



## PORTUGAL

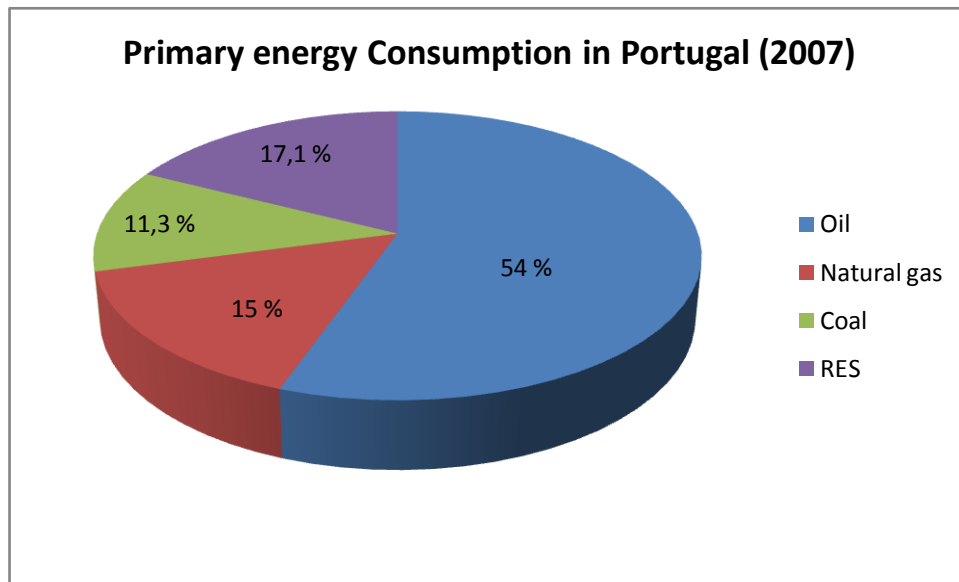
### RENEWABLE ENERGY POLICY REVIEW

Portugal, which is highly dependent on imported oil and gas, has stepped up its efforts to develop renewable energy sources (RES). The renewable policy framework in Portugal constitutes a comprehensive policy mix, complete with monitoring system; however administrative barriers are hindering a further development, especially for hydropower and solar technologies. At the end of 2008, 743% of total RES-e production was from hydropower and 38% from wind. A shoreline wave power plant with a capacity of 400 kW - Pico plant in Azores - is operating since 2005, and a small wave farm composed by three Pelamis devices ( $3 \times 750\text{kW} = 2.25\text{ MW}$ ) is also in operation since September 2008. A large photovoltaic power plant with 53 MW as started operation in the end of the year, with a forecast production of 76 GWh per year. Emerging technologies like wave energy and concentrated solar power have ambitious targets for 2010. Wind energy is the RES source with the higher rate of evolution in the last years: the supply of electricity from this source, in 2008 reached almost 5600 GWh. For the Renewable heating and cooling sector (RES-H&C) a new Portuguese building code was introduced in 2007 the obligation to install solar thermal systems in certain cases.

