LIST OF ABBREVIATIONS

ADENE – Energy Agency

APA – Portuguese Environmental Agency

ARA – Autonomous Region of the Azores

AREAM – Regional Energy and Environmental Agency of the Autonomous Region of Madeira

ARENA – Regional Energy and Environmental Agency of the Autonomous Region of the Azores

ARM – Autonomous Region of Madeira

BAU – Business as Usual

CAP – Common Agricultural Policy

CCGT – Combined Cycle Gas Turbine

CNQ – National Qualifications Catalogue

COP – Coefficient of Performance

CPV – Concentrated Photovoltaic

CSP – Concentrated Solar Power

DGEG – Directorate General for Energy and Geology

EIA – Environmental Impact Assessment

ESRE – Energy Services Regulatory Entity

FAME – Fatty Acid Methyl Ester

FdW – Fuels derived from Waste

FIT – Feed-in tariff

FPO – Forest Producers' Organisation

H&C – Heating and Cooling

ICNB – Institute for the Conservation of Nature and Biodiversity

IFAP – Institute for Financing Agriculture and Fisheries

INE – National Statistics Institute

ISP – Petrol Product Tax

LCV – Lower Calorific Value

MADRP – Ministry for Agriculture, Rural Development and Fisheries

MAOT – Ministry for the Environment and Territorial Organisation

MEID – Ministry for the Economy, Innovation and Development

MMP – Municipal Master Plans

NES – National Electricity System

NES 2020 – National Energy Strategy

NFA – National Forest Authority

NG – Natural Gas

ANQ – National Qualifications Agency

NREAP – National Renewable Energy Action Plan

PAC – Professional Aptitude Certificate

PDIRD – Distribution Network Development and Investment Plan

PDIRT – Transmission Network Development and Investment Plan

PIA – Prior Information Applications

PNAEE – National Energy Efficiency Action Plan

PROF – Regional Forest Organisation Plans

QREN – National Strategic Reference Framework

RCCTE – Regulations for the Thermal Characteristics of Buildings

REN – Redes Energéticas Nacionais, SGPS

RES – Renewable Energy Sources

RNT – National Transport Network

SCE – Energy Certification System

SEE – Strategic Environmental Evaluation

SEP – Electricity Producing System

SGCIE – Intensive Energy Consumption Management System

SPR – Special Production Regime

SUW – Solid Urban Waste

toe – Tonne oil equivalent

VAT – Value Added Tax

WWTP – Waste Water Treatment Plant

INTRODUCTION

Directive 2009/28/EC of the European Parliament and of the Council, of 23 April 2009, on the promotion of the consumption of energy from renewable sources, establishes, in Article 4, that Member States must approve and present a National Renewable Energy Action Plan (NREAP) to the European Commission by 30 June 2010.

This Action Plan defines the national targets of each Member State with regard to the share of energy from renewable sources used in the transport, electricity and heating and cooling sectors in 2020, as well as the respective trajectories for penetration in accordance with the pace of implementing the measures and actions that have been envisaged for each of these sectors. To this end, the plan must identify and describe these sectorial measures, in addition to suitable measures to achieve the overall national targets and must take into consideration the effects of other policies pertaining to energy efficiency in the context of energy use as well as measures to be implemented in order to comply with the requirements established in articles 12 to 17 of Directive 2009/28/EC.

This plan considered all pertinent contributions and explored relevant synergies, more specifically, cooperation between local, regional and national authorities, the possibility of using mechanisms to physically or statistically transfer energy, joint projects with other Member States and national policies to develop existing endogenous resources and to mobilise new endogenous resources.

Hence, these are the principles and guidelines that oriented the preparation of Portugal's National Renewable Energy Action Plan for 2020, which uses 2005 as the reference year but also, obviously, takes into consideration the policies and policy instruments that have been put into practice prior to this date and still continue to have an effect during the period when this plan is implemented.

This National Renewable Energy Action Plan was prepared and written on the basis of the Commission Decision of 30 June 2009, which provides for a template for national renewable energy action plans in the second paragraph of Article 4(1) of Directive 2009/28/EC.

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Template for the National Renewable Energy Action Plans (NREAP)

Directive 2009/28/EC of the European Parliament and of the Council, of 23 April 2009, on the promotion of the use of energy from renewable sources, provides that Member States must submit a National Renewable Energy Action Plan (NREAP) to the European Commission by 30 June 2010. This is the template for these Action Plans. According to Article 4 of Directive 2009/28/EC, the use of this template is obligatory.

The purpose of the template is to ensure that NREAPs are complete, cover all the requirements laid down in the Directive and are comparable with each other and with future Member State biannual reports on the implementation of the Directive.

When filling in the template, Member States are required to comply with the definitions, calculation rules and terminology laid down in Directive 2009/28/EC. Member States are furthermore encouraged to use the definitions, calculation rules and terminology in Regulation (EC) No 1099/2008 of the European Parliament and the Council[1].

Additional information can be provided either in the prescribed structure of the Action Plan or by including annexes.

Passages in italics aim to guide Member States in the preparation of their NREAP. Member States may delete these passages in the version of the NREAP which they submit to the Commission.

The Commission reminds Member States that all national support schemes must respect the State aid rules laid down in Articles 87 and 88 of the EC-Treaty. The notification of the NREAPs does not replace a State aid notification in accordance with Article 88(3) of the EC-Treaty.

[1] OJ L 304 of 14.11.2008, p. 1.

Summary of the National Renewable Energy Policy

CHAPTER 1

1. SUMMARY OF THE NATIONAL RENEWABLE ENERGY POLICY

Nowadays, the energy sector plays a structural, integral and fundamental role in society and in the Portuguese economy. Against this background, renewable energy sources (RES) play a prominent role in national policies for the sector, owing to their availability and their widespread and endogenous nature. In fact, all agents in the sector have unanimously recognised that there is a very significant potential for developing renewable energy in Portugal. This recognition has been reflected in the growing importance of sources of renewable energy in various sectors of activity: ranging from the transport industry to the domestic sector but, above all, in the production of electricity.

From the point of view of security of supply, for a nation like Portugal, which does not have known fossil fuel resources or reserves, renewable energy sources play an essential role in reinforcing levels of security, while simultaneously promoting the diversification of the energy mix and contributing towards enhancing the sustainability associated with the production, transmission and consumption of energy. Currently, more than 40% of the electricity produced in Portugal is based on the use of RES and around 20% of the final consumption of energy is met through renewable energy.

Portugal today has a scheme to access the electricity network which prioritises RES, both with regard to planning and developing the network as well as in relation to everyday management, by giving priority to such dispatches. Moreover, over the course of recent years, Portugal has created a series of financial and fiscal measures to support investment in renewable energy. These measures have been dynamised further with the creation of differentiated tariffs for electricity produced in renewable plants, feed-in tariffs (FIT), according to the degree of maturity of the various technologies that are available in the national market.

These measures have helped to successfully achieve the overall objectives of the national energy policy and renewable energy has become increasingly important and visible in the national strategies that recent governments have approved for the energy sector.

The recent Cabinet Resolution No. 29/2010, of 15 April, which approved the latest National Energy Strategy (NES 2020), continues to attribute a pivotal role to renewable energy in the energy strategy and the targets that have been delineated for this sector, with a very significant impact on the Portuguese economy.

NES 2020 incorporates the objectives of the energy policy established by the XVIII Government, planned for a time frame of 2020, and it seeks to maintain Portugal at the forefront of the energy revolution, namely with regard to the use of renewable energy, which, in this strategy, contributes greatly towards achieving the vast majority of these said objectives.

Thus, keeping in mind the contribution of RES, the main objectives of the national energy policy include:

- To guarantee compliance with Portugal's commitments in the context of European energy policies and policies to combat climate change, ensuring that 31% of the gross final

energy consumption, 60% of the electricity produced and 10% of the energy consumption in the road transport sector will be derived from renewable sources in 2020;

- To reduce Portugal's energy dependence on external sources, based on the consumption and importation of fossil fuels, to around 74% in 2020, by means of increasing use of endogenous energy resources (estimated reduction using a Brent reference of 80 USD/bbl);

- To reduce the balance of energy imports by 25% (around € 2 billion) with the energy produced from endogenous sources, making it possible to reduce imports by an estimated 60 million barrels of oil;

- To consolidate the industrial cluster associated with wind energy and to create new clusters associated with new technologies in the renewable energy sector, ensuring a Gross Added Value of 3.8 billion Euros and creating 100,000 new jobs in addition to the existing 35,000 jobs associated with the production of electricity from RES by 2020;

- To promote sustainable development, creating the necessary conditions to meet the commitments that Portugal has made with regard to reducing greenhouse gases, by means of a greater use of RES and energy efficiency.

In addition to these objectives, the energy policy for RES, by means of the NES 2020, likewise established a series of specific measures in order to promote compliance with these targets:

- To create, by 2012, a tariff equilibrium fund that will contribute towards minimising the variations in electricity tariffs, thus benefiting consumers and creating a framework for economic sustainability that will support a long-term growth in the use of renewable energy.

- To develop, during 2010, lines of support for investments in the field of renewable energy, within the scope of the implementation of the national strategic reference framework (QREN) and other instruments to support economic development, especially support for solar thermal energy, likewise aiming to increase exports in these areas.

- To update the microproduction programme, establishing more ambitious targets and introducing a mini-production programme aimed at projects with capacities of up to 150 kW or 250 kW, according to the technologies used.

- To approve measures to promote the production of forest biomass, so as to ensure the consumption needs that have already been installed and will be installed, by means of access to public support schemes, the promotion of certification for sustainable forest management, assessing and promoting energy crops, as well as the residual biomass resulting from agricultural and agro-industrial activities.

- To create, by the end of 2010, a permanent planning and monitoring system for demand and potential supplies of energy, so as to optimise the integrated management of available resources, improving the security of energy supplies and promoting more efficient use, along with the integration of different types of renewable energy.

- To implement the National Plan for High-Capacity Hydroelectric Dams (PNBEPH), the new hydropower initiatives that are underway and reinforce the expected capacities, making it possible to make better use of potential hydropower and facilitating the growth of wind energy, by introducing a stabilising element in the form of reversible capacity in the planned investments.

- To create the necessary conditions to introduce and popularise the use of electric vehicles on a national level, as a means of promoting the consumption of the renewable energy produced, with a view to positioning Portugal as a benchmark reference in terms of testing, developing and producing solutions for electric mobility.

The NES 2020 has been structured around 5 main axes, one of which is entirely dedicated to RES, establishing targets and strategies to develop and promote the various technologies that are part of the mix of renewable energies by 2020. This is aimed at enhancing the potential of endogenous resources and the capacity to create value, with a view to ensuring a greater diversification for the contributions of the RES.

The development of the national production of renewable energy will be based on an articulated increase in the installed hydro and wind energy capacity. This reinforcement of the hydropower capacity will have benefits in terms of optimising the management of hydrographic basins while simultaneously providing the system with the necessary speed of response to be able to cope with the variations associated with wind production. The increase of reversible hydropower capacity will also contribute towards promoting the viability of wind production during periods of lower consumption, reducing its production costs.

However, special attention will be paid during this decade to developing technologies based on the use of solar energy, both in terms of large-scale applications as well as an emphasis on mini and microproduction and systems for heating water for domestic use.

Other RES, such as biomass, biogas, biofuels, geothermal energy and wave energy will also be important in the future. Specific instruments have been envisaged to promote them and to develop the necessary technologies. Amongst these measures, it is especially important to note the implementation of the pilot zone created by Decree Law No. 5/2008, to test technologies that serve to harness wave energy, contributing towards Portugal's efforts to dynamise this technology and to promote an industrial cluster linked to maritime activities.

Similarly, the potential of hydrogen as an energy vector that has the capacity to store energy will be assessed as a means of making the large-scale use of renewable energy feasible and promoting innovative solutions in the transport sector.

EXPECTED FINAL ENERGY CONSUMPTION FOR 2010-2020

CHAPTER 2

2. EXPECTED FINAL ENERGY CONSUMPTION FOR 2010-2020

Using the year 2005 as a reference, in which there was a gross final energy consumption of 19,582 ktoe, it can be seen that this figure has declined over the course of recent years. In 2008, this consumption was 18.619 ktoe.

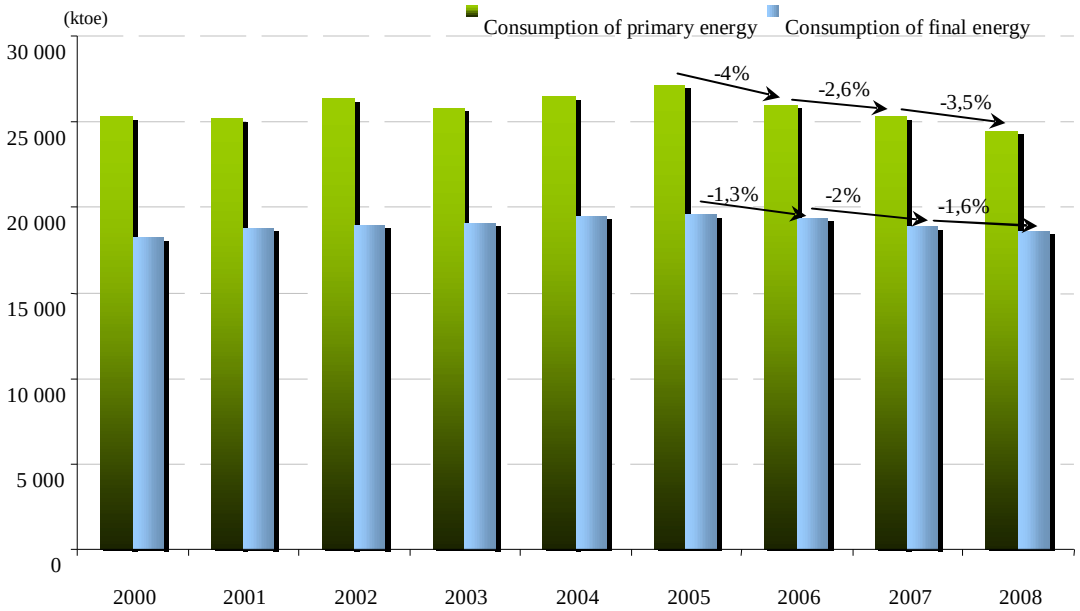

Figure 1 – Evolution of primary energy and final energy consumption

Economic growth in Portugal has been characterised by a relative stagnation up to 2010, as a result of the adverse international economic situation. Between 2010/2013 it is expected that a gradual recovery will take place, in keeping with the Stability and Growth Plan (PEC)[2]. It has been estimated that the GDP growth will exceed 2% from 2014 onwards and will reach 2.9% in 2020. In this scenario, it is possible to forecast a gross final energy consumption of 20,082 ktoe, a figure that is relatively close to the figure recorded in 2005.

The forecasting analytical study carried out in Portugal for the period between 2010 and 2020, with a special emphasis on the years 2010, 2015 and 2020, considered two macro-economic scenarios to ascertain the demand for final energy:

- Scenario A is more conservative with regard to economic growth and will be used as the basis to develop the National Renewable Energy Action Plan;
- Scenario B contemplates a greater economic growth for Portugal from 2013 onwards, reflected in the measures established in the new NES 2020, which thus assumes more

[2] Ministry for Finance and the Public Administration, 2010. Stability and Growth Programme 2010-2013. March 2010

ambitious internal targets, both with regard to demand/consumption, as well as supply/production, presenting greater installed capacities in various technologies.

Both these scenarios are based on the commitments and challenges envisaged in the PEC 2010-2013, with regard to main choices and economic growth. This is also the case with the prices of the energy products, which have been derived from the Primes energy model *"Portugal: Baseline 2009"*[3], adopted by the European Commission for analyses that seek to forecast the evolution of demand for energy and final energy consumption, as can be seen in the figure below.

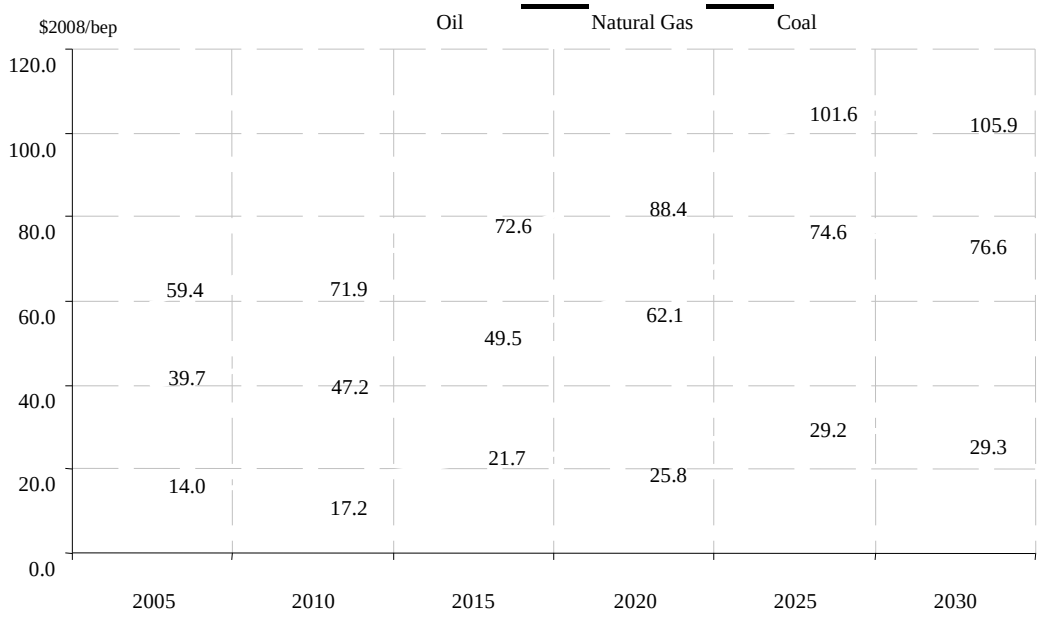

Figure 2 – Evolution of the prices of the main energy products

These two scenarios also use the same assumptions with regard to energy efficiency.

It can also be noted that both Scenario A as well as Scenario B have contemplated, in their respective reference scenarios, the impact of adopting all the energy efficiency and energy savings measures adopted until the end of 2009 (as specified by the template for the national renewable energy action plans adopted by the Commission Decision of 30 June 2009).

Thus, the measures contained in the National Energy Efficiency Action Plan (PNAEE) currently in effect (2008-2015) and an extension of their effects for the 2020 time frame, as well as the effects of introducing electric vehicles[4], have already been contemplated in the reference scenario. In the Portuguese case they already represent a significant part of the

[3] European Commission, 2010. Directorate-General for Energy and Transport. European energy and transport. Primes modelling (Baseline 2009. Primes Ver. 4 Energy Model)

[4] 200,000 vehicles were considered in this exercise, equivalent to approximately 3% of the road park. The NES 2020 introduced a more ambitious target for the penetration of electric vehicles, which is reflected in the additional energy efficiency scenario of the NREAP.

measures aimed at achieving the goal of reducing consumption by 20%, as defined at a European level.

Table 1 shows the macro-economic assumptions for the two scenarios.

Table 1 – Macro-Economic Assumptions

		2005	2010	2011	2012	2013	2014	2015	2020
Scenario A	GDP (Millions € 08)	161,076	162,919	164,386	166,523	169,354	173,068	177,719	205.31
	Rate of annual change (%)	-	0.2	0.9	1.3	1.7	2.2	2.7	2.9
	Population (Millions)	10,570	10,656						10,826
Scenario B	GDP (Millions € 08)	161,076	162,919	164,386	166,523	169,354	173,249	178,273	209,695
	Rate of annual change (%)	-	0.2	0.9	1.3	1.7	2.3	2.9	3.3
	Population (Millions)	10,570	10,656						10,826

The current economic scenario and the uncertainty regarding future evolution imply that it is essential to constantly monitor some economic variables, especially the evolution of GDP and energy consumption, so as to review and adjust the assumptions used in the forecasting models that have served as the basis for the scenarios of the NREAP. Over the course of the 10 years during which the plan will be implemented, the evolution of this scenario will determine the way in which Portugal achieves the targets that have been set for 2020, which is the ultimate objective.

The energy consumption forecasts for the two scenarios, for the time frame of 2010-2020, were calculated on the basis of the LEAP model (Long range Energy Alternatives Planning system). The results have been summarised in Table 2 (reference scenarios, without additional energy efficiency measures adopted after 2009).

Table 2 – Forecast for gross final energy consumption

Scenarios	**Energy Consumption (ktoe)**			
	2005	**2010**	**2015**	**2020**
Scenario A	19 582	18 592	19 094	20 082
Scenario B		18 592	19 800	21 700

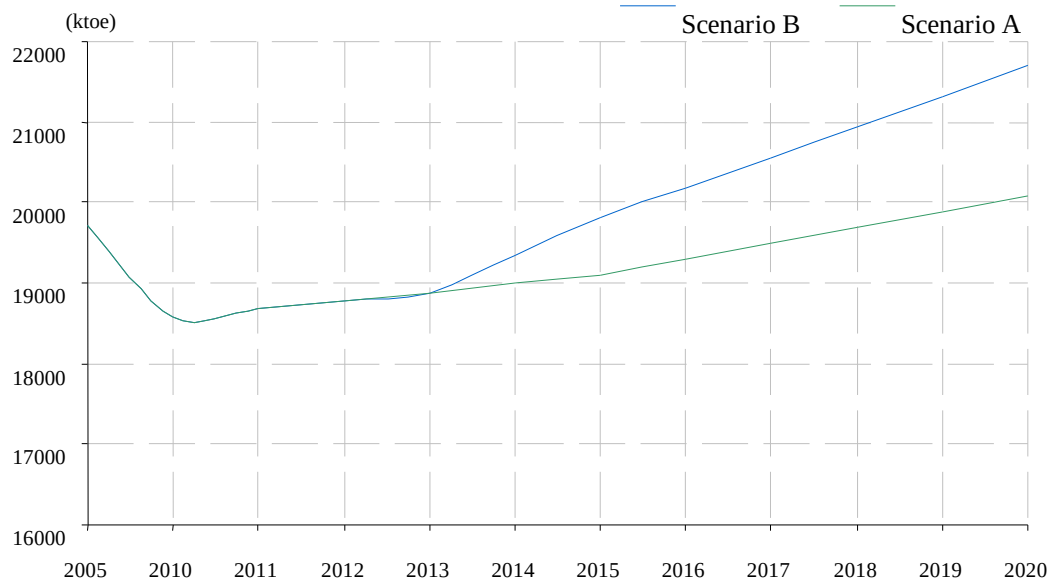

Figure 3 – Evolution of gross final energy consumption

The scenario of "additional energy efficiency" developed on the basis of a single macro-economic scenario (Scenario A), in addition to the aforesaid efficiency measures that have already been integrated into the "reference scenario", also considers the measures adopted after 2009. In particular, it contemplates the energy efficiency measures stipulated in the NES 2020, such as the development of smart grids and reinforcing the promotion of electric mobility (Mobi-E), amongst others, so as to ensure a 20% reduction in the final energy consumption by 2020 in the context of a BAU scenario.

Hence Chart 1 reflects the evolution of demand for energy based on the two scenarios (the reference scenario and the additional energy efficiency scenario), which are derived from this Scenario A.

The preparation of the NREAP and the respective results are based on the "additional energy efficiency" scenario, which incorporates all the necessary measures to entirely achieve the 20% energy efficiency target.

Chart 1 - Gross final energy consumption forecast for Portugal for heating and cooling, electricity and transport up to 2020, taking into consideration the effects of the energy efficiency and energy savings measures 2010-2020 (ktoe)

	2005	2010		2011		2012		2013		2014	
	Base year	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency
1) Heating and cooling[5]	7927	7286	7286	7370	7370	7454	7454	7538	7538	7622	7622
2) Electricity[6]	4558	4730	4730	4748	4748	4783	4783	4825	4825	4847	4847
3) Transport as in Art. 3 (4) (a)[7]	6223	6040	6040	6028	6028	6016	6016	6003	6003	5992	5992
4) Gross final energy consumption[8]	19582	18592	18592	18690	18690	18782	18782	18887	18887	18989	18989
The following calculation is needed only if final energy consumption for aviation is expected to be higher than 6.18 % (4.12 % for Malta and Cyprus):											
Final consumption in aviation	480	404	404	417	417	430	430	443	443	456	456
Reduction for aviation limit Article 5(6)[9]	0	0	0	0	0	0	0	0	0	0	0
Total consumption after reduction for aviation limit	19582	18592	18592	18690	18690	18782	18782	18887	18887	18989	18989

5 Final energy consumption of all energy commodities except electricity for purposes other than transport, plus the consumption of heat for own use at electricity and heat plants and heat losses in networks (items '2. Own use by plant' and '11. Transmission and distribution losses' of Regulation (EC) No 1099/2008 (p. 23-24).

6 The gross electricity consumption is national gross electricity production, including auto-production, plus imports, minus exports.

7 Transport consumption as defined in Article 3(4)(a) of Directive 2009/28/EC. Renewable electricity in road transport for this figure should be multiplied by a factor of 2.5, as indicated by Article 3(4)(c) of Directive 2009/28/EC.

8 As defined in Article (2)(f) of Directive 2009/28/EC. This comprises final energy consumption plus network losses and own use of heat and electricity at electricity and heating plants (NB: this does not include consumption of electricity for pumped hydro storage or for transformation in electrical boilers or heat pumps at district heating plants).

9 See Annex I

	2015		2016		2017		2018		2019		2020	
	Base year	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario	Base year	Reference scenario	Additional energy efficiency	Reference scenario	Additional energy efficiency	Reference scenario
1) Heating and cooling[10]	7706	7706	7839	7807	7972	7906	8105	8004	8238	8101	8371	8197
2) Electricity[11]	5076	5076	5201	5169	5327	5262	5593	5491	5655	5518	5721	5547
3) Transport as in Art. 3 (4) (a)[12]	5980	5980	5986	5932	5990	5884	5996	5836	6002	5789	6010	5743
4) Gross final energy consumption[13]	19094	19094	19293	19175	19490	19252	19680	19318	19879	19392	20082	**19467**
The following calculation is needed only if final energy consumption for aviation is expected to be higher than 6.18 % (4.12 % for Malta and Cyprus):												
Final consumption in aviation	469	469	478	478	488	488	498	498	508	508	517	517
Reduction for aviation limit Article 5(6)[14]	0	0	0	0	0	0	0	0	0	0	0	0
Total consumption after reduction for aviation limit	19094	19094	19293	19175	19490	19252	19680	19318	19879	19392	20082	**19467**

10 See footnote 5.
11 See footnote 6.
12 See footnote 7.
13 See footnote 8.
14 See footnote 9.

RENEWABLE ENERGY TARGETS AND TRAJECTORIES

CHAPTER 3

3. RENEWABLE ENERGY TARGETS AND TRAJECTORIES

3.1. National overall targets

The Directive established a target of 31% for Portugal as the share of renewable energy in the nation's gross final energy consumption, to be achieved by 2020, which implies an increase of 11.3% as compared to the figure recorded in the base year of 2005, which was 19.8%[15].

According to the latest data available, in 2008 Portugal achieved 23.1% and is expected to achieve approximately 24.1% in 2010, as can be seen in figure 4.

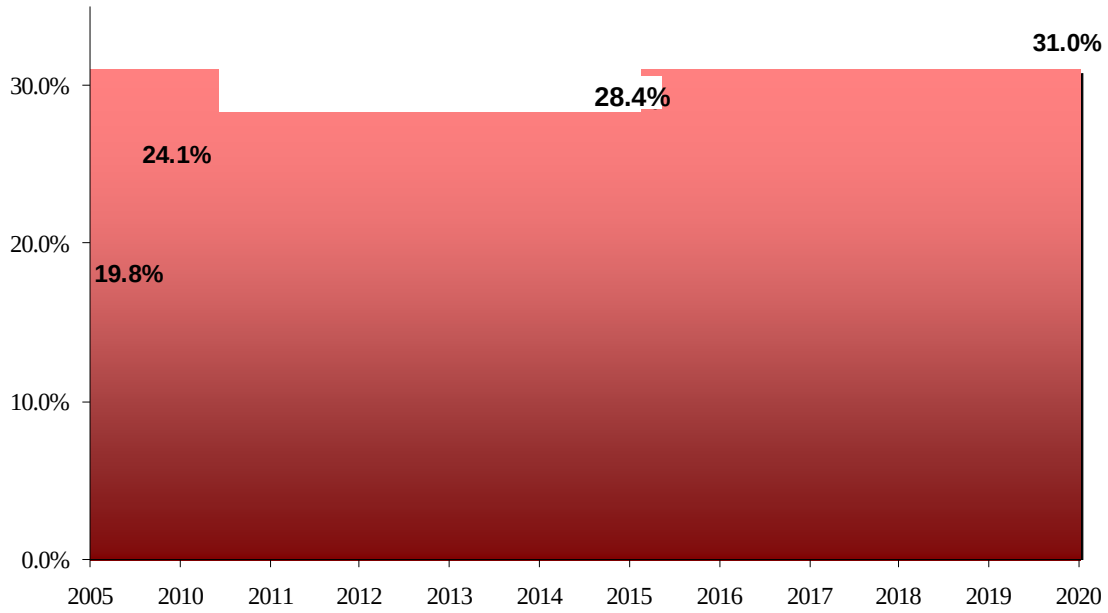

Figure 4 – Evolution of estimated energy derived from renewable sources in the gross final energy consumption

Table 3 provides a summary of the overall targets that Portugal has committed to achieving in 2020.

[15] The change in the value of the share of renewable energy in gross final energy consumption, as compared to the figure published in Annex I of Directive 2009/28/EC, of 23 April, is due to changes to the calculation methodologies that have since been agreed upon. This figure was determined according to the latest version of the Eurostat template.

Chart 2 – National overall target for the share of energy from renewable sources in gross final energy consumption in 2005 and 2020 [figures to be transcribed from Annex I, Part A of Directive 2009/28/EC):

A) Share of energy from renewable sources in gross final energy consumption in 2005 (S2005) (%)	**19.8**
B) Target of energy from renewable sources in gross final energy consumption in 2020 (S2020) (%)	**31.0**
C) Expected total adjusted energy consumption in 2020 (from Chart 1, last cell) (ktoe)	**19,467**
D) Expected amount of energy from renewable sources corresponding to the 2020 target (calculated as B x C) (ktoe)	**6,035**

3.2. Sectorial targets and trajectories

In sectorial terms, Portugal aims to achieve a share of 10% of renewable energy in the transport sector, 30.6% in the heating and cooling sector and 60% in the electricity sector. However, for the purposes of the NREAP, the share in the electricity sector will correspond to 55.3%, since it is necessary to account for pumped production in the gross final energy consumption as per the methodology defined by the Directive.

According to data for the reference year, 2005, in the transport sector the contribution of renewable sources of energy was 0.2%, practically negligible. In the electricity sector this contribution was 29.3%, while in the heating and cooling sector it was 31.9%.

The heating and cooling sector is a unique case, since an increase in the contribution of RES has not been planned during the period in question (2005-2020). This fact can be explained, essentially, by a combination of 3 factors:

- An expected reduction in the role played by firewood in the domestic sector (this figure will be confirmed by means of a survey to be carried out with the National Statistics Institute during 2011), owing to the growing introduction of natural gas in this sector. As a result, a decline of 1% per year in the consumption of firewood has been assumed between 2010 and 2020;

- A gradual increase in the contribution of other heating and cooling technologies, especially solar thermal energy, in keeping with the forecasts of the PNAEE up to 2020, which will also have some impact in terms of substituting the consumption of firewood;

- The substitution of low-yield technologies (open fireplaces have a yield of approximately 10%) by technologies that offer far superior yields (heat recuperators, pellet boilers and even solar panels generally have yields of over 60%), which will reduce the final consumption of firewood.

