	5	0,003%
SUW	405	0,3%	395	0,3%
Geothermal	8	0,01%	8	0,01%
TOTAL	8.614	5,9%	9.154	6,4%
Consumption of primary energy	146.434		142.085	

* As the financial year 2005 is not yet closed, there is no information on new electricity generation capacity from biomass.

Source: IDAE

(a) Wind

Newly-installed wind capacity was lower in 2005 than in 2004: compared with the 1 920 new MW installed in 2004, a further 1 773 MW was installed in 2005, which gives a total wind capacity installed by the end of the year of 9 928 MW.

At the end of 2004, the wind capacity objective of the 1999 Plan had almost been exceeded. In this area, the sector's success meant that the objectives of the previous Plan had to be made more ambitious, whereas in other areas the objectives had to be revised downwards so as to be more realistic.

The number of wind farms in operation in 2005, still based on provisional data, covered 7% of gross electricity generation, compared with 0.7% in 1998. In short, wind production has increased by a factor of 15 since 1998.

Given the objectives of the new 2005-2010 Renewable Energy Plan, it can be stated that, of the 12 000 MW increase envisaged for the 2004-2010 period, 1 773 MW had already been installed in 2005. This installed capacity means that 15% of the new objective had been achieved by the end of 2005.

In order to achieve the objectives of the new Plan by 2010, the operating procedures of the electricity system need to be examined and perfected so that increasing volumes of non-manageable electricity can be integrated into the system by creating regional offices and by developing the necessary transport infrastructure.

(b) Hydroelectric

In 2005, no new power station came on line in the 10-50 MW capacity range. Since the Development Plan was adopted in 1999, only two new power stations have come on line (in 2001 and 2004) in the provinces of Valencia and León.

Although 11% of the objective had been achieved in this capacity range by the end of 2005, the new Plan adopted last year revises the objective upwards. The objective for new operational hydroelectric capacity of 10-50 MW by 2010 is 360 MW greater than operational capacity in 2004.

In the under-10 MW capacity range (mini-hydro power), approximately 40 extra MW has been added each year since the previous Plan was adopted. However, in 2005 the figure for new capacity was 69 MW, which means that 43% of the objective of the 1999 Plan had been achieved and 15% of the new, more ambitious, objective of the 2005-2010 REP.

Maintaining the rate at which small hydroelectric power stations came on line in 2005 will ensure that the new Plan's objective for 2010 is achieved. To this end, the Special Regime subsidies need to continue, as indicated in the 2005-2010 Renewable Energy Plan, which also proposes the use of hydroelectric power in public infrastructure and the most efficient use of ecological assets, as well as the removal of administrative barriers, in particular those of an environmental nature which make it difficult to get new projects up and running.

(c) Solar thermal

In 2005, the installed solar thermal collection area increased considerably from 90 000 m^2 in 2004 to 105 672 m^2 in 2005.

Given the capacity installed in 2005, only 10.3% of the target increase for 2010 envisaged in the previous Plan has been achieved, i.e. around 465 000 new m^2 installed (compared with the collection area in 1998, which serves a benchmark), out of a total of 4.5 million m^2 envisaged for the whole period.

Similarly, 2.5% of the objectives of the new Plan would appear to have been achieved in 2005. In actual fact, in order to achieve the objective of the new Plan

the solar collection area installed each year needs to increase by a factor of more than five by 2010, which would be possible if the Technical Construction Code was adopted quickly and Municipal Solar Ordinances were also adopted at a faster rate.

(d) Solar thermoelectric

The new 2005-2010 Renewable Energy Plan revised the target capacity for 2010 from 200 MW to 500 MW in the light of progress on the first PS 10 commercial power plant and on planned projects using tower and cylinder-parabolic collector technology.

The main barrier to the implementation of projects in this area, once subsidies are revised and hybridisation with natural gas accounts for 12% to 15% of the electricity produced (depending on whether a regulated tariff is chosen or offers are made to the market operator), seems to be the 200 MW limit laid down in Decree 436/2004 to maintain the economic regime envisaged, as this may delay the start of work on new large-scale projects which require a significant volume of financial resources.