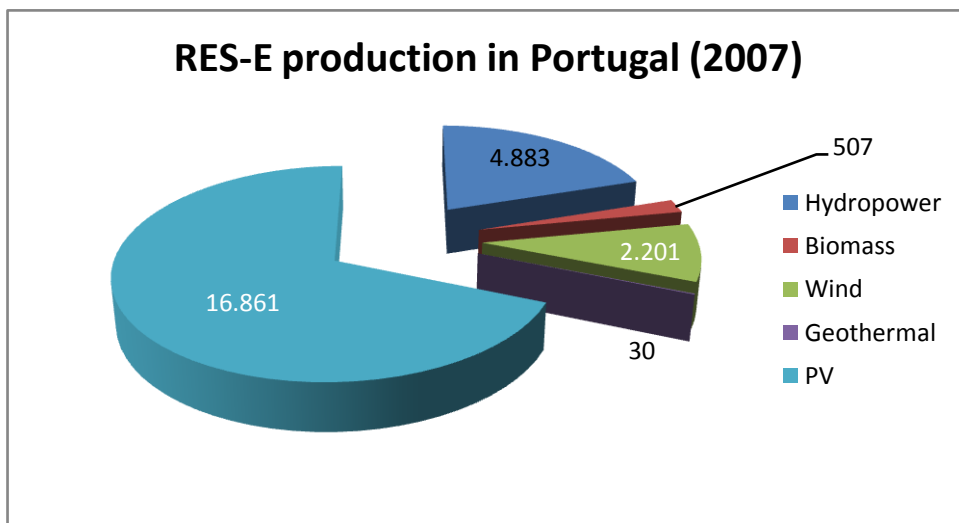
- The **share of RES in total primary energy consumption** was of 17.1% in 2007.
- The **share of RES in the gross final energy consumption** was 20.5% in 2005.
- The **share of RES in the gross electricity production** was 30.5 % in 2007(a 63% dry year), 30.6% in 2006 (an almost average year) 16.8% in 2005. 25.2% in 2004 (it highly dependent on the variation in hydropower production).
- The **share of biofuels** in the transport sector in 2006 was 1.02%
- Portugal energy dependence on imports amounts to 85% in 2005 and 86% in 2006.

### Technology specific figures

- More than 2.8 GW of **wind** are currently installed in Portugal. It reached more than 5600 GWh in 2008 and 4003 GWh in 2007.
- More than 4.8 GW of **hydropower** are currently installed in Portugal. It reached more than 6400 GWh in 2008, 10 219 GWh in 2007 and 11202 GWh in 2006.
- In 2008, **PV** reached 80 MW of capacity installed (14.7 MW in 2007); **biogas** 12.5 MW (8.2 MW in 2006), and **biomass** 357 MW in 2007 and 2006.



Source: DGEG



Source: DGEG

## **RES POLICY**

The Portuguese Government promotes RES principally via guaranteed feed-in tariffs for renewable electricity, direct subsidy payments (PRIME-Programme) and tax incentives. Beginning in 2005, a tendering/concession process has also been established. Subsidy payments and tax incentives have been largely, though not entirely, used for smaller-scale renewable energy applications. Feed-in tariffs and tendering schemes, used principally for larger-scale renewable applications.

## **RES TARGETS**

### **Mandatory targets set by the Directive on the Promotion of the use of energy from renewable sources**

- 31% share of RES on the final consumption of energy in 2020.
- At least 10% share of renewable energy in final consumption of energy in transport by 2020.

### **Indicative Target set by the RES- electricity European Directive from 2001<sup>1</sup>**

- 39% Share of RES on gross electricity consumption by 2010

### **Indicative Target set by the European Biofuels Directive from 2003<sup>2</sup>**

- Biofuels consumption of 5.75 % of petrol and diesel use for transport in 2010 (indicative target of 10% for 2010 following national energy policy commitment).

### **National Commitments**

- Indicative target of 45% Share of RES on gross electricity consumption by 2010 following national energy policy commitment).
- Indicative target for Biofuels consumption of 10 % of petrol and diesel use for transport in 2010 following national energy policy commitment.

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<sup>1</sup> Directive 2007/71/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market. Currently in force, sets targets up to 2010.

<sup>2</sup> Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport currently in force, sets targets up to 2010, with indicative targets by 2005.