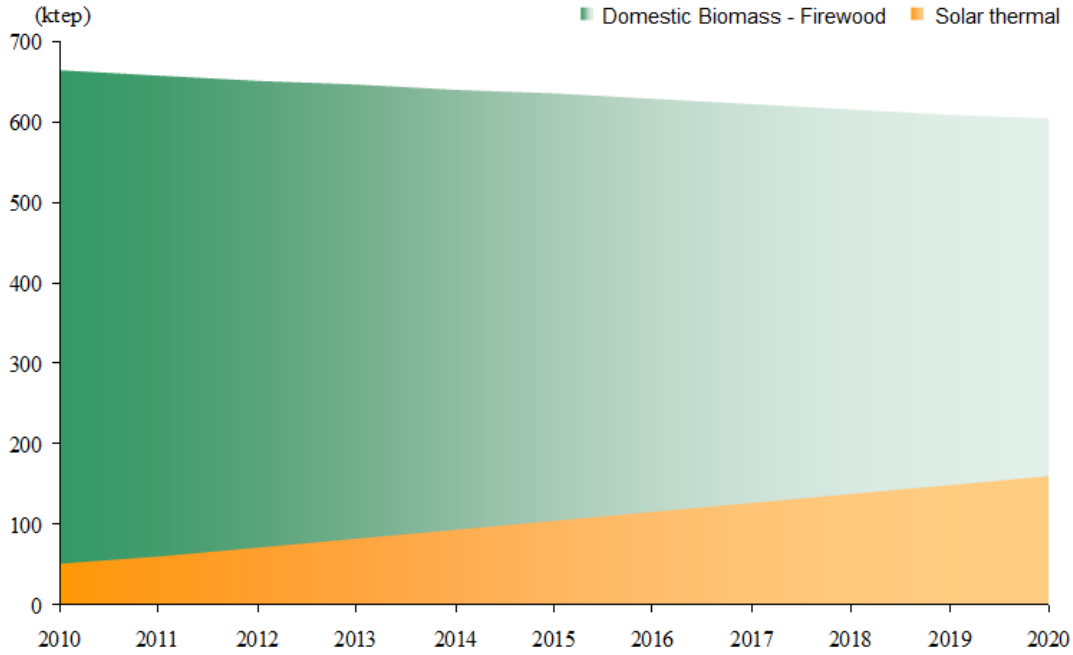

Figure 5 – Expected evolution of solar thermal and biomass (firewood) energy

Figure 6 shows the evolution of the contribution of RES in the various sectors encompassed by Directive 2009/28/CE, for the years 2005, 2010, 2015 and 2020

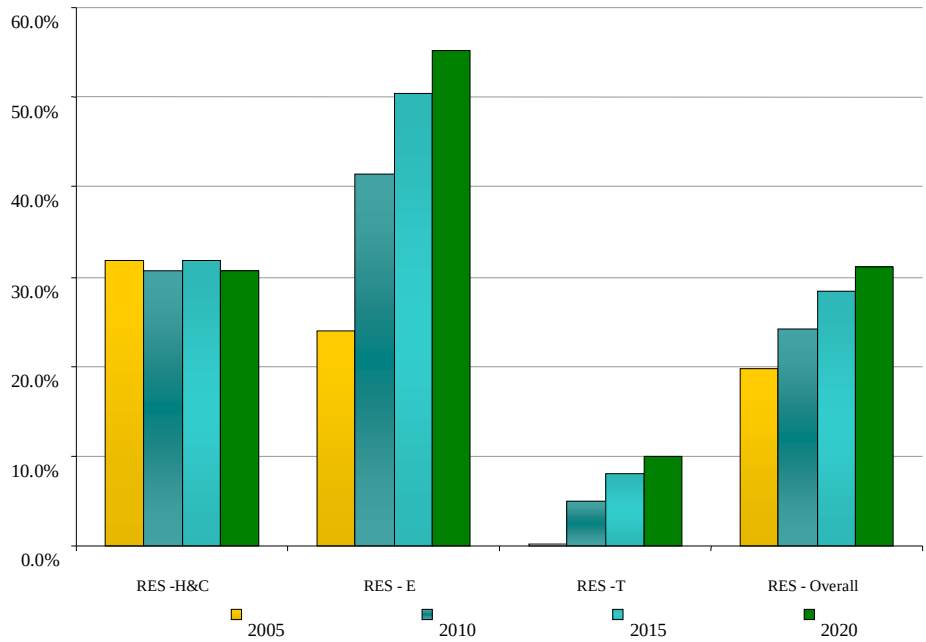

Figure 6 – Evolution of the estimated trajectory of energy from renewable sources in the heating and cooling, electricity and transport sectors

Chart 3 shows the estimated evolution of the incorporation of renewable energy in the different sectors.

Chart 3 – National 2020 target and estimated trajectory of energy from renewable sources in the heating and cooling, electricity and transport sectors

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
RES-H&C[16] (%)	31.9%	30.7%	31.7%	32.7%	32.4%	32.2%	31.9%	31.6%	31.3%	31.1%	30.8%	**30.6%**
RES-E[17] (%)	29.3%	41.4%	44.2%	48.8%	49.3%	50.4%	50.5%	51.0%	52.5%	54.2%	54.4%	**55.3%**
RES-T[18] (%)	0.19%	5.0%	5.1%	5.3%	5.7%	5.9%	8.0%	8.2%	9.0%	9.3%	9.7%	**10.0%**
Overall RES share[19] (%)	19.8%	24.1%	25.2%	26.9%	27.1%	27.4%	28.4%	28.9%	29.7%	30.6%	30.8%	**31.0%**
Of which from cooperation mechanism (%)		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Surplus for cooperation mechanism (%)		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
As Part B of Annex I to the Directive	2005		2011-2012		2013-2014		2015-2016		2017-2018			2020
	S_{2005}		S_{2005}+**20%** (S_{2020}-S_{2005})		S2005 +**30%** (S_{2020}-S_{2005})		S2005 + **45%** (S_{2020}-S_{2005})		S2005 +**65%** (S_{2020}-S_{2005})			S_{2020}
RES minimum trajectory (%)	19.8%		22%		23.1%		24.8%		27.1%			31.0%
RES minimum trajectory (ktoe)	3865		4299		4516		4842		5276			6035

16 Share of renewable energy in heating and cooling: gross final energy consumption from renewable sources for heating and cooling (as defined in Articles 5(1)b) and 5(4) of Directive 2009/28/EC) divided by gross final energy consumption for heating and cooling. Line (A) from Chart 3a divided by line (1) of Chart 1.

17 Share of renewable energy in electricity: gross final consumption of electricity from renewable sources for electricity (as defined in Articles 5(1)(a) and 5(3) of Directive 2009/28/EC) divided by total gross final consumption of electricity. Row (B) from Chart 3a divided by row (2) of Chart 1.

18 Share of renewable energy in transport: final energy from renewable sources consumed in transport (cf. Article 5(1)(c) and 5(5) of Directive 2009/28/EC) divided by the consumption in transport of 1) petrol; 2) diesel; 3) biofuels used in road and rail transport and 4) electricity in land transport (as reflected in row 3 of Chart 1). Line (J) from Chart 3b divided by row (3) of Chart 1.

19 Share of renewable energy in gross final energy consumption. Row (G) from Chart 3a divided by row (4) of Chart 1.

Chart 3a – Calculation table for the renewable energy contribution of each sector to final energy consumption (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
A) Expected gross final consumption of RES for heating and cooling	2529	2240	2338	2438	2445	2453	2462	2470	2478	2488	2497	2507
B) Expected gross final consumption of electricity from RES	1337	1956	2098	2333	2370	2439	2531	2631	2779	2956	2993	3060
C) Expected final consumption of energy from RES in transport	12	301	306	310	336	342	466	471	509	516	528	535
D) Expected total RES consumption[20]	**3866**	**4476**	**4719**	**5054**	**5122**	**5200**	**5421**	**5533**	**5724**	**5913**	**5966**	**6044**
E) Expected transfer of RES to other Member States		0	0	0	0	0	0	0	0	0	0	0
F) Expected transfer of RES from other Member States and third countries		0	0	0	0	0	0	0	0	0	0	0
(G) Expected RES consumption adjusted for target (D)-(E)+(F)	3866	4476	4719	5054	5122	5200	5421	5533	5724	5913	5966	6044

[20] According to Article 5(1) of Directive 2009/28/EC gas, electricity and hydrogen from renewable energy sources shall only be considered once. No double counting is allowed.

Chart 3b – Calculation table for the renewable energy in transport share (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
C) Expected RES consumption in transport [21]	12	301	306	310	336	342	466	471	509	516	528	535
H) Expected RES electricity in road transport [22]	0	0	0	1	2	3	5	7	9	12	16	20
I) Expected consumption of biofuels from wastes, residues[23], in transport[24]	0	4	4	5	5	6	6	6	7	7	8	8
(J) Expected RES contribution to transport for the RES-T target: (C) + (2.5-1) x (H) + (2 - 1) x (I)	12	305	310	316	343	353	479	487	529	541	560	574

21 Containing all RES used in transport including electricity, hydrogen and gas from renewable energy sources, and excluding biofuels that do not comply with the sustainability criteria (cf. Article 5(1) last subparagraph. The values indicated here are real values, they do not use multiplication factors.

22 Specify here actual values without using the multiplication factors.

23 Wastes, non-food cellulosic and lingo-cellulosic material

24 Specify here actual values without using the multiplication factors.

MEASURES FOR ACHIEVING THE TARGETS

CHAPTER 4

4. MEASURES FOR ACHIEVING THE TARGETS

The new measures of the NREAP

Table 3 – Overview of the new NREAP measures

Sector	Description	Expected Result/ Impact	Key dates	Reference
Electricity: Planning	Create a planning and permanent monitoring system for the potential demand and supply of energy	Optimisation of the planning and integrated management of demand and supply of energy on a national level, improving the security of energy supplies and promoting a more efficient use of the different forms of energy.	2010-2011	NREAP
Electricity: Planning	Align the MMP with the energy strategy, working together with the local administration and the municipalities. Introduce, within the scope of the revision of the MMPs, criteria for developing renewable energy.	Identify and quantify the potential that exists on a regional and local level for locating energy projects within the national territory. Improve the articulation between national and regional energy strategies.	2011-2012	NREAP
Electricity: Licensing	Reinforce the position of the DGEG as the interlocutor in licensing processes, by implementing a single counter, coordinating the interaction between the various actors involved	Create a single counter for licensing processes (DGEG). Facilitate the conclusion of licensing processes and information on these processes	2010-2011	NREAP
Electricity: Licensing	Consider the possibility of creating the figure of "project manager", responsible for a portfolio of projects in the licensing process	Identify the "*focal point*" responsible for accompanying the licensing process and for information for promoters	2011	NREAP
Electricity: Licensing	Create an electronic platform to accompany the evolution of each licensing process	Facilitate the conclusion of licensing processes and information on these processes	2011	NREAP
Electricity: Licensing	Create a working group with a view to harmonising and concentrating scattered legislation, with a view to simplifying administrative procedures and simultaneously creating a DGEG database with a search engine that brings together the various applicable documents.	Facilitate access to and consultations of legislation in the electricity sector	2011	NREAP

Electricity: All RES	Ensure that the capacity attributed to the various technologies to date (hydro, wind, biomass and others) is effectively installed	The capacity attributed to date by PIA and/ or tenders must be installed within the time frames that have been defined and intense efforts must be made to follow-up and check the implementation of contracts.	2010 onwards	NES 2020
Sector	**Description**	**Expected Result/Impact**	**Key dates**	**Reference**
Electricity: General	Create, by 2012, a tariff equilibrium fund that contributes towards minimising the variations of electricity tariffs.	Contribute towards minimising the variations in the electricity tariffs, benefiting consumers and creating a framework for economic sustainability that supports the long-term growth of the use of renewable energy. The fund's revenues will be partially derived from the revenues obtained by selling CO2 emissions licences to be acquired by the electricity sector, with caps on the remuneration of hydro plants during years of law hydraulic resources and high prices, amongst others.	2011-2012	NES 2020
Electricity: Microproduction	Review DL 363/2007 for Microproduction: Incentives for microproduction (units up to 3.68 kW subsidised regime and up to 5 kW general regime)	Improve the functioning and the supply capacity for the Immediate Renewables programme, with a view to installing, by 2020, a capacity of 250 MW in microproduction units.	2010	DL 363/2007 NES 2020
Electricity: Miniproduction	Create a new miniproduction programme, aimed essentially at the services sector (schools, public buildings and markets) and industrial sector, for a new range of capacities up to 250 kW	Increase the supply of electricity produced from intermediate capacity plants, up to 250 kW, with the possibility of delivering the entire production to the network, in low and medium voltage, with a view to installing approximately 500 MW by 2020. Just like the microproduction regime, applications for a reception point and the licensing process will be dematerialised and will now be done through an online platform, with a view to simplifying the licensing procedure.	2010	NES 2020
Electricity: Hydel Miniproduction	Consider a simplified regime in the short term for attributing connection points for hydro plants installed in water supply systems, waste water systems and irrigation canals, making use of the kinetic energy resulting from the transportation of water.	Increase the supply of electricity produced from small and medium capacity intermediary facilities, by simplifying the licensing process, since the applicants will be the owners of the system.	2010-2011	NREAP
Electricity: Mini-hydel plants	Define a plan for mini-hydel plants to make use of the existing potential	Promote the development of the mini-hydel segment so as to comply with the targets established in the NES 2020 and to make use of the existing potential	2010/2011	NES 2020 NREAP

Electricity: Large hydel plants	Implement the National Plan for High-Capacity Hydroelectric Dams (PNBEPH), the new hydel enterprises that are underway and reinforce the planned capacity	Use hydro capacity better and promote the viability of the growth of wind energy by introducing a stabilising element in the form of reversible capacity in scheduled investments so as to integrate the intermittent supply associated with wind production into the electricity system. The objective is to double the capacity that is currently installed – 4274 MW more, of which, almost 3300 MW in reversible capacity.	2010-2019	PNBEPH
Electricity: Wind	Launch new administrative procedure to attribute reception points and capacity for wind parks.	Achieve an installed capacity of wind energy by 2015 of over 6000 MW and approximately 6800 MW in 2020, in articulation with the installation of new reversible hydro capacity to absorb the off-peak consumption of wind energy.	2011-2015	NREAP

Sector	**Description**	**Expected Result/Impact**	**Key dates**	**Reference**
Electricity: Solar	Prepare plans to attribute capacity (tenders or other administrative procedures) to CSP and CPV solar plants	Ensure the attribution of capacity according to the security needs of the electricity system and the evolution of technology costs, so as to achieve the target defined for 2020.	2010-2011	NES 2020 NREAP
Electricity: Wave	Promote an industrial cluster linked to maritime activities, by means of various initiatives such as the creation and activation of the pilot zone	Achieve 250 MW of installed capacity by 2020	2010-2012	NES 2020
Electricity: Wave	Prepare electricity infrastructure in the pilot zone of S. Pedro de Moel, granted to REN, to install trial projects for ocean energy, especially wave energy.	Create conditions for network connections for future promoters of wave energy projects, with a view to installing a capacity of over 50 MW in 2015 and 250 MW by 2020.	2011-2012	NES 2020 NREAP
Electricity: Biomass	Define incentives for dedicated forest biomass plants within the scope of a framework linked to certain conditions, by means of voluntary agreements with the promoters of such plants.	Design a framework of commitments with the promoters of biomass plants so as to enable projects, linking the promoters to measures to support the forest policy, organisation of a logistical chain, added local economic value and social responsibility as well as compliance with the construction periods for implementing the projects;	2010	NREAP
Electricity: Geothermal	Profile the national territory in terms of deep geothermal resources.	Assess the potential of this resource, Prepare an important tool to select the most suitable sites for installing EGS projects.	2011	NREAP
Heating & Cooling: Biogas	Regulate the necessary specifications for injecting biomethane biogas into the NG network GN.	Enable the use of biogas/ biomethane for other purposes in addition to the production of electricity.	2010-2011	NREAP

Heating & Cooling: Biomass	Promote the use of more efficient equipment for using biomass, with low particulate emissions	Promote the use of biomass for residential heating	2010-2011	NES 2020
Heating & Cooling: Biomass	Promote the domestic consumption of pellets by the domestic acquisition/ substitution of boilers to pellets.	Promote the use of biomass for residential heating	2010-2011	NES 2020
Transport: Electric Mobility	Create the necessary conditions to introduce and proliferate the use of electric vehicles on a national level.	Position Portugal as a reference nation in relation to testing, developing and producing electric mobility solutions, with a view to substituting approximately 10 % of the fuels currently consumed in the road transport sector by electricity.	2010 onwards	NES 2020
Sector	**Description**	**Expected Result/ Impact**	**Key dates**	**Reference**
Transport: Electric Mobility	Implement the MOBI.E Programme to promote electric vehicles	Introduce electric vehicles as an alternative to road transport modes. Develop a pilot network that encompasses 25 municipalities and 50 quick charging stations and 1300 slow charging stations.	2010-2012	NES 2020
Transport: Biofuels	Transpose and implement in Portugal the directives and best practices pertaining to biofuels. Define a model for biofuels after 2010.	Ensure the sustainable production of biofuels with a 2020 timeframe, respecting the sustainability criteria and quality standards defined by the EU, as well as ensure compliance with the RES target for the transport sector.	2010	NES 2020
Transport: Biofuels	Promote the use of endogenous resources to produce biofuels, with closer links with national agriculture and solutions linked to second generation biofuels.	Increase the use of endogenous resources in the production of biofuels and encourage the production of biofuels produced from waste, residues, non-food cellulosic and lingo-cellulosic material.	2010-2011	NES 2020
Transport: Biofuels	Create a new entity certifying the introduction of biofuels	A certification process must be created and implemented, within the alternative models envisaged in the Directive.	2011	NREAP
General: Biomass	Dynamise the Biomass Energy Centre	Create a centre for research, certification and the overall coordination of the biomass sector, articulating the efforts of the MEID, the MADRP and the MAO, keeping in mind the scientific and technological capacity that already exists in research centres and the promoters/ companies in this sector. Growth of the sustainable use of biomass.	2010-2011	NES 2020
General: Biomass	Create intermediate parks to collect and chip biomass and install intermediate storage platforms for biomass.	Increase the sustainability of forest biomass supplies, promote regional development and the creation of stable jobs in the regions where there is biomass and where the parks will be located.	2010-2011	NES 2020

General: Biomass	Increase forestation throughout the national territory. Permanent use of the forest fund to promote investments for forestation in the country.	Optimise the management of the forest chain and increase the production of biomass in a sustainable manner.	2010 onwards	NREAP
General: Biomass	Promote the cultivation of energy crops in lands that cannot be used for other agricultural purposes.	Optimise the management of the forest chain and increase the production of biomass in a sustainable manner.	2011 onwards	NREAP
General: Biomass	Introduce a monitoring and inspections system for a suitable use of raw materials.	Ensure the sustainability of the biomass used, as well as the commitments assumed for the production of electricity.	2010-2011	NREAP
General: Biomass	Conceive mechanisms to regulate the market.	Resolve possible imbalances and distortions in the price formations for supplies of raw materials	2010-2011	NREAP
Sector	**Description**	**Expected Result/Impact**	**Key Dates**	**Reference**
General: Biomass	Launch co-funding programmes for room heating and hot water equipment by using heat recuperators and biomass fuelled boilers.	Promote the introduction and use of small biomass equipment for heating rooms and hot water in the domestic sectors and public and similar services (municipal facilities, schools, social solidarity institutions…)	2010	NREAP
General: Biomass	Launch a programme to support the promotion of certification of sustainable forest management.	Ensure the sustainable management of forestry resources and prevent the use of this resource for energy purposes from clashing with existing industry.	2010-2011	NES 2020
General: Biomass	Monitor and audit the types of forest biomass used in energy projects. Activate the biomass observatory.	Ensure the sustainable management of forestry resources. Monitor the impact of using biomass on Portuguese forests and in the industrial sectors that use timber and biomass.	2011 onwards	NREAP
General: Geothermal	Promote pilot projects in the area of scientific research and assess the potential for using high enthalpy geothermal systems to generate electricity and low enthalpy geothermal systems to use the energy associated with aquifers (energy hydrogeology) or in geological formations	Promote the use of geothermal energy	2011-2012	NES 2020
General: Buildings	Review the horizontal property rules pertaining to condominium relations	Facilitate conditions so that individuals can install solar collectors, micro units and energy miniproduction, or other equipment and energy efficient solutions in the common areas of existing buildings.	2010-2011	NREAP

General: Buildings	Review the legislation for the Energy Certification and Interior Air Quality of Buildings.	Promote the integration of renewable energy into buildings.	2010-2011	NREAP
General: Iberian centre	Create and inaugurate the Iberian centre for Renewable Energy and Energy Efficiency (CIEREE) at Badajoz.	Contribute towards affirming the national cluster of renewable energy and towards technological research and Iberian cooperation in the areas of energy efficiency and RES.	2010-2012	NES 2020
General: Biomethane	Assess the potential for biomethane in Portugal and its alternative uses.	Carry out a study on the potential for biomethane in Portugal and its alternative uses from a technical and economic point of view, considering international best practices.	2010-2011	NREAP
Sector	**Description**	**Expected Results/Impact**	**Key Dates**	**Reference**
General: Fiscal	Create task-forces or a working group to review the fiscal framework in the energy sector with a view to correcting some asymmetries that currently exist.	Promote the use of RES and energy efficiency, in line with the objectives of the NES 2020 and this Plan.	2010-2012	NREAP
General: Hydrogen	Prepare the hydrogen trajectory	Identify the potential for hydrogen and define the trajectory for the respective development and use	2010-2011	NES 2020
General: Intelligent Cities	Implement a pilot experiment in the city of Évora as a smart city	Promote the integrated management of the decentralised production of energy, the intelligent charging of electric vehicles and the intelligent management of consumption, using intelligent meters, and a more efficient management of network operations.	2010-2011	NES 2020

4.1. Overview of all policies and measures to promote the use of energy from renewable sources

Chart 1- Overview of all policies and measures

Overview of the specific policies and measures for the Heating & Cooling sector

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
Law 10/2009	Solar Thermal programme 2009 (residential+IPSS+ADUP)	Financial	Installation of 225,000 m^2 of solar thermal panels in target sectors and a production of 54 MWh of renewable energy	End user (homes and institutions)	E	2009	
	Publicity campaign for the 2009 Solar Thermal Programme using outdoor advertising, radio, television and the printed media	Promotion campaign	Promotion of solar thermal energy in Portugal	End user	E	2009	
RCM 80/2008	**Green Heat**: Installation of heat recuperators fuelled by biomass, biomass microgeneration or heat pumps (COP>=4).	Financial	6,247 toe in 2010 and 16,020 in 2015	End user (Residential and Services)	P	2010	
	Solar Thermal – "Renew Solar Thermal" Programme: Programme of incentives for installing new solar thermal equipment. Obligatory to install solar thermal systems in new buildings. Publicity campaigns.	Regulatory	Residential: 5.446 toe in 2010 e 1.844 toe in 2015 Services: 4.236 toe in 2010 e 12.180 toe in 2015	End user (Residential and Services)	E	2007	
	Solar Thermal – Swimming Pools: Installation of Solar Thermal Systems for hot water in swimming pools and changing rooms	Financial/ Voluntary	2,301 toe in 2010 and 6,138 toe in 2015	State (Buildings)	E	2008	
	Solar Thermal – Sports Complexes: Installation of Solar Thermal Systems for hot water.						
RCM 104/2006	Adoption of new regulations: RCCTE and RSECE (Decree Law Nos. 79/2006 and 80/2006)	Regulatory	Increase in the thermal efficiency of new buildings by 40%	End user	E	2007	
	Solar Hot Water for Portugal Programme	Promotion Campaign	2005 - 2006: 13,000 m^2/ano 2007 -2020: installation of 100,000 m^2/ano	End user	E	2003	2006

Overview of the specific policies and measures for the electricity sector

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
DL 51/2010	Making capacity viable by means of additional equipment	Regulatory	400 MW to upgrade wind equipment	Producer of Renewable Energy	E	2010	
RAM	Reversible plant in Calheta - Madeira	Financial	Increase in the penetration capacity of wind energy and an increase in the strategic reserves of water in Madeira.	Producer of Renewable Energy	P	2011	
RCM 80/2008	Microproduction: Incentives for microproduction (plants up to 3.68 kW subsidised regime and up to 5 kW general regime)	Regulatory/ Financial	2010: 62 MW e 8 793 toe 2015: 165 MW e 23 447 toe	End user (Residential)	E	2007	
	Microproduction in schools: Installation of Electricity Microproduction Systems in public schools	Financial/ Voluntary	2010: 5.6 MW e 605 toe 2015: 15 MW e 1 613 toe	State (Buildings)	E	2008	
RCM 1/2008	Reinforced capacity for the existing hydroelectric infrastructure (Picote, Bemposta and Alqueva).	Financial	575 MW of installed capacity (hydro-energy)	Producer of Renewable Energy	E	2007	2011
	Investments in hydroelectricity with pumping, important to ensure complementarity with wind resources	Financial	Construction of ten new dams. Installed capacity of **1100 MW** and an annual estimated production of 1630 GWh, which also includes the upgrade of eight pre-existing dams.	Producer of Renewable Energy	E	2008	
	National Strategic Plan for investments in hydro initiatives to be implemented between 2007-2020. Approval of the National Programme for High-Capacity Hydroelectric Dams (PNBEPH).	Voluntary		Producer of Renewable Energy	E	2007	
	Construction of the Photovoltaic Plant in Amareleja	Financial	Installation of 46.41 MW, with an annual estimated production of 90 GWh/year, equivalent to the consumption of 30,000 homes	Producer of Renewable Energy	E	2006	2008
	Substitution of coal in the thermoelectric plants in Sines and Pego by biomass or fuel derived from waste (FdR).[25]	Regulatory	Substitution of 5% to 10% of the coal in the thermoelectric plants in Sines and Pego	Sines and Pego Plants	E	2010	

[25] PNAC Measure. The opportunity of this measure is being considered.

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
DL 5/2008	Creation of a pilot zone (São Pedro de Moel): Legal system to access and engage in activities to produce electricity based on wave energy.	Regulatory	250 MW of exploratory capacity	Producer of Renewable Energy	E	2008	
RAM	Installation of 3 photovoltaic plants in the Autonomous Region of Madeira along with an integrated biomass plant (biogas, forest and animal waste)	Regulatory	17 MW of total capacity in PV (2 MW on the island of Porto Santo and 6 + 9 MW on the island of Madeira) and 8 MW in Biomass	Producer of Renewable Energy	E	2009	
DL 225/2007	Special tariffs for electricity produced from renewable energy sources	Regulatory	Increase in electricity produced from RES.	PRE	E	2007	
DGEG Orders	Creation of a decentralised network of biomass plants (~15 new plants)	Regulatory	100 MW of installed capacity	Producer of Renewable Energy	E	2006	2014
MEID Order	Issue a tender for up to 1,800 MW of wind capacity	Regulatory	1,800 MW of installed capacity	Producer of Renewable Energy	E	2005	2008
RCM 169/2005	Intensification and diversification of the use of all sources of renewable energy to produce electricity, especially hydro and wind energy.	Voluntary	By 2010, 39% of final electricity will be derived from renewable energy.	Producer of Renewable Energy	E	2006	2010
RCM 169/2005	Clarification and streamlining of the administrative licensing mechanisms, especially those that serve as an interface between the economy and the environment.	Voluntary	Reducing the licensing time frames	Licensing Entities	E	2007	

Overview of the specific policies and measures for the transport sector

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
DL 39/2010	Establish a universal and equitable regime for accessing electric mobility services.	Regulatory	Ensure that all users can access the different vendors of electric mobility throughout the integrated network of charging stations, and the existence of technical conditions for interoperability between this network and the diverse brands and charging systems.	End user	E	2010	
	Electric mobility programme. Legal framework to create a national network of charging stations.	Regulatory	Ensure charging for the batteries of electric vehicles by means of an integrated, comfortable and effective charging network. Create a pilot network for electric mobility, on a national scale and encompass 25 cities: **2010**: 300 slow charge stations and 20 quick charge stations **2011**: 1,300 slow charge stations and 50 quick charge stations	End user/Municipalities	E	2010	
DL 39/2010 and Order 468/2010	Subsidy of € 5000, for private individuals to purchase electric automobile vehicles, which could reach € 6500, in case there is a simultaneous junking of an internal combustion engine vehicle, subject to the conditions in effect regarding the junking of vehicles.	Regulatory/Financial	Encourage the acquisition and use of electric vehicles.	End user	E	2010	
DL 49/2009	Obligatory to incorporate biofuels in road diesel. Payment of compensation by entities obliged to incorporate biofuels in diesel for not obtaining the necessary certificates.	Regulatory	2009 - 6% and 2010 - 10% (v/v). The non-alteration or substitution by a new norm, of European norm EN590 applicable to road diesel, implies the revision of these incorporation targets.	Entities responsible for introducing road diesel in consumption	E	2009	2010
DL 89/2008	Create specification that make it possible to sell fuels with higher incorporations of biofuels than those specified in prevailing norms, with maximum levels of 20 % from 2008 onwards, for vehicles that are compatible with these specifications.	Regulatory	Increase in the consumption of biofuels	Entities responsible for introducing road diesel in consumption / Vendors of fuels	P		
	Establish a minimum share of 5% of incorporated biofuels in coloured and marked diesel from the second quarter of 2008 onwards.	Regulatory		Entities that introduced coloured and marked diesel into consumption	E	2008	

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
RCM 80/2008	Modal transfer associated with the expansion of the Lisbon metro (Lisbon Metro Transport Authority)	Financial	130,428 toe in 2015	Metro authority	E	2004	
	Modal transfer associated with the construction of the Porto metro (Porto Metro Transport Authority)					2006	
	Modal transfer associated with the construction of the Mondego Light Metro					2011	
	District or regional mobility plans					2006	
	Increased use of the railway network	Voluntary	31,123 in 2010 and 33,577 toe in 2020	End user	E	2008	
	Revision of the Regulations for Managing Energy Consumption in the Transport Sector (Order 228/90)	Regulatory	Reduce consumption by 5,858 toe in 2010 and 76,593 toe in 2015	Transport/ Companies with fleets	P	2010	
Order 1391-A/2006 and Order 1554-A/2007	Partial or total exemption of Petrol Product Tax (ISP) for biofuels to be used in road transport	Regulatory	**Biofuels substituting diesel:** 2007-183,270 tep; 2008 – 252,608.64 tep; 2009 – 268,396.68 toe e 2010 – 284,184.72 tep **Biofuels substituting petrol**: 2009 and 2010 – 88,395.62 toe **Small Dedicated Producers** 2007 to 2010: 40 000 tonnes.	Biofuel Producers	E	2007	2010
	Promote supporting national agricultural chains by means of ISP exemptions for road fuels that ensure their incorporation	Financial	Increase in the percentage of endogenous raw materials used to produce biofuels	Agricultural Sector	E	2007	2010
DL 66/2006	Change in the Special Consumption Tax Code (CIEC), so that biofuels benefit from a total or partial exemption from ISP tax	Regulatory	Increase in the consumption of biofuels	Economic operators	E	2006	2010
DL 62/2006	Transposition to the national juridical framework of Directive 2003/30/EC, regarding the promotion of the use of biofuels or other renewable fuels in the transport sector.	Regulatory	5.75 % incorporation of biofuels in fossil fuels, in terms of energy content, in 2010	Biofuel chain operators	E	2006	2010

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
RCM 104/2006	Construction of the Metro South of the Tagus River (MST) - DL 337/99	Financial	Modal transfer to the MST of 115,500,000 pkm in 2010	Metro Authority	E	2002	2008
	Rail link to the port of Aveiro	Financial	Transfer to maritime traffic of 1553 kt of goods, annually, from 2007 onwards. Transfer from road to rail traffic, from 2010 onwards, of the cargoes transported on the rail link to the port in Aveiro.	REFER	E	2001	2009

Overview of the general policies and measures for the three sectors

Reference	Name of Measure	Type of Measure	Expected Result	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
DL 50/2010	Energy Efficiency Fund (EEF)	Financial	To ensure compliance with the national energy efficiency targets established in the National Energy Efficiency Action Plan (PNAEE)	State/ Companies/ End user	E	2010	
DL 23/2010	Transposition of the cogeneration Directive	Regulatory	Promotion of cogeneration based on renewable energy.	Producer of Renewable Energy	E	2010	
Law No. 3-B/2010: State Budget for 2010	**30% tax deduction** of amounts spent on acquiring the following goods, as long as they are for personal use, up to a limit of 803 Euros: a) New equipment to use renewable energy; b) Equipment and works to improve the conditions for the thermal performance of buildings, which directly result in greater insulation; c) Vehicles that must be registered, which are exclusively electric or work on non-fuel renewable energy.	Regulatory/Financial	Increase in the use of renewable energy	End user	E	2010	
RD 25/2009	Amortization over a period of 4 years of investments in solar equipment, since the maximum applicable value for the amortization and reintegration rate is 25%. It makes it possible to amortize solar systems in 4 years, irrespective of other incentives.	Regulatory/Financial	Increase in the use of renewable energy	Companies	E	2010	
DL 16/2009	Regional forest organisation plans (PROF) Forest management plans (PGF) Specific plans for forestry intervention (PEIF)	Regulatory	Sustainable management of forests. Increase in the available biomass.	NFA /Forestry and agro-forestry enterprises / Forestry owners or producers	E	2009	
Law No. 10/2009	**To improve the energy efficiency of Public Buildings:** Measure to promote investments in solutions to improve the energy efficiency of 100 public buildings that are intensive energy consumers (hospitals, universities, courts, public administration buildings)	Regulatory/Financial	Improvement in the energy performance of a series of public buildings	Public Services	E	2009	2010

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
Law 64-A/2008: State Budget for 2009	30% tax deduction, up to a maximum of 796 euros, of expenditure to acquire: a) new equipment to use renewable energy; b) Vehicles that need to be registered that are exclusively electric or work on non-fuel renewable energy.	Regulatory/Financial	Increase in the use of renewable energy	End user	E	2009	
Order 32276-A/2008	Creation of the Fund to Support Innovation (FAI) -	Regulatory/Financial	Promote research and development in the area of renewable energy	Renewable Energy Sector	E	2008	
RCM 80/2008	**Residential Buildings:** Reach minimum shares for efficient classes in the context of new buildings. Programmes to remodel housing requiring repairs	Regulatory	34,792 toe in 2010 and 94,436 toe in 2015	End user (Residential)	E	2006	
	Service Buildings: Reach minimum shares for efficient classes in the context of new buildings. Increase the penetration of cogeneration systems. Implement solar thermal systems and microproduction systems in schools	Regulatory	32,561 toe in 2010 and 98,386 toe in 2015	Services	E	2006	
	Energy Certification of State Buildings	Financial/Voluntary	4,652 toe in 2010 and 16,401 toe in 2015	State (Buildings)	E	2008	
	Energy in Schools: Monitoring the energy consumption and dissemination of the results ("energy meters"). Information and awareness campaigns amongst students and teachers. "Open Week" for energy. Green Campus. Renewable Energy in Schools	Information Campaign	Change in behaviour	Schools (Users)	E	2007	
DL 225/2007	Observatory for Renewable Energy (ObsER),	Regulatory	Follow up and monitor the installation and functioning of electricity producers that use sources of renewable energy, as well as the use of primary resources and the rational and sustainable management of these resources.	Electricity producers using RES	E	2007	
RCM 86/2007	QREN – Funding for innovative pilot initiatives for the rational use and production of energy (from renewable sources)	Financial	Increase in the use of renewable energy	Producer of Renewable Energy/ Companies	E	2007	2013
DL 127/2005	Creation of Forest Intervention Zones (ZIF)	Regulatory	Increase in available biomass	Forest owners or producers	E	2005	

Reference	Name of Measure	Type of Measure	Expected Results	Targeted group and/ or activity	E/P	Start and end dates of the measure	
						Start	End
VAT Code	Devices, machines and other equipment, exclusively or mainly used to capture or use solar, wind, geothermal or other alternative forms of energy are subject to the intermediate rate of VAT of 12%.	Regulatory/Financial	Increase in the use of renewable energy	End user/Companies	E		

Legend: E – Existing; P – Planned; RCM – Cabinet Resolution; DL – Decree Law; DR – Regulatory Decree; VAT – Value Added Tax; MEID – Ministry for the Economy, Innovation and Development.

