Intelligent Energy Europe

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PRODES

Promotion of Renewable Energy for Water production through Desalination

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Legislative and Institutional Issues for Energy & Water

Greece, Italy, Spain, Portugal

September 2010

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Introduction

WP6 is dedicated to the analysis of energy and water framework conditions in the target countries, Greece, Italy, Spain and Portugal and how they can affect the implementation of RE- Desalination. The aspects that are examined in each country are as follows:

- Relevant Legislation and administrative issues (i.e. required licenses)
- Institutional Framework
- Energy and Water Prices and subsidies
- Existing Funding schemes and programmes

Special emphasis is given on the real costs of water supply by analyzing and evaluation the existing subsidies that have various forms. Energy tariffs for RES and energy costs from conventional energy sources are also presented in this report.

The output of this report includes recommendations for policy makers and suggestions on the improvement and acceleration of the procedures and on the progress of RE-Desalination in each country. As it is known, there is no legislation for the combination of the two technologies, so for each country the two sectors, energy and water, are examined in separate.

More analytically,

Chapter 1 presents the EU laws and directives concerning Renewable Energy Sources (RES) and Water.

Chapter 2 presents the current energy and water situation, the RES and Water Framework, administrative procedures for the installation of RE and Desalination plants, tariffs and funding schemes in the four target countries, Greece, Italy, Portugal and Spain.

Chapter 3 summarizes the framework conditions of RES and Desalination in the four target countries and presents comments and suggestions for their optimization.

Chapter 1

"The main goal of the EU is the progressive integration of Member States' economic and political systems and the establishment of a single market based on the free movement of goods, people, money and services."

1. EU Legislative Framework

The main goal of the EU is the progressive integration of Member States' economic and political systems and the establishment of a single market based on the free movement of goods, people, money and services. To this end, its Member States cede part of their sovereignty under treaties which empower the EU institutions to adopt laws. These **laws** (regulations, directives and decisions) take precedence over national law and are binding on national authorities. The EU also issues non-binding instruments, such as recommendations and opinions, as well as rules governing how EU institutions and programmes work, etc. (http//ec.europa.eu).

- **EU Directives**

EU directives lay down certain end results that must be achieved in every Member State. National authorities have to adapt their laws to meet these goals, but are free to decide how to do so. Directives may concern one or more Member States, or all of them. Each directive specifies the date by which the national laws must be adapted - giving national authorities the room for manoeuvre within the deadlines necessary to take account of differing national situations. Directives are used to bring different national laws into line with each other, and are particularly common in matters affecting the operation of the single market (e.g. product safety standards), (http//ec.europa.eu).

- **EU Regulations**

A regulation is a legislative act of the European Union which becomes immediately enforceable as law in all member states simultaneously. Regulations can be distinguished from directives which, at least in principle, need to be transposed into national law. Under the European Constitution regulations would have become known as "European laws" but this proposal has since been dropped.

- **EU Decisions**

Decisions are EU laws relating to specific cases. They can come from the EU Council (sometimes jointly with the European Parliament) or the Commission. They can require authorities and individuals in Member States either do something or stop doing something, and can also confer rights on them. EU decisions are:

• addressed to specific parties (unlike regulations),

• fully binding.

1.1 EU Legislative Framework for RES

The European Community recognises the need to promote Renewable Energy Sources as a priority measure given that their exploitation contributes to environmental protection and sustainable development. For the promotion of RES under certain schemes, EC provides a number of Directives. Each Member State has to adapt them in its electricity and environmental system. The main Directives for RES are as following:

L140/16 - Directive 2009/28/EC[1], on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. According to Directive 2009/28/EC, the Member States have different renewable energy potentials and operate different schemes of support for energy from renewable sources at the national level. The majority of Member States apply support schemes that grant benefits solely to energy from renewable sources that is produced on their territory. For the proper functioning of national support schemes it is vital that Member States can control the effect and costs of their national support schemes according to their different potentials. One important means to achieve the aim of this Directive is to guarantee the proper functioning of national support schemes, as under **Directive 2001/77/EC**, in order to maintain investor confidence and allow Member States to design effective national measures for target compliance.

L283/33 - Directive 2001/77/EC, on the promotion of electricity produced from renewable energy sources in the internal electricity market. This Directive aims at facilitating cross-border support of energy from renewable sources without affecting national support schemes. It introduces optional cooperation mechanisms between Member States which allow them to agree on the extent to which one Member State supports the energy production in another and on the extent to which the energy production from renewable sources should count towards the national overall target of one or the other. In order to ensure the effectiveness of both measures of target compliance, i.e. national support schemes and cooperation mechanisms, it is essential that Member States are able to determine if and to what extent their national support schemes apply to energy from renewable sources produced in other Member States and to agree on this by applying the cooperation mechanisms

[1] Amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC

provided for in this Directive. To ensure increased market penetration of electricity produced from renewable energy sources in the medium term, all Member States should be required **to set national indicative targets** for the consumption of electricity produced from renewable sources Member States and to agree on this by applying the cooperation mechanisms provided for in this Directive.

L176/37 - Directive 2003/54/EC, is concerning common rules for the internal market in electricity and repealing Directive 96/92/EC. Experience in implementing this Directive shows the benefits that may result from the internal market in electricity, in terms of efficiency gains, price reductions, higher standards of service and increased

competitiveness. Requirements relating to the maintenance of the reliability and safety of the grid and to the dispatching may differ according to the characteristics of the national grid and its secure operation shall ensure that the origin of electricity produced from renewable energy sources can be guaranteed as such within the meaning of this Directive, in accordance with objective, transparent and non-discriminatory criteria.

L350 - Directive 98/70/EC, as regards the specification of petrol, diesel and gas-oil and the introduction of a mechanism to monitor and reduce greenhouse gas emissions from the use of road transport fuels.

L073 - Directive 97/11/EC, amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment.

L123/42 - Directive 2003/30/EC, on the promotion of the use of biofuels or other renewable fuels for transport.

L255 - Directive 2005/36/EC, lays down requirements for the mutual recognition of professional qualifications, including for architects, there is a further need to ensure that architects and planners properly consider an optimal combination of renewable energy sources and high-efficiency technologies in their plans and designs. Member States should therefore provide clear guidance in this regard.

L450 – Directive 84/450/EEC, relating to the approximation of the laws, regulations and administrative provisions of the Member States concerning misleading advertising.

L144 – Directive 97/7/EC, on the protection of consumers in respect of distance contracts - Statement by the Council and the Parliament re Article 6 (1) - Statement by the Commission re Article 3 (1), first indent.

L166/51 - Directive 98/27/EC, on injunctions for the protection of consumers' interests.

L271 – Directive 2002/65/EC, is concerning the distance marketing of consumer financial services and amending Council Directive 90/619/EEC and Directives 97/7/EC and 98/27/EC.

L24 - Directive 98/34/EC, laying down a procedure for the provision of information in the field of technical standards and regulations and rules on Information Society services relating for example to levels of quality, testing methods or conditions of use, should not create barriers for trade in renewable energy equipment and systems. Therefore, support schemes for energy from renewable sources should not prescribe national technical specifications which deviate from existing Community standards or require the supported equipment or systems to be certified or tested in a specified location or by a specified entity.

L358/114 - Directive 98/746, conservation of European wildlife and natural habitats adopted at the 17th meeting of the Convention's Standing Committee.

L257 - Directive 96/61/EC, is concerning integrated pollution prevention and control.

L305 - Directive 97/62/EC, adapting to technical and scientific progress Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

L206 - Directive 92/43/EC, on the conservation of natural habitats and of wild fauna and flora.

L327/1 - Directive 2000/60/EC, establishing a framework for Community action in the field of water policy.

L1/65 - Directive 2002/91/EC, on the energy performance of buildings.

L149/22 - Directive 2005/29/EK[2], concerning unfair business-to-consumer commercial practices in the internal market and amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive').

L027 - **Directive 96/92/EK**, is concerning common rules for the internal market in electricity.

[2] Amending Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive')

L175 - Directive 85/337/EEC, on the assessment of the effects of certain public and private projects on the environment.

L156 - Directive 2003/35/EC, providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC - Statement by the Commission.

L140/88 - Directive 2009/30/EC, amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC.

The European Commission (EC) reports **COM (2005)627** and **COM (2008)19** have highlighted that despite the requirements of Directive 77/2001/EC, the efforts of Member States, and some improvements of the regulatory frameworks, major barriers to the growth and integration of renewable electricity remain. The main cause of the slow development in some Member States is not deliberate policy barriers, but delays in authorization, unfair grid access conditions, and slow reinforcement of the electric power grid.
The reports invite the Member States to give a high priority to removing administrative barriers and improving grid access for renewable producers. Finally, the EC reports conclude that the harmonization and support schemes for economic efficiency, single market, and state aid remains a long-term goal, but the harmonization in the short-term is not appropriate. By adopting best practices or combining national support schemes Member States can continue to reform, optimize, and coordinate their efforts to support renewable electricity. [IEA, Wind Energy, Annual Report 2008].

EC Report COM(2005)627 - in 2005, in accordance with directive 2001/77/EC on the promotion of renewable electricity, the European Commission reported on the application and coexistence of the different support mechanisms for electricity from renewable energy sources (COM(2005)627). The report found that in general the effectiveness and efficiency of support schemes differ widely across the Member States. It also found that the different support schemes are characterized by different levels of maturity and that policy schemes in some countries – in particular

quota obligation systems – are fairly young systems and still in a transitional phase. The report also found that there is scope for greater cooperation between member States and optimisation of individual support schemes. Whilst harmonisation of support schemes was considered a long term objective, persisting barriers to the development of renewable electricity and the low level of competition in the electricity market implied that such harmonisation would be premature. The report concluded that the Commission should closely monitor support schemes and report again in 2007.

EC Report COM (2008)19 - presents an updated review of the performance of support schemes using the same indicators presented in the 2005 report. It finds that, as in 2005, well-adapted feed in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity. This report also examines the relationship between support schemes and the internal electricity market, including current policy proposals to increase competition, the application of rules on the free movement of goods. The report underlines the need to improve the competitive situation on the internal electricity market, and recalls the need for implementing the Commission proposals regarding unbundling, improved regulatory oversight and cooperation, network cooperation and transparency. These proposals are vital in order to improve the market access for renewable electricity. It also concludes that it is important that the design of support systems is compatible with a competitive internal electricity market. If the renewable electricity is traded on the electricity market, it can contribute to the development of a more competitive market through for example a more diversified supply structure. Member States' efforts to coordinate and optimise their support regimes are then examined. Several Member States have adapted their support schemes to optimize or improve their effectiveness and there have been some efforts to coordinate between Member States. Administrative, grid and market barriers are also discussed as these can have an important impact on the performance of support schemes.

EU Directives for RES

EU Directive	Year	Scope
L450 – Directive 84/450/EEC	1984	Relating to the approximation of the laws, regulations and administrative provisions of the Member States concerning misleading advertising.
L175 - Directive 85/337/EEC	1985	On the assessment of the effects of certain public and private projects on the environment.
L206 - DIRECTIVE 92/43/EC	1992	Conservation of natural habitats and of wild fauna and flora.
L257 - Directive 96/61/EC	1996	Concerning integrated pollution prevention and control.
L027 - Directive 96/92/EK	1996	Common rules for the internal market in electricity
L144 – Directive 97/7/EC	1997	On the protection of consumers in respect of distance contracts - Statement by the Council and the Parliament re Article 6 (1) - Statement by the Commission re Article 3 (1), first indent.
L305 - Directive 97/62/EC	1997	Conservation of natural habitats and of wild fauna and flora.
L073 - Directive 97/11/EC	1997	Assessment of the effects of certain public and private projects on the environment.
L24 - Directive 98/34/EC	1998	Provision of information in the field of technical standards and regulations and rules on Information Society services.
L166/51- Directive 98/27/EC	1998	On injunctions for the protection of consumers' interests.
L358/114 - Directive 98/746	1998	Conservation of European wildlife and natural habitats.
L350 - Directive 98/70/EC	1998	The specification of petrol, diesel and gas-oil and the introduction of a mechanism to monitor and reduce greenhouse gas emissions from the use of road transport fuels.
L327/1 - DIRECTIVE 2000/60/EC	2000	Framework for Community action in the field of water policy.
L283/33 - DIRECTIVE 2001/77/EC	2001	Promotion of electricity produced from renewable energy sources in the internal electricity market.
L271 – 2002/65/EC	2002	Concerning the distance marketing of consumer financial services and amending Council Directive 90/619/EEC and Directives 97/7/EC and 98/27/EC
L1/65 - DIRECTIVE 2002/91/EC	2002	Energy performance of buildings.
L176/37 - DIRECTIVE 2003/54/EC	2003	Common rules for the internal market in electricity.
L123/42 Directive 2003/30/EC	2003	Promotion of the use of biofuels or other renewable fuels for transport.
L156 - Directive 2003/35/EC	2003	Providing for public participation in respect of the

		drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC - Statement by the Commission
L255 - Directive 2005/36/EC	2005	Requirements for the mutual recognition of professional qualifications.
L149/22 - DIRECTIVE 2005/29/EK	2005	Council Directive 84/450/EEC, Directives 97/7/EC, 98/27/EC and 2002/65/EC of the European Parliament and of the Council and Regulation (EC) No 2006/2004 of the European Parliament and of the Council ('Unfair Commercial Practices Directive').
L140/16 - DIRECTIVE 2009/28/EC	2009	Promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.
L140/88 - DIRECTIVE 2009/30/EC	2009	Regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emission. amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC.

1.2 Overview of EU Support Schemes for RES

There is a great range of market-based instruments governments use to subsidize renewable electricity. These can be divided between investment support (capital grants, tax exemptions or reductions on the purchase of goods) and operating support (price subsidies, green certificates, tender schemes and tax exemptions or reductions on the production of electricity).

In overall terms, operating support - support per MWh – for renewable electricity is far more important than investment support. Market-based instruments providing operating support can be EN divided in instruments that fix a quantity of renewable electricity to be produced and in instruments that fix a price to be paid for renewable electricity

1. Economic theory has shown that under ideal conditions, quantity-based instruments and price-based instruments have the same economic efficiency.

2 Quantity-based market instruments quota obligations are used in seven Member States. Under a quota obligation, governments impose an obligation on consumers, suppliers or producers to source a certain percentage of their electricity from renewable energy. This obligation is usually facilitated by tradable green certificates (TGC)

3. Accordingly, renewable electricity producers sell the electricity at the market price, but can also sell green certificates, which prove the renewable source of the electricity. Suppliers prove that they reach their obligation by buying these green certificates, or they pay a penalty to the government. Under tendering, used in the past in three Member States on a broader scale, a tender is announced for the provision of a certain amount of electricity from a certain technology source, and the bidding should ensure the cheapest offer is accepted. Denmark has recently decided to use tendering for the development of off-shore wind projects. Price-based market instruments feed-in tariffs and premiums are used in 18 Member States. Feed-in tariffs and premiums are granted to operators of eligible domestic renewable electricity plants for the electricity they feed into the grid. The preferential, technology-specific feed-in tariffs and premiums paid to producers are regulated by the government. Feed-in tariffs take the form of a total price per unit of electricity paid to the producers whereas the premiums (bonuses) are paid to the producer on top of the electricity market price. An important difference between the feed-in tariff and the premium payment is that the latter introduces competition between producers in the electricity market. The cost for the grid operator is normally covered

through the tariff structure. The tariff respectively the premium is normally guaranteed for a period of 10 – 20 years. In addition to the level of the tariff respectively the premium, the guaranteed duration provides a strong long term degree of certainty which lowers the market risk faced by investors. Both feed-in tariffs and premiums can be structured to encourage specific technology promotion and cost reductions (the latter through stepped reductions in tariff/premiums). Three Member States offer the choice between feed-in fixed prices and premiums, and one Member State offers a pure premium payment.

Fiscal incentives, such as tax exemptions or reductions, are used as the main support scheme in two Member States and as supplementary instruments in others. Producers of renewable electricity are exempted from certain taxes (e.g. carbon taxes) in order to compensate for the unfair competition they face due to external costs in the conventional energy sector. Directive 2003/96/EC4 explicitly allows for such fiscal incentives in its Article 15. The effectiveness of such fiscal incentives depends on the applicable tax rate.

Due to different resource potentials and differences in renewable technology costs, a single support instrument is seldom sufficient to develop a full spectrum of renewable energy sources available in one country. In most cases, Member States apply a combination of support schemes to realize renewable energy investments. A common combination of support schemes is to have investments subsides or soft loans in addition to the main support scheme, such as feed-in tariffs or quota obligations [COM(2008) 19 final].

1.3 EU Legislative Framework for Water

Water is a major concern for environmental policies in the European Community and is one of the environmental priorities of the European Commission. The European Union (EU) has established a Community framework for water protection and management.[3]

The main pillar of water policies during the coming decades will be the proposed Directive establishing a framework for Community action in the field of water policy (or Water Framework Directive). In line with recent initiatives to give more weight to economic instruments in environmental policies, the proposed Water Framework Directive promotes the use of water charging to act as an incentive for the sustainable use of water resources and to recover the costs of water services by economic sector, [COM(2000) 477 final].

Desalination of marine water to produce water for human consumption or agriculture will become more significant due to the effects of climate change in many coastal regions, islands and outermost regions.

The Water Framework Directive establishes a legal framework to protect and restore clean water across Europe and ensure its long-term, sustainable use. (Its official title is *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy*). The directive establishes an innovative approach for water management based on river basins, the natural geographical and hydrological units and sets specific deadlines for Member States to protect aquatic ecosystems. The directive addresses inland surface waters, transitional waters, coastal waters and groundwater. It establishes several innovative principles for water management, including public participation in planning and the integration of economic approaches, including the recovery of the cost of water services.

Further information on the Water Framework Directive and on Europe's waters, are provided at the **Water Information System for Europe**: water.europa.eu. A list of international commissions that co-ordinate the implementation of the Directive in several IRBDs can be found on the European Commission's website:

.http://ec.europa.eu/environment/water/waterframework/links/index_en.htm

[3] (http://europa.eu/legislation_summaries/environment/water_protection_management)

Twelve "Water Information Notes" provide an introduction and overview of key aspect of the implementation of the Water Framework Directive [WISE, EU DG)

Waternote 1 – Joining forces for Europe's shared waters – Coordination in international river basin districts

Waternote 2 - Cleaning up Europe's Waters – Identifying and assessing surface water bodies at risk

Waternote 3 - Groundwater at Risk – Managing the water under us

Waternote 4 - Reservoirs, Canals and Ports – Managing artificial and heavily modified water bodies

Waternote 5 - Economics in Water Policy – The value of Europe's waters

Waternote 6 - Monitoring programmes – Taking the pulse on Europe's water

Waternote 7 - Intercalibration – a common scale for Europe's waters

Waternote 8 - Pollution – Reducing dangerous chemicals in Europe's water

Waternote 9 - Integrating water policy – Linking all EU water legislation within a single framework

Waternote 10- Climate Change – Addressing floods, droughts and changing aquatic ecosystems

Waternote 11 - From rivers to the sea – Linking with the new Marine Strategy Framework Directive

Waternote 12 - A common task – Public participation in River Basin Management Planning

http://ec.europa.eu/environment/water/water-framework/facts_figures/index_en.htm

The main Directives for Water are as follow:

L020 – Directive 80/68/EEC[4], on the protection of groundwater against pollution caused by dangerous substances.

L31 - Directive 76/160/EEC, concerning the quality of bathing water.

L129 - Directive 76/464/EC[5], on pollution caused by certain dangerous substances discharged into aquatic environment of the Community. The 'limit values' and 'quality objectives' established under the Directive.[6]

L81/60 - Directive 2008/32/EC, amending Directive 2000/60/EC establishing a framework for Community action in the field of water policy, as regards the implementing powers conferred on the Commission.

L372/19 - Directive 2006/118/EC, on the protection of groundwater against pollution and deterioration.

L348 – Directive 2008/105/EC, on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council.

L222 - Directive 78/659/EEC[7]**,** on the quality of freshwaters needing protection or improvement in order to support fish life. Directive as last amended by the 1994 Act of Accession.

L281 - Directive 79/923/EEC[8], on the quality required of shellfish waters. Directive as amended by Directive 91/692/EEC.

L271 - Council Directive 79/869/EEC[9], concerning the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking waters in the Member States. (Directive as last amended by the 1994 Act of Accession).

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[4] Thirteen years after the entry into force of the Directive 2000/60/EC this Directive will be repealed
[5] Thirteen years after the entry into force of the Directive 2000/60/EC this Directive will be repealed
[6] The Mercury Discharges Directive 82/176/EEC, OJ L 81, 27.3.1982, p. 29
(ii) The Cadmium Discharges Directive 83/513/EEC, OJ L 291, 24.10.1983, p. 1.
(iii) The Mercury Directive 84/156/EEC, OJ L 74, 17.3.1984, p. 49.
(iv) The Hexachlorocyclohexane Discharges Directive 84/491/EEC, OJ L 274, 17.10.1984, p. 11.
(v) The Dangerous Substance Discharges Directive 86/280/EEC, OJ L 181, 4.7.1986, p. 16.

[7] Thirteen years after the entry into force of the Directive 2000/60/EC this Directive will be repealed
[8] Thirteen years after the entry into force of the Directive 2000/60/EC this Directive will be repealed

L135 - Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment. The Directive determines the minimum technical infrastructure in sanitation networks and waste water processing installations depending on the population and on the final receiver of the processed waste waters. A water body must be identified as a sensitive area if it falls into one of the following groups:
(a) natural freshwater lakes, other freshwater bodies, estuaries and coastal waters which are found to be eutrophic or which in the near future may become eutrophic if protective action is not taken.
(b) surface freshwaters intended for the abstraction of drinking water which could contain more than the concentration of nitrate laid down under the relevant provisions of Council Directive 75/440/EEC of 16 June 1975 concerning the quality required of surface water intended for the abstraction of drinking water in the Member States. On the other hand, a marine water body or area can be identified as a less sensitive area if the discharge of waste water does not adversely affect the environment as a result of morphology, hydrology or specific hydraulic conditions which exist in that area.

L375 - Directive 91/676/EEC, concerning the protection of waters against pollution caused by nitrates from agricultural sources. OJ L375, 31.12.1991, p.1.4. The 91/676/EEC Council Directive has the objective of reducing water pollution caused or induced by nitrates from agricultural sources and - preventing further pollution. The Directive contains criteria for identifying waters affected by pollution and waters which could be affected by pollution and codes for good agricultural practice.

L305 - Directive 97/62/EC, adapting to technical and scientific progress Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

L103 - Directive 79/409/EEC, on the conservation of wild birds, Last amended by Directive 97/49/EC.

L223 - Directive 97/49/EC, amending Council Directive 79/409/EEC on the conservation of wild birds.

L194 - Directive 75/440/EEC[10], concerning the quality required of surface water intended for the abstraction of drinking water in the Member States. Directive as last amended by Directive 91/692/EEC.

[10] Seven years after the entry into force of the Directive 2000/60/EC this Directive will be repealed

L377 - Directive 91/692/EEC, on the control of major-accident hazards involving dangerous substances.

L175 - Directive 85/337/EEC, Environmental Impact Assessment Directive. Amended by Directive 97/11/EC.

L335 – Directive 86/574/EEC, amending Decision 77/795/EEC establishing a common procedure for the exchange of information on the quality of surface fresh water in the Community.

L73 - Directive 97/11/EC, on the assessment of the effects of certain public and private projects on the environment.

L229 - Directive 80/778/EC, relating to the quality of water intended for human consumption. The Directive is amended by Directive 98/83/EC.

L230 - Directive 91/414/EEC, Directive as last amended by Directive 98/47/EC

L191 - Directive 98/47/EC, including an active substance (azoxystrobin) in Annex I to Council Directive 91/414/EEC concerning the placing of plant protection products on the market.

L123 - Directive 98/8/EC, concerning the placing of biocidal products on the market.

L010 - Directive 96/82/EC, on the control of major-accident hazards involving dangerous substances.

L181 – Directive 86/278/EEC, on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture

L257 - Directive 96/61/EC, concerning integrated pollution prevention and control.

L164/19 Directive 2008/56/EC, Establishing a Framework for Community action in the field of Marine environmental policy.

L376/14 – Directive 2006/113/EC, on the quality required of shellfish waters.

L64/37 – Directive 2006/7/EC, concerning the management of bathing water quality and repealing Directive 76/160/EEC.

L64/52 – Directive 2006/11/EC, on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community.

L288/27 - Directive 2007/60/EC, on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community.

Directive 98/83/EC, on the quality of water intended for human consumption The objective of this Directive is to protect human health from the adverse effects of any

contamination of water intended for human consumption by ensuring that it is wholesome and clean. 'Water intended' for human consumption means:

(a) all water either in its original state or after treatment, intended for drinking, cooking, food preparation or other domestic purposes, regardless of its origin and whether it is supplied from a distribution network, from a tanker, or in bottles or containers;

(b) all water used in any food-production undertaking for the manufacture, processing, preservation or marketing of products or substances intended for human consumption unless the competent national authorities are satisfied that the quality of the water cannot affect the wholesomeness of the foodstuff in its finished form.

This Directive does not apply to natural mineral waters and waters which are medicine products.

According to this Directive all Member States shall take all measures necessary to ensure that regular monitoring of the quality of water intended for human consumption is carried out, in order to check that the water available to consumers meets the requirements of this Directive and in particular the parametric values set to water intended for human consumption (Article 5 of the same Directive). Samples should be taken so that they are representative of the quality of the water consumed throughout the year. In addition, Member States shall take all measures necessary to ensure that, where disinfection forms part of the preparation or distribution of water intended for human consumption, the efficiency of the disinfection treatment applied is verified, and that any contamination from disinfection by-products is kept as low as possible without compromising the disinfection.

The harmonization of national legislation with 98/83/EC is published in 2001, and is valid since 25/12/2003, with Y2/2600/2001 Health Regulation.

L331/1 -DECISION No 2455/2001/EC, establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC

L334 - Council Decision 77/795/EEC[11] , establishing a common procedure for the exchange of information on the quality of surface freshwater in the Community. Decision as last amended by the 1994 Act of Accession.

L327 - Directive 2000/60/EC, establishing a framework for Community action in the field of water policy *Official Journal L 327, 22/12/2000 P. 0001 – 0073.* In this

[11] Seven years after the entry into force of the Directive 2000/60/EC this Decision will be repealed

Directive mainly is mentioned that "water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such".

The European Water Framework Directive (WFD) is a legally binding policy that provides a common framework for water management and protection in Europe and that promises to transform the European water sector. The document was voted in by the European Union's Plenary Session in September 2000 and came into force in December 2000. The decision for establishing a new framework for water management in Europe happened within a changing social and political framework [Kaika, 2003].

Note from Directive 2000/60/EC Article 11, paragraph 4 with reference on Desalination

"'Supplementary' measures are those measures designed and implemented in addition to the basic measures, with the aim of achieving the objectives established pursuant to Article 4. Part B of Annex VI contains a non-exclusive list of such measures. Member States may also adopt further supplementary measures in order to provide for additional protection or improvement of the waters covered by this Directive, including in implementation of the relevant international agreements referred to in Article 1."

ANNEX VI-LISTS OF MEASURES TO BE INCLUDED WITHIN THE PROGRAMMES OF MEASURES- PART B

The following is a non-exclusive list of supplementary measures which Member States within each river basin district may choose to adopt as part of the programme of measures required under Article 11(4):

(i) legislative instruments

(ii) administrative instruments

(iii) economic or fiscal instruments

(iv) negotiated environmental agreements

(v) emission controls

(vi) codes of good practice

(vii) recreation and restoration of wetlands areas

(viii) abstraction controls

(ix) demand management measures, inter alia, promotion of adapted agricultural production such as low water requiring crops in areas affected by drought

(x) efficiency and reuse measures, inter alia, promotion of water-efficient technologies in industry and water-saving irrigation techniques

(xi) construction projects

(xii) ***desalination plants***

(xiii) rehabilitation projects

(xiv) artificial recharge of aquifers

(xv) educational projects

(xvi) research, development and demonstration projects

(xvii) other relevant measures

Table 1 presents a chronology of the European legislation on water.

Table 2. A chronology of the European legislation on water, [Kaika, 2003]

First Wave of Legislation	
Focus on water quality objectives (WQO)	
1975	The surface water directive
1980	The drinking water directive
Second Wave of Legislation	
Focus on emission limit value approach (ELV)	
1991	Urban Waste Water Management Directive
1991	Nitrates Directive
	New Drinking Water Directive
1996	Directive for Integrated Pollution and Prevention Control
Third Wave of Legislation (The Water Framework Directive)	
Integrated approach	
February 1996	Commission's Communication on European Water Policy
February 1997	Commission's Proposal for a Water Framework Directive (COM(97)49)
November 1997	Commission's amended proposal following consultation (COM (97) 614)
January 1998	Involvement of environmental NGOs in amending Annex V on the proposed WFD
February 1998	Commission's further amendment of proposal following consultation (COM (98) 76)
June 1998	Council of Ministers adopt provisional common position on the WFD
Summer 1998	Environment Committee of the European Parliament amends proposed WFD and reveals substantial differences between Council of Ministers and European Parliament over the text
Autumn/Winter	European Parliament deliberately postpones giving the WFD a first reading in order to achieve co-decision status
January 1999	Informal conciliation talks under the auspices of the German Presidency of the European Union between European Parliament, European Commission and Council of Ministers
February 1999	European Parliament gives draft WFD its first reading—votes to accept 120 of the amendments made by the Environment Committee to the Commissions text.
Summer 1999	Legislative Process delayed by elections for European Parliament. European Commission accepts many of the amendments made by the European Parliament, but the Council of Ministers does not and reverts to the political agreement of June 1998.
Autumn/Winter 1999	Environment Committee of the European Parliament re-tables their proposed amendments (PE 231.246) knowing the WFD will have co-decision status
February 2000	European Parliament give draft WFD its second reading, accepting the bulk of the amendments proposed by the Environment Committee, and challenges the common position adopted by Council of Ministers
May 2000	First round of formal conciliation talks between European Union institutions unsuccessful
June 2000	Second round of formal conciliation talks produce a compromise WFD
September 2000	The text drawn up in the conciliation talks formally approved the plenary session of the Parliament and by the Council of Minister
December 2000	WFD (Directive 2000/60/EC) published in the official gazette (22nd December 2000 L 327/1), member states have 3 years from this date to transpose it into national legislation

Source: compiled by the author and annotated by Dr. Ben Page.

EU Directives for Water

EU Directive	Year	Scope
L194 - Directive 75/440/EEC	1975	Concerning the quality required of surface water intended for the abstraction of drinking water. Amended by Directive 91/692/EEC
L129 - Directive 76/464/EC	1976	On pollution caused by certain dangerous substances discharged into aquatic environment
L31 - Directive 76/160	1976	Concerning the quality of bathing water.
L334 - Council Decision 77/795/EEC	1977	Establishing a common procedure for the exchange of information on the quality of surface freshwater.
L222 - Directive 78/659/EEC	1978	On the quality of freshwaters needing protection or improvement in order to support fish life.
L281 - Directive 79/923/EEC	1979	On the quality required of shellfish waters. Amended by Directive 91/692/EEC
L271 - Directive 79/869/EEC	1979	Concerning the methods of measurement and frequencies of sampling and analysis of surface water intended for the abstraction of drinking waters.
L103 - Directive 79/409/EEC	1979	On the conservation of wild birds. Amended by Directive 97/49/EC
L223 - Directive 97/49/EC	1979	Amending Council Directive 79/409/EEC on the conservation of wild birds
L20 - Directive 80/68/EC	1980	On the protection of groundwater against pollution caused by dangerous substances.
L229 - Directive 80/778/EC	1980	Relating to the quality of water intended for human consumption. The Directive is amended by Directive 98/83/EC.
L175 - Directive 85/337/EEC	1985	Environmental Impact Assessment Directive. Amended by Directive 97/11/EC
L335 – Directive 86/574/EEC	1986	Amending Decision 77/795/EEC establishing a common procedure for the exchange of information on the quality of surface fresh water in the Community
L181 – Directive 86/278/EEC	1986	On the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture
L135 - Directive 91/271/EEC	1991	Concerning urban waste-water treatment
L230 - Directive 91/414/EEC,	1991	Amended by Directive 98/47/EC

L377 - Directive 91/692/EEC	1991	On the control of major-accident hazards involving dangerous substances
L375 - Directive 91/676/EEC	1991	Concerning the protection of waters against pollution caused by nitrates from agricultural sources
L206 - Directive 92/43/EEC	1992	On the conservation of natural habitats and of wild fauna and flora Amended by Directive 97/62/EC
L257 - Directive 96/61/EC	1996	Concerning integrated pollution prevention and control.
L010 - Directive 96/82/EC	1996	On the control of major-accident hazards involving dangerous substances
L73 - Directive 97/11/EC	1997	On the assessment of the effects of certain public and private projects on the environment
L305 - Directive 97/62/EC	1997	Adapting to technical and scientific progress Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora
L330/32 Directive 98/83/EC	1998	On the quality of water intended for human consumption.
L191 - Directive 98/47/EC	1998	Including an active substance (azoxystrobin) in Annex I to Council Directive 91/414/EEC concerning the placing of plant protection products on the market.
L123/1 - Directive 98/8/EC	1998	Concerning the placing of biocidal products on the market.
Directive 98/83/EC	1998	On the quality of water intended for human consumption.
L327 - Directive 2000/60/EC	2000	Framework for Community action in the field of water policy.
L331/1 - Decision No 2455/2001/EC	2001	Establishing the list of priority substances in the field of water policy and amending Directive 2000/60/EC.
L376/14 – Directive 2006/113/EC	2006	On the quality required of shellfish waters
L64/37 – Directive 2006/7/EC	2006	Concerning the management of bathing water quality and repealing Directive 76/160/EEC.
L64/52 – Directive 2006/11/EC	2006	On pollution caused by certain dangerous substances discharged into the aquatic environment of the Community
L372/19 Directive 2006/118/EC	2006	On the protection of groundwater against pollution and deterioration.
L288/27 - Directive 2007/60/EC	2007	On pollution caused by certain dangerous substances discharged into the aquatic environment of the Community.

L81/60 Directive 2008/32/EC	2008	Establishing a framework for Community action in the field of water policy.
L164/19 Directive 2008/56/EC	2008	Establishing a Framework for Community action in the field of Marine environmental policy.
L348/84 Directive 2008/105/EC	2008	On environmental quality standards in the field of water policy
Regulation (EEC) No 793/93)		Focusing solely on aquatic ecotoxicity and on human toxicity via the aquatic environment

1.4 Water Pricing Policies in Theory and in Practice, *[COM(2000)477 Final]*

1.4.1 Basic concepts and theory

The main uses of water resources include economic sectors such as agriculture, households, energy, industry and tourism, but also environmental uses such as providing natural wastewater treatment or habitat for wildlife. For most uses, a large variety of water services are developed, from the abstraction, storage and distribution of water to the collection and treatment of wastewater. To play an effective role in enhancing the sustainability of water resources, water pricing policies need to reflect different cost types:

(1) Financial costs of water services, that include the costs of providing and administering these services. They include all operation and maintenance costs, and capital costs (principal and interest payment, and return on equity where appropriate).

(2) Environmental costs, that represent the costs of damage that water uses impose on the environment and ecosystems and those who use the environment (e.g. a reduction in the ecological quality of aquatic ecosystems or the salinisation and degradation of productive soils).

(3) Resource costs, that represent the costs of foregone opportunities which other uses suffer due to the depletion of the resource beyond its natural rate of recharge or recovery (e.g. linked to the over-abstraction of groundwater). Overall, each user should pay for the costs resulting from its use of water resources, including environmental and resource costs. Moreover, prices should be directly linked to the water quantity used or the pollution produced. This ensures that prices have a clear incentive function for users to improve water use efficiency and reduce pollution.

1.4.2 Water pricing policies in the EU Member States

The integration of economic and environmental objectives into water pricing policies is highly variable among Member States of the EU, within Member States and between economic sectors. Overall, the full recovery of financial costs is only partly achieved. This is particularly valid for sewerage services and for the agricultural sector, especially in Southern European countries where this sector is by far the largest and least efficient consumer of water and where scarcity problems are greatest. Agriculture pays much lower prices than other sectors, as a result of both direct subsidies and cross-subsidies with financial transfers from the household and industrial sectors to agriculture.

Environmental and resource costs are rarely considered in pricing policies. In most cases where countries have established abstraction and discharge charges, they are mainly aimed at revenue collection, that can then be used for financing activities that enhance the quality of water bodies and related ecosystems.

Although most of water price structures for domestic water supply include fixed and variable elements and have an incentive role, flat (lump sum) water charges independent of use or pollution are still in use. Most irrigation charges are area based, leading to low water use efficiency especially in surface gravity irrigation systems. Conversely, farmers that pump water directly from underground aquifers pay the full financial costs of their water supply and face a strong incentive to use water efficiently. However, they are never charged for the environmental and resource costs resulting from their (over-) abstractions.

The recent years have recorded an increasing role given to pricing in water policies in many Member States. Increasingly, the objectives of water pricing policies include the full recovery of financial costs and the integration of environmental concerns. However, the strict implementation of these principles remains to be seen.

Chapter 2

"For the promotion of RES under certain schemes, EC provides a number of Directives. Each Member State has to adapt EC Directives in its electricity and environmental system."

2. Legislative Framework for RES & Water in target countries

Chapter 2 describes the adaptation of EU Directives for RES and Water in the three under examination countries, Greece, Italy, Portugal and Spain. More analytically, the chapter presents the current situation/development of RES and Water Desalination in each target country, the Framework, Legislation and administrative issues, as well as the existing funding schemes and programmes are described.

For most of these countries the exploitation of RES and the provision of fresh water to the citizens is a priority. However, in most of those countries the bureaucratic problems as well as the slow reinforcement of the electric power grid are the main causes of the slow development of RES and Water Desalination.

Greece

2.1 Current Status of Renewable Energy Sources and Water

Greece is located in the southeastern part of Europe. The country is comprised of the Greek peninsula as well as of the adjacent archipelago of approximately 3000 islands. Greece is predominantly an agricultural country, although less than one-third of its area is cultivated, but tourism is as well developed and is economically very important. Greece has an area of 131.944 square kilometres, with coastlines of more than 15.000 kilometres. Greece encompasses many island groups, including the Ionian Islands to the west and the Sporades and Cyclades to the east, as well as the larger islands of Crete, Lesvos, Rodhos, Samos, Samothraki, Chios, and Lemnos (see Figure 1). The area and population of Greece is presented in Table 3.

The terrain is predominantly mountainous while the climate is typical northern Mediterranean with most of the precipitation falling during the winter months and increasing from southeast to northwest [ADU RES, 2006].

Figure 1 Map of Greece

Table 3 Area and population of Cyclades and Dodecanese [Kaldelis J, 2007]

Area and population of Cyclades and Dodecanese [1]

	Area (1000 km^2)	Population 1991 (1000)	Population 2001 (1000)	% increase 1991–2001
Dodecanese	2.7	162	190	17
Cyclades	2.6	100	111	11
South Aegean Prefecture	5.3	263	301	14
Greece	132	10,264	10,939	7

Greece has a significant potential of wind, solar, biomass and geothermal energy. With 300 sunny and warm days a year, over 1,000 islands with sea wind, an average wind speed exceeding 7.5 m/s and an important number of geothermal fields, Greece is an ideal country for wind, solar and geothermal energy production.

In describing the water resources of Greece, the key element seems to be the uneven distribution, both in time and space, of precipitation, activities and population. The average annual rainfall ranges from 350 to 2150 mm/yr, with an approximate average of 760 mm/yr. Western Greece is by far richer in water

creating a water 'crescent' from the north to the south than the eastern part of the country, where the majority of population is concentrated. Some additional constraints may be imposed by the continuing increase of water demand as well as by environmental considerations, [ADU RES, 2006].

A. Energy Current Status

Energy production by Renewable Sources in Greece already makes very profound efforts on institutional, regulatory, engineering and funding level to meet the indicative target set by Directive 2001/77/EC through the yet fluid state brought about by the liberalization process of the electricity market dominated for more than half-a-century period by the sole public utility.

During the last decade a continuously increasing interest in renewable energy technologies, was noted in Greece. This was a combined effect of: a) the favorable legal and financial measures that were implemented, b) the rich potential of Renewable Energy Sources (RES) that exists in the country and c) the rising environmental awareness. Even though, in nowadays, the most common power source for electricity production in Greece is lignite and also diesel for the Greek Islands. Figure 2, shows the contribution of each source into the total electricity production of the country.

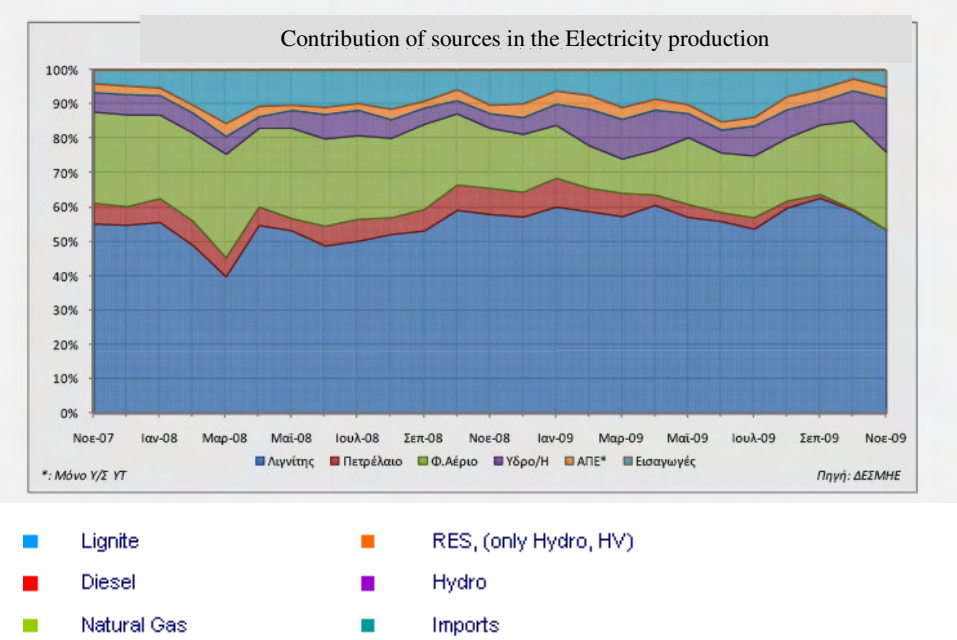


Figure 2 Contribution of the power sources into the total electricity production of the country

More analytically, the electricity demand in the Aegean islands has up to now been covered (PPC, 2005) by thirty two autonomous power stations (APS), based on internal combustion engines and gas turbines, which belong to the former Greek Public Power Corporation (PPC), (see Table 4). In specific cases, like in those of Thassos, Samothrace and Sporades (excluding Skiros), the islands are connected to the nearest available mainland electrical network. The existing APS total installed capacity is approximately equal to 800MW, while the corresponding electricity generation during 2005 was almost 2200GWh (RAE, 2006), [Kaldelis, 2007]. The rated power of the existing thermal power units varies from 100kW, in the case of very small islands, up to 36MW for the gas turbine operating since 1987 in Rhodes island.

Approximately 220 thermal power units operate in the Aegean, most of them being in operation for almost 20 years. The result of this situation is that several units present serious problems, being out of service for remarkable time periods, while their real output is almost 15% less than their rated power, especially during summer. According to the available information, all the APS operating in the Aegean area utilize diesel oil and heavy oil (mazut).

Table 4 Aegean islands classification in terms of APS installed capacity [Kaldelis, 2007]

Aegean islands classification in terms of APS installed capacity

Category (scale)	APS installed capacity (MW)	Islands
Very small	<1	Agathonissi, Agios Efstratios, Anafi, Antikithira, Donoussa, Erikousses, Megisti, Othoni
Small	>1 and <9	Amorgos, Astipalea, Kithnos, Samothrace, Serifos, Sifnos, Simi, Skiros
Medium small	>9 and <20	Ikaria, Ios, Karpathos, Milos, Patmos
Medium	>20 and <50	Andros, Lemnos, Mikonos, Santorini, Siros
Big	>50	Chios, Kos-Kalimnos, Lesvos, Paros, Rhodes, Samos

The legal framework currently governing RES electricity is Law 2773/1999, which also sets the rules for the liberalization of the electricity market in the country. Starting in February 2001, any private investor can produce electricity, subject to the

issuing of a generation license by the Regulatory Authority for Energy (RAE)[12]. A specific mention to RES-electricity production is included in Law 2773/99, which states that the Transmission System Operator (TSO) is obliged to grant priority access (priority in load dispatching) to RES electricity-producing installations.

One of the main obstacles in the penetration of RE technologies in the electricity generation is the limited capacity of the transmission network to absorb and transmit the RES electricity produced. The problem of absorption is focused in the Greek islands, where the local network is not capable to absorb the electricity produced by RES. The development of RES within the three last years is shown in Figure 2. As it shown in Figure 3, the Wind Energy has the largest contribution in the total electricity production from RES.

Total Electricity Production from RES (grid-connected)

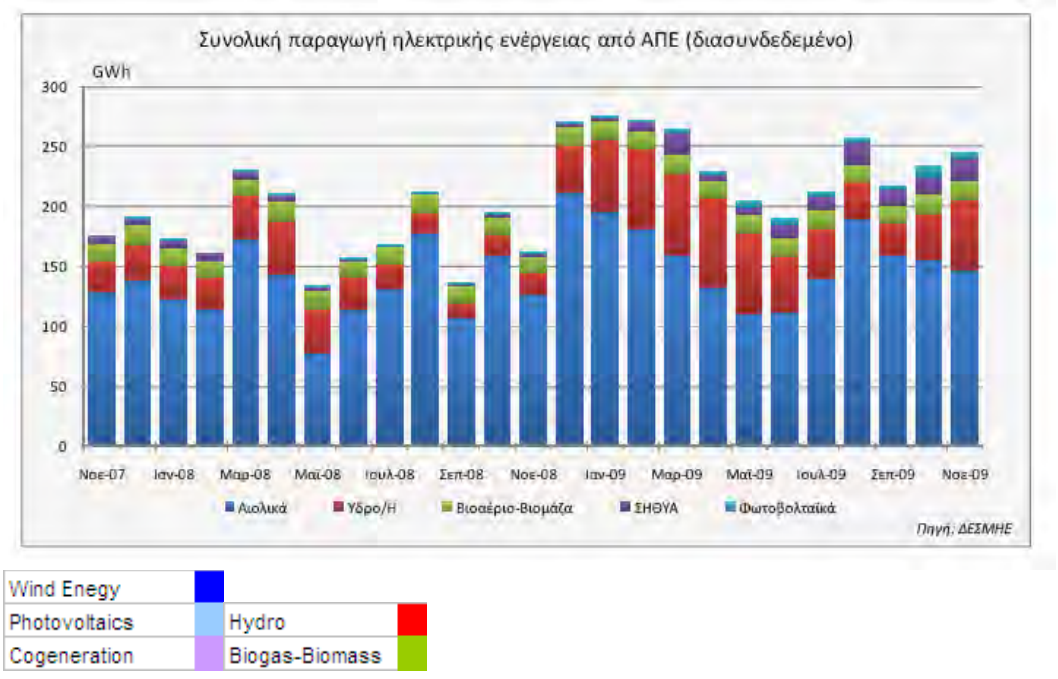


Figure 3 RES electricity production vs source in the grid-connected system

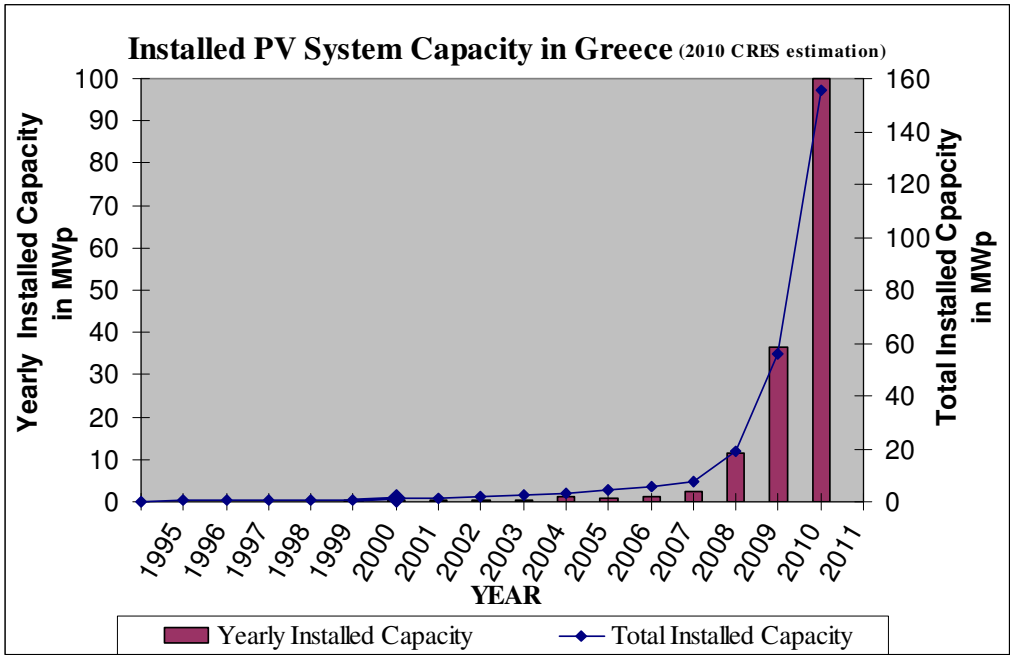
Concerning photovoltaics, the **PV installed capacity,** at the first semester of 2010, was around **90 MWp**. Most of the installations have nominal power of less than 150

[12] According to the EU Directive (2003/54/EC) dispositions, the non-interconnected islands defined as "isolated micro grids" (total electricity consumption less than 500GWh during 1996) can be excluded by the proposed adjustment concerning the electrical market liberalization. Besides, emphasis should be laid to ensure the islands' safe supply.

kWp and are grid connected, (Figure 4). The prospect for PVs installed capacity at the end of 2010 is estimated to be around 160Mwp.

Greece recently has started to invest on the development of local PV market, with the installation of small industries for the production of PV wafer, cell and modules. Up to now these effort amount to five companies:

- Solar Cells Hellas SA
- Heliosphera
- Energy Solutions S.A.
- Heliodomi S.A.,
- Solar Technologies S.A.



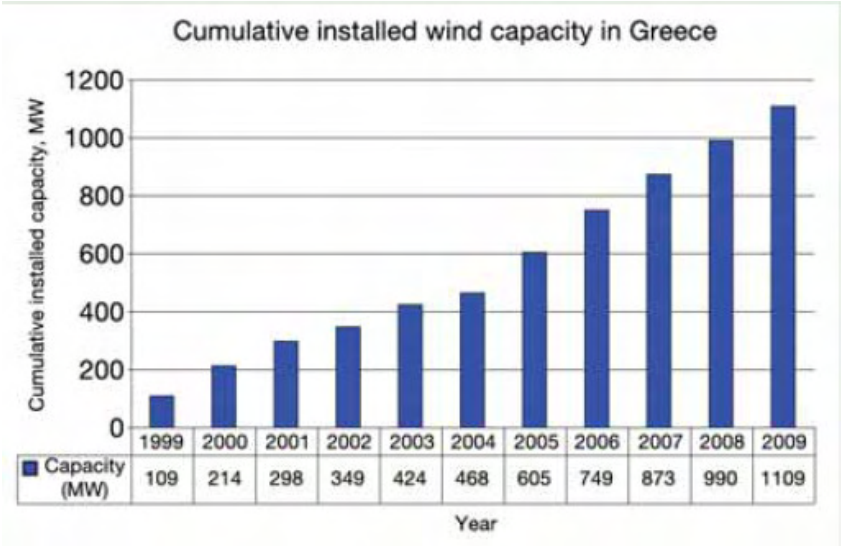
Source: CRES

Figure 4 Total PV installed capacity

The progress in wind power capacity has been slow compared with other European countries. In 2009, the **installed capacity of the wind turbines** reached **1109 MW**, showing an increase over the previous year of 12 %. The development of wind energy within the last 10 years is shown in Figure 5, which depicts the total installed capacity per year, [IEA, 2009].

The energy produced from wind turbines during 2009 was approximately 2550 GWh, and corresponds to the 4.4% of the national electric demand. Figure 6, shows the electricity produced from wind turbines during the last ten years.

Figure 5 Cumulative installed wind capacity in Greece [CRES]



Source CRES

Figure 6 Electricity produced from wind turbines in Greece [IEA, 2009]

Regarding solar thermal systems, the installed power of **solar thermal collectors**, including solar flat plate collectors and vacuum collectors, in Greece, is around **2,095.0 MW_{th}**, (Figure 7). The installed power of the **solar cooling systems** in Greece is of **1000 KW**, including absorption and adsorption systems, (Figure 8).

