HELLENIC REPUBLIC
MINISTRY OF DEVELOPMENT
DIRECTORATE GENERAL FOR ENERGY
RENEWABLE ENERGY SOURCES
AND ENERGY SAVING DIRECTORATE

4th NATIONAL REPORT REGARDING THE PENETRATION LEVEL OF RENEWABLE ENERGY SOURCES UP TO THE YEAR 2010 (ARTICLE 3 OF DIRECTIVE 2001/77/EC)

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1. Directive 2001/77/EC

Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market (OJ L283/27.10.2001) in its annex sets an indicative target for Greece to cover a part of its gross national electricity consumption[1] by 2010 from renewable energy sources (RES) equal to 20.1 percent, with the contribution of large-scale hydroelectric plants included. This target is compatible with the international commitments of the country resulting from the Kyoto protocol[2] signed in December 1997 within the context of the Rio UN framework agreement on climate change. The Kyoto protocol anticipates that Greece, by 2008-2012, will reduce the rate of increase of CO_2 and other gases that aggravate the greenhouse effect by 25 percent in relation to the base year 1990.

According to the most recent estimates, the gross consumption of electric power in 2010, amounts to 71.9 TWh[3], i.e. close to the previous level of 72 TWh of the 2nd National Report and notably increased in comparison with the 68 TWh of the 3rd National Report. Subsequently, production of electric power from RES in the order of 14.45 TWh (including large-scale hydro-electric plants) is the goal for 2010.

In order to be set up a realistic scenario of required RES installed capacity to meet the above target, the following assumptions have been made:

- The share of various RES types will not vary significantly in the next three years. This assumption is considered as pragmatic given that rapid technological evolution that would lead to significant changes in the economic viability of the various technologies is not expected.
- The average power production per installed capacity unit (load factor, or equivalent operation hours) will be lower due to the necessary development of projects in areas of inferior RES potential.

According to the above, the installed RES capacity required for 2010 in order for the target to be achieved, are presented in table 1:

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[1] It is defined as the national electrical power production including autoproduction plus imports minus exports.

[2] By virtue of Law 3017/2002 "Ratification of the Kyoto protocol to the UN framework agreement on climate change" (Official Gazette A 117) the Greek Parliament put on official footage the country's commitment to undertake actions running against the aggravation trend of the greenhouse phenomenon. The percentage of 25 percent is an intra-Community quota within the framework of a burden-sharing agreement between the Energy Ministers of the EU member states.

[3] In the estimated quantity, the consumption for powering the generation machinery (6 percent) and also transmission losses (2.5 percent) have been included.

	Requirements in installed capacity by 2010, in MW	Energy generated in 2010 in TWh	Percentage share of every renewable energy source in 2010
Wind farms	3,648	7.67	10.67
Small-scale hydros	364	1.09	1.52
Large-scale hydros	3,325	4.58	6.37
Biomass	103	0.81	1.13
Geothermal	12	0.10	0.14
Photovoltaics	200	0.20	0.28
Total	7,652	14.45	20.10

Table 1. RES installation requirements to meet the 2010 target

2. Basic characteristics of the Greek economy

Greece occupies an area of 132,000 square kilometers and has a population of 10.96 million according to the 2001 census. It is estimated that this year the per capita gross national product (GNP), in current prices, will be approximately 18,750 Euro. During the same year, the growth rate as a percentage change of the volume of the gross national growth, is estimated at 4.4 percent.

3. Basics of the electrical system for the year 2007

At present, the electricity sector operates within the framework set by Law 2773/1999 "Liberalisation of the Electricity Market-Regulation of energy policy issues and other provisions» (Official Gazette A 286) enacted for the transposition of Directive 96/92/EC for the liberalisation of the electricity market (OJ L27/30.1.1997). That basic law was revised by Law 3175/2003 "Exploitation of the geothermal potential, district heating and other provisions"(Official Gazette A 207) and Law 3426/2005[4] "Precipitation of the liberalisation process of the electricity market" (Official Gazette A 304).

[4] That new law consolidates the system of direct licensing (i.e. without a prior tendering procedure) of plants using conventional fuels and RES all over Greece. A tendering procedure is foreseen only for Crete whereby in case a tender is declared fruitless, the production authorization is granted to PPC S.A.

The law strengths the competencies of the System Operator as solely responsible for the operation, maintenance and development of the transmission system the ownership of which is still retained by PPC S.A. in charge of actually implementing the relevant works. The independence of the System Operator vis-à-vis PPC S.A. is boosted by barring any contractual affiliation of the members of the board of directors of the former with entities actively engaged in the field of power production or supply.

The same law imposes a distinction between activities of distribution grid management and its ownership status. Thus, is spite of the fact that the ownership of the distribution grid remains with PPC S.A. and all the more so the responsibility for connecting new users and the day-by-day operation and maintenance of the grid, its management is undertaken by the System Operator

4. Basic features of electric system in 2007

The main burden of power generation is still borne by the Public Power Corporation (PPC S.A.) established in 1950, on a monopolistic basis, and having as a main target the production and transmission of electric power.

Electricity consumption in 2007 is estimated to reach 62.5 TWh, with an installed capacity of 12,500 MW of PPC-operated plants[5] and 1,570 MW of auto-producers, conven-

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which under a new organizational scheme is foreseen to be renamed "Operator of Hellenic Power Transmission System and Distribution Network" with the trade name "DESDIE S.A."

In the islands which are not connected to the mainland's interconnected system, PPC S.A. continues to act as Grid Operator although with stricter obligations for a more efficient operational unbundling of the grid operation activities from those of power production and supply.

For the supply of power the obligation under Law 3175/2003 for furnishing warranties of availability of generation capacity of plants installed in a EU member country is now supplanted by a provision for availability of adequate capacity in the form of long-term warranties.

For the smooth power supply of the islands which are not connected to the mainland's interconnected system in case of emergency and as long as such a situation lasts, power production authorization is granted to PPC S.A. only.

With the exception of Crete, in the islands which are not connected to the mainland's interconnected system, production authorization is granted to PPC S.A. without however any bearing on the current licensing regime of RES, hybrid stations and stations of auto-producers.

In order to be met the fundamental requirement put forth in Directive 2003/54/EC for the rendering of public services aiming at the protection of the costumers, the safety of supply, the protection of the environment and the equivalent competition levels in all member states, the ministerial decision D5/EL/B/F1B/13.6.2007 (Official Gazette B' 1040) was issued to establish the public service obligations, and specifically the supply of electricity to the consumers residing in the islands which are not connected to the mainland's interconnected system at a price not differing from that applicable to every category of consumers served through the mainland's interconnected system and on the other hand a special billing for those having many children.

The new System Operation and Power Transaction Code approved by virtue of ministerial decision D5/EL/B/F1/oik.8311/9.5.2005 (Official Gazette B 1040), as amended by decision D5/EL/F1/13303/23.6.2006 (Official Gazette B 793) provides for the following particular markets and mechanisms making up the overall electricity market and focuses, inter alia, in setting up a market of supplementary services incorporated in the daily energy scheduling.

§ Daily wholesale electricity market in which the domestic producers and importers deliver, against a consideration, electricity which in a corresponding way absorb at a charge the representatives of the domestic load and the exporters.

§ Market for imbalance settlement in the form of extraordinary transactions aiming at settling any discrepancies between the amount of electricity that a company has contracted to generate or consume and that which they actually generated or consumed every dispatch day.

§ Market of long-term capacity reliability through which the producers are remunerated for keeping up operational preparedness

For a fuller insight into the peculiarities of the current status of electricity market liberalization it is necessary to resort to the 1st Report on the long-term energy planning of Greece 2008-2020 compiled by the Council of National Energy Strategy according to article 2 of Law 3438/2006 "Set up of the Council of National Energy Strategy – regulation of matters of the Ministry of Development" (Official Gazette A' 33) and published on August 9, 2007.

[5] Besides the Public Power Corporation (PPC S.A.), the only power generation plants that are natural gas fueled are those of the company "HRON" in Voiotia that already operate mainly for serving demand peaks with an installed capacity of 147 MW and the company "ENERGEIAKI THESSALONIKIS" (affiliated company of "HELLENIC PETROLEUM S.A") with an installed capacity of 390 MW that started operating in December 2005 in Thessaloniki.

tional power and renewable energy sources generators. The transmission lines in the interconnected system have a length that exceeds 10,750 km whereas the distribution lines are nearly 214,000 km[6]. The number of customers served is some 7 million. With respect to the trading of electricity, it should be noted that with the neighbouring Balkan countries (Albania, FYROM and Bulgaria) there are connections capable of meeting on an annual basis electric power transactions at a level up to some 7 percent of Greece's needs mainly from the surplus of the Bulgarian and Romanian systems. The matter of re-connection with the countries of Central Europe participating in the UCTE, which was pending since the war in Yugoslavia, was finally settled. The submersible link with Italy via a 400 kV direct-current cable has a transmission capacity of 500 MW and was commissioned in 2002.

The main fuel source is domestically extracted low-calorific-value lignite (70 million tons), which is expected to meet this year 50.5 percent of the total needs for energy. Oil, mainly used by the power plants on the islands not connected to the mainland's system, is estimated to have a share of 13 percent. Natural gas imported from Russia and Algeria in the form of LNG will cover 22.5 percent. In the same year large-scale hydroelectric plants are estimated to produce 4.8 percent. Lastly, wind energy, small hydro, biomass and photovoltaics combined, muster 3.6 percent whereas the net of imports-exports make up the remaining 5.6 percent.

The cumulative capacity in MW of the RES plants added each year (except large-scale hydro), based on reliable forecasts, for the years 2007 and 2008, according to a survey of the degree of completion of each RES project is shown in Figure 1. It is emphasised that the 2007 and 2008 data concern the capacity of plants that will be operating or will have been installed and will be operating on a test basis as contrasted to the data of the previous years for which the installed capacity refer to plants in status of commercial operation.