(e) Solar photovoltaic

20 MW of photovoltaic capacity was installed in 2005, which involves a significant change in the scale of the new capacity installed each year. More capacity had already been installed in 2004 than in previous years, largely as a result of the new payments approved by Decree 436/2004 for photovoltaic facilities and also due to the change in the threshold for receipt of the highest subsidy, from 5 kWp (Decree 2818/98) to 100 kWp (Decree 436/2004).

In view of the new capacity installed, it can be confirmed that by the end of 2005 36% of the target increase of the previous Development Plan had been achieved. The successful results of the last two years have confirmed the need to raise the target increase for photovoltaic capacity installed by 2010. Whereas the objective of the previous Plan entailed the installation of an extra 135 MW over the 1999-2010 period, the objective of the new Plan involves an increase of 363 MW over the 2005-2010 period, until installed production capacity reaches 400 MW.

Prompt adoption of the Technical Construction Code will help to ensure that integrated photovoltaic systems are incorporated into buildings, thereby helping to achieve the objective set, as well as the objective for the installation of new solar thermal collection systems.

The extent to which the objectives of the new 2005-2010 Renewable Energy Plan have been achieved can also be calculated. In this case, the figure is only 5.6%, which shows that the rate at which new capacity comes on line must increase by 2010 so as to achieve the projections of the new Plan.

(f) Biomass

In 2005, new electricity-generation capacity from biomass appears to have been greater than the capacity which came on line in 2004. However, as this report was drawn up before the end of the year, it does not include data on new installed capacity from biomass or on the extent to which the objectives of the 2005-2010 Renewable Energy Plan have been achieved.

The new Plan, given the barriers which exist not only when the resource is produced or obtained but also when it is transformed into energy, set an objective similar to the previous Plan and appreciably lower than the objective set in 2002 by "*Planning in the electricity and gas sectors*", which raised the objective to 3 098 MW of electricity from biomass by 2010.

The barriers to the implementation of new production capacity are considerable, e.g. the existence of an alternative market for forestry or herbaceous waste, the extra cost of facilities in relation to those which use fossil fuels, and the low energy yield of plants. Overcoming these barriers will require much of the public aid envisaged in the new 2005-2010 REP in order to achieve the objective of 2 039 installed MW by 2010. This objective assumes an increase of 1 695 MW over capacity installed in 2004, 722 MW of which corresponds to co-combustion facilities for the combustion of biomass and coal in conventional power stations. The main innovation of the 2005-2010 Renewable Energy Plan in this area is the introduction of a co-combustion programme.

The 2005-2010 REP proposed legislative changes so as to enable the combustion of biomass at conventional facilities, including those approved before the end of last year. The amendment of Law 54/97 on the Electricity Sector, which was envisaged in the 2005-2010 REP so that conventional power stations which also use biomass could receive a subsidy, was incorporated into Law 24/2005 which set out reforms to boost productivity.

The major challenge of the new 2005-2010 Renewable Energy Plan is to promote biomass applications which are mainly electrical but also thermal. In short, the aim is to achieve greater penetration for efficient ways of using biomass to produce heat in the domestic and industrial sectors.

The scale of the barriers facing these applications, as well as competition with fossil fuels, have required the objective for renewable energy consumption to be revised downwards in this case from the 4 376 ktoe envisaged for 2010 to 4 070 ktoe.

Competition with other fuels is the main barrier facing biomass in thermal applications in both the domestic and industrial sectors. Particularly in the domestic sector, clean generation systems are needed to handle the fuel, as well as systems for self-lighting and automatic ash removal, those which can be remote-controlled and those which produce low noise levels. In the industrial sector, the price of conventional fuels is the variable which makes biomass less competitive, as prices are lower than those paid by domestic consumers. However, the industrial sector also needs safe and clean fuel-supply systems which make the replacement of diesels and fuel-oils by biomass a more attractive proposition.

It also needs to be borne in mind that the more limited technological development of biomass-based thermal generation equipment and the need for larger fuel-storage areas increase investment costs and thus makes it difficult to adopt these systems in the industrial sector, again when compared with conventional technologies.