4.2. Specific measures to meet requirements under Articles 13, 14, 16 and Articles 17 to 21 of Directive 2009/28/EC

4.2.1. Administrative procedures and spatial planning (Article 13(1) of Directive 2009/28/EC)

(a) List of existing national and, if applicable, regional legislation concerning authorisation, certification, licensing procedures and spatial planning applied to plants and associated transmission and distribution network infrastructure:

The following tables contain the following:

Table 4 – Legislation applicable to licensing (approval of projects and inspections) for units producing electricity from renewable sources, with a capacity of more than 3.68 kVA and public facilities of the transmission and distribution network

Table 5 – Legislation that defines the procedure for granting permission to link production plants to the public network

Table 6 – Legislation applicable for licensing (approval of projects and inspections), for plants producing electricity based on renewable sources, with a capacity equal to or less than 3.68 kVA.

Table 4 – Legislation applicable to licensing (approval of projects and inspections) for units producing electricity from renewable sources, with a capacity of more than 3.68 kVA and public facilities of the transmission and distribution network

Legislative provision	Date of publication	Description
Regional Legislative Decree No. 24/2009/M	14-08-2009	Approved the essential norms pertaining to the licensing of private electricity facilities (adaptation for the ARM of Decree Law No. 517/80, of 31 October).
Decree Law No. 288/2007	15-07-2008	Allows the attribution of production licences before the environmental compliance report for the project being implemented (RECAPE) in the case of renewable energy.
Decree Law No. 101/2007	02-04-2007	Simplifies the licensing of electricity facilities, for both public as well as private service, amending Decree Law Nos. 26 852, of 30 July 1936, 517/80, of 31 October, and 272/92, of 3 December.
Order No. 344/89	13-05-1989	Amended articles 19 and 20 of Decree Law No. 26852, of 30 July 1936. Revoked Order No. 24/80, of 9 January.
Decree Law No. 517/80	31-10-1980	Established the norms to be obeyed while preparing projects for private electricity facilities.
Order No. 401/76	06-07-1976	Established the norms for processing licensing applications for public service electricity facilities.
Decree Law No. 446/76	05-06-1976	Provided the new text for some articles of the Licensing Regulations for Electricity Plants, approved by Decree Law No. 26852, of 30 July 1936.
Decree No. 487/72	05-12-1972	Defined the norms that must be obeyed to establish nuclear plants for the production of electricity.
Decree Law No. 30349/40	02-04-1940	Determined that the licensing of high voltage electricity lines covered by Art. 5 of the Licensing Regulations for Electricity Plants should be carried out under the terms of the said regulations.
Decree Law No. 26852/36	30-07-1936	Approved the regulations for licences for electricity facilities (RLIE).

Table 5 – Legislation defining the procedures for granting licences to connect production plants to the public grid

Legislative provision	Date of publication	Description
Decree Law No. 51/2010	20-05-2010	Simplified the procedure for installing additional equipment in wind energy plants, reviewed the respective remuneration regimes and made it obligatory to install equipment to support voltage drops, amending Decree Law No. 225/2007, of 31 May.
Decree Law No. 23/2010	25-03-2009	Established the juridical and remuneration regime applicable to electric and mechanical energy and useful heat produced by means of cogeneration, transposing Directive 2004/8/EC to the national juridical framework.
Order No. 865/2009	13-08-2009	Determined the values of the Z coefficient, applicable to the electricity plants which use geothermal energy in mainland Portugal, for very deep projects with high enthalpy.
Decree Law No. 225/2007	31-05-2007	Implemented a series of measures linked to renewable energy envisaged in the national energy strategy, established by means of Cabinet Resolution RCM No. 169/2005 of 24 October.
Order No. 9148/2002	04-05-2002	Issued given the need to clarify the interpretation of the procedures described in Decree Law No. 312/2001, of 10 December, regarding the processing of applications to attribute a reception point for electricity.
Decree Law No. 85/2002	06-04-2002	Altered Decree Law No. 182/95, of 27 July, subjecting the hydroelectric projects with an installed capacity of up to 10 MW to the regime stipulated in Decree Law No. 189/98 of 27 May.
Order No. 62/2002	16-01-2002	Regulated the amounts and way of providing the sureties described in Decree Law No. 312/2001, of 10 December, which defined the regime for managing the capacity to receive electricity in the networks of the Public Service Electricity System from electricity producers from the Independent Electricity System.
Order No. 60/2002	15-01-2002	Established the tariff applicable to cogeneration units licensed under the terms of Decree Law No. 538/99 of 13 December, as well as the provisions on the urgency period for the modalities of the said tariff.
Order No. 1467-C/2001	231-12-2001	Established the fee for receiving electricity from the networks of the Public Servicœ Electricity System.
Decree Law No. 312/2001	10-12-2001	Defined the regime to manage the capacity to receive electricity in the networks of the Public Service Electricity System from electricity producers from the Independent Electricity System.
Decree Law No. 189/88	27-05-1988	Established norms pertaining to the production of electricity by individuals or companies governed by public or private law.

Table 6 – Legislation applicable to licensing (approval of projects and inspections) for units producing electricity from renewable sources, with a capacity equal to or less than 3.68 kVA

Legislative provision	Date of publication	Description
Regional Legislative Decree No. 16/2008/M	6/06/2008	Adapted for the ARM Decree Law No. 363/2007, of 2 November, regarding the production of electricity from microproduction units.
Order No. 201/2008	22-02-2008	Fixed the fees to be charged for the services envisaged in Article 23(1) of Decree Law No. 363/2007, of 2 November, which establishes the legal system applicable to electricity production by means of microproduction units.
Decree Law No. 363/2007	02-11-2007	Established the legal system for the production of electricity by means of small units (microproduction).
Notice No. 12806/2003	29-11-2003	Publicly announced that, by means of an order dated 29 October 2003, the director general for Energy defined the technical and safety norms and the licensing procedures for the production units injecting electricity into the public low voltage network of more than 16 A per phase and with a maximum capacity of no more than 150 kW.
Order No. 764/2002	01-07-2002	Established the applicable tariff for low voltage electricity production units, licensed under the terms of Decree Law No.68/2002, of 25 March, as well as the provisions referring to the period of effect of the modalities of the said tariff.
Decree Law No. 68/2002	25-03-2002	Regulates the activities of producing low voltage electricity, as long as the capacity to be delivered to the public network does not exceed 150 kW.

In addition to establishing rules to authorise links to the public network, the legislation mentioned in Table 5 also contains mechanisms that make it possible to plan the development of renewable energy, both by means of orders issued every four months by the Directorate General for Energy and Geology (DGEG) as well as by launching public tenders.

With regard to the electricity transmission and distribution networks, the planning instruments include the Transmission Network Development and Investment Plan (PDIRT) and the Distribution Network Development and Investment Plan (PDIRD). These are medium term plans prepared by the system operators, aimed at the future development of the networks to satisfy consumption and production needs, including the overall targets fixed by the government for renewable energy. These network planning instruments (PDIRT and PDIRD) are aligned with the objectives, targets and measures of the NREAP, as described below in point 4.2.6.

These plans are approved by the Ministry for the Economy, Innovation and Development (MEID) after being evaluated by the DGEG.

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(b) **Responsible ministry(/ies)/authority(/ies) and their competences in the field**:

The entity responsible for planning, attributing links to the network and approving projects is the DGEG, which is responsible for inspecting plants with a capacity of more than 10 MW, while the inspection of other plants is the task of the Regional Economic Directorates (DRE).

In the case of microproduction, the DGEG has delegated its tasks to the CERTIEL, the entity responsible for analysing, approving and certifying projects for electricity plants fed by a low voltage public service distribution network or permanent plants with their own low voltage production of up to 100 kVA, if they are for security or assistance (type C).

For the autonomous regions of Madeira and the Azores, the aforesaid competences are the responsibility of the respective Regional Directorates for Trade, Industry and Energy.

In the case of hydrographic resources, according to Law No. 58/2005, of 29 December, it is the responsibility of the Hydrographic Regions Administrations of the MAOT, through its bodies and services, to decide on licences to use water resources and to monitor this use.

In addition to the aforesaid entities there are other permissions that are derived from specific legislation, more specifically, construction permits to be issued by the municipalities and environmental licences when the projects are located in environmentally sensitive areas.

(c) **Revision foreseen with the view to take appropriate steps as described by Article 13(1) of Directive 2009/28/EC by [date]**:

The rules regarding the procedures for permission, certification and licences that are applicable to the process of transforming biomass into biofuels will have to be reviewed by the end of 2010.

The national rules regarding the procedures for permissions and licences for facilities and infrastructure associated with the transmission and distribution network, aimed at producing electricity from renewable sources, have regularly been reviewed so as to keep pace with the evolution of the sector, the development of technologies and the suitability of existing infrastructure.

There has been a positive evolution in the articulation between the responsible authorities with a view to improving coordination and the effectiveness of procedures for the licensing process to produce energy and to obtain environmental licences, more specifically with regard to the use of hydro resources and the installation of wind energy plants.

In this sense, for example, the regulatory framework for installing additional equipment in existing wind energy plants has recently been updated, simplifying the licensing procedure for new equipment, reducing it to merely informing the DGEG beforehand, except in cases in which it is obligatory to conduct an environmental impact assessment or an environmental incidence assessment (which considers the number of equipments installed). Additionally, it is now compulsory to install equipment to provide support during drops in voltage.

In the area of solar energy, the review of the microproduction regime is in the final phase, as is the creation of a new regime for miniproduction (up to 250 kW, according to the RES technologies). These are two simplified licensing regimes, which no longer have counters to receive applications and issue licences, since everything is done on-line. These simplified regimes are applicable to the entire national territory, including the autonomous regions.

In 2008 the government implemented a pilot zone for wave energy with the potential to receive approximately 250 MW of installed capacity, with a view to contributing towards developing this technology. On 18 June 2010 the concession contract for the pilot zone was also approved, which will be given to a company that will be constituted by the National Electricity Network. It will now be necessary to proceed to regulate it so that the infrastructure to install demonstration projects can be prepared in 2011.

With regard to small hydroelectric facilities with a capacity of up to 10 MW (mini-hydel), a strategic plan is being defined to assess the potential and the licensing process with a view to maximising the use of the national hydel potential, respecting the existing environmental factors.

In addition to this task of assessment, within a strategy of articulation between enhanced energy and aspects pertaining to the preservation of nature and the

restoration of biodiversity in the context of hydel resources, the authorities are studying ways of simplifying the administrative procedures for systems using hydropower up to 750 kW of installed capacity. More specifically, a facilitated procedure is being studied (environmental commitment form) for systems whose dimensions are smaller than 250 kW, along with a pre-oriented procedure, with enhanced monitoring and technical inspections, for systems with a greater capacity of up to 750 kW. The improvement, rehabilitation or increase in the capacity of existing hydel infrastructure, as long as there are no significant changes to the hydro-morphological conditions, will also be framed within a simplified licensing procedure.

In the near future a simplified regime to attribute link points for hydel plants installed in water supply systems, waste water systems and irrigation canals will also be implemented, with a view to making the most of the kinetic energy resulting from the transportation of water, wherein the sole applicant will be the owner of the system. This regime will function in harmony with the regimes for microproduction and miniproduction, with a simplified licensing system and specific tariffs.

Other lines of action are likely to be developed in the future with a view to simplifying the RES licensing procedures, more specifically, the opening up of administrative procedures to explore locations that have a pre-identified potential for the resource, encompassing key technologies of the Portuguese energy strategy, i.e. small hydel, wind energy and solar plants. These projects could benefit from the fact that a part of the procedures and the conditioning factors derived from the environmental impact assessments have already been implemented and identified, respectively, in the prior stage of the administrative procedure, during the surveying and pre-qualification of the sites and identification of the associated potential. It is likewise possible to note the obvious advantages that result from the use of synergies between greater planning for energy ventures and an articulation with instruments for managing the territory and environmental concerns.

(d) Summary of the existing and planned measures at regional/local levels (where relevant):

By means of Regional Legislative Decree No. 16/2008/M, the Autonomous Region of Madeira adapted for the said autonomous region Decree Law No. 363/2007, of 2 November, which established the legal system governing the production of electricity by means of small capacity plants, known as microproduction units. The regional diploma that seeks to establish the general principles applicable to the organisation and functioning of the Electricity System of the Autonomous Region of Madeira (SEM) is currently in the process of being approved, as are the principles governing the activities of production, transmission and distribution, and the sale of electricity.

The Autonomous Region of the Azores is also in the phase of preparing the regional diploma that aims to establish the general principles of the organisation and functioning of the Electricity System of the Autonomous Region of the Azores, which keeps in mind, on the one hand, the specific characteristics of the region without, on the other hand, overlooking the need to create conditions that make it possible to keep

pace with the evolution of technology and the rapid incorporation of the main developments resulting from technology in the production, transmission, distribution, management and use of electricity.

(e) Are there unnecessary obstacles or non-proportionate requirements detected related to authorisation, certification and licensing procedures applied to plants and associated transmission and distribution network infrastructure for the production of electricity, heating or cooling from renewable sources, and to the process of transformation of biomass into biofuels or other energy products? If so, what are they?

No.

(f) What level of administration (local, regional and national) is responsible for authorising, certifying and licensing renewable energy installations and for spatial planning? (*If it depends on the type of installation, please specify.*) If more than one level is involved, how is coordination between the different levels managed? How will coordination between different responsible authorities be improved in the future?

At a macro level the policies pertaining to guaranteeing the security of supplies are the responsibility of the State and are ensured by the government through the MEID. Generally, the minister holding this portfolio is responsible for defining suitable measures and instruments for maintaining a balance between supply and demand, namely those concerning the overall technical management of the system, the diversification of sources of supplies and the planning, construction and maintenance of the necessary plants, with the support of the Directorate General for Energy and Geology.

The Directorate General for Energy and Geology (DGEG) is responsible for monitoring the security of supplies, in collaboration with the entity that grants concessions for the national transmission network (NEN – National Energy Networks). The DGEG also manages, on a national level, the production of electricity from RES and the respective permissions and licensing processes.

In the autonomous regions of the Azores and Madeira these competences are attributed to the respective department of the regional government that has jurisdiction over energy matters.

(g) How is it ensured that comprehensive information on the processing of authorisation, certification and licensing applications and on assistance to applicants is made available? What information and assistance is available to potential applicants for new renewable energy installations on their applications?

The responsible entity, the DGEG, publishes on its website (www.dgge.pt) a list of licensed facilities and facilities that are in the process of obtaining a licence. In addition to identifying the licensed entity, these lists also include the location, the type of renewable plant, the capacity stated in the licence, the date when the permission was granted, the date of connection to the network and, in the case of hydel plants, it also identifies the respective river or watercourse. The website also contains all the legislation mentioned in tables 4, 5 and 6, above, the capacity available per network zone and a guide that provides information on the licensing procedure for electricity plants.

This service will be optimised so as to improve the quality of and access to the information available on-line, improving the quality of the data processing.

(h) How is horizontal coordination facilitated between different administrative bodies, responsible for the different parts of the permit? How many procedural steps are needed to receive the final authorisation/licence/ permit? Is there a one-stop shop for coordinating all steps? Are timetables for processing applications communicated in advance? What is the average time for obtaining a decision for the application?

In the case of licensing for renewable energy plants, with the exception of licences for construction works, which must be requested directly from the respective municipality, the DGEG centralises the licensing process, including environmental licensing. However, whenever necessary, the promoter must interact with the diverse entities involved in the procedure.

National plans will be developed for some technologies so as to minimise these interactions, more specifically, for mini-hydel plants and energy producing marine technologies, by means of the Maritime Space Organisation Plan (POEM).

The use of RES contemplated in Decree Law No. 69/2000, of 3 May, is subject to environmental impact assessment procedures (EIA). The use of RES that is not subject to an EIA but which is located in the area of a National Ecological Reserve, a Nature 2000 Network site or the National Network of Protected Areas is subject to procedures to assess environmental incidents (EIncA), as stipulated in Decree Law No. 225/2007, of 31 May.

The procedure of the EIA favours inter-ministerial coordination in the sense of an articulated participation by bodies from diverse areas of governance, constituting a common platform for intervention. Even the public can participate actively in the licensing process for the respective projects, during the period earmarked for public consultations.

The licensing of hydel infrastructure to produce energy requires documentation for using the hydro resources, which is issued by the competent Regional Hydrographic Administration (RHA). Owing to the nature of the resource in question these procedures must perforce hear other potential interested parties and, whenever such interested parties exist, it could be necessary to commence a tender process,

consequently resulting in longer periods for the licensing procedures. Nevertheless, it is essential to recognise the efforts that the RHAs have made in this regard, having presented a proposal to simplify the licensing procedures and to clarify the processes, more specifically, by developing manuals for the procedures.

This period is much shorter for the other technologies. However, growing difficulties have been observed in the case of onshore wind energy parks, owing to the fact that sites with less environmental pressure and greater production hours have already been occupied.

Some measures aim to facilitate the licensing procedures, and information on these processes is being contemplated, including:

§ Reinforcing the position of the DGEG as the interlocutor in the licensing procedures, by implementing a single counter, thus coordinating the interaction between the different entities involved;

§ The possibility of creating "project managers", who will be responsible for portfolios of projects undergoing the licensing process;

§ The creation of an electronic platform to monitor the evolution of each process;

§ Implementing a project to harmonise and concentrate scattered legislation, with a view to simplifying administrative processes, while simultaneously creating a DGEG database with a search engine that encompasses the various applicable documents.

(i) Do authorisation procedures take into account the specificities of the different renewable energy technologies? If so, please describe how. If they do not, do you envisage taking them into account in the future?

The current procedures do not contemplate the technology used nor the type of renewable sources, with the exception of microproduction and the additional equipment of wind parks, which have a simplified licensing procedure, as has been mentioned. Some regimes that are currently being planned envisage the creation of self-licensing regimes in the near future, suitable for the characteristics of some technologies, as in the case of miniproduction, mini-dams and wave energy.

The National Plan for High-Capacity Hydroelectric Dams was subjected to a preliminary strategic environmental evaluation, held at a European level. Its analysis and approval reflected an important joint effort by the Portuguese authorities and diverse technical bodies of the European Commission.

(j) Are there specific procedures, for example simple notification, for small-scale, decentralised installations (such as solar panels on buildings or biomass boilers in buildings)? If so, what are the procedural steps? Are the rules publicly available to

citizens? Where are they published? Is the introduction of simplified notification procedures planned in the future? If so, for which types of installation/system? (Is net metering possible?)

The procedures that are applicable to plants with a capacity equal to or less than 3.68 kW are very simple. The process was completely dematerialised on paper and now takes place entirely on an electronic platform up to the request to inspect the facilities, a notification being made by sms. After the application has been approved the period for construction is 120 days, after which the approvals are annulled if the facilities have not been built.

The rules are clear and are described in the legislation and on the website dedicated to licensing procedures for this kind of plant (www.renovaveisnahora.pt). Hence, citizens can access comprehensive information on the procedures that are required. Naturally, simplifying procedures is always an objective, within suitable limits.

(k) Where are the fees associated with applications for authorisation/licences/permits for new installations published? Are they related to the administrative costs of granting such permits? Is there any plan to revise these fees?

The fees are published in the official journal of the Portuguese Republic (*Diário da República*) and are available on the website of the entity that is responsible for licensing the new facilities (www.dgeg.pt). These fees are not directly associated with the administrative costs.

Revisions of the fees are indexed to legislative updates regarding permissions/ licences for new facilities.

(l) Is official guidance available to local and regional administrative bodies on planning, designing, building and refurbishing industrial and residential areas to install equipments and systems using renewable energy sources in electricity and heating and cooling, including in district heating and cooling? If such official guidance is not available or insufficient, how and when will this need be addressed?

The instrument par excellence for integrating the equipment and systems that use RES and issues relating to territorial sustainability in general is the Municipal Master Plan (MMP), whose objective is to translate territorial and urban planning proposals in relation to municipal territory, to classify the existing and future use of the spaces, to define the general regime for buildings and the consolidation of rural and urban properties, to establish the bases for the municipal urban administration and to ensure a convenient use of the territory's natural resources, environment and cultural patrimony.

The preparation of these instruments has taken into consideration sectorial policies and, naturally, from the very outset, involves the bodies and entities which are

responsible for implementing territorial, environmental and energy policies. These are the bodies that provide these municipal planning instruments with directives and priorities in terms of the incorporation of equipment and systems based on the use of RES.

However, even though these instruments for territorial management (the MMPs) must compulsorily be reviewed every 10 years, not all of them have complied with these time frames. Thus, some of them are out of date and it is hence difficult to envisage the construction of RES projects.

Nevertheless, simplified measures have been introduced to speed up the process of reviewing the MMPs so as to ensure that they are compatible with these projects. Efforts will be made in the medium term to further improve the alignment of the MMPs with the energy strategy, working in collaboration with the local administration and the municipalities, more specifically, by introducing criteria for the development of renewable energy, keeping in mind the local potential, within the scope of the reviews of these plans.

Hence, it is of fundamental importance to improve the articulation between the national and regional energy strategies and to effectively make the most of the local potential for energy and other resources (such as human and financial resources, knowledge and available supplies of goods and services, amongst others). Urgent efforts will be necessary to ensure this, with regard to surveying the potential in municipalities, so as to integrate this potential into the strategies for local development, more specifically in relation to agriculture, industry and services. This approach is essential to ensure that the national energy strategy is implemented at an overall level, which is only possible if it can be extended and integrated at all levels, especially on a regional and local level.

(m) Are there specific trainings for case handlers of authorisation, certification and licensing procedures of renewable energy installations?

Yes, within the scope of the professional training provided by the licensing entities.

4.2.2. Technical specifications (Article 13 (2) of Directive 2009/28/EC)

(a) To benefit from support schemes do renewable energy technologies need to meet certain quality standards? If so, which installations and what quality standards? Are there national, regional standards that go beyond European standards?

In addition to complying with European norms, some technologies also have to satisfy technical specifications to be eligible to benefit from support schemes in effect.

Wind parks:

In the wake of tenders that were launched from 2005 onwards for the "Capacity to Inject Power into the Electricity Producing System (EPS) and Associated Reception Points for Electricity Produced in Wind Energy Plants", bidders had to satisfy certain technical requirements, more specifically:

§ The systems for converting wind energy had to have the necessary capacity to remain operational even during voltage drops, resulting from network faults, and should not be disconnected from the network if the effective value of the voltage at their terminals was above the curve defined in the figure below, during such an incident.

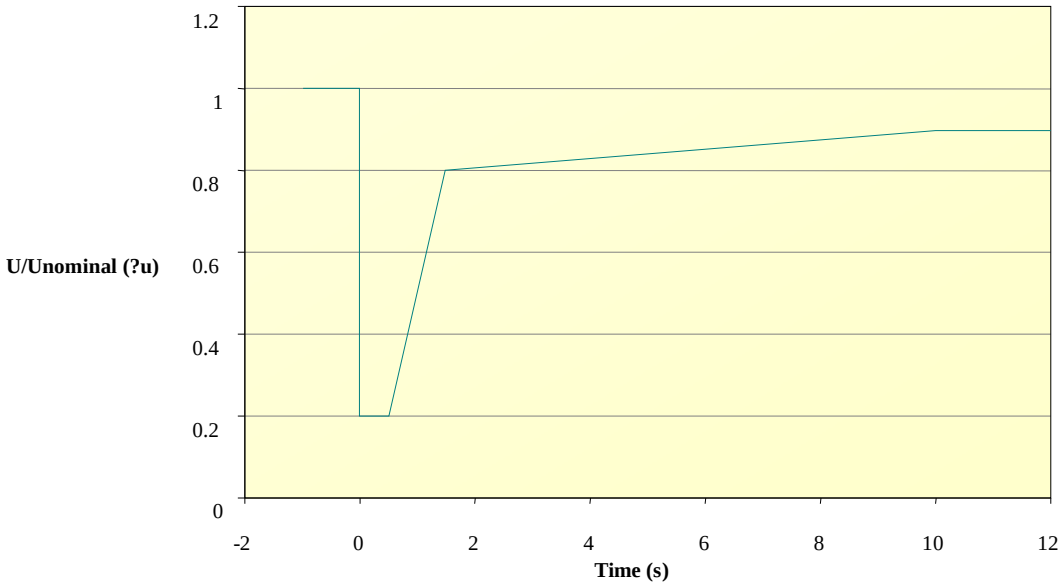
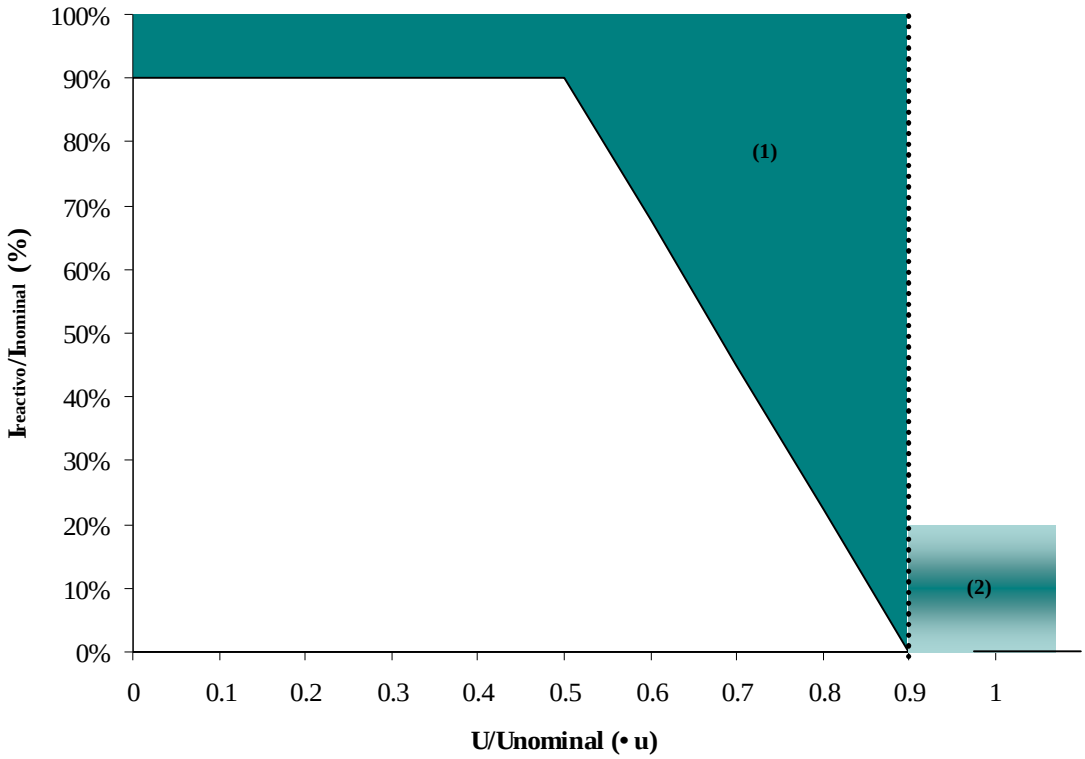


Figure 7 – Voltage-time curve for capacity required of wind energy plants to withstand voltage drops

§ The wind energy conversion systems had to have the capacity to supply reactive energy during voltage drops providing support for the voltage on the network, as per the following figure:



Notes:

(1) Zone corresponding to the fault and recovery operating regime. After a fault that causes a drop in voltage of more than 10%, the wind energy plant must comply with the minimum curve for the production of reactive power, with a maximum delay of 40ms.

(2) Zone corresponding to the normal operating regime (when entering this operating zone the wind energy producer must return to the regime for producing reactive power that is in effect).

Figure 8 – Curve for the supply of reactive energy by wind energy plants during voltage drops

§ The wind energy conversion systems had to have the capacity to adjust, at the request of the network operator, the reactive power injected for values corresponding to tg ϕ varying in the interval [0 ; +0.2].

The recently published Decree Law No. 51/2010, of 20 May, which simplifies the procedure for installing additional equipment in wind energy plants and reviews the respective remuneration regimes, also stipulated that it was obligatory to install equipment in all wind generators to support voltage drops and supply reactive energy during these drops, in order to reinforce the security of the Public Service Electricity Network and the quality of service.

Biomass Plants

In the case of biomass plants and after having launched an international tender for 100 MW of a "Capacity to Inject Power into the Electricity Producing System (EPS) and Associated Reception Points for Electricity Produced in Thermoelectric and Forest Biomass Plants", some technical requirements were defined related to the mix of fuels to be used in the plants. Especially, the tender made it compulsory to use a minimum of 60% of fuels derived from operations to manage and exploit forest resources and a maximum of 5% of fuels derived from fossil sources.

Solar Thermal Systems

In order to benefit from public support, the solar thermal collectors or solar thermal systems supplied as a kit must have a label with the Solar Keymark certification, which confirms compliance with European norms. The body responsible for national certification is CERTIF (Association for Certification).

In the case of measures for financial support for the installation of these systems, it is also necessary to provide a 6 year guarantee for the systems that have been installed, the certification of the installer and a maintenance plan.

Additionally, the end user must be informed by means of a detailed document on the responsibilities of the installer of the solar thermal system, the total cost of all the components of the system, including labour and the maintenance plan, before making the decision to install the system.

The maintenance contract must clearly state the levels of coverage, more specifically with regard to the frequency, time of the year and scope of the scheduled maintenance operations.

Microproduction

In the case of programmes to support the installation of microproduction units for electricity, a contract is required for the purchase of low voltage electricity. In order to access the subsidised tariff regime, it is compulsory to install a minimum of 2 m^2 of solar thermal panels in cases where solar or wind systems are being installed, or in cases where biomass systems are to be installed, to integrate them into the building heating system.

Additionally, as stipulated in Decree Law No. 363/2007, which regulates microproduction, a series of technical rules has been approved to support the implementation of microproduction, guaranteeing the suitable functioning of the system. These technical rules are attached in Annex II.

The review of this Decree Law No. 363/2007, which is currently underway, also contemplates the inclusion of a range of technical criteria such as certification for equipment by a body in conformance with the ISO/IEC No. 5 system.

4.2.3. Buildings (Article 13(3) of Directive 2009/28/EC)

(a) Reference to existing national and regional legislation (if any) and summary of local legislation on the increase in the share of energy from renewable sources in the building sector:

Table 7 – National legislation on the increase in the share of energy from renewable sources in the building sector

Legislative provision	Publication	Description
Decree Law No. 78/2006	04-04-2006	National System for Energy Certification and Interior Air Quality in Buildings (**SCE**), the objectives of which include: the implementation of regulations on energy efficiency conditions and the use of renewable energy systems according to the requirements and provisions of the RSECE and the RCCTE; certification of the energy performance of buildings; identification of corrective measures or measures to improve the energy performance applicable to buildings and the respective energy systems, especially boilers and air conditioning equipment.
Decree Law No. 79/2006	04-04-2006	Regulations for Energy and Climate Control Systems for Buildings (**RSECE**), which establish the conditions to be observed in the project with regard to the requirements for thermal comfort and the renovation, treatment and quality of interior air, which must be achieved in conditions of energy efficiency by selecting suitable equipment, as well as the maximum limits of energy consumption in existing large service buildings, along with the applicable capacity limits for climate control systems to be installed in those buildings.
Decree Law No. 80/2006	04-04-2006	Regulations for the Characteristics of the Thermal Behaviour of Buildings (**RCCTE**), which indicate the rules to be observed in the design by all the residential buildings and the service buildings which do not have centralised climate control systems so as to ensure that the requirements for thermal comfort, heating or cooling, as well as the need for hot water, can be met without an excessive use of energy.
Order No. 461/2007	05-07-2007	Defines the calendar for the implementation of the SCE.
Order No. 835/2007	07-08-2007	Defines the amount of the registration fees for certificates of Regulatory Compliance and Energy Certificates at the Energy Agency (ADENE).
Order No. 10250/2008	08-04-2008	Defines the Certification Model for Energy Performance and Interior Air Quality, issued within the scope of the SCE
Order No. 11020/2009	30-04-2009	Defines the Simplified Calculation Method for Energy Certification of Existing Buildings within the scope of the RCCTE, allowing an expedited analysis of the fractional units or buildings for which no information is available, for the integral application of the regulatory calculation of that rule.