## RES Technology Roadmap

- **Wind Power:** increase by 1,950 MW the installed capacity goal for 2012 (reaching a new total of 5,100 MW with an increase of 600 MW through equipment upgrade) and promote the creation of new technological and investment clusters linked to wind power;
- **Hydropower:** anticipate upgrading capacity investments for existing hydropower plants, in order to reach the 5,575 MW target of installed hydropower capacity by 2010 (575 MW more than expected in previous energy policies). For 2020 the target is higher than 6960 MW following the recently granted projects included in the National Plan for Dams with High Hydroelectric Potential;
- **Biomass:** increase by 100 MW the installed capacity goal for 2010 (67% increase), promoting a tight coordination across regional forest resources and potential, and fire risk mitigation policies. Thus in 2010 the biomass installed capacity shall be of 250 MW ;
- **Solar:** the world's largest photovoltaic plant (Moura plant) has already been put in operation and a link to micro-generation policies and goals will be ensured. The 2010 goal is of 150 MW of solar installed capacity;
- **Wave:** increase installed capacity by 200 MW through the creation of a Pilot Area with a total exploitation potential of up to 250 MW for new emerging industrial and pre-commercial waves technological development prototypes;
- **Biofuels:** define a 10% penetration of biofuels in road transport (attaining European Union goal 10 years in advance) and promote domestic agriculture initiatives through tax exemptions for road transport fuels incorporating biofuels;
- **Biogas:** define goals and action plan for a previously uncovered area, establishing a 100 MW target of installed capacity for anaerobic waste treatment units;
- **Micro-generation:** promote programme for installing 50,000 systems until 2010, with installation incentives for water heating systems based on solar energy in existing houses. A new law promoting the micro generation of electricity by home owners was approved in the end of 2007 and will be in force starting in February 2008, with a special fast process of licensing and an interesting tariff
- Replacing 5% to 10% of coal used in Sines and Pego Power Plants with biomass or waste until 2010.

## Progress towards the Targets

Portugal has been moving towards its RES-e target in 2007 41.9%, in 2005 (35.9%). However, Portugal has been moving further away from its RES-e target between 1997 and 2007, this is due to the fact that the target was not entirely realistic as it was based on the exceptional hydropower performance of 1997. As a consequence, Portugal is not expected to reach its target, even if measures are successful.

## RES POLICY INSTRUMENTS

### Support for Electricity

#### *Feed in tariff*

The Decree-law 33\_A of 16<sup>th</sup> February 2005 modified the system of feed-in tariffs, establishing a new calculation system. The formula for calculation of the feed in tariffs takes in account the technology, the environmental aspects and the inflation rate through the index of prices to the consumer. There are also some minimum and maximum tariffs, according to the variations of load on the grid.

<i>Feed-in Tariff</i>				
Resource	Technology	Support level [cents/ kWh]	Feed-in tariff or premium?	Duration [up to years that an investor is entitled to support]
hydro	small	7.5	feed-in tariff	20 years
wind	onshore	7.4	feed-in tariff	15 years
wind	offshore	7.4	feed in tariff	15 years
biomass	solid	11	feed in	15 years
biomass	gasification (biogas)	10.2	feed-in tariff	15 years
PV		31-45	feed in	15 years
CSP	Up to 10 MW	26.3-27.3	feed-in tariff	15 years
Wave		26 -7.6	feed-in tariff	15 years

The Decree-law 225/2007 introduced new tariffs for emerging technologies, such as wave energy and Concentrated Solar Power providing the legal basis for government use of public maritime areas for producing electricity from sea-wave power.

The present Portuguese feed-in law also describes a specific procedure that aims at minimizing local opposition towards new wind projects. In consideration of the crucial role of wind power within Portugal's energy strategy and the immense increases in installed capacity required to meet Portugal's wind energy targets. Under this procedure, municipalities in which a wind farm is located will automatically benefit from the remuneration the operator of the wind project receives. Altogether, the municipality receives a share of 2.5 percent of the monthly remuneration paid to the wind project operator. As expected, municipalities have responded with support for wind power projects in their territory. Local resistance against new installations has consequently remained negligible. A comparable procedure for other renewable technologies does not exist under the Portuguese regulation, and most other countries with feed-in tariffs have not experimented with this approach to minimizing local opposition to new renewable energy projects.