(g) Biogas

The objectives of the 2000-2010 Renewable Energy Development Plan for electricity from biogas had already been considerably exceeded in 2003. In 2005, the target increase for 2010 was exceeded by 60%. Even considering the new 2005-2010 REP objectives for new electricity capacity from biogas, which were amended upwards, 18% of the target increase was, in fact, covered during the period. The new REP objective for 2010 is 235 MW, which is an increase of 94 MW when compared with the objective applicable at the end of 2004, the reference year for the new Plan.

In this sector, the possibilities for applications based on anaerobic digestion technology for the management of livestock waste need to be explored. The fact that under the Special Regime dried manure was grouped with natural gas has deterred potential investors from using this technology to treat this type of waste. The Plan's goal in this area is actually to use these technologies to treat agricultural and livestock waste, since Directive 1999/31 on the depositing of organic matter in landfills limits the scope for producing biogas from the degassing of landfills.

(h) Biofuels

The increase in the consumption of biofuels in 2005 is basically due to the fact that the EHN biodiesel plant in Caparroso, Navarre, came on stream with a production capacity of 35 000 tonnes/year. The fact that the new plant has become operational means that 53% of the previous Plan's objective has been achieved.

Also in this area, and given the considerable progress made on the initial objective, the new 2005-2010 Renewable Energy Plan proposes more ambitious objectives than those of the previous Plan in the order of 2 000 000 toe more than production in 2004, bearing in mind the need to achieve the consumption objectives of 5.75% of total petrol and diesel consumption in 2010 as set by Directive 2003/30 on the promotion of the use of biofuels.

The measures which the new Plan proposes to achieve these objectives include reducing medium-term uncertainty as regards the preservation of the favourable fiscal arrangement currently enjoyed by biofuels. Current legislation sets a deadline of December 2012 for reviewing the applicable rate which determines profitability analyses for new projects in this area and which may, in practice, act as a deterrent for new projects.

5. CONCLUSIONS

Analysis of changes in the production and consumption of renewable energy over the 1999-2004 period shows a significant increase in consumption. Especially in the case of wind energy, the increase in installed capacity has been in line with the estimates of the 2000-2010 Renewable Energy Development Plan adopted in December 1999 and the previous *Planning in the Electricity and Gas Sectors, 2002-2011*. Indeed, the high rate at which new wind farms have come on line has required the objectives for 2010 to be revised upwards.

The increase in renewable energy consumption has also been satisfactory in the case of biogas and biofuels. The results have been less favourable in other areas, although 28.4% of the target increase for renewable energy consumption by 2010 had been achieved by the end of 2004.

The positive results obtained for electricity generation from renewable sources are largely due to the stability of the payment framework for electricity from renewable sources. The system of subsidies and regulated fixed prices, which was recognised as a Special Regime for Electricity Production by Law 54/97 on the Electricity Sector and implemented by Decree 2818/98, has been fundamental in achieving 90% of the installed wind capacity objective for 2010 (or 63% of the objectives set for 2011 by *Planning in the Electricity and Gas Sectors, 2002-2011*).

Preserving the payment framework for renewable electricity is regarded as fundamental for the development of electricity-generation potential from renewable sources in Spain. Decree 436/2004, which revised the terms of Decree 2818/98, ensured that the payments received by renewable-electricity producers were more stable. The new Decree, which was adopted in March 2004, sets subsidies (for producers who sell on the open market) and regulated tariffs as a percentage of the average basic electricity tariff. This procedure enables producers to anticipate the prices they will be paid for renewable electricity and facilitates profitability analyses for new projects by reducing the risk to the promoter and thus the financial costs of the project.

Of the technologies for using renewable energy to produce electricity, mini-hydro power is progressing rather more slowly than anticipated, achieving 33.2% of the objectives for hydro capacity under 10 MW for 2010. Solar collection areas, both thermal and photovoltaic, are also being developed rather more slowly than anticipated, even though the number of facilities coming on line each year is still increasing. By 2004, solar thermal had achieved 8% of the objective for 2010. As regards solar photovoltaic, the figure by the end of 2004 was higher (21.2%). In both areas, the adoption in 2006 of the Technical Construction Code will provide a stimulus in the medium term for the inclusion of solar energy facilities in buildings. In addition, solar photovoltaic energy also received considerable impetus from Decree 436/2004, as evidenced by the provisional data for new photovoltaic capacity in operation in 2005.