In figure 1 a clear and impressive acceleration of the RES market's development is presented for the two-year period 2007-2008, which is documented from the analysis of the development of each project separately. This acceleration is due to:

- The completion, during this period, of many starts initiated by private entities that had been delayed during the period 2001-2004, mainly due to institutional reforms in the power sector, which had begun in early 2000 (e.g. creation of the Regulatory Authority for Energy)
- The maturing and consolidation of administrative and institutional actions during 2003-2004, which definitely simplified the investing environment compared to the previous era and lifted many administrative barriers.
- The thorough revision, by means of Law 3468/2006 (see section 6.1), of the licensing regime and the widening of the time frame of the power supply contracts virtually to 20 years.

5.. The evolution of the institutional framework for RES

The beginning of RES entry into Greece was Law 1559/1985 "Regulation of issues of alternative forms of energy and specific issues of power production from conventional fuels and other provisions" (Official Gazette A 135) under which the PPC, leading the way with RES, installed 24 MW whereas local government organisations confined themselves to a meager

[6] Included therein are high-voltage transmission lines incorporated to the distribution network.

level of 3 MW until 1995 and the private sector was left out of the scene entirely. In spite of the small outcome, the effort showed the strengths and weaknesses of the sector and in particular the initial failures paved the way for more mature implementations.

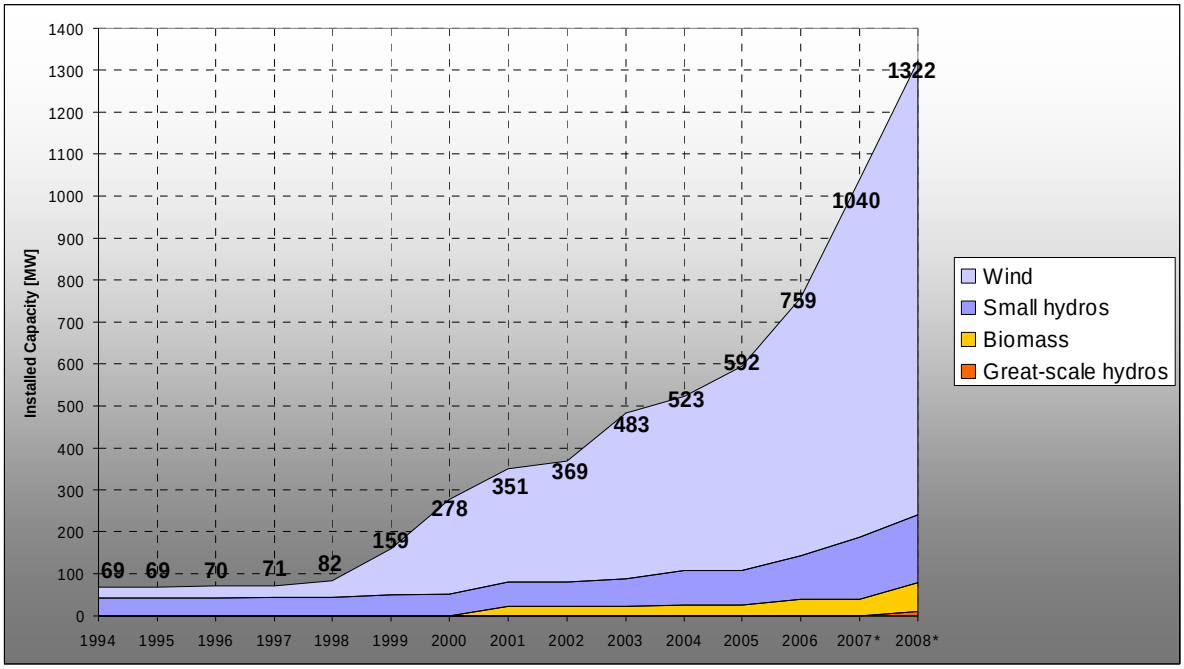

Figure 1: Evolution of RES installed capacity

Law 2244/1994 "Regulation of power generation issues from renewable energy sources and conventional fuels and other provisions" (Official Gazette A 168) modeled on the pattern of the German Stromeinspeisungsgesetz ushered in the RES era. The Law established for the country's interconnected system fixed sale rates for renewable energy at a level equal to 90 percent of the medium-voltage, general use tariff and made it obligatory for the PPC to buy that energy. For the reimbursement of the capacity part, a scale pricing system was introduced according to the type of RES plant in terms of time availability at nominal capacity. Roughly speaking, the capacity part merely augmented the energy earnings by a small percentage of some 6.5 percent so that the final rate in 2006 corresponded to 0.07287 Euro/kWh. In the islands that are not connected to the mainland's interconnected system, the pricing was based on 90 percent of the low-voltage, household rate and corresponded in the same year to 0.08458 Euro/kWh and no capacity reimbursement was provided. Today the revised feed-in regime is detailed in par. 5.

Law 2773/1999 for the liberalisation of the electricity market maintained the favorable pricing regime for RES by also placing emphasis on priority access to the grids.

Law 2941/2001 "Simplification of procedures for establishing companies, licensing Renewable Energy Sources plants, regulation of issues of the company GREEK SHIPYARDS S.A. and other provisions" (Official Gazette A 201), coped successfully with the issue of RES installation in forests and scrublands by including provisions upheld and ruled as constitutional by the Council of State, Greece's Supreme Administrative Court. Further-

more, this Law filled some important gaps in the legislative fabric and also attempted to deal the licensing process pathogenesis a thorough blow[7].

By virtue of Law 3017/2002 "Ratification of the Kyoto Protocol to the Framework-convention on climate change" (Official Gazette A 117) the Greek Parliament put on an official footing the country's commitment to actions to counter the growth of the greenhouse phenomenon.

Law 3175/2003 [8] established for the first time a comprehensive set of rules for the rational use of geothermal energy. The new framework is compatible with Community's view on geothermal energy as a renewable energy source contributing to sustainable development. Thus, law 3175/2003 moves in a direction at variance with the long entrenched view of geothermal energy as a mineral obeying the rather rigid rules of Legislative Decree 210/1973 "Mining Code" (Official Gazette A 277). In short, any geothermal field will be addressed as a unique deposit-source by avoiding any breakdown according to individual concession procedures. A concrete bidding procedure was set up for the whole range of products, by-products and process residues. The recoverable potential of the two fully explored high-enthalpy fields for power generation purposes amounts to 170 MW_e whereas the probable potential of the whole country exceeds 500 MW_e.

However, the main scope of the new law was to revise Law 2773/1999 in order to make up for the slowness of the liberalisation process of the electricity market mostly attributed to the dominant position held by PPC S.A. This revision was also necessary in order to reflect the modifications that were about to be made in Directive 2003/54/EC. In the realm of RES, law 3175/2003 reiterated the definition of Directive 2001/77/EC article 2

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[7] The pillars of Law 2941/2001, in addition to the settlement of forests and scrublands issues, are:

- The exemptions from the overall restrictions imposed by the forest laws applicable to the implementation of large-scale infrastructure works for public benefit in forests and scrublands, are extended to include RES,
- With the exemption of civil works no building permit is required for the installation of solar systems and wind farms
- Connection lines for electricity producing facilities using RES with the interconnected system of the mainland and the grids of autonomous island areas may be constructed by any interested investor, according to specifications provided by the System Operator
- The renewable electricity projects including the connecting lines, substations and infrastructure works in general are deemed as public utility works irrespective of the entity implementing them and therefore the expropriation of landed property or the mandatory acquiring of rights over them is possible
- The issuing of a joint ministerial decision is provided for, by means of which more relaxed zoning and subdivision controls, in comparison with the generally applicable town-planning regime, will be enacted in areas beyond the limits of existing city plans to facilitate RES development.
- The Planning and Development Directorates of the relevant Regions having jurisdiction over the issue of installation and operating permits, act in some ways according to the one-stop shop principle, by coordinating the relevant procedures in which many public services and other bodies are involved.

[8] As a matter of fact the main scope for the passage of the law was the development and reinforcement of competition in the electricity market, the attraction of new investment sources and the safeguarding of electricity sufficiency for the sake of ensuring competitive consumer prices.

regarding hybrid plants in order to remove the existing ambiguity with respect to the actual classification of the energy produced from these systems.

In the pattern of breakthrough law-making initiatives taken to speed up the implementation progress of projects pertinent to the 2004 Olympics, Law 3175/2003 provided further actions including the introduction of shortened and simplified procedures regarding expropriations necessary for the reinforcement and extension of power transmission lines which will also serve RES deployment[9].

The environmental process follows a revised path following the passage of Law 3010/2002 "Harmonisation of Law 1650/1986 with Directives 97/11/EC and 96/61/EC, procedure for delineation and regulation of matters regarding water courses and other provisions" (Official Gazette A 91) for the harmonisation of national legislation for the protection of the environment with the acquis communautaire.

On the regulatory level, specially for RES two joint ministerial decisions were issued, namely decision oik.104247/EYPE/YPEXODE/25.5.2006 "Procedure of preliminary, environmental assessment and approval of environmental terms of power plants using renewable energy sources according to article 4 of Law 1650/1986 as replaced with article 2 of Law 3010/2002" (Official Gazette B 663) and decision oik.104248/EYPE/YPEXODE/25.5.2006 "Content, supporting documents and miscellaneous data of preliminary studies of environmental impact assessment, environmental impact assessment studies and appurtenant environmental studies of power plants using renewable energy sources" (Official Gazette B 663) in order to be adjusted the overall licensing of RES facilities to the regime of environmental consensus. Among the regulations introduced, worth mentioning is the restriction of the number of consenting authorities to the absolute minimum necessary, the establishment of short-cut deadlines, the inactive lapse of which will allow the authority in charge of environment permitting to consider as positive the lacking intermediate approvals and opinions of other bodies and generally the streamlining of the sequence of the intermediate consents in the spirit of Directive 2001/77/EC article 6.