#### *Tendering procedures*

- Were used in 2005 and 2006 in connection to wind and biomass installations.
- In 2006, a call for tenders was launched for CSP power plants using forest biomass.

## Support for Heating and Cooling

The most recent legislation Portaria 1463/2007 of November 15th, defining the Incentive System applicable to SMEs. Art. 12, no.1, a) acquisition of renewable equipments. Art. 15, no.1) states maximum incentive rate.

### Investment Subsidies

Resource	Technology	Support level [%/total investment]	Start year	End year	Comments
All renewables	All residential and commercial technologies	25	2006		SIEST program Only applicable to Azores Autonomous Region (roughly 1.5% of total national demand). It applies to all residential and commercial renewable based energy production
Solar thermal	Domestic solar water heater	70	2001		SIEST program Only applicable to Madeira Autonomous Region (roughly 1.5% of total national demand)
all (applicable to all renewables)	all (applicable to all renewables)	35	2007	2013	Applicable only to SMEs to a maximum of 250000€ per project

### Financial Incentives (reduction on interest rate)

Resource	Technology	Support level [% reduction on interest rates]	Start year	End year	Comments
all (applicable to all renewables)	all (applicable to all renewables)	100%	2007	2013	Applicable only to SMEs to a maximum of 750000€ per project; loan for 5 years and 2 years for capital " carência"

### Fiscal Incentives (deduction from taxable profits)

Support for individuals (thermal use) for the 2006 fiscal exercise, 30% of the costs in RES equipments were deductible.

Resource	Technology	Support level [% deduction from taxable profits]	Start year	End year	Comments
solar; ambient heat; biomass	Domestic solar water heater; Solar space and water heating; Solar space heating and cooling; Space and water heating; Space and water heating and cooling; Biomass combustion small scale furnace	30	2000	not defined	up to 777 euros of the new equipment cost

State budget. This data is for the 2008 state budget proposal. The previous ones, since 2000 had the same measure but less ambitious (e.g. In 2000 % deduction was 25% up to 250 euros)

## Energy Certification- Building Code

The System of Energy Certification (SCE) for buildings complemented by a Regulation on energy conditioning in Buildings (RSECE) and a Regulation on the Thermal properties of Buildings (RCCTE) are pieces of legislation passed in mid 2006. They develop a strategy to implement the directive 2002/91/CE on the Energy Certification of Buildings. The RSECE, in its article 14, determines the conditions under which a newly built building should be provided with a centralised energy conditioning system, obliging to make use of RES sources in all those cases where a study proves that it is financially viable. The National Energy Agency ADENE is the body in charge of the implementation of the Certification System. Heat from biomass boilers is one of the technologies benefiting from this new scheme.

### Support for Biofuels

#### Biofuel quota obligations

Directive 2003/30/EC was transposed into Portuguese law by Decree-Law No 62/2006 of 21 March 2006, which sets the possible introduction of mandatory minimum quotas of biofuels in fossil fuels where the incorporation of such fuels during the preceding year was well below the level forecast

Resource	Quota in % (per year)	Year	Comments
Biofuels	5.75% (energy)	2010	Compulsory

#### Tax exemption

The promotion of biofuels by fiscal means is the subject of Decree-Law No 66/2006 of 22 March 2006, which provides for total exemption (in the case of small dedicated producers) or partial exemption from the duty on such fuels (more specifically the ISP - Tax on Petroleum and Energy products) up to a target set annually

Resource	Technology	Total support level (= tax exemption incl. reduction of VAT to be paid) [€cents/litre]	Maximum amount per year eligible (in case of tender system)	start year
biofuels	bioethanol	38.94	589221.5 GJ	2007
biofuels	biodiesel	10.94	unlimited	

#### Others

- The possibility of imposing a quota for biofuels in transport fuels, and of establishing voluntary agreements whenever the biofuel share in blends exceeds 15% in the case of public passenger transport fleets
- Establishing a recognised figure, that of the dedicated small producer, corresponding to firms producing up to 3 000 tones annually whose output is derived from waste products or is based on technology projects aimed at the development of products that are less polluting.