The progress reports on the Renewable Energy Development Plan in Spain over the 1999-2004 period served as a basis for drawing up a new 2005-2010 Renewable Energy Plan (2005-2010 REP). The new Plan assesses the extent to which the objectives have been achieved in the various areas, the impediments to the use of renewable energy sources in Spain and the measures which can be taken to promote renewable energy.

The new Plan confirms the Spanish Government's goal of ensuring that 12% of overall energy demand will be met from renewable sources in 2010. In terms of electricity generation from renewables, renewable energy will provide more than 100 000 GWh, accounting for approximately 30.3% of gross electricity consumption in 2010 (higher than the indicative figure of 29.4% laid down by Directive 2001/77/EC). The new Plan will thus meet the objective of Directive 2003/30/EC that biofuel consumption should account for 5.75% of total petrol and diesel

consumption in 2010 (in concrete terms, the objective of the 2005-2010 REP is that biofuels should account for 5.83% of fossil-fuel consumption).

The 2005-2010 REP significantly revises the objectives for wind, solar photovoltaic and thermo-electric capacity and for biofuel production when compared with the 2000-2010 Renewable Energy Development Plan. The new Plan proposes a wide range of measures for achieving the objectives set, including the need (already mentioned above) to preserve the current payment scheme for renewable electricity, albeit with the amendments needed to guarantee economic viability, mainly of biomass facilities. In the latter area, the main innovation is the proposal for a biomass co-combustion programme at standard electricity-producing coal-fired plants. In actual fact, some of the measures included in the Plan were already implemented in 2005 so that the plants in question could receive a subsidy per kilowatt-hour transferred to the grid, within the legal framework governing electricity production (which resulted in Law 54/97 on the Electricity Sector being amended).

The renewable energy situation in 2005 can also be considered positive. The production and consumption of renewable energy other than hydro contributed around 6% (5.9% to be precise) to the overall energy balance.

Renewable energy consumption in 2005 was almost 9 million toe. The fall in hydro-power production of more than one million toe affected the final results in terms of the contribution by renewable energy to overall energy demand and gross generated electricity. However, the increase in consumption of renewable energy other than hydro partially offset the fall in hydroelectric production. Wind production, which rose more significantly, increased its contribution to the national balance by more than 400 ktoe.

The increase in non-hydro renewable energy consumption was approximately 9% in 2005, almost 6% above the 3% growth in primary energy consumption.

It may therefore be concluded that, despite the negative impact of low rainfall in recent years, renewable energy is consolidating its position and increasing its share of Spanish energy provision. The new Plan makes a firm and emphatic commitment in this connection with a view to achieving the 12% objective set for 2010.

In the course of 2006, various actions are planned with a view to achieving the Plan's objectives and to ensuring that Spanish legislation complies with EU legislation as regards the promotion of renewable energy.

One such action is the incorporation into Spanish law by means of a Real Decree (currently being drafted) of Directive 2001/77/EC concerning the creation of a system to certify the origin of renewable electricity. The Decree will designate the new body responsible for issuing guarantees as to the origin of renewable electricity. Also in the area of renewable electricity, the aim is to revise Decree 436/2004 so that it meets the requirements of the new 2005-2010 REP.

The incorporation of Directive 2002/91/EC on the Energy Performance of Buildings into Spanish legislation will also contribute to the development of renewable energy, especially solar technologies. Incorporation will be in the form of three Decrees which will approve the Technical Construction Code, revise the Regulation

on Thermal Facilities in Buildings and establish the procedure for the Energy Certification of Buildings.

In short, the Spanish Government reaffirms in this report its commitment to developing the potential of renewable energy in Spain. Its success depends on a detailed diagnosis of existing barriers and clearly defined measures to overcome them, as set out in the new 2005-2010 Renewable Energy Plan. Some of these measures (although adopted only last August) have already been implemented in recent months. By means of the tools described throughout this report, the Spanish Government therefore hopes to achieve the objective of 12% of renewable energy consumption by 2010 which the 1997 White Paper had already proposed as an indicative objective for the European Union.