Also, worth of being mentioning is the joint ministerial decision D6/F1/oik.19500/4.11.2004 (Official Gazette B' 1671) by virtue of which small-scale RES plants were shifted to zero-impact level in order to make their integration possible into towns and settlements.

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[9] The law stipulates that private forest expanses may be expropriated for the benefit of the State without any alteration of their classification being necessary nor the observance of the procedure laid down in the provisions of article 14 of Law 998/1979 re: "Protection of the country's forests and scrublands in general" (Official Gazette A 289). These provisions established a tedious administrative procedure of interlocutory settlement of disputes concerning forest classification because there is no forest registry. Furthermore, the law provides that by virtue of decisions taken by the Minister of Development, some projects may be designated as of public benefit. Any expropriations necessary for their implementation are announced through an act of Cabinet in case the early, i.e. in advance of the payment of the compensation to the owner of the property, occupation of the property is considered of importance. The law itself already designates the following projects as serving the public interest: "Development of 400-kV loop in Eastern Macedonia and Thrace", "Connection line between Nea Makri-Polipotamos and the high-voltage grid in Southern Evvoia", and "High-voltage connecting line for new power plant in Rhodes". Although all of them aim at strengthening the transmission capacity of conventionally generated power, their impact on the development of RES as well is nevertheless obvious.

6. Current developments in the institutional environment of RES

6.1 Law 3468/2006

Today the RES deployment regime is governed primarily by Law 3468/2006[10] "Generation of electricity from renewable energy sources and through high-efficiency co-generation of electricity and heat and miscellaneous provisions" (Official Gazette A' 129). The text of the law along with its circular D6/F1/oik.21691/30.10.2006 are posted on the Ministry of Development website (http://www.ypan.gr). The main axis of that serious legislative initiative are outlined below:

- Putting the national target for the share of RES on an official footing in the net domestic power consumption in the year 2010 at 20.1 percent and in the year 2020 at 29 percent.

- Taking initiatives in environmental permitting through the setting of strict deadlines within which approvals should be granted or consensus rendered by services and bodies involved in the interim stages of the overall licensing. More specifically, it is provided that in case the Secretary General of the Region fails to issue the installation permits within 15 days, the relevant competence is assumed by the Minister of Development[11]

- Setting up of two intra-ministerial coordinating bodies, one on level of secretaries general and the other made up of high-echelon civil servants, aiming at the coordination of the licensing processes control and the provision of support and guidance to authorities involved therein.

- •ntroduction of a regime of strict follow-up procedures for the holders of generation authorisations, in order to keep them bound to their legal commitments and making provisions for getting rid of those profiteering from license trading.

- Diversification of the previous unique feed-in tariff regime chiefly on behalf of PV in order to boosting investments in that sector lagging behind so far. The tariffs set by the law are revised every year by virtue of a decision taken by the Development Minister on the basis of the weighted average increases of the incumbent utility's bills whereas after the full liberalisation of the electricity market the revisions shall take place at 80 percent of the consumer price index. Regarding the current year applicable are according to ministerial decision D6/F1/oik.14610/4.7.2007 "Revision of sale bills of electricity generated by producers and auto-producers in plants using renewable energy sources or through high-efficiency co-generation of electricity and heat" (Official Gazette B' 1223) the prices of table 2.

- Enactment of provisions at variance with the economic development law 3299/2004 (Official Gazette A' 261) in order to be lawful the transfer to the responsible power transmission Operator of the fixed assets of companies receiving public aid for investment schemes corresponding to the cost of grid extension works connecting power generation plants to the grids even before the lapse of the five-year period generally provided for in the above law.

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[10] Law 3468/2006 was amended by virtue of article 17 of Law 3489/2006 "Thessaloniki innovation zone and other provisions" (Official Gazette A' 205) and article 19 of Law 3587/2007 "Revision and additions to Law 2251/1994 re: "Protection of consumers", as in force at each time – transposition of directive 2005/29 of the European Parliament and Council (OJ L.149)" (Official Gazette A' 152).

[11] On central level is done from the beginning the issue of the installation and operating permits of large-scale facilities, as well as plants located in environmentally sensitive areas.

Generation of electricity from:	Price of energy (Euro/MWh)	
	Interconnected System	Non-interconnected islands
Wind energy, hydraulic energy exploited in small-scale hydroelectric plants with an installed capacity up 15 MW, Geothermal energy, biomass, gases released from sanitary landfills and biological treatment plants and biogases, miscellaneous RES, High-efficiency cogeneration of heat and electricity	75.82	87.42
Wind energy from sea wind farms	92.82	
Solar energy utilised in photovoltaic units with an installed capacity less than, or equal to 100 kW, and which will be installed in a lawfully owned or possessed property or in adjacent properties of the same owner or lawful possessor	452.82	502.82
Solar energy exploited in photovoltaic units with an installed capacity of over 100 kW	402.82	452.82
Solar energy exploited in units employing a technology other than that of photovoltaics with an installed capacity up to 5 MW	252.82	272.82
Solar energy exploited in units employing a technology other than that of photovoltaics with an installed capacity of over 5 MW	232.82	252.82

Table 2. Renewable energy feed-in tariffs in the year 2007

- Establishing of the right to install sea wind farms following the successful precedent of similar projects in the Northern Sea.

- Licensing of hybrid stations without a prior tendering procedure and direct indexing of the energy tariff regime applicable to hybrid stations that will be installed in island systems not connected the mainland's interconnected system chiefly to the avoided cost of conventional plants whose operation is thereby supplanted to ensure the economic viability of the said stations (analysis of the tariff regulations applicable to hybrid stations is given in section 5.3).

- Completion of the package of efforts at bringing national laws into line with the requirements set forth in article 5 par. 5 of Directive 2001/77/EC through the set up of a system for issuing warranties of origin for renewable energy.

- Improvement of electricity sale terms with the aim of facilitating bank financing of the projects. More specifically, the initial 10-year validity period of the contracts may be extended by an equal period simply upon a producer's unilateral declaration to the responsible Operator.

- Redrafting and legislative consolidation of the levy imposed on the gross proceeds from the sale of renewable energy (with the exception of photovoltaic) in favor of local governments, at 3 percent in lieu of the previous 2 percent.

- Increase of the limits of installed capacity up to which it is not required the issue of production authorisation and installation and operating permits[12].

[12] Under the previous regime that limit was 20 kW and by virtue of the new law it is increased at 0.5 MW for geothermal energy, 100 kW for biomass or biofuels, 150 kW for PV, 20 kW for wind energy in case the wind farms are installed in an autonomous island or at 40 kW in the case of Crete, or 50 kW for plants installed in the mainland's interconnected system and all other forms of RES. The

- Increase of the limit of a plant which is termed a small-scale hydroelectric plant from 10 MW to 15 MW so that a greater number of plants utilizing hydraulic power will enjoy a feed-in tariff regime plus priority by load dispatch.
- Lifting of the 50-MW limit of installed capacity above which the provisions of article 35 of Law 2773/1999 did not grant priority to RES plants by load dispatch
- Imposition of mandatory measurements of RES potential by a certified body

6.2 The new regulatory framework

For the enforcement of Law 3468/2006 an unprecedented in form and extend regulatory framework was set up as detailed below.

1. Ministerial decision D6/F1/oik.18359/14.9.2006 "Form and scope of electricity supply contracts in the System and the Interconnected Network according to the provisions of article 12 par. 3 of Law 3468/2006" (Official Gazette B 1442). The text of the decision in bilingual form is posted on the Ministry of Development website (http://www.ypan.gr).

2. Ministerial decision D6/F1/oik.1725/25.1.2007 "Establishment of form and scope of sale contacts of electricity generated using renewable energy sources and through high-efficiency cogeneration of heat and electricity in the Network of the Non-Interconnected Islands according to the provisions of article 12 par. 3 of Law 3468/2006" (Official Gazette B 148)

3. Ministerial decision D6/F1/oik.5707/13.5.2007 "Regulation of production authorisation regarding electricity generated using renewable energy sources and through high-efficiency cogeneration of heat and electricity" (Official Gazette B 448). The text of that decision is posted on the Ministry of Development website

4. Ministerial decision D6/F1/oik.13310/18.6.2007 "Procedure for the issue of installation and operating permits of power plants using renewable energy sources" (Official Gazette B 1153)[13]. The text of the decision in bilingual form is posted on the Ministry of Development website.

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exemption holds true in case the stations are not installed in areas with congested grids and pursuant to article 19 of Law 3587/2007, the relevant right is non-transferable before the implementation of the projects.

[13] The main points of the new regulations for the issue of installation and operating permits are the following:

a) The formulation of connection terms is done before the filing of the application for the issue of the installation permit. After the formulation of connection terms by the responsible Operator, the holder of the production authorization maps out in a surveyor's diagram the connection mode of the plant with the grid as proposed by the Operator which thereafter endorses the diagram. In case the station is connected through a new medium to high voltage substation, the applicant should furnish the Operator with a suitability certification of the land lot destined for the installation of the substation issued by the responsible service of the owner of the grid. The Operator endorses the surveyor's diagrams with respect to their compatibility with the connection terms. Aim of that disposition is to be safeguarded that the scope of the environmental impact assessment study prepared thereafter by the producer and which should include the connection works shall not be subject to further modifications and shall be endorsed by the Operator.

b) Thereupon, it is foreseen that the applicant will submit a file to the licensing authority for the issue of an act approving the environmental terms (EPO) and the concession of the right of use a forest expanse, whenever so required, as well as the rest supporting documents (including the pro-

5. The ministerial decisions for the implementation of the photovoltaic energy deployment scheme referred to in section 5.2.