***NOTE**: DL No. 78/2006, DL No. 79/2006 and DL No. 80/2006, all related to the Energy Certification of buildings, are currently in the process of being revised*

Table 8 – Regional legislation referring to the increase in the energy share from renewable sources in the building sector

Legislative provision	Publication	Description
Regional Legislative Decree No. 1/2008/M	11-01-2008	Adapts the National System for Energy Certification and Interior Air Quality in Buildings (SCE), the Regulations for Energy and Climate Control Systems for Buildings (RSECE) and the Regulations for the Characteristics of the Thermal Behaviour of Buildings (RCCTE) for the Autonomous Region of Madeira.
Regional Legislative Decree No. 16/2009/A	13-10-2009	Adapts the National System for Energy Certification and Interior Air Quality in Buildings (SCE) for the Autonomous Region of the Azores.

(b) Responsible ministry(/ies)/authority(/ies):

On a national level, the Directorate General for Geology and Energy is the entity responsible for supervising the Energy Certification System (SCE). With regard to energy efficiency and certification, the Energy Agency (ADENE) is the entity responsible for managing the system.

On a regional level, the competent authorities are:

Autonomous region of the Azores – The Regional Directorate for Energy for the Azores is the entity responsible for supervising and managing the SCE.

Autonomous Region of Madeira: The Regional Directorate for Trade, Industry and Energy and the Regional Directorate for the Environment are the entities responsible for supervising the SCE, while the Regional Energy and Environmental Agency (AREAM) is responsible for managing the system.

(c) Revision of rules, if any, planned by: [date]

The legislation pertaining to Energy Certification and the Interior Air Quality of Buildings is currently in the process of being reviewed.

This process was begun in January 2010 and it is expected that a preliminary version will be available for Public Consultation at the beginning of the second half of 2010 and that legislative approval will be obtained during the first half of 2011.

Another interesting measure which Portugal intends to implement in the near future entails a review of the horizontal property rules, more specifically the rules which apply to condominiums, by introducing a change in the law that makes it possible for individual residents in existing buildings to install solar panels, micro and miniproduction energy equipment or other equipment and energy efficient solutions in common parts of the building.

(d) Summary of the existing and planned measures at regional/local levels:

Within the scope of the Regional Operational Programmes for Mainland Portugal, which are part of the structure of the QREN – National Strategic Reference Framework, support measures were created in the field of "Energy", defining the conditions for access and the general rules for attributing EU co-funding, by means of the European Regional Development Fund (ERDF). The field of "Energy" has focused on creating an innovative regional energy framework, marked by structural criteria and practices aimed at energy efficiency, the widespread use of renewable energy and an intensified penetration of energy vectors that have a lower environmental impact.

Specifically in the area of buildings, innovative pilot initiatives to produce energy (from renewable sources) and for the rational use of energy can be financed under the terms of the present regulations. These include support for the use of solar hot water systems for producing hot water in existing collective equipment and social housing units.

In the Autonomous Region of the Azores a System of Incentives to Produce Energy from Renewable Sources (PROENERGIA) was implemented by means of Regional Legislative Decree No. 26/2006/A, of 31 July, subsequently updated by Regional Legislative Decree No. 5/2010/A, of 23 February. Projects aimed essential at own-consumption can be funded within the scope of the PROENERGIA programme, including:

i. Investments to explore renewable energy resources for the microproduction of electricity or heat, using endogenous resources;

ii. Investments for the use of solar thermal resources and heat pumps to produce hot water.

These investments must be promoted by small and medium companies, including individual entrepreneurs, cooperatives, private social solidarity institutions and non-profit associations, individuals or condominiums.

In the Autonomous Region of Madeira, within the scope of the Intervir+ Programme (an operational programme to enhance the economic potential and territorial cohesion of the Autonomous Region of Madeira), various incentive systems were created which promote, in different areas of investment, energy efficiency in buildings (Industry, Tourism), the production of electricity from renewable sources and combined systems for the production and distribution of heat/cold and electricity (cogeneration). These incentives are as follows:

i. System of Incentives for Corporate Revitalisation in the Autonomous Region of Madeira (SIR).

ii. System of Incentives for Corporate Qualification in the Autonomous Region of Madeira (Qualificar+)

iii. System of Incentives to Promote Tourism Excellence in the Autonomous Region of Madeira (SITurismo)

(e) Are there minimum levels for the use of renewable energy in building regulations and codes? In which geographical areas and what are these requirements? (Please summarise.) In particular, what measures have been built into these codes to ensure the share of renewable energy used in the building sector will increase? What are the future plans related to these requirements/measures?

Yes. Decree Law No. 80/2006, of 4 April, concerning the Regulations for the Characteristics of the Thermal Behaviour of Buildings (RCCTE), currently in effect and applicable throughout the country, has made it obligatory to install solar panels to produce domestic hot water, opening up a broad market to develop renewable solar energy. This obligation is applicable whenever there is suitable solar exposure, based on 1 m^2 of panel per conventional occupant and this figure can be reduced so as to not exceed 50% of the total coverage area available, on terraces or the sides facing the south quadrant between the southeast and southwest.

As an alternative to the use of solar thermal collectors, any other forms of renewable energy can be used which capture energy equivalent to the solar panels, measured in annual terms. This energy can be used for other purposes in addition to heating water if this is more efficient or convenient.

(f) What is the projected increase of renewable energy use in buildings until 2020?

Chart 2 – Estimated share of renewable energy in the building sector (%)

	2005	**2010**	**2015**	**2020**
Residential	46%	n.a.	n.a.	n.a.
Commercial	15%	n.a.	n.a.	n.a.
Public	n.a.	n.a.	n.a.	n.a.
Industrial	n.a.	n.a.	n.a.	n.a.
TOTAL	**n.a.**	**n.a.**	**n.a.**	**n.a.**

(g) Have obligations for minimum levels of renewable energy in new and newly refurbished buildings been considered in national policy? If so, what are these levels? If not, how will the appropriateness of this policy option be explored by 2015?

In the case of the compulsory installation of solar panels to produce domestic hot water (partly derived from the obligations contained in the RCCTE), the following

targets for the time frames of 2015 and 2020 have been considered within the scope of the national policy, as part of the PNAEE, which has already been revised for 2020:

Table 9 – PNAEE Measure (R&S6M6)

Measure (R&S6M6)	**2015**		**2020**	
	Area (m^2)	**Impact (toe)**	**Area (m^2)**	**Impact (toe)**
Residential	**1,113,093**	13,844	**1,700,000**	18,910
Services	**272,572**	12,180	**435,000**	16,889

Likewise within the scope of the PNAEE, other objectives and targets have been stipulated for the residential sector and services sector. The "Green Heat" measure aims to promote the installation of heat recuperators and small boilers fuelled by biomass in buildings (residential and service sectors), as well as heat pumps with COP> 4, with the following impact forecast for 2015 and 2020:

Table 10 – PNAEE Measure (R&S4M7)

Measure (R&S4M7)	**2015**	**2020**
	Impact (toe)	
Installation of heat recuperators and small boilers fuelled by biomass, as well as heat pumps with COP> 4	16,020	25,094

Similarly, the PNAEE has also stipulated goals for the same time frames in the case of the installation of micro-generator equipment based on RES, within the scope of Decree Law No. 363/2007 and its subsequent revisions, with the following impact:

Table 11 – PNAEE Measure (R&S6M1)

Measure (R&S6M1)	**2015**		**2020**	
	MW	**Impact (toe)**	**MW**	**Impact (toe)**

Incentives for microproduction (photovoltaic, wind microturbines, hydel microplants, etc…)	165	23,447	250	34,291

(h) Please describe plans for ensuring the exemplary role of public buildings at a national, regional and local level by using renewable energy installations or becoming zero energy buildings from 2012 onwards? (Please take into account the requirements under the EPBD).

The measures to promote technologies based on RES will be articulated with the measures pertaining to managing the demand for energy in buildings. The public sector is no exception. In this regard, the PNAEE has already envisaged a specific programme called the State Energy Efficiency Programme, which encompasses a vast range of measures, from amongst which it is possible to highlight those that are directly related to promoting the use of RES in public buildings:

Measure E8M1 – Energy Certification of State buildings.

Measure E8M2 – Installation of solar thermal systems for sanitary hot water in swimming pools and changing rooms.

Measure E8M3 – Installation of solar thermal systems for sanitary hot water in swimming pools and changing rooms in sports complexes.

Measure E8M4 – Installation of electricity microproduction systems in public schools.

Within the scope of the Miniproduction Programme specific sub-programmes will be created aimed at public buildings, such as, for example, the "Green School Programme", which will take advantage of work on the renovation of schools to include the energy component, more specifically to introduce renewable energy, in line with energy efficiency objectives.

On a regional level, of special note is the publication of the Government Council Resolution No. 66/2006, of 16 June, in the Autonomous Region of the Azores. This resolution created a mixed committee, with a view to preparing an action plan to promote the rational use of energy and to conduct energy audits in the buildings of the Regional Public Administration and the public lighting systems along roads in the region.

(i) How are energy efficient renewable energy technologies in buildings promoted? (*Such measures may concern biomass boilers, heat pumps and solar thermal equipment fulfilling eco-label requirements or other standards developed at national or Community level (cf. text of Article 13(6*))).

Various measures have been implemented to promote their use.

Firstly, by means of regulatory obligations, as mentioned in points (e) and (g) above, with regard to the RCCTE.

Secondly, by means of building regulations which have made it possible to create favourable conditions for the installation of these technologies. This is the case with Decree Law No. 26 /2010, which establishes the Legal system for Urbanisation and Buildings (RJUE), which, with a view to simplifying the installation, access to and use of renewable energy, has exempted the installation of photovoltaic solar panels and wind generators from prior inspections, within the limits that have been deemed to be appropriate for the scarce urban relevance (building or demolition work that, owing to the nature, size or location has reduced urban impact), along with solar thermal collectors for heating domestic water.

In other words, the installation of photovoltaic solar panels or wind generators associated with the main building, used to produce renewable energy, including microproduction, which, in the case of the former, does not exceed the area covered by the building and its clearance up to 1 m in height, and, in the case of the latter, a clearance of up to 4 m and where the generating equipment does not have a radius greater than 1.5 m, as well as solar thermal collectors for heating domestic water that do not exceed the limits stipulated for photovoltaic panels, do not need to be inspected before being licensed by the municipal authorities, thus attenuating the bureaucratic and administrative processes and promoting these technologies.

Thirdly, by means of incentives for acquiring RES based equipment:

- The use of direct support for investments, as in the case of some measures stipulated in the PNAEE, more specifically, solar thermal collectors or biomass heat recuperators (measures R&S4M7 and R&S6M6); the former were the subject of incentives in 2009, which will be continued in 2010 in other formats;

- The use of support for production, as in the case of microproduction, by means of Decree Law No. 363/2007, which contemplates a tariff scheme with positive differentiation to remunerate the energy produced in these units that is destined for energy users, in a producer/ consumer model;

- Tax incentives, both in terms of VAT where this equipment is subject to an intermediate rate of 13% (as compared to the general rate of 21%), as well as in terms of Income Tax, where it is possible to deduct up to € 803 of the value of acquiring such equipment from taxes;

- The use of promotional, information and awareness campaigns for users, such as the “Solar Thermal 2009” campaign, which was carried out in 2009 to promote the programme of incentives for acquiring solar collectors. The campaign was implemented by means of television, radio, Internet, the printed press and outdoor initiatives.

4.2.4. Information provisions (Articles 14(1), 14(2) and 14(4) of Directive 2009/28/EC)

(a) Reference to existing national and or regional legislation (if any) concerning information requirements according to Article 14 of Directive 2009/28/EC:

The applicable legislation in this regard is Law No. 51/2008, of 27 August, which made it compulsory to provide information on the source of primary energy used, applicable to all energy vendors operating in the national energy market (electricity, gas, oil and other fossil fuels).

The legislation makes it obligatory to provide a detailed bill (with percentages) regarding the source of primary energy used, which must also state, in a place which is clearly visible on the individual bill for each consumer, calculations of CO_2 emissions and emissions of other greenhouse gases corresponding to the respective consumption.

In addition to the information on the source of primary energy used, energy vendors must, as far as possible, incorporate relevant information on sustainability and energy efficiency.

(b) Responsible body/(ies) for dissemination of information at national/regional/local levels:

On a national level, the frontline entity responsible for disseminating information with regard to promoting the use of RES is the Secretary of State for Energy and Innovation, with the support of the DGEG. On a regional level, this is the task of the regional authorities that are responsible for the area of energy, in partnership with the respective regional energy agencies: ARENA (Azores) and AREAM (Madeira).

On a regional and even a municipal level there are also a host of regional, municipal and inter-municipal energy agencies, which play a significant role in communicating and disseminating information on a local level and in articulating the needs of the population and the territories in which they are located and the national policies which are defined centrally. The role of these agencies must be reinforced so that they become effective partners of the central and local administration in defining and implementing strategies and policies in the field of energy. More specifically, they can play a relevant role in promoting sustainable development, the characterisation and management of resources and defining alternatives that can contribute towards better urban mobility, amongst other aspects, making the most of the knowledge of the territory and their close ties with the local population.

(c) Summary of the existing and planned measures at regional/local levels (where relevant):

The regional, municipal and inter-municipal agencies develop their own communications strategies, aligned with the national strategy for the sector but oriented towards the specific needs and realities of the territory in which they are located. In terms of output, the most frequent communication products are the energy matrixes, surveys on the regional potential for RES, the development of projects for international partnerships (above all, at a European level) with other similar agencies, awareness campaigns and initiatives aimed at the local population, etc.

(d) Please indicate how information is made available on supporting measures for using renewable energy sources in electricity, heating and cooling and in transport to all relevant actors (consumers, builders, installers, architects, suppliers of relevant equipment and vehicles). Who is responsible for the adequacy and the publishing of this information? Are there specific information resources for the different target groups, such as end consumers, builders, property managers, property agents, installers, architects, farmers, suppliers of equipment using renewable energy sources, public administration? Are there information campaigns or permanent information centres in the present, or planned in the future?

The information on measures to support the use of renewable energy sources is available on the websites of the different bodies involved in the sector.

Thus, public administration bodies, government agencies, sectorial associations from the RES sector, funding entities and other organisations that are active in this sector and are responsible for the respective measures make available the information that they deem to be necessary and they are also responsible for their suitability, updates and adaptation for different target groups.

Before and during the launch of new programmes and measures to promote the use of RES or energy efficiency, media campaigns are carried out amongst the general public, complemented by a more specialised dissemination, in seminars and other similar events aimed at target audiences.

(e) Who is responsible for publishing information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity?

The suppliers of the equipment or systems are responsible for publishing information on the net benefits, costs and energy efficiency of equipment and systems using renewable energy sources for heating, cooling and electricity.

However, the competent public bodies disseminate information on the general benefits of using renewable energy and some information has been incorporated into the new National Energy Strategy.

(f) How is guidance for planners and architects provided to help them to properly consider the optimal combination of renewable energy sources, high efficiency technologies and district heating and cooling when planning, designing, building and renovating industrial or residential areas? Who is responsible for that?

Decree Law No. 80/2006, which approved the new Regulations for the Characteristics of the Thermal Behaviour of Buildings (RCCTE), is a legal instrument that stipulates the requirements for projects for new buildings and large-scale refurbishments, so as to ensure that the conditions for thermal comfort are safeguarded in these buildings without an excessive need for energy, both during the winter as well as during the summer.

The RCCTE establishes the rules to be observed in the project for all the residential and service buildings without centralised climate control systems, so that the requirements for thermal comfort (heating or cooling) and ventilation (guaranteeing the air quality inside the building), as well as the need for domestic hot water, can be satisfied without an excessive consumption of energy. The application of these regulations is also aimed at minimising harmful surface or internal condensation caused by building materials which will have a potential negative impact on the durability of the building materials and the quality of the air inside the buildings.

In addition to the RCCTE, there are general guidelines included in the instruments for territorial organisation and management, more specifically with regard to the MMPs, which likewise encompass the areas of construction and sustainable mobility and promote a more rational management of flows with regard to the energy model for cities.

All the new legislation which is currently being revised in relation to the energy certification of buildings will further develop and improve aspects pertaining to improving the performance of buildings, both by introducing energy efficiency measures as well as by using RES based technologies, after considering their complementarity with urban and industrial planning.

With regard to industry, some municipalities have already begun to plan heat networks for their industrial zones, especially when associated with energy producers, more specifically thermoelectric plants fuelled by forest biomass, which can provide excess heat to other industrial units nearby. Furthermore, all the large industrial consumers, using more than 500 toe/year, are covered by Decree Law No. 71/2008, of 15 April, which established and regulates the Intensive Energy Consumption Management System (SGCIE), the objective of which is to promote energy efficiency and monitor energy consumption in facilities which are intensive consumers of energy, including the substitution of the consumption of fossil fuels by RES.

The municipalities are responsible for the MMPs, while the remaining regulations fall within the scope of the MEID, especially the management of buildings (SCE), entrusted to the ADENE, and the management of the SGCIE, which has been entrusted to the DGEG.

(g) Please describe the existing and planned information, awareness raising and training programmes for citizens on the benefits and practicalities of developing and using energy from renewable sources. What is the role of regional and local actors in designing and managing these programmes?

One of the main measures stipulated in RCM No. 29/2010, which approved the National Energy Strategy, was the creation of a campaign to disseminate the NES 2020. This was aimed at dynamising the modernisation of the Portuguese economy so as to consolidate Portugal's position as a leading nation in the field of sustainable energy and to contribute towards promoting the active participation of Portuguese society in preparing and implementing the measures which make it possible to achieve the targets proposed therein.

This campaign to disseminate the NES 2020 envisages, amongst other aspects, the following initiatives:

- The creation of the RE.NEW.ABLE website, which aims to bring together all relevant information on energy in Portugal and to also disseminate information and raise awareness amongst citizens on issues related to energy efficiency and renewable energy;
- Fairs, exhibitions and demonstrations of products and solutions;
- Seminars, meetings, sessions to present "best practices";
- Actions to publicise national projects.

These actions will be carried out on a national and regional level and will be promoted by public bodies as well as private companies, who can promote their renewable energy solutions amongst the public.

4.2.5. Certification of installers (Article 14(3) of Directive 2009/28/EC)

One of Portugal's main objectives is to promote the development of training as a means of meeting the need to create specialised labour which can satisfy the needs of companies and the demand that already exists and which will undoubtedly increase for training entities, trainers and trainees alike.

(a) Reference to existing national and/or regional legislation (if any) concerning certification or equivalent qualification schemes for installers according to Article 14(3) of the Directive 2009/28/EC:

Table 12 – National legislation pertaining to certification systems or equivalent applicable qualifications for installers in conformance with article 14(3) of Directive 2009/28/EC

Legislative provision	Date of publication	Description
Order No. 782/2009	23-07-2009	Regulates the National Qualifications Framework and defines the characteristics for the different levels of national qualifications.
Order No. 781/2009	23-07-2009	Establishes the structure and organisation of the National Qualifications Catalogue, as well as the respective evolution model for qualifications based on skills.
Decree Law No. 396/2007	31-12-2007	Establishes the legal system for the National Qualifications System and defines the structures that ensure its functioning
Order No. 1451/2004	26-09-2004	Establishes the conditions for accessing the Professional Aptitude Certificate for Installers of Solar Thermal systems, as well as the conditions for the equivalency of training courses.

(b) Responsible body/(ies) for setting up and authorising certification/qualification schemes by 2012 for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps:

On a national level, the body responsible for identifying and defining professional profiles associated with qualifications that are not of a higher level, including those mentioned in Directive 2009/28/EC, is the National Qualifications Agency (ANQ), which acts in close articulation with specialised sectorial bodies.

The certification of the professional categories is the task of the specialised sectorial bodies. The Directorate General for Energy and Geology (DGEG) is the entity responsible for certifying the aforesaid professional categories.

(c) Are such certification schemes/qualifications already in place? If so, please, describe.

With regard to the certification of technicians who install small renewable systems, within the scope of the National Professional Certification System (SNCP), it has been possible, from 2004 onwards, to obtain qualifications and the corresponding Professional Aptitude Certificate for installers of solar thermal systems. This certification is regulated by Order No. 1451/2004, of 26 November, which stipulates the

conditions for accessing the PAC, as well as the conditions for the equivalency of training courses. The DGEG is the certifying entity for the PAC and equates training courses. Currently, approximately 6,000 PACs have been issued.

A professional profile was defined within the scope of the Technical Energy Commission of the Institute for Employment and Professional Training (IEFP) and conditions were similarly established to issue a PAC for Installers of Solar Thermal Systems.

The Installer of Solar Thermal Systems must schedule, organise and coordinate the installation, maintenance and repair of solar thermal systems, in compliance with the norms, safety regulations and best practices applicable to this field of activity. This professional profile corresponds to level 3 of professional training.

There are three ways to obtain a PAC:

A) By specific initial training

• After completing secondary education or equivalent and successfully concluding the professional training course of the initial qualification for being an Installer of Solar Thermal Systems;

B) By means of equivalency

• Candidates that have a certificate or another document that qualifies skills identical to the skills stipulated for this professional profile, which has been obtained in a European Union nation or in a third country with which Portugal maintains reciprocal relations, should apply for equivalency to the DGGE.

C) By means of professional experience

• In such cases the candidates must have completed their obligatory schooling and demonstrate their professional skills, according to a methodology that will be defined.

The PAC will be valid for a period of 3 years. Its renewal will imply attending a minimum of 30 hours of suitable ongoing training during the said 3 years.

With regard to the certification of technicians that can install other renewable systems, the DGEG, in collaboration with the Institute for Employment and Professional Training and the National Qualifications Agency, will implement a project to ensure the compatibility of the profiles for the technical-professional courses for installers of renewable energy systems and electricians so as to comprehensively certify such installers, since, in the context of electricity producing facilities, these installers also need to be electricians in order to carry out the installation.

Likewise in the area of solar systems, the creation of a PAC is being envisaged for technicians for solar thermal and photovoltaic facilities.

Within the scope of the National Qualifications System, with regard to professional qualifications, the ANQ has already prepared a series of professional profiles and the

respective training references, integrated into the CNQ, in the area of education and training "522 – Electricity and energy", more specifically as below:

- Electricity Installations Technician (12th grade and Level 3)
- Refrigeration and Climate Control Technician (12th grade and Level 3)
- Technician/ Installer of Bioenergy Systems (12th grade and Level 3)
- Technician/Installer of Wind Energy Systems (12th grade and Level 3)
- Technician/ Installer of Photovoltaic Solar Systems (12th grade and Level 3)
- Technician/ Installer of Solar Thermal Systems (12th grade and Level 3)

It is also expected that benchmark references for recognising, validating and certifying professional skills pertaining to the aforesaid qualifications will also be integrated into the CNQ.

Any of these professional qualifications can be certified by means of the Qualifications Certificate obtained through one of the training routes of the NQS, namely Apprenticeship Courses, Professional Courses, Youth Education and Training Courses, Adult Education and Training Courses and Certified Modular Training, in conformance with the respective specific legal frameworks of each of the training modalities.

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(d) Is information on these schemes publicly available? Are lists of certified or qualified installers published? If so, where? Are other schemes accepted as equivalent to the national/regional scheme?

All the information regarding certification, professional profiles, training benchmarks and benchmarks for the recognition, validation and certification of professional skills is available on the respective websites of the DGEG (http://www.dgge.pt) and the ANQ (http://catalogo.anq.gov.pt; http://www.anq.gov.pt).

(e) Summary of existing and planned measures at regional/local levels (where relevant):

The local initiatives are part of the national scheme presented above.

4.2.6. Electricity infrastructure development (Article 16(1) and Article 16(3) to (6) of Directive 2009/28/EC)

(a) Reference to existing national legislation concerning requirements related to the energy grids (Article 16):

Table 13 –National legislation in effect concerning requirements related to energy grids

Legislative provision	Date of publication	Description
Decree Law No.172/06	23-08-2006	Sets out the general principles for the organisation and functioning of the national electricity system (NES), approved by Decree Law No. 29/2006, of 15 February, regulating the legal system applicable to the activities of production, transmission, distribution and sale of electricity and the organisation of electricity markets. Amongst other things this law stipulates the conditions for accessing the public electricity grid (transmission and distribution), the criteria for preparing the grid Investments Plans and the principle of the respective consultation, as well as the information that must be published by the operator of the transmission and distribution network.
Decree Law No. 232/07	15-06-2007	It establishes the regime for assessing the effects of various plans and programmes on the environment, transposing Directives Nos. 2001/42/EC, of the European Parliament and of the Council, of 27 June, and 2003/35/EC, of the European Parliament and of the Council, of 26 May, to the national juridical framework. In particular, it establishes a framework that ensures that the plan for the National Transmission Grid is subject to this evaluation, as well as the rules for this procedure.

(b) How is it ensured that transmission and distribution grids will be developed with a view to integrating the targeted amount of renewable electricity while maintaining the secure operation of the electricity system? How is this requirement included in the transmission and distribution operators' periodical network planning?

Both the operator of the transmission network as well as the operator of the distribution network regularly present Development and Investment Plans for the Transmission Network and the Distribution Network (respectively, the PDIRT and the PDIRD), in which they present a comprehensive plan for the short and medium term (5 and 10 years) with regard to how the network will be developed, in relation expanding and remodelling their infrastructure and associated costs.

This plan always takes into consideration the targets fixed by the government with regard to the production of renewable electricity (in addition to contemplating the development and evolution of thermal capacity and large hydel projects). The grid is developed gradually and progressively, in conformance with the objectives established by the executive and incorporating a capacity surplus that is suitable for the expansion

envisaged by this plan. It is also important to note that these plans are reviewed regularly, so as to be continually up to date and in harmony with the directives of the energy policies for the electricity sector that are in effect.

At the same time that these plans are prepared, the operator of the electricity network also prepares a Report on the Security of Supplies, in collaboration with the Directorate General for Energy and Geology. The report aims to ensure the security of electricity supplies in the medium and long term, by analysing diverse scenarios for demand and the production of energy, which includes compliance with the RES goals, minimising the risk of supply failures. This plan details the scheduled construction of the new hydroelectric plants as well as the CCGTs that have already been licensed, which guarantee the existence of a reserve capacity and sufficient flexibility in the electricity producing system that are sufficient to support the growth of intermittent renewable energy sources, more specifically, wind energy plants, in periods when their output is lower.

(c) What will be the role of intelligent networks, information technology tools and storage facilities? How will their development be ensured?

Intelligent networks, information technologies and storage facilities, as well as electric vehicles, will play an important role in guaranteeing the security of Portugal's supplies, enabling a better management of consumption and, consequently, greater energy efficiency.

The emphasis on intelligent electricity networks, coupled with the introduction of electric vehicles, will enable a greater and more efficient monitoring, control and integrated management of the production, storage, transmission, distribution and consumption of energy, by shifting some consumption from the periods when there is a greater demand for electricity (peak and full use periods) to periods when there is a greater availability of supply and less demand, especially during off-peak hours, where an excess of renewable supply is concentrated.

These two specific projects (intelligent networks and electric mobility) are the two major technological pillars of the Portuguese energy policy, benefiting from great support both on the part of the political authorities as well as private institutions, which see these energy solutions developed in Portugal as an excellent opportunity to export national technology and to contribute towards a more efficient and sustainable global economy.

The construction of new hydel initiatives and an increase in the reversible capacity in hydroelectric plants are the most effective ways of developing the capacity to store energy on a large scale in the short term until a more effective development of intelligent networks and information technologies takes place.

Portugal will of course also take into consideration and monitor the work undertaken in this area by the national scientific and technological system, including laboratories, universities and technology-based companies, researching new and innovative storage solutions, through hybrid solutions, more specifically resorting to the hydrogen vector,

new batteries, innovative substances and materials, which make it possible to regularise the production of intermittent RES.

(d) Is the reinforcement of the interconnection capacity with neighbouring countries planned? If so, which interconnectors, for which capacity and by when?

The Iberian market is already reasonably interconnected, but decisions have been made to reinforce these interconnections. Investments have been scheduled that will make it possible to achieve a commercial interconnection capacity with Spain of 3,000 MW, by 2014. This goal is more than the first target that was established and implies the development of two more 400 kV interconnections:

- Northwest Portugal – Galicia (in addition to the dual 400 kV line which already exists);
- Algarve – Andalusia;

These two interconnections with Spain also achieve other objectives, namely, reinforcing support for the distribution networks, and serve other consumption purposes (supplying the high speed railway link between Porto and Vigo), while also making it possible to receive new production.

It is also necessary to note, however, that in order to ensure that there is sound development of the capacity to interconnect the Iberian Peninsula with the rest of Europe, so as to reinforce the security of European supplies, it is extremely important to reinforce the connections between Spain and France, resolving, more specifically, the existing blockage in the Pyrenees, and thus enabling a connection with Europe, creating a real European market. Only then will it be possible to ensure access by Portugal and Spain to the rest of Europe and accelerate their integration into the Southwest Europe Electricity Market.

(e) How is the acceleration of grid infrastructure authorisation procedures addressed? What is the current state and average time for getting approval? How will it be improved?

The authorisation of a project that is destined to be part of the National Transmission Network (NTN) entails a series of stages and procedures, which all have time frames that are sufficient to correctly evaluate the solution and concept that has been submitted, including the participation of the population in the public consultation process with regard to the EIA, which is an essential step for these projects to be subsequently accepted by the communities that will be affected by them. The normal overall duration for implementing a project for the NTN, from taking the decision to implementing the project until it goes onstream, ranges from between 3 to 5 years. Various factors contribute towards this time frame, including: the need for a public consultation within the scope of the EIA; the existence of social opposition, sometimes even extending to the local authorities; the frequent existence of litigation by private

individuals and municipal authorities with regard to decisions made by central administration; as well as problems relating to legal appeals derived from legal actions with regard to both environmental as well as administrative licensing. This time frame does not include the phase of associated strategic environmental planning and assessment, which is carried out before the decision to proceed with the project.

The procedures and the respective time frames for the decisions have been defined in detail in national legislation. For example, within the scope of the EIA procedure, the system is essentially based on an assessment carried out by an assessment committee comprising technical experts from the Portuguese Environmental Agency (APA) and technical experts from other bodies of the central and regional administration, while the respective decisions are binding for the administrative authorities. The bodies, the promoters and the associations that have an interest in an EIA (such as the Portuguese Association for Impact Assessments) have maintained an open dialogue while analysing procedural constraints and in order to promote best practices. Portuguese legislation likewise envisages the existence of a formal advisory body to monitor the EIA procedures on a national level, namely, the Advisory Council for Environmental Impact Assessments, to which a representative of the NTN operator has been invited.

So as to streamline the procedures for authorising network infrastructure, the government is currently studying, in collaboration with the entities involved, ways of promoting and improving efficacy within the scope of EIA and administrative licensing procedures, in keeping with the instruments for territorial management, which could entail adjusting the government model and greater coordination between different state bodies.

However, one of the major reasons for the delay in licensing procedures is due to societal opposition, within the scope of public consultation, which frequently implies changes or even the unfeasibility of projects. One of the measures that must be implemented, before commencing the process of licensing the infrastructure, is to reinforce communications on important aspects and the effects of this infrastructure on the population, where the EIA process can and must be used to contribute towards ensuring the compatibility of all the interests involved.

(f) How is coordination between grid infrastructure approval and other administrative planning procedures ensured?

The plan that serves as the basis for developing the NTN is the PDIRT, which is prepared by the concessionaire and is evaluated by the DGEG, after hearing the opinion of the Energy Services Regulatory Entity (ESRE). The preparation of the PDIRT and its strategic environmental evaluation (SEE) takes into consideration the guidelines of the energy policy, the NTN planning safety standards, the needs of the delivery capacity (or reception, with a growing supply by the SPR) to the National Distribution Network (NDN) and connections to electricity production plants and industrial consumers. It also considers broad options of a spatial/ territorial nature so as to take into consideration other plans for development and territorial, urban and industrial organisation and aspects such as the preservation of nature, protecting water

resources, tourism, protecting archaeological and built patrimony, etc. In this context, diverse other entities and bodies are heard, as are the municipalities, by means of a public consultation. The SEE indicates criteria and commitments that must be observed while developing the projects.

The analysis during the planning phase is carried out on a large scale and on a strategic plane. During the development of the projects themselves, compliance with the criteria and commitments derived from the SEE is monitored, in addition to refining the analysis and the spatial framework for locating the infrastructure, with different possible alternatives. Compatibility (normally within the scope of the Environmental Impact Studies) with other plans for development and territorial organisation is also ascertained during this phase.

(g) Are priority connection rights or reserved connection capacities provided for new installations producing electricity from renewable energy sources?

The preparation of the Transmission Network Development and Investment Plan (PDIRT) keeps in mind the scheduled targets and the strategy that has been approved by the Portuguese State with regard to the capacity installed in plants based on RES, ensuring a reserved capacity for these future plants. The connection of these plants is authorised in each point of the network up to the limits derived from the planned network capacity. The overall value of these capacities is higher than the goals that have been fixed and hence there have not been any limitations for installing the renewable energy capacities that have been attributed up to now.

(h) Are any renewable installations ready to come online but not connected due to capacity limitations of the grid? If so, what steps are taken to resolve this and by when is it expected to be solved?

There are no renewable energy installations facing such limitations, thanks to the planning process mentioned above (see line (g)). Consequently, during the licensing process permission is only given to build electricity producing facilities, irrespective of whether or not they are based on RES, if the recipient network has the necessary capacity to receive the production. This guarantees, from the outset, the connection of all the plants whose construction has been authorised.

In the future, the new PDIRT envisages the gradual and phased expansion of the electricity network, keeping in mind the targets indicated by the Portuguese State, so as to ensure that network bottlenecks do not occur.

(i) Are the rules on cost sharing and bearing of network technical adaptations set up and published by transmission and distribution system operators? If so, where? How is it ensured that these rules are based on objective, transparent and non-

discriminatory criteria? Are there special rules for producers located in peripheral regions and regions with low population density?