Installed power of solar thermal collectors (flat plate, vacuum)

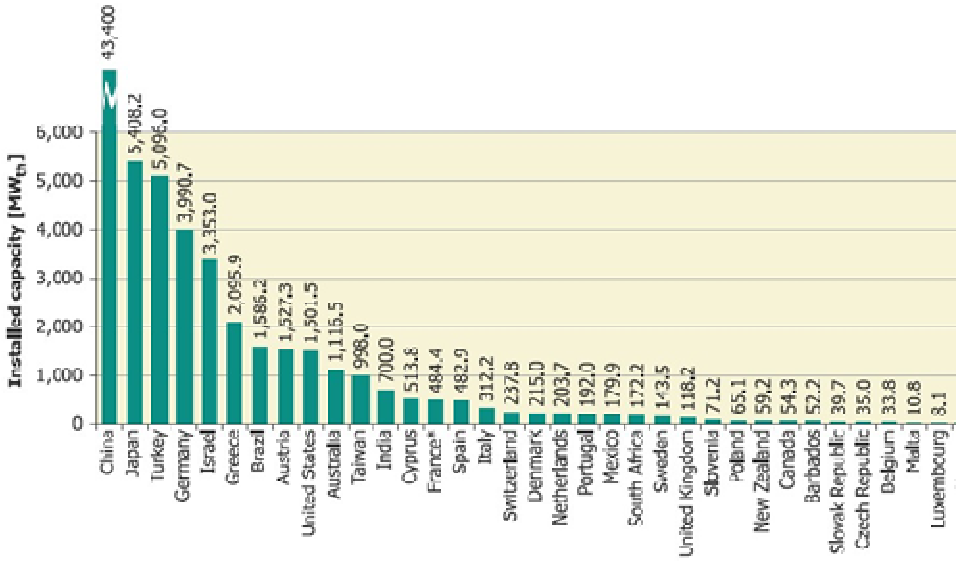


Figure 7 Installed power of solar thermal collectors [ESTIF, 2008]

Solar Cooling Systems

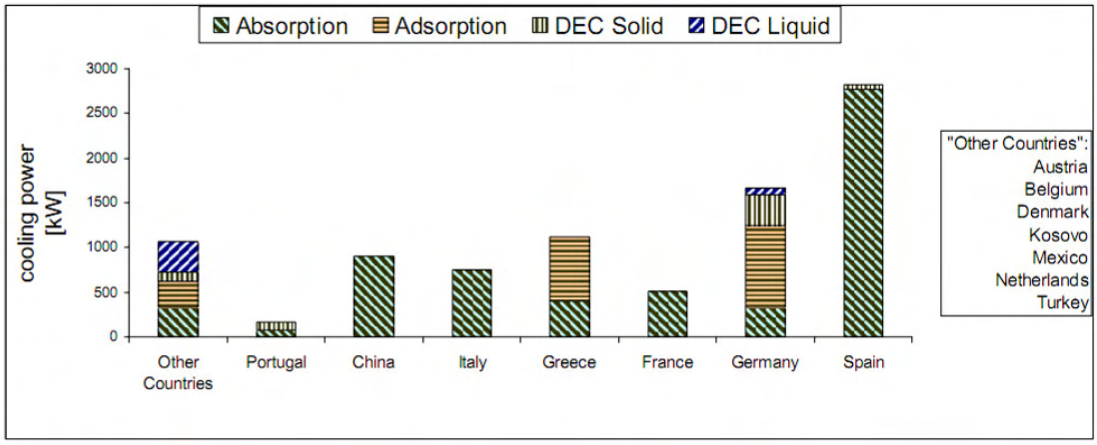


Figure 8 Solar Cooling Systems

The total installed capacity of **geothermal energy installations**, in Greece is of **105,8 MW_{th}**, (Figure 9).

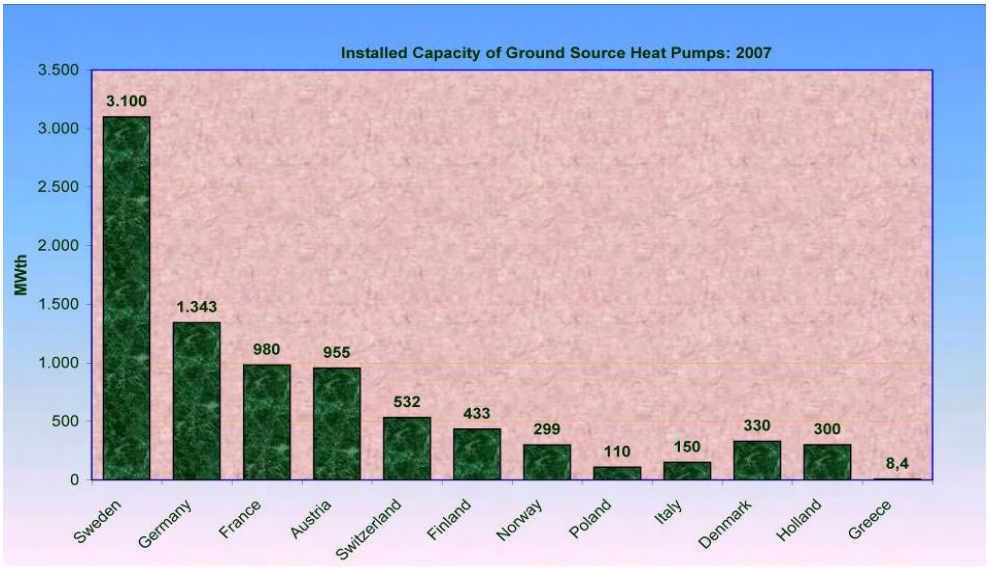
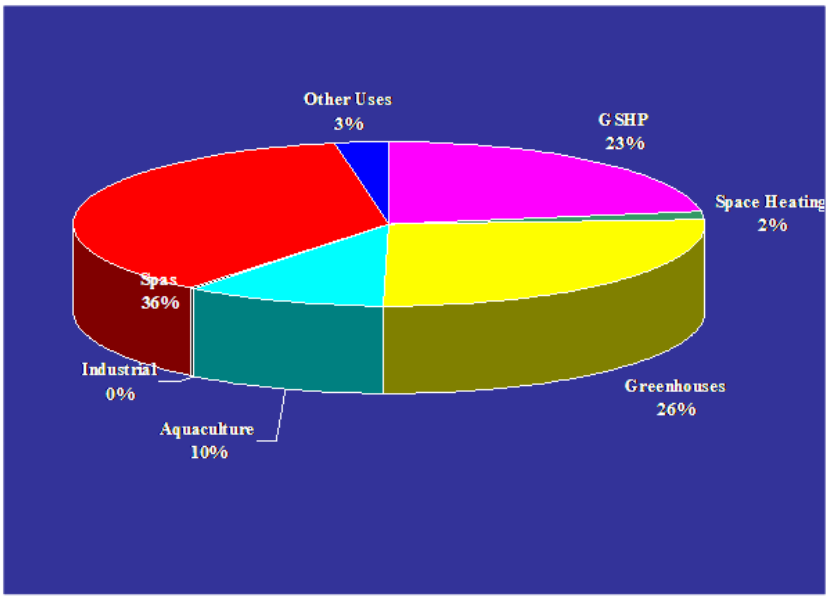


Figure 9 Installed Capacity of ground source heat pumps, GSHP (2007)

The geothermal applications in Greece concerns with spas, greenhouses, GSHP systems etc. Figure 10, presents the distribution of geothermal applications in Greece.



Source: CRES

Figure 10 Geothermal applications in Greece

B. Water Current Status

Water resources refer to the water "produced" inside a country in conjunction with the external water contribution from the neighboring countries (e.g. transboundary rivers). Precipitation and evaportranspiration, in combination with the natural characteristics of underground aquifers, establish the main climatic variables that determine the quantity of internally produced water resources. Precipitation constitutes the main component of the surface and underground water enrichment. The mean precipitation of the Mediterranean European countries is 840mm/year, while in Greece it approaches the 850 mm/year, [Mimikou, 2005]. Figure 11 demonstrates the distribution of the mean annual precipitation in Greece.

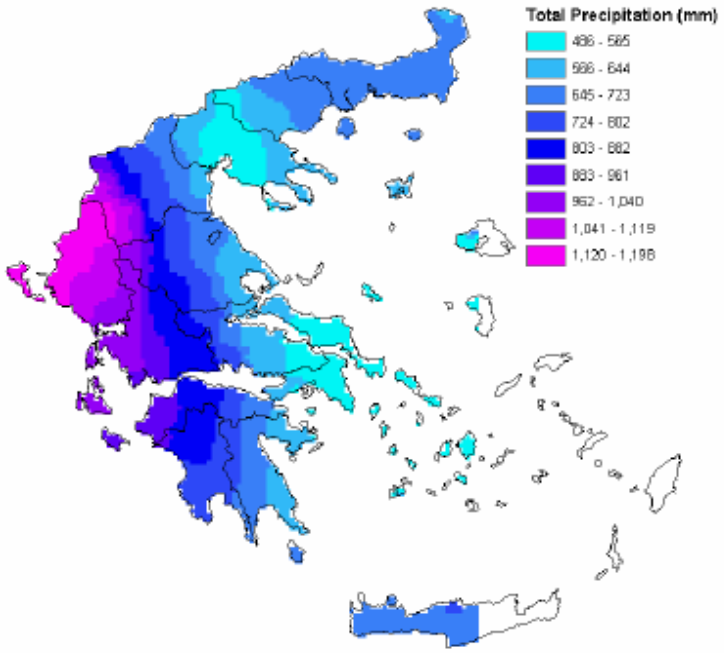


Figure 11 Distribution of total precipitation in Greece

In describing the water resources of Greece, the key element seems to be the uneven distribution, both in time and space, of precipitation, activities and population. Western Greece is by far richer in water creating a water 'crescent' from the north to the south than the eastern part of the country, where the majority of population is concentrated. Some additional constraints may be imposed by the continuing increase of water demand as well as by environmental considerations, [ADU RES, 2006].

Based on existing legislation, Greece is separated into 14 water sectors based on the major watersheds, (see Figure 12). As it is already mentioned, Greece is considered

to be among the richest countries in, per capita, total water resources. However, this is a rather rough estimation since a careful study reveals the contrast concerning the supply and demand values in 14 water sectors. As it is shown in Figure 12, Greek islands and especially the Aegean islands that belong to the 14th water sector are confronted with a serious drought problem.

Water sector	Surface water		Ground water				Total	
			Karstic	Other	Total			
	MIET[a]	Ma[b]	MIET	MIET	MIET	Ma[c]	MIET	MA
(1) West Peloponnesus	3050	2720	550	150	700	80	3750	2800
(2) North Peloponnesus	2650	3201	800	100	900	100	3550	3301
(3) East Peloponnesus	1000	1859	850	100	950	114	1950	1973
(4) West Sterea Hellas	9750	11649	750	100	850	75	10600	11724
(5) Epirus	8500	8591	200	50	250	59	8750	8650
(6) Attica	200	219	150	50	200	2	400	221
(7) East Sterea Hellas	1900	1816	750	300	1050	83	2950	1899
(8) Thesalia	3250	3253	550	800	1350	590	4600	3843
(9) West Macedonia	4100	4320	800	50	850	417	4950	4737
(10) Central Macedonia	6900	7186	150	550	700	344	7600	7530
(11) East Macedonia	4200	4419	300	250	550	252	4750	4671
(12) Thrace	10900	10991	100	300	400	180	11300	11171
(13) Crete	1300	1564	1200	100	1300	95	2600	1659
(14) Aegean Islands	1000	1080	200	50	250	61	1250	1141
Total	58700	62868	7350	2950	10300	2452	69000	65320

[a] The Ministry of Industry, Energy and Technology (MIET), 1987.
[b] The Ministry of Agriculture (MA), 1980.
[c] The data are measured groundwater flow.

Figure 12 Administrative division of Greece in 14 Water Districts [ADU RES, 2006]**.**

Water demands in the Greek Islands have increased steadily over the last decade as a result of a building boom for new homes, hotels, and resorts. The increase in water demand has resulted in the disruption of past sustainable water management practices. At present, most freshwater needs are met through the use of the limited groundwater, desalinated seawater or brackish water, and water importation, [Gikas, 2009].

Aegean Islands, Cyclades and the smaller islands of Dodecanese, are facing the most serious problems due to the huge number of visitors every year, while they are the driest part of Greece and isolated making water transportation extremely expensive.

Table 4 presents the average itemized annual uses of water at the Aegean Islands.

Table 4 Average itemized annual uses of water at the Aegean Islands [Gikas, 2009]

Prefecture	Agricultural irrigation		Stock raising (hm^3/yr)	Industrial (hm^3/yr)	Domestic (hm^3/yr)	Total (hm^3/yr)
	Area (1000 m^2)	Demand (hm^3/yr)				
Lesvos	41,360	23.2	2.6	0.48	7.77	34.05
Chios	12,248	6.9	0.3	0.14	3.84	11.18
Samos	13,068	7.8	0.4	0.09	3.25	11.54
Dodecanese	32,690	20.8	1.2	0.28	15.18	37.46
Cyclades	31,021	21.5	2.3	0.24	7.15	31.19
Total	130,387	80.2	6.8	1.24	37.19	125.43

[a] Adapted from the Hellenic Ministry for the Environment, Physical Planning and Public Works (2008).

In most of the Aegean Islands, where the freshwater sources are limited, people depended traditionally on rain water collection for most of their needs, including drinking water. Traditionally, runoff from the house terraces and from specially paved areas was collected in water tight reservoirs for use during the dry season. This water along with water from relatively shallow wells, often brackish, and with water from rare natural freshwater sources, was used for crop irrigation, [Gikas, 2009]. The main natural water sources on the islands are the scarce freshwater springs and the usually shallow wells (often yielding brackish water).

Rain water comprises an alternative freshwater source, which also remains underexploited, despite its high potential. About 20 artificial lagoons have been constructed or are under construction in a number of Aegean Islands, while studies have been contacted for the construction of 20 more lagoons in the near future (Hellenic Ministry for Agriculture, 1996 & revision 2002) to be used to retain runoff for domestic or agricultural use. Alternatively, a series of well placed small dams and

reservoirs, are used in some islands, to retain both the rain water and the spring water, augment the aquifer, and supply water for agricultural applications.
Water importation from the mainland is practiced commonly in the Aegean Islands, as it is the only way to fulfill instantly the freshwater needs of the islands. However, the volume of water to be transported is limited by the capacity of the tankers, which in high seasons may not be able to keep up with the demand. During winter there are also difficulties of the water transportation due to the difficulty of the tanker to reach the ports of the small islands because of high winds. As an example, the amount of water transported in 2007 in the Aegean islands was as follows, [Ministry for Development]:

Island Group	**Amount of water transported by tankers, m^3/year**	**Unit Water cost €/m^3**
Cyclades islands	642.752.0	7.59
Dodecanese islands	1.101.628	4.88

The total amount of water transported reached the 1.744.380.0 m^3/year, with a total cost of around 9.400.000.0 €. In 2010, the cost of water transportation reached the 12.5 €/m^3.

Regarding desalination, it must be noticed that the main target regions for desalination in Greece are the small and medium islands (according to the population), having significant deficit in freshwater. At the same time, most of these islands are not connected to the electricity transmission system of the mainland but they have autonomous power supply systems. The development of desalination as an alternative source of freshwater is greatly depended on the existence of secure and optimistically, cheap energy supply sources. For the small grids of these areas the load of the desalination unit could be a serious extra charge in the already problematic grid.

Most of the Desalination units in the Greek islands follow the technology of Reverse osmosis for seawater desalination [Tzen, 2008, 2010]. The total product water capacity of the desalination units operate in the islands is estimated of more than 30,000m^3/day (Table 5).

The operational and maintenance cost of the desalination units in the Greek islands ranges from 0.30-2 €/m^3, while most of them include energy recovery devices for the reduction of the energy consumptions.

Table 5 Desalination units in the Greek islands, [Tzen, 2010]

Location	Area	Year of Operation	Desalination Technology	Water Capacity m^3/day	Feed water type
Mykonos	Ornos	2001	RO	2000	seawater
Mykonos	Ornos	2008/9	RO	4500	seawater
Kefalonia	Fiskardo	2008	RO	500	seawater
Kefalonia	Fiskardo	2008	RO	200	seawater
Syros	Ermoupolis	1989	RO	1200	seawater
Syros	Ermoupolis	1993	RO	800	seawater
Syros	Ermoupolis	2000	RO	2×250	seawater
Syros	Ermoupolis	2001/2	RO	4×500	seawater
Syros	Kini	1993	RO	144	seawater
Syros	Kini	2000	RO	250	seawater
Syros	Kini	2002	RO	500	seawater
Thira	Oia	1994	RO	400	seawater
Thira	Oia	1998	RO	160	seawater
Thira	Oia	2002	RO	250	seawater
Thira	Thira	2009	RO	1200	seawater
Thira	Oia	2001	RO	320	seawater
Thirasia[1]	Thirasia	1997	RO	4,8	seawater
Ios	Milopotas	2001	RO	1000	seawater
Sifnos	Kamares	2002	RO	500	brackish
Paros	Naousa	2001	RO	1200	brackish
Milos	-	2008/9	Wind/RO	3600	seawater
Nisyros	Mandraki	2001	RO	300	seawater
Symi		2008/9	Wind/MVC/autonomous system	10-12m^3/hour	seawater
Ikaria	Fourni	2009	RO	100	seawater
Chios	Omiroupolis	2000	RO	720	brackish
Chios	Omiroupolis	2001	RO	900-1000	brackish
Leros		2001	RO	240	seawater
Sxinousa	-	2004	RO	100	seawater
Milos		2008	RO	2300	seawater
Ithaki	Kioni	2003	RO	120	seawater
Ithaki	Dexsia	2003	RO	500	seawater
Ithaki	Stavros	2005	RO	200	seawater
Ithaki		1983	RO	500	seawater
Tinos		2001	RO	500	seawater
Symi		2010	RO	600-650	brackish
Symi		2010	RO	600 -650	brackish
Symi		2010	RO	600-650	Brackish.

Moreover, the shortage of water (drought) in a region is not only related to the availability of the water resources, but also to the water utilization. Unfortunately, as previously mentioned, the major users of water in Greece are mainly located in the Eastern and Southern regions of the country, which is rather disadvantageous as compared to the natural enrichment. Figure 13 presents the percentage sharing of each main category of water uses (urban, rural, industrial and energy) to the available water resources for Greece, [Mimikou, 2005].

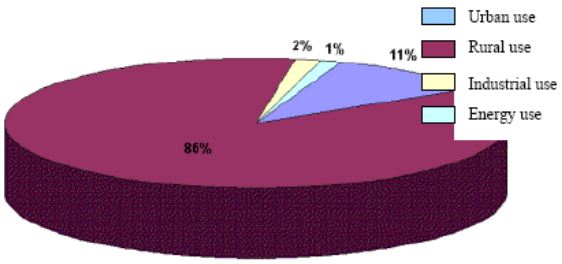


Figure 13 Water Use in Greece [Mimikou, 2005]

2.2 Main Actors of the Energy and Water System

2.2.1 Main Actors of the Energy System

The Regulatory Authority for Energy, www.rae.gr

The Regulatory Authority for Energy (RAE) is an independent public authority established by the 4th article of law 2773/1999. The agency's task is to monitor and control the energy market in Greece. The purpose of RAE on the one hand is to facilitate free and healthy competition in the energy market, so that through the development of competition, the services offered to costumers will be improved and on the other hand, to apply a suitable regulatory policy which will allow healthy and maintainable economic viability in the regulated business and will provide assurance for potential investors who want to enter the energy market, that they will have equal access to transmission and distribution grids for the promotion of the products offered, [16].

The Hellenic Transmission System Operation, www.desmie.gr

The Hellenic Transmission System Operator (HTSO) or the System Operator, as provided for in article 14 of Law 2773/ 1999 was established by virtue of Presidential Decree 328/2000 "Establishment and statutes of the Societe Anonyme HELLENIC ELECTRIC POWER TRANSMISSION SYSTEM OPERATOR S.A." (Government Gazette A 268) and has as scope the operation, maintenance and development of the electric power transmission System throughout the whole country, as well as of its interconnections with other Systems, in order to secure the country's supply with electric power in a sufficient, safe, financially effective and reliable way.

HTSO S.A. assumed the commercial management of the renewable energy plants of the interconnected system in October 2002. According to the provisions of article 21 of Law 2773/1999, PPC S.A., having already been floated by virtue of Presidential Decree 333/2000 "Conversion of the Public Power Corporation (PPC) into a Societe Anonyme and approval of its statutes" (Government Gazette A 278) performs duties of system operator of the island grids which are not connected to the mainland system.

The Centre for Renewable Energy Sources, www.cres.gr

The establishment of the Centre for Renewable Energy Sources (CRES) was provided in article 25 of Law 1514/1985 "Promotion of scientific and technological research"

(Government Gazette A 13) and was implemented by virtue of Presidential Decree 375/1987 "Establishment of a legal entity under private law with the registered name Centre for Renewable Energy Sources" (Government Gazette A 167). The scope of CRES is the promotion of RES, the saving and the rational use of energy, as well as any kind of support of the activities in those fields. Further, by virtue of article 11 of Law 2702/1999 "Regulation of matters falling under the jurisdiction of the Ministry of Development and other provisions" (Government Gazette A 70), CRES operates as the national coordinating centre of all those activities.

CRES owns laboratories for certification of RES technologies, carries out studies for the determination of the physical and economical potential of RES and participates effectively in the evaluation and monitoring of the investments implemented in the sector, including the energy saving field.

2.2.2 Main Actors of the Water System

The Athens Water Supply and Sewerage Company (EYDAP SA) by Law is responsible for the water supply of the capital. For the islands responsible organizations for the water are the Municipal Enterprises for Water and Sewage (DEYA).

EYDAP SA, is the largest company in Greece operating in the water market. EYDAP SA supplies approximately 4.000.000 inhabitants of Attica with potable water, through an extensive network that includes 1.796.500 metered connections and a total length of 7.940 km. The sewerage sector similarly serves 3.300.000 inhabitants, with a total network length of 5.800 km.

EYDAP was founded in 1980 with the enactment of Law 1068/1980, after the merging of the Hellenic Water Company (E.E.Y.) and the Sewerage Organization of Athens (O.A.P.).

In 1999, after the passing of Law 2744/1999, EYDAP SA took on its current legal form, with the primary fixed assets of the company passing into the ownership of the newly formed "Fixed Assets Company EYDAP NPDD ", (NPDD is an Greek acronym which translates as "Legal Entity – Public Sector") , a company remaining in the public sector. The Fixed Assets Company EYDAP NPDD owns the dams, the reservoirs, the external raw water aqueducts and pumping stations, as well as all other installations that ensure the secure transfer of water until it reaches the Water Treatment Plants. However, based on a signed agreement between EYDAP and the Hellenic Republic in November 1999, EYDAP SA continues to operate the

aforementioned works on behalf of the Fixed Assets Company EYDAP NPDD. In January 2000, EYDAP SA went public on the Athens Stock Exchange.

The Law 2744/1999 and its modifications define the Corporate Objectives, as stipulated in the Joint Ministerial Decision of the Ministries of National Economy, Finance and the Environment, Physical Planning and Public Works. These objectives are as follows:

The provision of water and sewerage services, as well as design, construction, installation, operation, utilization, management, maintenance, expansion and renewal of water supply and sewerage systems. In addition to the above activities, the objectives include the pumping, desalination, treatment, storage, transfer, and distribution of all kinds of water. In addition, the works and procedures of collection, transfer, storage, treatment, as well as the management and distribution of the waste treatment products are included.

EYDAP's area of jurisdiction was originally defined as the greater metropolitan area of Athens in Law 1068/1980, which initially founded the company. In conjunction to the above, in accordance to Law 2744/1999, EYDAP has the exclusive right to offer water supply and sewerage services in the geographical region of its jurisdiction. This right is undeniable and non transferable. The duration of this right, as well as its renewal, are regulated by the Agreement signed by the Hellenic Republic and EYDAP. This Agreement was signed December 9th, 1999 and is valid for 20 years with the option of renewal.

It is important to mention that Law 2744/1999 and the Joint Decision of the Ministers of National Economy, Development, Environment, Physical Planning and Public Works, allows EYDAP the ability to expand its activities to regions inside or outside of Attica. As a precondition to expanding its activities, EYDAP must first examine and ensure the effectiveness of the investment, as well as ensure that the Company has the necessary funds for this purpose, so as it is in position to fulfill its obligations.

In order to ensure the water supply of the metropolitan area of Athens, EYDAP procures raw water from the Greek Government, who has agreed to provide it from appropriate sources and to give it to EYDAP. In accordance to Law 2477/99 and the 1999 agreement between EYDAP and the Hellenic Republic, up until the year 2004, the price of the raw water provided by the Greek Government will be off-set by the cost of the services provided by EYDAP for the maintenance and operation of the fixed assets that belong to Fixed Assets Company EYDAP NPDD, (www.eydap.gr).

2.3 Legislation Framework for RES and Water

2.3.1 RES Legislation Framework

The start off RES entry into Greece was **Law 1559/1985** *"Regulation of matters of alternative forms of energy and specific matters of power production from conventional fuels and other provisions" (Government Gazette A 185*) under which the Public Power Corporation, PPC, leading the way to RES, installed 24 MW whereas local government organizations confined to a level of 3 MW and the private sector was left out of the scene. In spite of the small outcome, the effort showed the weaknesses and strengths of the sector and especially the initial failures paved the way for more mature implementations.

In 1986 came into force the **Law 1650/1986** on the protection of the environment. The law sets the rules for the protection of the environment and categorize the public and private projects in view of their environmental impacts.

The Greek state in 1994 by the **Law 2244/1994** (FEK '168), *"Regulation of issues pertinent to the generation of electrical energy from Renewable Energy Sources and fossil fuels and other provisions*", makes the first step in the production of electricity from third parties, outside of the Public Power Corporation PPC, and allowing independent producers to enter this field, particularly in power generation from Renewable Energy Sources (RES).

Law 2647/1998, transfer of jurisdiction to districts and local administration and other clauses.

In 1999, the **Law 2773/1999** (FEK '286) *"Deregulation of the Electricity Market – Regulation of Matters Pertaining to Energy Policy and Other Provisions" (Government Gazette Part A, No. 286)"* for liberalization of the electricity market, fit the institutional framework in Greece in accordance with Directive 96/92/EC, and proceed with steps to faster liberalization. With this law, created a favourable regime for electricity production from renewable energy sources, giving priority to absorb the energy generated by them over conventional units, and defining specific pricing. By this Law establishing the Regulatory Authority for Energy (RAE) and initiating the deregulation of the electrical energy market. The so-called, "Code for the Management of the System and Transactions of Electrical Energy", regulates the framework of the energy sector in Greece.

The **Law 2941/2001** *"Simplification of the procedures for the establishment of companies, licensing of plants using renewable energy sources, regulation of matters pertinent to Hellenic Shipbuilding S.A. and other provisions" (Government Gazette Part A, No. 201*)" of 2001 supplemented Law 2773/99 with certain important provisions about renewables, including: a) the definition of the general terms and conditions, under which it is allowed to install RES stations in forests and forestry lands, and b) the characterisation of all RES projects as projects of public utility status, which gives them the same rights and privileges in land expropriation procedures as those given to public works, independently of the legal status of the RES project owner (being private or public).

The **Law 3010/2002** *"Harmonisation of Law 1650/1986 with Directives 97/11/EC and 96/61/EC, procedure of delination and other issues pertinent watercourses and other provisions" (Government Gazette Part A, No. 91),* of 2002 specified the general terms, procedures and requirements for obtaining the necessary environmental licenses for any given investment project (including, as such, a RES project).

Law 3175/2003 "*Exploitation of geothermal potential, district heating and other provisions*" *(Government Gazette A 207)*", established for the first time a comprehensive set of rules for the rational use of geothermal energy.

Moreover, in 2006 the **Law 3468/2006** (FEK '129), "*Generation of Electricity using Renewable Energy Sources and High-Efficiency Cogeneration of Electricity and Heat and Miscellaneous Provisions (Official Gazette A' 129/27.06.2006)"* come into force. The purpose of this law was on one hand, the transposition of Directive 2001/77/EC of the European Parliament and Council of September 27, 2001, on the promotion of electricity produced from renewable energy sources in the internal electricity market (OJ L 283/27.10.2001) and, on the other hand, the promotion, by granting priority to the generation of electrical power from Renewable Energy Sources (RES) and high-efficiency co-generation of electricity and heat plants in the internal electricity market, on the basis of rules and principles.

In January 2009, with the **Law 3734/2009** (FEK '8): a) the Greek legislation in line with Directive 2004/8/EC on the promotion of cogeneration based on useful heat demand in the internal market and make the legal framework, and b) adapt the absorption rates of energy produced by photovoltaic power plants.

In June 2009, a Joint Ministerial Decision (Gov. V'1079) issued under the authority of N.3468/2006 as amended by N.3734/2009, a Special development program for Photovoltaics, and opens the way for the installation of small systems on buildings.
In December 2009, a draft of a new Law for the acceleration of RES come into a public consultation. The new Law came into force in May 2010. In brief the new **Law 3851/2010**, among others:
(a) Doubles the target for the contribution of RES to gross electricity consumption in Greece by 2020 to 40% from 20% previously,
(b) Reduce the time required for the licensing procedure to 8-10 months from 3-5 years currently, and thus facilitates the deployment of RES in Greece,
(c) Introduces discounts in the electricity bills of local communities and
(d) Introduces a different tariff regime for the new RES installations according to which, a 20% higher tariff will be provided to the investor who will decide not using state subsidies for the development of the RES station.

New feed-in-tariffs (FITs) have also been set. Feed-in tariffs of RES technologies within the purpose of the project are presented below:

Generation of electricity from:	**Price of energy (Euro/MWh)**	
	Interconnected System	**Non-interconnected islands**
(a) wind energy inland with an installed capacity more than 50kW	**87,85**	**99,45**
(b) wind energy with an installed capacity less or equal than 50kW	**250**	
(c) Photovoltaics up to 10 kWp for homes or small enterprises according to the programme for PV on buildings MD12323/ΓΓ 175/4.6.2009, B'1079)	**550**	
(d) Hydraulic energy exploited in small-scale hydroelectric plants with an installed capacity up to fifteen (15) MW_e	**87,85**	
(e) Solar energy exploited by solar thermal systems for the generation of electric energy	**264,85**	
(e) Solar energy exploited by solar thermal systems for the generation of electric energy with storage system, providing at least 2 hours of operation at nominal power	**284,85**	
(d) Geothermal energy of low temperature according to the 1st paragraph of Article 2 of the Law 3175/2003 (A' 207)	**150**	
(f) Geothermal energy of high temperature according to the 1st paragraph of Article 2 of the Law 3175/2003 (A'	**99,45**	

207)		
(g) Biomass exploited from stations with nominal power ≤1MW (excluding the wastes rejections)	**200**	
(h) Biomass exploited from stations with nominal power ≥1MW (excluding the wastes rejections)	**175**	
(i) Miscellaneous RES	**87.85**	**99.45**

The mentioned tariffs concerns RES systems with installed capacity up to 35MW. Prices are adjusted each year in 25% of the CPI of the previous year.

New Feed-in Tariff Levels for Solar PV (€/MWh)

Year	Month	Mainland Grid		Autonomous island grids	
		>100 KWp	≤100 KWp	>100 KWp	≤100 KWp
2009	February	400.00	450.00	450.00	500.00
2009	August	400.00	450.00	450.00	500.00
2010	February	400.00	450.00	450.00	500.00
2010	August	392.04	441.05	441.05	490.05
2011	February	372.83	419.43	419.43	466.03
2011	August	351.01	394.88	394.88	438.76
2012	February	333.81	375.53	375.53	417.26
2012	August	314.27	353.56	353.56	392.84
2013	February	298.38	336.23	336.23	373.59
2013	August	281.38	316.55	316.55	351.72
2014	February	268.94	302.56	302.56	336.18
2014	August	260.97	293.59	293.59	326.22
Year 'n' from 2105 onwards SMC = System Marginal Cost		$1.3*SMC_{n-1}$	$1.4*SMC_{n-1}$	$1.4*SMC_{n-1}$	$1.5*SMC_{n-1}$

The production authorization shall be granted for a period of up to twenty (20) years and may be renewed. For the solar thermal system the production authorization shall be granted for a period of up to twenty five (25) years.

The benefits of the new Law are numerous including:

For the citizens

- strengthened the participation of citizens in the immediate benefits of renewable energy by direct reimbursement to the citizens part of the revenue[13].

[13] **Law 3468**, **Article 25,**. A. 1. Any producer of electricity from RES to whom a generation authorization will be granted after the date this law comes into effect shall be burdened from the start of the commercial operation of the plant with a special fee. That fee corresponds to 3 percent of the pre-VAT sale price of electricity to the Operator of the System or the Network of the islands not connected to the mainland's Interconnected System. The producers of electricity from photovoltaic systems are exempted from the payment of the fee.

- reinforce small plants RES, providing to citizens simple procedures and benefits, in case they wish to have a unit of renewable energy at home.
- implementation of a Strategic Plan for Islands Interconnections, by ceasing the operation of the local conventional plants, with expensive and polluting petroleum fuels, minimizing the local pollution.

For the Investors

- simplifies the process of issuing the production license of RES projects.
- Merging into a single, the procedures for Preliminary Environmental Assessment & Evaluation (FPRD) and the Environmental Conditions (EPO). By this way reduce the time required for the completion of the procedure.
- upgraded the role of RAE and limited the duration of the licensing process, at 2 months (10-12 months).
- provide more incentives for renewable energy projects that will not be included in a grant program to avoid delays.
- establish tight deadlines to the administrator.
- the pricing become more efficient, ensuring sustainability of investments, without wasting resources.
- permitted, under special provisions for reducing the effects of the RES, the installation of RES at high-productivity farmland, giving priority to professional farmers. In this way, the RES will be additional income for farmers.

For the Country

- in determining the national binding target of 20% for the participation of renewable energy to meet the final energy consumption in 2020 and 40% for electricity, protect the environment and fully meets the international obligations and commitments under the EU directive.
- establishment of an Individual Entity for the service of investors on RES projects under the standards of "one-stop service" (one-stop-shop).
- the expected growth of RES investments in Greece will result to a growing economy, and energy security of the country
- promote the development of offshore wind farms by the use of tendering. The confirmed mature projects allocated for implementation by individuals. The

government undertakes the strategic planning process and permitting to solve the major procedural obstacles in the sea.

Regarding **RES Desalination** the new Law offer an advantage on the coupling of the two technologies. In the new Law the Article 3 of Law 3468/2006, is amended with the following paragraph.

In the issuing procedure, for the production license or exemption for RES plants in islands, the applications that concerns with the installation of RES plants combined with plants for the production of potable water or other water use through desalination, examined in priority, since

- the installed power of the RES plant does not exceed the 25% of the installed power of the desalination plant
- there are signed contracts between the applicant and the General Secretariat of Aegean and Island Policy or to the concerned local authority (OTA) for the provision of the produced water.

In these cases the time duration of the authorized license linked to the time of the contract. The applicant has to submit a techno-economical study of the proposed RES Desalination project. The evaluation of this study is a critical parameter for the approval of the investment.

The electricity produced by the unit RES, offset, on an hourly basis, with the consumed energy by the desalination plant. The surplus electricity can be supplied in the network, up to 20% of the output/produced power in accordance with the rules for auto-producers[14]. Law 3468/2006, (Article 5) determines the procedures of authorization or withdraw of permission in case of failure and non implementation of the desalination project.

Laws 2244/1994, 2773/1999 and 2941/200101 on renewables, as well as Law 3010/02 on environmental licensing, are supplemented by a number of Ministerial Decrees, which specify:

a) The procedures, required documents, fees, etc. for issuing the generation, installation and operation licenses, necessary to all RES-to-power projects;

b) The general technical and financial terms of the contract to be concluded between the Transmission System Operator (TSO) and each RES power producer, the details

[14] Auto-producer of electricity using RES or high-efficiency cogeneration of electricity and heat. A producer who generates electricity from RES or high-efficiency cogeneration of electricity and heat plants chiefly for its own use and supplies energy surplus, if any, to the System or the Network.

of the electricity tariff system to be applied, the terms and conditions for connecting the RES station to the grid, etc. The most important of the above Ministerial Decrees (MD) and Joint Ministerial Decrees (JMD) are summarised below[15]:

MD 17951/2000: Terms and procedures for obtaining the electricity generation license.

JMD 15393/2002: Categorisation of activities / projects according to their potential environmental impact. RES projects are categorised according to RES type (technology) and installed capacity.

JMD 11014/2003: Specific terms, procedures and requirements for obtaining the necessary environmental licenses (preliminary environmental impact assessment, approval of environmental terms and conditions), for all types of projects and activities categorised under JMD 15393/2002 above.

MD 2000/2002: Specific terms, procedures and requirements for obtaining the RES installation and operation licenses, as well as a model contract (PPA) between the TSO and the RES power producer.

MD 31928/1993: (in conjunction with Law 3175/2003): Terms, procedures and fees for obtaining the necessary concession license, for the right to exploit a geothermal field.

MD 5813/1989: (in conjunction with Law 1739/1987), terms and procedures for obtaining the necessary "unified water license", which is a license for water use and for carrying out any project of exploitation of water resources (including energy valorisation).

JMD 1726/2003: This Decision marks a breakthrough in the State's intensifying efforts to rationalise and simplify the complex and very lengthy licensing procedures for RES-to-power projects.

JMD 69269/5387/90, concerning the classification of projects and activities, the content of study on environmental consequences, the definition of the content of specific environmental studies and other relevant clauses, according to the Law 1650/1986 for the protection of environment.

JMD 49828 Approval of the Specific Framework of Planning Design and Sustainable Development for the Renewable Energy Sources.[16]

[15] The legislative framework for the licensing procedure, the methodology and the guidelines for obtaining grid connection for RES projects has been further clarified and described in a number of ministerial decisions that followed the law 3468/06 (i.e. Δ6/Φ1/21691, Δ6/Φ1/5757, Δ5/Φ1/25968, Δ5/Φ1/13303), while recently (April 2007) the Greek PV roadmap that sets clear PV targets and timetable for all Greek Prefectures has been approved by the Ministry of Development (Regulatory Authority of Energy, decision 75/2007).

Environmental Categorization of Works and Activities

Based on the **L1650/1986** and its amendment **L3010/2002** any public and private project and activity is classified in categories, sub-categories and groups, in view of their environmental impacts. L3010/2002 specifies the procedures for the approval of the environmental assessments according to the categories of projects or activities.

JMD 15393/2332/2002 (L1022) and **JMD 13727/5.8.2003** (L1087), **MD 145799** (L1002)/2005 classify public and private projects and activities in view of their environmental impacts. The specific criteria for this classification are:

- the type and size of the project or the activity;
- the type and the quality of the emitted pollutants, as well as any other effects on the environment;
- the possibility to prevent the production of pollutants generated by the current productive activities;
- the danger of the occurrence of a serious accident and the necessity to impose restrictions for the protection of the environment.

These categories are the following:

Category A[17]: Projects and activities which, because of their nature, size or extent may cause *serious risks* for the environment;

Category B: Projects and activities which, *without being seriously hazardous* for the environment, *must be subject to* general specifications, terms and restrictions for reasons of environmental protection;

Category C: Projects and activities, which may cause an insignificant risk or nuisance or degradation to the environment.

According to the **JMD 15393/2332/2002**, RES projects belong to **Group 10, Special Projects.**

	Electricity Production			
	Category A		Category B	
Type of project or Activity	Subcategory 1	Subcategory 2	Subcategory 3	Subcategory 4
El. Production from Wind, Solar energy	> 40 MW	40-5 MW	< 5 MW	
El Production from Photovoltaics		> 5 MW	≤ 5 MW	

[16] Based on Law 2742/1999 « Framework of Planning Design and Sustainable Development and other decrees» (FEK 207 A΄).

[17] There are 4 sub-categories (1st 2nd, 3rd, 4th) according the plant capacity (tn/year of the product) or the installed power (kW) of the plant, etc.

Within the **MD14599/2005**, the category for PV stations is changed to

	Electricity Production			
	Category A		Category B	
Type of project or Activity	Subcategory 1	Subcategory 2	Subcategory 3	Subcategory 4
El Production from Photovoltaics		≥ 2 MW	2 MW – 20 kW, <2 MW	

Based on the category of each project, the procedures for the environmental permission are considered.

Category A– An environmental assessment study is required; approval of environmental terms is issued by the Ministry of Environment, Physical Planning and Public Works or in some cases by the Prefecture.

Category B – submission of justifications on the environmental assessment of the project, permission is issued by the Prefectures.

Category C -submission of justifications on the environmental assessment of the project, permission is issued by the local Municipality.

2.3.2 Licensing Procedures for the Development of RES plants

For the construction and operation of a RES power station, the issue of relevant licenses and contracts is required. These are granted by the relevant bodies, appropriate on request, accompanied by the required documents and studies. In general according to the **Law 3851/2010**, the steps that need to be made are:

1. **Issuing of Production Authorization or Exception**

That authorization shall be granted by RAE on the basis of several criteria (national security, protection of public health and safety, overall safety of the facilities following an opinion, energy efficiency of the project, maturity of the project, protection of the environment according to the special planning framework for RES). RAE may cooperate with the Operator of the System, the Network or the Network of the islands not connected to the mainland's interconnected system for the preliminary selection of the point and mode of connection of the station to the System or the Network.

Estimated Duration for the issue of the production authorization: 2 months after the submission of the requirement.

The production authorization shall be granted for a period of up to twenty five (25) years and may be renewed for up to an equal time.

The issue of production authorization is a prerequisite for the submission of request for the issue of the Environmental Terms Approval.

Exemptions from the obligation of production authorization

The exemption from the obligation of issuing a production authorization is mainly based on the installation capacity of the RES station. These exemptions concerns:

a) Geothermal energy stations with an installed capacity less than, or equal to a half (0.5) MWe.

b) Biomass, biofuels, biogas stations with an installed capacity less than, or equal to one (1) MW.

c) Photovoltaic or solar thermal stations with an installed capacity less than, or equal to one (1) MWp.

d) Wind energy installations with an installed capacity less than, or equal to 100 kW

e) cogeneration plants with an installed capacity less than or equal to 1 MW

f) plants with an installed capacity up to five (5) MWe built by educational or research bodies of the public or private sector and for as long these plants operate

exclusively for educational or research purposes, as for plants erected by the Centre for Renewable Energy Sources for as long as these plants operate for carrying out certification or measurements.

g) autonomous plants that are not connected to the System or the Network with an installed capacity less than, or equal to five (5) MW and without any change of their autonomous operation.

h) miscellaneous plants with an installed capacity less than, or equal to fifty (50) MWe in case they utilize RES of those included in par. 2 of article 2 hereof in a form other than that of the above cases.

RES power stations that are not under the obligation of a production authorization, are also exempted from the obligation of granted an installation and operation licenses. However, there is no exemption from the issue of the Approval of Environmental Terms (APT). The only exemption from the APT concerns with installations of PVs or small W/T on buildings.

2. Determination of the Connection Terms - connection of the plant to the System[18], the Interconnected Network, or the Network[19], Grid Connection offer (after the issue of production authorization)

The investor after the issue of the production license submits an application to Hellenic Transmission System Operator (HTSO-DESMHE) or PPC for the issue of connection terms to the System or Network.

The duration for the issue of the connection terms is 4 months.

The offer of the Operator is valid for 4 years that can be extended by the Operator.

[18] *System:* The high-voltage lines, the interconnections on Greek territory, the overland or sea and all relative installations, the control equipment and installations required for the trouble-free, safe and uninterrupted transmission of electricity from a generation plant to a substation, from a substation to another substation, or to or from any interconnection. The System does not include the power generation facilities, the high-voltage lines and facilities that have been incorporated into the Network, as well as the Network of the islands not connected to the mainland's interconnected System.

[19] *Network*: The electrical power distribution grid owned by the Public Power Corporation (PPC S.A.) and installed on Greek territory and composed of the medium and low-voltage lines and distribution installations, as well as the high-voltage lines and installations having been incorporated therein. With the exception of the Network of the islands not connected to the mainland's interconnected system, the Network is connected to the System through the high-voltage and medium-voltage substations. The boundary between System and Network is the interruption means positioned at the high-voltage side of the power transformer and which means is a part of the Network. With regard to areas whose high-voltage lines belong to a Network, the boundary between System and Network shall be established by virtue of a decision of the Minister of Development following a recommendation of the System Operator and the Network Operator and an opinion from RAE, as well as of the owners of the System and the Network.

3. Intervention or Concession Approval

The investor submits an application to the local forestry department for an Intervention or Concession of the land used for the RES Park, if the land is State owned, Law 998/1979 (FEK 289 A').

4. Approval of Environmental Terms (after the issue of production authorization and the determination of the Connection terms to the System or the Grid)

For the installation of a plant and the Approval of Environmentally Terms (AET), an Environmentally Impact Assessment Study is required. The approval of environmentally terms is granted for 10 years and may be renewed. The responsible (Ministry of Environment or Prefecture) for the issue of the Approval of the Environmental Terms is considered according to the project categorization in view of the environmental impacts

Duration for the issue of AET: 2-4 months from the time the study is considered as fully completed.

Exception from the obligation of Approval of Environmental Terms

Power production from RES stations of less than:

- 0.5 MW for geothermal el. power production plants
- 0.5 MW for biomass, biogas and biofuel el. power production plants
- 0.5 MW for photovoltaic or solar thermal el. power production plants
- 20 kW for wind energy power production plants

For the above cases a verification of the exemption is required, from the relevant Region /Department of Environment.

5. **Building Permission** (in cases of construction works).

Overall, for the construction of buildings on the site of the RES station, a building permit or certificate, issued by the Planning Agency of the Region, is required. Specifically, under the N.2244/1994, FEK '168, arth.3, as amended by N.2941/2001, FEK '201, and arth.2 N.3734/2009, FEK 8 arth.27A, 9 for the installation of solar plants and wind turbines, there is no requirement for a building permission. In this case, only a work verification issued by the appropriate Planning Agency in the area of the establishment, is needed.

6. Sitting Permission

A relevant permit is required for the installation or extension of a power generation plant using RES or high-efficiency cogeneration of electricity and heat.

That permit will have the form of a decision of the Prefecture or the Secretary General of the Region in whose territory the plant will be installed in.

Duration for the issue of the installation permission: no later than fifteen (15) days from the date the applicant files the relevant application along with the supporting documents provided. The evaluation of the documents in any case should be completed within 30 days of the submission of the relevant requirement. In case the Secretary General of Region fail to issue the installation permit within the deadline established in the previous section, the permission issue fall upon the Minister of Environment, Energy and Climatic Change.

The *installation permission is granted for 2 years* and may be renewed for up to an equal time.

7. Contract for the Connection with the System or the Network

The investor submits an application to the Operator for the Connection of the RES Park to the System, according to the terms the Operator has offered, (paragr.2)

8. Power Purchase Agreement (P.P.A.)

The Agreement is signed between the investor and HTSO for the interconnected system or the PPC for the no interconnected network. The contract is valid for 20 years and may unilaterally be extended for more years. For solar thermal plants used for electricity production the contract is valid for 25 years may unilaterally be extended for more years.

Both contracts, for connection with the grid and power purchase agreement are signed and are valid after the issue of the installation permission.

9. Operation Permits

After the full construction of the plant, an application for granting the operation license is submitted to the Secretary General of the relevant Region. [20]After the evaluation of the technical data and operation of the system from CRES the

[20] CRES is responsible for the evaluation of the project according to technical data and the testing operation of the plant

Secretary General of the Region issues the Operation license. Foreseen time of the process: Within 20 working days as of the date the necessary tests of the plant have successfully completed. The operation license is valid for 20 years, plus 20 years extension. For solar thermal plants the operation license is valid for 25 years, plus 20 years extension. Plants with an exemption in installation permission are not required an operation permission. Figure 13 presents a diagram of the license procedure for the development of a RES station.

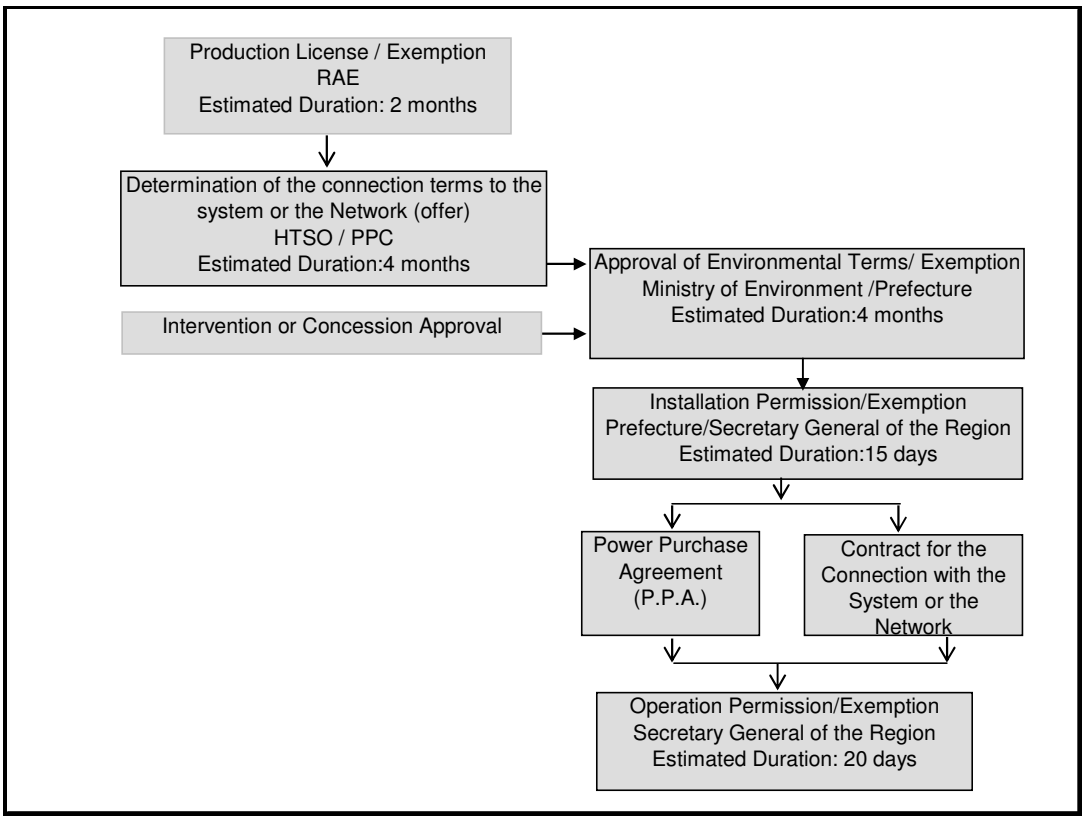


Figure 13 Licensing procedure for the installation and operation of RES stations

2.3.3 Legislation Framework for Water

The administrative structure responsible for the water resources management has various levels. According to Law 3199/2003, several agents are established for the protection and management of water. These are: the National Water Commission which determines the water policy of the country and consists of several Ministries, and the National Water Council, which consists from regional organizations, DEYAS, PPC, Municipalities, etc.

Several of the main public agents among others which deal with water and their main responsibilities, are:

• Ministries (the Ministry of the Interior, Public Administration and Decentralization, the Ministry of Development, Agriculture, the Ministry of Environment, Physical Planning and Public Works, Ministry of Health and Welfare, Care and Social Insurance, and the Ministry of Foreign Affairs which is responsible for international waters[21].

• Local administrations (Regions, Prefecture Administrations, OTA — Organizations of Local Administrations as well as EYDAP, PPC for hydro projects, Research institutes and foundations (IGME -Greek Institute of Geology and Mineral Exploration, N.AG.RE.F. National Agricultural Research Foundation, etc., [ADU RES, 2006].

According to the Law, the Central Division for Water, within the Ministry of Energy, is responsible for the development of the National programs for the water protection and water management, suggests the pricing policy, control and support the Water Division of the regions, etc. Each region has its own Water Division for the water protection and management of the area owned in the particular region. Also according to the Law, in each region of the country is established a Water Regional Council, which aims on the participation of the public, social discussion and consultations regarding water issues.

The legislation framework for water includes common Laws with the energy framework, Laws that concerns with the environmental protection in general. These laws are:

Law 1650/1986 for the protection of environment, **Law 3010/2002** for the specification of the environmental permissions, and a number of Joint Ministerial

[21] The title of most of the Greek Ministries has been changed by the Government elected in October 2009. However, in most of the Laws (developed before 2009) the previous titles of the Ministries are used.

Decisions concerning the categorization of the projects in view of the environmental impacts, the determination of the procedures for the approval of environmental agreement terms, the public information and participation on the environmental assessment procedure, etc.

Before the establishment of the fundamental **Law 3199/2003** (OJG 280A/2003), with which the EU Water Framework Directive-WFD (2000/60/EC) is transported into the national legislation, the legislative framework of the country on water resources management and protection, was included the followings:

The **Law 1739/1987,** on Water Resources Management, establishing the institutional framework for the management of water resources in Greece.

The **Law 1650/1986,** on the Environmental Protection, among with the protection of surface and groundwater quality, including control of effluent discharges.

The 1987 Law also provided for the design and implementation of water resources policies as a prerequisite for development that would enhance the results of production processes, balance the various competitive uses for water and contribute to the renewal-replenishment of water resources as well as to the protection of the environment through participatory processes. Despite the innovative and integrated approach introduced by this Law, its complexity made its full implementation in practice quite difficult.