What it remains for the completion of the regulatory framework is the issue of a ministerial decision approving the terms and conditions, and also the unit prices of the connection works of consumers and producers to the power transmission system[14].

6.3. Photovoltaic energy deployment scheme

In addition to streamlining the licensing regime, Law 3468/2006 quashed the feed-in status of photovoltaic energy which previous Law 2244/1994 had left on the fringe of viable deployment in spite of the law's significant contribution to the promotion of other RES forms. The basic axis of the PV energy deployment scheme established by the new law, was elaborated by the Minister of Development decision D6/F1/oik.8684/24.4.2007 (Official Gazette B 694) as revised by virtue of the decision D6/F1/oik.15450/18.7.2007 (Official Gazette B 1276). The scheme makes up the first important effort of organised spatial deployment of stations which utilise solar energy as it was already the case in other countries, both in Europe and elsewhere, with a much less abundant solar energy potential compared to Greece.

The desire of small investors to do business in the field of PV well beyond any expectations as evidenced by the great number of applications for licensing and getting public aid, proves in the first place the correctness of the government's targeting to

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duction authorization and the connection terms). After a preliminary checking of the identification of the data with those of the production authorization the licensing authority forwards the data to the authority in charge of approval of environmental terms. Finally, after the issue of that act, an application may be submitted to the above licensing authority for the issue of the installation permit.

c) For the issue of the operating permit, the applicant submits a file to the authority which issued the installation permit. In the ministerial decision the new procedure is detailed as established in the framework of the operating permit issue regarding RES plant by article 8 par. 5 of Law 3468/2006, i.e. for the checking of the operational features of the plant's equipment by the Centre for Renewable Energy Sources.

d) Pending applications which have been submitted after the date Law 3468/2006 came into force and up to the date of the ministerial decision for the issue of installation permit, the approval of environmental terms, the transfer of the right of use a forest expanse, the transfer of a forest expanse, or the issue of an operating permit are subject to the provisions of that decision. Presupposition for considering these applications is the rendering of a positive opinion on the preliminary environmental impact assessment, which in the case the production authorization was issued before the date Law 3468/2006 came into force, is issued upon an application of the person interested therein directly to the service in charge of environmental permitting.

e) The formulation of the connection terms is done after a positive opinion on the preliminary environmental impact assessment has been delivered so that no capacity is taken up in the transmission system with projects which are lacking proper environmental planning to be granted a relevant permit.

f) The validity time of the installation permits of RES plants is increased. Thus, permits referring to new plants or additions to existing ones and issued after the date the decision comes into force will henceforth have a two-year duration. Under some conditions the right of extension of the initial period is provided for two more years.

[14] The issue of that important decision is foreseen in articles 5 par. 1 subpar. a and 29 of Law 2773/1999 as they are in force after having been revised by virtue of articles 2 par. 1, and 19 par. 1 of Law 3426/2005 for the transposition of Directive 2003/54/EC article 20.

stimulate the sound interest of that people. In any case, however, the Ministry of Development has stressed that the investments in the field of energy presuppose knowledge and responsibility, and are not means of opportunistic and easy enrichment and that especially the small investors should be cautious.

Under the scheme, it is foreseen the licensing of PV stations making up the target (590 MW in the mainland's interconnected system, 200 MW in the autonomous islands, and 50 MW for auto-producers) spanning the 2007-2010 period. That leads to a full deployment of PV stations under the scheme until 2015 should the progress so far of licensing mainly large-scale stations be taken into consideration. In addition thereto, the experience gained regarding the actual deployment of RES plants has shown that it is not possible the implementation of all stations for which production authorisations have been issued, so that the full deployment of PV energy to meet the target is expected to take place gradually up to the year 2020, as also provided in Law 3468/2006. Therefore, it is feasible the aim of granting public aid to the said investments from domestic and Community resources under the regime of the National Strategic Reference Framework now in the final stage of preparation. On the other hand, there should also be taken into consideration that the expected technological advances in the field of PV systems will substantially lead to increased efficiency with a simultaneous cutback in their procurement and installation cost. Also, the expected increase of the generation cost of energy by conventional means in combination with the obligation of acquiring emissions allowances shall finally lead to a small and as such socially acceptable burden to the consumers via the special levy on the electricity bills in favor of RES.

Up to the end of this year and the next ones 2008-2010 the proportion of licensed capacity as a percentage of the total capacity of the PV scheme and in MW are shown in table 3.

Time frame	Percentage of scheme's total capacity	Licensed Capacity in the mainland's interconnected system in MW	Licensed Capacity in the autonomous islands in MW
Up to 31.12.2007	50%	275.50	100
Up to 31.12.2008	70%	383.00	140
Up to 31.12.2009	90%	491.00	180
Up to 31.12.2010	100%	540.00	200

Table 3. Licensed capacity as a percentage of the overall capacity of the PV energy deployment scheme

According to the above ministerial decisions, in the mainland's interconnected system the installed capacity of PV stations in MW will be settled on the base of the geographical distribution per administrative Region as shown in table 4.

Also, an additional 50-MW capacity is allocated to the department (nom•s) of Arcadia.

Today the percentage of public aid to the capital of RES investments as provided under law 3299/2004, as amended by virtue of article 37 of Law 3522/2006 (Official Gazette A 276) and elaborated in the joint ministerial decisions published in Official Gazette issue B 1292/2007, reflects the country's fiscal strength expressed in the capacity of

satisfaction of the greatest possible number of investment proposals. On the other hand, the grant of public aid to the investment capital acts in a complementary way to the abovementioned favorable feed-in regime applicable to electricity generated in PV systems as established by Law 3468/2006 so that the viability of the investments can be taken as granted.

Administrative Regions	Total capacity	•20 kW	>20 and •150 kW	>150 and <2 • W	•2 • W
Eastern Macedonia & Thrace	46.45	4.45	14.50	12.50	12.00
Central Macedonia	60.10	5.45	24.50	15.00	15.00
Western Macedonia	40.00	4.00	12.00	12.00	12.00
Epirus	18.00	1.80	5.40	5.40	5.40
Thessaly	56.60	5.34	16.02	16.02	16.02
Ionian Islands	15.00	1.50	4.50	4.50	4.50
Western Greece	60.00	6.00	18.00	18.00	18.00
Central Greece	63.15	5.69	17.06	17.06	17.06
Peloponesse	122.10	12.20	36.59	36.59	36.59
Attica	43.60	3.64	10.92	10.92	10.92
Department (nom•s) of Thessaloniki	15.00	1.50	4.50	4.50	4.50
Total	540.00	50.00	159.48	147.98	147.48

Table 4. Capacity of PV stations in MW installed in mainland's administrative Regions

Basic target of the scheme is the deployment of many small-scale station with a capacity up to 150 kW close as possible to the consumption clusters of electricity as they turn out from recordings of peaking demand at every location of the whole country and especially in the islands where actually only such small stations are going to be implemented. For the final geographical distribution in the mainland's interconnected system, sunshine and temperature data were taken into account and also the needs of the country's southern part where the centre of gravity of electricity consumption is located. In the autonomous islands the invitation of the Regulatory Authority for Energy to potential licensees took into consideration the capacity margins of every island cluster served by the same power facilities in order to be avoided stability problems. The total capacity allocated to stations of a size up to 150 kW exceeds 40 percent of the target in the mainland and includes the overall capacity of the autonomous islands, i.e. in total 410 MW. The benefits anticipated from reaching that target are multiple since the smaller stations have a considerable lower impact on the environment, the grids are decongested due to decentralised generation at the "ends" of the transmission lines, whereas the regional development is boosted through the creation of employment posts and revenue raising by small and predominantly locally active producers.

Further, there should be noted that the assessment of the benefits accrued from the PV stations is not confined to the substitution of electricity generated in conventional plants. The PV stations, as a dispersed generation mode, do supply energy during medium and high-demand hours and therefore make redundant conventional capacity in coping with peaking loads. In addition thereto, significant is their contribution in lowering transmission grid losses. Albeit not directly reflected in the electricity bills and the special

levy in favor of RES, these advantages are nevertheless real and knowledgeable and in the final analysis turn out to the benefit of national economy.

6.4. Hybrid systems

6.4.1 Hybrid is termed a power generation plant using at least one form of RES and an energy reservoir, provided that the total amount of energy absorbed from the grid on an annual base does not exceed 30 percent of the total amount of energy consumed for the filling of the reservoir of that station[15]. Especially, with regard to hybrid stations which utilise solar energy in a form different from that of the photovoltaic energy, it is also allowed the use of conventional primary energy, provided that the latter is necessary for the utilisation of the solar energy. In that case the conventional energy used may not exceed 10 percent of the totally energy produced in a year in the units utilizing solar energy. On the other hand, the maximum generation capacity of the RES part may not exceed 120 percent of the installed capacity of the units driven by the energy contained in the reservoir of the station[16].

The capacity availability billing of hybrid stations which are connected to the grid of the islands which are connected to the mainland's interconnected grid and the actually sold energy will be made administratively on a case-by case base. The price for capacity availability (Euro/MW-year) is calculated by taking into account the estimated construction cost and the constant operation cost of a newcomer conventional plant to the specific autonomous electrical system. More specifically, the annual price is calculated as the sum of the annual burden for the paying off the invested capital necessary for the construction of the "newcomer" conventional power plant, i.e. the conventional plant which is deemed as implemented to meet the needs of the island and, on the other hand, the annual constant operation cost of the conventional plant. That pricing cannot be less than the remuneration paid for the availability of the units of the newcomer plant of corresponding size.