The legal and regulatory rules that have been defined for the transmission network have established, in general terms, that the internal development of the network is supported by tariffs paid by consumers. The producers promote and pay for the line connecting their new enterprise to the connection point, on a pre-existing or planned network, which has been defined beforehand. They also pay for the connection panel in the facility they are connecting. In cases in which a more complex cost-sharing arrangement is necessary, this is established by means of negotiations between the producer and the network concessionaire.

(j) Please describe how the costs of connection and technical adaptation are attributed to producers and/or transmission and/or distribution system operators? How are transmission and distribution system operators able to recover these investment costs? Is any modification of these cost-bearing rules planned in the future? What changes do you envisage and what results are expected?

The transmission and distribution system operators are responsible for reinforcing and expanding the electricity network, supporting the resulting costs. These costs are integrated into the network tariffs and are paid for by the customers.

In turn, electricity producers are responsible for connecting their production plant to the electricity network and are only responsible for the costs associated with building this link.

The operator of the transmission network recovers its investments by means of the network tariff, in the same way as in the case of any other investment it makes in the network it operates.

(k) Are there rules for sharing the costs between initially and subsequently connected producers? If not, how are the benefits for subsequently connected producers taken into account?

The network elements (lines, transformers and facilities) that are financed by the promoters for the connection to the public network can be divided into two categories:

- Elements that become assets of the public network after they are built, whose operation and maintenance then becomes the responsibility of the network operator;

- Elements that continue to be the property of the promoter.

In the first case, if a new promoter uses these elements for their connection within a period of 5 years after the respective network element became operational, then they

must compensate the first promoter in a manner that is proportional to the installed capacity.

In the second case, since these elements belong to a private entity, the costs are shared as per agreements between the promoters.

(l) How will it be ensured that transmission and distribution system operators provide new producers wishing to be connected with the necessary information on costs, a precise timetable for processing their requests and an indicative timetable for their grid connection?

As per prevailing legislation it is obligatory to make such information available.

Before connecting the plants to the public network meetings are held between the operator of the said network and the promoter, where they discuss the existence of the grid capacity, the costs involved and the time frames for the various phases for connecting to the grid. Support is also provided for drawing up the technical specifications for the project and, subsequently, while monitoring and inspecting the construction of the line connecting the new plant. The network operators make significant efforts in such endeavours and the success of this process has been recognised by the promoters.

4.2.7. *Electricity network operation (Article 16(2) and Article 16(7) and (8) of Directive 2009/28/EC)*

(a) How is the transmission and distribution of electricity from renewable energy sources guaranteed by transmission and distribution system operators? Is priority or guaranteed access ensured?

Electricity producers whose plants are based on the use of RES, with the exception of hydel plants that are not covered by Decree Law No. 189/88 and its subsequent amendments and renewable energy cogeneration plants that have opted for the general modality defined in Decree Law No. 23/2010, benefit from a guarantee that the transmission or distribution network will receive the electricity produced in their plants.

In effect, the electricity produced from renewable energy sources has priority over electricity that is produced from other, non-renewable sources and it is compulsory for the former to enter the transmission or distribution network.

The hydroelectric plants that are not covered by Decree Law No. 189/88 and its subsequent amendments and the renewable energy cogeneration plants that have opted for the general modality defined in Decree Law No. 23/2010 have been integrated into the electricity market and hence their production is defined by means of the organised market or by means of bilateral contracts.

(b) How is it ensured that transmission system operators, when dispatching electricity generating installations give priority to those using renewable energy sources?

With the exception of the hydroelectric plants and the renewable energy cogeneration plants that have been integrated into the electricity market, the operators of the transmission or distribution system are obliged by legislation (Decree Law No. 312/2001) to receive the energy derived from electricity plants that use sources of renewable energy, thus ensuring that such plants have priority.

(c) How are grid- and market-related operational measures taken in order to minimise the curtailment of electricity from renewable energy sources? What kinds of measures are planned and when is implementation expected?

Currently, forecasts are being prepared for wind energy production so as to ensure that measures can be taken in due course to minimise the impact of intermittent supplies of wind energy in the network. It is likewise important to note that the expected capacity for thermal plants (in the light of what is scheduled to be installed) will be sufficient to overcome these challenges of intermittent supplies.

Moreover, the operator of the national transmission network has an interruption mechanism, which, in exceptional situations in which the system is overloaded, allows the operator to immediately interrupt the supply of electricity to industries that are intensive consumers of energy. Hence, this mechanism is an important system service and functions as a preventive measure that promotes the security and the stability of the electricity system.

During occasional situations of an excess of renewable energy, more specifically during off-peak periods coupled with an abundant hydel supply, pumped hydro storage solutions have been employed, using reversible hydel plants to integrate this energy, along with exporting the energy whenever possible.

In the future, the implementation of a diverse series of measures has been planned both on the side of demand as well as on the side of supply, which can contribute to avoid the curtailment of renewable production during off-peak periods. Of these measures, some of the more relevant aspects can be highlighted:

i. Scheduled investments in reversible capacity; the construction of a significant series of new hydel facilities has been planned along with a reinforcement of the capacity of existing hydel plants, with a pumped hydro storage capacity (3,266 MW reversible by 2020);

ii. It is obligatory for wind energy producers to carry out investments to increase the stability of the electricity system and attenuate drops in voltage;

iii. Reinforcing connectivity with Spain, which makes it possible to export surplus renewable energy;

iv. Promoting electric vehicles, by launching the MOBI.E. Programme. Electric mobility will be supported by the design and development of a network of stations for charging the batteries of these vehicles, which, in the case of slow charges, will make it possible to store the energy produced at night, which could possibly be integrated into the network during periods of greater demand;

v. Focusing on intelligent electricity networks, not just to ensure the success of the introduction of electric vehicles but, above all, because they promote flexibility for managing networks.

(d) Is the energy regulatory authority informed about these measures? Does it have the competence to monitor and enforce implementation of these measures?

In Portugal the authority that is responsible for regulating the energy sector, from the economic point of view, is the Energy Services Regulatory Entity (ESRE). ESRE has been entrusted with the public service mission of regulating the electricity and natural gas sectors. It has been attributed a series of competences by means of legislation and its statutes, which include protecting the rights and interests of consumers with regard to prices, services and the quality of service, verifying compliance with public service obligations and diverse legal, regulatory and other obligations, and implementing liberalisation in the electricity and natural gas sectors.

In this context, it must perforce be informed about the implementation of these measures, since such information is relevant for its mission and its sphere of competences. However, monitoring and controlling the said measures falls within the purview of the competences of the Ministry for the Economy, Innovation and Development, by means of the Directorate General for Energy and Geology, which is the entity responsible for the technical regulation of the energy sector, with the support of the system operator (NES).

(e) Are plants generating electricity from renewable energy sources integrated in the electricity market? Could you please describe how? What are their obligations regarding participation in the electricity market?

The hydroelectric plants that are not covered by Decree Law No.189/88 and its subsequent amendments have been integrated into the electricity market, competing equally with thermal plants.

With regard to other facilities producing electricity that use renewable energy sources, they have been integrated into the electricity market by means of the Last Resort Vendor, which is obliged to acquire all the production of these plants by means of a regulated FIT, which can vary according to the renewable technology being used.

This regulated tariff is ensured for a given period of time, which is defined in the applicable legislation and is necessary so as to allow the investments that have been made in renewable energy plants to be recovered. At the end of this period, these facilities are integrated into the market.

In the future, depending on the evolution of the competitiveness of technologies and their degree of maturity, the plants that produce electricity from renewable energy sources could cease to benefit from a regulated FIT and could be immediately integrated into the electricity market. However, for the time being, no time frames have been defined for such measures to be implemented.

With regard to cogeneration using renewable sources, Decree Law No. 23/2010 established that such production will be directly integrated into the electricity market and envisages the payment of a market participation premium.

The form and amounts of these premiums are currently in the process of being regulated.

(f) What are the rules for charging transmission and distribution tariffs to generators of electricity from renewable energy sources?

Producers generating electricity from RES do not pay transmission and distribution tariffs. The costs inherent to transmission and distribution are taken to ESRE by transmission and distribution network operators as costs for the General Use of the System and as such are paid for by consumers with regulated tariffs.

4.2.8 Biogas integration into the natural gas network (Article 16(7) and Article 16(9) and (10) of Directive 2009/28/EC)

(a) How is it ensured that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources?

In Portugal tariffs for accessing the networks are defined in a non-discriminatory manner by ESRE (an independent regulatory entity).

(b) Has any assessment been carried out on the need to extend the gas network infrastructure to facilitate the integration of gas from renewable sources? What is the result? If not, will there be such an assessment?

Typically in Portugal, regardless of its origin, biogas has been used almost exclusively for the production of electricity, especially by means of using effluents from the agro-livestock sector and from the treatment of waste water collected at the respective waste water treatment plants (WWTP). The authorities have only recently begun to consider using biogas produced in landfills and from the management of solid urban waste for purposes other than the production of electricity, more specifically the production of biomethane for transport and integration into the natural gas (NG) network.

In this context, no assessment has yet been made regarding the expansion of the gas infrastructure to accommodate the integration of gas from renewable sources of

energy. In this initial phase, this viability study will be carried out according to each concrete project.

(c) Are technical rules on network connection and connection tariffs for biogas published? Where are these rules published?

In its chapter dedicated to "Network Connections", in the context of gas producing plants, the Regulations for Commercial Relations for the Natural Gas Sector, issued by ESRE, already makes it compulsory for operators to allow connections to their network by all gas producing plants that apply for such connections, if they meet the technical and legal requirements that are necessary for their operations and comply with the rules that have been stipulated in the said regulations.

Thus, with reference to biomethane, although no specific technical rules have been framed in this regard, in order to be injected into the NG network it will have to likewise comply with the technical specifications imposed by the regulator and by the network operator.

Considering that the NG network supplies the most industrialised and the most densely populated regions in mainland Portugal, this is the main and most interesting channel for transporting biomethane to consumers.

In addition to the technical conditions and access tariffs, biomethane producers must also recruit their customers – a consumer or a vendor. The Regulations for Managing Energy Consumption for the transport sector are expected to be revised and in all likelihood will include benefits for the use of biofuels in transport. Since biomethane is a biofuel, fleets of vehicles functioning on NG could benefit from buying biomethane from the network.

It must be noted that this mechanism to support biomethane injected into the network can only be implemented having regard to mass balances, since supply and consumption will be at different points.

The sale of biomethane to the NG network by means of a regulated tariff, as in the case of the sale of electricity generated from renewable sources to the electricity network, could be a possible option but it will be necessary to reflect upon management models and the remuneration of supplies, not just from the technical and financial point of view but also from the perspective of sustainability and guaranteeing the said supplies.

4.2.9. District heating and cooling infrastructure development (Article 16(11) of Directive 2009/28/EC)

(a) Please provide an assessment of the need for new district heating and cooling infrastructure using renewable energy sources and contributing to the 2020 target. Based on this assessment, are there plans to promote such infrastructures in the

future? What are the expected contributions of large biomass, solar and geothermal facilities in the district heating and cooling systems?

Owing to Portugal's climatic conditions, which generally comprise a temperate Mediterranean climate (higher temperatures in summer and mild temperatures during the winter), significant investments have not been made in the district heating and cooling infrastructure, as it is difficult to ensure profitability owing to low levels of usage.

Therefore, the targets for 2020 relating to the share of energy consumption for heating and cooling based on RES do not include the construction of significant infrastructure for district heating and cooling.

It is possible that occasionally heating infrastructure based on the use of the low enthalpy of geothermal energy could be developed, in areas that use hydrothermal waters, as well as heat distribution infrastructure associated with the construction of thermal electricity plants using forest biomass. However, it is presently not possible to identify and quantify these investments.

In this context, the plan has instead opted to focus on energy efficiency and on distributed renewable energy production units, such as solar thermal solutions.

*4.2.10. **Biofuels and other bioliquids — sustainability criteria and verification of compliance (Articles 17 to 21 of Directive 2009/28/EC)***

(a) How will the sustainability criteria for biofuels and bioliquids be implemented at national level? (*Is there legislation planned for implementation? What will be the institutional setup?*)

The sustainability criteria will be transposed to the national juridical framework by means of the decree law that will implement the contents of Directive 2009/28/EC. Orders could also be issued to regulate questions regarding the definition of the conditions of use and the geographical limits of grazing grounds (to be established by the European Commission, as stipulated in the last paragraph of Art. 17(3) of Directive 2009/28/EC), along with a manual of procedures issued by the coordinating entity that is responsible for issuing the certification for compliance with the sustainability criteria.

(b) How will it be ensured that biofuels and bioliquids that are counted towards the national renewable target, towards national renewable energy obligations and/or are eligible for financial support comply with the sustainability criteria set down in Article 17(2) to (5) of Directive 2009/28/EC? (*Will there be a national institution/body responsible for monitoring/verifying compliance with the criteria?*)

Proof of compliance with the sustainability criteria will be obtained by using audit and verification companies, which have been duly recognised for this purpose by the European Commission. Such companies must comply with a series of procedures and requirements to prove their competence in this area and their capacity to work closely with the various zones where the raw materials are grown and throughout the value chain for biofuels and bioliquids. These competences can also be assessed by their participation in other certification schemes such as those that are used for genetically modified crops or for licences for CO_2 emissions. The work of these audit and verification companies will be monitored and must be easily verifiable. These bodies must publicise and ensure that their procedures are transparent and obtain all the necessary documentation to prove compliance with the said sustainability criteria.

Naturally, in order to ensure that biofuels and bioliquids can access support mechanisms and can be counted for the purposes of compliance with the minimum incorporation quotas stipulated in the national legislation they will perforce have to comply with the legislation in effect with regard to the sustainability criteria. This will be verified by the coordinating entity that is responsible for issuing the certification for compliance with the sustainability criteria.

(c) If a national authority/body will monitor the fulfilment of the criteria, does such a national authority/body already exist? If so, please specify. If not, when is it envisaged to be established?

The creation of a coordinating entity that is responsible for issuing the certification for compliance with the sustainability criteria has been envisaged. This entity will analyse the documentation presented by the producers of biofuels and bioliquids and will calculate the greenhouse gas emissions that have thus been avoided. By means of voluntary and auditable schemes, the producers of biofuels will obtain the documentation that is necessary to verify the sustainability criteria. This entity is expected to be constituted in the first half of 2011.

(d) Please provide information on the existence of national law on land zoning and national land register for verifying compliance with Article 17(3) to (5) of Directive 2009/28/EC. How economic operators can access to this information? (*Please provide information on the existence of rules and distinction between different land statuses, like biodiversity area, protected area etc; and on the competent national authority who will monitor this land register and changes in land status.*)

The areas or lands mentioned in Art. 17(3)(a) and 17(4)(b) of Directive 2009/28/EC are the responsibility of the National Forest Authority (NFA).

The wetlands mentioned in Art. 17(4)(a) and Art. 17(5) of Directive 2009/28/EC are the responsibility of the National Water Institute (INAG).

The Institute for the Conservation of Nature and Biodiversity (ICNB) is responsible for the competences derived from the legislation in effect for the conservation of

nature and biodiversity, more specifically with regard to Art. 17(3)(b)(i) and (ii) of Directive 2009/28/EC, for the territory of mainland Portugal. Its website provides information on identification and the legislation that is applicable to these areas.

Table 14 – National legislation pertaining to the areas mentioned in Art. 17(3)(b)(i) and (ii) of Directive 2009/28/EC

Legislative provision	Publication	Description
Decree Law No. 142/2008	24-07-2008	Established the legal system for the conservation of nature and biodiversity and revoked Decree Law Nos. 264/79, of 1 August and 19/93, of 23 January
Amendment No. 53-A/2008	22-09-2008	Amended Decree Law No. 142/2008, of 24 July, which established the legal system for the conservation of nature and biodiversity
Cabinet Resolution No. 102/96	08-07-1996	Integration of sectorial policies in protected areas

For comprehensive and updated information on protected areas in Portugal, please see the ICNB website (www.icnb.pt).

(e) As far as protected areas are concerned, please provide information under which national, European or international protection regime they are classified.

The areas that have been classified within the scope of nature conservation have been organised by means of the National System for Classified Areas (SNAC), which, in addition to the National Network of Protected Areas also includes the classified areas that are part of the Nature 2000 Network and other areas that have been classified within the scope of international commitments made by the Portuguese State.

The regimes pertaining to the classified areas have been established in articles 9 to 27 of Decree Law No. 142/2008, of 24 July.

(f) What is the procedure for changing the status of land? Who monitors and reports at national level on land status changes? How often are the land zoning registers updated (monthly, annually, bi-annually, etc.)?

The procedure for classifying areas with a view to nature conservation has been described in articles 9 to 27 of Decree Law No. 142/2008 (and the specific regimes cited therein). The ICNB is responsible for proposals, information and communications regarding the classification or declassification of areas with a view to nature conservation.

No time frames have been established for classifying areas within the scope of nature conservation.

(g) How is compliance with good agro-environmental practices and other cross-compliance requirements (required by Article 17(6) of Directive 2009/28/EC) ensured and verified at national level?

The entity responsible for verifying compliance with the minimum requirements for good agricultural and environmental conditions, defined in Art. 6(1) of (EC) Regulation No. 73/2009 of the Council, of 19 January 2009, which establishes common rules for the regimes of direct support for farmers within the scope of the Common Agricultural Policy (CAP) and institutes given regimes for support to farmers, is the Institute for Financing Agriculture and Fisheries (IFAP). This institute carries out verifications on the basis of the reports and documentation provided by the Regional Directorates for Agriculture and Fisheries, which, based on a logic of closer physical proximity, develop their work on the ground by means of Local Support Structures, which directly monitor and collect pertinent information from farmers that makes it possible to audit compliance with the said regulations, whenever support provided by the CAP is involved.

(h) Do you intend to help develop voluntary 'certification' scheme(s) for biofuel and bioliquid sustainability as described in the second subparagraph of Article 18(4) of Directive 2009/28/EC? If so, how?

Yes. The system described above in lines a), b) and c).

4.3. Support schemes to promote the use of energy from renewable resources in electricity applied by the Member State or a group of Member States

Regulation

Regulation can set target(s) and obligations. In case there is such an obligation please detail it:

The existing regulation on a national level includes the Special Production Regime (SPR), created by Decree Law No. 312/2001, of 10 December, which establishes, in Article 5, that the Last Resort Vendor is obliged to receive all SPR production (electricity produced from renewable energy plants and cogeneration plants).

In Portugal there is no regulatory mechanism to support the promotion of the use of RES to produce electricity, which requires a distributor or consumer to have a percentage of renewable energy in their energy mix. The vendor only has the duty to provide information.

Although the National Energy Strategy 2020, which is not a regulatory diploma but rather a ministerial resolution, establishes specific targets according to the technologies and for the year 2020, the specific goals for the technologies and years, in the electricity sector, with which Portugal aims to achieve the target of 31% renewable energy, are shown in charts 10a and 10b of point 5.1 of this document.

Financial support

Specific questions for **financial support for investments**:

In terms of attributing subsidies, some types of projects for producing electricity from renewable sources are eligible for the QREN, more specifically for the system of incentives to encourage innovation for technology projects and the system for incentives for research and technological development.

These systems for incentives attribute subsidies that range from 35% to 55% of the eligible expenditure, under the terms of the respective regulations published in Orders Nos. 353-B/2009 and 353-C/2009, both of 3 April.

With regard to the regimes for fiscal support plans are being drawn up to create a task-force or working group to review the fiscal framework in the energy sector with a view to correcting some asymmetries that currently exist, so as to promote the use of RES and energy efficiency, in line with the objectives of the NES 2020 and this Plan. The principle of fiscal equitability must reflect:

- The energy content and the renewable component in the products;
- The environmental impact with regard to greenhouse gases (reductions per fuel and technology);
- Rewarding technological innovation, the use of waste and the use of crops with a favourable CO_2 balance.

To this end, Order No. 10289-A/2010, of 14 June, determined the constitution of a working group for the tax framework of energy markets, whose mission is to analyse the tax problems associated with the energy and natural resources sectors and to prepare the respective proposals for legal and regulatory texts that prove to be relevant. More specifically, this working group is responsible for:

a) Preparing a proposal for the legal system of taxation for electricity, which will transpose to the national legal framework Directive 2003/96/EC, of the Council, of 27 October, which restructures the EU framework for the taxation of energy products and electricity;

b) Preparing the rules for the fiscal framework for the Iberian Electricity Market (MIBEL) and the Iberian Natural Gas Market (MIBGAS);

c) Preparing the rules for the tax framework for the market for CO_2 emissions licences.

Specific questions for **feed-in fixed tariffs**:

SPR renewable energy

The producers of electricity based on renewable energy sources are remunerated on the basis of a formula established by means of legislation (Decree Law No. 189/88, while the latest updates have been introduced by means of Decree Law No. 225/2007):

VRDm = {KMHOm x [PF(VRD)m + PV(VRD)m] + PA(VRD)m x Z} x (IPCm-1/IPCref) x [1/(1-LEV)]

The elements of the formula represent different factors that influence the value of the remuneration for the supply of electricity produced in renewable energy plants delivered to the network.

KMHOm: This is the modelling coefficient according to the times when the electricity has been supplied

PF(VRD)m: This is the fixed component of the remuneration applicable to renewable energy plants, in month m, which represents the costs of investment avoided in building new conventional electricity producing plants

PV(VRD)m: This is the variable component of the remuneration applicable to renewable energy plants, in month m, which represents the operating costs avoided in conventional electricity producing plants

PA(VRD)m: This is the environmental component of the remuneration applicable to renewable energy plants, in the month m, which represents the environmental costs avoided in terms of the reduction of CO_2 emissions

IPC m-1/IPCref: This is the factor that adjusts the formula in accordance with inflation (IPC m-1: This is the consumer price index, without housing, in mainland Portugal, referring to month m-1 and the IPCref: is the consumer price index, without housing, in mainland Portugal, referring to the month before the month in which the renewable energy plant began to supply electricity to the network)

1/(1-LEV): This is the factor that represents the transmission and distribution network losses avoided by the renewable energy plant

The environmental component is multiplied by the coefficient Z, which varies according to the technology associated with the source of renewable energy. Due to the introduction of this coefficient in 2001 (Decree Law No. 339-C/2001), the remuneration system for RES, which was only based on costs avoided, evolved towards a concept that considered differentiated costs according to the diverse technologies. This thus established a differentiated remuneration based on the technology being used.

Under the terms of point 25 of Annex II of Decree Law No 189/88, with the changes introduced by means of Decree Law No. 225/2007, the FITs are updated at suitable intervals, so as to reflect the updated investment and operational costs of each technology, inflation and the price of energy.

Within the scope of the NES 2020, keeping in mind the contribution of new technologies for the production of renewable electricity, as well as the costs associated with developing these technologies, this support mechanism will be reviewed at the beginning of the second half of 2010 so as to create a framework for economic sustainability that supports the long term growth of the use of renewable energy.

The tariffs that have been in effect during the past 2-3 years can be seen in the following table:

Table 15 – Average indicative tariffs – Renewable Energy (DL No. 225/2007)

Technology	Average indicative tariffs (€/MWh)	Coefficient Z	Validity of the tariff and other observations
Wind nergy	74 - 75	4.6	33 GWh/MW or 15 years
Hydel energy up to 10 MW	75 - 77	4.5	52 GWh/MW or 20 years. In exceptional cases 25 years
Photovoltaic > 5 KW	310 – 317	35	21 GWh/MW or 15 years
Photovoltaic <= 5 KW	450	52	
Solar thermoelectric <=10MW	267 - 273	29.3	
PV microgeneration <=5KW	470	55	15 years. When installed in residential, commercial, service or industrial buildings
PV microgeneration <5KW and <=150 KW	355	40	
Forest biomass	107 – 109	8.2	25 years
Animal biomass	102 - 104	7.5	
Anaerobic digestion biogas, Solid Urban Waste, WWTP and effluents and wastes from the agro-livestock and agro-food sectors	115 – 117	9.2	15 years. When the limits for capacity installed on a national level are exceeded, Z becomes 3.8
Landfill gas	102 - 104	7.5	
Solid Urban Waste (burning)	53 – 54	1	15 years
FdW (burning)	74 - 76	3.8	
Wave energy (demonstration up to 4 MW)	260	28.4	15 years
Wave energy (pre-commercial up to 20 MW)	191	16 - 22	15 years. Z is fixed by an Order keeping in mind the interval
Wave energy (commercial):			15 years. Z is fixed by an Order, taking into account the interval and the strength of the project
First 100 MW	131	8 – 16	
Next 150 MW	101	6 – 10	
Next MW	76	4.6	

The support mechanism described above is voluntary and the managing entity is the DGEG.

The aforesaid tariffs are borne by the Last Resort Vendor and are subsequently reflected in the expenditure for the General Use of the System, which, in its turn, is reflected in the electricity tariffs paid by consumers.

Bearing in mind the extensive progress that has been achieved in terms of installed capacity based on RES, it can be seen that the introduction of these differentiated tariffs, adjusted for each technology, has made it possible to create a stable scenario and suitable conditions for private investors, while ensuring the economic viability of projects to produce electricity from renewable sources.

In order to access this support mechanism there is a capacity limit that is conditioned by the electricity transmission and distribution network's technical reception capacity. Once the capacity to inject electricity into the network has been attributed there is no limit to the annual production that benefits from the tariff, however the total production that can benefit from the tariff is limited to an overall energy value or a specific number of years, whichever is reached first. Once these limits have been reached, the plants then sell their production under the open regime. This support mechanism can be accumulated with the systems to support investments in the areas of innovation and technology trials.

SPR renewable cogeneration

Under the terms of Decree Law No. 23/2010 there are two kinds of remuneration regimes: the general regime and the special regime.

In order to be able to access the special regime, the cogenerator must comply with the following conditions:

- Have an installed capacity that is equal to or less than 100 MW;
- Access a licence for the plant after first obtaining a connection to the public service electricity network, under the terms stipulated in Decree Law No. 312/2001, whose text was amended by Decree Law No. 33-A/2005.

Energy is remunerated under the special remuneration regime in the following manner:

- for supplies of thermal energy the remuneration is defined by means of contracts freely signed between the cogenerator and its clients;
- for supplies of electricity to the last resort vendor the remuneration is calculated by applying a reference tariff;
- efficiency premiums, calculated according to primary energy savings;
- renewable energy premium, calculated according to the proportion of renewable fuels consumed.

Energy is remunerated under the general remuneration regime in the following manner:

- for supplies of thermal and electric energy the remuneration is defined by means of contracts freely signed between the cogenerator and its clients;

- premium for participation in the market, calculated as a percentage of the reference tariff; it is only attributed to cogeneration units that have an installed capacity which is equal to or less than 100 MW.

The form, modalities and amounts of these premiums are currently in the phase of being regulated and hence it is not yet possible to define them herein.

For cogeneration plants using renewable sources the reference tariff and the renewable energy, efficiency and market participation premiums are in effect from the commencement of operations and as long as the high-efficiency cogeneration or efficient cogeneration classification is maintained. Only the value of the market participation premium must be reviewed 120 months after the plant goes onstream and for the plant to be deemed to be renewable cogeneration, at least 50% of the primary energy consumed in the plant must be from renewable sources.

Specific questions for **tendering**:

As per the legislation in effect (DL 312/2001), there are two ways of obtaining a connection point to the network: by means of Prior Information Applications (PIA) or by tenders.

The attribution of network connection points by means of a PIA is carried out at the request of the promoters 3 times a year, during the first fortnight of the months of January, May and September, after verifying the network's capacity to accommodate the requests. Before each PIA period is opened the DGEG publishes a notice informing potential applicants on the technologies that can be submitted during this procedure.

The attribution of network connection points by means of tenders is carried out by announcing the launch of the tender, which publicises the available connection points and the respective capacity, as well as the terms for accessing the tender and the way in which the proposals will be evaluated.

With regard to the tenders or the administrative procedures for attributing capacity, there is no pre-determined period or launch routine. They are decided according to the strategy that has been defined and an implementation schedule that makes it possible to comply with the targets that have been established for the energy sector.

The opportunity to promote these administrative procedures always takes into account the development of the network and is consequently associated with the availability of the network to receive the capacity to be injected by these projects.

To date three phases of tenders have been opened for wind energy (for a total of 1800 MW): phase A - 1200 MW, in 2005; phase B – 400 MW, in 2005; phase C – 200 MW, in 2008.

In 2006, 15 tenders were launched for forest biomass thermoelectric plants, for a total of 100 MW, of which only 2 were abandoned, while 96 MW, corresponding to the remaining 13 tenders, have been awarded and some of these plants are already operational.

With regard to the National Programme for High-Capacity Hydroelectric Dams, approved on 7 December 2007, after a comprehensive strategic environmental evaluation, the attribution of capacity was likewise carried out by means of a tender procedure, conducted by the National Water Institute (INAG), in various phases during 2008.

The dates for the new administrative procedures or tenders to attribute capacities for the various RES technologies have not yet been established.

4.4. Support schemes to promote the use of energy from renewable resources in heating and cooling applied by the Member State or a group of Member States

(a) How are the support schemes for electricity from renewable energy sources adapted to encourage the use of CHP from renewable energy sources?

The microproduction programme (Decree Law No. 363/2007) requires the installation of solar thermal panels to be able to access the subsidised tariff for electricity production. On the other hand, individuals who install renewable energy equipment during 2010 will benefit from a tax deduction of € 803.

In the tender for forest biomass thermoelectric plants, the use of the heat generated while producing electricity was appraised and considered as a criterion for the purposes of the evaluation and final classification of the proposals.

(b) What support schemes are in place to encourage the use of district heating and cooling using renewable energy sources?

The Energy Certification System for Buildings (SCE) provides benefits, in terms of classification, for the buildings that use renewable energy for climate control or for heating domestic hot water, thus encouraging the use of renewable energy sources for thermal purposes in buildings.

Energy certification is compulsory for all new buildings or buildings that have undergone extensive remodelling, and is likewise compulsory whenever a fractional unit is transacted (for sale, rental or leasing). Within the scope of these regulations, the use of renewable energy is voluntary, with the exception of heating domestic hot

water, where it is obligatory to install solar thermal collectors whenever the necessary technical conditions for their installation can be met.

In terms of incentives, the investments in solar systems for heating domestic hot water and in other renewable systems can apply for co-financing, for a maximum limit of 70% of eligible expenditure, to the regional operating programme of the energy QREN. Beneficiaries of this programme include:

- Municipalities, associations of municipalities and metropolitan areas;
- Public municipal and inter-municipal companies and municipalized services;
- Direct or indirect bodies of the central public administration;
- Regional, inter-municipal and municipal agencies for the energy and environmental sectors;
- Private, non-profit companies regulated by private law, including private social solidarity institutions or equivalent entities and public sports associations.

These regulations also provide support for training, demonstrations and technical support, whenever agreements have been duly established with entities that are part of the National Scientific and Technological System and within the scope of compliance with the measures of the National Energy Efficiency Plan, enhancing the local and regional energy capacity with a view to promoting renewable energy.

(c) What support schemes are in place to encourage the use of small-scale heating and cooling from renewable energy sources?

In 2009, the Portuguese government launched a programme to support the installation of solar thermal collectors for heating domestic hot water. In an initial phase, the programme was only aimed at domestic consumers and the state support consisted of a subsidy of €1641.70 for each installation. In a second phase, the programme was expanded to private social charitable institutions (PSCI) and to sports associations, contemplating a subsidy that could go up to 65% of the value of the investment that was to be made. This initiative ended on 31 December 2009.

In 2010, so as to comply with the targets established for the area of heating and cooling, two new regulations were created within the QREN.

The first set of regulations, framed within the scope of the "System of Incentives to Qualify and Internationalise SMEs – Diversification and Energy Efficiency" of the QREN, is dedicated to small and medium enterprises (SME) and seeks to support projects that include investments in installing solar thermal systems for heating hot water for domestic use or climate control, as well as investments related to passive surroundings, such as the installation of thermal insulation or the correction of solar factors in glass encased spaces.

The second set of regulations was framed within the support granted by the Regional Operational Programmes for Mainland Portugal (POR) and was aimed at promoting decentralised energy conversion systems and systems using energy supported by a process of energy audits, more specifically, the use of solar thermal energy to produce hot water for domestic use, the rational use of energy and energy and environmental efficiency by means of thermal insulation and the use of solar thermal energy to produce hot water for domestic purposes.

(d) What support schemes are in place to encourage the use of heating and cooling from renewable energy sources in industrial applications?

With regard to industrial applications, the Intensive Energy Consumption Management System (SGCIE) envisages benefits in terms of energy performance for using renewable energy for thermal purposes, thus constituting an incentive to use renewable energy in the industrial sector. It is compulsory for all companies that have an energy consumption of more than 500 toe to comply with the SGCIE and the use of renewable energy is voluntary for the purposes of these regulations.

4.5. Support schemes to promote the use of energy from renewable resources in transport applied by the Member State or a group of Member States

(a) What are the concrete obligations/targets per year (per fuel or technology)? Is there differentiation of the support according to fuel types or technologies? Is there any specific support to biofuels which meet the criteria of Article 21(2) of the Directive?

The annual targets for the use of renewable energy sources in the transport sector have been presented in Table 12 of point 5.1. of this document.

With regard to the use of electricity in the transport sector, the launch of the Mobi.E programme is expected to result in the transfer of fossil consumption to electricity in the transport sector.

This programme has measures to support the decommissioning of vehicles that are more than 8 years old, by attributing a subsidy, and substituting them by electric vehicles. It can be noted that the electric vehicles likewise benefit from exemptions from Automobile Tax and the Road Tax.