The **Law 2971/2001** concerns with the determination of the coast, beach and other arrangements.

The outstanding framework concerning the water resources in Greece was put into force in December 2003. This consists of **Law 3199/2003** (OJG 280A/2003), according to the WFD, on the protection and sustainable management of the water resources. This framework Law foresees a radical reorientation of the respective administrative capacities in Greece and introduces an innovative and holistic approach concerning water management that recognizes explicitly the ecological function of water. It also lays emphasis on the management of water on the basis of river basins as well as on the water pricing so that it reflects its full costs. The main objectives of this law include:

- the long-term protection of water resources,
- the prevention of deterioration and the protection and restoration/remediation of degraded water resources and wetlands,
- the reduction and phasing out of harmful and polluting discharges,

• the reduction of groundwater pollution and the prevention of its further deterioration as well as the mitigation of the effects of floods and droughts.

Law 3199/03 also incorporates the 'polluter pays principle' and the objective of maintaining or reaching a 'good ecological status' for all water resources through the control of pollution by use of thresholds levels and standards. It also introduces innovative approaches concerning the protection of water quantity and the transnational cooperation for the protection of transboundary water courses and lakes. The law also integrates the public participation requirements of the WFD. The active involvement of the interested parties is ensured by their representation at the National and Regional Water Councils that are developed as a part of the new administrative framework. As mentioned in the Law, each Region shall elaborate a Management Plan for the optimum management and protection of the natural water resources of the region. The contents of this action plan are determined by a CMD.
Apart from the Law 3199/2003, the existing water framework also includes Joint Ministerial Decisions (JMD) such as **JMD 46399/1352/1986** and **JMD A5/288/1986** for the harmonization of the Greek legislation with EU Directives 75/440, 76/659, 76/160 and Directives 78/659, 79/869 and 80/778 respectively, as well as **JMD 18186/271/1988** for measures and restrictions for the Protection of the Aquatic Environment: Determination of Limit Values for Dangerous Substances in wastewater.

The Greek water framework also includes Council of Ministers' Decisions (CMD), such as, **CMD 144/1987** for the Protection of the Aquatic Environment from Pollution caused by Dangerous Substances, and the **CMD 55/1998** (OJD 58A/20-3-1998) for the protection of aquatic environment, **CMD 256/1998** (OJG 190A/12-8-1998), the completion of the **CMD 541/1978**, regarding the categorization of studies, as well as the **CMD 256/1989** (OJG 121A/11-5-1989) on the permission for the use of water.
Regarding the **pollution caused by substances discharged into the aquatic,** the Greek Framework, enters the **MD 221/65** (OJG 138/B/65) on the disposal of sewage and industrial waste.

Moreover, concerning drinking water quality, the Sanitary Regulatory Decision A5/288/86 (Official Journal of the Government - OJG 53B, 379B) about "Drinking Water Quality" (which refers to the qualitative characteristics of drinking water, to the frequency of sampling and the obligations of the responsible persons), in

harmonization with Directive 80/778/EEC, was valid until December 25th 2003, when the new JMD Y2/2600/01 (OJG 892/B/11/11-7-01), in harmonization with EU Directive 98/83 for the quality of water for human consumption came into force. The Council Directive 98/83/EC of 3 November 1998 on the quality of water intended for human consumption is aiming at protecting human health from the adverse effects of any contamination of water intended for human consumption by ensuring that it is wholesome and clean. Moreover, in 2007, JMD 38295/2007 is amended JMD Y2/2600/01 according to Directive 98/83/EC. JMD 38295/2007 provides the new values and parameters of the potable water.

Management of protected areas including wetlands, was defined in 1999 (Law 2742/99) through the establishment of administrative units (Management Bodies) and the competence of NATURA 2000 Committee, whereas in 2002, through Law 3044/02, twenty five (25) Management Bodies were established, additionally to the existing two ones. Management of the most important protected wetland sites in Greece, designated as RAMSAR wetlands of international importance, is attained through the establishment of these Bodies (which are financially supported, for the time being, from the state), that will collaborate with the respective regional services to be established according to Law 3199/2003, with the mandate to develop and implement regional water management plans.

Concerning the protection of the quality of water resources and of vulnerable zones, in years 2001 and 2002 the existing legislative framework was complemented by various JMDs determining protection measures for vulnerable water resources as well as threshold levels for polluting substances from various anthropogenic sources, according to relative EU Directives.

Legal Framework for Environmental Impact Assessment (EIA)

The EIA system, which includes elaboration, publicity, and administrative approval, has been regulated for the last fifteen years mainly by **Law 1650/1986** and several Joint Ministerial Decisions. This legal status has been recently amended by **Law 3010/2002** and by the subsequent Joint Ministerial Decisions already issued for its application.

Joint Ministerial Decree 46399/4352/86, concerning the quality required of surface water intended for the abstraction of drinking water, bathing water, culture and fishery of shellfish, frequencies of sampling and analysis of surface water intended for the abstraction of drinking water.

Ministerial Decree and Approvals Φ16/5813/1989, concerning the permission for works on the improvement of water resources from the Private sector. This permission is not required for works that belong to the Public sector and to physical persons. However, this discrimination between the private and public sector modified by the Law 3199/2003, in which both sectors require permission for the use of water and for the water improvement.

Joint Ministerial Decision 69269/5387/1990, on the classification of projects and activities in categories, on the content of study on environmental consequences, the definition of the content of specific environmental studies and other relevant clauses, according to Law 1650/1986.

Joint Ministerial Decision 75308/5512/26.10.1990, of the Minister of Environment, Planning and Public Works and the Deputy Minister of National Economy, on the right of public access to information on the content of E.I.A.s (Official Gazette Β΄ 691/2.11.1990).

Joint Ministerial Decree 16190/1335/97, measures and conditions concerning the protection of waters against pollution caused by nitrates from agricultural sources.

Law 3010/2002, amends the above mentioned articles (3,4,5) of Law 1650/1986 and sets the framework for the new environmental permitting system: categories of projects, procedure of environmental terms approval, contents and publication of EIA study. Three Joint Ministerial Decisions (JMD) elucidate and specify further the provisions of Law 3010/2002:

JMD 15393/2332/2002 of the Minister of Economy and Economics and of the Minister of Environment, Planning and Public Works on the classification of public and private projects (Official Journal 1022/B/2002) in categories, according to the article 3 of Law 1650/86 as it is replaced with the article 1 of the Law 30120/2002, in harmonization of Law 1650/1986 with Directives 97/11/EC and 96/61/EC.

JMD 11014/703/Φ104 of the said Ministers as well as of the Minister of Internal Affairs, on the procedures of preliminary environmental impact assessment and approval of environmental terms (Official Journal 332/B/2003). The JMD 11014/703/Φ104 lays down the procedures for EIA for the categories A and B in accordance with directives 85/337/EEC, 96/61/EC and 97/11/EC. The Environmental Impact Assessment for projects under Categories A1 and A2 is mandatory and is carried out in two stages as described in following paragraphs.

JMD 37111/2021/2003 of the just mentioned Ministers, on the procedure of public information and participation in the framework of the environmental permitting system (Official Journal 1391/B/2003). The procedures set by JMD 37111/2021/2003 for public information and participation are following the Directives 97/11/EC, 96/61/EC and 2003/35/EC. Public information and participation is taking effect at a local level.

2.3.4 Licensing Procedures for the Development of Desalination plants

For the installation of desalination plants driven by RES, there is no any standard administrative procedure. Therefore, the general practice is to follow the license procedures for water, together with the procedures applied for energy production, effluents management and other related aspects.

According to **JMD 15393/2002,** desalination belongs to Industrial projects, and characterized as projects with medium or low environmental impacts according to their size (product water capacity).

According to the **Law 3325/2005,** for the establishment of an **industrial installation** the following permissions are required from the Prefecture of the relative region (Figure 14).

1. Sitting Permission

The installation permission is issued by the Prefecture of the specific Region. Exemption from the prerequisite of an installation permission as well as from an

operation permission obtain the installations characterized by low environmental impacts and have an installed power of up to 22KW and thermal power up to 50KW. For the operation of these units the prefecture should be informed with the submission of a declaration. However, these plants are not exempted from the granted of the Approval of Environmental Terms.

In addition, for installations within industrial zones there is exemption from the installation permission. For the issue of installation permission the planning design of the region - use of land -is also considered and examined. There is no exemption on the approval of environmental terms. Moreover, for the electrification and the issue of a building permission the issue of the installation permission is required.

2. Operation permission

For the granted of the operation permission the validation of the installation permission is required. The duration of the issue of the permission is around 1 month and is valid for undefined time. The permission is re-evaluated after five years of its issue and/or in cases of modifications of the mechanical equipment of the installation. For the granted of the operational permission the followings are required:

- **General Justifications**

Three declarations concerning with the observance of the technical study, the number and the education of the technicians and the person responsible for the operation and maintenance of the plant.

- **Special Justifications**
  - Fire protection Certification
  - Building Permission, (if required[22])
  - Permission for the use and improvement of water (Law 3199/2003)
  - Permission for construction of port works and use of the beach and the coast (Law 2971/2001)**
  - Permission for the disposal of liquid industrial wastes (MD 221/65**)**
  - Certification of the Water Quality for potable use. The quality of the water[23] should be according to the arrangement Y2/2600/2001, as

[22] In case where a container is used for the installation of a desalination unit, there is no requirement for the issue of a building permission. According to the **Law 3463**, there is no requirement for a building permission for buildings developed by Municipalities and Municipal Enterprises for Water and Sewage.

amendment with the Decision ΔΥΓ2/ΓΠ οικ.38295/2007, following the Directive 98/83/EU.

More analytically, regarding the **Permission of water use and improvement of water, Law 3199/2003** defines the aim and the general rules for the permission of water use and improvement of water, while, **MD43504/2005** classifies the categories of the permission required regarding the use and improvement of water and determines their issue procedure. The permission is issued by the General Secretary of each Region. The projects that require an authorization for the exploitation/expansion of water are water feeding projects, water transportation, network projects, water storage projects, water treatment, water protection and maintenance services. The Water Division of each Region issues the permission within 20 days after the granted of the Approval of the Environmental Terms.[24] The permission for water use are valid for 10 years max.

Based on the **MD 221/65**, (article 4, paragr.2) permission is required for the disposal of brine to the aquatic environment. The permission is issued by the Prefecture after the submission and evaluation of the relevant study. Following the permission the determination of the disposal area as well as data on specific constitutes and chemical characteristics of the disposal water are published as a Ministerial Decision.

According to the **Law 2971/2001**, works that occurred on the beaches or coasts are considered as "port works or activities". According to article 14 of the same Law, for the concession of the beach, coast for works, for instance for the construction of beach wells, a verification of concession is required. This is issued by the **Hellenic Public Real Estate Corporation[25]** after the verification from the followings:

- The Ministry of Mercantile Marine[26]
- The Ministry of Environment, Physical Planning and Public Works

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[23] Responsible Ministries: Ministry of Health and Welfare, Care and Social Insurance, and the Ministry of Foreign Affairs

[24] In case that AET is not required the water exploitation permission is issued within 45 days from the day of the requirement submission.

[25] The Hellenic Public Real Estate Corporation (HPREC) was founded in 1979 as a private corporation based on L.973/79. It has one share that is owned by the Greek State. It is supervised by the Ministry of Economy and Finance, and operates within the framework of the Greek Founding Legislation and specifically Law 3429/2005.

[26] One of the main objectives of the Mercantile Marine and Hellenic Coast Guard is the Implementation of legislation concerning sea, ports and coasts.

- The Ministry of Agriculture
- The Ministry of Civilization
- The Ministry for Development
- Hellenic Organization of Tourism
- Planning and environment committee of the Prefecture (NEXOP)
- Local Municipality, Community
- Ministry of Aegean
- The Ministry of National Defense, Hellenic Navy

The procedure has duration of around 3 months. The verification for the concession is granted by the Hellenic Public Real Estate Corporation. After the approval of the Framework of Planning Design and the verification of concession of beach or coast the Environmental impact assessment is approved.

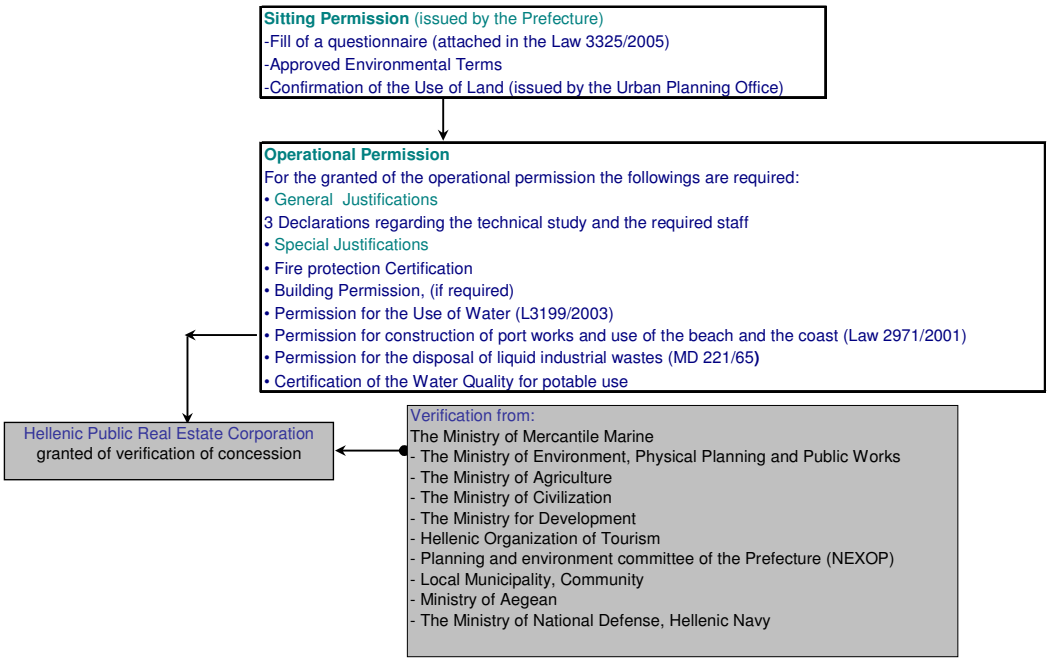


Figure 14 Licensing Procedure for the installation of a Desalination plant

Finally, it must be noted that in case of the construction of plants with public interest (e.g. water supply of municipalities) special procedures can be followed relaxing the prerequisites and even regulating land-allocation issues. In case of small private plants also, where the production is intended for private use (for example small

hotels or houses), the license issue is easier and the main and sometimes sole issue is the fulfillment of the environmental conditions [ADU RES, 2006].

Environmental Categorization of Desalination Projects

According to the **JMD 15393/2332/2002**, Desalination projects belong to **Group 9, Industrial Projects.**

Code ESIE 410.10	**Collection, Treatment and Distribution of Water**			
	Category A		Category B	
Type of project or Activity	Subcategory 1	Subcategory 2	Subcategory 3	Subcategory 4
Water desalination		>100 m^3/day	≤ 100 m3/day	

According to **JMD13727/724**, desalination projects classified as activities with medium or low level of environmental effects, as follows:

Desalination units of
>100 m^3/day characterized by **Medium Level** of environmental effect
≤ 100 m^3/day characterized by **Low Level** of environmental effect

According the category of each project, the procedures for the environmental permission are considered, (same as for RES)[27].

A CATEGORY – An environmental assessment study is required; approval of environmental terms is issued by the Ministry of Environment, Physical Planning and Public Works or in some cases by the Prefecture.

B CATEGORY – submission of justifications on the environmental assessment of the project, permission is issued by the Prefecture.

C CATEGORY -submission of justifications on the environmental assessment of the project, permission is issued by the local Municipality.

[27] **Category A[27]**: Projects and activities which, because of their nature, size or extent may cause *serious risks* for the environment;

Category B: Projects and activities which, *without being seriously hazardous* for the environment, *must be subject to* general specifications, terms and restrictions for reasons of environmental protection;

Category C: Projects and activities, which may cause an insignificant risk or nuisance or degradation to the environment.

2.4 Energy and Water Tariff

2.4.1 Energy Tariff

As of 1 July 2007, all consumers have become eligible customers and are therefore subject to the power sales tariffs, applicable to eligible customers, in line with the Supply Code (Ministerial Decision 4524/2001) issued under article 27 of the Electricity Law. Said code provides that, the market having opened up, suppliers are free to decide their tariffs and pricing and the terms of the supply contracts. However, the Supply Code also provides that PPC's tariffs must be approved by the Minister for Development following an opinion of RAE for as long as PPC covers more than 70 per cent of the domestic electricity consumption (article 14), which is the case today as PPC still covers more than 90 per cent of domestic consumption.

Furthermore, the Supply Code (article 13) provides that in case of the so-called big suppliers (those covering more than 40 per cent of the country's total electricity consumption), the Minister for Development, following an opinion of the RAE, may intervene and amend the tariffs and the general terms of business published by the big supplier.

The electricity tariff is considered according to the type of use (domestic, general, industrial), the type of electricity supply (use of 1 phase or 3 phases) in domestic use, as well as on the consumption. However, in average the electricity tariff costs around 0.08€/kWh.

In general, the electricity supply is divided into four categories according to the power requirements:

Industrial Use

Γ22Β - for installed power of 25 up to 250 KVA

Γ21Β – for installed power of up to 25 KVA

Γ23Β – for use during the night

Domestic Use

For Professionals

For other the activities (agricultural, etc)

The following table presents the electricity tariffs according to the voltage type, electricity supply and consumption.

Low Voltage - Tariffs		
Residential Tariffs		

Electricity Consumption	1 phase	3 phase
kWh/4 months	€/kWh	
0-800	0.07169	0.07671
801-1600	0.08761 for up to 800kWh 0.11165 more than 800kWh	0.08761 for up to 800kWh 0.11165 more than 800kWh
General Use	0.14002 €/kWh	
Medium Voltage - Tariffs		
General Use	0.14002 €/kWh	
Industrial Use	0.14002 €/kWh	
High Voltage – Tariffs		
low load periods mid load periods high load periods	0.03356 €/kWh 0.04523 €/kWh 0.06526 €/kWh	

Source: PPC, 2010

A fixed charge is also included in the total tariff of the electricity depending on the type of the electricity supply, on the type of voltage. In general is ranged between 3 up to 65 € for a period of 4 months.

A "special fee for RES" (= kWh consumed * 0,00030 €/kWh) is also included in the electricity bill of the consumers.

The production electricity cost in several cases, especially in the small autonomous power plants of the islands is much higher than the electricity price that the consumers are paid. The electricity demand in the Aegean Archipelago islands has up to now been marginally covered by the existing Autonomous Power Stations (APS), based on internal combustion engines and gas turbines.
Unfortunately, one of the major problems of these islands is the low quality of electricity available at very high production cost, Figure 15.

Besides, a continuous load demand increase is encountered during the last thirty years dictating the installation of new power stations throughout the entire area, [Kaldelis, 2007].

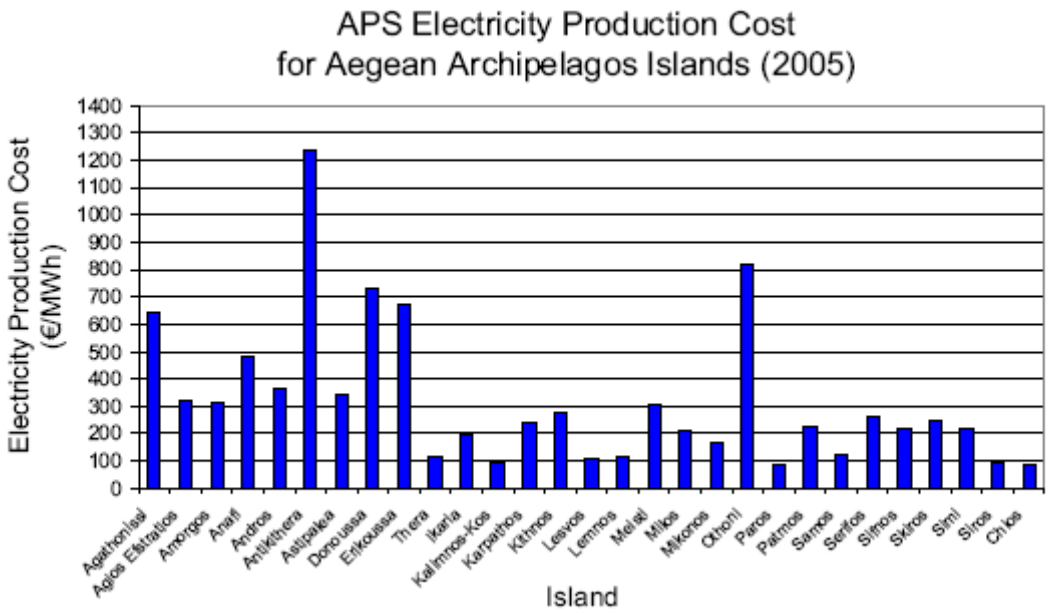


Figure 15 Electricity production cost of selected Greek APS

As it is shown in Figure 15, the **electricity production cost from APS** of the Greek islands is ranged **from 8 to 120 €/kWh**.

The **cost of generated wind power** could be assumed to be between **0.25 c€/kWh and 0.5 c€/kWh**, depending on the site conditions and project cost. The typical interest rate for financing wind energy projects is 7% to 8%.

The **cost of generated PV power** in Greece is around **0.20 €/kWh**, depending on the site conditions and the installed capacity of the plant.

2.4.2 Water Tariff

Concerning the water supply in Greece, the Athens Water Supply and Sewerage Company, EYDAP is responsible, by Law (Law 1068/1980), for the water supply of the capital[28]. For the islands responsible organizations for the water supply are the Municipalities with the Municipal Companies for Water Supply and Sewerage (DEYA). For the pricing of domestic and industrial water, EYDAP as well as DEYAs**,** follow a

[28] responsible for the provision of water in Thessaloniki is DEYATH , a public sector company

non-uniform pricing policy, in which the price of water ranges with the amount of consumption, [Ντεμιάν, 2010].

The prices of the water in towns and villages are determined by the municipality and the local corporations responsible for water supply and sanitation (DEYAs). In the cities the prices are determined with the States' intervention [Stefopoulou, 2008]. On the other hand, water prices for irrigation are most of the times not related with quantity of water consumed but with the area irrigated.

Thus, as it shown in Figure 16, each region of Greece follows a different pricing scheme and different charges. The areas of Athens and Thessaloniki have a combined water billing system covering both water supply and wastewater collection & treatment charges. Volumetric rates for industry are generally higher than for households with charges including also flat rate pollution charges and wastewater charges.

Moreover, the charges for water use in Greece are generally lower than most of the European countries even if there are serious water scarcity problems (see Figure 17). In most cases the water price is lower in areas with dramatic water scarcity problems and higher in areas with abundance of water resources.

According to the **MJD 48405/346/2004**, the tariff system for the services of EYDAP is separated into 8 categories. The two categories concerns the present work is as follows:

1st Category - GENERAL TARIFF[29] (domestic use)	
Monthly Water Consumption m^3	Water Price €/m^3
0 - 5	0,39
5 - 20	0,61
20 - 27	1,75
27 - 35	2,45
>35	3,05
2nd Category - INDUSTRIAL – TRADE TARIFF	
Monthly Water Consumption m^3	Water Price €/m^3
≤1000	0,79
>1000	0,93

The above prices are charged with a fixed charge, which is ranged from 0.53 to 0.82 €/month, for domestic use, according the consumption. For the industrial category the fixed charge is ranged from 4-41 €/month. Also, there is a charge for the use of

[29] There are special prices for families with more than 3 children

sewer, this is estimated as a percentage (60%) of the value of the consumed water, for each category of consumer.

Following are some examples of the water tariff system in the Greek islands:

Mykonos Island – Cyclades – Aegean island

Water Consumption	**Price**
m^3	€/m^3
0-30	0.73
31-50	1.06
51-100	1.39
101-150	1.63
151-200	2.12
201 and more	2.44

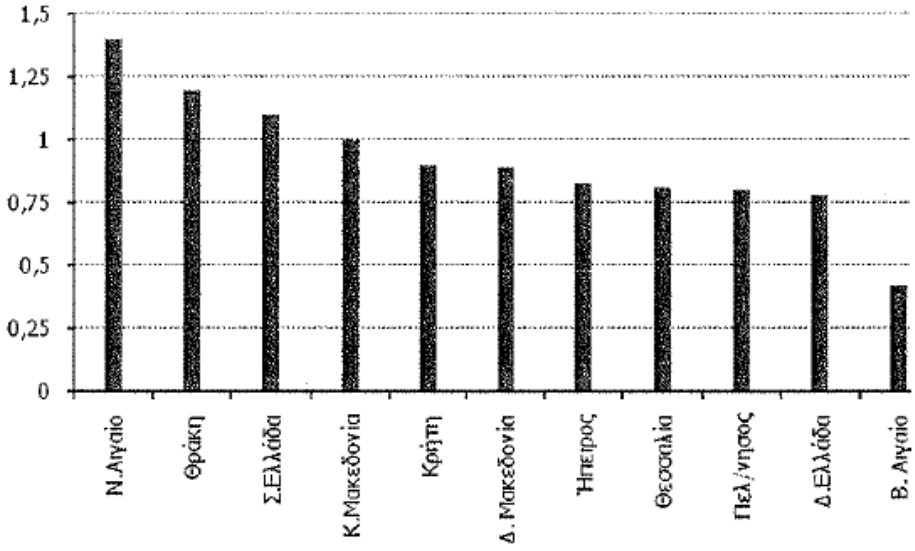
The above prices charged with a "special charge" and VAT.

Kefallonia – Eptanisa - Ionian Sea island [ADU RES, 2006]

Water Consumption	**Price**
m^3	€/m^3
for Domestic Use	
0-20	0.40
20-30	0.60
30-45	1.00
45-60	1.50
Over 60	3.00
for Industrial Use	
0-50	0.60
50-100	0.80
Over 100	2.00

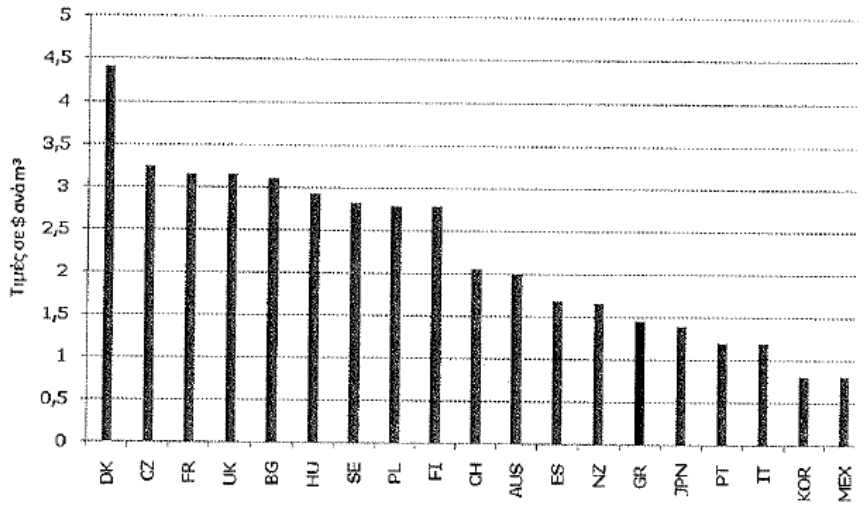
The **unit water cost from the seawater desalination units** in the Greek islands is ranged **from 1 up to 2 €/m^3** (except special cases that is more).

As already mentioned in Chapter 3.1.1, the Greek Government subsidizes the water transportation in most of the Aegean islands. The yearly water cost of the transported water is of the order of 9.396.512.0 € (2007) for a total amount of 1.744.380.0 m^3/year. The unit water cost is ranged from 5 to 8 €/m^3. This water is part of the water distributed and charged to the consumers of the islands.



Source: IOBE, 2010

Figure 16 Water prices in €/m^3 in the regions of Greece[30]



Source: IOBE, 2010

Figure 17 Water prices in USD$/ m^3 in several Countries

[30] For consumption of 30 m^3 , year 2001

2.5 Funding Schemes & Programs

Financial support for RES projects are provided by the state in the framework of the **Operational Program for Competitiveness (OPC), 2000-2006** and the **Law for Development 3299/2004** as amended with Article 37 of Law 3522/2006.

The OPC raises resources from the Third Community Support Framework to provide public aid to renewable energy sources and energy saving, substitution, and other energy-related actions. State aid accounts for 30 per cent of the eligible cost of the projects and can go up to 50 per cent in the case of construction of transmission lines connecting renewable energy plants to the grid [21]. As 2008 was the ending year of the Third Community Support Framework most of the projects financed by the OPC are finalized.

In January 2008, the Greek Ministry of Economy and Finance is announced the new program entitled **National Strategic Development Plan (NSDP), 2007-2013**. The NSDP raises resources from the Fourth Framework Programme to reinforce the investment activities of the private sector and strengthening the productive potential of the country.

The Law for Development 3299/2004, as amended with Article 37 of Law 3522/2006 provides grants of up to 40% of the total investment.

Figure 18 The division of Greece in three zones according to Law 3299/2004

Law for Development 3299/2004, as amended with Article 37 of Law 3522/2006:

National Development Law 3299/04

This is a financial instrument-umbrella, covering all private investments in Greece , in all sectors of economic activity. Investments in RES installations (both electricity- and heat-producing ones) also had a favoured status under the previous Law 3299/04, such as investments in high technology, environmental protection, tourism, etc.

The following categories in the energy sector are eligible for incentives:

- Power generation, in the form of warm water, steam.
- Production of solid fuels from biomass.
- Cogeneration of electricity and heat.
- Energy production from renewables, and especially wind and solar, hydroelectric, geothermal energy and biomass.
- Environmental protection and waste disposal projects.

The kinds of incentives alternatively provided are:

- Cash grant and/or leasing subsidy; or
- Tax allowance; or
- Labour cost subsidy for new employment

For the purpose of investment incentives, Greece is divided into 3 zones :

Kind of incentives	Investment zone		
	Zone A	Zone B	Zone C
Cash grant and/or leasing subsidy	20%	30%	40%
Tax allowance	60%	100%	100%
Labour cost subsidy for new employment	20%	30%	40%

Table. Investment incentives for the energy sector

The level (%) of public subsidy is increased by 10 to 20 (bonus) percentage points in the following cases:

a) Very small and small-sized enterprises (less than 50 persons, and annual turnover less than 10M€): 20% bonus
b) medium-sized enterprises (less than 250 persons, and annual turnover less than 50M€) : 10% bonus

In order to be eligible for the funding the following parameters should also be satisfied:

- Required own capital: 25 % (min) of the total investment cost
- Minimum investment cost required: 100,000-500,000 € (depending on the size of the enterprise)
- Installation license is required for project application (grant proposal)

On the 10 th of July 2007, with a new Ministerial Decision, a new level of public subsidy for energy investment projects especially in the fields of photovoltaic and wind energy was set. The table below summarises the introduced changes concerning the level of the public subsidy, under the National Development Law, for wind and photovoltaic investment projects.

Enterprise size	Investment Zones / level of subsidy		
	A	B	Γ
big	20	30	40
medium	30	40	40
small	40	40	40
Very small	40	40	40

A new National Development Law is expected to be issued before the end of 2010 and come into force in January 2011.

The new Law is part of a new strategy for economic growth and promoting a new business model. The new Law seeks for a dynamic and sustainable economy with cutting edge green building, enhancing competitiveness, productive transformation, employment and regional convergence.

The New Development Law introduces three major reforms:
- tendering evaluation procedure of investment proposals under a range of quality parameters that define whether this investment leads to a product, or provides a service that is competitive, qualitative and contribute to improving the balance of payments; whether incorporating green measures and constitutes a new development model of world economy; whether it contributes to the restructuring and balanced development.
- Embody of all the economic activities except those which expressly prohibited either by law or by decisions or regulations of National or Community legislation. Thus, eliminate a major weakness of the previous law, in which was included a number of rules concerning the nature and scope of the activities supported.
- Setting up an investment board that will oversee the implementation of the law and recommend improvements and changes to adapt to current challenges.

Below several important points of the Law are mentioned:
- Installations of PVs stations for the electricity production are not supported by the new Law.
- As in the previous Law, the percentage of the public subsidy depends on the size of the enterprise and the investment zone. The enterprises categorized in three categories, small, medium and large while the country is separated into 3 zones (A,B,C).The percentage of the subsidy in each zone is considered according to the level of development (Gross National Product (GNP) per capita of each Prefecture in relation with the average GNP per capita of the country, for the same year).
- The level of subsidy could not be higher than 50% of the total investment.
- The minimum allowable investment cost is considered according to the size of the enterprise and is as follows:
- for big enterprises, the amount of 1.000.000,00 €
- for medium enterprises, the amount of 500.000,00 €

- for small enterprises, the amount of 300.000,00 €
- for very small enterprises, the amount of 200.000,00 €.

Finally, for the enterprises that have been reinforced within the Law, there are tax exceptions on their total income tax. The amount of the tax exemption is estimated according to the year of the integration and the beginning of the productive period of the investment.

Moreover, the Greek Government is planning to announce two important programs regarding RES Desalination in the Greek islands. The first concerns with the Implementation of Desalination Units in the islands of the Prefectures of Dodecanese and Cyclades. The desalination units, as mentioned in the open consultation, should cover their energy needs by RES. The proposed water capacity of the units for 16 specific islands (9 from Cyclades group and 7 from Dodecanese group of islands), is ranged from 3 m^3/day to 300 m^3/day. The Ministry is planning to implement the project through a Public-Private Partnership scheme.

Additionally, the General Secretariat of Tourism of the Ministry of Civilization and Tourism, within the National Strategic Development Plan (NSDP), 2007-2013, is going to announce a program for the "Green Tourism". The program includes the case of using small water plants in combination with RES for the production of fresh water.

2.6 Conclusions - Recommendations

Following the examination of the energy and water framework in Greece, it is obvious that both are too complicate and a significant time is required for the granted of the several licenses or verifications.

The new Law for RES aims on the acceleration of the procedures but it is too early to evaluate its effectiveness.

Water framework in some cases is clear but it seems that there are many exceptions or lack of knowledge, so in several cases is not followed completely.

The most important step forward for the development of RES Desalination in Greece, seems to be the development of a specific framework for the desalination of brackish and seawater. In this framework the desalination units should be separated in thermal and membrane processes and based on specific parameters such as the installed power, the quality of the produced water, environmental impacts, should be categorized for the determination of the legislation requirements and procedures. By this way the implementation of a framework for RES Desalination will be straightforwardly and the procedures will be simplified. Since in Greece, as in many other Mediterranean areas, to provide green electrification and potable water supply is a priority, it is vital to obtain simple, fair and prompt procedures for the development of the projects.

Additionally, other important aspects that should be taken in consideration are as follows:

- Priority should be given on the implementation of projects concerning small autonomous RES Desalination units in remote areas, such as in small islands. (The new RES Law, Law 3851/2010, already provides priority on the licenses authorization for the implementation of RES desalination projects).

- Based on the Law 3010/2002 and the JMD 15393/2002 and JMD 13727/2003, public or private projects and activities are obtained in categories and sub-categories according to their impacts on the environment. Desalination units with a water capacity of 100 m^3/day are characterized as projects that may cause serious risks for the environment, while units of less than 100 m^3/day characterized as projects which, without being seriously hazardous for the environment, must be subject to general specifications, terms and restrictions for reasons of environmental protection.

Based on the above, units of less than 50 m^3/day, are proposed to belong at Category C; projects and activities, which may cause an insignificant risk or nuisance or degradation to the environment.

Finally, is proposed, units of less than 10 m^3/day developed for Municipal Use, be exempted from the licenses procedures, and follow specific rules regarding technical and environmental aspects. The construction and operation of the system should be only under the responsibility of the Municipality.

Regarding the tariff system, the price of water could not exceed the water cost. According to the Water Framework water should be charged at a price which fully reflects the services provided. Provision of water could not be a profitable investment. On the other hand RES exploitation is a profitable investment with, in most cases, significant feed-in-tariffs. Based on the above, the price of the water produced from RES Desalination plants, also, could not exceed the water costs, (including initial cost, O&M cost, environmental cost, etc). Thus, specific subsidies or feed-in tariff issues regarding RES plants combined with desalination, should be considered for those units that offer to the public benefit.

All the above issues have been reported and/or discussed with the Greek Ministries, (Ministry of Environment, Energy, and Climatic Change, Ministry of Economy, etc). Some of them have been taken already into consideration.

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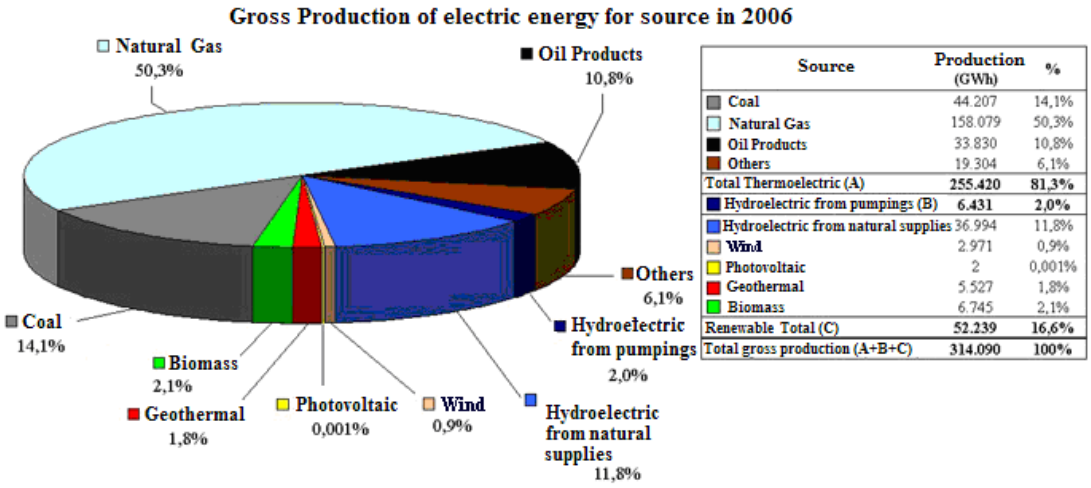
Italy

2.1 Current Status of Renewable Energy Sources and Water

A. Energy Current Status

Italy is currently the fourth natural gas worldwide importer (mainly from Russia and Algeria) and the second electrical energy worldwide importer (International Energy Agency, Key World Statistics 2007). The natural gas is the first source for the national production of electricity (50.3%), while all renewable sources represent a secondary source (16.6%), (Figure 1, GRTN-TERNA).



Source	Production (GWh)	%
Coal	44.207	14,1%
Natural Gas	158.079	50,3%
Oil Products	33.830	10,8%
Others	19.304	6,1%
Total Thermoelectric (A)	255.420	81,3%
Hydroelectric from pumpings (B)	6.431	2,0%
Hydroelectric from natural supplies	36.994	11,8%
Wind	2.971	0,9%
Photovoltaic	2	0,001%
Geothermal	5.527	1,8%
Biomass	6.745	2,1%
Renewable Total (C)	52.239	16,6%
Total gross production (A+B+C)	314.090	100%

Figure 1 Electrical energy lord production for source in 2006 (Source GRTN-TERNA)

The Italian energetic production is much unbalanced toward oil and natural gas (i.e. foreign energy source) with the result that the current price for consumers is one of the highest in Europe.

Although this strong dependence on foreign energy, Italy was a pioneer country in the field of Renewable Energy Sources (RES). For many years in fact (until the late sixties) the energy production in Italy was essentially characterized by the hydroelectric energy source with a number of hydroelectric power stations in the Alpine regions. However, under the present conditions because of increased energy demand, the contribution of renewable energies to the production of electricity currently account for less than 17%.

The electric energy production from renewable sources in 2006 was in fact equal to 16.6% of total electric energy required, with the 13.1% originating from hydroelectric sources. The remaining part comes from the addition of geothermal, wind and biomass and waste combustion. Italy results to be the fifth producer of electricity from renewable energies in UE-15, although Europe community targets foresee the energy production from renewable energies to be at 22% of the total within 2010.

In 2007 the renewable energy sources covered the 15.7% of national electrical production (313.888 GWh, including all the imports).

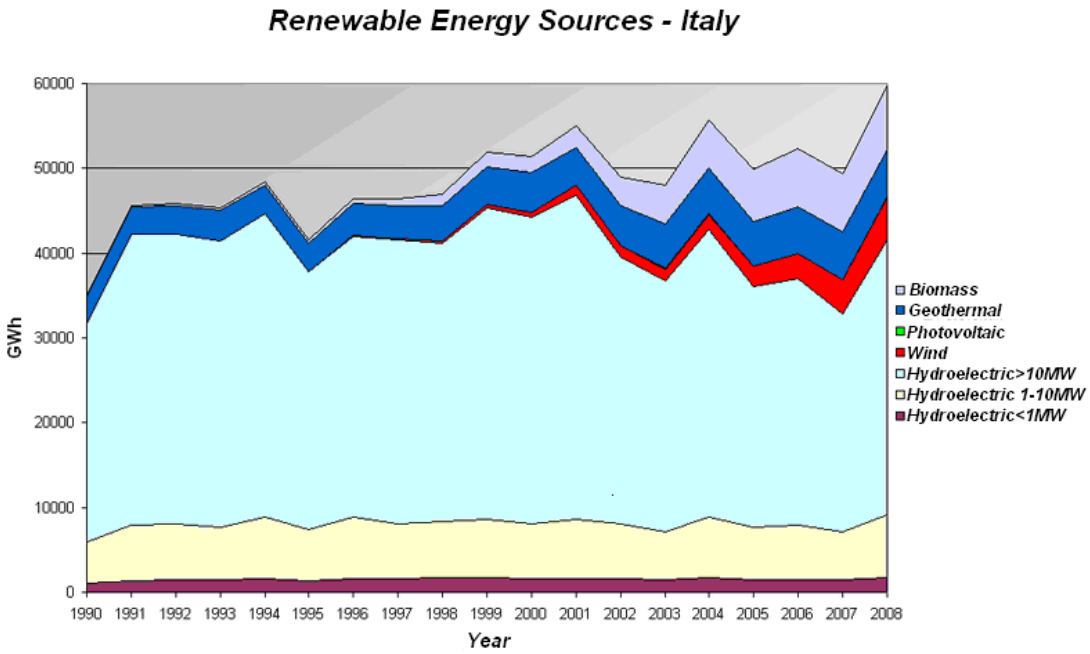


Figure 2 Diagram of renewable energy source production

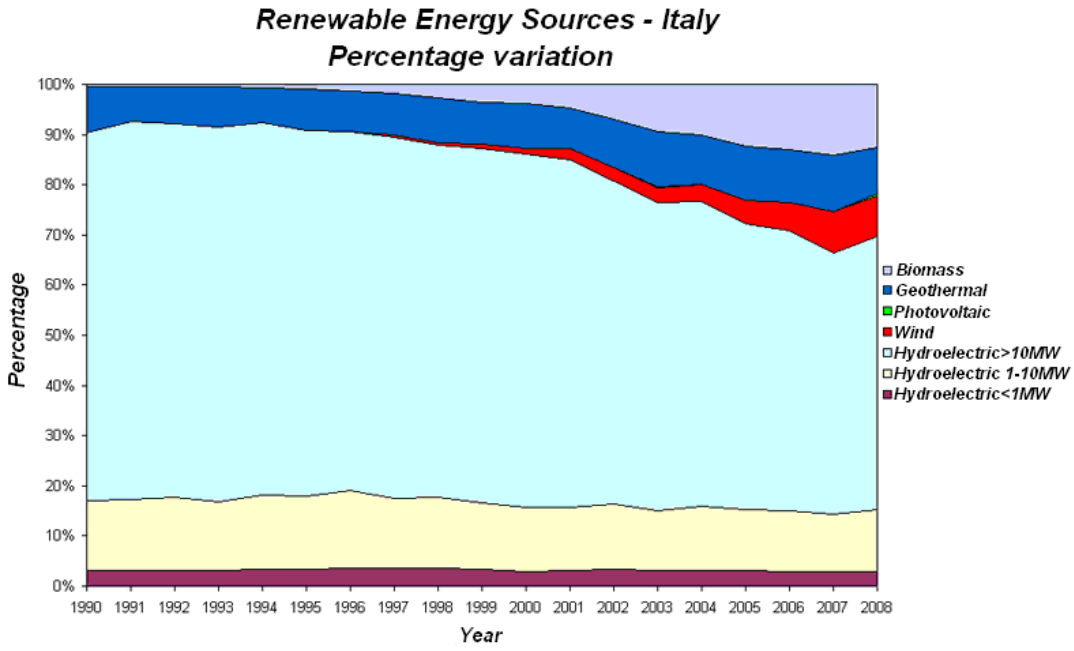


Figure 3 Diagram of renewable energy source percentage

Although 2007 was a critical year for hydroelectric energy sources with a energy production lower than that of 2006 (about 4179 GWh) and 2004 (about 9.522 GWh), in 2008 the power due to Wind energy source increased from 2.716 MW to 3.736 MW

(Figs 2-3), while the new energy incentive system brought about proliferation of domestic photovoltaic systems that in June 2009 reached up the number of 40.000 units, resulting in a total power of 500 MW.

From the data reported in Figure 2,3 it is clear that in the last years the amount of electrical energy produced in hydroelectric plants is decreasing, while that produced in thermoelectric plants (from the combustion of biomass or industrial and urban wastes) and Wind is increasing.

The actual (2010) production of electric energy in Italy by source is (CIA World Factbook):

Fossil Fuel:	78.6%
Hydro:	18.4%
Nuclear:	0%
Others:	3%

In Table 1 the power (MW) of renewable energy source plants for each Italian region is reported. In 2008 the geothermal-electric plants (in Toscana) produced about the 1.5 % of the electricity while the more recent renewable energy sources as the Wind (Sardinia, Sicily and Southern Apennine) produced about 1.3 %, while the solar produced about 0.05 % that corresponds to 193 GWh.

In September 2007 the Italian Government approved a Position Paper with the title: "Energia: temi e sfide per l'Europa e per l' Italia" (Energy: Themes and Challenges for Europe and Italy). In this paper an evaluation of the renewable energy sources for power production (on the basis of viable potentialities and industrial targets) in Italy until 2020 is considered. The paper predicts that the installed power will increase from 20.989 MW in 2005 to 46.215 MW in 2020 with contribution by the different energy sources as reported in Table 2 (installed power in 2005 in the first column and potential installed power in 2020 in the second column).

Table 1 Renewable Energy Sources in Italian regions (Source: Terna)

Italian region	*Renewable Energy Sources*				
	Hydroelectric (MW)	Aeolian (MW)	Solar (MW)	Geothermic (MW)	Biomass (MW)
Piemonte	2.398	12	25	5,7	66,8
Valle d'Aosta	861	0,0012	0,2	0,09	0,8
Lombardia	4.902	0,02	46	6,2	391,4
Trentino Alto Adige	3.049	4	24	0,3	18,2
Veneto	1.088	1,4	28	0,13	111,7
Friuli Venezia Giulia	453	-	9	0,03	21,1
Liguria	72	19	3	-	13,6
Emilia Romagna	290	24	32	-	204,4
Toscana	321	42	20	711	75,6
Umbria	508	1,5	11	0,02	25,3
Marche	230	14	14,4	0,02	10,5
Lazio	399	13	18	-	80,1
Abruzzo	1.001	174	7	0,3	5,1
Molise	84	29	0,9	-	40,1
Campania	333	711	11	-	26,1
Puglia	-	1.023	42	-	86
Basilicata	128	196	8	-	7,2
Sicilia	152	846	17	-	17,8
Sardegna	466	549	12	-	15,8
Italia	17.451	3.861	340	723	1

Table 2 Evaluation of installed power for renewable energy sources in 2005 and 2020 in Italy, (Source: Terna).

	2005	2020
Hydro	17.325 MW	20.200 MW
Wind	1.718 MW	12.000 MW
Solar	34 MW	9.500 MW
Geothermic	711 MW	1.300 MW
Biomass and Biogas	1.201 MW	2.415 MW
Sea and Waves	0 MW	800 MW

B. Water Current Status

In **Italy** the first water desalination plants were built in the sixties and from then about one hundred plants were built, with a overall capacity of 430.000 t/d. Most of these plants are operated by ENEL, ENI and large oil refineries producing desalinated water for their own internal consumption or for both internal consumption and freshwater supply to the local territorial water networks. In accordance with data updated to 2006 and neglecting all the plants with a capacity lower than 100 t/d, the overall production is so divided: 238.000 t/d from 36 MSF (Multi Stages Flash) plants, 99.000 t/d from 35 MED (Multi Effect Desalinations) plants, 83.000 t/d from 19 RO (Reverse Osmosis) plants.

Currently 2 or 3 plants with a capacity higher than 100 t/g are being built every year. All desalination processes can be classified in two types:

Reverse Osmosis and Evaporative processes. The Reverse Osmosis processes require more limited investments but a more thorough and specialized maintenance.

Although the energy consumptions of RO plants were considerably reduced in the last years (with the use of high quality membrane and improving the energy recovery techniques) currently it is possible to produce fresh water from sea water with a consumption of energy of about 3.5 Kwh/m^3. The less salty the water, the less is the energy consumption. The result is not much encouraging in energy terms as the consumption regards a noble energy as electricity. The production of a 1 m^3 involves the direct electricity consumption of about 3.5 kWh. In conclusion the

amount of electrical energy consumed for the desalinated water strictly corresponds to significant electric energy consumption.

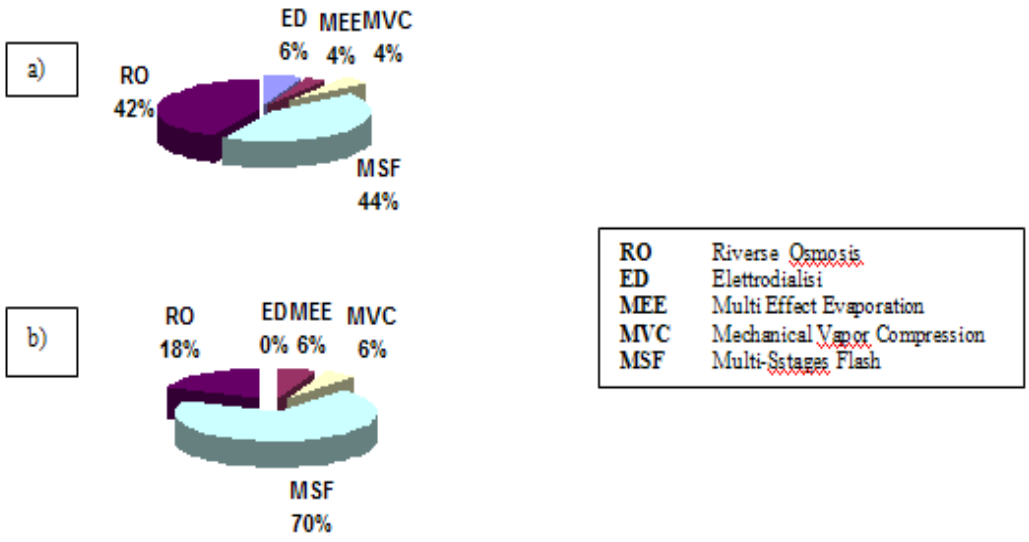


Figure 4 Market percentages for several desalination technologies, a) All the applications; b) Only seawater

The main evaporative processes as the Multi Stage Flash (MSF) and the Multi Effect Distillation (MED) require more investments and higher energetic consumes than RO plants. Better quality of the distillate and plant reliability is such to make them more preferable for process water production (utilities) or as feed for high pressure steam boilers. The energy required for the evaporation is thermal, i.e. less noble than electrical energy, and it is possible to operate with process temperatures even in the range or below 60 °C. In conclusion the evaporative plants result more convenient if combined with more complex industrial plants, with the targets to produce water for inside industrial use and to generate a suitable and productive surplus to be supplied to the potable water networks. In Italy actually the price of the "desalinated water" is more expensive (e.g. around 2-3 Euro/m^3) than "water-works water" (e.g. around 1 Euro/ m^3), but more convenient than "bottled water" (e.g. around 200 Euro/m^3 and more).

The problem of drought in the last decades in **Sicily** gave the input to the construction of some desalination plants for civil, agricultural and industrial uses. The

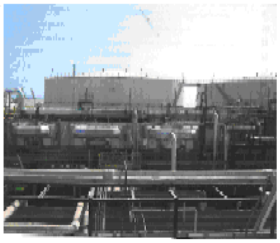
population affected by the problem of water shortage can be estimated in as much as 500,000 inhabitants that are distributed along southern and western coast, covering the districts of Caltanissetta, Agrigento and Trapani. During the 1970s a plan was developed by CASMEZ (State Fund for the South) to exploit the sea, the most abundant resource of water. Thus a plan was developed for the creation of several seawater desalination plants.

The four main plants are located in Gela, Porto Empedocle and Trapani (Figure 5). The largest is located in Gela and makes use of MSF technology to produce around 50,000 m^3/d of water, used both for civil and industrial use. The desalination plant built in Porto Empedocle is a MED with MVC and has a capacity of around 5000 m^3/d of water for civil use, while that built Trapani is a MED with TVC and was built to produce 36,000 m^3/d of water for civil use. The fourth plant is a RO that operates in Gela with a total capacity of 15,000 m^3/d.