Accordingly, the actual power generated in the firm output units of the hybrid station (i.e. the units which utilise the stored energy) and fed to the grid, is reimbursed on the base of the mean marginal variable cost for power generation which is supposed to incur, by the time of power production authorisation issue, the conventional units meeting peaking loads of the autonomous system to meet the electricity demand in that autonomous system to meet energy demand in the non-interconnected island during peak hours by which the hybrid station supplies its stored energy to the grid. As peak-load serving units are deemed those who operate in an annual circle for a period lasting no more than 30 percent of a year. The power sale price cannot be less than 125 percent[17] of the price the hybrid station is charged for power taken up from the grid in order to fill its storage

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[15] In that way it is excluded the possibility of setting up hybrid systems which will be made up of storage means for the demand management the power having been generated by conventional fuels and not RES plants.

[16] By means of this restriction, hybrid stations possessing an insignificant regulation capacity of the energy produced will not enjoy any energy billing advantages over other RES facilities.

[17] This restriction acts in a preventive way to any possible tendency of the Grid Operator which at the same time is a producer, to aim at an equalization of the price at which energy is sold to the hybrid station mainly during night hours of low demand and the price the Operator is supplied with energy coming from the hybrid station mainly during the peaking-demand afternoon hours.

system. That price is also fixed administratively on the base of the mean variable generation cost of the base-load serving units of the autonomous by the time of issue the production authorisation. As base-load serving units are those operating no less than 70 percent of a year's duration.

In the above generation variable costs of the base and peaking loads serving units is included the variable part of the fuel cost and the operation and maintenance cost, as well as the emissions right.

The billing of the power the RES units of the hybrid station supply directly to the grid is not different from the price at which electricity produced in other RES plants is remunerated. However, a compensation on hourly base[18] of that energy with that absorbed from the grid is possible. In that case the pricing of the energy the hybrid station absorbs from the grid and the energy supplied directly to the grid by the RES units, refers to the power which is reckoned as absorbed from or fed to the grid after the said compensation.

By load dispatch, the responsible Operator grants to the RES units of the hybrid station the same priority status accorded to the other RES plants except if for reasons of safe operation of the grid the access of the RES units of the hybrid station is impossible. In that case the priority of access of the RES units of the hybrid stations to the grid is applicable to an administratively fixed proportion of the power absorbed from the grid for the operation of the storage units of the hybrid station, which operate during the same dispatch time.

The above pricing of the services and electricity supplied to the grid or the hybrid station absorbs from it, may be annually revised. The holders of production authorisations in the autonomous islands conclude with the Operator of those islands an electricity supply contract lasting 20 years. In case of connection of the island with the mainland's interconnected system, the contract continues to be valid without being possible its renewal.

The above operation framework of the hybrid stations in the autonomous islands aims at the increased penetration of RES into their energy balance without any bearing on the other RES plants which operate in those islands and do not form a part of the hybrid stations. Also, the same framework contributes to the rational use of energy so that a real reduction in the consumption of conventional fuels is achieved in the island where a hybrid station is installed. Therefore, a considerable increase of the share of RES in the energy balance of the islands is expected as a result of participation of the said stations.

So far, profound interest has been manifested for the installation of hybrid stations in the islands and relevant applications have been filed especially for Crete and also other smaller islands. The technology opted in all applications refer to hybrid stations utilizing wind energy by means of storing it in the form of the potential energy of water. There should be mentioned that since the water turbines are in general quick load pick-up units, considerable improvement in flexibility and reliability of an island's power production system where hybrid stations are installed is expected (ancillary services).

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[18] That calculation is made on an hourly base so that the owner of the hybrid will be prompted to store energy during the hours the RES units of the hybrid station are operating, since, as a rule, during the same time no feeding of energy to the grid is possible due to technical constraints.

6.4.2. The operation mode of hybrid stations in the mainland's interconnected system in spite of being similar to that of the hybrid stations of the autonomous islands, has been adapted more to electricity market mechanism. The firm power output units of the hybrid stations utilizing the energy stored in the reservoir of that station enjoy access to the mainland's interconnected system according to the provisions of the relevant Operation Code, as they are applicable at each time to hydroelectric plants of a capacity over 15 MW. Also, for the filling of the storage system, energy may be absorbed from the grid according to the rules in force at each time for the large-scale hydroelectric plants. In particular, the storage of energy (absorption from the System), as well as the feeding of energy to the System by the firm power output units, is done through tendering in the daily electricity market. The tenders are settled out on the base of the marginal price of the System according to the relevant provisions of the System Operation and Power Transaction Code.

6.4.3. The differentiation of the operation framework of hybrid stations in the autonomous islands with respect and that applicable to the interconnected System, reflects the effort to shaping up more attractive conditions for the deployment of hybrid stations in these islands. As a matter of fact, their electrical systems are already saturated due to the operation of RES plants and mainly wind farms. Thus, the capabilities for further penetration of renewable energy are considerably reduced but their potential these islands possess for the deployment of hybrid stations is significant.

7. The planning dimension of RES deployment

7.1. As mentioned at the outset of this report, at the time the institutional framework for RES was established, the emphasis was placed on the granting of financial incentives in the form of feed-in tariffs guaranteed by law in combination with the simplification of the licensing procedure by means of omitting the establishment permit generally applicable to manufacturing facilities.

However, the issue of siting from the point of view of abiding by the physical planning which was then covered inadequately by Law 360/1976 re: "Physical Planning and Environment" (Official Gazette A' 151) was not a cause for concern. The same happened also with the more specific but still important matter of installation in forests and scrublands.

By virtue of Law 2941/2001, the first serious effort was made to resolve the problem. In particular the installation of RES installation in forests and scrublands was regulated through concrete provisions which formed a new standing and generally applicable regime which the Supreme Administrative Court ruled as constitutional.

Furthermore, by mid 2003 by virtue of decisions of the Minister of Environment, Physical Planning and Public Works, the Regional Frameworks for Spatial and Sustainable Development Plans were instituted under Law 2742/1999 "Spatial Planning and Sustainable Development and other provisions" (Official Gazette A' 207). All these frameworks highlight RES and stress the need for their development. At the same time the issue of these decisions filled the gap identified by the ruling 2569/2004[19] of the Supreme Administrative Court having been promulgated in the meanwhile.

[19] Under that decision the installation permit of a wind farm in Lakonia, Peloponnesus, issued before 2003, was annulled since it was ruled that in an area where so many applications are piled up, a

7.2. Already in 2004, for the more effective and integral settlement of the issue of RES physical planning, the inner cabinet decided to push forward on an urgency base the drafting of the Special Spatial Framework on country's scale. In doing so the cabinet took advantage of the capabilities provided by Law 2742/1999 and paid heed to the suggestions and criteria expressed in the Supreme Administrative Court's ruling 2569/2004. By extension, the meeting of the national targets in connection to the abatement of the greenhouse phenomenon was pursued as foreseen in the Green Paper for the Security of Energy Supply (European Commission COM (2000) 769 final, page 44).

At same time it was decided the promotion of the General Planning Framework, as well as the Special Frameworks for tourism, industry, mountain masses and seaside areas. Most of these special frameworks, as well as the National Zoning Plan, after having been formulated by the Ministry of Environment, Physical Planning and Public Works, were put on public consultation and the rendering of opinion of the National Board of Planning and Sustainable Development is imminent in order to be adopted.

The RES special planning framework is abiding by the principles and criteria applicable to spatial planning under article 2 [20]of Law 2742/1999 and elaborates the directions towards a sustainable development and organisation of the national territory with respect to the spatial structure of power generation from RES as a sector of productive activity and as infrastructure of public interest of nation-wide range and decisive importance for the protection of the environment. Also, the said framework provides guidelines for the underlying planning levels (Regional Frameworks, General Town-planning Schemes, Housing Organisation Plans of Non-compact Towns, Housing Control Zones, etc).

In a more concrete way, the RES Special Planning Framework:

§ Shapes out spatial policies for RES per category of activity and space, on the base of data available on country's level

§ Establishes siting rules and criteria which will allow on the one hand the set up of viable RES facilities and on the other hand their harmonious incorporation in the natural and man-made environment, i.e. through the endorsement of the framework it is sought, in addition to other benefits, a more clear-cut guide to the licensing authorities and the investors so that the latter will be oriented to installation locations in the first place being proper from the spatial planning point of view. In that way it is possible to cope with any ambiguities and conflicting land uses that often prop up on the spot.

§ Sets in motion an effective siting mechanism of RES facilities in order to be met the targets of the national and European policies

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permit may be issued only after the adoption of such frames or the declaration of the area as Productive Activities Integrated Development Area.

[20] In par. 1 the targets are defined which push to the fore the triptych of integral, balanced and sustainable development of land and demonstrate the need for safeguarding and highlighting the country's comparative geographical natural, cultural and productive advantages. Par. 2 includes the essential principles that contribute to meeting the planning target and into which, inter alia, the guidelines of Agenda 21 and the 5th Action Plan for the European Union Environment, as well as the general criteria for a planning approach on a European scale as mapped out in the Community documents 'Europe 2000', 'Europe 2000+', the Community Area Development Plan, etc. are incorporated.

§ On the operational level the special framework is seeking after the simplification and shortening of the procedures pertinent to the spatial planning and its spatial-environmental elaboration in view of the set up of RES plants, as well as the establishment of legal certainty for the investors without relegating the environmental protection to a subordinate role.

8. The Regulatory Authority for Energy

The Regulatory Authority for Energy (RAE) was established by virtue of article 4 of Law 2773/1999 as an independent public agency entrusted with the task of monitoring and controlling the electricity market and the delivery of opinions regarding the observance of the rules of genuine competition and the protection of consumers.

In addition, RAE formulates proposals to the Minister of Development with regard to the issue of power generation authorisations and thereafter monitors the implementation progress of the RES projects through quarterly reports and recommends the removal of those investors who exhibit unjustifiable delays. Also, RAE recommends legislative measures for the further deregulation of the electricity market within which critical RES issues can be addressed (as is the case of hybrid plants).