## **Support for All RES technologies**

### *Investment subsidies for all RES technologies*

The most recent legislation Portaria 1463/2007 of November 15th, defining the Incentive System applicable to SMEs. Art. 12, no.1, a) acquisition of renewable equipments. Art. 15, no.1) states maximum incentive rate

- Support level [%/total investment] 35%. Start year 2007- End year 2013 Applicable only to SMEs to a maximum of 250000€ per project

### *Financial Incentives for all RES technologies*

- Support level [% reduction on interest rates] 100%: Start year 2007- End year 2013. Applicable only to SMEs to a maximum of 75 000€ per project loan for 5 years and 2 years for capital " carência".

### *Fiscal Incentives for all RES*

A reduced VAT rate of 12% is also in place for all RE equipments purchased within the national territory.

## Sources:

European Commission Factsheets by Country

[http://ec.europa.eu/energy/energy\\_policy/facts\\_en.htm](http://ec.europa.eu/energy/energy_policy/facts_en.htm)

Member States Reports in the framework of the Directive 2001/77/EC on renewable electricity

[http://ec.europa.eu/energy/res/legislation/electricity\\_member\\_states\\_en.htm](http://ec.europa.eu/energy/res/legislation/electricity_member_states_en.htm)

Member States Reports in the framework of the Directive 2003/30/EC on biofuels

[http://ec.europa.eu/energy/res/legislation/biofuels\\_members\\_states\\_en.htm](http://ec.europa.eu/energy/res/legislation/biofuels_members_states_en.htm)

APREN

<http://www.apren.pt/>

Technical University of Lisbon

<http://www.utl.pt/>

Ministry of Economy and Innovation. Directorate General for Energy and Geology

<http://www.min-economia.pt/default.aspx?idLang=2>

Legal Sources on renewable energy

<http://res-legal.eu/index.php?id=9&L=1>



In the framework of the EU co-funded project: RES 2020: Monitoring and Evaluation of the RES Directives implementation in EU27 and policy recommendations to 2020

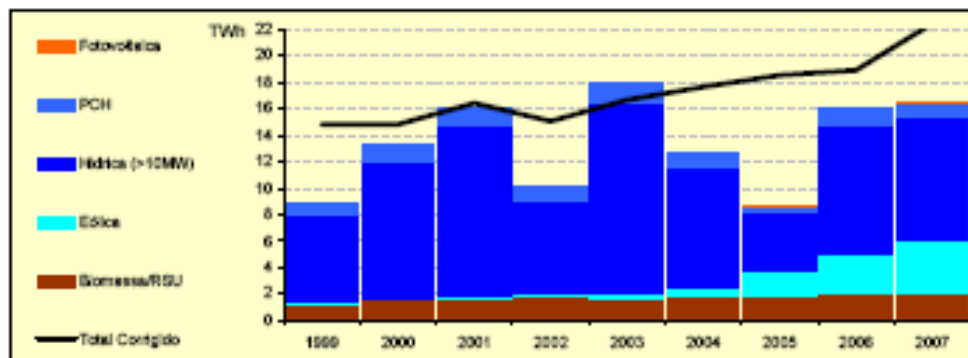
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## Annex I Historical development of renewable in Portugal (1999-2007)

Gráfico B.1 - Evolução da energia produzida a partir de fontes renováveis



Quadro B.1 - Evolução histórica da energia elétrica produzida através de renováveis (GWh)  
Portugal Continental