The current model to support biofuels, established by means of Decree Law Nos. 62/2006, of 21 March, and 66/2006, of 22 March, whose period of effect concludes on 31 December 2010, is based on the attribution of ISP tax exemptions for two different groups of biodiesel producers:

I – Large biodiesel producers

Large biodiesel producers benefit from an ISP exemption of €280/1000 litres, as a result of a procedure for attributing such an exemption stipulated in Order No. 1391-A/2006, of 12 December, for the year 2007, and in Order No. 1554-A/2007, of 7 December, for the years 2008 to 2010, wherein the criteria for attributing exemptions, in hierarchical order, are as follows:

- Biofuels derived from endogenous agricultural production from regions encompassed by the Programme to Recover Depressed Areas and Sectors of the Economy, as per Cabinet Resolution No. 11/2004, of 22 January;
- Biofuels derived from waste (animal fat or used vegetable oils) and algae of a national origin;
- Biofuels produced within the national territory based on oils that have also been extracted within the national territory;
- Other biofuels produced within the national territory;
- Imported biofuels.

II – Small dedicated producers

In order for a producer to be recognised as a small dedicated producer and benefit from a total exemption from ISP, the producer must submit an application to the Directorate General for Energy and Geology, proving compliance with the criteria that have been established by prevailing legislation, namely:

- They must have an installed capacity that is equal to or less than 3000 tonnes per year;
- Their technology must be based on innovative solutions or at least 50% of the raw materials used must be derived from waste;
- They must deliver the entire production to dedicated clients identified by means of contracts.

Small dedicated producers benefit from a total ISP exemption.

With the publication of Decree Law No. 49/2009, of 26 February, it became compulsory to incorporate biofuels into automotive diesel for a percentage, in volume, of 6% in 2009 and 7% in 2010, keeping in mind the maximum biodiesel content (FAME) permitted by the EN 590 for automotive diesel .

Keeping in mind that the support mechanism for biofuels that is currently in effect concludes on 31 December 2010, a new mechanism is currently being prepared, which will be in effect until the end of 2020 and will be guided by the following general principles:

- Companies responsible for introducing biofuels into consumption must present certificates corroborating the incorporation of biofuels into consumption of a quantity that is equivalent to a certain percentage of incorporation, in terms of energy content, to be established for every year. A necessary condition for the issue of these certificates is that the biofuel corresponding to this incorporation must be certified to be in compliance with sustainability criteria;

- A mechanism to support the use of biofuels produced from waste, residues, non-food cellulosic and lingo-cellulosic material, as well as the use of endogenous non-food raw materials, as an incentive to introduce new raw materials that do not exert pressure on the food industry. Biofuels produced from endogenous agricultural raw materials will also be supported, as long as they are derived from regions that are covered by the Programme to Recover Depressed Areas and Sectors of the Economy, as per Cabinet Resolution No. 11/2004, of 22 January, as a means of supporting rural development;

- The continued implementation of the support scheme for small dedicated producers.

If the necessary number of certificates is not presented then monetary compensation will be applied.

As for the support schemes for investments, some types of projects to produce biofuels, more specifically projects for innovation and technological trials, are eligible for the QREN, more specifically for the system of incentives for innovation for technological trials and the system of incentives for research and technological development. These systems of incentives attribute subsidies that range from 35% to 55% of eligible expenditure, under the terms of the respective regulations published in Orders Nos. 353-B/2009 and 353-C/2009, both of 3 April.

4.6. Specific measures for the promotion of the use of energy from biomass

4.6.1. Biomass supply: both domestic and trade

Keeping in mind the estimated figure for the potential of the (forestry and other) biomass available in Portugal, it is believed that the conditions necessary to achieve the national target that has been established for producing electricity in dedicated plants have been ensured. The national target has been fixed at 250 MW of installed capacity by 2020.

In any case, considering that other uses have been envisaged for biomass, especially the production of pellets for heating, it will be necessary to make efforts to balance public policies and private interests so as to increase and guarantee the availability of the resources. These efforts have been developed by promoting forest cooperatives,

measures that compensate for the absenteeism of forest owners, certification for forests and forest products, amongst other solutions, such as, for example, the promotion of energy crops, systems to support forest clearing and new measures to prevent forest fires.

Chart 3 – Biomass supply in 2006

Sector of origin		Amount of domestic resource[26]	Imported		Exported	Net amount	Primary energy production (ktoe)
			EU	Non-UE	EU/non-EU		
A) Biomass from forestry[27]:	*Of which:*						
	1. Direct supply of wood biomass from forests and other wooded land for energy generation	4,751 kton					1,188
	Optional — if information is available you can further detail the amount of feedstock belonging to this category: (a) fellings (b) residues from fellings (tops, branches, bark, stumps) (c) landscape management residues (woody biomass from parks, gardens, tree rows, bushes) (d) other (please define)						
	2. Indirect supply of wood biomass for energy generation	5,651 kton					1543
	Optional — if information is available you can further detail: a) Residues from sawmilling, woodworking, furniture industry (bark, sawdust) b) By products of the pulp and paper industry (black liquor, tail oil) c) Processed wood-fuel d) Post consumer recycled wood (recycled wood for energy generation, household waste wood) d) Other (please define)	 3,042 kton 2,609 kton					 796 747

26 Amount of the resource in m3 (if possible, otherwise in appropriate alternative units) for category A and its subcategories and in tonnes for categories B and C and their subcategories.

27 Biomass from forestry should also include biomass from forest-based industries. Under the category of biomass from forestry processed solid fuels, such as chips, pellets and briquettes should be included in the corresponding subcategories of origin.

Sector of origin		Amount of domestic resource [28]	Imported		Exported	Net amount	Primary energy production (ktoe)
			EU	Non-EU	EU/non-EU		
B) Biomass from agriculture and fisheries:	*Of which:*						
	1. Agricultural crops and fishery products directly provided for energy generation						
	Optional — if information is available you can further detail: a) Arable crops (cereals, oilseeds, sugar beet, silage maize) b) Plantations c) Short rotation trees c) Other energy crops (grasses) d) Algae d) Others (please define)						
	2. Agricultural by-products/processed residues and fishery by-products for energy generation	27 kton					7
	Optional — if information is available you can further detail: a) Straw b) Manure c) Animal fat d) Meat and bone meal e) Cake by-products (incl. oil seed and olive oil cake for energy) f) Fruit biomass (including shell, kernel) g) Fishery by product h) Clippings from vines, olive trees, fruit trees i) Others (please define)	27 kton					7
C) Biomass from waste:	*Of which:*						
	1. Biodegradable fraction of municipal solid waste including biowaste (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) **and landfill gas**	537 kton SUW + 16,574 Nm^3 Biogás					99
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)						
	3. Sewage sludge						

[28] Amount of the resource in m 3 (if possible, otherwise in appropriate alternative units) for category A and its subcategories and in tonnes for categories B and C and their subcategories.

A Lower Calorific Value (LCV) was used for the different groups of biomass while converting the quantity of resources used in primary energy.

$$E_p = Q_{resource_x} \times LCV$$

In which:

E_p - Primary energy produced (ktoe)

$Qresource$ - Amount of resource used (kton or m^3)

LCV - Lower Calorific Value (ktoe/kton and ktoe/m^3)

The LCV values used to calculate primary energy production have been summarised in table 16.

Table 16 – LCV used to convert the amount of resource into primary energy

Product	LCV	
	ktoe/kton	ktoe/m^3
Wood biomass from forests and other wooded lands	0.250	-
Residues from sawmilling, woodworking, furniture industry (bark, sawdust)	0.262	
Black liquor	0.286	-
Cake by products	0.248	-
Olive cake	0.369	-
Grape cake	0.212	-
Solid Urban Waste	0.185	
Biogas	-	5.5×10^{-7}

Thus, for the wood biomass from forests and other wooded lands, used in dedicated biomass plants and in the domestic sector for heating, an average LCV of 0.250 ktoe/kton has been assumed, for a relative humidity of 40%, while for sawmilling, woodworking and furniture industry residues (bark, sawdust) a LCV value of 0.262 ktoe/kton was used.

On the other hand, keeping in mind that the by products of the pulp and paper industries used to produce energy essentially consist of "*black liqours*", a typical LCV figure of 0.286 ktoe/kton has been considered for this type of biomass.

Keeping in mind that the cake used to produce energy comprises olive cake and grape cake, with an associated LCV of 0.369 ktoe/kton and 0.212 ktoe/kton, respectively, an average weighted calculation of these values was carried out, thus obtaining a LCV of 0.248 ktoe/kton.

The biodegradable fraction of solid urban waste and landfill gases are used exclusively to produce electricity. However, electricity can be produced directly from solid urban waste, whose biodegradable fraction is approximately 50%, or from biogas, thus using the LCV values of 0.1852 ktoe/kton and 5.500 Kcal/m^3 (5.5 x 10^{-7} ktoe/m^3), respectively.

Chart 7a- Estimated biomass domestic supply in 2015 and 2020

Sector or origin		2015		2020	
		Expected amount of domestic resource	Primary energy production (ktoe)	Expected amount of domestic resource	Primary energy production (ktoe)
A) Biomass from forestry:	**1. Direct supply of wood biomass from forests and other wooded land for energy generation**	5,778 kton	1,504	5,610 kton	1,460
	2. Indirect supply of wood biomass for energy generation	5,100 kton	1,442	5,074 kton	1,434
B) Biomass from agriculture and fisheries:	**1. Agricultural crops and fishery products directly provided for energy generation**	990 kton	281	1,043 kton	296
	2. Agricultural by-products/processed residues and fishery by-products for energy generation	60 kton	21	88 kton	30
C) Biomass from waste:	**1. Biodegradable fraction of municipal solid waste including biowaste** (biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises, and comparable waste from food processing plants) **and landfill gas**	215,628 Nm^3	119	313,179 Nm^3	172
	2. Biodegradable fraction of industrial waste (including paper, cardboard, pallets)	0	0	0	0
	3. Sewage sludge	79,753 Nm^3	44	115,833 Nm^3	64

The following graph provides an overview of the estimated evolution of the domestic supply of biomass, in its various forms, using 2006 as a reference year for comparisons, in which the annual energy consumption survey carried out by the DGEG revealed a consumption of forest biomass of more than 4.7 million tonnes.

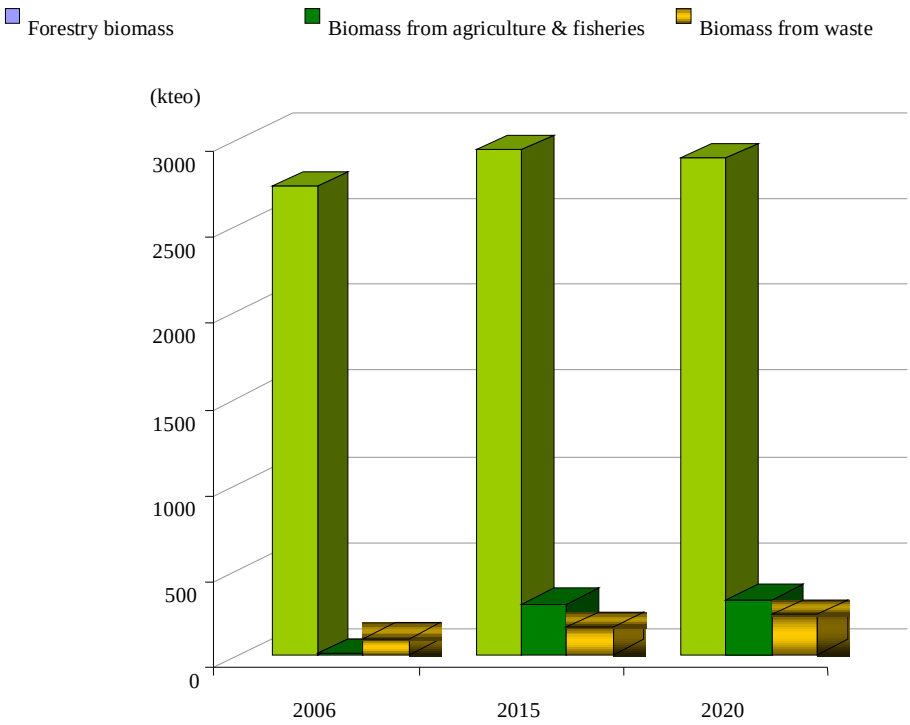

Figure 9 – Estimated evolution of the domestic supply of biomass.

Keeping in mind the demand for biomass in different sectors – Electricity, H&C and Transport – it is expected that Portugal will be able to satisfy the majority of its needs by means of domestic supplies of raw materials. The only exception is in the transport sector, particularly the production of biofuels, where imports will account for a relatively significant value. Effectively, it has been estimated that in 2020 imports for this purpose will touch 431 ktoe, representing more than 90% of the raw materials used to produce biofuels. In overall terms, however, imports will not represent much more than 10% of Portugal's biomass needs, and it is estimated that imports will account for 11% in the year 2020.

With regard to the countries that serve as a source for these imports, keeping in mind the sustainability criteria that have been adopted by the EU, it is currently difficult to identify which countries could be possible sources of imports. All circumstances being equal, the guidelines seek to give preference to transactions within the EU. However, this is an issue that falls within the purview of decisions made by private operators who are responsible for importing the said raw materials and who will undoubtedly

consider factors such as prices and the market conditions for the future certified products.

Chart 4 – Current agricultural land use for production of crops dedicated to energy in 2006

Agricultural land use for production of dedicated energy crops	Surface (ha)
1) Land used for short rotation trees (willows, poplars)	0
2) Land used for other energy crops such as grasses (reed canary grass, switch grass, Miscanthus), sorghum	236

4.6.2. Measures to increase biomass availability, taking into account other biomass users (agriculture and forest-based sectors)

–**Mobilisation of new biomass sources:**

(a) Please specify how much land is degraded.

The term degraded land is believed to refer to lands in which the value of the biophysical environment has been affected by one or more combinations of processes caused by man acting on the earth, including human activities that lead to natural disasters, such as floods and forest fires

However, there are currently no estimates quantifying the amount of degraded land in Portugal.

(b) Please specify how much unused arable land there is.

In 2007 the National Statistics Institute estimated that there were 136,409 hectares of unused arable land or unused agricultural surfaces.

(c) Are any measures planned to encourage unused arable land, degraded land, etc. to be used for energy purposes?

With regard to energy crops, a working group has been created, which is coordinated by the National Forest Authority, with a view to identifying measures to encourage an increase in the availability of biomass for energy purposes, more specifically with regard to changes in legislation that are necessary to promote energy crops in Portugal or the inspection process on the use of forest biomass.

(d) Is energy use of certain already available primary material (such as animal manure) planned?

Apart from the use of effluents from the agro-livestock sector to produce biogas, which has already been implemented and is well-known, the use of other primary materials has not been envisaged.

(e) Is there any specific policy promoting the production and use of biogas? What type of uses are promoted (*local, district heating, biogas grid, natural gas grid integration*)?

With a view to promoting the production of energy from renewable sources, Portugal has a system of differentiated tariffs for the electricity produced in renewable energy plants known as "*feed-in tariffs*" (Decree Law No. 225/2007, of 31 May). Plants that use biogas energy have been encompassed by the remuneration scheme, although they are subject to different tariffs, according to whether the electricity has been produced from landfill gases or from biogas from the anaerobic processing of solid urban waste, WWTP sludge or effluents and waste from the agro-livestock sector and agro-food industries.

Portugal has only recently begun to contemplate the use of biogas produced in landfills and to manage solid urban waste for other purposes in addition to the production of energy, more specifically, the production of biomethane for the transport sector and integration into the NG network.

(f) What measures are planned to improve forest management techniques in order to maximise the extraction of biomass from the forest in a sustainable way?[29] How will forest management be improved in order to increase future growth? What measures are planned to maximise the extraction of existing biomass that can already be put into practice?

Some of the main objectives of the national forest policy, enshrined in the Basic Forest Policy Law - Law No. 33/96, of 17 August - include: promoting and ensuring the sustainable development of forest areas and a series of forest related activities; optimising the use of the productive potential of forest-related goods and services and the associated natural systems; respect for the multipurpose value of forest areas and promoting the management of Portugal's forest patrimony, more specifically by means

[29] Recommendations can be found in the report issued by the Standing Forestry Committee ad hoc Working Group II in July 2008 on Mobilisation and efficient use of wood and wood residues for energy generation. The report can be downloaded at: http://ec.europa.eu/agriculture/fore/publi/sfc_wgii_final_report_072008_en.pdf

of organising the exploitation of forest resources and promoting and supporting cooperatives.

Forest spaces are organised, in each region, by means of forest organisation plans, with a view to ensuring a multiple usage, in articulation with regional and local plans for territorial organisation. Hence, the regional plans for forest organisation (PROF) are prepared by the legally competent public body, namely the National Forest Authority, in collaboration with the owners of the covered areas. These plans are then submitted for public consultation and approved by the Ministry for Agriculture, Rural Development and Fisheries (MADRP). The PROFs are thus a tool that serves to establish specific norms for the use and exploitation of forest areas.

On a less broad scale of territorial intervention, the Forest Management Plans (PGF) are fundamental tools for administering forest spaces. Keeping the guidelines contained in the PROFs in mind, these plans define the time frames and areas for the interventions that will be carried out, with a view to the sustained production of goods and services provided by such forest areas, while keeping in mind the diverse activities and uses of the surrounding spaces.

However, it is important to keep in mind that a large part of the total national forest cover belongs to private owners. In mainland Portugal private property corresponds to 2.8 million hectares of wooded forest areas, i.e. 84.2% of the total, while public areas represent 15.8%, of which only 2% are owned by the state.

Given that this fragmented ownership hinders obtaining minimum areas for management, the State must promote the constitution of forest enterprises that are of a suitable scale so as to ensure efficiency gains for such management, by means of incentives for grouping initiatives together and the consolidation of properties so as to discourage their fragmentation into fractions.

The government consequently decided to create the necessary legal framework to constitute forest intervention zones (ZIF), i.e. continuous and delimited territorial areas, essentially constituted by forest spaces, which are subject to forest management plans and specific forest intervention plans, with a single entity responsible for managing each of these zones, which must encompass a minimum of 750 hectares and include 50 forest owners or producers (Decree Law No. 127/2005, of 5 August, amended by Decree Law No. 15/2009, of 14 January).

So as to comply with the dispositions of the Basic Forest Policy Law and to support the sustainable management of forests, the Permanent Forest Fund (FFP) was created in 2004 (Decree Law No. 63/2004, of 22 March). Thus, with the Permanent Forest Fund's new management and support regulations, in effect until 2012, approved by Order No. 1338/2008, of 20 November, this fund seeks to support projects aimed at forest planning, management and intervention, forest sustainability and research and technical assistance.

Another important instrument for promoting the sustainable management of forests is the Forest Management Certification process, i.e. the accreditation of the management

process by means of certification issued by the competent entities. This certification ensures compliance with legal, social and environmental criteria.

This system, which is still voluntary, is a self-regulating tool, supported by representatives from the biomass sector, such as forest producers or entrepreneurs using forest products. However, since the entire chain of responsibility, from the forest to the consumer, is certified, this certification allows the producer to sell the product at a higher price and/ or access markets that would otherwise be inaccessible.

Thus, one of the factors influencing the use of forest biomass is its dispersion throughout the national territory, which sometimes makes it difficult to access this resource, since the onerous transport factor must be considered. Hence, in order to make the transportation of biomass economically more viable, the new National Energy Strategy NES 2020 contemplated the creation of intermediate parks to collect and chip biomass along with intermediary storage platforms.

On the other hand, in the past two decades the forest producers organisations (OPFs) have played an important role in supporting forest management. By means of cooperation and the combined efforts of producers it has been possible to overcome the structural problems of small land holdings, thus enabling the constitution of units that are large enough for a rational, sustainable and economically viable forest management. To this end, with a view to promoting the OPFs, the government implemented Order No. 118-A/2009, of 29 January, which approved the Framework Regulations to Support Forest Producers Organisations.

An inventory of existing resources and the ownership regime is also considered to be of the utmost importance. Decree Law No. 224/2007, of 31 May, which created the National System for Exploring and Managing Land Records Information, coordinated by the Portuguese Geographical Institute, aims to implement land records in Portugal, as a set of comprehensive, methodical and updated data, which can serve to characterise and identify the properties that exist in the national territory.

As has been mentioned before, a working group for energy crops (GTCE) has been created, headed by the NFA, which encompasses both public and private entities, from the forest, energy and environmental sectors. The objective of this group is to identify barriers and opportunities to promote energy crops for the production of biomass, more specifically, by identifying the most suitable species, the type of associated crop practices and the respective impact on the territory, apart from non-technical barriers, especially regulatory barriers, so as to promote the introduction of energy crops into non-agricultural areas.

More recently, the government entities responsible for the area of Energy and Forests presented a complementary series of measures that aim to further promote and increase the availability of biomass, especially emphasising: 1- the promotion of investments in forests (forestation, conversion and benefits for settlements); 2 – support for forest certification as a means of guaranteeing and encouraging the professional management of forests and consequently an increase in their productivity; 3 – the creation of a Biomass Observatory to monitor the impact of the use of biomass on Portuguese forests and on industrial sectors that use wood and biomass; 4 –

promoting the installation of energy crops based on the results of the work of the GTCE.

Finally, with a view to centralising issues related to promoting biomass for producing energy, one of the priorities of the NES 2020 in this sector is to promote an Energy Biomass centre, so as to create a centre for research, certification and overall coordination with regard to biomass, by means of articulated efforts on the part of the MEID, the MADRP and the MAOT.

–**Impact on other sectors:**

(a) How will the impact of energy use of biomass on other sectors based on agriculture and forestry be monitored? What are these impacts? (If possible, please provide information also on quantitative effects.) Is the monitoring of these impacts planned in the future?

Biomass must be used in a balanced manner, keeping in mind the various sectors that use biomass. An observatory is currently being developed to specifically accompany and monitor the use of biomass, so as to ensure a sustainable management and use of this resource. Although it is not yet being monitored, the impact on other sectors resulting from the use of biomass for the energy sector will be monitored in the future.

(b) What kind of development is expected in other sectors based on agriculture and forest that could have an impact on the energy use? (e.g. could improved efficiency/productivity increase or decrease the amount of by-products available for energy use?)

Currently no new developments are expected that would make it possible to assess this impact.

4.7. Planned use of statistical transfers between Member States and planned participation in joint projects with other Member States and third countries

4.7.1. Procedural aspects

(a) Describe the national procedures (step by step) established or to be established, for arranging a statistical transfer or joint project (including responsible bodies and contact points).

Portugal is committed to achieving the target of 31% that has been agreed and hence no statistical transfers with other Member States have been envisaged.

However, Portugal has the potential (natural resources) to go beyond the target of 31%, especially in relation to producing electricity from RES. For this to occur it will be necessary to have the possibility of physically exporting this electricity, since producing more renewable electricity merely for domestic consumption will signify an added exposure to the RES electricity producing sector, as well as a low use of thermal plants, which would have an important impact on the profitability of the investments made in these assets. Since Portugal is part of MIBEL, a market that currently has a surplus capacity for producing electricity, the solution of exporting renewable energy to Central Europe must contend with the physical limitation of current connectivity between Spain and France.

Consequently, in the wake of the position that has already been transmitted in its Forecast Document, Portugal has continuously drawn attention to the pressing need to reinforce the inter-connections between the electricity network in France and the Iberian Peninsula, which would enable the Iberian nations – Portugal and Spain – to physically export renewable energy to help achieve European targets.

Even though statistical transfers to other Member States is not envisaged in this plan, Portugal nonetheless maintains the possibility of, in the future, defining a trajectory for incorporating RES in the gross final energy consumption that could enable it to surpass the national target of 31%, aligned with the development of connections that would make it possible to physically export electricity. This possibility will, however, be contemplated in future exercises to review the plan, according to whether concrete conditions exist for this purpose.

(b) Describe the means by which private entities can propose and take part in joint projects either with Member States or third countries.

Private entities can participate in joint projects between the Portuguese State and other Member States or third countries, by means of invitations or tenders, on terms that will be duly specified.

(c) Give the criteria for determining when statistical transfers or joint projects shall be used.

Portugal can contemplate the use of statistical transfer mechanisms if they result from:

- A bilateral agreement with suitable quid pro quos to finance the supplementary effort of promoting RES;
- Surpassing the expectations, and hence the trajectories, forecast for the heating and cooling sectors and for the transport sector.

(d) What is going to be the mechanism to involve other interested Member States in a joint project?

Multilateral or preferably bilateral cooperation agreements.

(e) Are you willing to participate in joint projects in other Member States? How much installed capacity/electricity or heat produced per year are you planning to support? How do you plan to provide support schemes for such projects?

Yes. However, such participation has not yet been envisaged or contemplated.

4.7.2. Estimated excess production of renewable energy compared to the indicative trajectory which could be transferred to other Member States

No excess production of renewable energy is envisaged in the current plan.

4.7.3. Estimated potential for joint projects

(a) In which sectors can you offer renewable energy use development in your territory for the purpose of joint projects?

In the sectors of Heating and Cooling (solar thermal, renewable energy heat pumps) and in the Transport sector.

(b) Has the technology to be developed been specified? How much installed capacity/electricity or heat produced per year?

No, but the technologies indicated above are applicable.

(c) How will sites for joint projects be identified? (For example, can local and regional authorities or promoters recommend sites? Or can any project participate regardless of its location?)

To be defined on a case by case basis.

(d) Are you aware of the potential for joint projects in other Member States or in third countries? (In which sector? How much capacity? What is the planned support? For which technologies?)

This has not been estimated.

(e) Do you have any preference to support certain technologies? If so, which?

Yes, a preference for more mature technologies involving fewer costs.

4.7.4. *Estimated demand for renewable energy to be satisfied by means other than domestic production*

The current plan does not envisage a deficit of energy derived from RES.

Chart 5- Estimated excess and/or deficit production of renewable energy compared to the indicative trajectory which could be transferred to/from other Member States in Portugal (ktoe)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimated excess in forecast document	-	-	-	-	-	-	-	-	-	-	-
Estimated excess in NREAP	-	-	-	-	-	-	-	-	-	-	-
Estimated deficit in forecast document	-	-	-	-	-	-	-	-	-	-	-
Estimated deficit in NREAP	-	-	-	-	-	-	-	-	-	-	-

ASSESSMENTS

CHAPTER 5

5. ASSESSMENTS

5.1. Total contribution expected of each renewable energy technology to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity, heating and cooling and transport

Portugal's target for the share of renewable energy in the gross final energy consumption for 2020 is 31.0% - the fifth highest in the EU – and essentially reflects two important aspects: the path that has already been traversed with regard to promoting RES, which has placed Portugal in a leadership position in terms of installed thermal and electric capacity, and the potential that exists for developing new projects.

Consequently, even though Portugal is faced with an ambitious target, the current contribution of RES, more specifically for the production of energy, is already at an interesting level and has undergone significant developments over the course of the past decade, as can be seen in the graphs of figures 8 and 9:

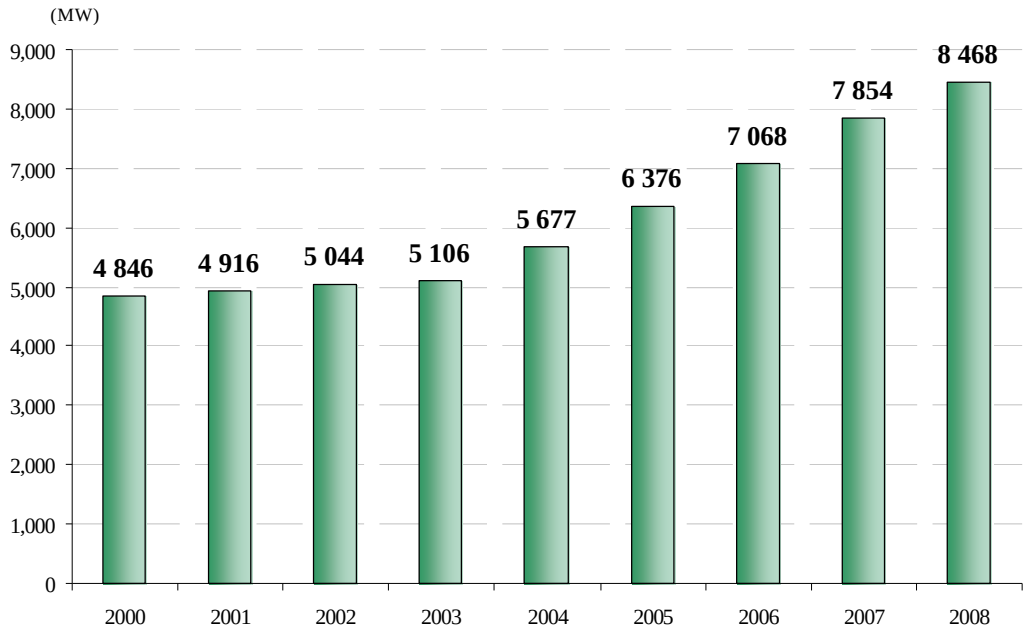

Figure 10 – The evolution of RES installed capacity

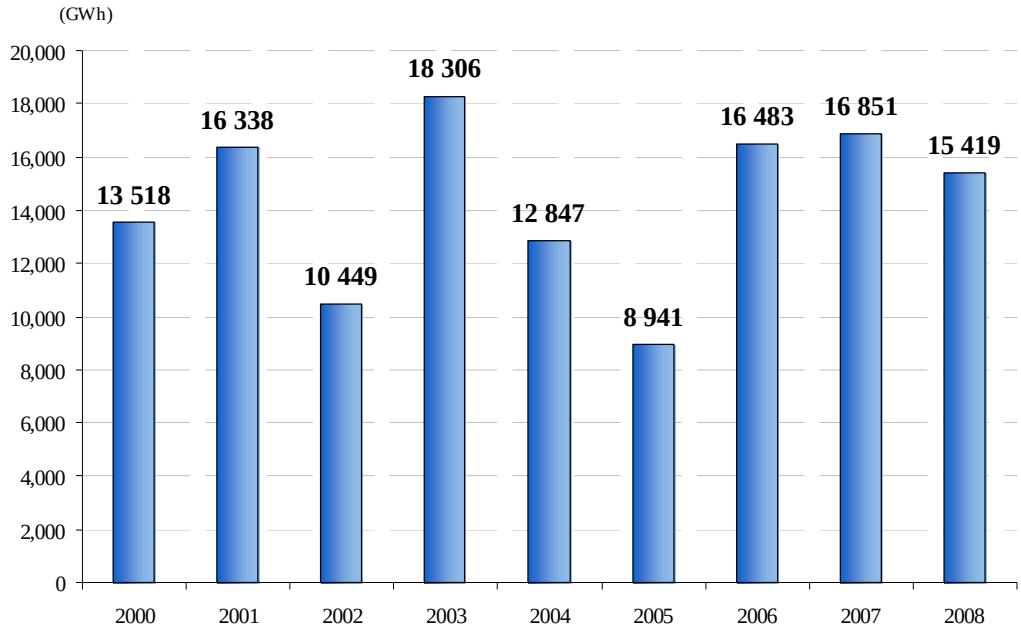

Figure 11 – The evolution of the real production of electricity from RES

The target of 31% RES for 2020 will be achieved by incorporating 60% of renewable energy into the electricity sector (55.3% under the terms of the NREAP with the methodology specified by the Directive), 30.6% into the heating and cooling sector and 10% into the transport sector.

However, despite Portugal's great emphasis on renewable energy, additional thermal capacity is expected to be installed, which will ensure the security of electricity supplies in the medium and long term. The commencement of operations of eight groups in four new combined cycle plants (table 17), will result in an installed capacity in thermal plants of approximately 6510 MW in 2020.

Table 17 - Chronogram for the commencement of operations of the new CCGTs.

New base thermal groups	Net capacity (MW)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CCGT Lares I	415												
CCGT Lares II	415												
CCGT Pego I	415												
CCGT Pego II	415												
CCGT Sines I	415												
CCGT Sines II	415												
CCGT Lavos I	415												
CCGT Lavos II	415												

The next two charts (8.a and 8.b), reflect the estimates for the total contribution of the different RES based technologies towards achieving the objectives that have been established for Portugal, keeping in mind the availability of resources, the maturity of technologies, specific scheduled plans and the respective time frames for introducing various measures to promote RES. The estimated figures indicate an annual average growth of 6.8% for the period 2010-2020 for the installed capacity and 4.6% for the production of electricity.