The evaluation of all applications is performed by RAE assisted in the technical part by the Centre for Renewable Energy Sources on the basis of the criteria laid down in article 9 of the Production Authorisation Regulation which was issued according to Law 2773/1999 article 28 (see also RAE's website http//www.rae.gr).

9. The Transmission System Operator

The creation of a System Operator was provided for in article 14 of Law 2773/1999 and it was set up 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). Its task is 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 Greece's electric power supply in a sufficient, safe, cost effective and reliable way[21]. The Transmission System Operator (DESMIE 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, the PPC S.A. which had already floated on the stock market by virtue of Presidential Decree 333/2000 "Conversion of the Public Power Corporation (PPC) into a Societe Anonyme and approval of its statutes" (Official Gazette A 278) performs the duties of system operator for the island grids which are not connected to the mainland's system.

[21] According to Law 3175/2003 the System Operator assumes expanded duties as regulator of the daily electricity market, settles the supply and demand imbalances, and provides ancillary services and reserve capacity. The System Operator is entrusted with the enforcement of the law's provisions, which aim at the development of genuine competition on the basis of a more deregulated and flexible daily market. That upgraded role runs in conjunction with the development of an actual daily electricity market, which lessens the business risk and ensures the viability of new entrants in the field of small-scale power generation. Further, the System Operator is obliged to ensure a sufficient long-term margin of domestic power generation potential to cope with probable power shortages in the future. For that purpose the holders of supply authorizations are obliged to provide availability guarantees for productive potential.

10. The Centre for Renewable Energy Sources

The establishment of the Centre for Renewable Energy Sources (CRES) was provided for 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" (Official Gazette A 167). The scope of CRES is the promotion of RES, energy saving and rational use of energy, as well as all kinds of support for activities in these 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 these activities.

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

11. Public funding •f RES projects

11.1 Granting of funding to RES using funds from the 2nd Community Support Framework

The Operational Programme for Energy (OPE), managed by the Ministry of Development, drew funds from the 2nd Community Support Framework (CFS), which ended on December 31, 2002, to grant public aid to projects with a total budget of Euro 1.061 billion.

	Wind	Small hydro	Photo-voltaics	Bio-mass	Total
Number of investments	16	9	15	2	42
Total budget in million Euro	141.60	17.20	6.10	31.50	196.40
Total public expenditure in million Euro	53.20	7.70	4.20	14.80	79.90
Total installed electric power in MW	121.00	11.50	0.74	20.70	153.90
Annual power production in TWh	354.00	53.00	1.00	168.00	576.00

Table 5. Summary data of cost and capacity of RES funded from the 2nd CSF

The European Regional Development Fund provided 33.8 per cent of that amount and national resources 45.2 percent (including the PPC's funds) whereas private capital flows made up the remaining 21 percent. A part of the sub-programme 3 addressed the issue of RES promotion. Summary data is shown in table 5.

On the other hand, the Ministry of National Economy (now Ministry of Economy and Finance) provided funding from national resources under Law 1892/1990 "Modernisation and development and other provisions" (Official Gazette A 101) and thereafter under Law 2601/1998 "Private investment aids for the country's economic and regional development and other provisions" (Official Gazette A 81). From the available data, it is estimated that one third of the operating plants was funded from national resources.

11.2 Funding of RES under 3rd Community Support Framework

The Operational Programme "Competitiveness" (OPC)[22] that uses funds from the 3rd Community Support Framework provides public funding for RES and energy saving,

[22] See website of Ministry of Development www.ypan.gr

substitution and other energy-related actions as high as Euro 1.02 billion. Public aid accounts for 30 percent of the eligible cost of the projects and goes up to 60 percent whereas the cost of transmission lines independently of the technological category of the investment receives by 45 percent for areas A and B of Central Macedonia and Attica as they are characterised in Law 3299/2004 and 50 percent for the rest country whereas for small-scale enterprises a flat 50 percent applies all over the country.

The approved budgets and the corresponding amounts of public financing are shown in table 6.

	Wind	Small hydro	Photo-voltaics	Bio-mass	Total
Number of investments	51	27	91	3	172
Total budget in million Euro	549.59	122.20	38.30	25.70	735.79
Total public expenditure in million Euro	175.40	49.70	17.30	10.30	252.70
Total installed electric power in MW	554.69	88.40	4.32	17.30	664.71
Annual power production in TWh	1,392.30	318.70	5.32	136.30	1,852.62

Table 6. Financial data of RES and energy saving projects co-financed from 3rd CSF in million Euro

11.3 Law 3299/2004 providing development incentives

A considerable funding tool for RES investments is the so called development law 3299/2004[23], as in force today, following its amendment by virtue of article 37 of law 3522/2006.

Specifically, the Greek territory is divided into three (3) zones where the capital grants are as high as 20, 30 and 40 percent respectively of the eligible investment cost, the connection cost to the grid being also included in the case of large scale enterprises. The grant is increased up to 10 percent for medium-scale enterprises and up to 20 percent for the small ones.

In particular, for investments in power generation using solar and wind energy, the grant intensity along with the above markup amounts to 40 percent.

11.4 Fiscal regulations for RES investments without capital subsidy

The projects that will receive public funding from national and Community rsurces under the National Strategic Reference Framework (NSRF) in combination with the large-scale hydroelectric projects do not suffice to meet the target of 20.1 percent and therefore investments using purely private funding will be necessary. The lack of measures providing public funding will likely be offset by:

- The alleviation of the bureaucratic burden through the simplification of procedures and the overcoming of administrative constraints (see recent legislative measures in par. 5 and Special Spatial Plan in par. 6).
- The consolidation and stabilisation of the investment environment by means of broader development and taxation policies.

[23] See Greek and English text of Law 3299/2004 providing development incentives at the website of Hellenic Center for Investment (http//www.elke.gr)

- The continuation of the feed-in price regime of the renewable energy on a permanent and stable base[24].

- The facilitation of bank financing of the projects by the measures taken under Law 3468/2006 as illustratively the improvement of terms and duration of power purchase contracts.

12. Current status of RES and large-scale hydroelectric plants

12.1 Renewable energy sources

The total energy yield of RES-electricity stations (except large-scale hydroelectric plants) which will have been put into operation up to the end of 2007 or at the latest by end of January 2008, amounts to 2.25 TWh, coming by 79.9 percent from wind farms, 10.5 percent from small hydroelectric plants and 9.6 percent from other RES (biogas, biomass, photovoltaic).

The most up to date data for RES facilities into which large-scale hydroelectric plants have been included is shown in table 7, wherein facilities operating for testing purposes have been taken into account.

Besides what is presented in table 7, at present, there are further installation authorisations for RES stations totaling a capacity of 813 MW out of which 670 MW are wind farms, 110 MW small-scale hydro, 1 MW of photovoltaic systems and 32 MW biomass stations. They are mature plans for projects throughout Greece, without connection to the grid or environmental licensing problems and therefore it is estimated that they will be completed by 2010. It should be noted that these projects could be connected directly without requirement of costly projects to enhance the local transmission energy grids.

On the contrary, in areas such as South Euboea, Southeastern Peloponnese and Eastern Macedonia and Thrace, the planned RES projects should wait for the completion of the transmission projects that have begun before they are installed. Detailed presentation of the situation in these areas, as well as in islands not connected to the mainland's interconnected system, is given in par. 15.

As regards the development of the less mature plans for RES projects in the rest of Greece, that is to say except the areas where extensive network projects have begun, it should be noted that wind potential especially is confined to areas where the local conditions of accelerated wind flow create the conditions for energy exploitation. It is a fact that this wind potential is unexplored. However, in recent years there has been a considerable and detailed survey by private bodies for the identification of appropriate locations in areas which don't face problems concerning grid transmission and/or local acceptance.

[24] The establishment of a more favorable grid access regime for energy generated in large–scale hydroelectric plants, in comparison to conventionally generated electricity could take place insofar as that the measure does not go against the acquis communautaire.

Region	Large-scale hydros	Wind	Small-scale hydros	Photo-voltaic	Biomass	Totals
Eastern Macedonia & Thrace	500.0	196.67	2.97	0.00	0.00	699.64
Attica	0.00	3.11	0.99	0.10	29.63	33.83
North Aegean	0.00	29.90	0.00	0.00	0.00	29.90
Western Greece	907.20	58.15	24.31	0.00	0.00	989.66
Western Macedonia	375.00	0.00	0.00	0.00	0.00	375.00
Central Macedonia	492.00	17.00	34.00	0.40	8.38	551.78
Epirus	543.60	0.00	45.75	0.00	0.00	589.35
Ionian islands	0.00	40.20	0.00	0.00	0.00	40.20
Thessaly	130.0	17.00	11.43		0.35	158.78
Crete	0.00	129.50	1.00	0.80	0.36	131.66
South Aegean	0.00	37.56	0.00	0.00	0.00	37.56
Peloponesse	70.0	119.80	2.00	0.00	0.00	191.80
Central Greece	0.00	204.30	24.62	0.00	0.00	228.92
Totals	3,017.80	853.19	147.07	1.30*	38.72	4,058.08

*This capacity is registered but there are many non-registered photovoltaic systems due to exemption from the licensing obligation. On the base of electricity sales it is estimated that the totally installed capacity of PV systems by early 2008 will be some 5 MW.

Table 7. Installed capacity of RES systems in MW (December 2007 – January 2008)

The situation is similar regarding the other types of RES, where there are numerous ongoing efforts for developing projects in many areas of Greece.

A reliable picture of this investment interest is given in table 8, which shows the capacity of energy production authorisations in mainland areas beyond those where transmission line reinforcement has begun and no installation authorisations haven been issued. It should be noted that the delay in the development of a project through an investor's own fault (i.e. because of financial inability to implement the project), results in revocation of the production authorisation. So far, authorisations for about 584 MW and idling for a considerable time have been revoked.