Figure 5 The four main desalination plants in Sicily

In Figure 6, the technology used and the nominal capacities of Gela, Porto Empedocle and Trapani desalination plants are reported in the first and second column. The manager of each plant is reported in the third column.

Desalinated Water Production



	TECNOLOGY	NOMINAL CAPACITY	MANAGEMENT
		l/sec	
GELA DESALINATION POLE			
4 THERMIC MODULES	MSF	660	Gela Refinery spa
OSMOSIS	Osmosis	200	Gela Refinery spa
5^MODULE BIS	MSF	200	Di Vincenzo spa
PORTO EMPEDOCLE DESALINATION PLANT	Thermocompression	55	Di Vincenzo spa
TRAPANI DESALINATED PLANT	MED	320	Siciliacque spa

Figure 6 Desalinated water production in Sicily

In Figure 7, the total volume of freshwater production in Sicily for the year 2009 is reported, including both the conventional freshwater sources and the amounts generated by the desalination plants.

The percentage distribution of resources used (as wells, desalinated plants, sources and so on) in year 2006 and 2007 is reported in Figure 8. It is easy to note that the percentage of water storage capacity is the highest in each year and increases every year.

Resource Volume Production - year 2009

SICILIACQUE MANAGEMENT	Mmc
WELLS AND SOURCES	34
BLUFI ROAD	2,7
FANACO STORAGE CAPACITY	13,5

DESALINATION PLANTS	Mmc
TRAPANI DESALINATION PLANT	7,6
GELA DESALINATION PLANT	4,4
PORTO EMPEDOCLE DESALINATION PLANT	0,6

MANAGEMENT OF OTHERS	Mmc
PRIZZI STORAGE CAPACITY	0,1
GARCIA STORAGE CAPACITY	7,6
ANCIPA STORAGE CAPACITY	19,6
RAGOLETO STORAGE CAPACITY	1,8
CIMIA DISUERI STORAGE CAPACITY	1,4

TOTAL PRODUCTION	93,3 Mmc

Figure 7 The volume production of water in 2009 in Sicily

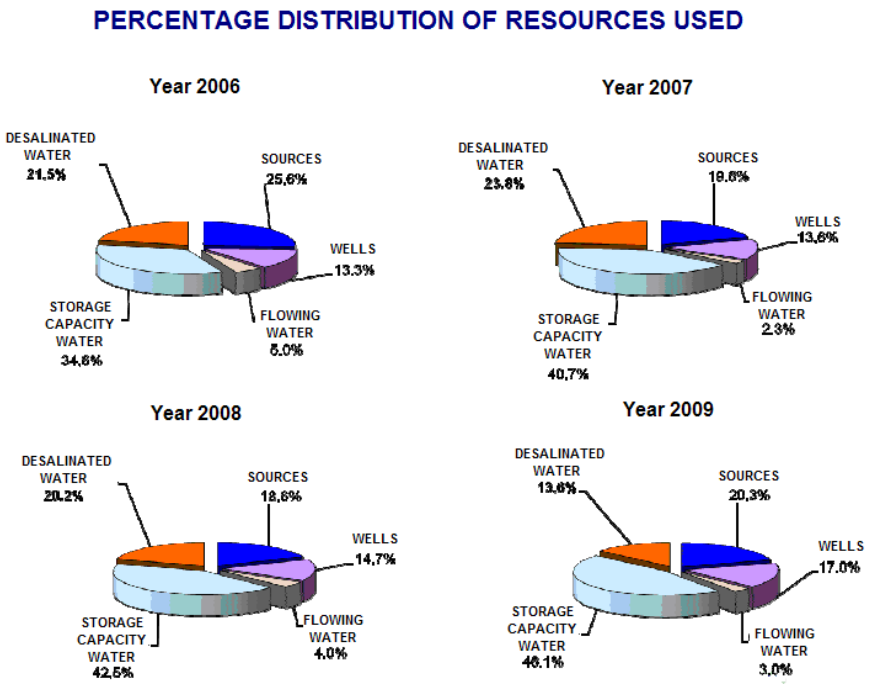


Figure 8 The percentage distribution of resources used in year 2006 and 2007

2.2 Main Actors of the Energy and Water System

2.2.1 Main Actors of the Energy System

The administrator of the national transmission network (GRTN) has the task to be responsible for the transmission and dispatch, including the unified management of the national networks. Actually all these works are up to Terna - National Electrical Network- S.p.A. that obtained all the GRTN businesses as defined in DPCM 11 may 2004. The task of Terna S.p.A is that to connect to the national transmission network all the subjects that require it. Moreover Terna has the duty to handle the energy flows, the related interconnection devices and all the necessary auxiliary services, committing oneself to guarantee the security, the reliability, efficiency and the lower cost of the service and supplying.

Figure 9 Symbols of Electric Energy Authorities and Organizations

The economic management of the electric market is entrusted to an administrator of the electric market (GME) that is a joint-stock company constituted by the administrator of the national network, with the task to organize the same market with criteria of neutrality, transparence and competition among producers. The distribution activity is entrusted to private societies and is developed in concession system issued by Minister of industry, commerce and handicraft.

2.2.2 Main Actors of the Water System

The main duties of ATO, as established by the legal national framework, can be summarized as in the following:

- to choose the management form of the SII, safeguarding and exploiting the technical property and the human resources of the existing managements;

- to arrange and to update the program of the interventions within the territorial field and the financial planning;
- to establish and to update the costs of the water service as it has been established by articles 13 and following of Galli law;
- to control the action of the water service administrator, with the aim to safeguard the interest of the users;
- to ensure the correct application of the price;
- to verify the achievement of the objectives and service levels foreseen by the strategic plan (Piano d'Ambito);
- to estimate the economic-financial course;
- to define all the necessary activities to verify the correct and timely realization of the plannings.

The service administrator has to guarantee the correct fulfillment of the SII, using the public works pertaining to the same services realized or under construction in several communes constituting the ATO. The administrator is responsible of the correct running of the services starting from the date of works and plants delivery. The administrator has to guarantee the least levels of the services established by the law involved in the water supply and in the waste disposal; he has to assure that in all the houses the potable water comes with suited pressure for all day such to allow all the normal activities of the townsman. The quality of the potable waters distributed has to be fully compliant with all the existing laws. Moreover the administrator has to carry out a progressive reduction of the leaks in the water pipe of adduction and distribution, accordingly to the plan prepared in the initial bid, with fixed amount of results that have to be reached yearly. The reduction of the leaks in the net will involve a significant reduction of the supplying, since the amount of dispersed water underground is smaller. As regards the depurative drainage sector, the administrator has to guarantee the whole collection and the conveyance of the effluent wastewater produced by all ATO to suitable treatment plants. The wastewater treatment service has to guarantee the final quality of the treated water.

2.3 Legislation Framework for RES and Water

2.3.1 RES Legislation Framework

With article 6(2) of directive 2001/77/EC the Member States have to publish a report on the evaluation of the existing legislative and regulatory framework, with regard to authorization procedures as those laid down in Article 4 of directive 96/92/EC and applicable to production plants for electricity from renewable energy sources.
In the report the following points have to be taken in to account:

- the reduction of the regulatory and not regulatory barriers to the increase in electricity production from renewable energy sources;
- the streamlining of the procedures at the appropriate administrative level;
- to ensure that the rules are objective, transparent and non-discriminatory and take fully into account the particularities of the various renewable energy source technologies;
- to indicate the actions taken and to provide an indication of the stage reached.

The Article 7(7) of the same Directive requires the report to consider the measures to be taken to facilitate access to the grid system of electricity produced from renewable energy sources.
The legislative picture tends to regulate all the aspects relevant to realization of new works. It is so possible to identify some subjects as:

- the environmental and landscape impact;
- the plant authorization;
- the connection to network;
- the fund achievement.

There are several protagonists of the legislative actions. A legislative cascade starts with the acceptance of an European directive, following its reception to national level. From national levels a cascade of other laws and national decrees, regional laws and technique norms expands.
The main protagonists are:

- European Commission;
- National States;
- Region;
- AEEG (Authority Electric Energy Gas).

The normative picture results much more complex. With the **legislative decree 79/99 (Bersani decree)** the energetic monopoly detained by Enel from 1962 finishes. All the stages as generation, transmission dispatch, distribution and sale of electrical energy are separated and entrusted to several subjects.

The aim is to guarantee that private capitals can enter into this market and a competition among several operators with taxes lower than those that characterize a monopoly situation. Moreover this decree institutes some public subjects with the aim to optimize the operation of the market. All the activities of production, importation, exportation, purchase and sale of electrical energy are free; therefore a private subject can take care of one or more stages of the system to gain profit. Some private societies enter in the electricity market with the rule that each subject cannot produce or import more than 50% of total electrical energy produced and imported in Italy. The activities of transmission and dispatch are reserved to the State. The decree 79/99 indicates the administrator of the national transmission network (GRTN originally, now GSE) with the role at the national level of transmission and dispatch of electricity within the national transmission network.

Starting from November 2005, all these works are up to Terna - National Electrical Network- S.p.A. that obtained all the GRTN businesses. Terna S.p.A has the obligation to connect to the national transmission network all the subjects that require it. The administrator of the electric market is the GME and has to organize the market with criteria of transparence and competition among producers. The private societies handle the distribution activity. All the distribution companies have the obligation to connect to networks all the subjects that require it. The decree 79/99 introduces the obligation among producers and importers of electric energy not originating from renewable sources, to introduce every year a percentage of green energy equal to 2% of produced energy or imported in the previous year for the part exceeding 100 GWh.

All producers and importers of electrical energy that did not sell the imposed percentage of energy coming from renewable sources, are obligated to satisfy this obligation, buying the green certificates that are recognized from GSE to producers of electrical energy from renewable sources.

In this way a demand and supply system in which who produces renewable energy can sell the green certificates to subjects that do not reach the intake rate equal to 2%. The decree defines as renewable energetic sources sun, wind, water resources,

geothermic resources, sea, wave motion, and transformation of vegetable products or organic and inorganic refuses.
The status of plant producing from renewable source is recognized with an opportune certification issued from GSE. The number of green certificates that a producer receives depends on the amount of electrical energy produced during an activity year; in fact every certificate corresponds to a precise number of kWh of energy put in network, so produced and consumed. There is no discrimination among energy produced from several renewable sources.

Decree 387/2003 "Accomplishment of directive 2001/77/CE related to promotion of electric energy produced by renewable energetic sources in the home market of electricity".

The main points of this decree (Figure 10) are:

- to promote a larger contribute of renewable energetic sources to electricity production in the Italian market and community;
- to establish some national objectives to promote the increase of electricity consume by renewable sources and to promote some measures to reach them;
- to concur to the creation of basis for a common EU framework;
- to support the development of electric micro-generation plants, feed by renewable sources, in particular for agricultural works and mountain areas.

The decree 387/2003 lays the bases for the building of renewable sources system, characterizing three main passages:

- **exchange on-site;**
- **energy account;**
- **authorization procedure;**

For the "exchange on-site" the article 6 gives to electricity and gas authority the task to regulate the sectors for the plants with power under 20 KW. The energy producers that consume energy in the same location of the plant produce energy and use the electric network as a battery. When the production exceeds the consumption then the producers transfer the surplus of energy in the network from which they draw energy in the periods of poor productivity.

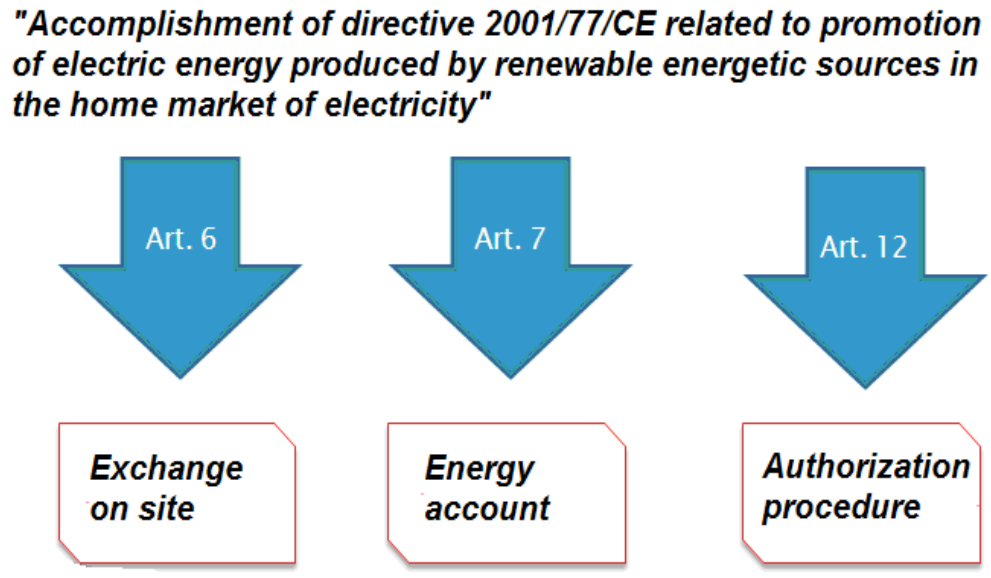


Figure 10 The main subjects of the Articles 6, 7 and 12 of the decree 387/2003

The article 7 of decree 387/2003 refers to introduction in Italy of incentive system known as "Energy Account". With this system the electric energy production from photovoltaic plants is economically supported.

For the "Authorization Procedure" some fundamental points for the realization of plants are fixed. First *"the work for the realization of plants feed by renewable source are works of public interest, that cannot be postponed and urgent".*

With the financial act 2008 the authorization procedures depend on the size of the plant (Figure 11). For large power plant the procedure is that of ex 241/90. In this case the plant must be subjected to the so called "All-in-One" Procedure to (ex 241/90) to obtain a "All-in-One" Authorization. For plant with power under a defined limit (Wind <60kW and Solar <20 kW) the procedure is that of DIA (declaration of activity beginning) according to the articles 22 and 23 of DPR 380/2001.

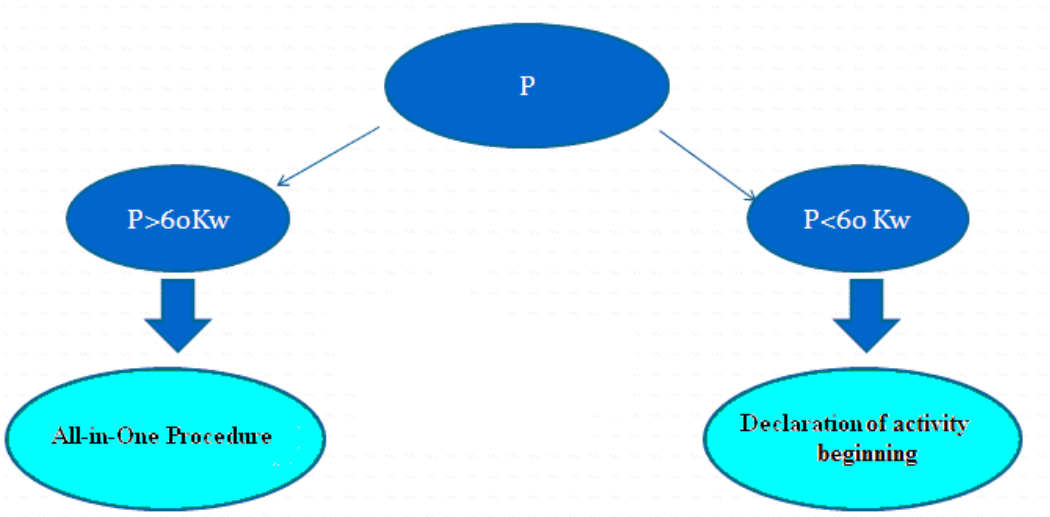


Figure 11 Two authorization procedures: "All-in-One" Procedure and Declaration of activity beginning, depending on plant dimension sizes

The authorization procedures here treated are those foreseen by article 12 of legislative decree 387/2003:

- **"All-in-One" Authorization, ex law 241/90**
- **Declaration of activity beginning according to the articles 22 and 23 of DPR 380/20001**

A third possibility is that of making a simple communication to the Technical Department of the Municipality. The installation of Wind generators with one meter max diameter and 1.5 meter height are assimilated to ordinary maintenance intervention, therefore any authorizations are required.

The Decision 28/06

The Decision 28/06 regulated the "exchange on site" until 31/12/2008. The mechanism is the following: the user consumes and produces electric energy and at the end of the year can be in credit (the user produces more than the quantity consumed), or in debit (the user consumes more than the quantity produced).

In case of debit, the user corresponds to the manager of the net a sum for the surplus consumed that is established in accordance with the contractual agreements. In case of credit, the taking from the net is considered equal to zero and the

user/producer can boast a credit of energy produced to reduce for the consumes of the following year. The time limits for the validity of this credit is 3 years.

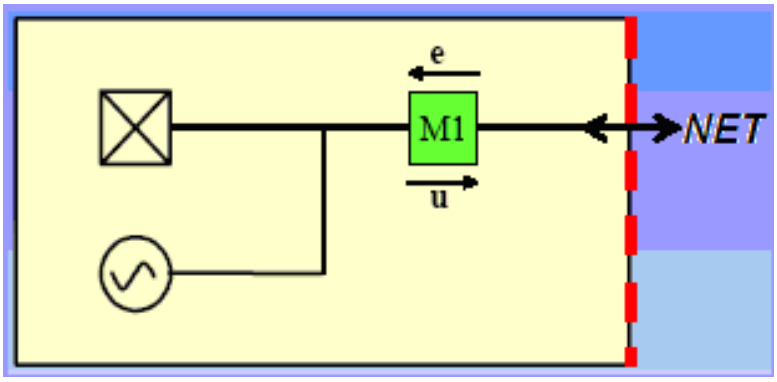


Figure 12 Exchange on site. User-Net energy exchange

The Financial Act 2007 foresees that all the public incentives oriented to promotion of renewable sources since 1/1/2007 are allowable escusively for the production of electric energy produced by renewable energetic sources, as denifined by directive 2001/77/CE.

Integrated Text on Exchange on Side- decision 74/08

The decision 74/08 redefined the operative picture of the exchange-on-site. This last is allowed for plant with a power up to 200 kW.

Decree 99/2009

The last legislative intervention in temporal order is the decree 99/2009. This law presents 64 articles and the main points are here reported:

- Exchange on site: the small municipalities (up to 20 thousands inhabitants) can take advantage of the "Exchange on site" service, for the plants until 200 kW, without taking into account the obligation of coincidence between point of inflow and point of withdrawal of the energy exchanged with the net.

- VIA and energetic plants: the verification of regional requirements does not regard the following plants: 1) Non-thermal industrial plants for the production of energy, steam and water, when the power is

higher than 1 MW; 2) Wind-energy industrial plants, when the power is not higher than 1 MW.

- Off-shore Wind: the Wind plants for the production of electric energy located on sea are subjected to procedure of public VIA.

- The obligation of the inflow of renewable energy in the net and therefore the presentation of green certificates (art 11 decree 79/1999) now applies to all subjects that complete with Terna Spa one or more contracts for the activity of management of the energy flows on the net (called "dispacciamento").

- The following period is added to art. 2, paragraph 152 of the law 2007. For the plants managed by agricultural companies or in connection with agricultural companies fed by specific energy sources (see number 6 of table 3 enclosed to the present law) the access to the "all included" rate could be cumulated with other public incentives that have not exceeded 40% of the investment cost.

2.3.2 Licensing Procedures for the Development of RES plants

"All-in-One" Procedure

The "All-in-One" Procedure is an authorization instrument controlled by regulation of legislative decree 241/90 and by its modification introduced in 1. 15/2005 and 1.80/2005. The service conference is started from the request that the applicant makes to competent authority that in Sicily is the regional aldermanship of industry. The main aim of service conference is that to involve all the parts interested to authorization to reach a decision in which all the interested administrations converge. Typically representatives from the following parts will attend the conference:

- Assessorato Territorio & Ambiente (Regional Department for the Protection of the Environment);
- Soprintendenza (Regional Department for Cultural Heritage, Arts and the Environment);
- Ministero dei Beni Culturali (Ministry of the Environment and Arts);
- Municipality;

- Assessorato Industria servizio urbanistica (Regional Department for Urban Services industra);
- Network local distributor (e.g. ENEL);
- Ministry of Communications;
- Ministry of infrastructures;
- Genio Civile (Civil Engineering District Council);

For major projects a conference of preliminary services can be foreseen, art. 14-bis, to establish the design criteria. When the indications are obtained, the definitive project is redacted.
The conference is usually called by the responsible of the procedure between the thirtieth and the sixtieth day following the transmission of the project.

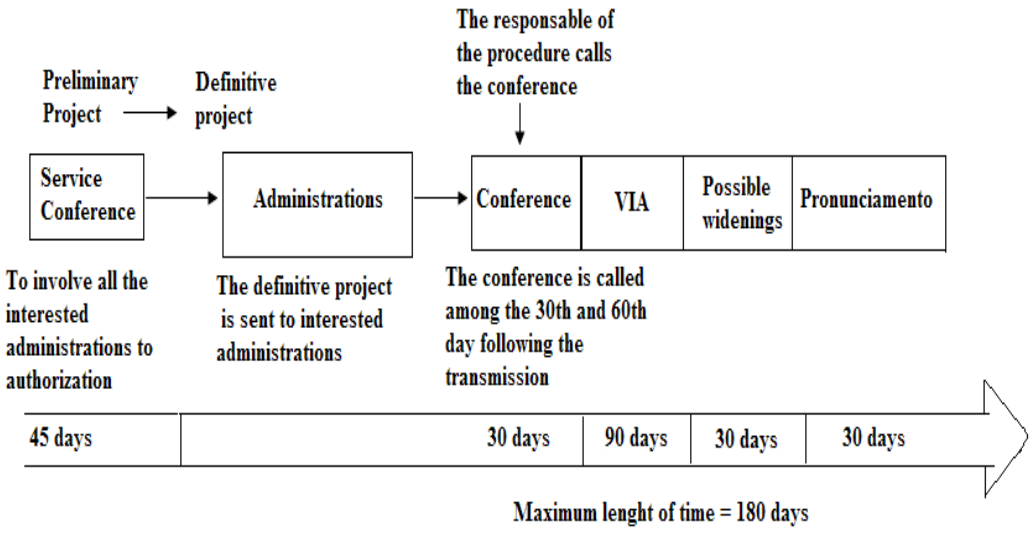


Figure 13 Procedure for the "All-in-One" Procedure

If any representative of enviromental protection or historic-artistic property or safety safeguard disagrees with the project, the decision is transfered to:

- The cabinet in the case of disagreement among state managements;
- State-Regions Conference, when in the disagreement is involved a regional management;
- Unified Conference for a disagreement among a state or regional management and one or more local bodies.

When the whole documentation is checked, it is sent to instructors. The decision is assumed within 30 days. The President of the cabinet, state-region Conferences or unified Conference, may decide to extend this period for at most 60 days. The development of the service Conference is regulated by Art 14-ter of 241/90. The procedure is so resumed:

- The first meeting must be called within 30 days from the beginning of the conference. During the first meeting the continuation of the procedure must be approved by the majority of those present.
- The representative who attend the conference determine the deadline for the conclusive decision. The works of the conference can not exceed 90 days, excepting the case of obligation of the VIA procedure.
- The VIA has to be concluded within 90 days from the presentation of the request. The time for the development of the VIA procedure has to be further added to the 90 days of the Services Conference.
- In the case of no result of the VIA within the foreseen end, the Services Conference expresses within the thirtieth day since the deadline for the submission of the VIA report.

Following this procedure (Figure 13), the entire procedure has to last at most 180 days with a correct fulfillment of the VIA. The conclusion of the procedure may be either an authorization measure in case of favourable opinion or a denial in case of rejected plan.

Declaration of activity beginning (Denuncia di Inizio Attività)

An opportunity to simplify the procedures, in case of Wind Plants with a power lower than 60 kW is that to proceed to denounce of activity beginning in reference to Only Test on building, DPR 380/2001. The art 23 of the Only Test locates the modality to realize the procedure and is reassumed in the following Figure 14.

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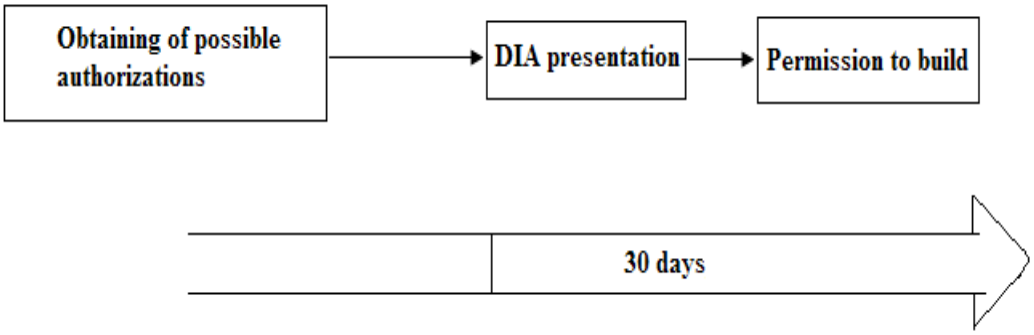

Figure 14 Procedure for the Declaration of activity beginning

The person that presents the declaration of activity beginning 30 days earlier than the effective beginning of the works, has to present to the "all-in-one office" (*sportello unico*) the declaration together with a detailed relation of the works signed by an qualified professional and by suitable elaborated projects to confirm that the works to be realized are fully compliant with the laws and the relevant regulations.
The DIA is a procedure easier and faster than the "All-in-One" Procedure to obtain the authorizations, therefore the entrepreneurs prefer to invest money in the development of plants with power lower than 60 KW.

The valorization of the energy

The "Exchange on site" is a scheme that makes the management of energy flows viable and profitable. In Italy the change on site is regulated by the deliberation of the Authority 74/08, known as "Integrated Text Exchange on Site".

The concept of exchange on site is very simple. Supposing that there is a temporal shift between electricity consumption and production, the idea is that to use the electric network in order to make possible a profitable balance throughout the year between production and consumption.

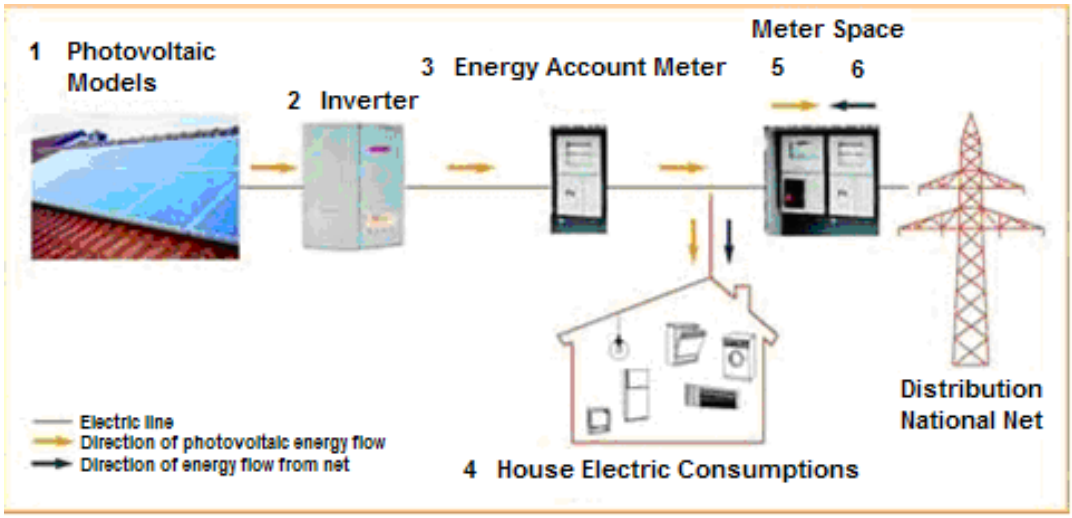

Figure 15 Exchange on site. Balance among source of production, the load (house) and the net

In conclusion the "Exchange on site" allows that the owners of the plant supply the energy produced, but not immediately consumed, to the distribution network and to take it in a subsequent moment to satisfy their own consumptions.

Authorization Procedure for Photovoltaics Plants

The Conto Energia (DM 2007) is the current operative decree that defines the conditions for the supply of special rates. The main characteristics of the incentive mechanism are synthesized in the following points:

- The subject responsible for the photovoltaic plant operation who requires incentive rates is the responsible subject of the photovoltaic plant.
- The physic and juridical persons, public subjects and owner-occupiers, can benefit of the rates as responsible of the photovoltaic plant.
- The nominal power of the plants has to be lower than 1 kW.
- The requirement of the incentive has to be sent to GSE (energetic services manager) only after the running start of the photovoltaic plants.
- The maximum limit for the power of the plant is fixed by decree 2007 and equal to 1200MW. Reaching this limit, it is foreseen a moratorium period for 14 months. The plants that start the activity in this moratorium period can benefit from the incentive rates.

- The rates are different depending on size and typology, with the aim to support the applications of small size, fully integrated within buildings.
- A reward was introduced for the photovoltaic plants coupled to an effective use of the energy in buildings.

The deliberation ARG 161/08 makes the incentive mechanism of the decree 2007 more flexible. The following two advantages are highlighted:

- Each section of the plant can start operating as a single independent plant;
- It is possible to connect more sections of a plant in the same connecting point, respecting the limit imposed by decree 2007, for which a photovoltaic plant can not share the connection point to the network with other photovoltaic plants.

The art 12 of decree 387/2003 establishes that the construction and the operation of the plants feed by renewable sources are subjected to an "All-in-One" Authorization that has to be released after a procedure fully complying with the norms in environmental, environmental safety and historical-artistic patrimony matters.
The decree foresees that in a single unified conference, the Ministero per le Attività Produttive (Ministry of productive activities), with the Ministero dell'Ambiente e Tutela del Territorio (Ministry of the Environmental Protection) and with the Ministero dei Beni e le Attività Culturali (Ministry for Cultural Heritage and Cultural Activities), may approve the guide lines for the development of the procedure in reference to only authorization.

Procedure for the Construction of the Photovoltaic Plants

The photovoltaic plant has to be built in accordance with the technical norms that are foreseen in the enclosure N. 1 to DM 19/02/07. The main steps to build a photovoltaic plant are the following:

- The subject who wants to build a plant asks a professional to elaborate a preliminary project with an economic estimate of the plant. An accurate inspection made by the project manager on the installation site is advisable because the energy production of the plant depends on the correct installation of the plant that is the optimal exposure to solar irradiation.

- The subject who wants to build a plant has to make an enquiry at the municipal office responsible for the issue of legal authorization and has to get the foreseen authorizations and the permission to build the plant.
- The subject who wants to build a plant has to send the preliminary project to the manager of the local distribution network (Enel, A2A, Hera, etc.) and to require to the same manager the connection to net, specifying if he wants to choose the "exchange on the site" scheme for the electric energy produced.
- The manager of the local net communicates to subject who wants to build a plant the connection point to net, with the economic estimation and the time for the plant realization.
- The subject who wants to build a plant has to accept the estimation and to terminate the contractual relationship with the manager of the local net.
- The subject sends to the manager of the local net the communication of work end, when the whole plant is realized.
- For the plants with a power higher than 20 kW, the responsible subject has to present to the qualified technique office of the finance the claim of the opening of electric shop. This claim is not necessary if the plant puts all the energy produced in the net.
- The manager of the local net provides to connect the plant to electric net.

When the plant is in operation, the occurrence of not receiving the special rates depends exclusively on the lack of conformity of the plant to the requirements dictated by GSE during the evaluation phase.

Moreover the DM 19/02/07 establishes that:

- the plants with a power lower than 20kW and the plants that are partially or totally integrated, are not considered "industrial plants" and therefore they are not subjected to regional environmental inspection provided they are not located in protected regions;
- if the acquisition of the "All-in-One" Authorization measure is necessary, this acquisition substitutes the "All-in-One" Procedure (art. 12 Decree 2003)
- for those plants for which an authorization is necessary, the declaration of activity beginning (DIA) is sufficient

- for those plants that have to be realized in an agricultural site the change of use of the site is not necessary .

Procedure for IAFR qualification

The producer who wants to access to the incentives of green certificates and the Omni-comprehensive rate has to apply to GSE for the recognition of the relative qualification of the above mentioned plants.

For those plants that are already in activity, the application has to reach to GSE by the end of three years from the starting date of operation of the plant. This application consists of the following:

- a technical relation with all the technical and documentary information;
- a copy of the plant definitive project;
- a copy of the "All-in-One" Authorization (art. 12 of legislative decree 387/2003).

For the plants with a nominal power lower than those shown in Table 3 (enclosed to legislative decree 387/2003), the application is completed with a copy of the declaration of activity beginning.

The application is received in the absence of pronouncement of GSE within 90 days from the reception.

For plants still in a design phase at the moment of the qualification requirement, the validity of the request ceases if the company does not communicate to GSE the starting date of the construction works within 18 months since the obtainment of the qualification, with the exception of possible delays generated by competent authorities. The qualification ceases its validity also when the subject that holds it does not communicate to GSE the plant start-up within three years from the beginning of works. Table 4, shows the value of the contribution in reason of the annual medium nominal power of the plant, for which the qualification is required.

Table 3 Table A of decree 387/2003. Limits of nominal power for each plant typology.

Source	*Limits*
1. *Wind*	60 kW
2. *Solar photovoltaic*	20 kW
3. *Hydraulics*	100 kW
4. *Biomasses*	200 kW
5. *Tip gas, residual gas of depuration process, biogas*	250 kW

At the moment of the request for the IAFR qualification to GSE, the producer has the right to choose between the green certificates and the Omni-comprehensive rate. Before the end of the incentive period only one passage from an incentive system to another is allowed.

Table 4 Fixed quota, Variable quota, IVA and Total (€)in reason of annual medium nominal power (MW) of the plants

Annual medium nominal power (MW)	Fixed quota (€)	Variable quota (€)	IVA (20%)	Total (€)
P <= 0,02	150	0	30	180
0,02< P <= 0,2	150	50	40	240
0,2< P <= 1	150	300	90	540
1< P <= 10	150	800	190	1140
P > 10	150	1200	270	1620

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2.3.3 Legislation Framework for Water

Water is considered as State property and since it is indispensable to life. The access to water is mentioned in the law as a universal service. Since the water is property of people that live in a country, it should have only the cost associated to operating costs to repay for depuration, control and pumping costs. Many local communities confer the water management to private societies with 30-40 year contracting, in exchange for annual fees returned to local municipality. Since the beginning of '900, in Italy the water service management was entrusted to no-profit municipal enterprises. These enterprises were changed in no-profit Special Enterprises, but the possibility to assign the service to private or only in part public companies (as the SPA) was also introduced. These companies are therefore subjected to taxation of the produced profits.

The legislation framework for water in Italy is essentially based on the **Galli law that in 1994** regulated the water sector, introducing the concepts of i) "integrated water cycle" and ii) "ATO" (Ambiti Territoriali Ottimali).
The general purposes of this law are:

- all the superficial and underground water are public and constitute a resource that must be preserved or used in conformity with solidarity criteria;
- all the water uses are addressed to saving and renewal of the resources;
- the use of the water for the human consume is priority.

The Galli law splits the entire country in Optimal Territorial Areas (ATO) and in each of these only a manager takes care of water services in connection with the whole cycle of water (the SII). The rate of the water services is changed from a form of taxation determined in function of political and economic choices to a form of prices proportional to service costs. The realization of works changes from a public financing to an auto-financing based system and the national law grants to regions the power to apply these norms according to the specific local context.

More in detail the Galli law provides for:

- The vertical unification of several management segments by institution of a Integrated Hydro Service, (Servizio Idrico Integrato, SII). This unification (Fig.12) has to be interpreted as a set of public services for undue influence, adduction and distribution of water for civil use, for drainage and wastewater

effluents depuration, with the target to reduce the management fragmentation. This fragmentation didn't allow for the achievement of management effectiveness, resulting in lack of homogeneity in the qualitative standards of the service.

- The determination of Optimal Territorial Areas, ATO (Ambiti Territoriali Ottimali), to achieve suitable management perspective, to surpass the fragmentation of local managements, implementing some economies of scale with a catchment area able to generate receipts such to cover the management costs and the required investments.

- The setting up of an environmental Circle Authority for each ATO, with the task to organize the SII, to individuate the administrator of the integrated hydro service, watching over activity of this last and determining the rates for the hydro services.

- The role of the ATO, intended as Authority, constitutes the center point of the whole system of hydro service reform, induced by Galli law.

- The entrepreneurial organization of the hydro sector management that should be imprinted according to effectiveness and entrepreneurship criteria.

- The definition of a rate system based on the principle of one rate for each ATO, inclusive of services for the distribution of potable water, drainage and depuration, such to assure the overall covering of the investment costs and exercise.

The organization of the SII is based on a clear distinction in the attribution of different functions to a hierarchical management structure.

The reference rate represents the criteria and condition as whole which the ATO Authority has to concern to establish the average real rate of management. This last is in fact established by ATO Authority in connection with organizational model of the management, quantity and quality of the hydro resource and service quality. The whole rate mechanism should allow for the whole cover of costs supported by service

administrator, including a remuneration for the capital that was invested (it was fixed to 7%).

The norm 388 of the law 23/12/2000 institutes the obligation of removing non-operating plants or abandoned buildings and allocates financial supports to optimize the water net.
The Financial Act 2001 allocated funds to provide financial support to investment plans for works and interventions to optimize the potable use of storages and nets included in the ATO plans. It will be possible to realize the same plans with a lower increase in taxes or, being equal taxes, to anticipate the realization of expected works.
In November 2001, the Ministry of the Environment and Protection of the Territory passed the decree of realization of article 20 (law 36/94). This fundamental measure establishes the rules for the concession of the water service to third party. This decree provides that the manager choice is carried out by public competition through the method of the open procedure.
Only the parties that handle pieces of water services as uptake, adduction, water distribution for civic uses, drainage, and depuration of waste water, with a served population and a mean annual turnover correlated to parameters of the service in competition can participate in. The criteria for the adjudication adopted are that of the most favorable offer in economic terms.

The article 35 of the law 28/12/2001 (financial act 2002) introduces the obligation to assure the management of industrial significance services through the capital society determined through public competitions, setting a limit to competitions participations for all those companies that profit by direct credit worthiness. The article 35 is also characterized by the clean distinction among the government functions due to local bodies thorough the ATO and the management that is entrusted to industrial companies chosen in accordance with market rules.

The law by decree 135/2009, known as Ronchi decree, foresees 20 sections. The 15th section of this decree entitled ("Adeguamento alla disciplina comunitaria in materia di servizi pubblici locali di rilevanza economica") allows not only to liberalize the mean services as water, gas, electricity, regional transport by rail, by tender but theirs privatization as well. The supporters of this privatization defend the Ronchi decree with the requirement of a better effectiveness, assuring no change to rates, but the sector studies underline that an increase of the rates is unavoidable to make

a profitable business. In some regions in fact where the privatization process is more advanced, as Toscana and Lazio, an increase of the rates occurred.

Accomplishment of Galli law in Sicily

The reform of the normative picture in terms of regulation and management of the water services in Sicily started in 1999 with the acknowledgment of the Galli Law resulting in the article 69 of the Sicilian Regional Law 10/99. Because of the inadequacy of water infrastructures the Sicilian region, the Italian State and the Europe Union promoted a co-joint action with the aim to overcome all these lacks and to close a gap with the other more developed European regions (Figure 16).

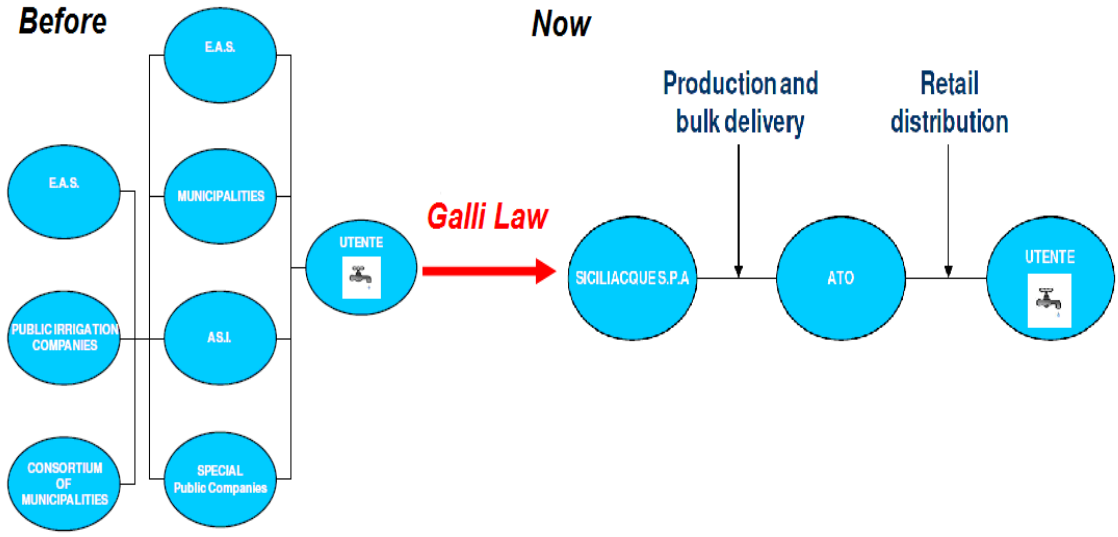


Figure 16 The Galli law made possible the reduction the water management fragmentation

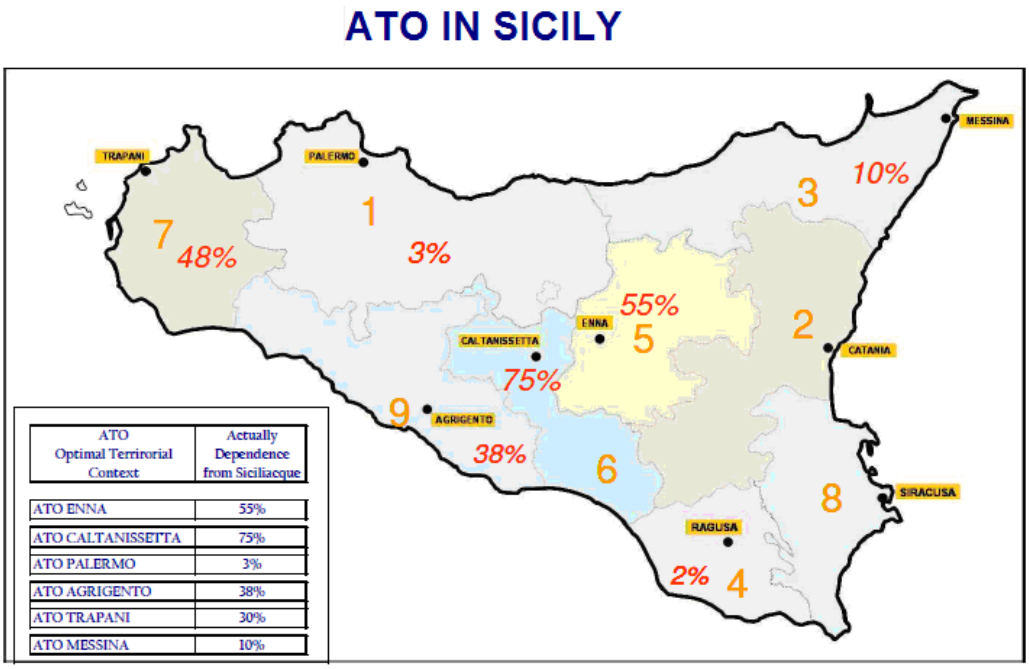
The renewal process started with two significant events:

- The water emergency in 2002, due to a drought that showed the inadequacy of Sicilian water network service.

- The availability in the environment of the Community Picture of Europe Union Support for some Italian regions of funds for a structural intervention of water networks with the aim to renew and further extend them.

The 500 millions Euros of European Union Funds for Sicily were granted on the basis that a substantial structural reform of the water service through accomplishment of Galli law and a consequent industrialization of the service in conformity with effectiveness and cheapness criteria would be put in place.

With the 07/08/2001 Decree of the President of the Sicilian Region, the Sicilian Region regulated the forms of cooperation among municipalities and regional districts for the government and use of water resources, indicating Sicilian ATO in form of union or convention among interested local bodies. In Sicily there are 9 ATO based on administrative boundaries.



ATO Optimal Territorial Context	Actually Dependence from Siciliacque
ATO ENNA	55%
ATO CALTANISSETTA	75%
ATO PALERMO	3%
ATO AGRIGENTO	38%
ATO TRAPANI	30%
ATO MESSINA	10%

Figure 17 Distribution of ATO in Sicily and actually dependence of each ATO on Siciliacque

All the ATO approved their own Piano d'Ambito defining a reference rate.
In conclusion the reorganization scheme decided by Sicilian Region with L.R. 10/99 determined the constitution of 9 ATO that have the task to individuate those subjects to whom the management of the water service has to be entrusted and the constitution of a new Society (Siciliacque). The task of Siciliacque is that to handle 13 water-works schemes and the service of wholesale water supply for potable use.

Siciliacque is classified of "public interest", as stated in article 23 of L. R. 10/99.

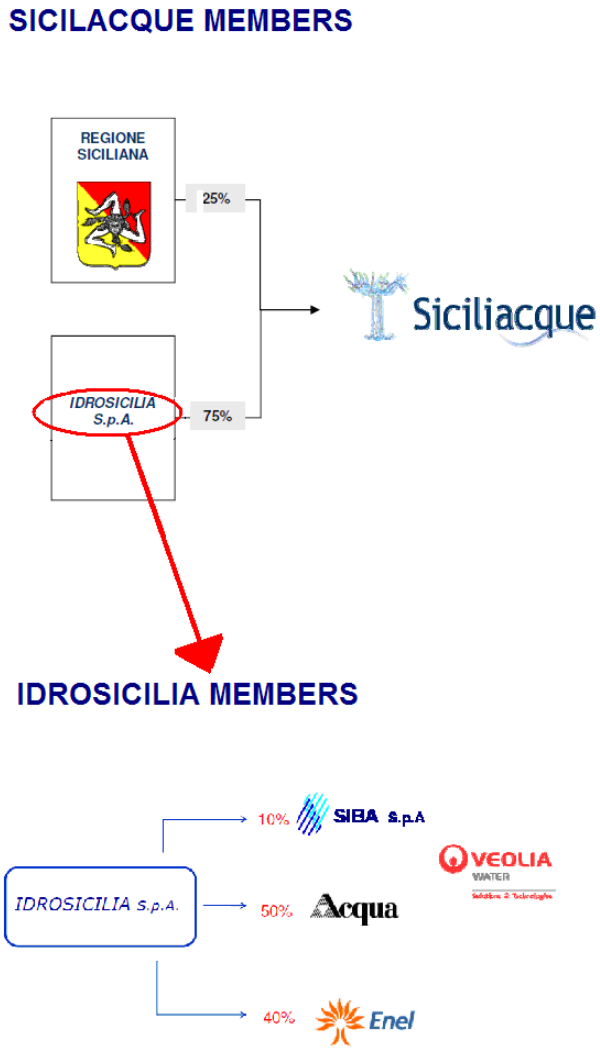


Figure 18 Sicilacque members and Idrosicilia members

2.3.4 Licensing Procedures for the Development of Desalination plants

So far there is not any precise regulation. Presently operating plants were paid by the regional government. The construction of a desalination plant is generally decided by the local government, following a request from the ATO or municipalities. A specific law decree is normally issued by the Government under the supervision of the "*Assessorato ai lavori pubblici*" (i.e. the Regional Governmental Department for Public Works), in order to prepare a tender, which is normally followed by the construction of the plant.

Concerning the operation and maintenance of the operating plants, the Regional Government entrusts the plant to a company which is in charge of the ordinary operation and maintenance duties. The company receives from the Government a fixed annual budget to cover relevant costs, whereas costs for energy and extraordinary maintenance are covered directly by the government. Moreover a variable subside is provided per each cubic meter of produced water in order to motivate the company to operate the plant at its maximum performances.

More recently, novel schemes have been proposed, although not applied yet to real cases, in which "project financing" (Law 109/1994) approach is used. In this case the tender specifies the plant capacity and water cost, but companies can choose the technology and the tender winner will be responsible of the production of the fixed amount of desalinated water at the indicated price for a certain amount of years, also indicated within the tender.

2.4 Energy and Water Tariff

2.4.1 Energy Tariff

The "exchange on site" is regulated by GSE on economic base, as contribution associated to valorization, at market price, of the energy exchanged with the net.
This regulation is applied since the 1st of January 2009 to requesting subjects that have the availability or the legal ownership of the plants:

- fed by renewable sources with power up to 20 kW;
- fed by renewable sources with a power up to 200 kW (if in operation after the 31 december 2007);
- in cogeneration scheme with an high yield of power up to 200 kW.

The GSE recognizes a contribution to favor the subject that is owner of the plant, defined as "user of the exchange". For the contribution, that is determined each year, the following points are to be taken in to account:

- the amount of energy exchanged with the net;
- the equivalent value in Euro of the electric energy supplied to the net;
- the cost covered due to the need of energy supply from the net, subdivided in direct cost of the energy and cost of related services.

The contribution supplied by the GSE to the user of the change foresees:

- the drawback of the service charge limited to energy exchanged with the net;
- the recognition of the minimum value between energy charge and the equivalent value in Euro of the electric energy supplied to the net.

In accordance with the decision 74/08 the subjects involved for the "exchange on site" are three: the user, the manager of the local net and the GSE.
The user of the service draws up two contracts: one with the manager of the local net (for example ENEL), and constitues a contract for the purchase of electric energy; the other with the GSE for the taking of the energy produced and immission in the net.
The physical balance in terms of energy occurs in accordance with the same principes of the decision 28/06, while the picture of the economic exchanges.

The user pays to producer firm the energy that was taken with bimonthly cadence and gives the energy produced to GSE that supplies with an annnual adjustment in exchange.
This adjustment can be at maximum equal to the economic value of the energy that has been taken, while for the surplus the users can exhibit a credit of economic nature without limit of time.
The value of the adjustment that the GSE gives to user, takes into account of the energy value calculated on hourly base and of the net aceess costs.
The price of the energy has a daytime value considerably higher than nocturnal value, a daytime kWh has a economic higher than a nocturne kWh. A daytime immission in the net is more convenient than a nocturne immission. The role of the GSE is that to be intermediary in those operations that before were handled by user and local distributor.

Exploitation of the energy – Sale of the energy

The sale of the energy produced in exchange of an economic exchange can be seen as an alternative to the "exchange on site". There are two possible schemes:

1. Dedicated withdrawal
2. Sale of the energy
   - Sale on the market.
   - Bilateral negotiation

In the first case, i.e. "dedicated withdrawal", the GSE withdraws all the energy produced. The user has to do a request to access to this valorization system. In the contract that is drawn up for the first annual 500.000 kWh the least economic return is 101,1 €/(M/Wh); from 500.000 kWh to annual 1.000.000 kWh, the value is 85.2 €/(M/Wh).
The other option for the producers is the direct sale of the energy produced. A simple system foresees a drafting of a bilateral contract for the sale of electric energy with a wholesaler. In the contract all the conditions of exchange are established. The alternative to bilateral negotiation is the sale of the energy on the electric market organized by GME (manager of the electric market). To obtain this procedure, it is necessary to require and to obtain the qualification of electrical market operator, for this is necessary to pay an access quota of 7500 € and an annual quota of 10.000 €

The prices are regulated in accordance with the offer and acceptance law. On the GSE website it is possible to visualize the behavior of the prices and exchanges. In Figure 19 the results of electric market of the previous day, MGP (Mercato del Giorno Prima) are reported. This market contains the most part of transaction of electric energy trading.

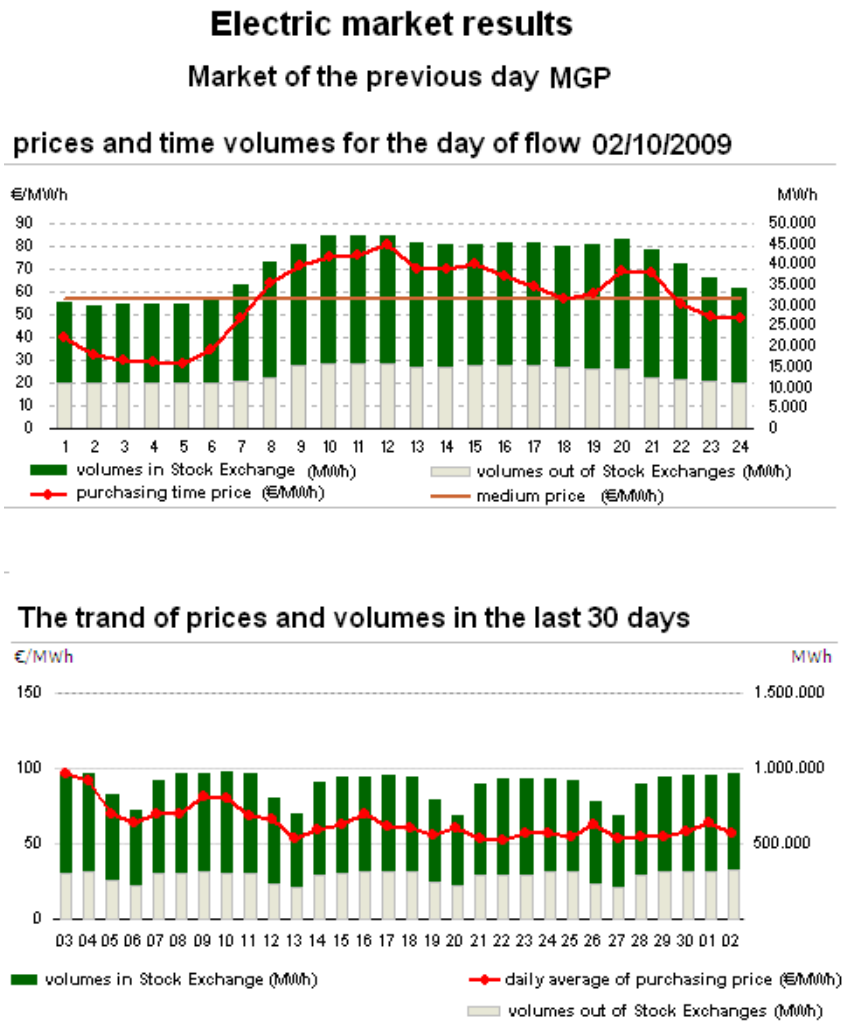


Figure 19 Electric market results. Market of the previous day

Green Certificates

With the article 11 of the decree 79/99 each producer or importer of electric energy has to supply to the net a part of the energy produced by renewable source. The green certificates are the documents stating the immission into the net of such

energy. The green certificates are issued by the GSE (manager of energetic services).