Chart 6a- Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Portugal to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the electricity sector in 2010-2014

	2005		2010		2011		2012		2013		2014	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydro:	**4 816**	**5 118**	**4 934**	**9 742**	**4 981**	**9 836**	**5 734**	**10 854**	**5 734**	**10 854**	**6 026**	**11 238**
1MW – 10 MW	323	381	410	827	457	920	503	1 013	503	1 013	550	1 108
>10MW	4 493	4 737	4 524	8 916	4 524	8 916	5 231	9 840	5 231	9 840	5 476	10 129
Of which pumping [30]	537	387	1 036	0	1 036	0	1 292	0	1 292	0	1 463	0
Geothermal	**14**	**55**	**25**	**163**	**25**	**163**	**25**	**163**	**28**	**182**	**30**	**195**
Solar:	**3**	**3**	**156**	**230**	**258**	**396**	**340**	**523**	**465**	**728**	**590**	**939**
Photovoltaic	3	3	156	230	228	336	300	443	385	568	460	679
Concentrated solar power	0	0	0	0	30	60	40	80	80	160	130	260
Tide, wave, ocean	**0**	**0**	**5**	**1**	**5**	**2**	**5**	**3**	**10**	**9**	**35**	**35**
Wind:	**1 063**	**1 773**	**4 256**	**10 214**	**4 928**	**11 334**	**5 600**	**12 600**	**5 600**	**12 600**	**5 600**	**12 600**
Onshore	1 063	1 773	4 256	10 214	4 928	11 334	5 600	12 600	5 600	12 600	5 600	12 600
Offshore	0	0	0	0	0	0	0	0	0	0	0	0
Biomass:	**476**	**1 976**	**647**	**2 400**	**722**	**2 671**	**812**	**2 991**	**862**	**3 191**	**907**	**3 358**
Solid	178	934	273	1 092	285	1 140	297	1 188	347	1 388	367	1 468
Biogas	9	34	39	138	53	184	80	280	80	280	105	368
Bioliquids[31]	289	1 008	334	1 170	385	1 346	435	1 523	435	1 523	435	1 523
TOTAL	**6 372**	**8 925**	**10 023**	**22 751**	**10 919**	**24 402**	**12 516**	**27 133**	**12 699**	**27 563**	**13 188**	**28 364**
Of which in CHP	369	1 304	**437**	**1 536**	**499**	**1 751**	**560**	**1 967**	**560**	**1 967**	**560**	**1 967**
Biomass	**369**	**1 304**	**437**	**1 536**	**499**	**1 751**	**560**	**1 967**	**560**	**1 967**	**560**	**1 967**
Solid	76	288	98	347	107	381	117	416	117	416	117	416
Biogas	4	8	5	19	7	24	8	28	8	28	8	28
Bioliquids	289	1 008	334	1 170	385	1 346	435	1 523	435	1 523	435	1 523

[30] All the installed capacity pertains to reversible plants.
[31] Take into account only those complying with the sustainability criteria (cf. Article 5(1) of Directive 2009/28/EC last subparagraph).

Chart 8b - Estimation of total contribution (installed capacity, gross electricity generation) expected from each renewable energy technology in Portugal to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the electricity sector in 2015-2020

	2015		2016		2017		2018		2019		2020	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Hydro:	**7 017**	**11 101**	**8 089**	**11 916**	**9 044**	**13 310**	**9 362**	**13 843**	**9 498**	**13 973**	**9 548**	**14 074**
1MW - 10 MW	550	1 108	600	1 209	650	1 310	650	1 310	700	1 410	750	1 511
>10MW	6 467	9 993	7 489	10 707	8 394	12 001	8 712	12 533	8 798	12 562	8 798	12 562
Of which pumping[32]	2 454	0	3 238	0	3 898	0	4 216	0	4 302	0	4 302	0
Geothermal	**40**	**260**	**45**	**293**	**50**	**325**	**60**	**390**	**65**	**423**	**75**	**488**
Solar:	**720**	**1 157**	**860**	**1 389**	**1 005**	**1 629**	**1 160**	**1 895**	**1 325**	**2 178**	**1 500**	**2 475**
Photovoltaic	540	797	630	929	725	1 069	810	1 195	900	1 328	1 000	1 475
Concentrated solar power	180	360	230	460	280	560	350	700	425	850	500	1 000
Tides, wave, oceans	**60**	**75**	**75**	**112**	**100**	**159**	**125**	**206**	**175**	**297**	**250**	**437**
Wind:	**6 125**	**13 480**	**6 125**	**13 480**	**6 125**	**13 480**	**6 625**	**14 580**	**6 825**	**14 476**	**6 875**	**14 596**
Onshore	6 100	13 420	6 100	13 420	6 100	13 420	6 600	14 520	6 800	14 416	6 800	14 416
Offshore	25	60	25	60	25	60	25	60	25	60	75	180
Biomass:	**907**	**3 358**	**922**	**3 411**	**922**	**3 411**	**937**	**3 463**	**937**	**3 463**	**952**	**3 516**
Solid	367	1 468	367	1 468	367	1 468	367	1 468	367	1 468	367	1 468
Biogas	105	368	120	420	120	420	135	473	135	473	150	525
Bioliquids[33]	435	1 523	435	1 523	435	1 523	435	1 523	435	1 523	435	1 523
TOTAL	**14 869**	**29 430**	**16 116**	**30 600**	**17 246**	**32 315**	**18 269**	**34 376**	**18 825**	**34 809**	**19 200**	**35 584**
Of which in CHP	560	1 967	560	1 967	560	1 967	560	1 967	560	1 967	560	1 967
Biomass	**560**	**1 967**	**560**	**1 967**	**560**	**1 967**	**560**	**1 967**	**560**	**1 967**	**560**	**1 967**
Solid	117	416	117	416	117	416	117	416	117	416	117	416
Biogas	8	28	8	28	8	28	8	28	8	28	8	28
Bioliquids	435	1 523	435	1 523	435	1 523	435	1 523	435	1 523	435	1 523

32 All the installed capacity pertains to reversible plants.

33 See footnote 31.

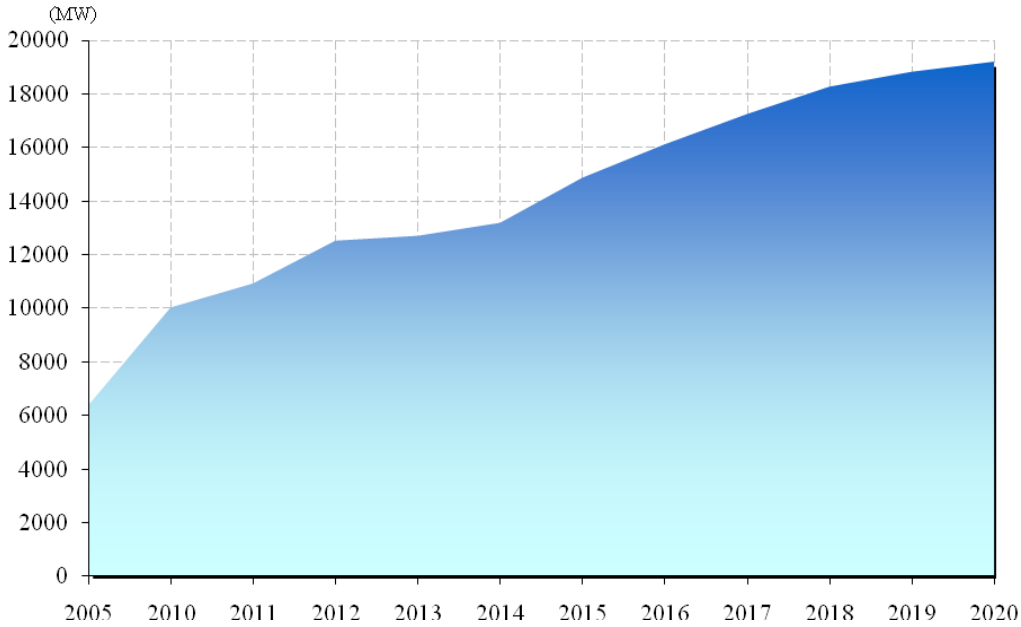

Figure 12 – Estimated evolution of the total installed renewable capacity

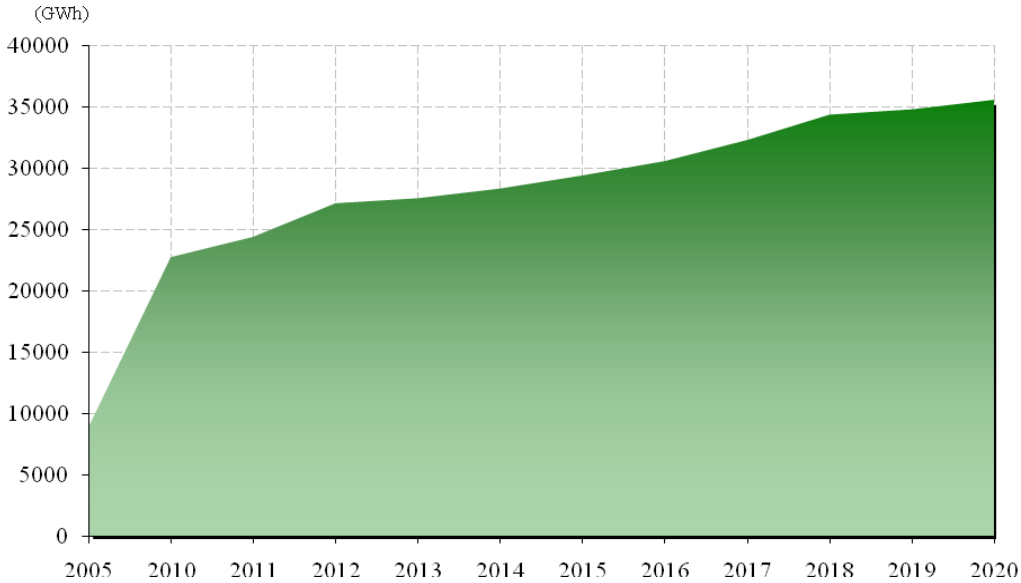

Figure 13 – Estimated evolution of the total renewable production

In recent years there has been a strong tendency towards developing **wind energy** in Portugal and the installed capacity has risen from 1065 MW in 2005 to more than 3500 MW in 2009. This progress in terms of installed capacity will tend to continue and it is expected that by 2012, an additional 2000 MW will be installed as a result of the capacity attributed in the past two years by means of tender processes. A further 400 MW of capacity will also be installed as a result of equipment upgrades in existing wind parks and hence Decree Law No. 51/2010 was recently published, so as to simplify the procedures for installing additional equipment. This diploma has also revised the respective remuneration regimes and has made it obligatory to install equipment aimed at supporting dips in voltage.

In the most conservative scenario of demand used for this NREAP and also keeping in mind several other factors, such as the installation of reversible hydro capacity, the pace of the penetration of electric vehicles and the capacity to transfer consumption from peak to off-peak periods, it is expected that by 2020, 6875 MW of wind energy capacity will have been installed, of which 6800 MW pertain to the onshore wind energy potential.

The exploration of the **offshore** potential for wind energy will play a negligible role, by 2020, in terms of contributing towards the production of electricity, since the use of this resource depends on technological developments and the economic viability of offshore wind energy technologies. From amongst the existing technologies the support structure for the towers that are best suited to the conditions off the Portuguese coast are still at a nascent stage and entail very high costs. Thus, it is expected that by 2020 the installed capacity for offshore wind energy will not exceed 75 MW, which will essentially serve the purposes of research and technological development.

Portugal has been focusing on **hydro-energy** since the 1940s. However, it has not managed to use its hydel potential as much as other European nations. The National Programme for High-Capacity Hydroelectric Dams (PNBEPH) was prepared in 2007, with a view to increasing the capacity for hydel production. The PNBEPH sought to identify and define priorities for the investments that will be made up to 2020, in hydel projects. Currently, the installed capacity for this RES is approximately 4900 MW.

The implementation of the PNBEPH, coupled with an increase in the capacity of some existing dams, is expected to increase the new installed reversible capacity and thus reduce the limitations of wind production during off-peak hours, ensuring the economic feasibility of the installation of the new capacity. In addition to enabling the integration of new wind production, this increase in hydel capacity will also afford a broad set of benefits related to the optimisation of river basin management, which makes such projects even more attractive.

Table 18 – Chronogram of the commencement of new hydel plants and capacity reinforcements

New hydel production centres	Type	Net capacity (MW)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Picote II	Not Reversible	246											
Bemposta II	Not Reversible	191											
Alqueva II	Reversible	256											
Pedrógão	Not Reversible	14											
Ribeiradio/Ermida	Not Reversible	74											
Baixo Sabor	Reversible	171											
Foz-Tua	Reversible	255											
Venda Nova III (Frades)	Reversible	736											
Salamonde II	Reversible	204											
Alvito	Reversible	225											
Fridão	Not Reversible	238											
Girabolhos	Reversible	355											
Gouvães	Reversible	660											
Alto Tâmega (Vidago)	Not Reversible	127											
Daivões	Not Reversible	118											
Paradela II	Reversible	318											
Cabril II	Reversible	86											

With the preparation of a new national plan for the development of **mini-hydel** plants (up to 10 MW), Portugal aims to achieve, by 2020, an installed capacity of 750 MW, representing an increase of more than 50% as compared to the current installed capacity.

On the other hand, the emphasis on **solar energy** will play an extremely important role in helping to achieve the targets that have been established, given Portugal's potential in terms of the availability of this resource and the efforts that have been invested in technological R&D. Hence, the most significant strategic focus in terms of renewable energy during the next decade will be on developing the solar sector and the diverse associated technologies.

To this end, in addition to continuing the microproduction programme, a new miniproduction programme will be created, with a view to installing approximately 500 MW by 2020, aimed essentially at the service sector (schools, public buildings and markets) and industrial sector, for a new range of capacities of up to 250 kW, according to the technologies involved. Depending on the evolution of demand and technological developments the expansion of miniproduction at higher capacities could be studied during a subsequent phase. On the other

hand, so as to improve operationality and the supply of capacity for the Immediate Renewables Programme and with a view to installing 250 MW in microproduction by 2020, it has already been proposed that Decree Law No. 363/2007, of 2 November, be revised.

The construction of plants with higher capacities must also develop according to the evolution of technology costs, beginning with the trial projects and a logic of research and development. In this context, with a view to demonstrating the concept, prior information applications (PIA) were launched in 2009 for innovative projects and trials for concentrated solar photovoltaic technologies (CPV) and concentrated solar thermoelectric technologies (Stirling engines, CSP Towers, Cylindrical-Parabolic CSP and Linear Fresnel CSP technologies), of which 15 trial projects have been selected and will be implemented between 2010 and 2011. After the results of these projects and after monitoring the evolution of relevant technologies and the costs associated with these technologies it is expected that commercial CPV and CSP projects will be launched, possibly from 2012 onwards. The scheduled capacities for the two technologies in this plan are indicative and could be partially redistributed between them according to their development.

Biomass plays an important role in the production of energy in Portugal. Currently, the installed capacity for the production of electricity is approximately 500 MW. However, it is expected that this figure will rise to 958 MW by 2020, of which 436 MW will be produced by cogeneration.

Portugal has a specific target for biomass plants of at least 250 MW of installed capacity, which it expects to achieve in 2013-2014. The 13 plants that were approved during tenders for attributing capacity to produce electricity, for a total of 96 MW, will contribute towards this endeavour. These approvals were given to thermoelectric plants fuelled by forest biomass, which are currently in different stages of the process (some are already operational). It is expected that all of this capacity will go onstream by 2014.

Promoting the use of biomass includes cogeneration. In fact, whenever possible, the use of this resource in high-efficiency cogeneration plants will be promoted in future processes, considering the significant advantages for the overall efficiency of the system and the use of the energy contained in this RES.

The capacity that has been attributed to dedicated plants will be balanced with the availability of forest biomass in the market, streamlining, wherever justifiable, the concentration of capacity so as to obtain economies of scale.

With regard to **biogas**, it is important to promote its use in a more rational manner, in articulation with agricultural and environmental policies. Its use in plants exclusively dedicated to producing electricity has been the dominant solution for this resource and a capacity of 150 MW is scheduled to be installed by 2020. However, as is the case for biomass in general, this type of use is not very efficient and it would be preferable to focus on cogeneration systems. Hence, part of these 150 MW could still be allocated to cogeneration plants. Nevertheless, it is essential to note that it is not always easy to make use of heat at the site in which biogas is produced; this is partly due to the isolated locations of these plants, associated with WWTP, landfills or agro-livestock establishments and, as such, without nearby consumers that could use the heat generated, which would be the ideal solution.

The injection of biogas into the NG network, in the form of biomethane, could be an interesting alternative solution in the near future.

Thus, as has already been done in some European nations, it is essential to develop a study to assess the potential of biogas in Portugal and its alternative uses. In accordance with the results obtained, pioneering projects and trials can be developed so as to test the conclusions of such a study.

Portugal has also focused on **wave energy** in terms of new forms of renewable energy. A pilot zone has been created for the installation of the first prototypes, however, the implementation of this project has been conditioned by the attribution of the concession for the zone and defining the cost sharing arrangement for the investments in the network infrastructure, as well as the development of associated technologies.

On the other hand, it is important to mention that a near-shore plant is already operating on the basis of this resource, on the island of Pico in the Azores, built with 100% indigenous technology. This plant became fully operational in 2005 and uses an oscillating water column system, with a Wells turbine as the reversible horizontal axis, which propels a variable speed electric generator with a capacity of 400kW.

The use of **geothermal energy** to produce electricity has been explored since 1980, with the construction of the Pico Vermelho geothermal plant on the island of São Miguel, in the Azores. This type of use of so-called "conventional" geothermal energy requires a heat source (e.g., natural water or rocks at a high temperature) close to the surface, which is generally associated with sites that evidence volcanic activity. In Portugal, the potential for this endogenous resource is limited to the region of the Azores and it plays an important role in ensuring the security of energy supplies for the archipelago.

Currently, a capacity of 25 MW has been installed on the island of São Miguel, resulting from the operations of the geothermal plants at Ribeira Grande and Pico Vermelho. In 2009, the production of energy derived from this RES was approximately 161 GWh, representing approximately 36.5% of the total energy produced in São Miguel and 19.5% of the total energy produced in the Azores.

After prospecting surveys carried out at the Ribeira Grande Geothermal Field a project to expand the generation capacity in the Pico Vermelho sector is currently being developed, which will double the installed capacity of 10 MW and result in the installation of a new geothermal plant with a similar capacity, in the Caldeiras sector. After having implemented a series of evaluatory geothermal wells, studies are currently underway in the Pico Alto geothermal field, on the island of Terceira, which could lead to the installation of a geothermal plant.

EGS (Enhanced Geothermal Systems) technology could also be tested in Portugal. This technology makes it possible to use the thermal energy of high temperature rocks (dry rocks) that exist at great depths to produce electricity, which is hence the most suitable technology for geothermal energy in mainland Portugal. However, although a project to survey this resource is currently being prepared by the National Laboratory for Energy and Geology (LNEG), the lack of data on the national territory in terms of deep geothermal resources, coupled with the fact that exploring this resource based on this technology is still a fairly

expensive process, means that the prospects for an EGS target must perforce be somewhat cautious.

Thus, the development of new geothermal capacity will essentially consist of the use of the potential that exists in the Azores.

In this way, by 2020 there will be a total of 19,200 MW of installed renewable energy capacity, which, when compared to the figure recorded in 2009, a year in which a total installed renewable energy capacity of more than 9,100 MW was recorded, corresponds to an increase of more than 100%. In terms of the electricity produced, there will be an increase of approximately 88%, corresponding to the 35,584 GWh envisaged for 2020 based on RES, as compared to the 18,947 GWh produced in 2009.

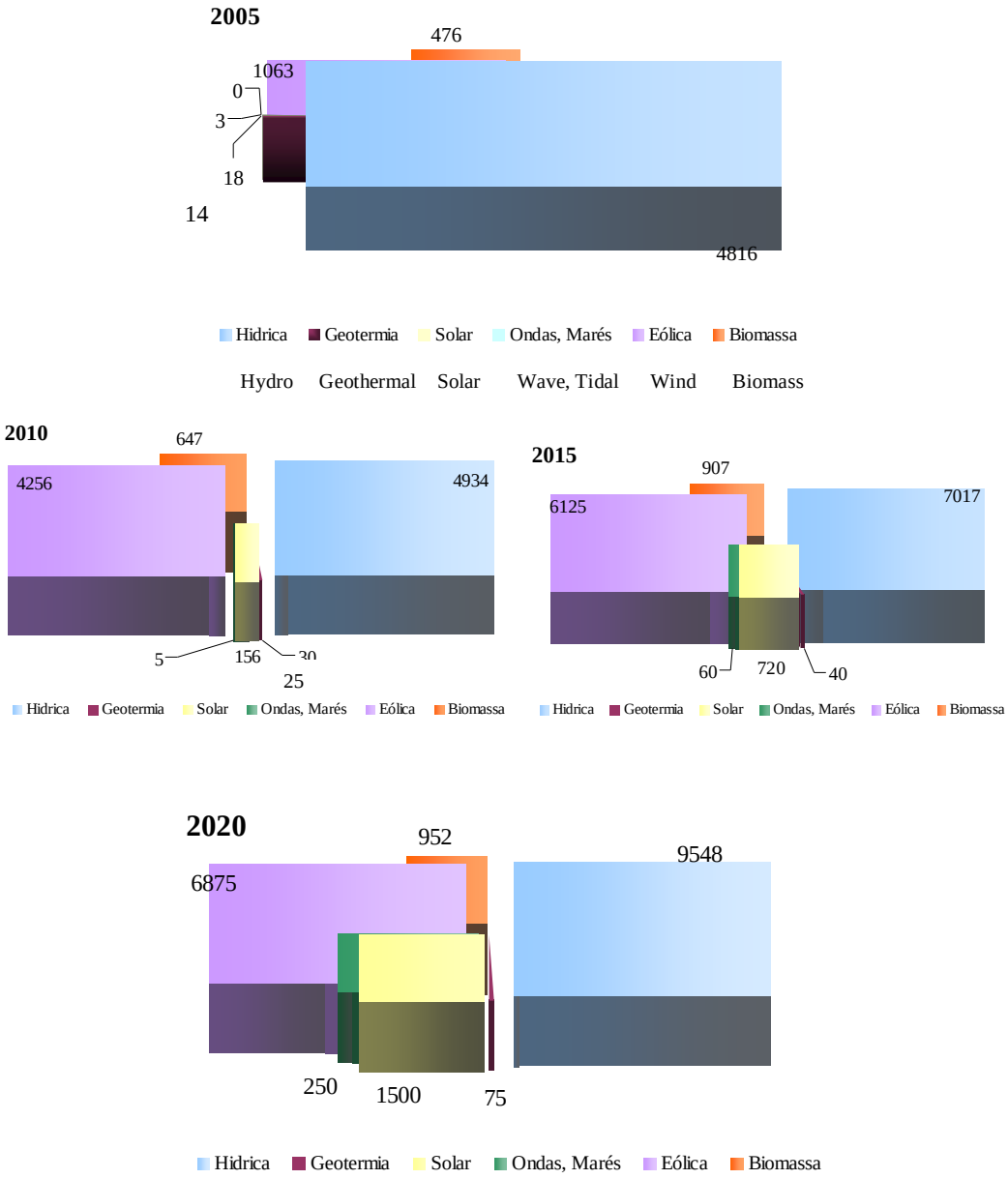

Figure 14 – Estimated evolution of installed capacity (MW) of the different RES technologies.

Chart 7 – Estimation of total contribution (final energy consumption[34]) expected from each renewable energy technology in Portugal to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the heating and cooling sector 2010-2020 (ktoe)

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Geothermal (excluding low temperature geothermal heat in heat pump applications)	1	10	12	14	15	16	18	19	21	22	23	25
Solar	22	50	61	72	83	94	105	116	127	138	149	160
Biomass:	**2 507**	**2179**	**2265**	**2352**	**2347**	**2343**	**2339**	**2335**	**2331**	**2328**	**2325**	**2322**
solid	1 785	1 514	1 523	1 533	1 527	1 521	1 515	1 509	1 503	1 497	1 490	1 484
biogas	10	10	14	18	20	21	23	25	27	30	34	37
bioliquids[35]	713	655	728	801	801	801	801	801	801	801	801	801
Renewable energy from heat pumps: - of which aerothermal - of which geothermal - of which hydrothermal	**0**	**0**	**0**	*	*	*	*	*	*	*	*	*
TOTAL	**2 530**	**2240**	**2338**	**2438**	**2445**	**2453**	**2462**	**2470**	**2478**	**2488**	**2497**	**2507**
Of which DH[36]	0	0	0	0	0	0	0	0	0	0	0	0
Of which biomass in households [37]	1 164	664	658	652	646	640	634	628	622	616	610	604

34 Direct use and district heat as defined in Article 5(4) of Directive 2009/28/EC.

35 Take into account only those complying with the sustainability criteria (cf. Article 5(1) last subparagraph of Directive 2009/28/EC).

36 District heating and/or cooling from total renewable heating and cooling consumption (RES-DH).

37 From the total renewable heating and cooling consumption.

** A contribution by renewable heat pumps is expected from 2012 onwards, which cannot be quantified currently, since the European Commission has yet to define the concept.*

With regard to the contribution of renewable sources for the purposes of heating and cooling, there has been a tendency to stabilise the total installed capacity as compared to the figures recorded in the reference year – 2005 – as can be seen in Figure 15 below.

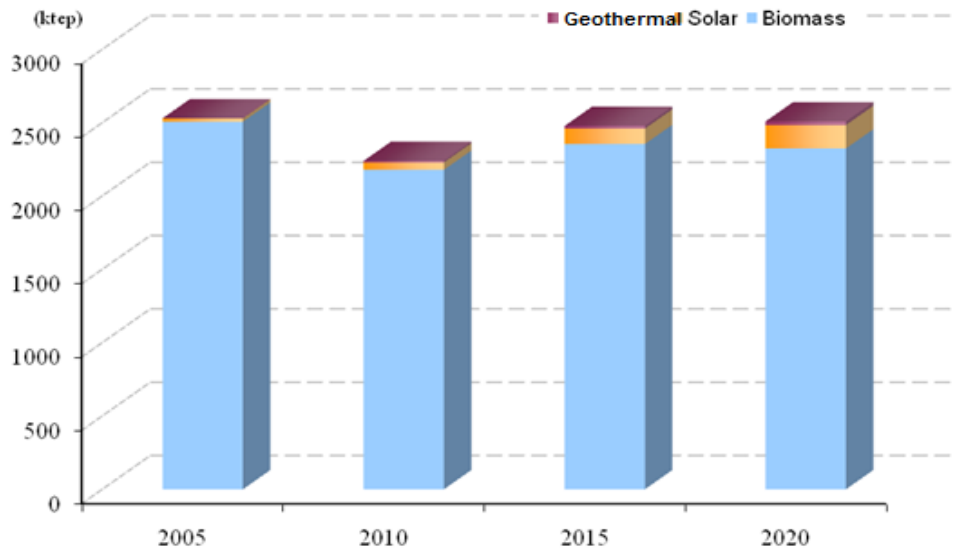

Figure 15 – Estimated evolution of the contribution of different RES technologies in the H&C sector.

In this sector it is important to note Portugal's emphasis on **solar thermal energy**, whose estimates indicate an annual average growth of 12% between 2010 and 2020. Currently, 533,723 m^2 of solar thermal panels have been installed, distributed over the Residential (377,198 m^2), Services (141,517 m^2) and State (15,008 m^2) sectors, thus enabling a total production of 27 ktoe. The efforts that have been made to promote this technology have achieved excellent results at this level, which is reflected in the increase in solar panels that has taken place in recent years, in 2009 144,603 m^2 were installed, while in 2008 some 86,820 m^2 were installed. The incentives given for installing solar thermal systems contributed greatly towards this progress, including subsidies for investments to acquire the equipment, a tax deduction for part of the investments and facilitated access to credit in order to purchase the equipment.

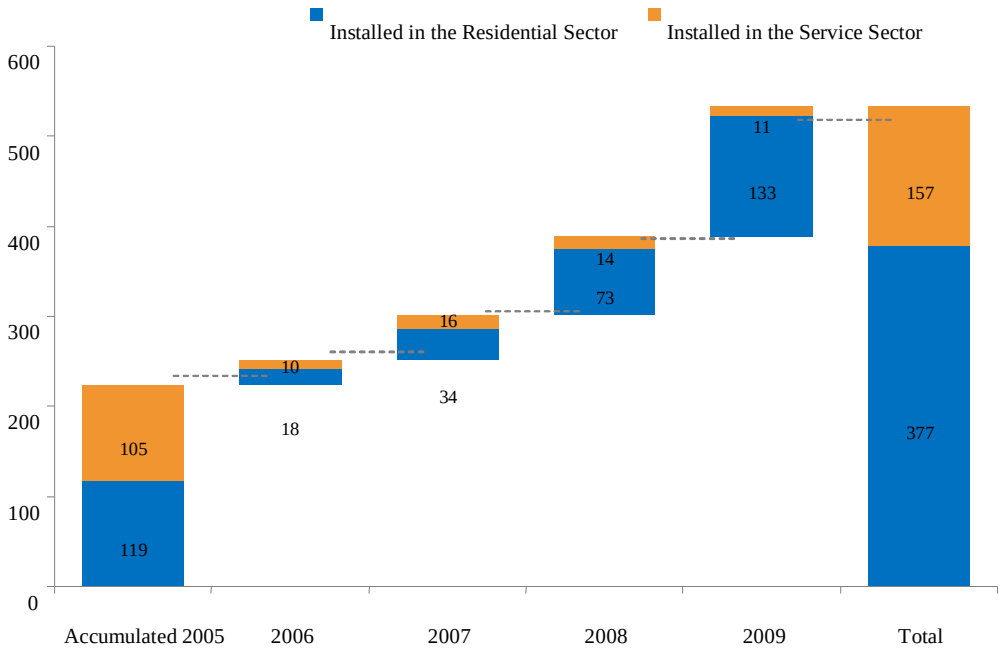

Figure 16 – Evolution of the installation of solar thermal collectors in Portugal (10^3 m^2)

In contrast to the growing use of solar thermal systems, there was a slight reduction in the use of **biomass** in the H&C sector. The expansion of the distribution network for natural gas is the main reason for the reduction of biomass consumption in the domestic and industrial sector. In any case, efforts will be made to gradually promote the use of more efficient biomass systems, more specifically heat recuperators and pellet boilers, which will contribute towards stabilising the consumption of this RES. However, owing to the high efficiency of these systems as compared to traditional systems, even though an equivalent amount of energy is produced there is expected to be a decline in the overall consumption of this kind of renewable fuel.

Biogas will tend to be used increasingly in the thermal dimension, both through the heat in cogeneration plants as well as in industrial and domestic consumption, by means of its gradual integration into the NG network, in the form of biomethane, so as to comply with the technical network specifications and avoid the contamination of the gasducts. Conformance with these technical specifications combined with a reduction in the current costs of treating and converting biogas into biomethane is, possibly, the great barrier for a comprehensive acceptance of this solution and is one of the greatest challenges faced by the sector to make this kind of usage viable, although it is also an opportunity for the scientific and technological system.

In the future, it will be possible to count the aerothermal, geothermal and hydrothermal energy captured by heat pumps for the purposes of calculating the contribution of these technologies towards the share of the RES in the H&C sector, since the definition that currently exists in Directive 2009/28/EC, "*Only heat pumps with an output that significantly exceeds the primary energy needed to drive it should be taken into account*", does not yet allow this.

This quantity of heat that is considered to be energy from renewable sources is calculated according to the methodology established in annex VII of the RES Directive, which defines two parameters: Q_{usable} (total estimated usable heat produced by heat pumps) and SPF (estimated average seasonal performance factor for heat pumps), which are essential to calculate the quantity of energy that is considered to be renewable, produced by the heat pumps. The European Commission has stated that it will issue directives, by 1 January 2013, on the way in which Member States should estimate these parameters for the different technologies and uses of heat pumps, keeping in mind the different climatic conditions. It has also announced that it will try and issue these directives in 2011, earlier than initially scheduled.[38]

[38] (EU OJ C45 E/133, of 23 February 2010).

Chart 8 - Estimation of total contribution expected from each renewable energy technology in Portugal to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in the transport sector in 2010-2020 (ktoe)[39]

	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bioethanol/bio-ETBE	**0**	**0**	**0**	**0**	**0**	**0**	**24**	**24**	**25**	**26**	**27**	**27**
Of which Biofuels [40] Article 21(2)	0	0	0	0	0	0	0	0	0	0	0	0
Of which imported[41]	0	0	0	0	0	0	0	0	0	0	0	0
Biodiesel	**0**	**281**	**283**	**283**	**306**	**308**	**405**	**407**	**441**	**443**	**449**	**450**
Of which Biofuels [42] Article 21(2)	0	4	4	5	5	6	6	6	7	7	8	8
Of which imported[43]	0	0	0	0	0	0	0	0	0	0	0	0
Hydrogen from renewables	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Renewable electricity	**12**	**20**	**23**	**26**	**30**	**34**	**37**	**40**	**43**	**47**	**52**	**58**
Of which road transport	0	0	0	1	2	3	5	7	9	12	16	20
Of which non-road transport	12	20	23	26	28	31	32	33	34	35	36	38
Others (as biogas, vegetable oils, etc.) — please specify	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Of which Biofuels [44] Article 21(2)	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**12**	**301**	**306**	**310**	**336**	**342**	**466**	**471**	**509**	**516**	**528**	**535**

The target of 10% of RES in the transport sector will be achieved by means of 85% biofuels and 15% renewable electricity, using multiplication factors for road electricity and biofuels from waste, as envisaged by the RES Directive (89% of biofuels and 11% renewable electricity, in real terms, as can be seen in chart 12).

39 For biofuels take into account only those compliant with the sustainability criteria (cf. Article 5(1) last subparagraph).