Technology	Capacity (MW)
Wind farms	3,059
Small hydros	316
Biomass	5
Geothermal energy	0
Photovoltaics	10
Total	3.390

Table 8: RES production authorisations in the mainland without installation authorisation, except the areas where grid reinforcement has been scheduled

On the base of the data presented in table 8 and the assumption that the rate of project installation over the last two years in Greece, will not only continue, but it will also improve during 2008-2010, due to legislative initiatives that have already been launched and the forthcoming adoption of the Special Spatial Plan (see par. 6 and 7), it is estimated that by 2010 a further 600-650 in the said areas of the country-scale hydroelectric plants will

have been implemented at a 10-percent part and wind farms at 20 percent of the figures shown in table 8.

It is notable the investment interest for the deployment of wind energy projects in islands and their connection with the mainland's system on the base of the fact that so far production authorisations for 75.8 MW for Skyros island and the Aghios Georgios island some 25 km south of cape Sounion, Attica have been issued.

In the autonomous electrical system of the island Ikaria, PPC's Hydropower Development Directorate has tendered a hybrid scheme composed of a typical hydroelectric unit combined with two reservoirs yielding 4.1 MW and assisted by a 2.4-MW wind farm for the generation of some 10.9 GWh/year. The project has already been included in the 3rd Community Support Framework to be granted public aid and the first installment was paid[25]. The construction of the works is scheduled for January 2008 whereas its completion is foreseen no later than 2010.

12.2. Large-scale hydroelectric plants run by PPC S.A.

The PPC S.A runs 15 large-scale hydroelectric plants[26] with a total installed capacity of 3,017.8 MW (see table 3) yielding 4.16 TWh under average hydraulicity conditions and with a conservative scenario for water management due to the multi-purpose character of most projects. During the current year, the production was expected to reach the level of 3 TWh (including the production of 0.5 TWh coming from pumped storage) whereas in 2006 this amount had exceeded 6 TWh.

Also, the works shown in table 9 have been planned[27] by PPC for commissioning by 2010 with an annual combined output of 1.67 TWh. The Greek Government decided to promote the implementation of all projects and especially those of Messochora and Ilarionas.

Region	Plant Name	Capacity in MW	Mean output in GWh/year
Central Macedonia	Ilarionas	153.0	527
Western-Central Greece	Sikia	126.5	296
Thessaly	Pefkofito	160.0	340
	Messochora	161.6	384
Eastern Macedonia	Temenos	19.0	60
Epirus	Metsovitikos	25.0	58
Totals		649.1	1,674

Table 9. Hydroelectric plants planned by the PPC for commissioning by 2010

Today the hydroelectric project of Aghios Nikolaos is in a preliminary stage of implementation by a private company. This plant is situated on the river Arahthos in northwestern Greece and has a total capacity of 93.1 MW and an annual mean output of 320 GWh. One more production authorisation for a hydroelectric project of another private

[25] A summary of engineering data is given in the 2nd National Report

[26] See a table of these plants in the 3rd National Report

[27] As some of them are multi-purpose projects, their implementation does not exclusively depend on the priorities of the PPC's medium-term strategy.

firm with a 60 MW capacity has been issued for Avlaki on the river Acheloos in Central Greece.

The plants of Messochora, Ilarionas and Metsovitikos are scheduled for commercial operation by 2010.

13. Management of dispersed power generation

In Greece, as in most European countries, the functioning of the existing electrical power system is structured on the pattern of central production because the PPC S.A. was, since its establishment and in fact continues to be, the main player in the field. In the case, however, of many small RES units whose operation is governed by the randomness of the natural resource exploited, their control on an uninterrupted basis turns out to be a cumbersome task. Taking this into consideration, RAE is drafting the parameters for using new technologies for control data processing and dispatching in order to effectively address the problem, at a price, however, of a higher cost of the electricity supplied to consumers. The implementation of the above, in the context of a deregulated electricity market, requires the pricing and appraisal of various techniques and capabilities in parallel with the operation of conventional sources in order to achieve the best result for the customers.

The problem becomes more acute in the autonomous island systems where the introduction of hybrid systems of considerable installed capacity poses highly complex problems due to be faced by the Grid Operation Code[28].

14. Guarantee of origin for electricity produced from RES

The institution of the mechanism of guarantees of origin for electricity produced using RES as provided by article 5 par. 5 of Directive 2001/77/EC, has already been included in the bill.

According to the regulation promoted, as issuing organisation of the warranties of origin for the energy fed to the system either directly or through the Network, the System Operator is designated, whereas with respect to the energy fed to the Network of the islands not connected to the mainland's interconnected system the Network Operator is designated.

As issuing organisation of the warranties of origin of the energy produced by autonomous stations that don't feed the System or the Network, CRES is designated. For this purpose CRES installs the appropriate measuring devices at the expense of the producer who wants to be issued with the warranties of origin.

The Regulatory Authority of Energy is assigned to supervise the organisation of the warranties system. RAE exercises a general reliable operation of the system of warranties of energy origin, cooperates with the competent Authorities of the member states and handles issues on mutual recognition of warranties, which have been issued by other member states of the EU or third countries.

[28] In the mainland's interconnected system and the islands connected thereto the matter is governed by the already enacted System Operation Code

15. Engineering activities under way to boost power transmission capacity

The areas of high wind potential (Aegean islands, Southern Euboea, Eastern Peloponnese, Thrace) have already attracted a great number of investors. The main feature of these profoundly windy, and usually sparsely populated areas, is their inadequate power transmission infrastructure constructed decades before renewable energy emerged as a viable option. Thus, in the mainland's areas with high wind potential, the investment capabilities have been restricted due to low feed-in capacity of the local grids. Similar restrictions in the islands are hampering further renewable energy penetration.

The main actions for the reinforcement of the existing power transmission infrastructure are planned to be implemented in the areas of Southern Euboea and South-eastern Peloponnese (see map 1) and Eastern Macedonia-Thrace (see map 2).

Map 1: Routing of electricity transmission enhancement works in the areas of South Euboea and Eastern Peloponnesus

With regard to Southern Euboea, the progress of the works as summarised as follows:

a) Transmission line 150 kV connecting the substation of Nea Makri (Attica) with the substation of Polypotamos (Euboea). It is expected the approval of environmental terms on the basis of the study submitted in October 2006. The line is composed of an underground stretch in Attica (Nea Makri-Marathon bay), a submarine part (Marathon bay-Tigani Euboea) and an overhead stretch on Euboea. PPC S.A. intends to tender the transmission parts with a view of having the project implemented by end 2010 on the condition that the environmental permitting will have been consummate, as well as the completion of the necessary expropriations.

b) Transmission line 150 kV connecting substation of Polypotamos with substation "Euboea 7". By virtue of cabinet of ministers 4/20.6.2007[29] expropriation was announced for tracts of privately owned land over a length of 15.4 km whereas in the rest of a total of 40 km the line goes through public forest expanses. For the assessment of the relevant compensation November 13, 2007, has been fixed as date of hearing [before the one-member court of the first instance having jurisdiction thereto]. PPC S.A. is contemplating starting works by 2008 in the stretches going through public forest expanses which as such do not require expropriation. There will follow the rest parts aiming at the completion of the project by end 2009.

c) Transmission line 150 kV connecting substation of Polypotamos with substation "Euboea 4", 18 km long. Albeit the design is due to be finished within 2008, PPC S.A. has set a time frame for project completion after 2011.

d) Construction of the Aliveri super-high voltage centre and its connection to the 400 kV transmission system and especially the super-high voltage centres of Larymna and Aghios Stefanos[30]. The centre at Aliveri basically aiming at serving the natural gas fueled power plant is now in the stage of environmental permitting for which a solution acceptable by the local society is sought. It is estimated that by the end of this year the project will be tendered with every endeavor for its completion by end 2009[31]. In the future, according to the energy-related developments, the centre is likely to serve the absorption of electricity from wind farms located in the broader area by functioning in a way offsetting somehow the failing implementation of the transmission line Aliveri-Pshachna-Schimatari.

On the other hand, is foreseen the construction of more substations for the connection of wind farms in Southern Euboea, whose final siting will be dictated by the location of the wind farms and the routing of the transmission lines.

With regard to the South-eastern Peloponnese, the connection of 40 MW to the Molai substation is now feasible. Also, the construction of the double-circuit 150 kV transmission line 80 km long, connecting the Astros and Molai substations, was completed in early 2007 and the System Operator formulated connection terms for plants totalling

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[29] Published in Official Gazette issue A 275

[30] Actually it was decided that project to go ahead instead of the initially planned upgrade of the transmission line Aliveri-Psachna-Schimatari (including the submersible link at the straight of Avlida) as fierce reaction of local societies was a stumbling block to the re-routing the overhead stretches.

[31] By that time it is estimated that PPC S.A. will have bring to substantial completion in Aliveri the country's biggest natural gas fueled plant of a capacity of 427.4 MW whose construction contract was signed in October 17, 2007.

some 160 MW. The upgrading of the 23-km long transmission line Astros II-Astros is now implemented with a view of being completed in early 2008.

In the regions of Eastern Macedonia and Thrace wind farms of 197 MW total capacity have already been connected to the 150-kV transmission line and are operating. The absorption of additional capacity is placed against the background of the national system's transmission capacity in the relevant area and specifically is dependent on the construction of

a) the 400-kV double-circuit transmission line connecting the super-high voltage centres of Filippi and Nea Santa

b) the 400 kV single-circuit Nea Santa-Turkish border where the works is estimated to be completed in the first half of 2008 (contractual date for project delivery: January 1, 2008).

c) the Nea Santa Super-High Voltage Centre where the construction of civil works has

Map 2: Routing of electricity transmission enhancement projects in the areas of Eastern Macedonia and Thrace

been awarded and its operation is due to start in the first half of 2009.