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Hídrica Total	7 514	11 606	14 240	8 096	15 834	10 053	5 000	11 202	10 219
Grande Hídrica (>300MW)	6 556	10 365	12 887	6 896	14 303	9 065	4 454	9 755	9 274
PCH (>10 e <=30 MW)	458	626	890	615	622	487	265	751	594
PCH (<=10 MW)	500	590	663	585	769	501	281	675	441
Eólica	108	154	239	341	468	787	1 741	2 892	4 001
Biomassa (c/ cogeração)	1 075	1 030	1 065	1 166	1 059	1 206	1 286	1 454	1 521
Biomassa (s/ cogeração)	3	7	21	42	43	52	64	71	149
Resíduos Sólidos Urbanos	157	514	511	518	523	475	545	480	420
Biogás	1,1	1,6	2,2	2,5	2,3	14	31	33	55
Fotovoltaica	1,1	1,4	1,6	1,6	2,6	3,8	4,1	4,8	23,6
Ondas/Marés									
Total	8 858	13 514	18 080	10 167	18 032	12 590	6 671	16 127	16 385
IPW (ao base de Diretiva - 1997)	0,557	0,685	0,875	0,623	1,090	0,654	0,336	0,650	0,627
Hídrica Total Corrigida (IPW=1)	13 480	13 114	14 805	12 965	14 582	15 140	14 881	14 023	16 238
Total Corrigido	14 835	14 622	16 445	15 066	16 690	17 676	18 552	18 927	22 474
Produção Bruta + Saldo Imp. (GWh)	41 358	43 535	45 454	46 652	48 220	50 017	51 729	52 749	53 698
% de renováveis (Real)	21,4%	30,6%	35,4%	21,6%	37,3%	25,2%	16,6%	30,6%	30,5%
% de renováveis (Dedutiva)	35,9%	34,9%	36,2%	32,3%	34,6%	35,3%	35,9%	35,9%	41,3%

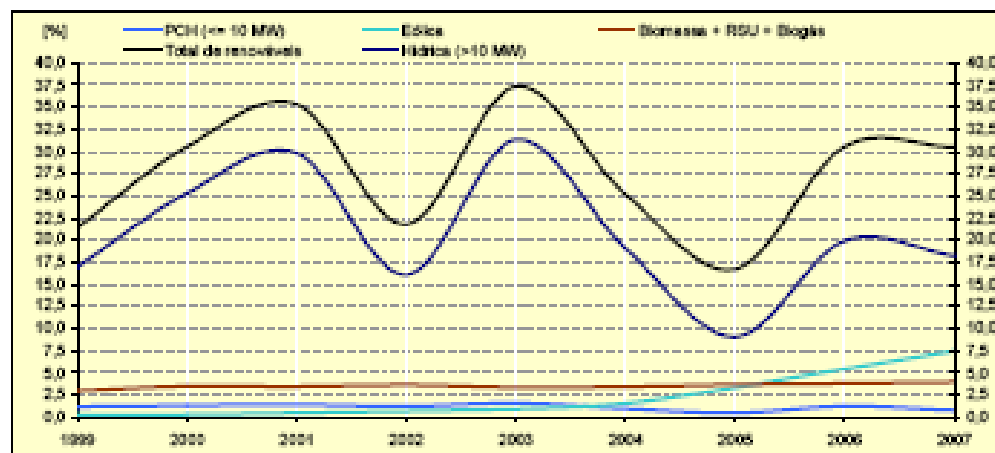
Produção Bruta + Saldo Importador para 2007, calculada com base num crescimento anual de 1,8%.

Quadro B.2 - Evolução histórica da potência total instalada em renováveis (MW)  
Portugal Continental