Each producer or importer of electric energy has two possibilities: the first is to produce energy by plants powered by renewable sources, IAFR (Impianti Alimentati da Fonti Rinnovabili), and to obtain the green certificates; the second is to buy the green certificates from a third subject.

The green certificates can be obtained for all those plants powered by any renewable source of energy, with the exception of photovoltaic plants for which a different scheme is offered, i.e. the Energy Account.

For the Wind plants the green certificates provide incentives for a period of 15 years.

In conclusion the manager that obtains green certificates can resell the same certificates to industries that are obligated to produce a part of energy by renewable sources, but that do not do this.

Omni-comprehensive rate

The omni-comprehensive rate represents an alternative to green certificates and includes both the remunerative and the incentive parts and is guaranteed by an single national subject, the GSE. The GSE has the duty to qualify the plants that have right to incentives.

All the plants powered by the sources identified in table 2 can be admitted to the Omni-comprehensive rate, provided the power is lower than 1 MW or lower than 200 kW in the case of Wind plants (Figure 20).

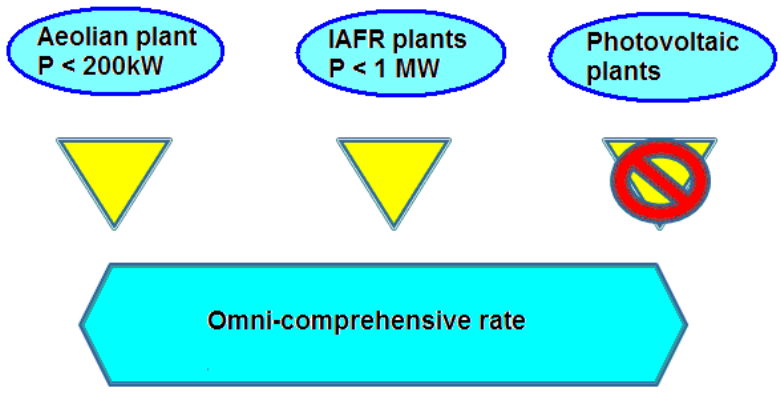


Figure 20 Plants that can access to the Omni-comprehensive rate

The computation of the power is made by adding the power of all generators connected to the same sub-section of the net. The calculus of the amount of the Omni-comprehensive rate is obtained multiplying the value of the incentive for the value of the energy provided (kWh). The ministerial decree, with the article 20, entrusts to the Authority for electric energy and gas, the task to issue some decisions with the aim to determine the rules, the times and the conditions for the supply of the fixed Omni-comprehensive rates, the exchange on site and to verify the respect of the dispositions of the same decree.

Energy Tariffs and Subsidies for Photovoltaic Plant

The rates established by decree 2007 for photovoltaic plants that started the activity since the 1/01/2010 benefit from an incentive rate characterized by the values shown in the following table:

Table 5 Incentive rates, expressed in €/kWh, subdivided for size of the plant and for integration typology

		Typology of Plant		
Nominal Power of the Plant (kW)		1 No integrated	2 Partially integrated	3 Integrated
A)	1≤P≤3	0,384	0,422	0,470
B)	3<P≤20	0,365	0,403	0,442
C)	P>20	0,346	0,384	0,422

Higher rates are recognized to small domestic plants up to 3 kW that are architecturally integrated. Lower rates are instead recognized to large plants architecturally non-integrated.

The rates are supplied for a period of 20 years with effect from the starting date of operation of the plant and remain constant.

The Ministry of Economic Development and the Ministry of Environmental Protection will establish with a successive decree the incentives for those plants that will operate after 2010.

In addition to the incentive, the subject responsible for the plant can take advantage on another economic benefit using the energy produced for:

- transfer in the net (partial or total);

- own auto-consumptions;
- exchange on site with the electric net (for the plant with a power up to 200 kW).

The base rate can be increased of 5% in the following cases (not cumulative):

a) for the plants of rows B and C of the first column (plant with a power up to 3 kW and not integrated) of the previous table, for whom the responsible subject auto-consumptions at least on annual base the 70 % of the energy produced by the plant;

b) for the plants for whom the responsible subjects is a public school or a public health structure;

c) for plant integrated in buildings, or in building structures in substitution of roofing in asbestos cement or asbestos;

d) for the plants for whom the responsible subjects are local bodies with a resident population lower than 5000 inhabitants (from the last ISTAT census).

In accordance with the law 2008 (art. 2 paragraph 173) the photovoltaic plants, for whom the responsible subjects are the local bodies, are classified as integrated plant, independently from the effective architectural characteristics of the installation.
The incentives of the Energy Account are not applied to the electricity produced by photovoltaic plants made in capital count and /or in interest count with an anticipated capitalization that exceeds the 20 % of the investment cost that has to be sustained for the building of the same plant, the only exception being the case when the responsible subject of the building is a public school or a public health structure.
These incentives are not cumulative with the green certificates and with the title of energy effectiveness.

2.4.2 Water Tariffs

Figure 21 presents a comparison among mean rates for the year 2005 reported in the environmental plans of each Sicilian ATO (Source ANEA, Blue Book 2005).

Each mean rate is then organized to favor consume levels and family unit. The rates are then adapted to component number of each single family unit (users). Big families will have larger water availability with a concessional rate.

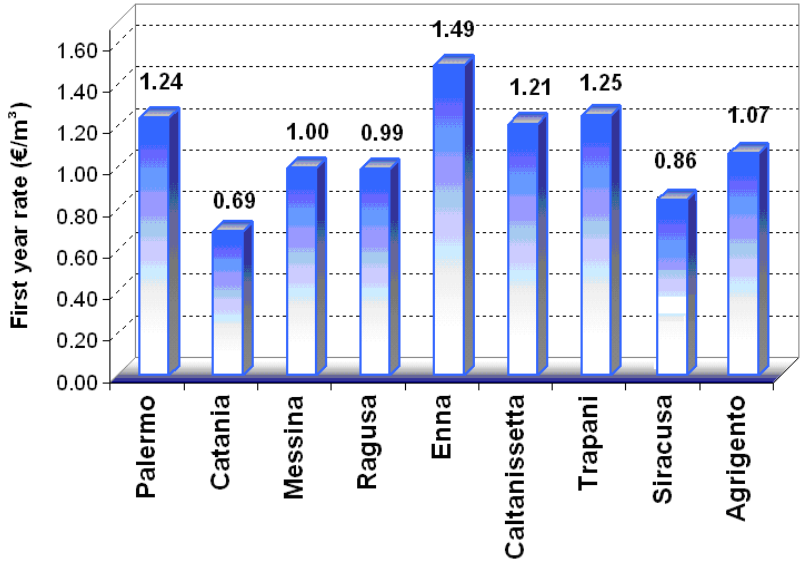


Figure 21 Rates for the first year of ATO ambit plane in Sicily, Source ANEA Blue Book 2005.

Social Rate

The ATO society approved a rate system that foresees an assisted segment and a "super assisted segment" for consumes until 15m^3/year for each person. This endowment with costs lower than service costs was devised to protect the weak segments of the population, as in the case of elderly people. In practice a water endowment of 41 lt of potable water is assured every day at 0.25 €/m^3. After the super assisted segment, a new assisted rate was hypothesized for consumes from 16 to 50 m^3/year with rates of 0.40 €/m^3 for the water-works service. Therefore with a consume per head of 137 lt of potable water every day, each user can take advantage of a reasonably cheap rate. Over these consumes the water rate is increased progressively with the scope to reduce the wastes.

In Tables 6 and 7 the rate system for Palermo ATO is reported in the following table:

Table 6 Rate system for Palermo ATO- municipal uses

Rate system - municipal uses

Medium consume: 300 m^3

	From (m^3)	To (m^3)	x base	€/m^3	m^3	Amount (€)
Base rate	0	88	1,00	0,717340	88	63,13
	88	140	base	0,717340	52	37,30
	140	200	1,00	0,717340	60	43,04
	200	260	1,00	0,717340	60	43,04
	260	oltre	1,00	0,717340	40	28,69
Water-work rate						215,20
Fixed Quota						28,00
Drainage rate				0,138600	300	41,58
Depuration rate				0,369600	300	110,88
					Total	395,66
Medium rate - municipal uses						€ 1,318867

Table 7 Rate system for Palermo ATO- other uses

Rate system - other uses

Medium consume: 140 m^3

	From (m^3)	To (m^3)	x base	€/m^3	m^3	Amount (€)
Base rate	0	88	1,00	0,885806	88	77,95
	88	140	base	0,885806	52	46,06
	140	200	1,00	0,885806	0	-
Rate 2° Surplus	200	260	1,00	1,550161	0	-
Rate 3° Surplus	260	oltre	1,00	2,214515	0	-
Water-work rate						124,01
Fixed Quota						40,00
Drainage rate				0,251040	140	35,15
Depuration rate				0,669440	140	93,72
					Total	292,88
Medium rate - other uses						€ 2,092000

2.5 Funding Schemes & Programs

In Italy and in Europe a wide incentive system was introduced to exploit the energy produced by plants powered by renewable energy sources.
A decisive push to the use of renewable sources was given by Financial Act 2008:

- The municipalities can introduce a reduced ICI tax (municipal tax paid on the basis of the value of a building/apartment), lower than 0.4% for those that build energetic plant from renewable source;
- The issue of the permission to build since 2009 is subjected to installation of plants for the production of electrical energy from renewable sources, to energy certification of the building and to structural characteristics of the buildings, finalized to water conservation;
- A fund of one million euro is available within the Ministry of Economy and Finance to finance a campaign to inform on measures for the reduction of energetic consumptions. A fund of 40 million euro is made available within the Ministry of Environmental Protection to promote the production of electric energy from solar energy.

Other incentives are added for the energetic effectiveness. The paragraph 143 commits Ministry of Environmental Protection to issue a decree to promote and support the electric energy produced from renewable sources and in particular the production of electrical energy from plants powered by sources listed in the following table with a mean annual nominal power higher than 1 megawatt (MW), by issuing green certificates for 15 years.

Table 8 Table of the law 23/07/2009 for green certificates

	Source	Coefficient
1	*Aeolian for the plant with size > 200kW*	1,00
1-*bis*	*Offshore Aeolian*	1,10
2	*Solar* **	**
3	*Geothermal*	0,90
4	*Wavy motion and sea-engine*	1,80
5	*Hydraulic*	1,00
6	*Biodegradable wastes, several biomasses different from those of point 7*	1,10
7	*Biomasses and biogas produced by agricultural activities, breeding and forest from short spinneret* *	*
7-*bis*	*Biomasses and biogas of point 7 that feed cogeneration plant with high yeld, with reutilization of thermal energy in agricultural field*	*
8	*Tip gas and residual gas from depuration processes and biogas different from those of point 7 bis*	0,80

The production of electrical energy from plants powered by sources listed in the following table with an annual mean nominal power less than 1 megawatt (MW), has the option, as an alternative to green certificates, to a special fixed rate that is inclusive of a variable part according to source that is used.

Table 9 Table of the law 23/07/2009 for Omni-comprehensive rate

	Source	Rate size (euro cent/kWh)
1	*Aeolian for the plant with size < 200kW*	30
2	*Solar* **	**
3	*Geothermal*	20
4	*Wavy motion and sea-engine*	34
5	*Hydraulic*	22
6	*Biodegradable wastes, several biomasses different from those of point 7*	22
7	*Biomasses and biogas produced by agricultural activities, breeding and forest from short spinneret* *	*
8	*Tip gas and residual gas from depuration processes and biogas different from those of point 7 bis*	18

This rate can be changed every three years, with a decree of Ministry of Economical Development. The article 2, paragraph 150 of the financial Act 2008 commits the Ministry of Economical Development the responsibility to issue a decree, (issued 12/18/2008) to regulate:

- The mechanism of the green certificates;
- The omni-comprehensive rate;
- The Exchange on site.

The producers can ask for incentive by green certificates for those plants that start activity from the 1/01/2008 or for those plants with a annual medium nominal power no higher than 1MW (200 kW for the wind source), or (only by explicit request of the producer) for the omni-comprehensive rate for a period of 15 years.

The green certificates have a unitary value equal to 1 MWh and are drawn by GSE. The number of these certificate is equal to the product of the net amount of energy provided incentives for and the coefficient of table 1 of the financial act of 2008 and updated by law 23/07/2009 (Table 8).

The financial act 2008 introduced a new way to calculate the supply price of green certificates of the GSE. Beginning from 2008 theses are placed in the market with a price equal to the difference between 180 €/MWh (reference value) and the yearly medium value of the price of electric energy assignment defined by Authority for

Electric Energy and Gas. The reference value and the coefficients are shown in table 1 and can be updated every three years.

As alternative to green certificates, the incentives can be recognized by GSE with payment of an Omni-comprehensive rate for those plant with a annual medium nominal power no higher than 0.2 MW for wind plants and no higher than 1 MW for the other plants, with the exception of those thermoelectric plants in activity before 1/4/1999 and start to operate as hybrid plants after 31/12/2007. The Omni-comprehensive rate includes the incentive value and the proceeds for the sale of electric energy produced. Moreover only the quote of electric energy produced by the plant and put in the net can accede to Omni-comprehensive rate. The values of the Omni-comprehensive rate are shown in table 3 of financial act 2008 and updated with law 23/07/2009 (Table 9). In the green certificates market the demand is constituted by the obligation for produces and importers to put in yearly a quote of energy produced by renewable sources equal to 2% of the amount of energy produced and /or imported from conventional sources in the previous year. Starting from 2004 and until 2006, the obligation quote is increased of 0.35 percentage points (art.2 paragraph 1 of decree 387/2003). The increase of the obligation quote for 2007-2009 and 2010-2012 is established with decrees issued by Ministry of Economical Development, as shown in Table 10.

Table 10 Table of the obligation quote (value in percentage)

ANNO	QUOTA DELL'OBBLIGO (%)
2007	3,80
2008	4,55
2009	5,30
2010	6,05
2011	6,80
2012	7,55

The renewable energy sector continues to attract the interest of the investor as is certified by a research of IEFE Bocconi-Ernst & Young. In accordance with this research the new investments in the world are higher than those of traditional energies. ENEL is investing 3.3 billion euro to develop in the 2012 about 1700 MW of renewable energy and 800 million euro in the research of alternative sources. Enel dedicated 4 billion euro in the research, investing also on the nets and on the improvement of the service quality, with the scope to reduce the interruption times and to give a better availability of the product to people.
In Italy there are many investments in the renewable sources but it is difficult obtain the permission to build plants. The procedure is slow and onerous and difficult to knock down. The investments are supported by a right incentive policy. More recently the Ministry of Environmental Protection published a call dedicated to Italian municipalities with at maximum 15 thousands inhabitants, so that they may apply to obtain funds to realize intervention in the field of energy efficiency devoted to public buildings in Calabria, Campania, Puglia and Sicily. This represents a possibility to test new forms of energy efficiency in building with significant architectural values, reducing the energy consumptions and providing economic and environmental benefits.

3.2.6.2 Funding Schemes and Programs for Water

Recently one of the most adopted funding scheme for the desalinated water plant is constituted by the *project financing*. The involvement of private subjects represents the main characteristic of this economic operation. The actual legal framework does not provide a general procedure to carry out the project financing operation. This procedure presents some peculiar characteristics; in fact the project financing is an instrument regulated by private autonomy but is oriented to carry out public works.
The project financing is constituted by three steps:

- Preliminary phase. The administrations (public and private) have to publish periodically (for the occasion of the triennial programming) an advice, to specify what programmed public works can be realized with private capitals.
- Promoting subjects have to propose by 30 June of every year to administrations their proposals relevant to public works that are included in the triennial programming. The administration has four month to evaluate the feasibility of the proposal. The Administration can also modify the proposal in accordance with the promoting subject.

- Phase of competition. Once the definitive project is drafted the administration individuates the competitor subjects with the promoting subject by tender to choose the best offers. The auction base is the project presented by the promoting subject (possibly modified). At the end of this step, the administration begins a negotiated procedure among the promoting subject and the two competitors that won the auction. The choice of the definitive winner is based on the most advantageous offer.
- Phase of building and management. The subject who takes the license (second phase) has to build a project society as joint-stock company. The project society becomes the new highest bidder.

The property of the work built is generally a public property. The norm foresees the separation between the property and the management. The public property can be made private subsequently. Every year the private pays a concession rent to work owner. The concession time starts from the foreseen date in the project. This in turn prompts the private to conclude all the works by deadline date. When the concession expires the public body can assume the direct management of the work or to call for tenders again or to transfer the property to the concessionaire.

2.6 Conclusions - Recommendations

A complete and complex framework has been depicted for the use of Renewable Energy in Italy. As in most Western Countries, also in Italy the growth of RE technologies is showing a very significant economical and technological fast development.

This is mainly related also to the fact that RE are largely supported by governmental financing schemes, which act in many directions, from the incentives for small private installation to the promotion of industrial installation and green certificates.

A general overview of authorization procedures, incentive schemes and operational regulations has been reported and discussed thoroughly in the report.

On the other side, water resources are regulated by a clear legislative framework, with specific reference only to conventional sources. Seawater desalination has been used in few regions in Italy as an important alternative to conventional sources, as in the case of Sicily where it covers up to 25% of total water need (for instance during drought periods). Nevertheless no clear regulation exists for the use of such technologies, and ad-hoc laws have been issued for the construction of large

desalination plants. Also incentives policies are not defined on a national basis, and Regional Governments regulate the use of such resource and the way to guarantee the operation of desalination plants under a regime of economical non-competitiveness.

Recently, the project financing scheme has been proposed for the construction of new large desalination plants, but none has been adopted yet to real cases.

Portugal

2.1 Current Situation of RES penetration

The Portuguese Energy policies enforced, over this last decade, a crescent use of renewable energy (RE) resources, following the common European directives. Successful feed-in tariff schemes on the fields of wind power and solar photovoltaic or subsidizing schemes for solar thermal hot water production systems, lead to a consistent growth on the use of RE technologies and to the establishment of strong market actors.

These policies reflect the need to overcome one of the major Portuguese economic and safety shortcomes: its energy dependence. With short (or inexistent, from the point of view of exploitability) own fossil fuel resources, such as oil, gas or coal, this external dependency amounted 82.9% of imports in 2007 (primary energy).

A. Energy Current Status

In terms of primary energy, Oil (54.0% in 2007) and Coal (11.3% in 2007) have been decreasing its weight over the last few years, after a growing use of NG (15.0% in 2007). The contribution of RE has been increasing slowly, with a contribution of 17.1% in 2007 (16.3% in 2006).

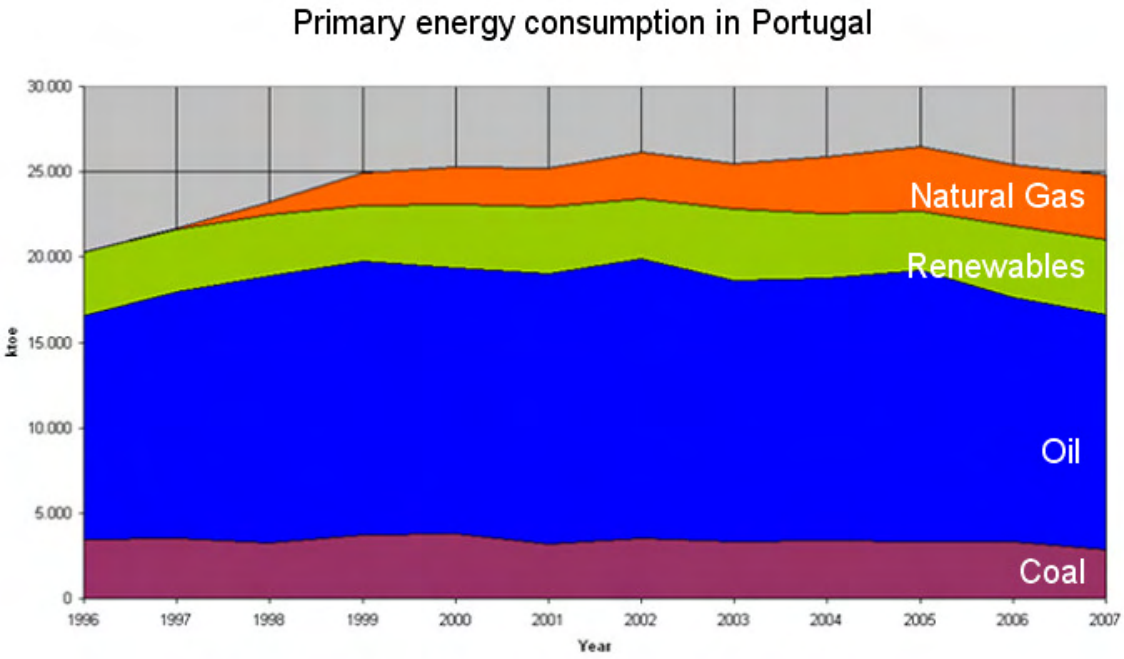


Figure 1 Evolution of primary energy consumption by source in Portugal [1]

By the end of March 2010, Portugal had a total capacity of electrical power production based on renewables of 9 229 MW, comprising hydric, wind, PV and biomass systems.

Regarding the gross electricity consumption, the contribution of RE electricity production in the total consumption (after the EU Directive 2001/77/CE) amounted 45% in 2009. By 2008 results for this parameter, Portugal was the fifth UE15 member-state with larger RE contribution, a result which reflects a strong decrease (30%) in hydric production.

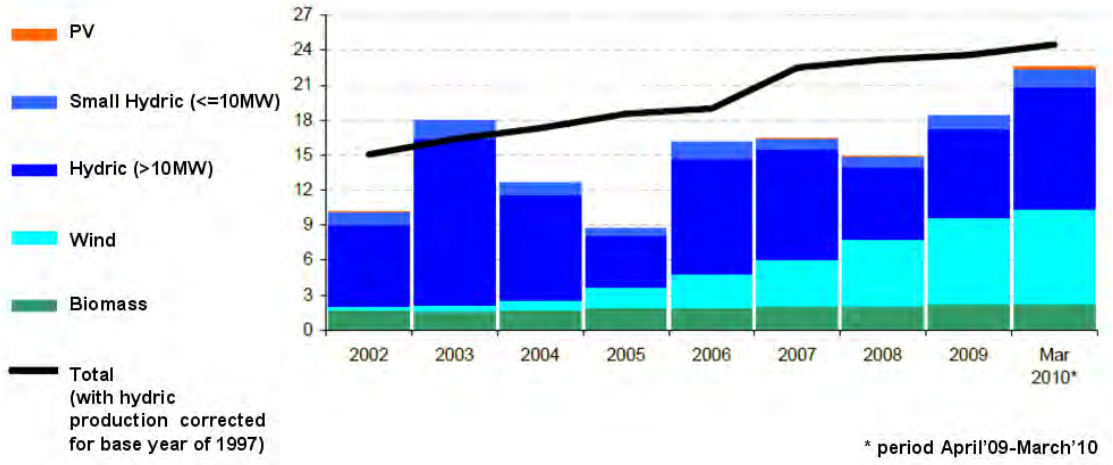


Figure 2 Evolution of electricity production from RE (TWh), [2]

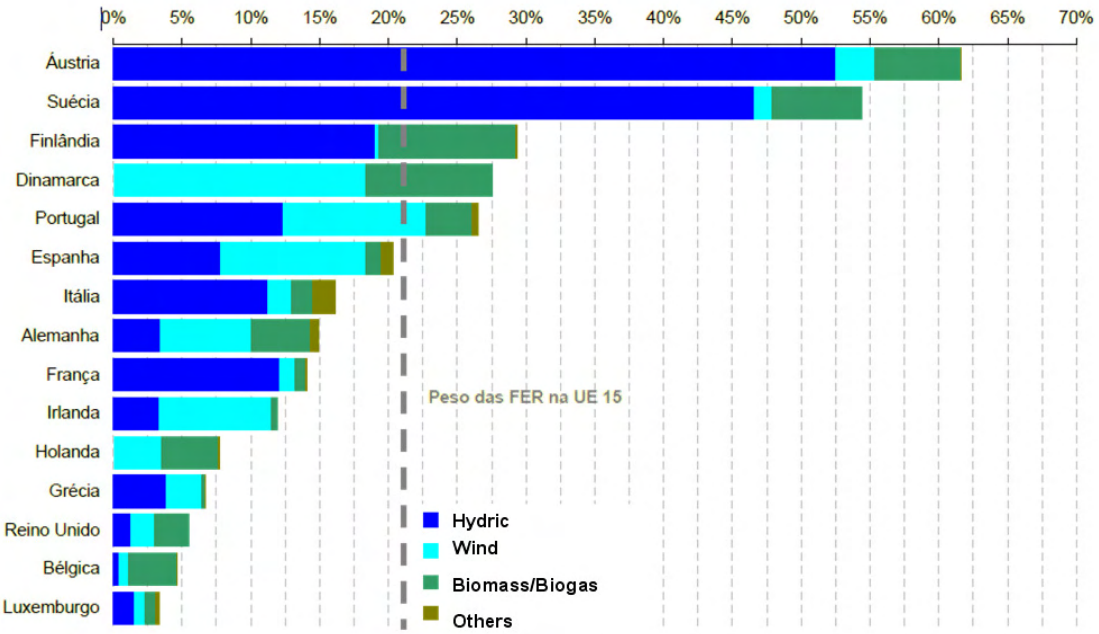


Figure 3 Fraction of RE contribution in gross production plus imports of electricity, in 2008, [2]

Considering the current technological development status and geographical distribution of used energy resource, the technologies which are more likely to be used with desalination are solar thermal, solar PV and wind power technologies.

Over the present decade, a significant increase in installed wind power has largely contributed to a doubling effect in total installed power of RE electricity production systems.

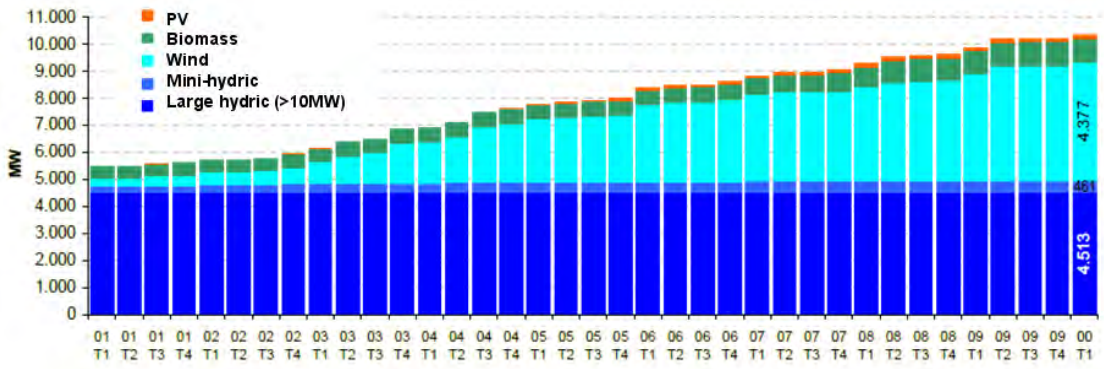


Figure 4 Evolution of accumulated licensed power, [2]

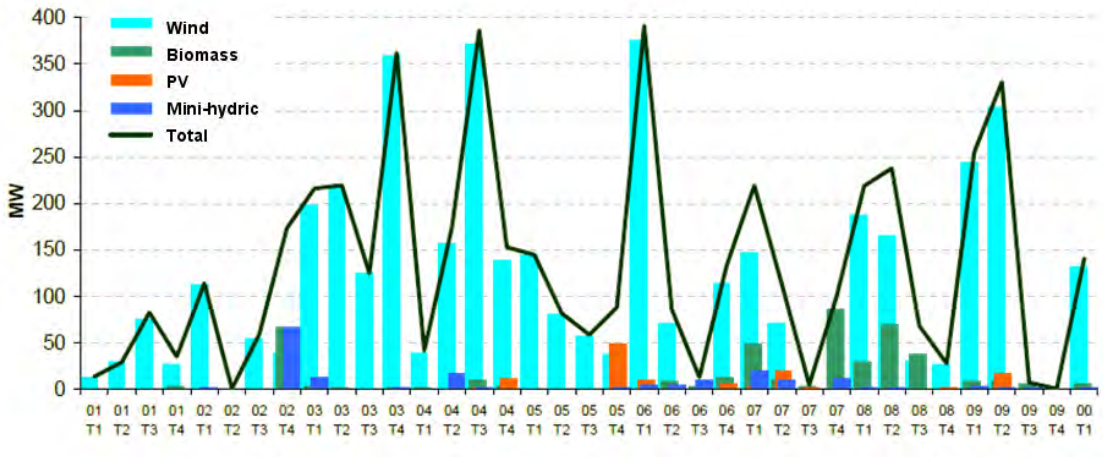


Figure 5 Licensed power per technology, [2]

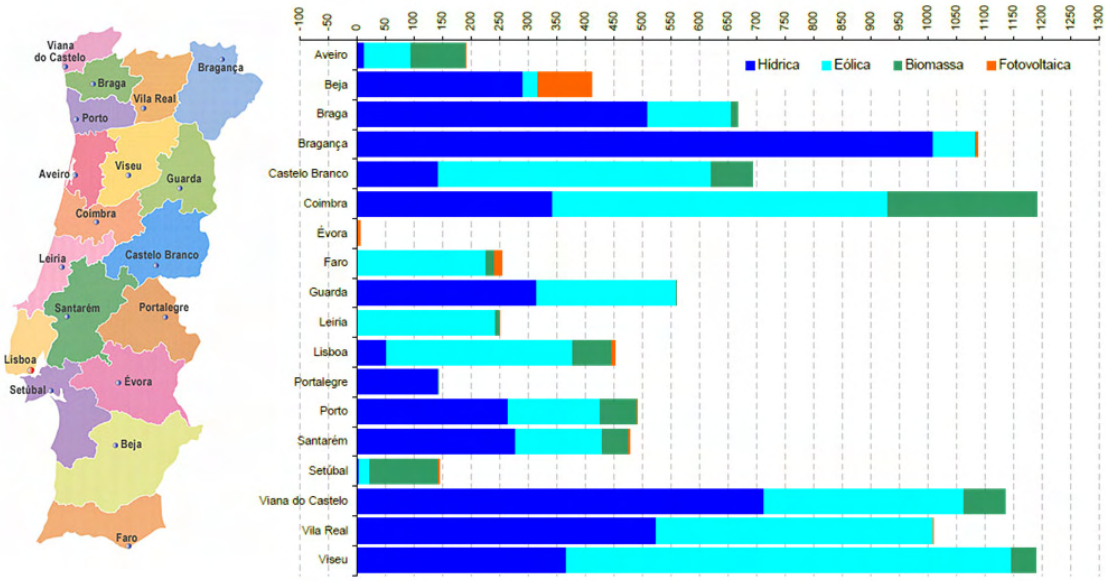


Figure 6 Total licensed electric power per technology and district (mainland), [2]

Photovoltaics

PV presents a remarkable increase in both installed power and electricity production from 2007, based on successful (yet short, considering the demand) feed-in tariff schemes for both small and large PV systems.

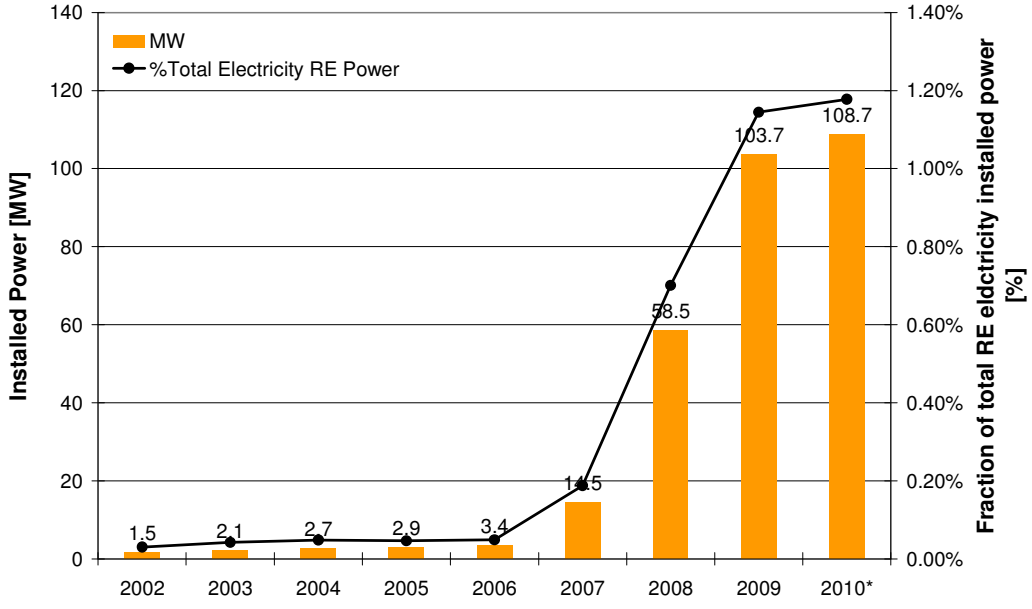


Figure 7 Evolution of installed PV power, [2]

In spite of the recent increase in PV installed power, it still represents a marginal impact on the total RE electricity installed power. In the same trend, electricity production after PV systems has increased substantially over the three last years, yet representing an impact under 1% of total RE based electricity production.

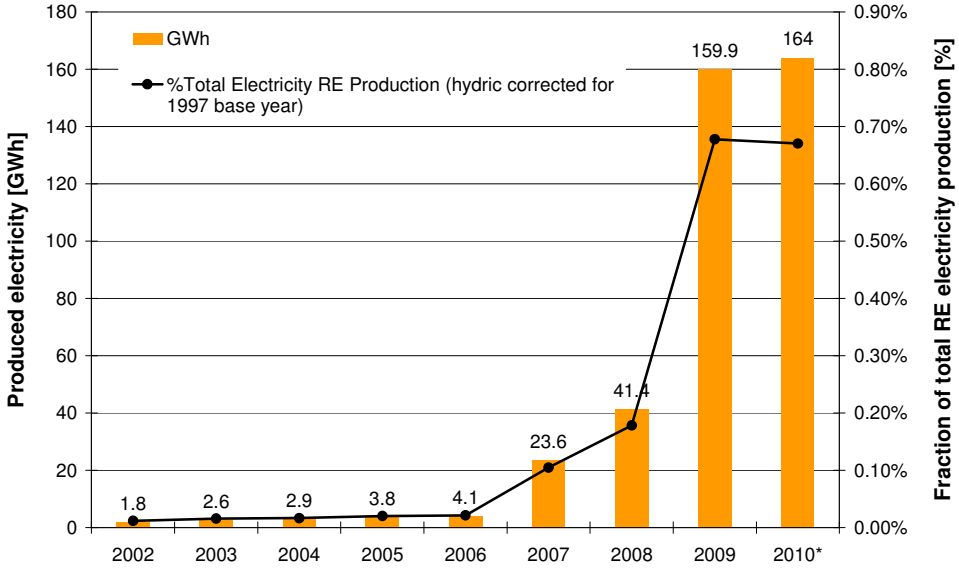


Figure 8 Evolution of installed PV electricity production, [2]

Wind Power

Wind power presents a consistent increase in both installed power and electricity production along the last decade, being the major contributor to the total RE electricity production verified along the last decade, based on successful feed-in tariff schemes.

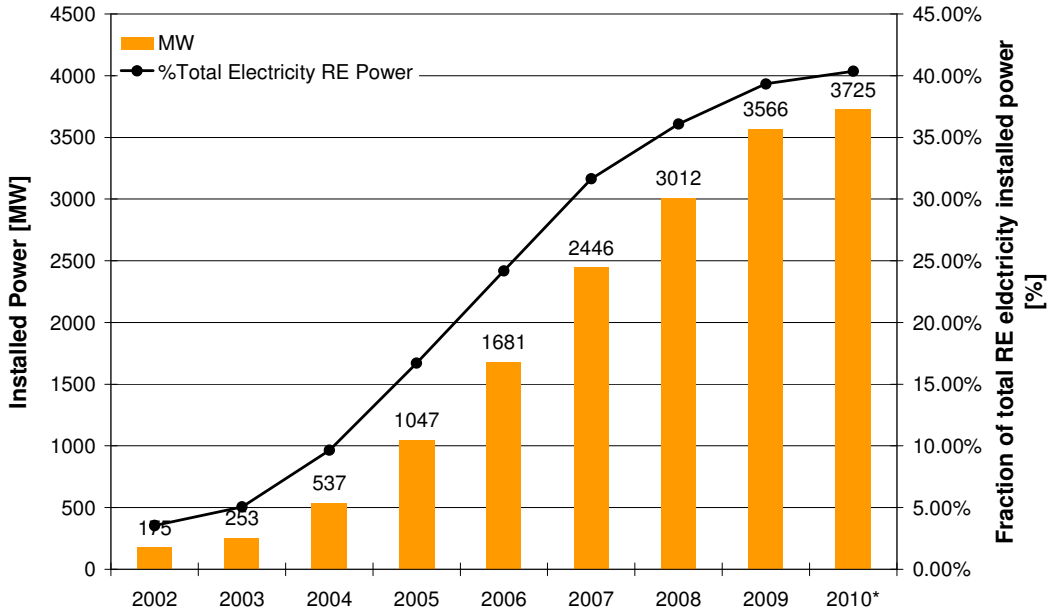


Figure 9 Evolution of installed Wind power, [2]

Wind power stands, in the present, for about 33% of total RE electricity production.

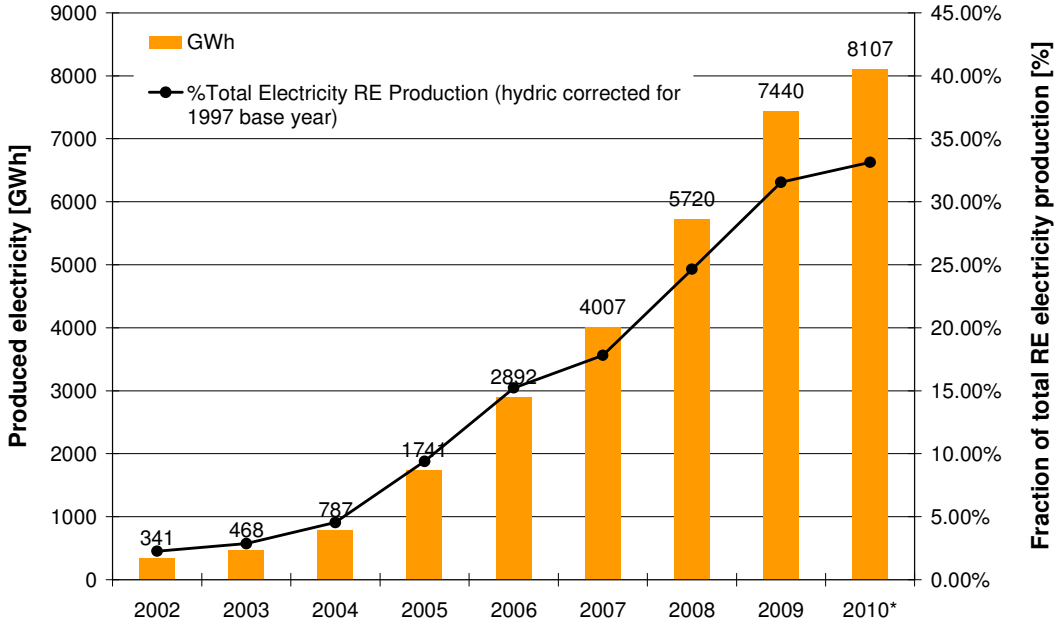


Figure 10 Evolution of installed Wind electricity production [2]

The major part of installed wind power systems fit medium to large multi-MW wind parks, has presented in the following table.

Table1 Wind parks and wind power by total power range, [2]

	Nr. wind parks					Power (MW)				
MW	2007	2008	2009	Mar 2010	% 2010	2007	2008	2009	Mar 2010	% 2010
Total	139	152	195	204	100%	1.681	2.446	3.012	3.725	100%
≤ 1	22	22	23	23	11%	16	15	15	15	0%
> 1 ≤ 10	62	67	73	75	37%	296	278	311	350	9%
> 10 ≤ 25	47	56	66	72	35%	599	701	842	1.106	30%
> 25 ≤ 50	13	20	19	19	9%	264	440	678	647	17%
> 50	8	9	14	15	7%	506	1.013	1.166	1.607	43%

Regarding the equivalent yearly production hours, it might be concluded from table 2 that the most part of the production lies in regions with an equivalent production hour range in between 2000 and 2500 hours/year.

Table 2 Wind power and wind electricity production by equivalent production hours range, [2]

	Installed power (MW)					Production (GWh)				
Horas	2006	2007	2008	2009	% 2009	2006	2007	2008	2009	% 2009
Total	**999**	**1.736**	**2.215**	**2.850**	**100%**	**2.119**	**3.579**	**5.034**	**6.358**	**100%**
> 3000	10	19	89	76	3%	32	67	292	245	4%
> 2750 ≤ 3000	26	31	64	193	7%	73	89	190	558	9%
> 2500 ≤ 2750	86	118	501	297	10%	228	309	1.301	765	12%
> 2250 ≤ 2500	219	349	510	728	26%	537	805	1.202	1.719	27%
> 2000 ≤ 2250	262	334	519	586	21%	570	716	1.083	1.244	20%
> 1750 ≤ 2000	221	713	365	846	30%	423	1.333	698	1.628	26%
≤ 1750	175	171	167	124	4%	255	259	268	199	3%

The map in figure 10 represents the geographical distribution of this average data.

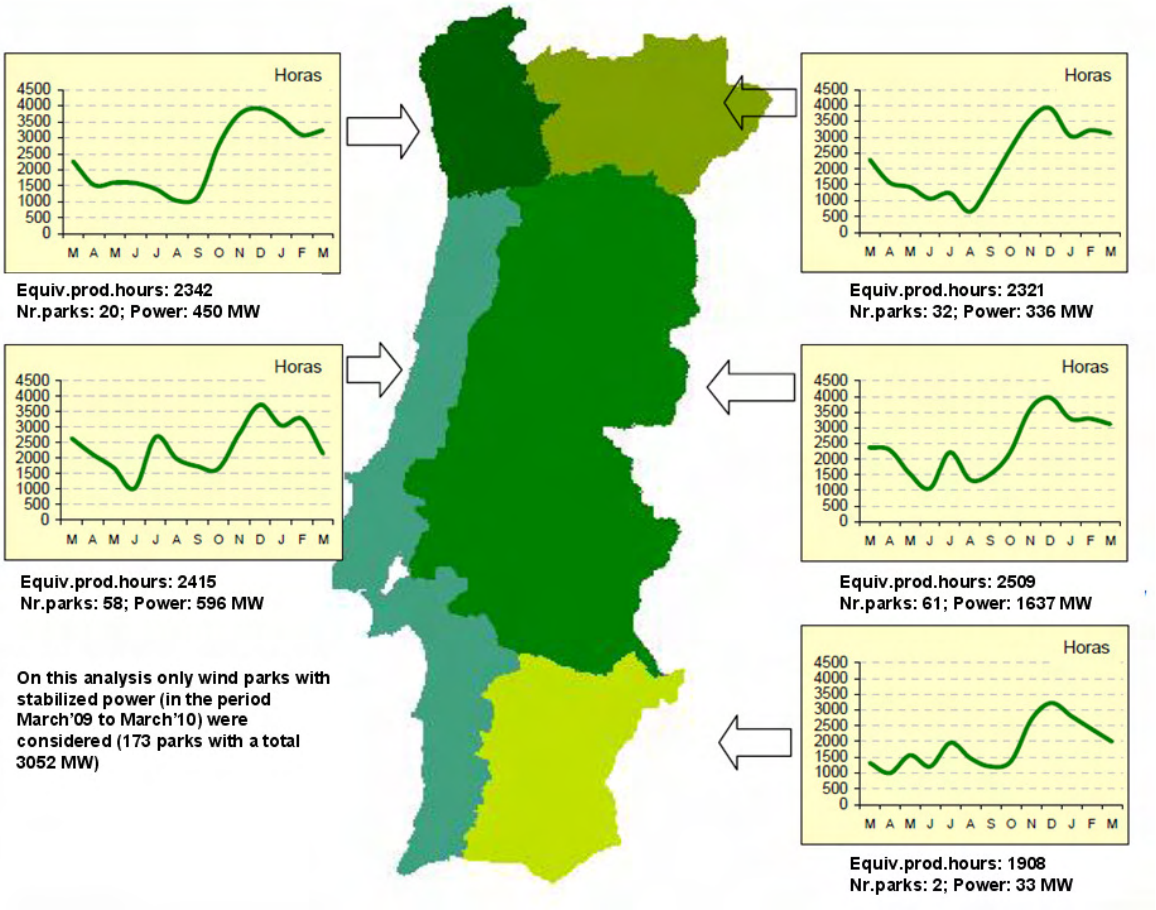


Figure 11 Geographical distribution of wind power and equivalent production hours [2]

Solar Thermal, [3]

During 2001 the Forum "Renewable Energies in Portugal" took place, with several groups responsible for studying each area. One of them was the group for the "Solar Thermal". The conclusions of the Forum were integrated in the Program E4 (Energy Efficiency and Endogenous Energies). In the framework of E4, a sub-program was launched, called "SWH - Solar Water Heating for Portugal".

Considering a maximum possible of 15 millions of m² of solar collectors (52% in the domestic sector and 48% in the Industry) it was considered reasonable to install 1 million m² until 2010, with an annual rate of 150 000 m² for the last years.
The emerging sector was supposed to correspond to 600 MEuro of business and 1500 direct jobs. The main measures considered to be implemented were developed in 5 action vectors:

- Image Promotion of Solar Thermal Energy - Implementation of promotional campaigns of information for installers, entrepreneurs, and users; Creation of information Green Line.
- Development of two structural ways of development for the solar thermal market: selling solar hot water (via ESCOs – Energy Service Companies) and selling/installation of SWH systems.
- Quality Certification - Certification of products; Certification of installers and designers.
- Incentives and subsidies - Reinforcement of fiscal incentives; Reformulation of the financial support in force (at that time, the so-called MAPE (Support Measure of Energy Production within the Portuguese Economy Operational Program)).
- Complementary measures - Promotion of active solar thermal within the revision of the building's thermal regulations; Promotion of solar thermal complementarily with gas and electricity; Promotion of solar thermal into financing institutions, especially those responsible for housing promotion; Support of the R&D activities; Promotion of the Good Practices; Constitution of a Solar Thermal Observatory.

These first steps lead to the recent implementation of a solar thermal obligation in Portugal, which benefits from a number of initiatives started in the past nineties, namely, [4]:

- the implementation of courses for installers of solar thermal systems;
- dissemination campaigns for good practices, contributing to the development of education material to be used in installers training courses;
- the establishment of the Portuguese qualification scheme for installers;
- the definition of a certification scheme for solar thermal collectors and factory made solar thermal systems.

In 2006, the legislation transposing the EU Directive 2002/91/CE (EPBD) was concluded and this was the final step for the implementation of a first solar thermal obligation in Portugal. This obligation is integrated in the new Portuguese Thermal Performance Building Regulation (RCCTE) [5].

These integrated actions lead to the development of a structured market along this last decade. The evolution of yearly installed collectors along the period 2003-2008 clearly shoes the effects of the implementation of market structuration measures (professionals and equipment certification, marketing and dissemination) after 2002,

and the strong contribution of the new building energy certification regulations, including a solar thermal obligation measure, after 2006.
Recently (2009), the "Solar Thermal Measure 2009", a direct subsidies scheme, involved a total of 55 certified solar thermal suppliers and 9 national banking institutions. This measure consisted on a 50% subsidy over the price of the solar system (with maximum reference prices set by the programme), added of a 30% tax deduction over the remaining part of the investment.

In the period 2002 to 2008, the total operative solar collector's area raised from about 180,000 m2 to about 390,000 m2. Even if this is a good indicator of the success of these measures, it still falls behind the objective (set in 2001) of 1,000,000 m2 by 2010. This conclusion is twofold:

- the market, today, is able to sustain a demand increase;
- there is still a considerable non-exploited potential for the installation of solar thermal systems.

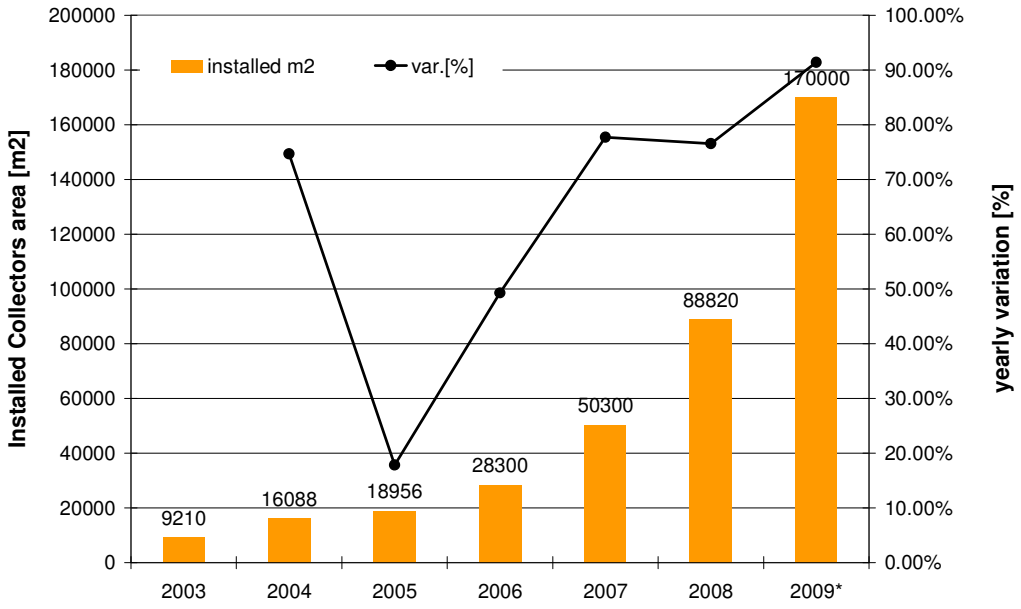


Figure 12 Yearly variation of installed solar collectors, [6], [9] *predicted values for 2009

B. Water supply

Portugal mainland is divided in 278 municipalities. The responsibility of water supply is of each municipality or association of municipalities. 88 % of the municipalities are into association, either with the partnership of the state, through SGPS SA (Águas de Portugal), the so-called *Sistemas multimunicipais*; or with the exclusive participation of municipalities, in the so-called *Sistemas intermunicipais* or *Sistemas municipais integrados*.