40 Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

41 From the whole amount of bioethanol/bio-ETBE.

42 Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

43 From the whole amount of biodiesel.

44 Biofuels that are included in Article 21(2) of Directive 2009/28/EC.

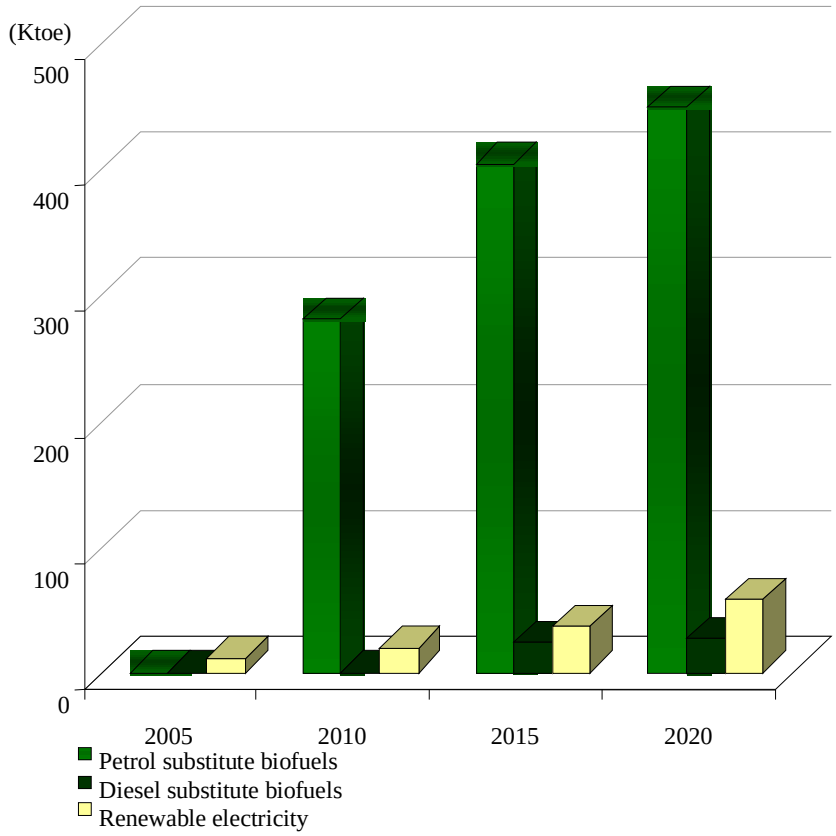

Figure 17 – Estimated evolution of the contribution of the different RES in the Transport sector.

The emphasis on the use of renewable energy sources in the transport sector has resulted in a reduction in dependence on oil and, consequently, a reduction in the external trade balance deficit. It has also resulted in a reduction of CO_2 emissions, thus contributing towards the struggle against climate change by reducing emissions of greenhouse gases.

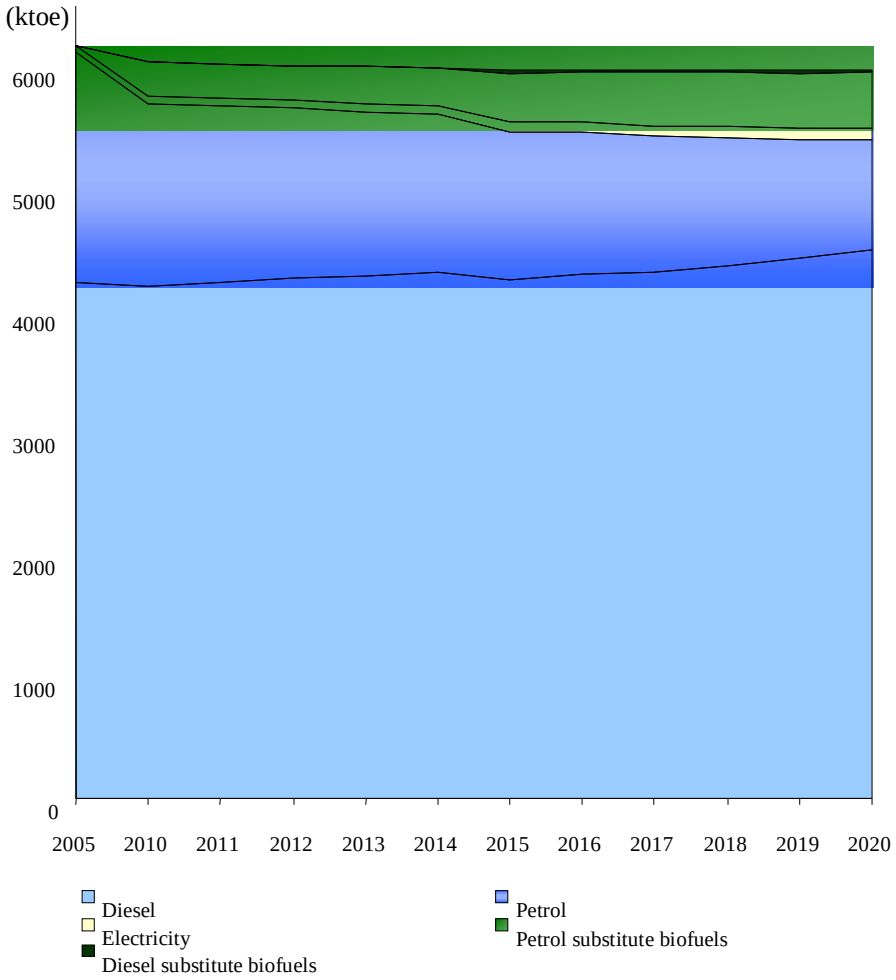

Figure 18 – Estimate of the contribution of different sources of energy in the Transport sector

On the other hand, the diversification of sources of supplies leads to a greater security of supplies, which is essential in the transport sector, by the indigenisation of the production of fuel, thus resulting in a greater control over its production and introduction into the market.

Given the great presence of products derived from oil in the transport sector and the difficulties involved in finding solutions for energy diversification in this sector, Portugal has decided to focus on **electric mobility**, by means of the Mobi.E programme, whose concept has the potential to be exported to other countries. This programme encourages passengers to switch to electric transport, from other forms of locomotion, and includes incentives for purchasing and using electric vehicles and the implementation of a national network of infrastructure to charge batteries, constituted by 50 quick charge stations and 1300 slow charge stations, which, in an initial phase, will encompass a total of 25 municipalities.

Biofuels represent a solution that can be implemented currently, since they are used in vehicles that are currently circulating, which makes them an obvious choice for achieving the EU target for the transport sector.

Considering that in the transport sector the profile of fuel consumption in Portugal clearly favours diesel and keeping in mind that the national refining apparatus produces, for this same market, an excess of petrol and a deficit of diesel (which obliges Portugal to import this type of fuel from Russia) Portugal has based its emphasis on biofuels on the production of **diesel substitutes**. This situation could be attenuated in the future, when the new refining unit at Sines goes onstream, by means of a greater production of diesel, paving the way for biofuels that could substitute petrol. Effectively, ways of promoting the penetration of biofuels that are **substitutes for petrol** are currently being considered, more specifically bioethanol, for which it is estimated that, from 2015 onwards, their introduction into the market on a reasonable scale could already contribute towards the share of renewables in the transport sector.

Keeping in mind the capacity for producing biofuels that is currently installed in Portugal (biodiesel) and its synergy with the animal foodstuffs industry, using the surplus of the latter as a raw material for the biofuels industry, Portugal is defining a new support mechanism that will ensure their use. This mechanism could include the presentation, by companies responsible for introducing them into fuel consumption, of certificates corroborating the incorporation of biofuels into the national consumption in a quantity equivalent to a given percentage of incorporation, in terms of energy content, to be established for each year. It could likewise include support for developing new technologies that can overcome the technical barriers for their introduction into consumption and which encourage the use of waste materials.

Thus, support mechanisms are being studied to promote the progressive increase of the contribution of biofuels produced from waste, residues, non-food cellulosic and lingo-cellulosic material, which are relevant for achieving the target of 10% for the transport sector, given that, within the scope of the RES Directive, these are counted doubly for this purpose. Hence, in addition to using and adding value to used edible oils, which is already underway, it is essential to promote research on these biofuels, as well as to develop new technologies to produce renewable fuels.

As has been mentioned before, it is currently obligatory to incorporate 7% (v/v) of FAME in road diesel. However, although the maximum quantity for incorporating biodiesel in road diesel is limited to the quantity stipulated in norm EN 590, it is possible to sell mixes that are richer in biofuel content, more specifically B10, with 8% to 10% of FAME, B15, with 13% to 15%, and B20, with 18% to 20%, as long as the respective supply equipment is duly labelled.

In the meanwhile, in addition to direct use in the road transport sector, the Portuguese State has also considered other alternatives for introducing biofuels into the market, more specifically, by means of coloured and marked diesel, mainly used in machines and transport linked to agricultural activities, and has defined incorporation shares for this purpose. Consequently, from 1 July 2008 onwards, coloured and marked diesel must compulsorily incorporate a minimum FAME content of 5% and a maximum content of 10%, in volume.

Thus, this measure, combined with the obligation to incorporate biodiesel into road diesel and the regulations for selling mixes that have a high biofuel content of up to 20 % (v/v), seeks to

encourage the development of the biofuels chain in Portugal and to achieve the targets for introducing this type of fuel into national consumption.

Defining and making it compulsory to comply with the sustainability criteria established by Directive 2009/28/EC are key conditions for ensuring the effective environmental sustainability of the use of biofuels and their benefits as a substitute for fossil fuels.

Going by the latest data obtained in 2008, the biofuels component has reached 132 ktoe, while renewable electricity for the transport sector was 14 ktoe.

5.2. Total contribution expected from energy efficiency and energy saving measures to meet the binding 2020 targets and the indicative interim trajectory for the shares of energy from renewable resources in electricity, heating and cooling and transport.

The National Energy Efficiency Action Plan, which came into effect in 2008, established a target for 2015 of reducing the nation's final energy consumption by 10%. A review of this plan will lead to energy savings of 20% in 2020.

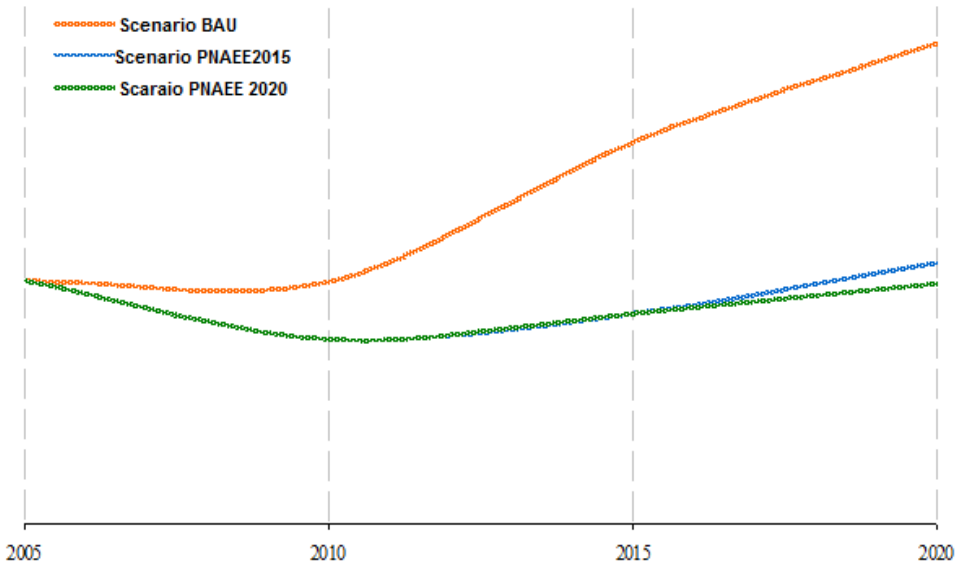

Figure 19 – Evolution of the results achieved in reducing final energy consumption by implementing energy efficiency measures

5.3. Assessment of the impacts (optional)

Portugal's emphasis on renewable energy has proved to be a positive step, which can be assessed by means of the impact on the Portuguese economy that has been observed in recent years and is expected to be seen over the next 11 years. In 2009 this sector represented 0.8% of the national GDP and it is expected to increase to 1.3% in 2020, which means that the renewable energy sector could generate a gross added value of approximately 2.9 billion Euros. The decentralised nature of renewable energy makes it possible to ensure a more balanced territorial distribution for investments in RES, thus contributing towards a greater regional and local development, by means of an emphasis on wind energy, biomass and solar energy.

In terms of employment generated in the sector, achieving the targets envisaged in this plan will result in the direct or indirect creation of 100,000 new jobs, which represents an annual average growth rate of 11.2%, keeping in mind that the sector currently already employs approximately 45,000 people, including the electricity, heating and cooling and transport sectors.

The impact on the energy balance could mean savings to the amount of 2 to 2.3 billion Euros (using a reference Brent = 80 USD/bbl), which is equivalent to a reduction in imports of energy products of 7.9 billion m^3 of natural gas in the electricity sector and 14 million barrels of oil, outside the electricity sector (transport, heating and cooling). This overall investment effort in renewable energy and energy efficiency will make it possible to reduce Portugal's energy dependence from the current 83% to figures closer to 74% in 2020.

The investments that are necessary to fully implement this plan have been calculated at approximately 17.8 billion Euros, the main share of which will be attributed to the hydro, wind and solar energy sectors, which will account for approximately 80% of these investments. During the first three years of the implementation of this plan, investments will focus on wind energy and will then focus on hydro and solar power in subsequent years.

Chart 9 – Estimated costs and benefits of the renewable energy policy support measures (2010-2020):

Measure	Expected renewable energy use (ktoe)	Expected cost (in Million EUR) — indicate time frame	Expected GHG reduction by gas (Mton CO_2 eq /year)	Expected job creation
(Overall)	1317	17,800	25	100,000

5.4. Preparation of the National Renewable Energy Action Plan and the follow-up of its implementation

(a) How were regional and/or local authorities and/or cities involved in the preparation of this Action Plan? Were other stakeholders involved?

The national authorities responsible for the area of energy were entrusted with the task of preparing the action plans. The body that is directly responsible for the plan and which coordinated all the tasks pertaining to its preparation was the Directorate

General for Energy and Geology, an entity that is part of the Ministry for the Economy, Innovation and Development.

The local and regional authorities, more specifically the autonomous regions, had the opportunity to express their views on this plan while it was being drawn up and during the prior consultation.

Representative associations from the energy sector were likewise involved, as were representatives from the academic and scientific community, network operators and a broad series of public and private corporate entities and local bodies.

(b) Are there plans to develop regional/local renewable energy strategies? If so, could you please explain? In case relevant competences are delegated to regional/local levels, what mechanism will ensure national target compliance?

The overall planning keeps in mind regional diversity and potential. The allocation of the capacity is carried out after considering both economic (resources) as well as regional criteria. One project is worthy of note in this context, although it is not limited to a strategy pertaining to renewable energy, namely the pilot experiment in the city of Évora to make it a *smart city*, involving the integrated management of the decentralised production of energy, the intelligent charging of electric vehicles and the intelligent management of consumption, using intelligent meters and a more efficient management of network operations.

Similarly, keeping in mind their status of regional autonomy, the autonomous regions of Madeira and the Azores could also develop regional policies regarding RES, aligned with the national strategy. In the case of these autonomous regions the respective regional governments are responsible for implementing these policies.

(c) Please explain the public consultation carried out for the preparation of this Action Plan.

A survey was prepared while the action plan was being developed, which was distributed amongst numerous individuals and entities (in the public and private sphere) on the targets, policies and measures that were necessary to achieve the objectives of Directive 2009/28/EC. This survey (Annex III) was made available on the DGEG website (www.dgeg.pt) and 52 replies were received, which were considered while preparing the final version of the NREAP.

After the final version of the document was concluded, the plan was available for public consultation on the DGEG website and was sent to all the relevant entities in the sector.

(d) Please indicate your national contact point/the national authority or body responsible for the follow-up of the Renewable Energy Action Plan?

The contact point and national authority responsible for follow-up of the National Renewable Energy Action Plan is the Directorate General for Energy and Geology, a body of the Ministry for the Economy, Innovation and Development.

(e) Do you have a monitoring system, including indicators for individual measures and instruments, to follow-up the implementation of the Renewable Energy Action Plan? If so, could you please give more details on it?

Portugal is developing a monitoring system to accompany the evolution of the implementation of the various measures and instruments contained in the action plan, including a model to monitor the respective indicators.

The monitoring system will be centralised in the DGEG, the MEID body that is responsible for managing the plan. The DGEG will liaise with the multidisciplinary technical teams responsible for key areas of the plan. One of these teams, headed by the DGEG, will be responsible for managing the indicators.

The DGEG will be supported by an Advisory Committee comprising entities from other state areas, regulators, network operators, relevant sectorial associations and representatives of stakeholders in this sector. This Committee will play a proactive role while monitoring the implementation of the NREAP and will propose suggestions for improvements or corrections.

The sets of indicators, routines for compiling data and the frequency of this compilation are also being organised. In the meanwhile, a significant number of indicators, such as, for example, the number of solar collectors installed and other renewable equipment integrated into buildings are already monitored within the scope of other plans, such as the National Energy Efficiency Action Plan. Microproduction and all electricity production in general based on the use of RES already have an established routine for collecting data for statistical purposes, as is also the case for the introduction of biofuels in the transport sector.

The ideal monitoring model would have the configuration shown in the following figure.

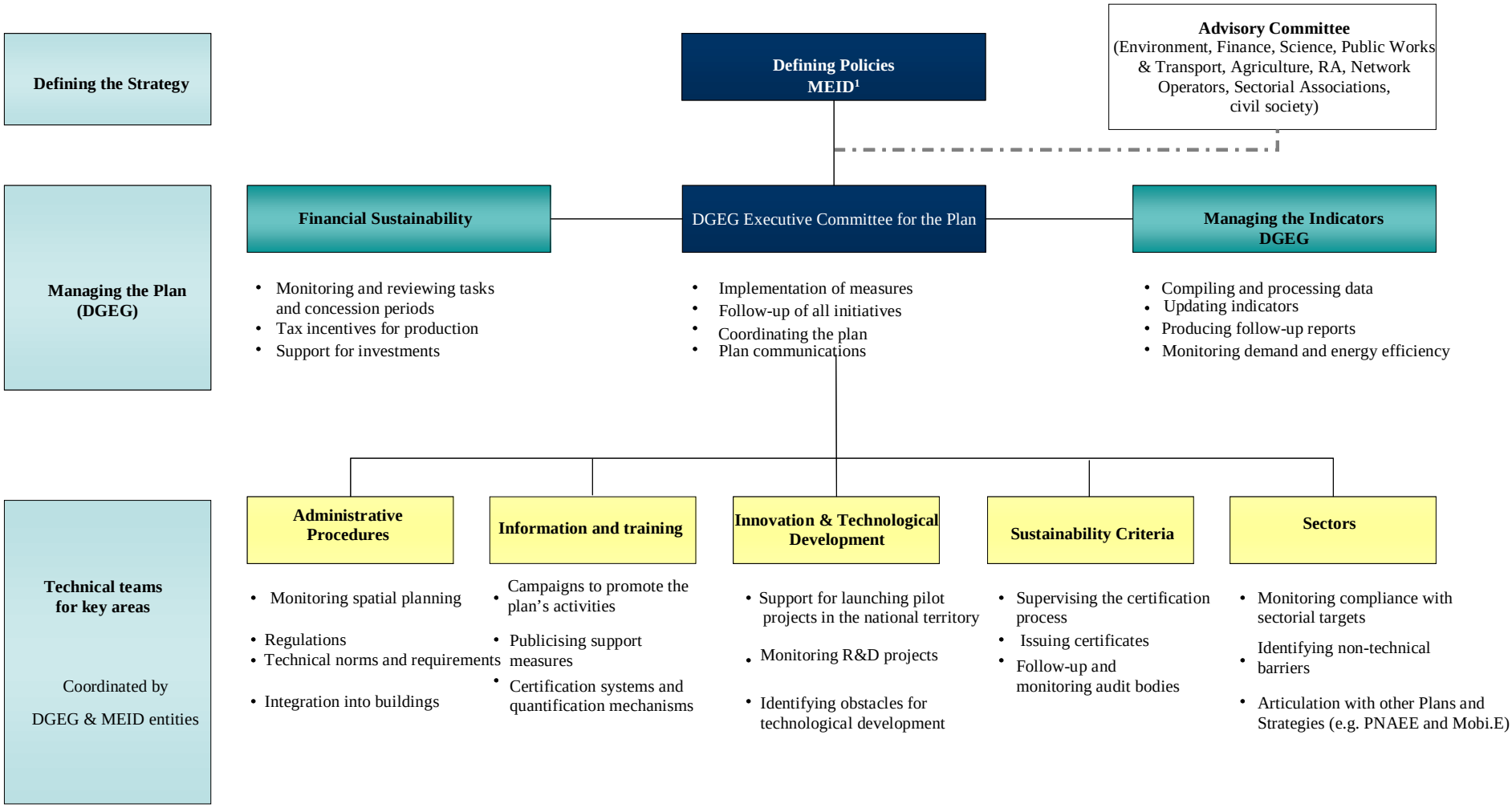
Defining the Strategy
Defining Policies
MEID[1]
Advisory Committee
(Environment, Finance, Science, Public Works & Transport, Agriculture, RA, Network Operators, Sectorial Associations, civil society)
Managing the Plan (DGEG)
Financial Sustainability
DGEG Executive Committee for the Plan
Managing the Indicators DGEG
• Monitoring and reviewing tasks and concession periods
• Tax incentives for production
• Support for investments
• Implementation of measures
• Follow-up of all initiatives
• Coordinating the plan
• Plan communications
• Compiling and processing data
• Updating indicators
• Producing follow-up reports
• Monitoring demand and energy efficiency
Technical teams for key areas
Coordinated by
DGEG & MEID entities
Administrative Procedures
Information and training
Innovation & Technological Development
Sustainability Criteria
Sectors
• Monitoring spatial planning
• Regulations
• Technical norms and requirements
• Integration into buildings
• Campaigns to promote the plan's activities
• Publicising support measures
• Certification systems and quantification mechanisms
• Support for launching pilot projects in the national territory
• Monitoring R&D projects
• Identifying obstacles for technological development
• Supervising the certification process
• Issuing certificates
• Follow-up and monitoring audit bodies
• Monitoring compliance with sectorial targets
• Identifying non-technical barriers
• Articulation with other Plans and Strategies (e.g. PNAEE and Mobi.E)

Figure 20 – Structure of the NREAP Monitoring System

ANNEXES

ANNEX I- CALCULATING THE AVIATION CAPPING MECHANISM MENTIONED IN CHAPTER 2

According to Article 5(6) of Directive 2009/28/EC, for the purpose of measuring compliance with the 2020 target and the interim trajectory, the amount of energy consumed in aviation is to be considered to be no more than 6.18 % of the Member State's gross final energy consumption (4.12 % for Cyprus and Malta). The appropriate adjustments (if any) could be made in the table. The box shows how to calculate this:

BOX – How to calculate the "aviation capping mechanism" in the Renewable Energy Directive

Assume Country A has a share of aviation energy consumption (AEC) of its total gross final energy consumption (GFEC) of X:

X = AEC/GFEC

Assume X > 6.18 %

In this case the cap implies that for the purpose of assessing compliance,

GFEC adjusted = GFEC – AEC + AEC adjusted
where AEC adjusted = 0.0618 * GFEC

In other terms

GFEC adjusted = GFEC – AEC + 0.0618 * GFEC =
= GFEC – X * GFEC + 0.0618 * GFEC =
= GFEC * (1.0618 – X)

The 'adjustment' as a % of the real GFEC and as a function of X is therefore
Adjustment = (GFEC – GFEC adjusted)/GFEC =

= X – 0.0618

NB: In the case of Cyprus and Malta, the figures of 4.12 % and 0.0412 should replace the fi gures of 6.18 % and 0.0618 respectively.

ANNEX II – TECHNICAL RULES FOR SUPPORTING THE IMPLEMENTATION OF MICROPRODUCTION PRODUCTION (DL NO. 363/2007, OF 2 NOVEMBER)

The transition from the general regime to the subsidised regime entails a new registration, which can only be done in the year after the registration under the general regime.

In case a consumer rescinds their contract to purchase electricity, the respective sale contract, in the quality of producer, is automatically rescinded.

After the contract for the sale of electricity is signed, the capacity contracted as a consumer can only be reduced to twice the amount of the connection capacity of the production facility, so as to maintain the quality of the producer.

As long as the procedure for the energy audit stipulated in Art. 9(1)(b)(iii), of the aforesaid diploma is not defined, certificates of responsibility will be accepted from qualified experts (under the present regimes of the SGCIE and SCE).

The qualified experts mentioned in the point above are experts who are recognised within the scope of the Energy Consumption Management Regulations and the Buildings Certification System.

The contract for the sale of energy produced by means of microproduction and the contract to purchase energy by the consumer will be signed with the same vendor.

The billing for the electricity produced will have the same time frame as the billing for the electricity consumed.

The payment for the electricity by the vendor to third parties, stipulated in art. 12(3), will be implemented from the month of September 2008 onwards.

The annual limit stipulated in Art. 12(7) of Decree Law No. 363/2007, of 2 November, for the connection capacity registered under the subsidised regime will be divided into parcels of 1.5 MW per session, and the registration dates will be duly announced in the SRM.

When there is occasion to apply the dispositions of the previous paragraph above, the SRM must provide information on the new date and time for the reception of new registrations.

The capacity of the inverter is characterised by the nominal exit capacity.

Equipment compliance can be proved by means of the EC certification or the manufacturer's declaration of compliance, with the exception of the inverter, for which a certificate of compliance is required for this product, issued by an independent certification body.

During the period between the date of the payment of the registration fee at the SRM and the signing of the contract, no changes can be made to the conditions associated with the registration.

The energy captured in the solar thermal collectors stipulated in Art. 9(1)(a)(ii) can be used by any kind of heat transfer heating equipment for use at the site where the electricity consumption is installed.

When the microproduction unit is implemented by a condominium, the respective condominium members are also entitled to the tax deduction.

The entities that hold the registration title for implementing low voltage electricity facilities, carried out under the terms of Order No. 14/2004, of 10 January, can only engage in the activity of installing microproduction units as long as they have obtained the necessary licence for implementing electricity producing facilities.

The sale tariff applicable to a microproduction unit constituted by more than one renewable energy technology is determined by means of the following formula:

[formula missing]

Where,

TV – Sale tariff

TR – Reference tariff

PS – Solar capacity

PE – Photovoltaic capacity

PH – Hydro capacity

PB – Biomass capacity

The transfer of the site of a microproduction unit is only possible under the conditions described in Art. 20(2) and (3) of DL 363/07, of 2 November, i.e. if the same consumer and the same producer continue at the new site.

The sale tariff for electricity, stipulated in Art. 10(2) of Decree Law No. 363/2007, of 2 November, which is applicable to all the microproduction under the general remuneration regime which is not marketed by the last resort vendor, is equal to the cost of energy of the simple tariff of the electricity system regulated to the BTN of a contracted capacity that is less than or equal to 20.7 kVA.

ANNEX III - SURVEY TO SUPPORT THE PREPARATION OF THE NREAP

Direcção Geral de Energia e Geologia

Plano Nacional de Acção para as Energias Renováveis

I. Visão para o sector das Renováveis

1. Para os seguintes sectores de consumo energético, como classifica de 1 a 5 o potencial das Fontes de Energia Renovável até 2020, e pós 2020?
(1 = potencial reduzido; 5 = potencial elevado)

	Até 2020					Pós 2020				
	1	2	3	4	5	1	2	3	4	5
Electricidade	○	○	○	○	○	○	○	○	○	○
Transportes	○	○	○	○	○	○	○	○	○	○
Aquecimento e arrefecimento	○	○	○	○	○	○	○	○	○	○

Comentários:

2. Quais são os principais desafios para a implementação das FER (escolha no máximo 3)?

- a) Competitividade económica das tecnologias ☐
- b) Grau de desenvolvimento das tecnologias ☐
- c) Acesso a meios de financiamento/instrumentos financeiros ☐
- d) Restrições de natureza técnica ☐
- e) Restrições de natureza regulamentar ☐
- f) Restrições de natureza ambiental ☐

Outros, especificar:

2. Quais são os principais desafios para a implementação das FER (escolha no máximo 3)?

- a) Competitividade económica das tecnologias ☐
- b) Grau de desenvolvimento das tecnologias ☐
- c) Acesso a meios de financiamento/instrumentos financeiros ☐
- d) Restrições de natureza técnica ☐
- e) Restrições de natureza regulamentar ☐
- f) Restrições de natureza ambiental ☐

Outros, especificar:

3. Quais são as principais oportunidades associadas à implementação das FER
(escolha no máximo 3)?

- a) Redução de emissões ☐
- b) Redução da importação de produtos petrolíferos ☐
- c) Redução da dependência externa de produtos energéticos ☐
- d) Criação de clusters industriais ☐
- e) Aumento da capacidade exportadora de tecnologia nacional ☐
- f) Criação de empregos qualificados ☐
- g) Desenvolvimento do sistema científico e tecnológico nacional ☐

Outros, especificar:

Next Save

Direcção Geral de Energia e Geologia

Plano Nacional de Acção para as Energias Renováveis

II. Prioridades tecnológicas

1.1. De 1 a 5, como classifica as seguintes tecnologias em termos de prioridade relativa? Qual a meta máxima para a potência instalada em cada uma das tecnologias? (1 = potencial reduzido; 5 = potencial elevado)

	Até 2020					Pós 2020					Observações/comentários
	1	2	3	4	5	1	2	3	4	5	
Grandes hídricas	○	○	○	○	○	○	○	○	○	○	
Pequenos aproveitamentos hídricos	○	○	○	○	○	○	○	○	○	○	
Geotermia (produção de electricidade)	○	○	○	○	○	○	○	○	○	○	
Geotermia (aproveitamento térmico)	○	○	○	○	○	○	○	○	○	○	
Solar Fotovoltaico (PV)	○	○	○	○	○	○	○	○	○	○	

1.2.

	Até 2020					Pós 2020					Observações/comentários
	1	2	3	4	5	1	2	3	4	5	
Solar PV Concentrado (CPV)	○	○	○	○	○	○	○	○	○	○	
Solar Termoeléctrico (CSP)	○	○	○	○	○	○	○	○	○	○	
Solar PV micro e minigeração (até 150 kW)	○	○	○	○	○	○	○	○	○	○	
Solar Térmico	○	○	○	○	○	○	○	○	○	○	
Eólica onshore	○	○	○	○	○	○	○	○	○	○	

1.3.

	Até 2020					Pós 2020					Observações/comentários
	1	2	3	4	5	1	2	3	4	5	
Eólica offshore	○	○	○	○	○	○	○	○	○	○	
Micro e mini-turbinas (até 250 kW)	○	○	○	○	○	○	○	○	○	○	
Biomassa Sólida	○	○	○	○	○	○	○	○	○	○	
Biomassa Líquida (excluindo biocombustíveis)	○	○	○	○	○	○	○	○	○	○	
Biogás	○	○	○	○	○	○	○	○	○	○	

1.4.

	Até 2020					Pós 2020					Observações/comentários
	1	2	3	4	5	1	2	3	4	5	
Bioetanol	○	○	○	○	○	○	○	○	○	○	
Biodiesel	○	○	○	○	○	○	○	○	○	○	
Hidrogénio a partir de FER	○	○	○	○	○	○	○	○	○	○	
Veículos eléctricos	○	○	○	○	○	○	○	○	○	○	
Cogeração a partir de FER	○	○	○	○	○	○	○	○	○	○	

Outra; especificar:

2. Para quais destas tecnologias devia haver metas definidas para 2020? Para esses casos, qual devia ser a meta?

	Definição de meta		Meta	Unidade			
	Sim	Não		MW	m2	ton	kteps
Grandes hídricas	○	○		○	○	○	○
Pequenos aproveitamentos hídricos	○	○		○	○	○	○
Geotermia (produção de electricidade)	○	○		○	○	○	○
Geotermia (aproveitamento térmico)	○	○		○	○	○	○
Solar Fotovoltaico (PV)	○	○		○	○	○	○
Solar PV Concentrado (CPV)	○	○		○	○	○	○
Solar Termoeléctrico (CSP)	○	○		○	○	○	○
Solar PV micro e minigeração (até 150 kW)	○	○		○	○	○	○
Solar Térmico	○	○		○	○	○	○
Eólica onshore	○	○		○	○	○	○
Eólica offshore	○	○		○	○	○	○
Micro e mini-turbinas (até 250 kW)	○	○		○	○	○	○
Biomassa Sólida	○	○		○	○	○	○
Biomassa Líquida (excluindo biocombustíveis)	○	○		○	○	○	○
Biogás	○	○		○	○	○	○
Bioetanol	○	○		○	○	○	○
Biodiesel	○	○		○	○	○	○
Hidrogénio a partir de FER	○	○		○	○	○	○
Veículos eléctricos	○	○		○	○	○	○
Cogeração a partir de FER	○	○		○	○	○	○

Outra; especificar:

3.1. Das tecnologias listadas acima identifique as 3 tecnologias com maior potencial para:

a) Reduzir a factura energética?			
b) Criar emprego?			
c) Potenciar o tecido empresarial nacional?			
d) Promover o desenvolvimento regional?			
e) Melhorar a capacidade exportadora de Portugal?			

3.2. Para as opções seleccionadas como resposta à pergunta 3.1.e), em que partes da cadeia de valor faz sentido apostar?

Opção 1

Opção 2

Opção 3

Next Save

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III. Medidas de apoio à implementação e modelo de seguimento

1. Que novas medidas de apoio às FER devem ser consideradas no PNAER?

a) A nível do enquadramento regulamentar:

b) A nível dos mecanismos de apoio financeiro:

c) A outros níveis, p. ex.: formação, comunicação, cooperação entre diferentes entidades:

2. Das medidas existentes e previstas, faz sentido reforçar algumas e/ou descontinuar outras? Se sim, pode especificar quais e porquê?

3. Para garantir o sucesso da implementação do plano e potenciar as FER, que tipo de medidas devem ser adoptadas no modelo e processos de seguimento?

a) A nível dos processos de controlo:

b) A nível do modelo de governo:

c) A outros níveis:

4. Comentários adicionais:

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