With respect to Crete, Rhodes and the other Aegean islands which are not connected to the mainland, the restrictions imposed today by the grids correspond to an absorption capacity of energy from wind farms in the order of 30 percent of the peak demand, without taking into consideration the storage capabilities of hybrid systems (see par. 11.4), i.e. some 300 MW out of which 210 MW have already been granted an installation permit or an operation permit. However, a study is being carried out by RAE co-operating with PPC (in the latter capacity as network operator) to establish in a more accurate way the absorption capacity of these islands. Already capacity totalling 200 MW for the deployment of PV energy on the base of the absorption capacity of every island cluster.

On the basis of the above considerations, the capacity of the additional wind farms that can be installed on islands or areas where the development of the grid has been launched is summarised in table 10.

Area	Capacity (MW)
1. Euboea- Andros –Tinos	470
2. Southeastern Peloponnese	280
3. Eastern Macedonia-Thrace	315
4. Crete, Rhodes and other islands not connected to Greece's mainland	35
Total	1,100

Table 10. Additional wind farms capacity from ongoing initiatives

It should be noted that for the areas of table 10, production authorisations for 1,500 MW have been issued.

16. Conclusions – targeting - need for additional measures

16.1 Basic scenario

After the completion of all planned works for the enhancement of the transmission capacity of the grids and on the basis of the economic potential of RES, the investment interest and the realistic estimates already mentioned, an approximate assessment of the penetration capabilities by 2010 is presented in table 11.

In the event of implementation of all the above investments, the target of the Directive will satisfactorily be reached. In sum, the conditions of fulfillment of the scenario concisely embodied in table 11 and approaching that target for 2010, are the following:

- The implementation of the investment for which installation permits have been granted, will continue unimpeded at an 80-percent portion. This assumption is realistic considering that the planning of the projects is at a mature stage, the licensing procedure has been completed, the access to the grid has been guaranteed and consequently the projects can be granted public funding.
- The projects destined to boost transmission capacity of the grids in the areas of Eastern Macedonia-Thrace, Southeastern Peloponnese and Euboea will be completed to their greatest part so that there will be possible the implementation of plants in those areas at an 80-percent portion. The assumption is realistic given the progress of these projects presented in par. 15.
- The general course of RES investment implementation over the last two years, in areas beyond those where grid transmission capacity projects are underway, is going to improve thereon.

	Installed capacity in MW (beginning 2008)	Additional Installation Authorisations in capacity (MW)	Additional wind farms due to initiatives already launched (MW)	Additional RES in the rest of Greece (MW)	Estimated total capacity 2010 in MW	Estimated energy production 2010 in TWh	Share per RES type during 2010
Wind farms	853	530	880	580	2,843	7.22	10.04
Small-scale hydros	147	90		30	267	0.81	1.12
Large-scale hydros	3,018			344	3,362	4.57	6.35
Biomass	39	29		5	73	0.56	0.78
Geothermal				8	8	0.06	0.08
Photovoltaics	5*	1		84	100**	0.10	0.14
Total	4,062	650	880	1,051	6,653	13.32	18.51

*See note of table 7

** Estimation on the base of the PV deployment scheme

Table 11. Basic scenario - Estimation of RES production figures in 2010

16.2. Conservative scenario

The three conditions of the basic scenario of par. 16.1 highlight simultaneously the dangers that may cause deviation in reaching the target expressed by the scenario and to which the Greek Government has focused its attention.

	Capacity installed in MW (early 2008)	Implementation in force of additional installation permits (MW)*	Additional wind plants due to routing initiatives (MW)*	Additional RES in remaining Greece (MW)*	Conservative Estimation for total capacity in 2010 in MW	Unfavorable Estimation for Power Generation in 2010 in TWh	Percentage share of every renewable energy source by 2010
Wind	853	-100	-400	-300	2,043	5.19	7.2
Small-scale hydro	147	-20		-10	237	0.70	0.97
Large-scale hydro	3,018			0	3,362	4.57	6.35
Biomass	39	-10		-5	58	0.45	0.62
Geothermal energy	0			-3	5	0.04	0.06
Photovoltaics	5*	0		-20	80	0.08	0.11
Total	4,062	-130	-400	-338	5,748	11.03	15.30

* Change in comparison with the basic estimation of table 11

** See note of table 7

Table 12. Conservative scenario - Estimation of RES production figures in 2010.

Illustratively, there can be said that in the case that:

- the percentage of implementation of projects that already have an installation permit is reduced to 65 percent

- the additional wind farms on South Euboea and on the islands will be restricted to 20 percent, while those on Southeastern Peloponnese to 60 percent in comparison with the figures given in the Basic scenario

- the implementation percentage of wind farms will be restricted to 10 percent and for small-scale hydros to 6 percent regarding plants for which production authorisations have been issued in the other parts of Greece (see table 8),

then the share of RES in the gross electricity consumption will reach 15 percent as shown in table 12.

It should also be reminded that the mean production of energy per installed capacity unit (load factor or equal hours of operation) will be slightly reduced because of the necessary development of projects in areas with inferior RES potential.

16.3 Optimistic scenario with additional measures

From what has been said, it is clear that to reach the 20.1 percent target additional measures and policies are required. According to that assumption, the additional initiatives that have been or will be undertaken in the near future could be divided into institutional measures and technological / commercial actions.

As far as the institutional measures are concerned, the following are under examination or have already been launched:

- Promotion and granting of public funding to the island hybrid systems, which will lead to increased RES penetration in areas which have a rich wind potential, which as mentioned earlier, is presently not being put to use.

- Growth of the PV energy to the limits of the scheme

- Establishment of the possibility of RES installation in coastal zones and the sea, so as the development of offshore wind farms, which has been up to now prohibited by virtue of article 14 of Law 2971 / 2001 "Shoreline, seashore and miscellaneous provisions" (Official Gazette A' 285). This will allow the prospecting of areas by investors who presently cannot do business there because of the above prohibition

- Deployment of wind farms in islands for the transmission of the generated electricity to the mainland's interconnected system through lines-cables implemented by the producers

As far as the technological – commercial actions are concerned:

- The connection of Northeastern Cyclades with the mainland's interconnected system has been decided and has started to get up steam. A feasibility study was prepared by a joint team of cadres from the RAE, the PPC, and the HTSO (Hellenic Transmission System Operator) under the auspices of Ministry of Development and was finished in May 2005. The study makes a provision of the connection of the island of Syros with Lavrio (south of Athens) through a DC or AC high-voltage submarine cable and the deployment of the remaining high-voltage grid in the form of submarine cables. Only in this way, overhead transmission lines are not required, which usually provoke fierce opposition from the local communities. At present, the implementation process of this complex project is at the stage of acquiring suitable land for the erection of new 150 / 20 kV

substations and the landing of the ends of the submarine cables. The connection of these islands will allow the transmission of considerable quantities of wind and of high-enthalpy geothermal power to the interconnected system, out of which today only a small percentage can be absorbed locally from the existing autonomous "weak grids". It is estimated that by 2010 a part of the project may be implemented.

- Taking advantage of the investment interest in large RES plants in isolated areas with parallel deployment of projects connected to the trunk of the interconnected system, at the investors' expense, by virtue of article 2 of Law 2941/2001. In general, recent investment interest for such large-scale projects has been demonstrated, which according to the would-be investors don't experience problems of local acceptance which are commonplace in other Greek areas (because they are isolated areas). Moreover, it seems that these areas provide investors with relative confidence in keeping on track the implementation schedule since the connection works can be constructed by the investors themselves, i.e. without having to rely on the owner of the transmission system (PPC).

	Additional RES plants resulting from additional measures by 2010 (MW)*	Optimistic estimation for total capacity in 2010 (MW)	Optimistic estimation for power generation in 2010 (TWh)	Percentage share of every renewable energy source by 2010
Wind	+350	3,193	8.11	11.30
Small-scale hydro		267	0.81	1.10
Large-scale hydro		3,362	4.58	6.36
Biomass		73	0.56	0.78
Geothermal energy	+30	38	0.29	0.39
Photovoltaics	+200	200	0.20	0.27
Total	+580	7,133	14.55	20.20

* Change in comparison with the basic estimation of Table 11

Table 13. Optimistic scenario - estimate of RES production figures in 2010

Under the optimistic scenario, assuming that all the above additional measures will be effective, the meeting of the target is possible[32]. This presupposes the installation by 2010 of about RES generated additional 580 MW (wind plants 350 MW, geothermal 30 MW and photovoltaic 200 MW, see table 13). It is estimated that the load factor of 350 MW of

[32] The meeting of the target depends indirectly on the promotion of measures to be taken in the context of electrical energy. In particular, the transposition of Directive 2002/91/EC for the energy performance of buildings and the draft Directive for energy saving in end uses are expected to give positive results in the effort to restrain energy demand in 2010. That element is not incorporated in the present estimate. Furthermore, the PPC works out its tariff structure, to be proposed to the Minister of Development so as to be incorporated therein the logic of demand–side management. It is noticeable that already in July 2004 successful special billing arrangements were applied to large industrial consumers including rather token incentives in the form of rebates for restrained energy use. It is estimated that conservation policies may contribute considerably to reaching the of RES target at least by 0.5 percent.

wind farms due to the special attributes of the areas where they will be installed will not be considerably less than 30 percent.

Summing up, it should be stressed that Greece takes pains on the institutional, legislative, technical and financing level, to reach the Directive 2001/77/EC indicative target of 20.1 percent, i.e. a feat feasible under quite favorable circumstances. It is important that due reference is made to the fact that once the risk–posing factors have been identified, coordinated effort is now expended on investigating whether they could cause a diversion from the desired goal.