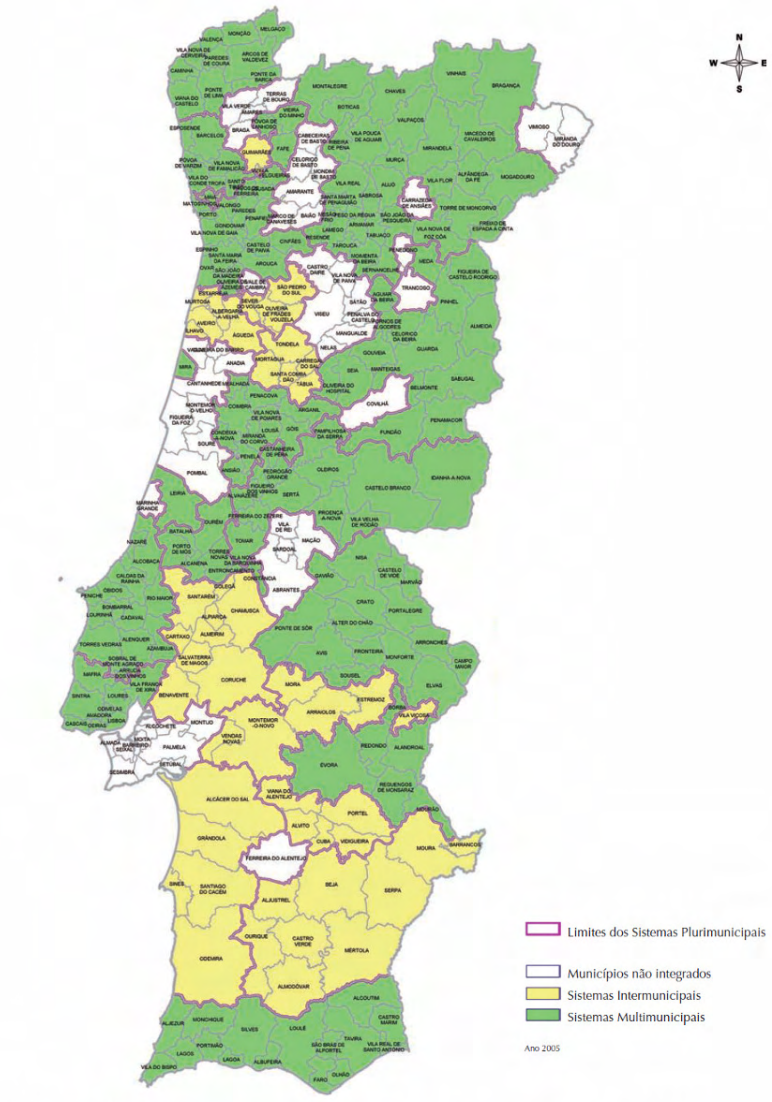
There are 180 municipalities into the *sistemas multimunicipais* (7,025.000 inhabitants) and 50 municipalities are into *Sistemas intermunicipais* (1,033.000 inhabitants).

The water supply is divided into two systems:

1. High: including the collection, treatment and the networks between them.
2. Low: from the treatment station to the user.

The IRAR (Instituto Regulador de Águas e Resíduos) of Portugal is the agency for the water and sanitation can only regulate the price for 10% of municipalities (22 % of inhabitants) for the low supply and 62 % of municipalities for the high supply.

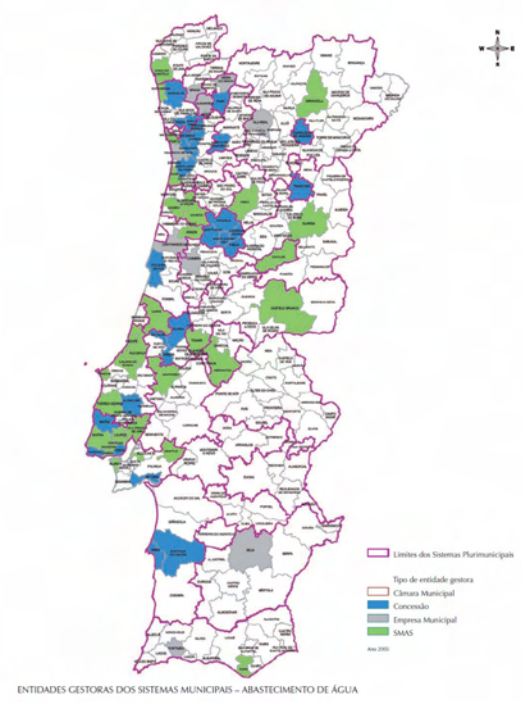
For the high water supply about the 80% of the municipalities are included in corporate management systems (governed by the commercial law). For the low water supply 87 % of the municipalities, about 7 millions of inhabitants, keep a public management systems. The possibility of partnerships between public and private for the municipality management began in 1993, and it is governed by the "Decreto-Lei nº 379/93" of 5 November.



ABRANGÊNCIA TERRITORIAL DOS SISTEMAS PLURIMUNICIPAIS – ABASTECIMENTO DE ÁGUA

Figure 13 Geographical distribution of water supply systems, [11]

Figure 14 Water supply systems management [11]



These associations are responsible for 93 % of the water supply. The rest of the water is supplied with local solutions where the location and the low number of inhabitants renders a networked solution technically and economically inappropriate.

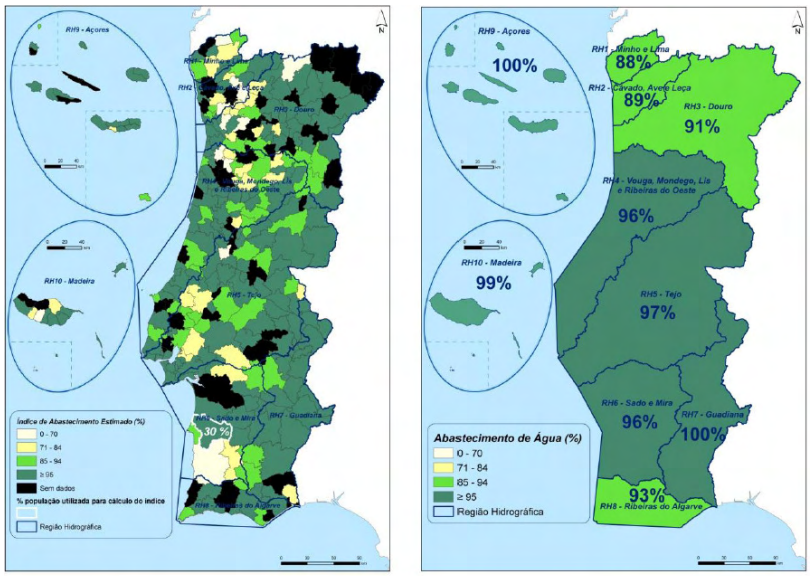


Figure 15 Public water supply coverage at a) municipal and b) hydrographical region levels [12]

Water captation is distributed, globally, in 66% surface waters and 34% underground waters.

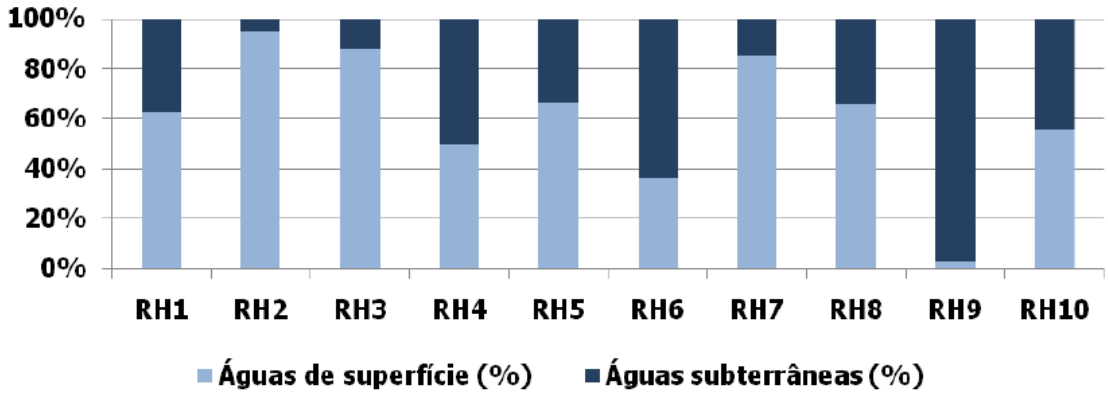


Figure 16 Water captation resources per Hydrographical Region (RH), [12]

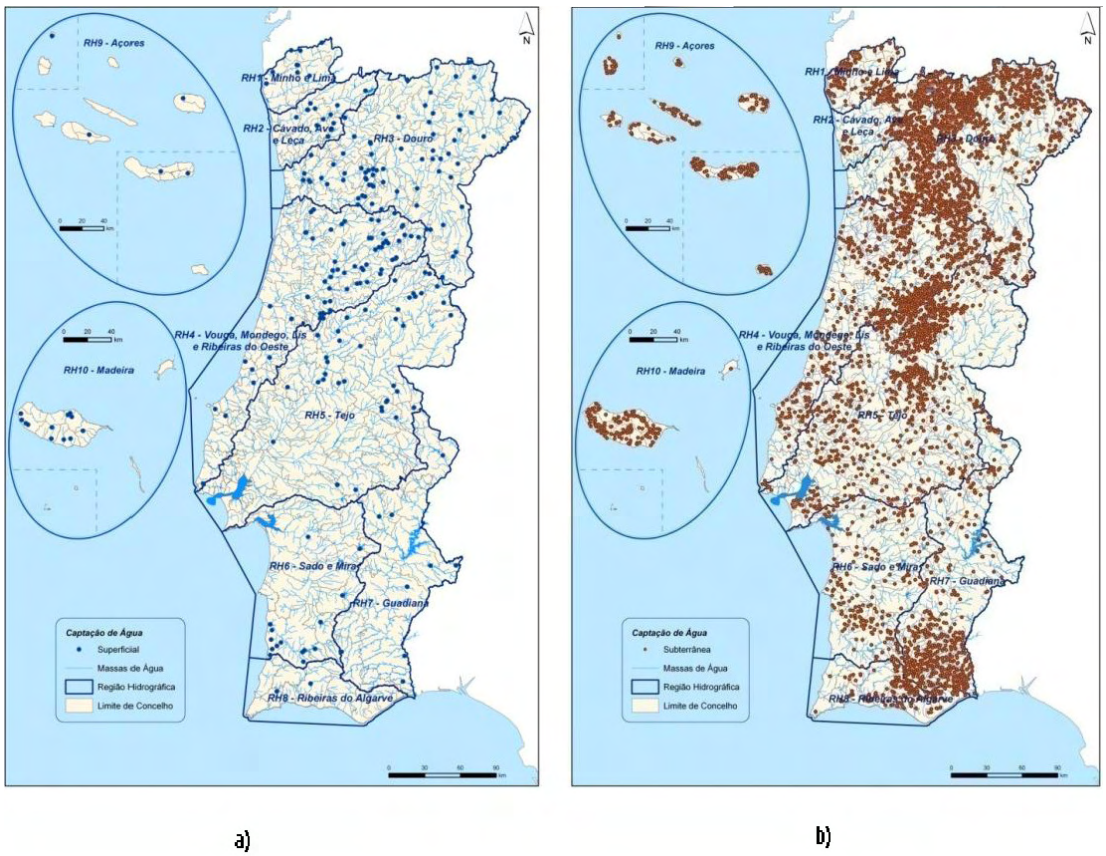


Figure 17 a) Surface and b) underground water captation per hydrographical region [12]

Final **water uses** are distributed according to Figure 18.

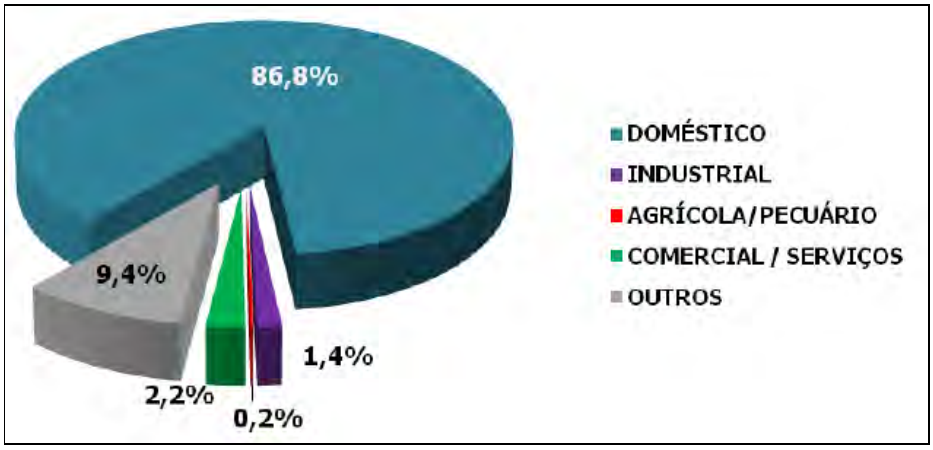


Figure 18 Final water uses per sector, [12]

The main water consumer in Portugal is the residential sector. The daily volume consumption per capita is distributed, geographically, according to Figure 19.

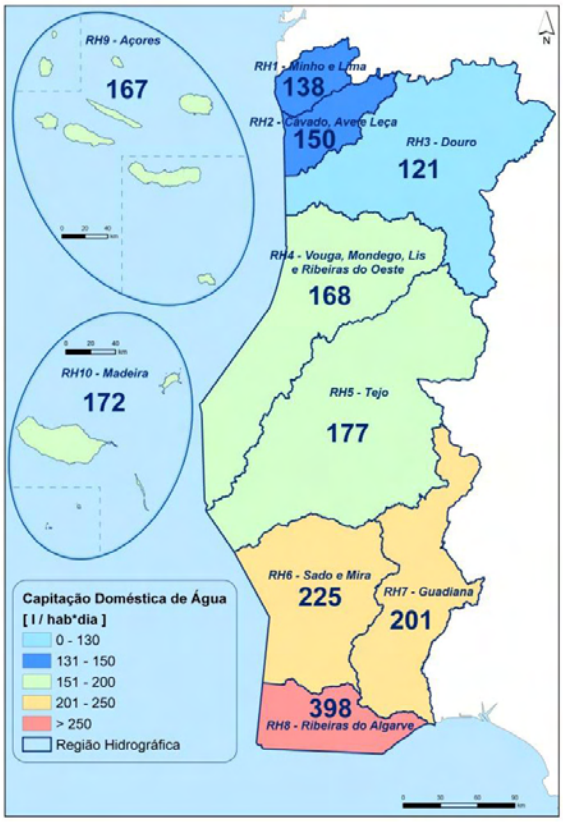


Figure 19 Water consumption in the residential sector, [12]

	Volume urbano no abastecimento		
	Captado	Tratado	Distribuído
	(x10³ m³)	(x10³ m³)	(x10³ m³)
Continente	779731	747138	581556
Açores (RH 9)	24768	14930	19357
Madeira (RH 10)	52100	47016	23527
Nacional	**856599**	**809084**	**624440**

Figure 20 Urban water supply, [12]

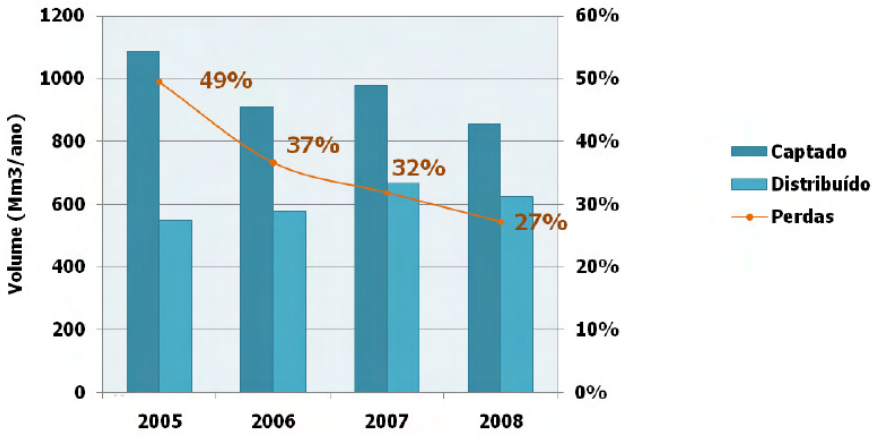


Figure 21 Water supply losses [12]

2.2 Main Actors of the Energy and Water System

2.2.1 Main Actors of the Energy System

Regarding the renewable energy sector, the following relevant institutions might be pointed:

- MEID - Ministério da Economia, da Investigação e do Desenvolvimento: governmental Ministry in charge of the energy sector.
- DGEG - Directorate General for Energy and Geology: entity of the Portuguese Public Administration, depending on the Ministry of Economy (MEID), whose mission is to contribute to the definition, promotion and assessment of public policies regarding energy and geological resources, following a philosophy of sustainable development and supply security. In DGEG mission are included

the dissemination and public awareness efforts in the fields of energy, resources, energy efficiency and sustainable development policies and available public instruments.

- LNEG - Laboratório Nacional de Energia e Geologia, IP: public research institute under the dependence of the Ministry of Economy (MEID), develops research activities both to the development of the national industrial sector and to the support of the governmental policies on the field of renewables.
- APISOLAR - Associação Portuguesa da Indústria Solar: national association of solar industries, member of ESTIF and EPIA
- APREN - Associação de Energias Renováveis: non-profit association representing RE based electricity producers in the elaboration of energy and environment policies promoting the use of RE based electricity production systems.
- SPES - Sociedade Portuguesa de Energia Solar: non-profit organization whose mission is the dissemination of solar energy and renewable energies in general.

2.2.2 Main Actors of the Water System

In the water sector, the following relevant entities might be highlighted:

- MAOT - Ministério do Ambiente e do Ordenamento do Territótio: governmental Ministry in charge of the hydrological resources sector.
- ARH's - Administrações de Regiões Hidrográficas: public institutes under the dependence of the Ministry of Environment (MAOT), responsible for the management of hydrological resources at regional level.
- CCDR's - Comissões de Coordenação e Desenvolvimento Regional, public regional committes, under the scope of MAOT, with attributions in the scope of integration of regional and local development, execution of national policies on environmental and territorial management questions and alignment of European and Regional development programmes.
- Instituto da Água, IP: public institute under the dependence of the Ministry of Environment (MAOT), acts as national Water Authority having the mission of propose, assess and assure the national policies on the domain of hydrological resources.
- AdP Águas de Portugal: public held private group responsible for the implementation of water captation, distribution and treatment systems.

- ANMP - Associação Nacional de Municípios Portugueses: national association of municipalities.

2.3 Legislation Framework

2.3.1 RES Legislation Framework

Regarding the most suitable technologies for RE desalination, wind power, PV and solar thermal, the legislation framework is divided into two different energy production approaches: electricity production, a sector which presents a wider regulation scheme and imposes more strict procedures; heat production, a sector where a direct technology access is easier. Those two different approaches are closely linked with the support measures adopted in each case: feed-in tariffs for electricity production; subsidizing schemes for heat production.

The production of electricity is framed upon two different regimes:

- production in ordinary regime, under which all the conventional fossil fuel based power plants are included;
- production in special regime, applicable to a number of different RE based electricity production technologies, such as wind, solar, biomass or wave power, as well as high efficiency technologies in the combined production of heat and power (cogeneration).

The access to the feed-in tariff scheme in RE based electricity production is regulated in the framework of the production on Special Regime (Produção em regime especial - PRE). Within this regime, three different categories are considered, depending on the installed power:

- microgeneration, for small systems up to 5.75 kW;
- producer-consumer, for systems up to 150 kW with a minimum 50% self-consumption;
- big systems, for systems over 150 kW.

The legislation framework which supports the RE based electricity production includes (the most relevant):

- Decree-Law n.º 189/88, (May 27), which established the rules applicable to the activity of RE based electricity production and combined heat and power production (cogeneration);
- Decree-Law n.º 168/99 (May 18), revising DL nº 189/88 on cogeneration issues, and including the Regulation for Authorization of Electric Power

Production Systems based in Renewable Energies integrated in the Independent Electric System(SEI) (Annex I) and respective remuneration process (Annex II);

- Decree-Law n.º 312/2001 (December 10), establishes the regime for management of power capacity delivery and reception on the electric grids of the Public Service Electrical System (SEP), allowing the reception/delivery of electricity from new production plants of the Independent Electric System (SEI);
- Decree-Law nº 33-A/2005 (February 16), changes Annex II of DL nº 189/88, reviewing the factors for calculation of feed-in tariff in RE based electricity generation systems, defining the procedures for attribution of power connections to the SEI and schedules for the emission of RE power plant licenses.
- Decree-Law n.º 363/2007 (November 2), establishes the juridical regime applicable to the production of electricity after microgeneration systems.
- Decree-Law nº 51/2010 (May 20), simplifies the procedures for the installation of additional equipment in wind power plants and reviews the respective tariff regimes.

Regarding the solar thermal area, the present Portuguese Thermal Performance Building Regulation (RCCTE, Decree-Law n.º 80/2006, DR n.º 67 SÉRIE I-A, 2006-04-04) sets a Solar Thermal Obligation scheme for new or refurbished buildings. This obligation is exempted only after a due economical or technical justification (e.g. inexistence of solar exposed surfaces). The amount of solar thermal energy collected yearly (and calculated after an official - LNEG - simulation tool) is accounted for in the energy classification parameters of the building, which must respect limits set on the regulation. For this purpose, only certified solar collectors, after a recognized certification scheme (e.g. Solar Keymark) are accepted.

Beside this regulation, the access to the bonified feed-in tariff regime, set by DL 363/2007, implies also the use of solar thermal collectors in the case of individually owned microgeneration systems.

2.3.2 Licensing Procedures for the Development of RES plants

Regarding the production of electricity after RE based technologies, in particular wind power and PV, the required administrative procedures may be differenced after both installed power and grid connection type.

Grid-connected Microgeneration

The access to the feed-in tariff scheme previewed for small systems (microgeneration, up to 5.75 kW), implies the registry and certification, by the candidate producer (private person or company) on the SRM (Microproduction Registry System), after a dedicated online platform [7].

This registry implies the filling of a producer form (online), providing the following information:

- Producer identification;
- Address;
- Email address;
- Fiscal ID number.

After this registry, the candidate producer must register the production unit, after submission of the following information:

- CPE – code of delivery point;
- Identification of the energy supplier;
- Identification of the microgeneration unit supplier (these entities must also be registered in the system as equipment suppliers);
- Fiscal ID number;
- Requested Feed-in tariff regime.

These registration data is then centrally confirmed. After confirmation of the suitability of the registration data, the registration of the producer and production unit is confirmed after the payment of a registration fee (€250 + VAT at the reduced tax of 12%).

After this registration procedure is completed, the producer has a limit of 2 years to proceed with the installation, after which an inspection must be required (also online, through the same platform).

The inspection is performed by the regulator within 20 days of its requirement. If everything is within conformity, the final contract for buying/selling energy is performed and the microgeneration unit is affected to one of the two feed-in tariff schemes previewed.

Although this process is, theoretically, permanently open, some problems accessing the platform have been noticed, especially in the beginning of its implementation. In the present the platform is suspended (from June 1st 2010) due to ongoing changes in the procedures and tariff schemes, to be published briefly.

Grid-connected medium and large systems

The installation of medium and large power systems (over 5.75 kW) is subjected to the opening of so-called Previous Information Requests (PIP), which determines a total amount of power to be installed with a given technology within a certain period.

Presently no PIP's are open.

Candidate producers for both total production sale (large systems over 150 kW) are authorized by the Directorate General for Energy and Geology (national level) and follow the requirements set on the general Regulation for Electrical Installation Licenses (RLIE).

Candidate producers for auto-consumption regime (systems with power up to 150 kW with mandatory 50% auto-consumption) are authorized by the Regional Economy Directorate (regional level) and follow the requirements set on the general Regulation for Electrical Installation Licenses (RLIE).

Grid-disconnected systems

Grid disconnected systems, without access to fee-in tariff schemes, are authorized by Regional Economy Directorate (regional level) and follow the requirements set on the general Regulation for Electrical Installation Licenses (RLIE).

Solar Thermal Systems

The access of solar thermal systems to both subsidy schemes or to energy contribution accounting on the Building Regulation procedures must be certified products after a recognized certification scheme (e.g. Solar Keymark).

The certification of the equipment is made upon presentation of a proper qualification certificate.

Certified products and installers are listed on a national online platform for the solar thermal industry [8].

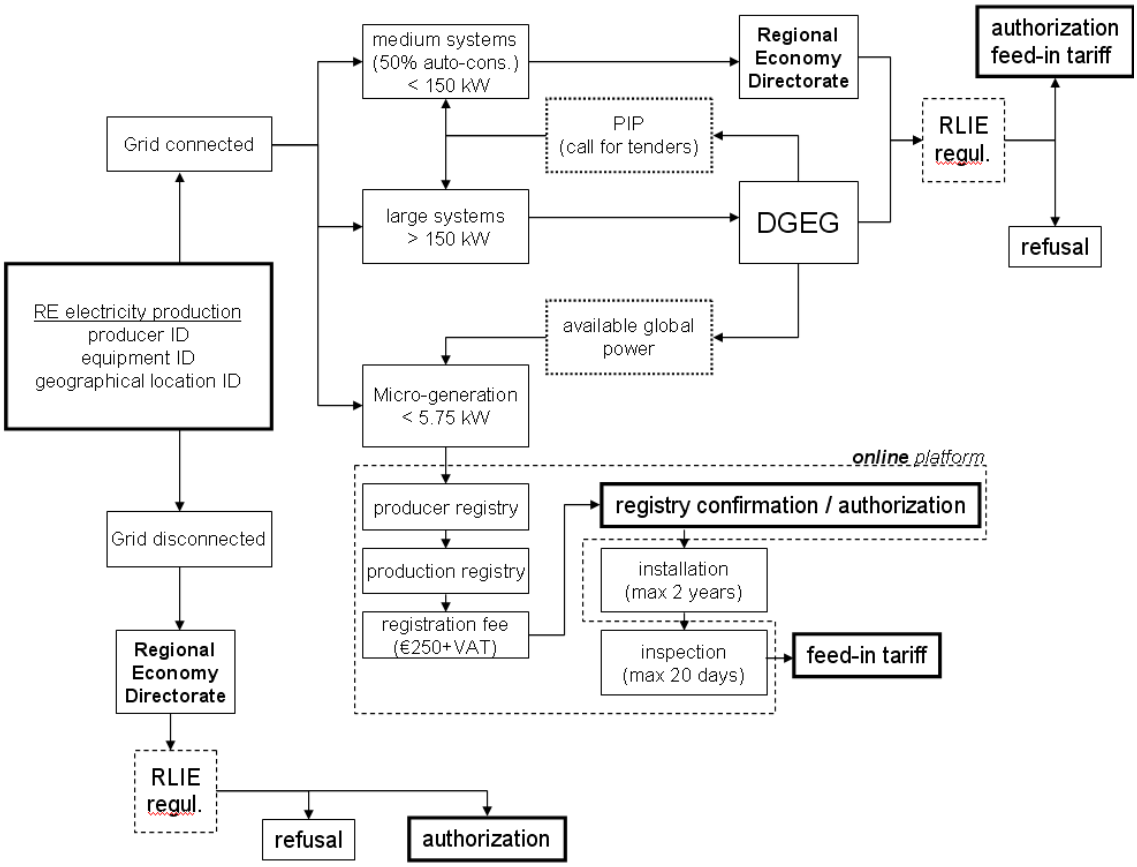


Figure 22 Scheme of the administrative process of RE based electricity production

2.3.3 Legislation Framework for Water

The use of hydric resources is subjected to previous licensing. Decree-Law n.º 58/2005 and Decree-Law n.º 226-A/2007, establish the activities located in the water, margins or waterbeds, subjected to licensing, which include surface or underground captation for public supply, human consumption, irrigation, energy production, tourism or industrial activities, construction of dams, urban and industrial residual water discharges, inert extraction, construction of beach support structures, among others.

The legislation framework of water use is set upon the following Decrees:

- Decree-Law n.º 54/2005, (November 15), establishes the ownership of hydric resources;
- Decree-Law n.º 58/2005 (December 29), approves the Law of Water, transposing for the national legislation the EU Directive 2000/60/CE and

establishes the base and institutional framework for the sustainable water management;

- Decree-Law nº 226-A/2007 (May 31), establishes the regime of hydric resources use;
- Decree-Law n.º 347/2007 (October 19), approves the delimitation of hydrographic regions.
- Decree-Law n.º 348/2007 (October 19), approves the regime of public hydric domain users associations.
- Decree-Law n.º 391-A/2007 (December 21), introduces changes to Decree-Law n.º 226-A/2007, establishing the regime of hydric resources use;
- Decree-Law n.º 5/2008 (january 8), establishes the juridical regime for the access to activities of electricity production after wave power technologies;
- Regulamentar-Decree n.º 9/2008 (March 18), approves the establishment of aquaculture production zones in open sea and defines the terms and conditions applicable for their authorization and exploitation license;
- Decree-Law n.º 93/2008 (June 4), introduces changes to Decree-Law n.º 226-A/2007, establishing the regime of hydric resources use;
- Decree-Law n.º 97/2008 (June 11), establishes the financial and economical regime of hydric resources;
- Decree-Law n.º 14872/2009 (July 2), establishes normatives for the use of public and private hydric resources.

2.3.4 Licensing Procedures for the development of Desalination plants

The access to the hydric resources on either the public maritime domain or the private underground domain is subjected to a general licensing process at the regional delegations of the Hydrological regions administration, ARH's.

There is not a specific licensing procedure for desalination.

The request of license for use of hydric resources is directed to the corresponding ARH and its instructed after the following information:

- Producer identification;
- detailed identification of the required use;
- detailed geographical reference of the required location;
- other elements related to the classification of the required use, such as environmental impact studies or other.

The emission of license is not subjected to any payment.

According to article 4.º of Decree-Law 97/2008, a tax of hydric resources pends over private uses of water and land within the State hydric domain or over the use of water, regardless of their nature or legal regime, subjected to public management and planning and susceptible of causing negative impacts.

This tax is consituted of different components:

- Component A - corresponding to the private use of waters in the public hydric domain of the State;
- Component E – corresponding to the direct or indirect discharge of effluents on the hydric resources domain;
- Component I - corresponding to the extraction of inert materials on the public hydric domain of the State;
- Component O – corresponding to land occupation on the public hydric domain of the State;
- Componente U - corresponding to the private use of waters, regardless of their regime or legal nature, subjected to public management and planning and susceptible of causing negative impacts.

Tax payment exemptions are defined in article 7.º, 8.º, 10.º and 11.º of Decree-Law n.º97/2008 and include exemption of water captation tax when using extraction equipments whose total power is under 5 HP and exemption of the discharge component for systems producing effluents with a volume under the equivalent of 10 inhabitants.

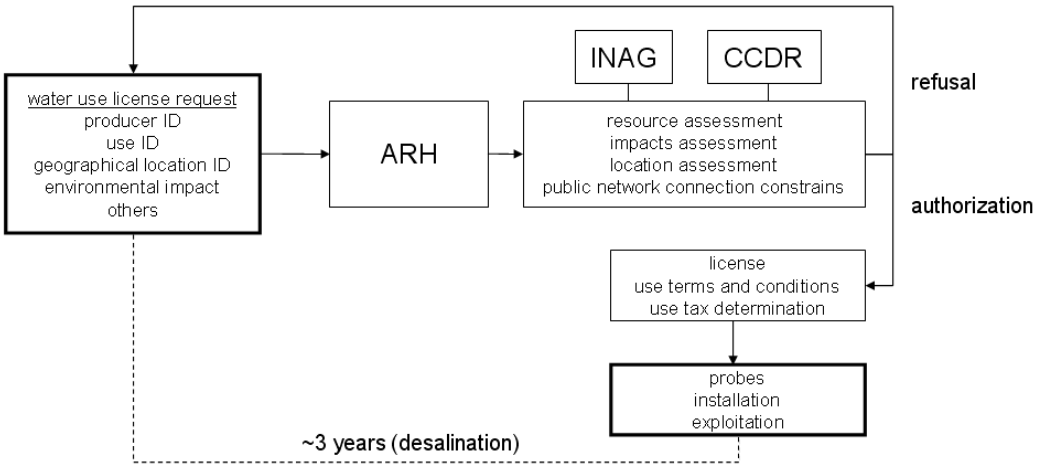


Figure 23 Scheme of the administrative process of water use license request

2. 4 Energy Tariff

The production of electricity after RE based technologies is subsidized after a feed-in tariff scheme, in the so called Production in Special Regime, which is classified after different power ranges as:

- microgeneration: with two different schemes, on for systems up to 3.68 kW (bonified regime) and other for systems up to 5.75 kW (general regime);
- large systems: for systems over 5.75 kW.

RE based electricity producers are payed after the following formula:

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

whose parameters are:

- KMHOm: modelling coefficient depending on the production day period;
- PF(VRD)m: fixed tariff fraction dependent on the technology and production month m
- PV(VRD)m: variable tariff fraction dependent on the technology and production month m
- PA(VRD)m: environmental tariff fraction dependent on the production month m
- IPC m-1/IPCref: inflation adjustement factor
- 1/(1-LEV): network losses avoidance factor

The environmental fraction is multiplied by a Z factor, which varies according to the technology employed. After the introduction of this coefficient, in 2001 (DL 339-C/2001), the feed-in tariff scheme for RE based electricity, previously based on an avoided cost philosophy, as evolved for a differenced technology cost philosophy.
In the following table the average feed-in tariff for the different technologies is presented:

Table 3 Average feed-in tariff for RE based electricity production (DL 225/2007), [1]

Technology	Average feed-in tariff (€/MWh)	Z	Remarks
Wind	74-75	4,6	33 GWh/MW or 15 anos
Hydric < 10 MW	75-77	4,5	52 GWh/MW or 20 anos (25 in exceptional cases)

PV > 5 kW PV <= 5 kW Solar CSP <= 10 MW	310-317 450 267-273	35 52 29,3	21 GWh/MW ou 15 anos
PV microgeneration <= 5 kW PV microgeneration > 5 kW and <=150 kW	470 355	55 40	When installed in residential, industrial or commercial buildings. 15 years
Forest Biomass Animal Biomass	107-109 102-104	8,2 7,5	25 years
Biogas, anaerobic digestion Landfill gas	115-117 102-104	9,2 7,5	When national installed power limit is surpassed, Z is changed to 3,8. 15 years
RSU (burned) CdR (burned)	53-54 74-76	1 3,8	15 years
Wave (Demonstration <= 4 MW)	260	28,4	15 years
Wave (Pre-comercial <= 20 MW)	191	16-22	Z factor fixed by the government member in charge of the Energy sector, considering the potential of the project, within the range 16 to 22. 15 years
Wave (Comercial) first 100 MW following 150 MW > 150 MW	 131 101 76	 8-16 6-10 4,6	Z factor fixed by the government member in charge of the Energy sector, considering the potential of the project. 15 years

Regarding the solar thermal sector, it has been [9] promoted after both direct incentives, in the form of subsidies, and indirect incentives, in the form of tax deductions.

Recently (2009), the "Solar Thermal Measure 2009", a direct subsidies scheme, involved a total of 55 certified solar thermal suppliers and 9 national banking institutions. This measure consisted on a 50% subsidy over the price of the solar system (with maximum reference prices set by the programme), added of a 30% tax deduction over the remaining part of the investment.

The measure, originally opened to small thermosyphon systems individually owned, on the residential sector, was further extended to private welfare institutions and sports associations.
Due to financial constrains, the measure was suspended by the end of 2009, with a total 50.658 solar systems commissioned, representing 207.044 m2 of solar collectors (part of them already installed).

2.5 Funding Schemes & Programmes

Regarding small/medium microgeneration or solar thermal systems, there are a number of different credit products available on the commercial banking systems, specially designed for the field of renewables. Such credit products, available to both individuals or companies, present maximum amounts in the range of 10.000 € to 75.000 €, effective interest taxes in the range of - 6% to ~16% and maximum payment periods in the range 96-120 months, [10].
Larger investments for privately owned RE based power plants follow the traditional banking credit circuit. Wind power investments are, presently, very well established as bankable investments. PV follows the same trend.

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Spain

2.1 Current Status of Renewable Energy Sources and Water

A. Energy Current Status

The goal of the government's *national renewable energy plan (PER)* is to have at least 12% of primary energy consumption in Spain to be derived from renewable energy sources (RES), such as wind, photovoltaic and thermal solar, waste-to-energy, mini-hydro, by 2010. Spain is currently the second largest producer of renewable energy in the EU15 after Germany. In 2007 renewable energy production represented 7% of all energy use in Spain, a 0.5% increase from the year before. The renewable energy sector generated a total of 61,951GWh. This rise in production

stems from dramatic increases in the photovoltaic, wind, and bio fuels sectors as energy sources. This corresponds to just over half of the required percentage to reach the 12% renewable energy use target of the EU15 by 2010 and Spain' s objective under the PER. It also indicates that an annual increase of 1.3% in renewable energy is needed to achieve this goal.

Spain was the world's second-largest producer of wind power in 2004, behind Germany. Spain has some 8,300 megawatts (MW) of installed wind capacity, with an additional 57,000 MW in various stages of planning, development, and regulatory approval.

The Solar thermal energy is the fourth largest in the world, with 6% of the European market share.

In terms of bio energy, Spain is first in bio ethanol production, fourth in biogas production and fifth in terms of bio fuel consumption in Europe. According to Ernst & Young's Most Attractive Countries in the Renewable Energy Sector report 2008 Spain is in 5th place globally. According to the report, Spain stands out in the read of infrastructures available for renewable energy, particularly in terms of wind and solar power.

Wind energy accounted for 10% of the country's energy demands in 2007. Projects such as the new Iberdrola Renovables wind farm in Guadalajara, which required a 24 million euro investment, and the thermal solar energy plant developed by the same company in Aragon with an investment of 200 million euro have moved Spain up the ranking and ahead of countries such as the United Kingdom, Canada and France, and have increased the likelihood of Spain meeting forecasts of generating 20% of the energy it requires from clean sources by 2020.

Participation of renewable energy consumption to gross final energy, new indicator of contribution of EERR according to Directive 2009/28/EC for the promotion of renewable energy in 2009 reached 12.2%.

With regard to electricity generation, the gross production of renewable energy was 73,465 GWh, contributing to 24.7% of total production in 2009.

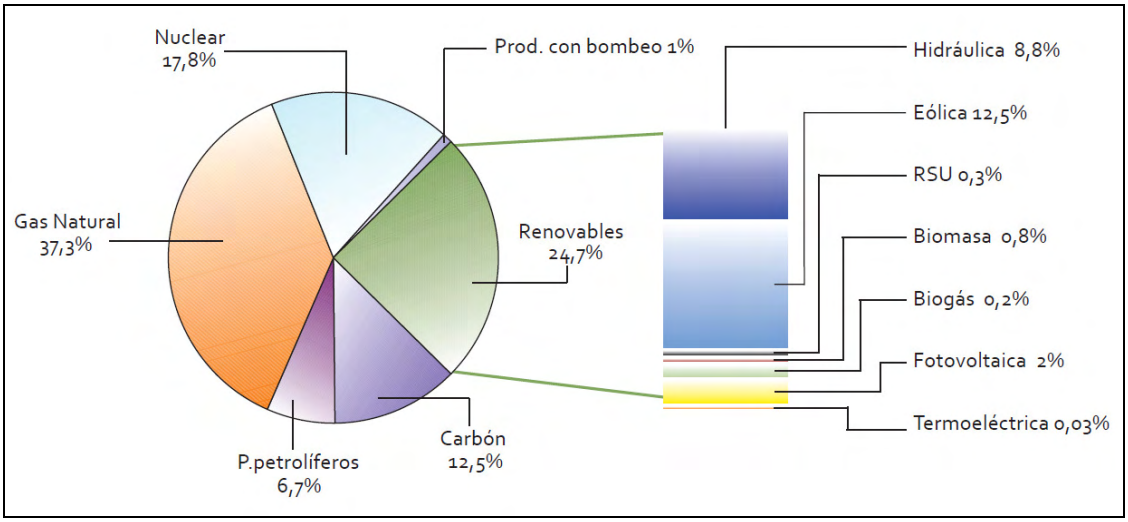

Figure 1 RE contribution to electricity generation in Spain (2009), [[1]Source Ministry of Industry, Tourism and Trade. Secretary of State for Energy].

The Spanish Renewable Energy Plan 2011-2020 [2](Source IDAE)

The National Action Plan for Renewable Energy 2011-2020 is currently under development, so that both the scenario and the objectives for each of the renewable technologies during this period can be reviewed. To form the scenario of energy map in 2020 has been taken into account the evolution of energy consumption in Spain, the rise in oil prices in relation to them in the nineties and the substantial enhancement of the saving plans and energy efficiency. The main conclusions of the report notified to the European Commission are:

• In a first estimate, the contribution of renewable energy to gross final energy consumption would be 22.7% in 2020, against a target of 20% for Spain in 2020 - equivalent to a surplus of renewable energy about 2.7 million tons of oil equivalent (toe).

• As an interim estimate is expected that in 2012 the share of renewable energies will be 15.5% (compared to the indicative value provided in the indicative trajectory of 11.0%) and 18.8% in 2016 (compared to 13.8% projected in the trajectory).

• The further development of RES in Spain corresponds to areas of power generation, with a forecast of the contribution of renewable energy to gross electricity generation of 42.3% in 2020. Thus Spain also exceeds the target set by the EU in this field (40%).

Spanish consumption of RE and its contribution in the Final Energy (Methodology European Commission).

FINAL RENEWABLE ENERGY CONSUMPTION (in ktoe)	2008	2012	2016	2020
Renewable energy for power generation	5.342	8.477	10.682	13.495
Renewables for heating / cooling	3.633	3.955	4.740	5.618
Renewable energy in transport	601	2.073	2.786	3.500
Total Renewable (in ktoe)	9.576	14.504	18.208	22.613
Total Renewables by Directive	10.687	14.505	17.983	22.382

FINAL ENERGY CONSUMPTION (in ktoe)	2008	2012	2016	2020
Final gross energy consumption	101.918	93.321	95.826	98.677
% Renewable Energy / Final Energy	10.5%	15.5%	18.8%	22.7%

The data are contained in the advance Renewable Plan 2011-2020, submitted by the Ministry of Industry, Tourism and Commerce to the European Commission in compliance with EU directive on the subject (2009/28/EC), which include renewable energy mandatory targets for the EU and individual Member States in 2020, and the production by these of national action plans to achieve those objectives.
Each EU country member has notified the Commission before January 1, 2010, a projection which states:

• Their estimate of excess energy production from renewable sources with respect to its indicative trajectory that could be transferred to other Member States and their estimated potential for joint projects by 2020, and

• Their estimate of energy demand from renewable sources to be met by means of other than domestic production until 2020.

However, for the use of renewable energy surplus estimated, on which Spain can obtain significant benefits for their transfer through the flexibility mechanisms foreseen in the Directive, given that around two thirds of renewable electricity generation in 2020 is estimated to be non-manageable, it is essential to further development of the electrical interconnections between Spain and the European electricity system, a circumstance on which special attention has been called in the report to Brussels.

Feed-in tariff

Based on experience, it can be concluded that choosing the right economic support model is critical to successfully developing a renewable electricity generation system. Spain chose to support the sales price of renewable electricity by establishing either a fixed tariff (which differs from one technology to the next) or a premium paid on top of the market price for installations that opt to sell their electricity on the market. The scheme, commonly known as a feed-in tariff, is basically the same as that used in countries such as Germany or Denmark, which, along with Spain, have also successfully rolled out renewable energies.

These feed-in tariffs are justified by the strategic and environmental benefits offered by renewable energies and aim to guarantee reasonable returns on investments while learning curves and economies of scale gradually enable the various technologies to become competitive with conventional sources. Another measure taken by the Spanish Government to promote the roll-out of renewable energies that could prove to be crucial is the transport sector's obligation to use bio-fuels.

Managing the electricity system with a large renewables share

One of the most outstanding aspects from a technical perspective is the transformation that the electricity generation system has undergone as a result of the installation of such a large amount of renewable capacity. That’s the reason why, in 2004, it was deemed to be most risky integrating more than 14% of wind power and warnings were given that exceeding this share would significantly increase the possibilities of a major power cut. Nevertheless, last November, wind power was used to generate more than 50% of the electricity output over a five-hour period, with peaks of 53% and a monthly average of 22.7%.

This a highly significant figure, because no other country the same size as Spain and with similar electricity demand and as weak cross-border grid connections has successfully achieved a 50% renewable share over such a long period of time. To make this possible, REE (Red Eléctrica de España, the Spanish grid operator), which has worked hand in hand with sector experts for many years, opened the Renewable Energies Control Centre (CECRE) in 2007, which enables the maximum amount of renewable energy to be securely integrated into the electricity system.

Wind power

The dynamism of the Spanish wind power sector is such that our country is an international benchmark and has occupied the top positions in terms of both installed capacity and international competitiveness of manufacturers and developers for many years.

At 1 January 2010, accumulated wind energy capacity in Spain stood at 19,050 MW, a figure that is only surpassed by the United States, Germany and China and close to the target of 20,155 MW established in the Renewable Energies Plan for the end of 2010. Having generated close to 36,000 GWh of electricity during 2009, wind power – which on occasions covered more than 50% of total electricity demand at specific times – met 14% of total electricity demand in Spain. In other words, wind power in Spain provides enough electricity in a year to meet the demand of almost nine million homes.

More than 2,500 MW of wind capacity was installed in Spain during 2009, the majority of which was supplied by factories in our country using both national technology (Gamesa Eólica, Acciona Windpower and Alstom-Ecotècnia) and foreign technology (Vestas, Suzlon, Enercon, etc.).

Milestones

- 19,050 MW of accumulated wind power capacity at 1 January 2010.
- In the early hours of 8 November 2009, wind power covered more than 50% of electricity demand in Spain over five hours.
- Wind power is the second most installed technology after combined cycle plants.
- In 2009, wind power avoided the emission of 13.3 million tones of CO_2.
- Exports by the sector amount to around Euros 3 billion per annum.
- The wind industry has generated more than 40,000 jobs.
- The sector is comprised of more than 700 companies: 19 wind turbine manufacturers, 270 component manufacturers, 140 wind farm developers, and 277 service providers.

Solar Photovoltaic

At the start of 2009, photovoltaic solar energy generated a significant amount of electricity in Spain, with 3,400 MW of installed capacity.

Spain has the second largest installed capacity in European and is world leader in terms of capacity per habitant, with 75.2 watts per capita. This technology truly took off in Spain in 2008. In that year, 2,715 MW of capacity was installed, representing an increase of 500% from that installed in 2007. Constantly falling photovoltaic panel prices, which reflect the economies of scale and improvements in the technological learning curve on a day-to-day basis, coincided with financial optimism, the diversification of many companies' activities, and regulatory changes, to drive this technology to levels that were unimaginable a few years previously. This was true not just in Spain but across Europe, where installed capacity was doubled in 2008, with 4.6 GW being added to take total accumulated photovoltaic capacity to 9.5 GW, according to EurObserv'ER data.

In September 2008, Royal Decree 1578/2008 was enacted, establishing a Registry of preliminary assignment of remuneration and a maximum annual cap of 500 MW for photovoltaic power. This new legislation aims to provide the sector with a good foundation and ensure its continuity by avoiding peaks and troughs that cause market imbalances, promote the installation of rooftop arrays, and give a signal of economic efficiency to this technology.

Milestones

- 1998. First regulated tariff and premium for photovoltaic solar energy are introduced.
- 2004. ROYAL DECREE 436/2004 includes the target of 150 MW by 2010 established by the Renewable Energies Development Plan. The regulated tariff is guaranteed for a period of 25 years.
- 2007. The prevailing legislation is revised by ROYAL DECREE 661/2007, establishing a new target for 2010 of 371 MW, as per the 2005-2010 Renewable Energies Plan. 85% of this target is reached the same year.
- 2008. After a transitional period of a year after the objectives are reached, the new framework which is in force today is enacted, Royal Decree 1578/2008. This legislation establishes a system of rising caps and falling feed-in tariffs. Spain becomes world leader in terms of installed capacity with over 2,700 MW.
- 2009. Photovoltaic solar energy covers approximately 2.6% of annual demand, reaching a peak of 4% in August. 2,488 arrays, with an associated capacity of 502 MW, are assigned a feed-in tariff.

Solar Thermoelectric

In only a few years, Spain has become an indisputable leader in solar thermal electric power generation, not only because more than a third of total solar thermal electric capacity in the world is installed on Spanish soil, but also because Spanish companies are developing, building and managing many solar thermal electric projects around the globe.

Three quarters (232 MW) of the 307 MW of solar thermal electric capacity installed in the last decade around the world is in Spain, and more than 1,346 MW is under construction (around 400 MW of which will be commissioned during 2010) and 843MW at an advanced stage of development. This will result in an installed capacity of more than 2,400 MW in Spain by 2013.

The first commercial central tower plant supplying power to the grid was the PS10 plant (Sanlúcar la Mayor, Seville), which was commissioned in 2006. Since then, the solar thermal electric industry has not stopped growing in our country. All four solar thermal electric technologies are in use in Spain. The most widely developed at a commercial scale is the parabolic trough receiver, which makes up 93% of the 2,500 MW that will be rolled out by 2013. Central tower receivers account for close to 3%, as do parabolic disks that are normally connected to Sterling engines, while linear Fresnel receivers make up little more than 1% of all plants.

Milestones

- 1980s. The Plataforma Solar de Almería (PSA) opens as a leading international research centre, which belongs to the Centre for Technological, Environmental and Energy Research (CIEMAT).
- 2002. Spain introduces a feed-in tariff for solar thermal electricity. It is the first country in the world to do so.
- 2004. The Government approves a new regulation (RD 436/2004) establishing the first target for 2010, 200 MW, and increasing the feed-in tariff for this technology making it economically viable. The possibility of using gas (up to 12%) to maintain the temperature of the heat accumulator is also introduced.
- 2006. Commissioning of PS10 plant (Sanlúcar la Mayor, Seville), the first commercial solar thermal electric plant with a central tower in the world. PS20 opens a year later.

- 2007. Prevailing legislation is revised (Royal Decree 661/2007), establishing a new objective of 500 MW by 2010. The possibility of hybridization with biomass and biogas is introduced.
- 2008. Andasol 1 (Granada), the first commercial parabolic trough plant in Europe, is commissioned.
- 2009. Council of Ministers agreement to establish a roadmap for the growth of solar thermal electric technologies to 2,400 MW by 2013.

B. Water Current Status

Spain built Europe's first desalination plant nearly 46 years ago and is the largest user of desalination technology in the Western world. Spanish companies lead the market, operating in regions including India, the Middle East, and North America.

Spain provided the home for Europe's entrance into the desalination industry with the first plant installed on the island of Lanzarote in the Canary Islands in 1964. Since then, the process has expanded throughout the islands and on the Spanish mainland as well. Today, Spain is the fourth-largest user of desalination technology in the world, behind Saudi Arabia, the United Arab Emirates, and Kuwait. Spain's more than 700 plants produce approximately 1,600,000 cubic meters of water each day, or enough for about 8 million inhabitants.

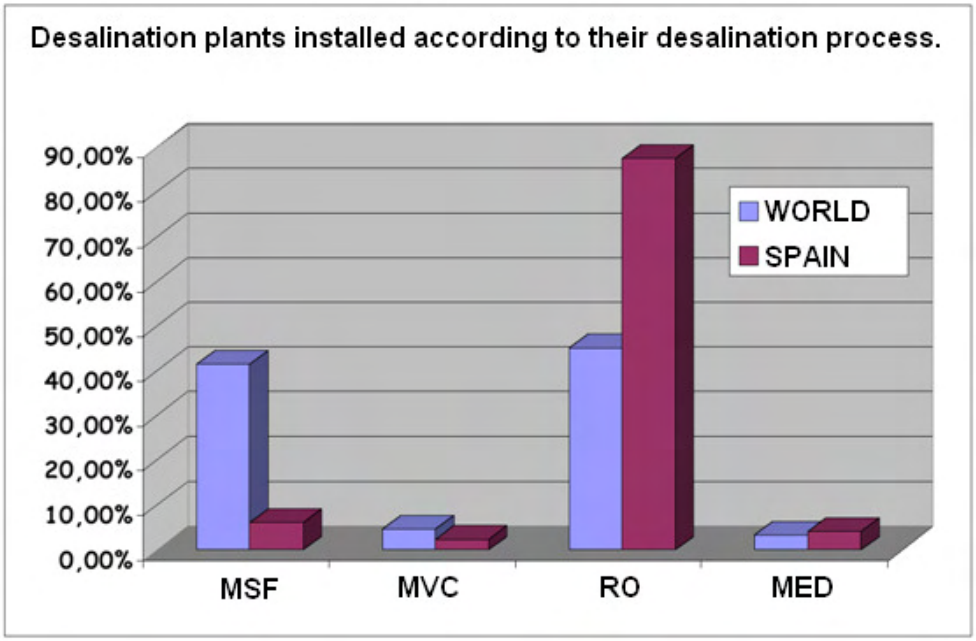

Figure 2 Desalination Plants installed according to desalination process

In Spain there has been a strong public investment in recent years in desalination due to:

- Desalination provides a resource independent of the weather conditions.
- Affordable costs (about 0.60 €/m^3) for urban water supplies and in some cases, agriculture.
- Potential for energy optimization and use of alternative energies.
- Improved technology to minimize the impacts, for example, in the Posidonia Oc.

A.G.U.A Program (Actions for the Management and Use of Water) **RDL 2/2004**
The National Hydrological Plan (PHN) provided by the current government includes the installation of 22 desalination plants along the east coast, with a total production capacity of 621 Hm^3/year. According to the document outlining the urgent actions in the Mediterranean Basin, the distribution of desalination by basin is as follows:

- South Basin: 215 Hm^3/year, 6 desalination plants.
- Segura Basin: 266 Hm^3/year, 10 desalination plants.
- Jucar Basin: 70 Hm^3/year, 4 desalination plants.
- Basins of Catalonia: 70 Hm^3/year, 2 desalination plants.
  TOTAL……621 Hm^3/year, 22 desalination plants

  The estimated investment in desalination in the PHN by basin is as follows:

- South Basin: 296 Millions of €.
- Segura Basin: 461 Millions of €.
- Jucar Basin: 159 Millions of €.
- Basins of Catalonia: 201 Millions of €.
  TOTAL……. 1,117 Millions of €.