	2000	2001	2002	2003	2004	2005	2006	2007	TCMA
Hídrica Total	4 226	4 263	4 289	4 292	4 581	4 752	4 802	4 825	1,8%
Grande Hídrica (>300MW)	3 783	3 783	3 783	3 783	4 043	4 234	4 234	4 234	1,6%
PCH (>10 e <=30 MW)	228	240	251	251	251	232	281	281	3,0%
PCH (<=10 MW)	226	240	254	256	267	286	287	290	3,6%
Eólica	76	114	175	253	537	1 047	1 661	2 108	60,8%
Biomassa (c/ cogeração)	344	344	372	352	357	357	357	357	0,5%
Biomassa (s/ cogeração)	8	8	8	8	12	12	24	24	17,5%
Resíduos Sólidos Urbanos	88	88	88	88	88	88	88	88	0,2%
Biogás	1,0	1,0	1,0	1,0	7,0	8,2	8,2	12,4	43,3%
Fotovoltaica	1,2	1,3	1,5	2,1	2,7	2,9	3,4	14,5	42,8%
Ondas/Marés									
Total	4 755	4 619	4 934	4 996	5 585	6 267	6 964	7 459	6,5%

TCMA - Taxa de Crescimento Médio Anual entre 2000 e 2007

Gráfico B.2 - Evolução do peso da produção das energias renováveis na produção bruta + saldo importador Portugal Continental



Quadro B.3 - Evolução do peso da produção das energias renováveis na produção bruta + saldo importador Portugal Continental

	%									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Hidrica Total	18,2	28,7	31,3	17,4	33,0	20,1	9,7	21,2	18,0	
Hidrica (>10 MW)	17,8	28,3	28,9	16,1	31,4	19,1	9,1	20,8	18,2	
Grande Hidrica (>30MW)	15,9	23,9	28,3	14,8	29,7	18,1	8,8	18,5	17,3	
PCH (>10 a <=30 MW)	1,1	1,4	1,3	1,3	1,7	1,0	0,5	1,4	0,8	
PCH (<= 10 MW)	1,2	1,4	1,3	1,3	1,6	1,0	0,5	1,3	0,8	
Eólica	0,0	0,4	0,5	0,7	1,0	1,6	3,4	5,5	7,5	
Biomassa + RSU + Biogás	3,0	3,6	3,8	3,7	3,4	3,5	3,7	3,8	4,0	
Biomassa (s/ cogeração)	2,8	2,4	2,3	2,5	2,2	2,4	2,5	2,8	2,8	
Biomassa (s/ cogeração)	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,3	
Resíduos Sólidos Urbanos	0,4	1,2	1,1	1,1	1,1	0,9	1,1	0,9	0,8	
Biogás	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,1	
Fotovoltaica	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
Total de renováveis	21,4	35,6	35,4	21,6	37,3	25,2	18,8	30,8	30,5	

Quadro B.4 - Evolução do peso da produção de cada tecnologia no total da produção de energia renovável Portugal Continental

	%									
	1999	2000	2001	2002	2003	2004	2005	2006	2007	
Hidrica Total	84,8	87,2	88,8	79,6	88,3	79,8	57,7	69,5	62,3	
Hidrica (>10 MW)	79,2	82,7	84,4	73,9	84,0	75,9	54,4	65,2	58,8	
Grande Hidrica (>30MW)	74,8	78,0	80,1	67,8	78,5	72,0	51,4	60,8	56,8	
PCH (>10 a <=30 MW)	5,2	4,7	4,3	6,0	4,6	3,9	3,1	4,7	3,1	
PCH (<= 10 MW)	5,8	4,4	4,1	5,8	4,3	4,0	3,3	4,2	2,7	
Eólica	1,2	1,2	1,5	3,4	2,8	6,3	20,1	17,9	24,4	
Biomassa + RSU + Biogás	14,0	11,7	9,9	17,0	9,1	13,9	22,2	12,8	13,1	
Biomassa (s/ cogeração)	12,1	7,7	6,8	11,5	5,9	9,6	14,8	9,1	8,3	
Biomassa (s/ cogeração)	0,0	0,1	0,1	0,4	0,2	0,4	0,7	0,4	0,9	
Resíduos Sólidos Urbanos	1,8	3,9	3,2	5,1	3,9	3,8	6,3	2,9	2,8	
Biogás	0,0	0,0	0,0	0,0	0,0	0,1	0,4	0,2	0,3	
Fotovoltaica	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	
Total de renováveis	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	