  This water produced by desalination is used in the coastal strip up to level 100 or 150, which is where most groups of the population and tourism are located. Consequently these resources, which currently came from sources within the interior basin, will be released to be used inland and not on the coast.

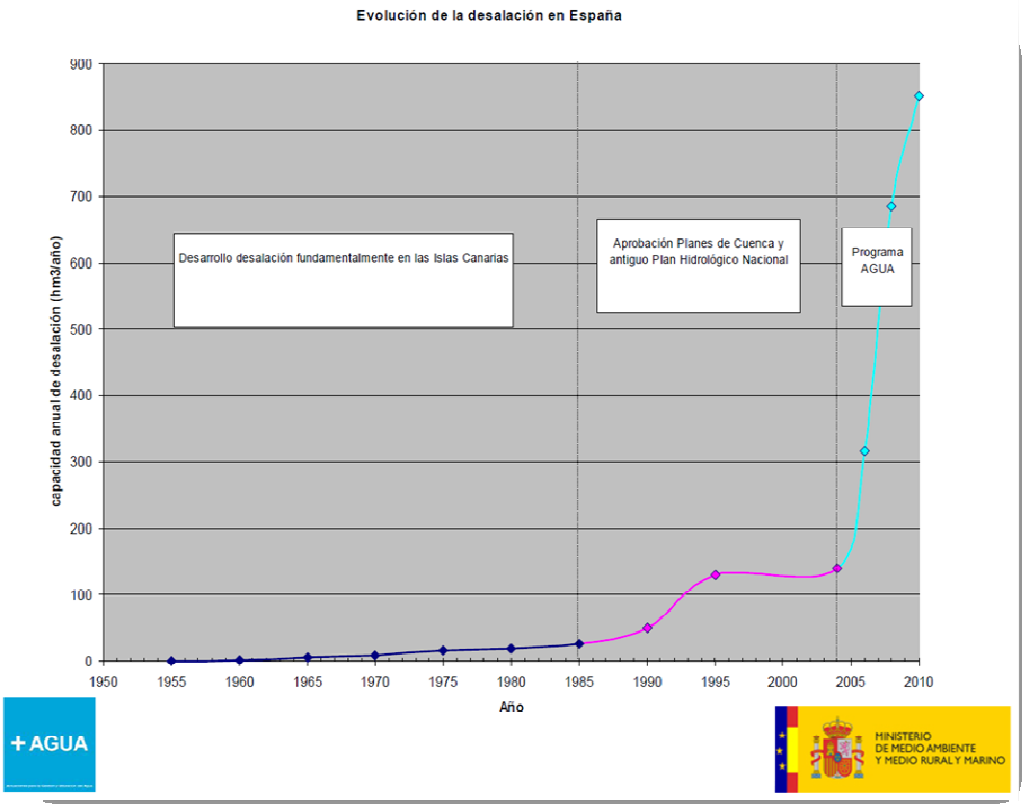

Figure 3 Evolution of Desalination in Spain

Energy for desalination

Expected volume of desalinated water production in late 2010, is about 800 hm^3/year.

One m^3 of desalinated water needs nowadays, approximately 3.5 kW/h, so the energy production required to meet the annual demand for desalination plants associated with this term would be about 2,800 GW/h.

This energy production requires an installed capacity of about:

- 800 MW for hydroelectric (considering 3,500 hours of operation per year)
- 1200 MW for wind energy (considering 2,300 operating hours per year)
- 1500 MW for photovoltaic's (considering 1,800 operating hours per year)

We must keep in mind that the average consumption has evolved:

- 1980: about 10 kW.h/m^3

- 2000: about 5 kW.h/m^3
- Margin to about 2.5 kW.h/m^3 (Studies Juan Manuel Ruiz and Antonio Esteban. CEDEX 2008).

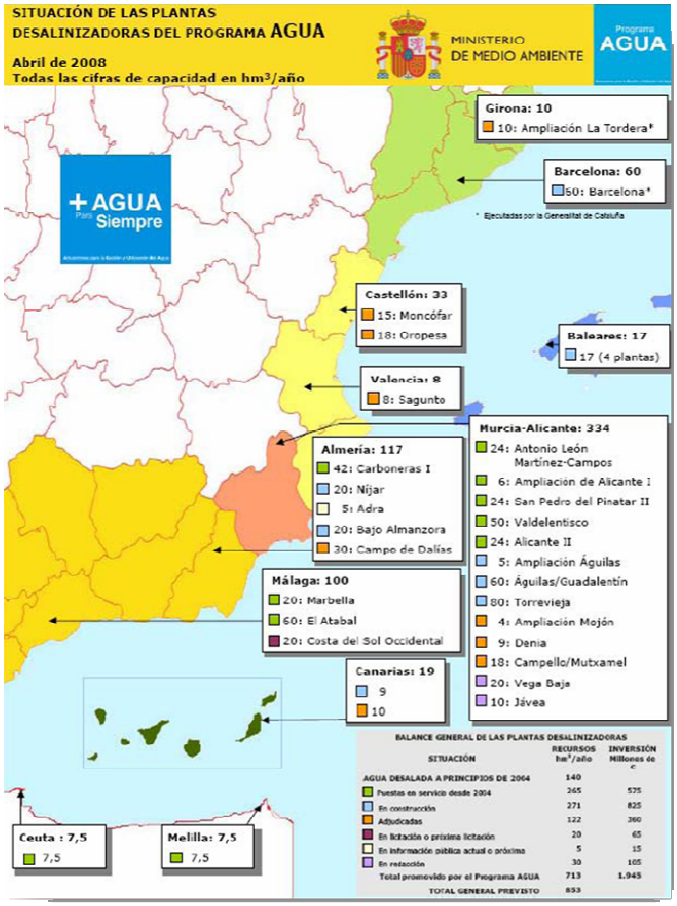

Figure 4 Desalination Plants - Programma Aqua

2.2 Main Actors of the Energy and Water System

2.2.1 Main Actors of the Energy System

The National Energy Commission (CNE) is the regulatory body for energy systems. The Commission is a public authority with independent legal identity, its own assets and full operational capacity. The CNE has been attributed wide-ranging functions. The law provides the CNE the faculty of making proposals in:

(a) The creation of general stipulations which affect energy markets;

(b) Energy planning; and

(c) The creation of projects to establish tariffs, charges and the payment terms for energy-related activities. In these processes, CNE reports have a prescriptive character.

The CNE also acts as an advisory body in energetic matters for both central state autonomous regional bodies:

(a) is obliged to report in the dossiers for the authorization of energy facilities when these facilities are the responsibility of Central State Administration;

(b) issues reports requested by Autonomous Regions in the exercise of its responsibilities with respect to energy issues;

(c) is obliged to report on operations involving the combination of companies or the control takeover of one or several energy companies by another company which carries out activities in the same sector when these operations must be submitted to the government for their approval;

(d) reports, when required, on the sanctioning dossiers initiated by different public administration bodies.

In the electricity sector, the CNE undertakes the payment for the costs of the transport and distribution of electrical energy, from the permanent costs of the system and from those other costs which are established for the entire electrical system when their payment is expressly commissioned. It determines those individuals whose actions result in deficiencies in supply to users, proposing the measures to be adopted. It agrees to the initiation of the sanctioning dossiers and it carries out the instruction of these dossiers when they are responsibility of the Central State Administration. It authorizes shares made by societies with activities which are considered to be regulated, or activities which are subject to administrative intervention, which implies a relationship of subjection in companies which may undertake mercantile type activities.

The CNE also acts in defense of free competition and participates in conflict resolution. Furthermore, it acts as inspecting body (from technical conditions to correct invoicing) at the request of the Central State Administration of the State or of responsible Autonomous Regions, or in an official manner.

Red Eléctrica de España (REE), a company created in 1985, took over the transmission grid and the operation of the Spanish power system, establishing transmission as a separate activity from generation and distribution. This marked a

radical change in how the Spanish power sector operated and served as a model for other countries when liberalizing their power sectors.

The Electricity Sector Act 54/1997 confirmed the role of REE as a cornerstone of system operation. This law created a wholesale power market which required an effectively-managed transmission grid to work properly and a coordinated operation of the generation-transmission system, to ensure that demand would be satisfied at all times. Act 17/2007 of 4 July amended the previous law to adapt it to European Directive 2003/54/CE, which established the common guidelines for the internal power market. This law has resulted in the definitive consolidation of the REE's TSO Model (Transmission System Operator). In this regard, REE, as the system operator, guarantees the continuity and security of the power supply and the proper coordination of the production and transmission system, performing its functions based on the principles of transparency, objectiveness and Independence. In addition, REE is the manager of the transmission grid and acts as the sole transmitter on an exclusive basis.

REE runs the power system, both on the Spanish mainland, as well as on the insular and extra peninsular systems. The role of REE as system operator consists in maintaining the balance between production and consumption and, for this purpose, it forecasts consumption and operates and oversees the generating and transmission installations in real time, thus ensuring that production planned at the power stations coincides at all times with the actual consumer demand. Should a difference arise between the two, it sends the appropriate instructions to the power stations to increase or reduce their output.

As part of its functions as system operator, REE draws up the annual power demand evolution forecasts, together with the relevant cover, for the medium and long term. These forecasts are essential as regards drawing up the transmission grid development plans for the next few years, approved by the Ministry of Industry, Tourism and Trade. REE likewise handles the so-called adjustment services, the purpose of which is to bring the production programs resulting from the daily and intradaily power markets in line with the quality, reliability and safety requirements of the power system. Adjustment services or adjustment markets involve the overcoming of technical restrictions, the assigning of complementary services and deviation handling.

To guarantee the security of the system, REE requires real-time communication with the generating stations, which requires their integration or affiliation with generation control centres, whether dedicated to special regime generators or another type. The requirements of the generation control centers are contained in the operational procedures P.O. 9 and P.O. 8.2 (generation equal to or greater than 10 MW per power plant or group of power plants connected to the same point of the network). In addition, given the particular relevance of control for special regime generation due to the number of facilities involved, Royal Decree 1454/2005 established this requirement for RE generation, which is ratified by Royal Decree 661/2007 and which must be fulfilled by the generators.

In June 2006, REE started up a control centre of renewable energies (CECRE), a worldwide pioneering initiative to monitor and control these energy resources. CECRE is an operating unit integrated into the Power Control Centre (CECOEL). RE generation is managed and controlled by CECRE, which allows the maximum amount of production from RE sources, especially wind energy, to be integrated into the power system under secure conditions. In addition, this centre is the sole interlocutor in real time between CECOEL and each one of the authorized generation control centers. Under this scheme, the generation control centre to which an electrical energy production facility is assigned acts as its Generation Control Centre and interlocutor with REE. To this purpose, every generation control centre must be connected with the REE control centers and have been previously approved by REE. REE will issue the corresponding qualification certificates of generation control centers.

2.2.2 Main Actors of the Water System

In Spain, there are different administrations and institutions with influence in the water sector. The institutional framework is quite wide because there are some competences in water matters, transferred from central government to regional and municipal governments. Thus, there are water institutions at national, regional and municipal level managing different aspects of water and coordinating them.

At national level, the most important body concerning water is the General Management of Water, belonging to the Environment Ministry. This institution is divided into different departments with different responsibilities: Planning and

sustainable water use, economic programming, infrastructure and technology, management of the public hydraulic domain, irrigation and water economy.

In practice, the basic unit for the water management in Spain is the hydrographical demarcation. This unit is the terrestrial and marine area consisting of one or more neighboring river basins and transitional waters, groundwater and coastal watersheds associated with these. The figure below shows the different hydrographical demarcations in Spain.

Figure 5 Hydrographical demarcations in Spain

As the geographic limits of the demarcation attend to river basin criteria, there is not an exact correspondence between regions and demarcations, thus one demarcation can covers one or more regions.

Spain has a long history of basin management through the institutions known as Hydrographical Confederation. This public organization reports administratively to the Environment Ministry and currently are entrusted with the management of basins that exceed the territory of one region, these are known as inter-basin. In the case of basins fall exclusively within a region, the so-called intra-basin, the regional

government is responsible for their management and carries it out throw their own regional hydraulic agencies.

In each inter-basin there is a cooperation agency called the Committee of Competent Authorities, whose role is to ensure effective cooperation in implementing the standards of water protection. In these agencies are represented by the Central Government, Regional Government and local entities.

Regarding construction and operation of hydraulic works, it is important to emphasize the role of the so-called "State Companies", which are not public but belongs to Public Administration. These companies are currently a very useful tool for the Administration to promote hydraulic works. Some examples of these companies are: Acuamed, Acuanorte or Hidroguadiana.

Another important public institution is the National Water Council, which is the main consultative body for water matters. Despite its non-executive status, this institution has an important role in the national and regional hydrological planning.

From the point of view of users and according to Waters Law, water users that benefit from the same outlet or concession should constitute a community of users. The basic functions of these communities are to manage and care for the proper functioning of the use.

When the main use for this water is irrigation, this organization is called Irrigation Community. Most Spanish irrigation is integrated into these groups, which play a key role in the proper use and water management to ensure water demand.

In the other hand, urban water supply, sewerage and water treatment are under municipal and regional jurisdiction. It could be provided directly by Town Council or using public, mixed or private companies subject to concession.

2.3 Legislation Framework for RES and Water

2.3.1 RES Legislation Framework

Law	**Content**	**Comments**
Royal Decree-Law 6/2009, of 30 April (article 4)	establishes the mechanism for registering the pre-allocation of remuneration for facilities under the special regime	
Order ITC/3801/2008, of	Tariffs and bonuses for renewable energy generation	

26 December		
Royal Decree 1578/2008, of 26 September	remuneration for power production using photovoltaic solar technology by plants constructed after the payment deadline specified in Royal Decree 661/2007, of 25 May, for this technology	
Royal Decree 1028/2007 of 20 July	established the administrative procedure for the processing of authorization applications for power generation facilities in territorial waters	
Law 17/2007 of 4 July	common standards for the domestic electricity market	Adapts Law 54/1997 on the electricity sector to the stipulations of Directive 2003/54/CE
Order ITC/1522/2007 of 24 May	regulation for guaranteeing the source of RES electricity	
Royal Decree 661/2007, of 11 May	Regulates electric power production under the special regime sets a bonus for RE power installations of over 50 MW	replaced Royal Decree 436/2004 and a establishes a transitory economic system for the facilities to which it applied
Royal Decree 314/2006, of 17 March	approved the Technical Code for Construction (RE use compulsory)	
Royal Decree 436/2004, of 12 March	establishes the methodology for updating and systematizes the legal and economic framework for electricity generation under the special system.	
Royal Decree 1432/2002, of 27 December	Defines Average Tariff or Reference Tariff	some items modified from Royal Decree 2017/1997, of 26 December
Royal Decree 841/2002, of 2 August	regulated electrical energy production facilities in the special regime	Later repealed
Royal Decree	connection of photovoltaic installations to	

1663/2000 of 29 September	the low voltage grid	
Royal Decree-Law 6/2000, of 23 June	established market participation obligations for those facilities covered by Royal Decree 2366/94 with a power capacity higher than 50 MW	
Royal Decree 2818/1998	electrical energy production by plants supplied by RES	Later repealed
Royal Decree 2017/1997, of 26 December	organized and regulated payment of transport, distribution and marketing costs for regulated tariff supplies	
Law 54/97 on the Electricity Industry, of 27 November	ordinary regime electricity producers who carried out their activities in the production market were differentiated from producers under the special regime, who were required to have installed capacity of 50MW or less	
Royal Decree 2366/1994, of 9 December	New regulation and definition of the special regime for power production	based on the principles established in the Law 40/94 (LOSEN)
Law 40/94 of the National Electric System (LOSEN)	consolidates the concept of the special regime	
Law 82/1980 on energy conservation	Regulates the special regime for power production which accounts for RES	

2.3.2 Licensing Procedures for the Development of RES plants

Until 31 October 2009 the company distributor was responsible for checking the invoicing and of paying the special regime tariffs, bonuses and complements. From 1 November 2009 the National Energy Commission (CNE) determines the equivalent bonuses, incentives and complements.

The Directorate-General of Energy Policy and Mines has established a new system of information for the electricity sector (SINCRO). Distributor companies send monthly invoicing information to the CNE from producers in the special regime connected to their networks.

The CNE carries out the supervision and control of the regulated costs which constitute the tariffs, bonuses and complements, and elaborates reports, regulatory proposals of monthly improvement and statistics which are made public through its website. Also, from July 2007 the CNE publishes the installed total power with a definitive inscription in order to learn the level of progress made in the fulfillment of the objectives established in the Promotion Plan for Renewable Energies. Furthermore, the invoicing of the production in the special regime is periodically inspected by the CNE on the basis of a selection of facilities which appear in the Plan of Inspections proposed by the Directorate-General of Energy Policy and Mines.

On the other hand, the CNE manages the System for Guaranteeing Origin and Labeling Electricity, implemented on 1 December 2007, to inform the consumer in detail of the origin of the energy consumed and the associated environmental impact. This initiative is an adaptation of the European regulation.

The CNE publishes the Statistical Information on Energy Sales of the Special Scheme every month, comprising the development of the sales made to the market and to the distributor companies for the Spanish sector of electric energy production in the special scheme.

The Instituto para la Diversificación y Ahorro de la Energía (Institute for Diversification and Saving of Energy, or IDAE) is a state-owned business entity that reports to the Ministry of Industry, Tourism and Trade through the State Secretary for Energy. One of the main poles guiding the institution's activity is achieving the targets set by the Renewable Energy Plan for 2005-2010. The IDAE jointly coordinates and manages the measures and funds destined for these plans in conjunction with the autonomous regions. Also, the IDAE also runs activities to increase public knowledge and awareness, provides technical advice, and runs and finances example technology innovation projects with potential for replication.

The way in which the Institute takes part in projects depends on each specific case, the sector concerned, the technology involved and the scale of the investment. The formulas it uses are primarily the following:

- Third-Party Financing (TPF): the IDAE takes part in the definition of the project, providing the most appropriate technical solution for each case and financing all or part of the project investment. The IDAE makes the investment directly, so payments are not normally required by the industrialist or final recipient of the investment, the equipment is owned by the IDAE until the investment is recovered.

The IDAE recoups its investment, with a profit, from the energy generated and then the installed equipment becomes the property of the industrialist.

- Project finance and Provision of services: a financing mechanism applicable to projects which have undergone a prior economic/technical feasibility analysis. It is a new model of financial collaboration which entails drawing up and signing two contracts:

(a) a framework collaboration and service provision contract and

(b) a project finance contract (i.e. a business loan).

The proposed contractual scheme enables the adaptation of the contracts to each individual project based on a standard template. The IDAE's remuneration depends on the energy performance of the facility, thus enabling the developer to financial costs of the project for the developer to be moderated. The developers can therefore finance 100% of the investment cost of an energy project (VAT and other charges included), and also ensures the technical advice and experience of the IDAE in this type of project is available during implementation.

Other IDAE financial interests in energy projects is carried out through Temporary Business Unions (UTE), Economic Interest Groups (AIE), Shares in companies, Participation accounts and Technology development agreements.

In Andalucía, the Energy Agency of Andalucía, depending on the Regional Ministry of Innovation, Science and Enterprising, has the mission of developing the energy policies of the Andalusian Regional Government. Amongst its goals are the development of infrastructures of generation, transmission and distribution of energy, the promotion of the use of renewable energies, the management of regional subsidies for projects and the promotion of research, dissemination, etc.

Legislation procedures for RES

Renewable energy production in Spain is framed in the so-called special regime.

The administrative authorization for the construction, exploitation, modification, transfer and closure of the installations under the special regime, and the recognition of the special regime corresponds to the Autonomous Regions, with the exception of those installed in more than one region, those larger than 50 MW and those installed off-shore (then, the Directorate General of Energy Policy and Mines is responsible).

For authorization of the installation it is compulsory to obtain the rights of access and the connection to the electric grid.

The Autonomous Regions are able to develop simplified procedures for the authorization of installations smaller than 100 kW.
For the recognition of the special regime the owners or exploiters of the installations must ask the corresponding administration of the Autonomous Region for their inclusion in the corresponding category of RE producers.

Also, they must accredit the compliance of the main technical and performance requirements of the installation and present a quantified evaluation of the network it is going to be connected to.

After the application, there are 3 months for resolution.

Inscription in the administrative register of electric power plants (dependent of the Ministry of Industry, Tourism and Commerce) under the special regime is also required. There are two phases: previous and final inscription.

Previous inscription must be directed to the corresponding administration of the Autonomous Region and requires the provisional commissioning certificate and the technical contract with the electric network. The Autonomous Region must inform the Directorate General of Energy Policy and Mines of the inscription in the regional registry within 1 month, so that the subsequent previous inscription in the administrative register is done. The National Energy Commission assigns an ID to the registry and the Autonomous Region notifies the applicant.

Final inscription must be directed to the corresponding administration of the Autonomous Region and requires: (a) a document specified the option for selling the energy (with a regulated feed-in tariff or by participating in the power market with a premium); (b) a certificate of compliance with the regulations for measuring consumption and fluxes in the network; (c) a report from the system operator or the network manager accrediting compliance with the access, connection and operational procedures; (d) the accreditation of compliance with the requirements of article 4 of Royal Decree 2019/1997.

The Autonomous Region must inform the Directorate General of Energy Policy and Mines of the inscription within 1 month.

There is a maximum of 3 months between previous and final inscription.

Finally, a contract with the electric company must be signed.

2.3.3 Legislation Framework for Water

Spanish legislation about water is quite wide and complex, it includes practically all the aspects (water production and distribution, water use, water quality, discharges, environmental protection…); moreover there is specific legislation at national, regional and municipal level. A summary of the current laws in Spain at national level can be consulted in the Annex 1.

Due to the complexity of the legislation framework, it is important to clarify what are the most important laws involving water. Thus in this epigraph main laws at national level will be mentioned and their purpose will be explained.

At national level, the most important law involving water is the one called "Ley de Aguas" (Waters Law) identified as 1/2001 and approved in the year 2001. This law regulates all the fields concerning public hydraulic domain including the following topics:

- Use of public hydraulic domain
- Authorizations and concessions
- Protection of public hydraulic domain and continental water quality
- Infractions and sanctions
- Economical and financial conditions to use the domain
- Hydraulic works

On the other hand, public Sea-Land domain is regulated by the Law 22/1988, of July 28 and the Royal Decree 1471/1989 of December 1, approving the General Regulations for Development and Implementation of that law. These ones are known as Coastal Law and Coastal Regulation and deal with the same aspects that the Water Laws, but applied to public sea-land domain.

The above mentioned regulations are supplemented by the Law 16/2002, of July 1 which regulates authorization and concessions proceedings in the frame of pollutant discharges to sea and continental water.

Regarding water quality, water for human consumption is subject to the prescriptions of the Royal Decree 140/2003 of February 7, which sets the health criteria for the

human consumption water quality. Thus, this regulation governs, inter alia, the following aspects:

- Physical-chemical and microbiological characteristics needed by water to be considered drinkable.
- Allowed substances in water treatment for human consumption.
- Allowed construction materials in water treatment for human consumption.
- Frequency and proceedings on water control.

This regulation is complemented by the Order SAS/1915/2009, of July 8, that updates allowed substances in water treatment for human consumption.

Regarding construction materials, the authorization for the use and installation of the different materials are subject to the above mentioned Decree and to the provisions established by the Inter-ministerial Commission on Construction Products (ICCP), an agency of the Ministry of Industry, Tourism and Trade.

2.3.4 Licensing Procedures for the Development of Desalination plants

The specific legislation framework for desalination is recent and has suffered important changes in the last years. The legislation evolution in this topic is detailed below.

The first state rule dealing with desalination was the Royal Decree 1327/1995, of July 28 on sea or brackish water plant, in which desalination activity was subject to a concession.

Subsequently, changes on the Waters Law approved by Law 46/1999, of September 13, first introduced provisions on desalination in this Law. Thus, requests of concessions for desalination are removed by this Law. Moreover this Law stated that the desalinated water belongs to hydraulic public domain in case that it is incorporated into any of the elements of this. Subsequent approval of The Waters Law by Royal Legislative Decree 1/2001 of July 20 did not produce significant changes in what is related to desalination.

Years after, the Waters Law reform, which was carried out by the Law 11/2005, of June 22, made substantial changes in the juridic regime relative to desalination again. In this sense it stated that desalinated water always belongs to hydraulic public domain and is subject to concession.

The last change in the revised text of the Waters Law, as far as regards desalination, is the one developed by the Law 42/2007, of December 13. This reform clarifies that production and use of desalinated water are subjected to concession.

Permissions and Legal Procedures

The installation of a desalination plant entails getting several concessions. Most important legal procedures and permissions needed are detailed below.

Environmental Impact Procedures

Currently, the main applicable regulation on this field is the Legislative Royal Decree 1/2008, of January 11, by approving the revised text of the Law on Environmental Impact Assessment Projects.

According this regulation, desalination plants are exempt to undergo to an environmental impact assessment, but the following cases:

- Desalination plants involving a new or added volume greater than 3000 m^3/day.
- Plants that may affect directly or indirectly to the Natura 2000 net.

In both cases, control test, specified in the regulation, will be required only when the competent environmental institution decide it.

The competent authority will be the Environmental Ministry or the Organization authorized by the Regional Government, depending on the region where the project is located.

The procedure begins with the sending of the project summary and ends with the concession of the "Environmental Impact Declaration" by the competent environmental Institution. This process lasts about 15 months.

Use of Seawater and Discharges

The Coastal Law only allows the occupation of the sea-land public domain by facilities that cannot have another location because of their own nature. Raw water supply works, pipelines to desalination plant and discharger fit in this description but desalination plants do not, thus these ones must be placed outside the domain. In this sense, a concession to occupy the sea-land public domain by the associated facilities is required.

According to article 150 of the Coastal Regulation, the processing of this concession to the coastal authorities, depending on Central Government, is carried out jointly with the application for authorization to discharge.
Brine discharges are regulated on the basis of the receiving environment, whether sea-land public domain (sea) or hydraulic public domain (public channel, inland waters), being applicable a different regulation in each case.

In the study case, the most common situation will be the discharge to sea. I.e. the sea-land public domain, in this case will be applicable the Coastal Law and the Coastal Regulation. In the same way, will be applicable the Ministry Order of 1993, July 13, which approved the instruction for projects about dischargers from land to sea.
The coastal Law subjects every discharge to authorization, whether polluting or not, considering the Regional Government as the competent authority.
These discharges will be authorized on the basis of quality objectives set for the receiving environment and the absorptive capacity of the pollution load from that environment, without undergoing significant changes.
In this regulation, quality objectives, set for the receiving environment, refer to metals and metalloids, biocides, VOC, and PAH but not to salinity. Similarly, no reference is made to the maximum level allowed of salt concentration in discharges. Thus the related authorizations remain at the discretion of the assessment made in this regard each region.
The authorized discharges will be taxed with a fee. The amount of this discharge fee depends on the pollution load in accordance with the discharge volume and its toxicity.
The duration of this phase is about 10 months.

Use of Desalinated Water

The revised text of the Water Law, approved by the legislative Royal Decree 1/2001, of July 20, including subsequent changes mentioned in the "Specific Legislation" epigraph, states that desalinated water belongs to hydraulic public domain and its use is subject to concession.
The concession must be requested by final users and it will be granted either by the General State Administration or by the Regional Administration, depending on whether water use is framed in a basin that occupies several regions or not.
The duration of this phase is 18 months.

Other Procedures

Royal Decree 140/2003 of February 7 states that water for human consumption is subject to health authorization. Therefore, if the desalination plant supplies drinkable water it will be subject to authorization granted by the Regional Government. This authorization depends on water quality control carried out by authorized labs.

The duration of this phase is variable depending on the region where the procedure is done.

Another necessary procedure is the registration of the company involved into Drinking Water Plants Operators Registry.

2.4 Energy and Water Tariff

2.4.1 Energy Tariff

In Spain, electricity producers in the special regime can sell their surplus energy or their product: (a) at a regulated tariff (when the energy is supplied to the distributor), or (b) in the market itself, either directly, or through an agent (adding a premium to the market price but with an upper and lower limit on the final price).

The corresponding tariffs, premiums and upper/lower limits are indicated in the table below for each RE source.

Type of RES	Power	Period	Regulated tariff c€/kWh	Ref. premium c€/kWh	Upper limit c€/kWh	Lower limit c€/kWh
Solar PV	P ≤ 100kW	First 25 years	44.0381			
		Since then	35.2305			
	100kW < P ≤ 10MW	First 25 years	41.75			
		Since then	33.4			
	10MW < P < 50MW	First 25 years	22.9764			
		Since then	18.3811			
Solar thermal		First 25 years	26.9375	25.4	34.3976	25.4038

		Since then	21.5498	20.32		
Wind energy		First 20 years	7.3228	2.9291	8.4944	7.1275
		Since then	6.12	0		
Waves, tidal, geothermic		First 20 years	6.89	3.8444		
		Since then	6.51	3.06		
Biomass (energy crops)	P ≤ 2MW	First 15 years	15.8890	11.5294	16.63	15.41
		Since then	11.7931	0.0000		
	P > 2MW	First 15 years	14.6590	10.0994	15.09	14.27
		Since then	12.3470	0.0000		
Biomass (agriculture and gardening residues)	P ≤ 2MW	First 15 years	12.5710	8.2114	13.31	12.09
		Since then	8.4752	0.0000		
	P > 2MW	First 15 years	10.7540	6.1914	11.19	10.379
		Since then	8.0660	0.0000		
Biomass (forestry residues)	P ≤ 2MW	First 15 years	12.5710	8.2114	13.31	12.09
		Since then	8.4752	0.0000		
	P > 2MW	First 15 years	11.8294	7.2674	12.26	11.44
		Since then	8.0660	0.0000		
Dumping site biogas		First 15 years	7.992	3.7784	8.96	7.44
		Since then	6.51	0.0000		

Waste anaerobic digestion biogas	P ≤ 500kW	First 15 years	13.069	9.7696	15.33	12.35
		Since then	6.51	0.0000		
	P > 500kW	First 15 years	9.68	5.7774	11.03	9.55
		Since then	6.51	0.0000		
Manure (combustion or liquid biofuels)		First 15 years	5.36	3.0844	8.33	5.1
		Since then	5.36	0.0000		
Biomass from industrial installations of agriculture	P ≤ 2MW	First 15 years	12.571	8.2114	13.31	12.09
		Since then	8.4752	0.0000		
	P > 2MW	First 15 years	10.754	6.1914	11.19	10.379
		Since then	8.066	0.0000		
Biomass from industrial installations of forestry	P ≤ 2MW	First 15 years	9.28	4.9214	10.02	8.79
		Since then	6.51	0.0000		
	P > 2MW	First 15 years	6.5080	1.9454	6.94	6.12
		Since then	6.5080	0.0000		
Biomass (liquid) from paper industry	P ≤ 2MW	First 15 years	9.28	5.1696	10.02	8.79
		Since then	6.51	0.0000		
	P > 2MW	First 15 years	8.0	3.2199	9.0	7.5
		Since then	6.508			
Solid urban waste			5.36	2.3		

Other waste not specified before			5.36	2.3		

2.4.2 Water Tariff

The water price in Spain has huge changes, depending on which geographical region are we considering. This difference of prices could be explained by several aspects:

- Quality, availability and proximity of water resources.
- Facilities needed to water transport (mainly pumping stations).
- Facilities needed for the water treatment and sewage treatment.

Differences between each region prices could be appreciated in the figure below. In this figure, the price for the integrated cycle of water (water supply, sewerage and water treatment) is represented, taking into account both the domestic and industrial use.

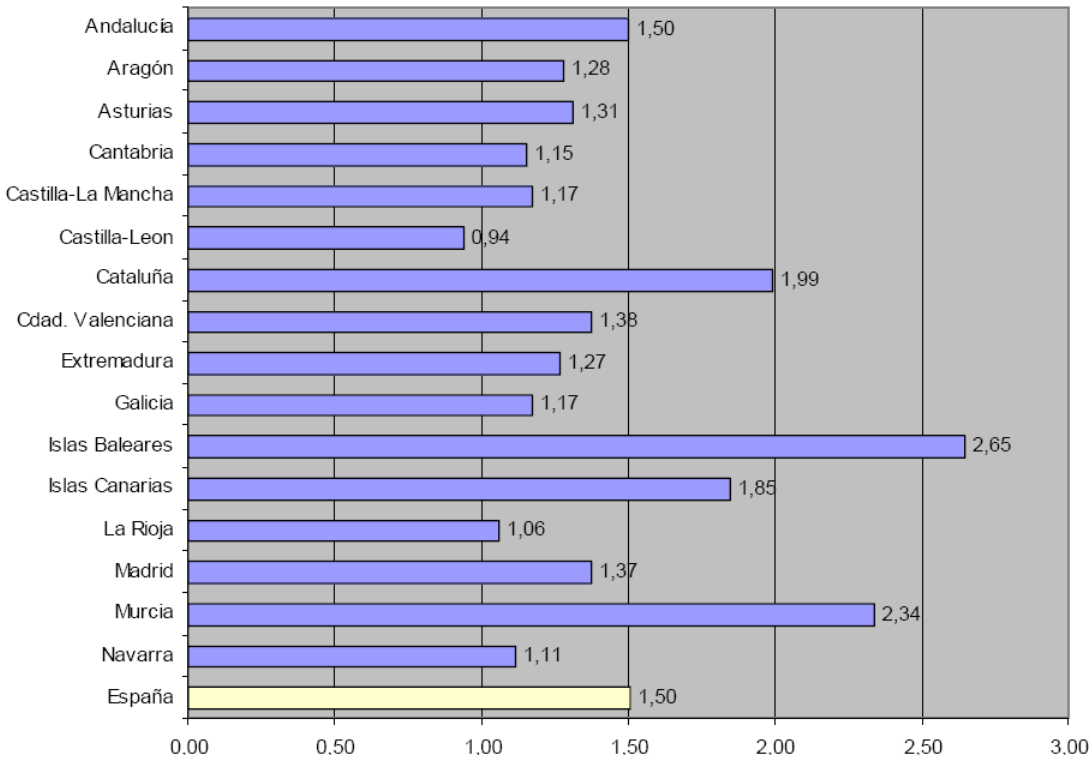

Figure 6 Price of water in Spain (prices in €/m^3)

Water tariffs are mainly controlled by the Town Councils (domestic and industrial users) and the irrigation communities (agricultural sector), but the final price paid by the user includes several taxes and fees, associated to the different services involved in the complete process of water management and whose values could be set by another institutions (mainly basin bodies). Anyway, the setting of prices is done agreeing the principle of recovery cost.

The following ones are the main taxes and fees associated to the different services:

- Regulation fee
- Water use rate
- Urban water supply rate
- Irrigation water supply rate
- Sewerage rate
- Sewerage fee
- Waste control fee

The following table shows the main water services and the most important recovery costs tools associated to each one.

Water service.	Recovery cost tool.
Water collection, storage and transportation	Regulation fee and water use rate
Underground water collection	Urban water supply rate and irrigation water supply rate
Urban water supply	Urban water supply rate
Urban sewerage and waste water treatment	Sewerage rate and sewerage fee
Irrigation water supply	Irrigation water supply rate
Waste control	Waste control fee

As far as water producers are concerned, the water sell price to major suppliers (Utililities like the Taibilla Channel Community) is set by both, producers and suppliers. Therefore, the price is subject to negotiation and the agreed amount depends on concessions granted and facilities financing conditions imposed by the Administration.

Some examples of Spanish water producers are Befesa, Acciona, Inima and Cadagua.

Regarding water subsidies, they are mainly focused on saving and efficiency strategies.

In this sense, subsidies for the improvement of the irrigation systems are very important tools in some regions to achieve more modern and efficient facilities. These subsidies promote the using of desalinated water, the implementation of planning and management programs and the re-using of water. Moreover these subsidies are an efficient tool in the task of recovery cost in the agricultural sector.

These measures are applied in another fields too, for example, Environment Ministry subsidizes the desalination in the Canary Islands Region in order to reduce water prices in the region, which are higher than the average price in the country. (Ref: Resolution of July 7, 2010, of the Secretariat of State of Water). But, as it was mentioned, the aim is not only to ensure the adequacy and quality of water resources but also encouraging more efficient systems and promoting a rational use of water.

2.5 Conclusions – Recommendations

The current document presents the main data and information concerning the legal and institutional situation of renewable energies (RE) and desalination in Spain.

The most relevant conclusions extracted are the following:

1. RE is a key and powerful industrial sector in Spain with a very significant contribution to electricity generation: 24,7 % of electricity in 2009 and very promising role for the next decade (42.3% in 2020).
    - It is particularly relevant the importance of wind power, with 50 % of the RE contribution.
    - Spain is world leader in terms of solar PV capacity per habitant, with 75.2 watts per capita
    - Spain has more than a third of total solar thermal electric capacity in the world. All four solar thermal electric technologies are used in Spain: parabolic trough receiver (93 %), Central tower receivers (3%), parabolic disks (3%), linear Fresnel receivers (1%)
2. The subsidy strategy (Feed-in tariffs) and the identified fees has allowed this high development of the RE sector
3. Different institutions share the responsibility of promoting and regulating the RE sector. Specific mention is made to, control centre of renewable energies (CECRE, June 2006), a worldwide pioneering initiative to monitor and control

RE electricity. This centre allows the maximum amount of electricity production from RE sources, to be integrated into the power system under secure conditions.

4. Spain has a long and intensive experience in desalination:
    - The first Europe's desalination plant was built nearly 46 years ago (Canary Islands).
    - Spain is the largest user of desalination technology in the Western world.
    - Spain is the fourth-largest user of desalination technology in the world, with more than 700 plants, producing approximately 1.6 millions of cubic meters of water each day.
    - In Spain there has been a strong public investment in recent years in desalination: 1,945 millions of € within the AGUA program.
5. There are interesting initiatives on subsidies, as the one, focused on desalination in the Canary Islands, addressed to reduce water prices in the region, which are higher than the average price in the country.
6. The promotion of RE powered desalination could have a specific legal regulation in the future, given the high interest and favorable reality of the RE and desalination sectors. Thus, it makes a lot of sense to joint both technologies. This question was specifically discussed in the seminar celebrated last 15 of June among the IDAE (www.idae.es), CIEMAT-PSA and ITC (See specific report for Task 6.4). The representatives of this Spanish organism were very receptive to the suggestion of creating a specific subsidy to desalinated water produced by RE resources. They agreed to include desalination in the next Plan for Renewable Energy in Spain (2011-2020)
7. Some of the current legal conditions can facilitate the procedures for RE desalination systems:
    - The Autonomous Regions are able to develop simplified procedures for the authorization of RE installations smaller than 100 kW, case of small wind and/or PV powered systems.
    - The Environmental Impact Assessment is not required for desalination units under 3,000 m^3/day. This limit is high enough for RE desalination.
8. The main PRODES outcomes (roadmap, commercial desalination products, databases…) can be used to promote RE desalination through legislative and

administrative actions by disseminating the mention results to the main stakeholders:

- Decision makers, who probably will have a limited idea about RE desalination
- Public companies related to water / energy management

9. As soon as the oil prices increase on the short term, the possibilities of promotion desalination powered by renewable energies projects will increase also. Thus, it is time to prepare the future by disseminating the very interesting findings of the ProDes project to the private sector also, trying to suggest the creation of joint collaborations between energy companies and desalination companies. This situation will boost the inclusion of more specific legal conditions that support RE desalination actions.

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ANNEXES

ANNEX I

a. Laws Concerning Sea-Water

- Law 10/1977, of January 4 on territorial sea.
- Order of December 30, 1977, which regulates the oil discharges from ships to sea.
- Law 15/1978, of February 20, to regulate the maritime economic zone.
- Law 23/1984, of June 25, on rules governing marine farming.
- Law 22/1988 of July 28. Coastal Law, which regulates the sea-land public domain.
- Royal Decree 1471/1989 of December 1, approving the General Regulations for development and implementation of Law 22/1988 of 28 July.
- Order of October 30, 1992, which sets the amount of the fee of occupation and exploitation of sea-land public domain, as set out in Article 84 of Law 22/1988, of July 28.
- Law 27/1992 of November 4, which regulates State Ports and Merchant Navy.
- Royal Decree 393/1996 of March 1, by approving the General Piloting Regulations, in accordance with the provisions of the Law of the State Ports and Merchant Navy.
- Royal Decree 1253/1997, of June 24, concerning minimum requirements for vessels transporting dangerous or polluting goods to or from national seaports.
- Law 62/1997, of December 26, 1997, modifying Law 27/1992 of 24.11.1992 (RCL 1992 \ 2496 and 2660), State Ports and Merchant Navy.
- Royal Decree 701/1999 of April 30 concerning minimum requirements for ships carrying dangerous or polluting goods to or from ports.
- Royal Decree 768/1999 of May 7, which approves the Regulations for the enforcement of international rules on maritime safety, pollution prevention and living and working conditions on foreign ships using the ports or facilities in Spanish territorial waters.
- Royal Decree 1828/2000 of November 3, which mending the Regulation for the enforcement of international rules on maritime safety, pollution prevention and living and working conditions on foreign ships using the ports

or facilities located in Spanish waters, approved by Royal Decree 768/1999 of 7 May.

- Law No. 3 / 2001 of March 26, the State Marine Fisheries.
- Royal Decree 1217/2002 of November 22, in determining the composition and functions of the National Sea Rescue.
- 2000 Amendments to the International Convention for Safety of Life at Sea, 1974 (published in the "Gazette" 144-146 numbers from 16 to June 18, 1980), adopted on 5 December 2000 by Resolution MSC 99 (73).
- Royal Decree 90/2003 of January 24, on common rules and standards for organizations of inspection and control of ships and for the relevant activities of maritime administration.
- PRE/583/2003 Order of March 13, which establishes the Commission for Coordination and Follow-up Activities Oceanographic Ships.
- FOM/599/2003 Order of March 11, by updating the technical conditions of the Royal Decree 809/1999 of May 14, regulating the requirements to be met for marine equipment to be shipped on ships, in application of Directive 2002/75/EC of the Commission.
- APA/874/2003 Order of April 10, laying down the ports where landings can be made more than 100 kg deep-sea species, from areas 1 to XIV of the International Council for the Exploration of coral Sea (ICES), and EU waters within CECAF 34.1.1, 34.1.2, 34.1.3 and 34.2.
- APA/782/2003 Order of April 4, by amending the Order of 29 November APA/3011/2002, by limiting fishing for certain procedures in certain areas of the National Fishing Grounds of Biscay and Northwest.
- APA/1029/2003 Order of April 23, which made public the new relations of production areas of shellfish and other marine invertebrates on the Spanish coast.
- APA/1032/2003 Order of April 28, by amending APA/3011/2002 Order of 29 November, in which fishing is restricted to certain procedures in certain areas of the National Fishing Grounds of Biscay and Northwest.
- Royal Decree 1048/2003 of August 1, on fisheries management.
- Royal Decree 995/2003, of July 25, laying down the requirements and harmonized procedures for loading and unloading of bulk carriers.
- Law 48/2003 of November 26, the economic regime and the provision of services of general interest ports.

- Royal Decree 210/2004, of February 6, by establishing a monitoring system and information on maritime traffic. BOE 39 of 02.14.2004. FOM/426/2004 Order of January 30, by approving the plan for using the port area of Puerto de Arrecife.
- FOM/818/2004 Order of March 4, definition of terms, conditions, scales and criteria for the application of port taxes and subsidies, in accordance with the provisions of Law 48/2003 of November 26 of economic system and the provision of services of general interest ports.
- FOM/1392/2004 Order of May 13 concerning the notification and delivery of waste generated by ships.
- Resolution of May 10, 2004, the Directorate General of Merchant Marine, by determining the maritime zones A, B, C and D for passenger ships engaged in voyages between Spanish ports.
- Royal Decree 1892/2004 of September 1, which sets out regulations for implementing the International Convention on civil liability for damage due to pollution of the waters of the sea by oil.
- Ministerial Order of May 31, 2005, establishing a plan for lobster pot in a certain area of Eastern Cantabria.
- Resolution of June 6, 2005, General Secretariat for the prevention of pollution and climate change as expressed by the environmental impact statement on the evaluation of the project 'desalination plant in the metropolitan area of Barcelona', promoted by ACUAMED.
- Resolution of June 7, 2005 of the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the evaluation of the proposed 'extension of the desalination plant of the Tordera, Municipality of Blanes (Girona)', promoted by the State Water Company of the Mediterranean Basin, SA..
- Resolution of June 7, 2005, the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the evaluation of the proposed 'New Canal Alicante desalination', promoted by Taibilla Channels Community.
- Order FOM/2187/2005 of June17, approving the valuation of land and water of the service area of the Port of Coruña.
- Resolution of June 23, 2005 of the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact

statement on the evaluation of the project 'Construction of the seawater desalination facility in Ciutadella (Menorca) ´.

- Resolution of June 23, 2005 of the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the evaluation of the project 'Construction of the seawater desalination facility in the Bay Alcudia ', promoted by the Directorate General of Water..
- APA/2858/2005 Order of September 14, laying down a plan for the conservation and sustainable management of bottom trawl fisheries in the national fishery of the Gulf of Cadiz.
- Resolution of July 28, 2005, the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the evaluation of the project 'Second Phase of Expansion Zone Port of Marin ', promoted by the Port Authority of Marin and Ria de Pontevedra.
- FOM/3037/2005 Order of September 14, approving the Plan of use of port areas Vilagarcía port.
- Resolution of September 23, 2005, the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the draft 'Connecting the desalination of the New Canal to Cartagena Vega Baja del Segura (AC / Pliar de la Horadada) ', promoted by the Taibilla Channels Community.
- FOM/3777/2005 Order of November 18, prohibiting the anchoring of vessels in the area of Community importance Sabadales del Sur on Tenerife.
- FOM/3997/2005 Order of December 9, by amending the Plan of use of port areas of the port of Cartagena, including the tailings basin.
- Royal Decree 1615/2005 of December 30, amending Royal Decree 560/1995 of 7 April, laying down minimum sizes of certain fish species.
- APA/79/2006 Order of January 19, establishing a Comprehensive Plan for the conservation management of fisheries resources in the Mediterranean.
- Resolution of August 23, 2006, the General Secretariat for the prevention of pollution and climate change by adopting the decision to waive environmental impact assessment of the draft 'Dredging and provision of aggregates in the territory of the beach of Cabanas (Cabanas, La Coruña)', promoted by the Ministry of Environment.

- Resolution of September 12, 2006, the General Secretariat for the prevention of pollution and climate change, which is formulated Environmental Impact Statement on the proposed 'Desalination and additional works for the Marina Alta (Denia, Alicante) ', promoted by ACUAMED, SA..
- Resolution of September 22, 2006, the Hydrographical Confederation of North, which publishes the collaboration agreement with the Xunta de Galicia and the Waters of Galicia autonomous body for the funding, implementation and operation of the improvement works debugging and discharged from A Coruña: Submarine Emissary Bens.
- Announcement of the Directorate General of Coasts on the decision of the Government Delegation in Galicia by declaring the need to occupy the property affected by the condemnation of property at the waterfront, old street slaughterhouse at the TM Coruna.
- APA/961/2007 Order of April 3, establishing a marine reserve fishing in Cala Ratjada, to the east of the Mallorca island, and defines its boundaries, zones and permitted uses.
- Resolution of July 31, 2006, the Society of Maritime Safety Agency, which is given `advertising Agreement is assigned to Marine Trailers, SA maintenance management and crew of the fleet of response units quick property of the Company and the total charter fleet of rapid response units.

b. Laws Concerning Discharges to Sea

- Resolution of April 23 1969, Interim Standards for wastewater treatment facilities and wastewater discharges to sea.
- Royal Decree 258/1989 of March 10, which establishes the general regulations on dangerous substances discharges from land to sea.
- Order of October 31, 1989, which sets emission standards, quality objectives, reference measurement methods and control procedures relating to hazardous substances contained in discharges from land to sea.
- Order of May 9, 1991, by amending Annex V of the Order of October 31, 1989,
- Order of October 28, 1992, by extending the scope of the Order of October 31, 1989 to four new dangerous substances that may be part of certain discharges.

- Order of July 13, 1993, which sets the regulations for projects concerning pipeline discharges from land to sea.
- Amendments to the Guidelines on the enhanced program of inspections during surveys of bulk carriers and oil tankers [Resolution A 744 (18), as amended] adopted on December 5, 2000 by Resolution MSC 105 (73).
- Amendments to the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (CLQ Code), adopted on December 5, 2000 by Resolution MSC.102 (73).
- Royal Decree 1381/2002, of December 20 on port facilities for ship-generated waste and cargo residues.
- Resolution of December 19, 2002 from the Chamber of Deputies, by ordering the publication of the Agreement on the Recognition of Royal Decree-Law 9 / 2002 of December 13, by adopting measures for tankers carrying dangerous or polluting substances.
- Royal Decree 1249/2003, of October 3, on reporting formalities required to merchant ships arriving in Spanish ports and out of them.
- APA/6/2004 Order of January 12, which regulates the trawl fishery in EU waters in the area IX of the International Council for Exploration of the Sea (ICES).
- APA/676/2004 Order of March 5, by regulating fishing with purse seine gear in the National Fishing Grounds of Biscay and Northwest
- APA/678/2004 Order of March 5, by regulating fishing with purse seine gear in the National Fishing Grounds of Mediterranean Sea.
- Royal Decree 429/2004 of March 12, laying down measures for the management of the purse seine fleet.

c. Laws Concerning Continental Waters

- Law of February 20, 1942, Inland Fishing.
- Decree of November 14, 1958, approving the Water Police Regulations.
- Decree 1975 of May 25, 1972, amending Chapters IV and V of the Rules of the Water Police.
- Order of July 28, 1974, by approving the General Technical Specification for Water Supply Pipes and creating a Standing Committee Pipeline Water Supply and Sanitation of Towns.

- Decree 2508, of September 18, 1975, to September 18, prevention from damages by flood and Urban Planning.
- Royal Decree 2473/1985 of December 27, approving the validity table referred to paragraph 3 of the repealing provision of Law 29/1985 of August 2.
- Royal Decree 849/1986, of April 11, by approving the Public Water Regulation, which develops a preliminary, I, IV, V, VI and VII of the Law 29/1985 of August 2. Amended by Royal Decree 606/2003.
- Law 14/1986 of April 25, about General Health.
- Royal Decree 927/1988 of July 29, by approving the Regulations of the Public Administration of Water and Water Planning in Development of titles II and Annex III to the Water Law. (partial text)
- Royal Decree 984/1989 of July 28, organizational structure of the Hydrographical Confederations.
- Royal Decree 1310/1990, of October 29, which regulates the use of sewage sludge in agriculture.
- Order of February 27, 1991, by amending and supplementing the Ministerial Decree of November 12, 1987, concerning Emission Standards, Quality Objectives and Methods of Measurement of Reference for discharges of certain dangerous substances.
- Order of May 25, 1992 amending the Order of November 12, 1987, emission standards, quality objectives and reference measurement methods relating to harmful or dangerous substances contained in a discharge.
- Royal Decree 117/1992 of February 14, by updating the composition of the National Water Council.
- Royal Decree 531/1992 of May 22 on the special administrative measures which are taken to manage water resources, under Article 56 of the Waters Law.
- Order of September 22, 1992 by adopting the additional technical instructions and recommendations for the development of Basin Water Plans exchanges.
- Royal Decree 1315/1992, of October 30, by partially amending the Public Water Regulation, which develops Preliminary Parts I, IV, V, VI and VII of the Law 29/1985 of 2 August , water, approved by Royal Decree 849 / 1986 of 11 April.

- Royal Decree 419/1993 of March 26, which updates the amount of the penalties provided for in Article 109 of Law 29/1985 of 2 August, water, and amending certain articles of the regulation public water, approved by Royal Decree 849/1986 of 11 April.
- Resolution of July 12, 1993, the secretary of state for water policy and the environment, which identifies the areas of irrigated land affected by drought, in compliance the provisions of Royal Decree-Law 8 / 1993 of May 21 by adopting urgent measures to redress the effects of drought.
- Royal Decree 439/1994 of March 11, amending various provisions of Royal Decree 927/1988 of 29 July, approving the Regulation of Public Administration of Water and Hydrological Planning, updating the composition of the National Water Council and Water Board of the basin.
- Royal Decree 1541/1994 of July 8, amending Annex I to Regulation of public water management and water planning approved by Royal Decree 927/1988, of July 29, 1988.
- Royal Decree 1771/1994, of August 5, adaptation to Law 30/1992 of November 26, the legal regime of public administrations and common administrative procedure, certain administrative procedures on water, coastal and environment.
- Royal Decree 484/1995 of April 7 on Adjustment measures and Spill Control.
- Law 8 / 1996 of January 15, by adopting urgent measures to redress the effects of drought.
- Law 9 / 1996 of January 15, by adopting extraordinary measures, in urgent and exceptional on water supplies as a result of persistent drought.
- Royal Decree 2068/1996, of September 13, by amending the composition of the National Water Council and Water Board Basin Organizations.
- Order of March 12, 1996, by approving the Technical Regulation on Safety of Dams and Reservoirs.
- Order of March 14, 1996 by providing for the publication of the agreement of the Council of Ministers of February 9, 1996, approving the National Irrigation Plan Horizon 2005.
- Royal Decree 2068/1996, of September 13, amending the composition of the National Water Council and Water Board Basin Organizations.
- Law 22/1997, of July 8, by adopting state-determined interest and waterworks.

- Resolution of May 25, 1998, the Ministry of Water and Coasts, which are declared "sensitive areas" in the Inter-Community Watershed.
- Royal Decree 1664/1998 of July 24, by approving the River Basin Management Plans.
- Royal Decree-Law 9 / 1998 of August 28, by approving the general interest and declare certain waterworks.
- Law 11/1999 of April 21, to amend the Law 7 / 1985 dated April 2, Regulating the Local System Rules, and other measures for the development of Local Government in terms of traffic, movement of motor vehicles and road safety and water issues.
- Resolution of May 17, 1999, the Directorate General of Quality and Environmental Assessment, which is formulated environmental impact statement on the proposed channel of Navarra and the transformation of its irrigated areas of the Directorate General of Hydraulic Works and Water Quality, and the Departments of Agriculture, Livestock and Food, and Public Works, Transport and Communications of the Government of Navarra.
- Order of August 13, 1999, by providing for the publication of the findings of the normative content of River Basin Management Plan del Duero, approved by Royal Decree 1664/1998 of July 24.
- Order of August 13, 1999, by providing for the publication of the findings of the normative content of River Basin Management Plan of the Ebro, approved by Royal Decree 1664/1998 of July 24.
- Order of August 13, 1999, by providing for the issuance of the determinations of normative content of the Plan of the Guadalquivir River Basin Management, approved by Royal Decree 1664/1998 of July 24.
- Order of August 13, 1999, which provides for the publication of the findings of the normative content of River Basin Management Plan of the Guadiana I and II, approved by Royal Decree 1664/1998 of July 24.
- Order of August 13, 1999, which provides for the publication of the findings of the normative content of River Basin Management Plan Júcar, approved by Royal Decree 1664/1998 of July 24.
- Order of August 13, 1999, which provides for the publication of the findings of the normative content of River Basin Management Plan North I, North II and North III, approved by Royal Decree 1664/1998 of July 24.

- Order of August 13, 1999, which provides for the publication of the determinations of normative content of the Plan of the Segura River Basin Management, approved by Royal Decree 1664/1998 of July 24.
- Order of September 6, 1999, which provides for the publication of the findings of the normative content of River Basin Management Plan of the South, approved by Royal Decree 1664/1998 of July 24.
- Order of August 13, 1999, which provides for the publication of the findings of the normative content of River Basin Management Plan of the Tajo, approved by Royal Decree 1664/1998 of July 24.
- Order of January 11, 2000 by correcting errors of the Order of August 13, 1999, which provides for the publication of the findings of the normative content of River Basin Management Plans North I, North II North III, approved by Royal Decree 1664/1998 of July 24.
- Order of January 11, 2000 by correcting errors of the Order of 13 August 1999 which provides for the publication of the findings of the normative content of river basin management plans Guadiana, Guadiana I and II, approved by Royal Decree 1664/1998 of July 24.
- Order of January 11, 2000, by correcting errors of the Order of August 13, 1999, which provides for the publication of the normative content determinations of the Guadalquivir Water Plan, approved by Royal Decree 1664 / 1998 of July 24.
- Order of January 11, 2000, correcting the errors of the Order of September 6, 1999, which provides for the publication of the findings of the normative content of River Basin Management Plan of the South, approved by Royal Decree 1664/1998 of July 24.
- Royal Decree 995/2000 of June 2, laying down quality objectives for certain pollutants and amending the Public Water Regulation, approved by Royal Decree 849/1986 of April 11.
- Royal Decree Law 8 / 2000 of August 4, Taking urgent measures to mitigate the effects of drought and other adverse weather.
- Royal Decree 378/2001 of April 6 by approving the Hydrological Plan of the Balear Islands.
- Law 10/2001, of July 5, the National Hydrological Plan. Amended by Law 11/2005.

- Royal Decree 1 / 2001 of July 20, by approving the Consolidated Text of the Waters Law. Amended by Royal Decree Law 4 / 2007.
- Correction of Errors of Law 10/2001, of July 5, the National Hydrological Plan.
- Resolution of September 19, 2001, the General Secretariat of the Environment on the environmental impact assessment of forest hydrological restoration project in the basin of Guadalmedina of the Hydrographical Confederation of the South.
- Corrigendum to the revised text of the Waters Law, approved by Royal Legislative Decree 1 / 2001 of July 20.
- Royal Decree 201/2002, of February 18, by approving the amendment of Hydrological Plan of the Ebro basin.
- MAM/638/2002 Order of March 7, to amend the Order of August 13th, 1999 by providing for the issuance of the determinations of normative content of the Hydrological Plan of the Ebro Basin, approved by Royal Decree 1664/1998 of July 24.
- Royal Decree 329/2002, of April 5, by approving the National Irrigation Plan.
- Resolution of July 1, 2002, the Duero River Basin, on the classification of reservoirs in the basin of the Duero, for the purposes of navigation.
- Royal Decree 839/2002, of August 2, which amends Royal Decree 929/1989 of July 21, by which is the body of the Duero River Basin watershed.
- Royal Decree 606/2003 of May 23, by amending the Royal Decree 849/1986 of April 11 by approving the Public Water Regulation, which develops a preliminary, I, IV , V, VI and VIII of Law 29/1985 of August 2, Water.
- Resolution of October 31, 2003, the General Secretariat of the Environment which makes environmental impact statement on the proposed transfers authorized by Article 13 of Law 10/2001, of July 5, Water Plan National Secretary of State for Water and Costs of the Ministry of Environment.
- Resolution of January 21, 2004 of the Hydrographical Confederation of North, which provides for the publication of the Collaboration Agreement for the parcel of integrated farm management, and maintenance of infrastructure works and general drainage system of Nalón river basins and flow..
- Royal Decree 435/2004 of March 12, which regulates the national inventory of wetlands.
- MAM/1873/2004 Order of June 2, by approving the official forms for the declaration of release and develop certain aspects of the discharge

authorization and settlement of the canon of the control of discharges regulated by Royal Decree 606/2003 of May 23, reform of the Royal Decree 849/1986 of April 11 by approving the Public Water Regulation, which develops a preliminary, I, IV, V, VI and VII Law 29/1985 of 2 August, Water.

- Royal Decree Law 2 / 2004 of June 18, by amending Law 10/2001 of July 5, the National Hydrological Plan.
- Royal Decree 2129/2004 of October 29, amending the Royal Decree 650/1987, of May 8, which defines the territorial areas of the basin organizations and water management plans.
- Resolution of April 29, 2005, the General Secretariat for the prevention of pollution and climate change, environmental impact assessment of the project 'Improvement of the irrigation network in the community of irrigators d'Escarp PNA, Massalcoreig TM (Lérida),
- Royal Decree Law 10/2005 of June 20, by adopting urgent measures to mitigate damage in the agricultural sector to drought and other adverse weather.
- Law 11/2005 of June 22, by amending Law 10/2001 of July 5, the National Hydrological Plan.
- Resolution of June 1, 2005, the General Secretariat for the prevention of pollution and climate change, environmental impact assessment project 'Fitting the beach resort. Leisure space in Vega Terron (Salamanca)'.
- Resolution of June 24, 2005, the General Secretariat for the prevention of pollution and climate change, which is formulated Environmental Impact Statement on the proposed Fresneda-Presa de la Torre del Compte in the river Matarraña (Teruel), promoted by the Ebro Hydrographical Confederation.
- Resolution of June 28, 2005, the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the 'Draft of sanitation and purification Alberche River Basin (Ávila) ', promoted by the Tajo River Basin.
- Resolution of July 1, 2005 of the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the evaluation of the project "Regulation of River Almonte (Trujillo, Cáceres), promoted by the Tajo Hydrographical Confederation.
- PRE/2500/2005 Order of July, 29 by determining the land areas affected by drought and establishing criteria for the award of certain measures in the

Royal Decree Law 10/2005 of June 20 by adopting urgent measures to mitigate the damage caused to agriculture by drought and other adverse weather.

- Resolution of July 11, 2005, the General Secretariat for the prevention of pollution and climate change, environmental impact assessment of the project 'Utilization of the river diversion hydroelectric BOEZ (León). Leaping transfer' in Congosto promoted by Endesa Generación SA.
- Resolution of August 22, 2005 of the Tajo River Basin Conference which provides the publication of the collaboration agreement between the Tajo River Basin Environment Ministry and the Ministry of Agriculture and the Environment, for the implementation of actions for the development of Watershed Restoration Plan-Forest.
- Royal Decree 1265/2005 of October 21, laying off administrative measures to manage water resources and to correct the defects of the drought in the watersheds of the rivers Jucar and Tajo Segura.
- Resolution of September 20, 2005, the General Secretariat for the prevention of pollution and climate change by adopting the decision to waive environmental impact assessment environmental restoration project Amadoiro River, promoted by Júcar Hydrographical Conference.
- Royal Decree 1419/2005 of November 25, by adopting administrative measures for exceptional management of water resources and to correct the effects of drought in the watersheds of the rivers Guadiana, Guadalquivir and Ebro.
- Royal Decree Law 15/2005 of December 16, on urgent measures for the regulation of transactions in rights to water use.
- Royal Decree 5 / 2006 of January 13, amending the Royal Decree 928/1989 of July 21, by establishing the Agency Confederation of the Guadiana Basin.
- Royal Decree-Law 9 / 2006 of September 15, by adopting urgent measures to mitigate the effects of drought on populations and irrigated farms in selected river basins.
- Resolution of September 19, 2006, the General Secretariat for the prevention of pollution, and climate change by adopting the decision to waive environmental impact assessment project 'Completion of the modernization of irrigation Castellon de la Plana.

- Resolution of September 28, 2006, the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the project "Extraction of aggregates in the course of the Duero"
- Royal Decree 125/2007 of February 2, laying down the territorial scope of river basin districts.
- MAM/698/2007 Order of March 21, approving the special plans of action in alert situations and eventual drought in the areas of inter-basin water management plans.
- Royal Decree Law 4 / 2007 of April 13, amending the revised Water Law, approved by Royal Legislative Decree 1 / 2001 of June 20.
- Resolution of May 15, 2007, from the Ebro River Basin, on amending the rules of the road because of the spread of zebra mussels and new classification of reservoirs in the Ebro basin.
- Royal Decree 907/2007 of July 6, approving the Regulation of Water Planning.

d. Laws Concerning Underground Water

- Royal Decree 2618/1986, of December 24, which set measures relating to groundwater under Article 56 of the Water Laws.
- Resolution of April 20, 2005, the General Secretariat for the prevention of pollution and climate change, concerning environmental impact assessment of the ponds aquifer recharge project in the Baix Llobregat (Barcelona) in Molins de Rei and Santa Coloma de Cervelló (Barcelona), promoted by Acuamed, SA.
- Resolution of July 26, 2005, the General Secretariat for the prevention of pollution and climate change, which is formulated environmental impact statement on the project 'Works of regulation for recharge of surplus winter river Belcaire' (Vall d'Uixó, Castellón), promoted by Acuamed, SA.

e. Laws Concerning Sewage

- Ministerial Decree of September 4, 1959, which regulates the discharge of wastewater.
- Ministerial Order of March 23, 1960, approving the Technical Standards of the Order of September 4, 1959.
- Ministerial Order of October 9, 1962, approving the Technical Standards of the Order of September 4, 1959.

- Ministerial Order of April 14, 1980 on measures to address pollution by dumping
- Order of December 23, 1986 which sets out additional rules relating to authorizations for discharges of wastewater.
- Order of July 1, 1987 by approving the official methods of physical-chemical analysis for public drinking water.
- Order of July 16, 1987 which regulates the companies working with watershed organizations in the control of wastewater discharges.
- Order of November 12, 1987 emission standards, quality objectives and reference measurement methods relating to harmful or dangerous substances contained in wastewater discharges.
- Ordinance of March 13, 1989 that is included in that of November 12, 1987, the new rules on harmful or dangerous substances that may be part of the dumping of sewage.
- Order of December 19, 1989 which sets out arrangements for setting in some cases of intermediate and low values of the coefficient k, which determines the pollutant load of the fee for the disposal of sewage.
- Royal Decree 1310/1990, of October 29, for regulating the use of the sewage sludge in agriculture.
- Order of February 27, 1991 by amending Annex V of the Order of 12/11/1987, on emission standards, quality objectives and reference measurement methods, for discharges of certain dangerous substances, especially for hexachlorocyclohexane.
- Order of June 28, 1991 by extending the scope of the Order of November 12, 1987 to four noxious or hazardous substances which may form part of the dumping.
- Order of May 25, 1992, by amending the Ministerial Decree of November 12, 1997, emission standards, quality objectives and reference measurement methods relating to harmful or dangerous substances contained in discharges
- Royal Decree 484/1995 of April 7, on Adjustment Measures and Spill Control.
- Resolution of April 28, 1995 of the Ministry of Environment and Housing, which provides for the publication of Agreement of the Council of Ministers of February 17, 1995, by approving the National Plan of Drainage and Wastewater Treatment (PNSD).

- Royal Decree Law 11/1995 of December 28, laying down rules for the treatment of urban wastewater. Amended by Royal Decree 2116/1998 of October 2.
- Resolution on January 30, 1996, by ordering the publication of the agreement on the recognition of Royal Decree Law 11/1995 of December 28, laying down rules for the treatment of urban wastewater.
- Royal Decree 261/1996, of February 16, the protection of waters against pollution caused by nitrates from agricultural sources. BOE 61, 11.3.1996
- Royal Decree 509/1996 of March 15, development of Royal Decree Law 11/1995 of December 28, laying down rules for the treatment of urban wastewater.
- Royal Decree 2116/1998 of October 2, which amends Royal Decree 5090/1996 of 15 March, development of Royal Decree-Law 11/1995 of December 28, laying down the rules governing the treatment of urban wastewater.
- Resolution of June 14, 2001, the General Secretariat of the Environment, which provides for the publication of Agreement of the Council of Ministers on June 1, 2001, by approving the National Plan of Sewage Sludge Wastewater 2001-2006.
- Resolution of May 20, 2005, the General Secretariat for the prevention of pollution and climate change on the evaluation of wastewater.
- Resolution of June 21, 2005, the General Secretariat for the prevention of pollution and climate change, on environmental impact assessment
- MAM/985/2006 Order of March 23, which develops the legal status of associates of water administration in the control and monitoring of water quality and management of discharges to public water.

f. Laws Concerning Water Contamination

- Decree 93/1968 of January 18, which bans the Use of non-biodegradable detergents.
- Decree 3157/1968 of December 26, by amending Decree 93/1968 of 18 January.
- Order of March 13, 1989 for which is included in that of November 12, 1987, the new rules on harmful or dangerous substances that may be part of the discharges.

- Order July 28, 1989 on Prevention of Pollution caused by waste from the Titanium Dioxide Industry.
- Royal Decree 261/1996, of February 16, the protection of waters against pollution caused by nitrates from agricultural sources.
- Law 16/2002 of July 1, integrated pollution prevention and control.

g. Laws Concerning Water Quality

- Order of August 16, 1964, the Prime Minister's Office, which approves the Technical-Sanitary Regulations concerning Ice.
- Resolution of January 25, 1982, the Health Secretariat, by adopting the model Record Book Industry Analysis for bottled drinking water.
- Ministerial Order of July 27, 1983, which provides official methods to develop microbiological analysis to drinking water.
- Resolution of April 23, 1984, the Secretariat, by adopting the positive list of permitted additives and processing aids for the treatment of drinking water for public consumption.
- Order of May 8, 1987, the Ministry of Relations with Parliament and the Secretariat of Government, in approving the official methods of microbiological analysis for the production, circulation and marketing of bottled drinking water
- Order of July 1, 1987, approving the Official Methods of water analysis for public consumption.
- Order of February 8, 1988 on methods of measurement and frequency of sampling and analysis of surface water intended for drinking water production.
- Order of May 11, 1988 on basic quality characteristics that must be maintained in the flow of storm water when they are intended for the production of drinking water.
- Royal Decree 734/1988, of July 1, laying down quality standards for bathing water.
- Order of December 16, 1988, the Ministry of Construction and Urban Development on the methods and frequency of analysis or inspection of fresh waters needing protection or improvement for the development of fish life.

- Royal Decree 1138/1990 begins of September 14, which approves the Technical Health Regulations for the supply and quality control of public drinking water.
- Order of October 15, 1990. 05.11.1988 Amendment to the Order of basic quality characteristics to be retained in the surface current for the production of drinking.
- Royal Decree 1164/1991 of July 22, by approving the Technical-Health Regulations for the preparation of movement and trade in bottled drinking water. (Amended by Royal Decree 781/1998,).
- Royal Decree 345/1993 concerning the water quality for shellfish.
- Order of November 30, 1994. Amendment to the Order on basic quality characteristics to be maintained on the surface fresh water streams for drinking water production.
- Royal Decree 1327/1995, of July 28, desalination facilities on sea or brackish water.
- Royal Decree 995/2000 of June 2, laying down quality objectives for certain pollutants and amending the Public Water Regulation, approved by Royal Decree 849/1986 of April 11.
- Royal Decree 140/2003 of February 7, laying down the health criteria of the quality of drinking water. Annex amended by Order SCO/3719/2005.
- Correction of errors of Royal Decree 140/2003 of February 7, laying down the health criteria of the quality of drinking water.
- Order of May 30, 2005 on the National Information System Drinking Water.
- SCO/3719/2005 Order of November 21, on substances for the treatment of water intended for the production of drinking water.
- MAM/985/2006 Order of March 23, which develops the legal status of associates of the Water Administration in the control and monitoring of water quality and management of discharges to public water.
- MAM/3207/2006 Order of September 25, approving MMA-EECC-1/06 additional technical training, chemical and microbiological determinations for water analysis.

Chapter 3

For the promotion of RES Des, a clear framework and rapid licenses procedures for energy and water desalination are required.

3. Summary and Recommendations

The target countries of this work, Greece, Italy, Portugal and Spain, have Government structures designed to encourage the development of RES and Desalination. From the research that achieved in each country it is concluded that the establishment of a specific framework for the development of Desalination plants is of vital importance. A specific framework and administrative procedures will help the growth of desalination, and further of RES Desalination, in a more rapid and safe way, regarding also the environmental impacts.

A further promotion of RES Desalination is required in all the countries, with funding programmes or subsidies from the Governments. Furthermore, the inclusion of "RES Desalination" in the energy laws of each country as an alternative with significant benefits for the users will also assist in the growth of the technology.

For the development of RES Desalination technology for electricity and fresh water production, "real" installations that will cover specific energy and water needs are required. To convince people, from simple inhabitants of an area to politicians, on RES Desalination technology, successful applications that will provide electricity and fresh water of good quality at a reasonable cost should be achieved.

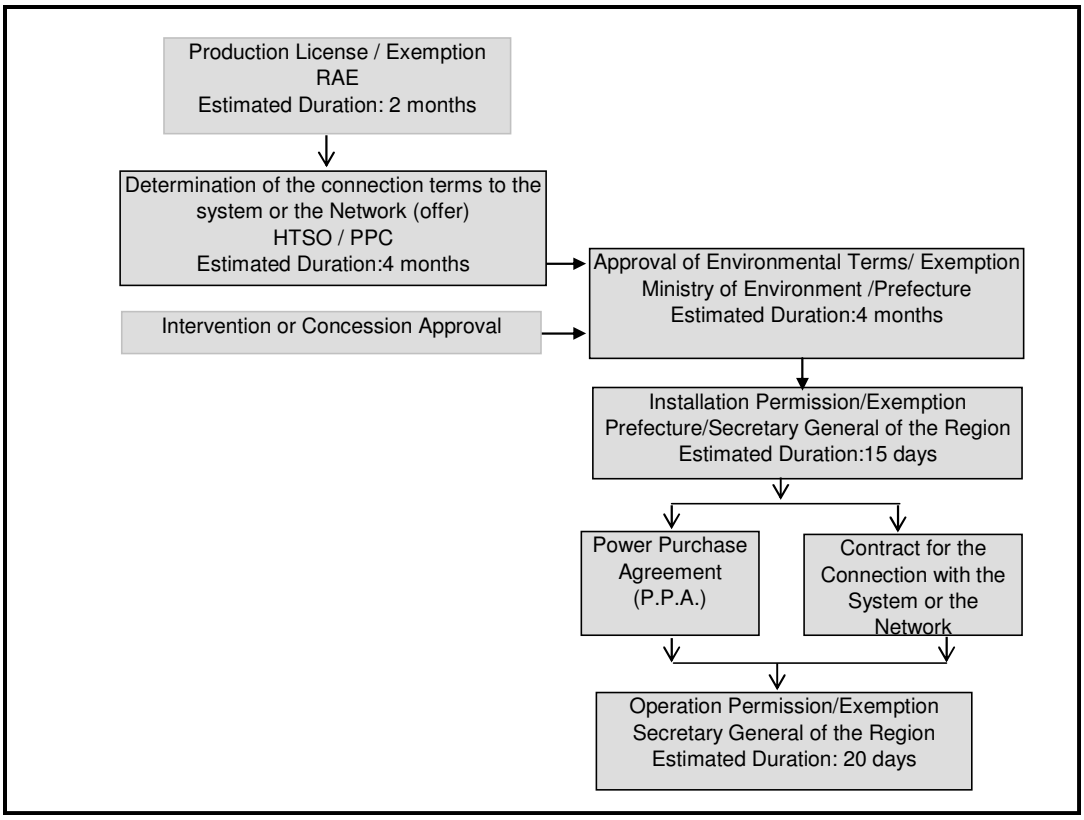
Following, a summary of the results of this report for the four target countries is presented.

3.1 Energy and Water Current Situation for the four target Countries

Current Situation of RES and Desalination	GREECE	ITALY	PORTUGAL	SPAIN
PV Installed Capacity	90 MWp [2010]	1032 MWp [2010]	108.7 MWp [2010]	3,417 MW [2009]
Wind Installed Capacity	1109 MW [2009]	4850 MW [2009]	3725 MW [2010]	19266 MW [2010]
Geothermal Installed Capacity	105,8 MWth [2007]	843 MWth [2010]		80 MWth
Solar Thermal Installed Capacity	2095 MWth [2008]	1,404 MWth [2010]	170000m2 [2009]	232 MWth
Desalination Capacity (m3/day)	> 30,000 m3/day [2010]	430,000 m3/day		>1,6Hm3/day
Framework for RES				
Existence of Specific Framework for RES	YES	YES	YES	YES
Number of Main Actors for Energy	3	4	6	5
Type of Incentive Programme	feed-in tariff	feed-in tariff	feed-in tariff	feed-in tariff
Framework for Water				
Existence of Specific Framework for Water Desalination	NO	NO	NO	NO
Number of Main Actors for Water	2	3	6	4

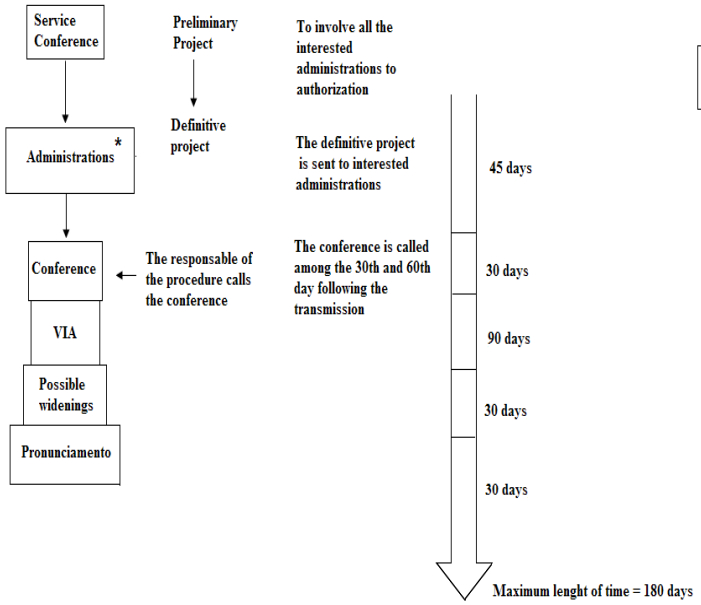
3.2 License Procedures for RES Installations

Greece

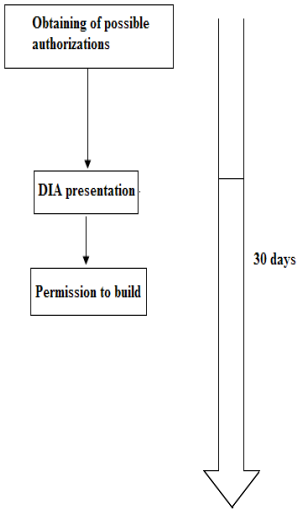


Italy

All-in-one Procedure



Declaration of activity beginning



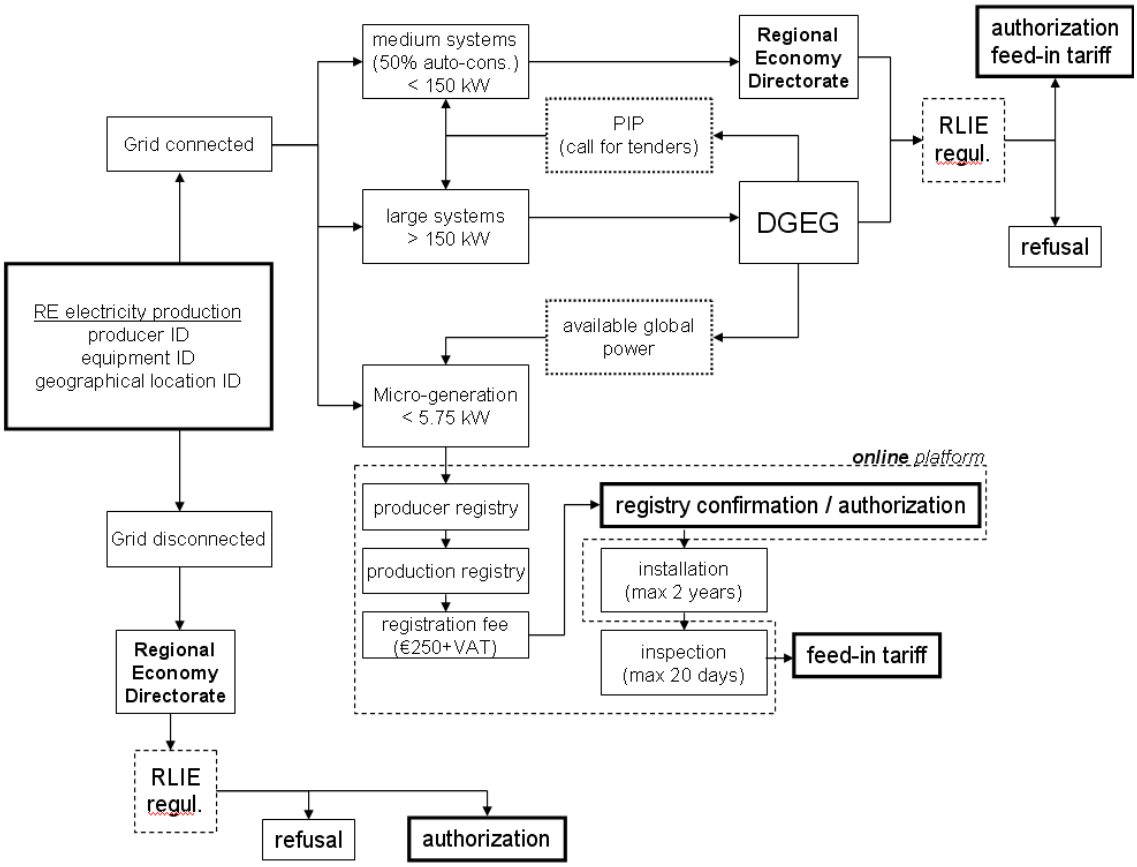
* Administrations

a) tutelage of the Environment and Arts:
- aldermanship of Country and Environment;
- office;
- Ministry of the Environment and Arts;

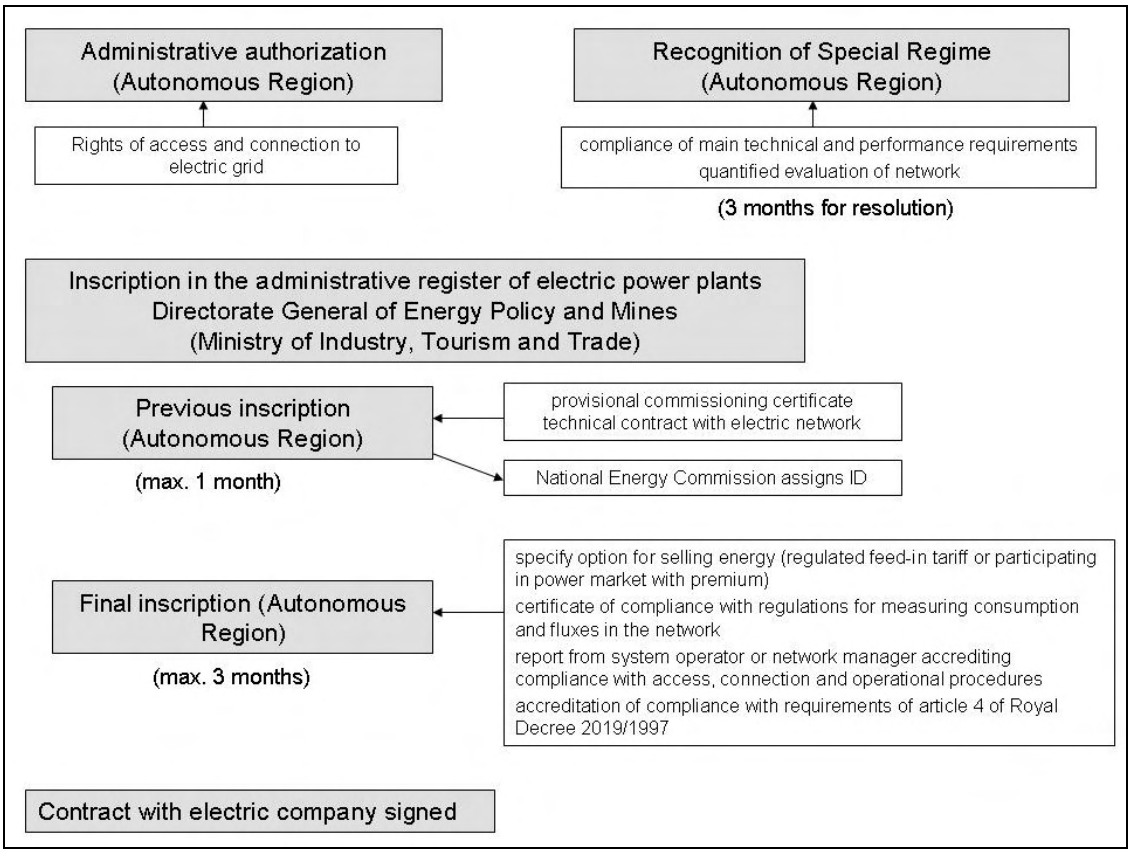
b) urban insertion:
- Municipality;
- Aldermanship for urban service industry;

c) Insertion in the electric system:
d) Network local distributor;
e) Ministry of Communications;
f) Ministry of infrastructures;
g) Civil Engineers

Portugal

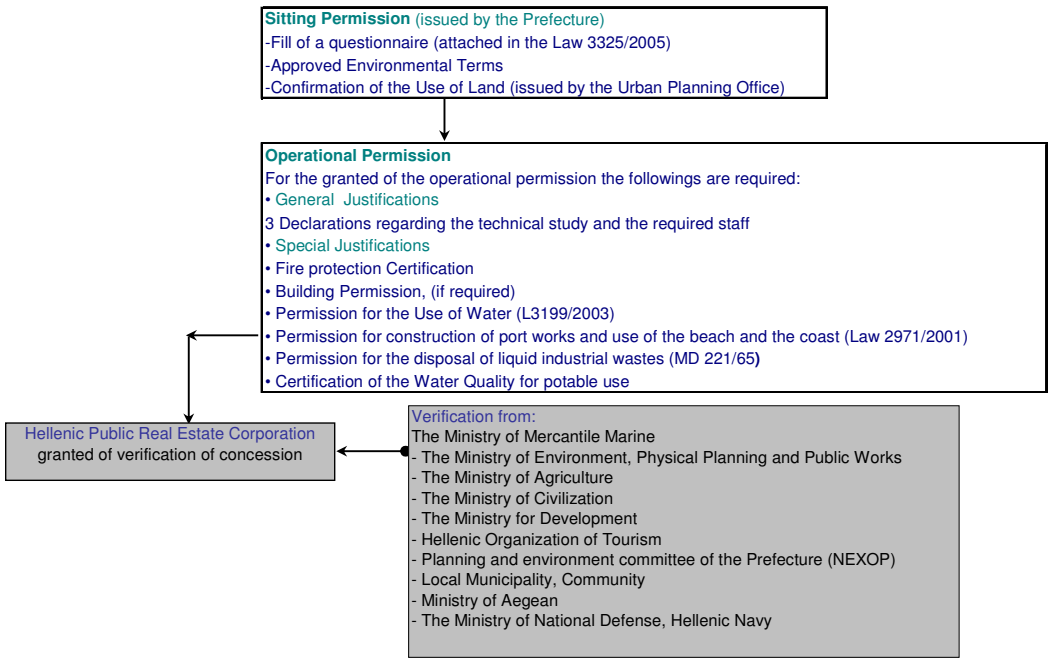

medium systems
(50% auto-cons.)
< 150 kW
Regional
Economy
Directorate
authorization
feed-in tariff
Grid connected
PIP
(call for tenders)
RLIE
regul.
large systems
> 150 kW
DGEG
refusal
RE electricity production
producer ID
equipment ID
geographical location ID
available global
power
Micro-generation
< 5.75 kW
online platform
producer registry
registry confirmation / authorization
Grid disconnected
production registry
installation
(max 2 years)
registration fee
(€250+VAT)
inspection
(max 20 days)
feed-in tariff
Regional
Economy
Directorate
RLIE
regul.
refusal
authorization

Spain


Administrative authorization
(Autonomous Region)
Rights of access and connection to electric grid
Recognition of Special Regime
(Autonomous Region)
compliance of main technical and performance requirements
quantified evaluation of network
(3 months for resolution)
Inscription in the administrative register of electric power plants
Directorate General of Energy Policy and Mines
(Ministry of Industry, Tourism and Trade)
Previous inscription
(Autonomous Region)
(max. 1 month)
provisional commissioning certificate
technical contract with electric network
National Energy Commission assigns ID
Final inscription (Autonomous Region)
(max. 3 months)
specify option for selling energy (regulated feed-in tariff or participating in power market with premium)
certificate of compliance with regulations for measuring consumption and fluxes in the network
report from system operator or network manager accrediting compliance with access, connection and operational procedures
accreditation of compliance with requirements of article 4 of Royal Decree 2019/1997
Contract with electric company signed

3.3 License Procedures for Desalination Installations

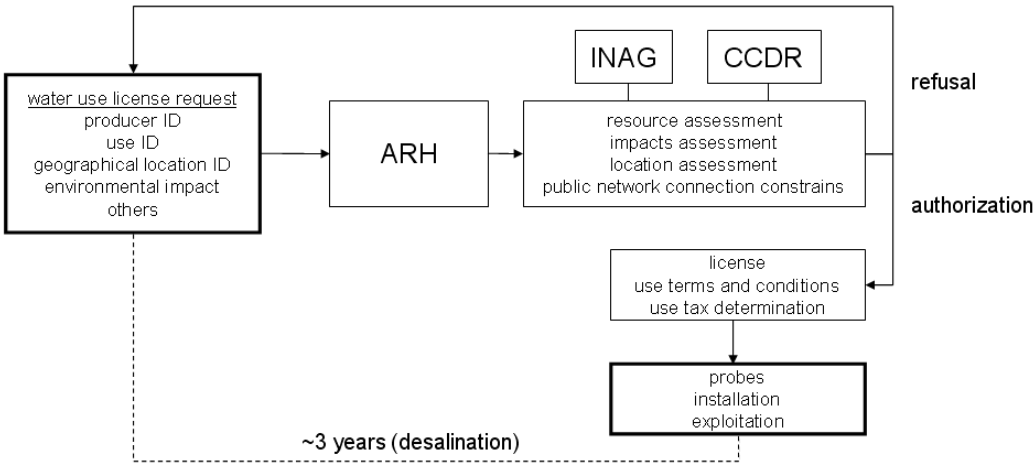
Greece



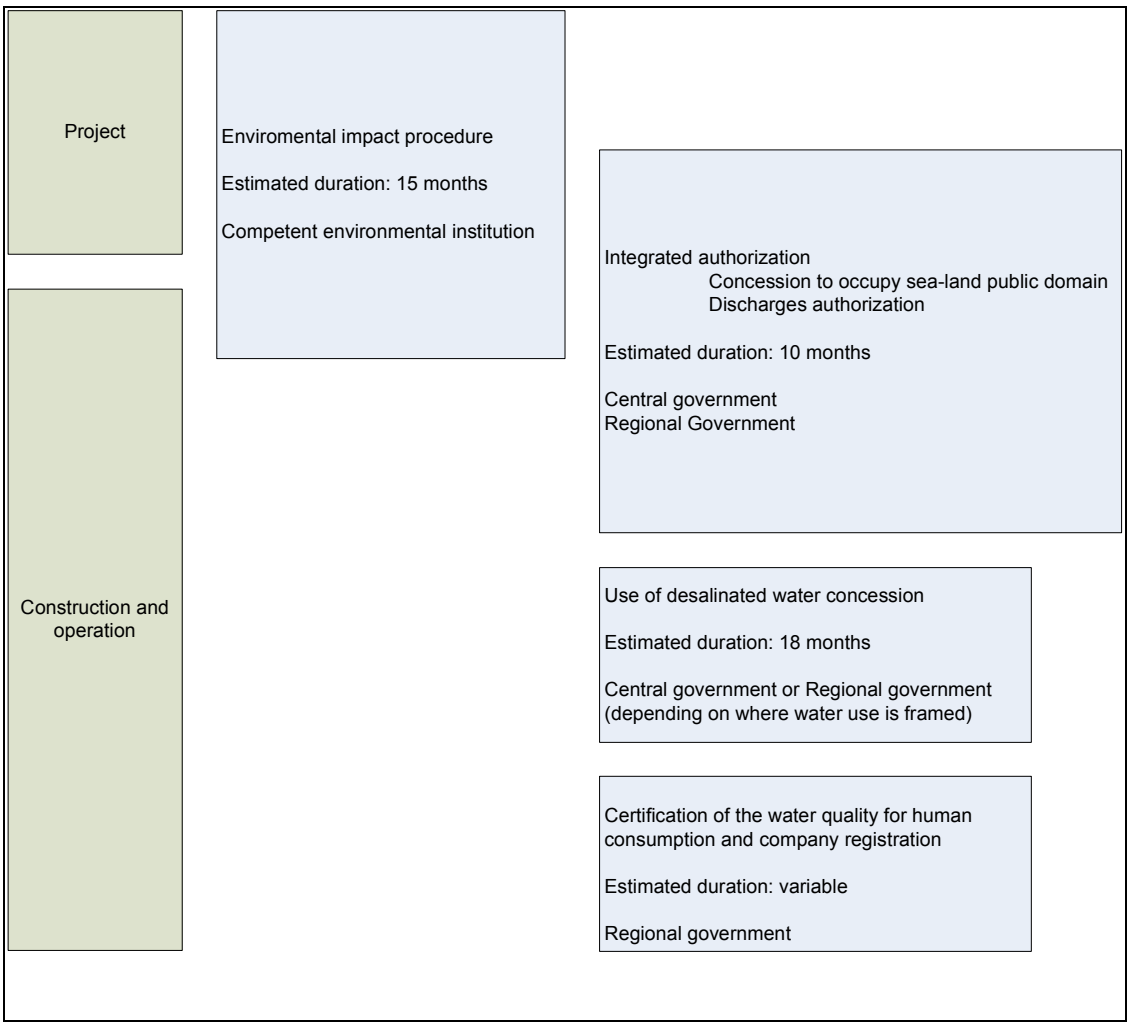
Italy

So far there is not any precise regulation. Presently operating plants were paid by the regional government. The construction of a desalination plant is generally decided by the local government, following a request from the ATO or municipalities.

Portugal



Spain


Project
Enviromental impact procedure
Estimated duration: 15 months
Competent environmental institution
Integrated authorization
Concession to occupy sea-land public domain
Discharges authorization
Estimated duration: 10 months
Central government
Regional Government
Construction and operation
Use of desalinated water concession
Estimated duration: 18 months
Central government or Regional government (depending on where water use is framed)
Certification of the water quality for human consumption and company registration
Estimated duration: variable
Regional government

3.4 Environmental Aspects

Greece

RES

	Electricity Production			
	Category A		Category B	
Type of project or Activity	Subcategory 1	Subcategory 2	Subcategory 3	Subcategory 4
El. Production from Wind, Solar energy	> 40 MW	40-5 MW	< 5 MW	
El Production from Photovoltaics		≥ 2 MW	2 MW – 20 kW, <2 MW	

Based on the category of each project, the procedures for the environmental permission are considered.

Category A– An environmental assessment study is required; approval of environmental terms is issued by the Ministry of Environment, Physical Planning and Public Works or in some cases by the Prefecture.

Category B – submission of justifications on the environmental assessment of the project, permission is issued by the Prefectures.

Category C -submission of justifications on the environmental assessment of the project, permission is issued by the local Municipality.

Water Desalination

Desalination units of >100 m^3/day characterized by **Medium Level** of environmental effect, A Category

≤ 100 m^3/day characterized by **Low Level** of environmental effect , B Category

In all cases environmental assessment study is required

Italy

RES

Installation of RES plant can be simply authorised by local or municipal authorities in the case of:

- Photovoltaic installation with a capacity lower than 200kW;
- Photovoltaic installation with a capacity lower than 1MW if architectonically integrated or partially integrated;

- Photovoltaic installation with a capacity lower than 1MW if located within an industrial area (low relevant environmental impact);
- Wind turbine with a capacity lower than 60kW and a tower height lower than 15m.

Larger plants must follow authorization procedures typical of industrial installations (i.e. Environmental Impact Assessment, regional or national authorisations, etc.)

Water Desalination

No specific regulation exists for desalination plants. Ad hoc laws are often issued for the construction of large plants, and regional regulations apply as in the general case of industrial installation concerning the Environmental Assessment iter and authorization procedure.

Portugal

RES

There is no environmental impact study requirement.

Water Desalination

For the use of hydric resources, environmental impact studies are required.

Spain

RES

Legislative Royal Decree 1/2008, of January 11, by approving the revised text of the Law on Environmental Impact Assessment Projects.

Water Desalination

1. Water desalination Categorization: Hydraulic Engineering and Water Management Projects.

Environmental permission is required only for the following cases:

a) Desalination plants involving a new or added volume greater than 3000 m3/day.

b) Plants that may affect directly or indirectly to the Natura 2000 net.

2. Exemption: the environmental permission for the above mentioned cases is required only when the competent environmental institution decides it.

3.5 Energy Costs

There are differences in the four target countries, on the electricity production cost, the electricity tariff cost (what the consumer pays) from conventional power sources as well as on the values of the electricity production cost from Renewables.
For instance, in Spain the average cost of generated Wind power is of the order of 0.0717 €/kWh while the cost of generated PV power is of around 0.1355 €/kWh. In Greece, the average cost of generated Wind power is between 0.25 c€/kWh to 0.5 c€/kWh, while the cost of the power generated from PVs is of the order of 0.20 c€/kWh, depending mainly on the size of the project and site conditions.

3.6 Water Costs

In general there is no uniform water pricing policy in the target countries. For instance in Spain the average water tariff cost could be ranged from 0.94 to 2.65 €/m^3 depending on the area. In Greece the water tariff cost depends also on the area, on the consumption and on the type of use. In Greek islands the water tariff cost (what the consumer pay) could be ranged from 0.40€/m^3 -1.40€/m^3 depending on the consumption, while in the capital is ranged from 0.39€/m^3 up to 2.45€/m^3 for consumptions of up to 30 m^3/month. A non-uniform policy is also followed in Italy, which is regulated by the local authorities on the basis of National Indications. In small islands the price is fixed by the municipality itself and can vary from 2 to 4 €/m^3 depending on the island and type of use (higher costs for industrial use).

Regarding the cost of the water produced from desalination plants, this is ranged from 1 up to 2 €/m^3 (except special cases that is more) in the Greek islands, approximate from 1.5 up to 5 €/m^3 (with higher prices for plants operating in small islands) in Italy and an average of 0.6 €/m^3 in Spain.

The cost of the transported water in all the countries is high. In Greece and Italy the cost for water transportation to the islands is reached the 12.5 to 13 € per cubic meter of water.

3.7 Feed-in Tariff Schemes

Greece

Generation of electricity from:	Price of energy (Euro/MWh)	
	Interconnected System	Non-intercon-nected islands
(a) wind energy inland with an installed capacity more than 50kW	**87,85**	**99,45**
(b) wind energy with an installed capacity less or equal than 50kW	**250**	
(c) Photovoltaics up to 10 kWp for homes or small enterprises according to the programme for PV on buildings MD12323/ΓΓ 175/4.6.2009, B'1079)	**550**	
(d) Hydraulic energy exploited in small-scale hydroelectric plants with an installed capacity up to fifteen (15) MW_e	**87,85**	
(e) Solar energy exploited by solar thermal systems for the generation of electric energy	**264,85**	
(e) Solar energy exploited by solar thermal systems for the generation of electric energy with storage system, providing at least 2 hours of operation at nominal power	**284,85**	
(d) Geothermal energy of low temperature according to the 1st paragraph of Article 2 of the Law 3175/2003 (A' 207)	**150**	
(f) Geothermal energy of high temperature according to the 1st paragraph of Article 2 of the Law 3175/2003 (A' 207)	**99,45**	
(g) Biomass exploited from stations with nominal power ≤1MW (excluding the wastes rejections)	**200**	
(h) Biomass exploited from stations with nominal power ≥1MW (excluding the wastes rejections)	**175**	
(i) Miscellaneous RES	**87.85**	**99.45**

Feed-in Tariff Levels for Solar PV (€/MWh)

Year	Month	Mainland Grid		Autonomous island grids	
		>100 KWp	≤100 KWp	>100 KWp	≤100 KWp
2009	February	400.00	450.00	450.00	500.00
2009	August	400.00	450.00	450.00	500.00
2010	February	400.00	450.00	450.00	500.00
2010	August	392.04	441.05	441.05	490.05
2011	February	372.83	419.43	419.43	466.03
2011	August	351.01	394.88	394.88	438.76
2012	February	333.81	375.53	375.53	417.26
2012	August	314.27	353.56	353.56	392.84
2013	February	298.38	336.23	336.23	373.59
2013	August	281.38	316.55	316.55	351.72
2014	February	268.94	302.56	302.56	336.18
2014	August	260.97	293.59	293.59	326.22
Year 'n' from 2105 onwards SMC = System Marginal Cost		1.3*SMC_{n-1}	1.4*SMC_{n-1}	1.4*SMC_{n-1}	1.5*SMC_{n-1}

Italy

Renewable Tariffs in Italy					
Conto Energia Decreto 19/02/07					
		Bonus Payment System			
		Net-Metering	1,261	1,230	
2009	Years	€/kWh	CAD/kWh	USD/kWh	Degression
Photovoltiacs					
1-3 kW		0,11	0,139	0,135	
3-20 kW		0,11			
>20 kW					
		Incentive Tariff			
Ground-mounted					
1-3 kW	20	0,392	0,494	0,482	-2%
3-20 kW	20	0,3724	0,470	0,458	-2%
>20 kW	20	0,3528	0,445	0,434	
		Incentive Tariff			
Rooftop					
1-3 kW	20	0,4312	0,544	0,530	
3-20 kW	20	0,4116	0,519	0,506	
>20 kW	20	0,392	0,494	0,482	
		Incentive Tariff			
BIPV					
1-3 kW	20	0,4802	0,606	0,591	
3-20 kW	20	0,4508	0,569	0,554	
>20 kW	20	0,4312	0,544	0,530	
Sun & Wind Energy/Italy 11/2009.					
		Bonus Payment System			
<500 MWh/yr		0,095	0,120	0,117	
500-1,000 MWh/yr		0,08	0,101	0,098	
>1,000 MWh/yr		0,07	0,088	0,086	
		Incentive Tariff			
Rooftop					
<500 MWh/yr		0,35	0,441	0,430	
500-1,000 MWh/yr		0,35	0,441	0,430	
>1,000 MWh/yr		0,35	0,441	0,430	
		Incentive Tariff			
Ground-mounted					
<500 MWh/yr		0,39	0,492	0,480	
500-1,000 MWh/yr		0,39	0,492	0,480	
>1,000 MWh/yr		0,39	0,492	0,480	
		Incentive Tariff			
BIPV					
1-3 kW	20	0,43	0,542	0,529	
3-20 kW	20	0,43	0,542	0,529	
>20 kW	20	0,43	0,542	0,529	
Small Wind <200 k\	15	0,30	0,378	0,369	
Geothermal <1 MW	15	0,20	0,252	0,246	
Wave & Tidal <100	15	0,34	0,429	0,418	
Biomass waste <1 I	15	0,22	0,277	0,271	
Farm Biomass & Bi	15	0,30	0,378	0,369	
Landfill and Sewage	15	0,18	0,227	0,221	
1. Net metering rates from 0.11-0.15/kWh. This table uses a conservative value.					
2. Additional premiums apply for municipalities, schools, and hospitals.					
3. Additional premius of 5% for BIPV on farm roofs replacing asbestos.					
4. Annual cap lifted.					
5. Program cap of 1,200 MW, 2012; 3,000 MW 2016.					
Source: Sun & Wind Energy 2/2007.					

Portugal

Technology	Average feed-in tariff (€/MWh)	Z	Remarks
Wind	74-75	4,6	33 GWh/MW or 15 years
Hydric < 10 MW	75-77	4,5	52 GWh/MW or 20 years (25 in exceptional cases)
PV > 5 kW	310-317	35	21 GWh/MW or 15 years
PV <= 5 kW	450	52	
Solar CSP <= 10 MW	267-273	29,3	
PV microgeneration <= 5 kW	470	55	When installed in residential, industrial or commercial buildings. 15 years
PV microgeneration > 5 kW and <=150 kW	355	40	
Forest Biomass	107-109	8,2	25 years
Animal Biomass	102-104	7,5	
Biogas, anaerobic digestion	115-117	9,2	When national installed power limit is surpassed, Z is changed to 3,8. 15 years
Landfill gas	102-104	7,5	
RSU (burned)	53-54	1	15 years
CdR (burned)	74-76	3,8	
Wave (Demonstration <= 4 MW)	260	28,4	15 years
Wave (Pre-comercial <= 20 MW)	191	16-22	Z factor fixed by the government member in charge of the Energy sector, considering the potential of the project, within the range 16 to 22. 15 years

Wave (Commercial) first 100 MW following 150 MW > 150 MW	 131 101 76	 8-16 6-10 4,6	Z factor fixed by the government member in charge of the Energy sector, considering the potential of the project. 15 years

Spain

Type of RES	Power	Period	Regulated tariff (c€/kWh)	Selling in the organized electricity market		
				Ref. premium (c€/kWh)	Upper limit (c€/kWh)	Lower limit (c€/kWh)
Solar PV	P = 100kW	First 25 years	46.5897			
		Since then	37.2718			
	100kW < P = 10MW	First 25 years	44.169			
		Since then	35.3352			
	10MW < P < 50MW	First 25 years	24.3077			
		Since then	19.4462			
Solar thermal		First 25 years	28.4983	26.8717	36.3906	26.8757
		Since then	22.7984	21.4973		
Wind energy		First 20 years	7.7471	3.0988	8.9866	7.5405
		Since then	6.4746			
	(off-shore wind park)			8.9184	17.3502	
Waves, tidal, geothermic		First 20 years	7.2892	4.0672		
		Since then	6.8872	3.2373		

3.8 Funding Schemes

Greece

- Law for Development 3299/2004, amended with Law 3522/2006. A new National Development Law is expected to be issued before the end of 2010 and come into force in January 2011.

- National Strategic Development Plan (NSDP), 2007-2013

Italy

Funding schemes for RES have been proposed by several ministerial decrees and legislative acts, among them:

1. Legislative Decree n.99/2009

2. Financial Act 2008

3. Inter-regional Operating Programme for Energy (POI)

So far seawater desalination plants have been constructed with public capitals, therefore no funding scheme for private investors have been proposed.

Portugal

Regarding small/medium microgeneration or solar thermal systems, there are a number of different credit products available on the commercial banking systems, specially designed for the field of renewables. Such credit products, available to both individuals or companies, present maximum amounts in the range of 10.000 € to 75.000 €, effective interest taxes in the range of - 6% to ~16% and maximum payment periods in the range 96-120 months, [10].

Larger investments for privately owned RE based power plants follow the traditional banking credit circuit. Wind power investments are, presently, very well established as bankable investments. PV follows the same trend.

Spain

Resolution of July 7, 2010, of the Secretariat of State of Water, which announces the concession of subsidies for the seawater desalination plants in the Canary Islands region.