

Dr. SAVVAS SEIMANIDES
Senior Partner, NETWORK CONSULTING GROUP Ltd
and
Dr. NICHOLAS P. VASSILAKOS
Senior Partner, NETWORK CONSULTING GROUP Ltd
President of the European Renewable Energies Federation (EREF)

**THE NEW EU STRATEGIC AND LEGISLATIVE
FRAMEWORK FOR RES AND ITS IMPLICATIONS ON
THE ENERGY SECTOR OF SOUTHEASTERN
EUROPEAN COUNTRIES : THE CASE OF GREECE**

IENE

Thessaloniki, May 2008

THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES

- The new EU strategic and legislative framework for RES is analytically described in the “Proposal for a Directive on the Promotion and the use of Energy from Renewable Sources” presented by the European Commission in January 2008 [COM (2008) 19 final, 2008/0013 (COD), 23.01.2008]
- The proposed Directive aims to establish :
 - An overall EU binding target of 20% share of RES in energy consumption
 - Binding national targets by 2020 in line with the overall EU target of 20%. Member-States retain discretion as to the mix of RES applications in electricity, heating and cooling and transport to reach their targets
 - A 10% binding minimum target for biofuels in transport to be achieved by each Member-State

THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES

- The new legislative framework for the promotion and the use of RE in the EU, in addition to “ensuring that all Member-States take the necessary measures to increase the share of renewables in their energy mix” is expected to :

“provide the business community with the long term stability it needs to make national investment decisions in the RE sector so as to put the European Union on track towards a cleaner, more secure and more competitive energy future”

- The proposed Directive builds on previous relevant Directives, namely 2001/77/EC on the promotion of electricity produced from RES in the internal market and 2003/30/EC on the promotion of the use of biofuels for transport

Furthermore, it is consistent with EU policies of combating climate change, reducing greenhouse gas emissions, achieving sustainable development, ensuring energy security and realising the Lisbon strategy

**«PROPOSAL FOR A DIRECTIVE ON THE PROMOTION OF THE
USE OF ENERGY FROM RENEWABLE SOURCES»
[COM (2008)19 final, 2008/0016 (COD), 23.01.2008]**

- A “painful” compromise between :
 - The European Commission, who sought but did not achieve the imposition of a generalised, mandatory mechanism of virtual trade guarantees of RES origin for all E.U. Member-States, otherwise known as “harmonised trading system of green certificates / guarantees of origin (GOs) between companies”
 - The European / National RES development and promotion organizations, who sought but did not achieve binding intermediate targets for the E.U. Member-States as well as a strong control mechanism for reaching national RES targets
- Critical role of the IFIC (International Feed-In Cooperation) : Germany, Spain, Slovenia, Greece, etc.



Athens, January 15, 2008
Ref.No.: D6/F27/1105

President Barroso, President of the European Commission
Commissioner Verheugen, Vice President of the European Commission
Commissioner Barrot, Vice President of the European Commission
Commissioner Wallstroem, Vice President of the European Commission
Commissioner Piebalgs
Commissioner Dimas
Commissioner Potočnik
Commissioner Fisher Boel
Commissioner Almunia
Commissioner Kroes
Commissioner Mandelson
Commissioner McCreevy

200, rue de la Loi
1049 BRUSSELS

Subject: Draft proposal of directive on the promotion of the use of renewable energy sources (RES)

Dear President, Dear Vice Presidents, Dear Commissioners

I write to express Greece's serious concerns regarding the text being prepared by the Commission on the promotion of the use of renewable energy sources, designed to ensure that 20% of the EU's energy comes from renewable energy sources by 2020.

In this context allow me to suggest that an EU-wide harmonized trading system of green certificates/guarantees of origin (GO) between companies, could be reconsidered by the Commission, given that to date, the majority of Member States use the efficient feed-in system. An EU-wide harmonized trading system between companies would potentially lead to a disruption of markets undermining the 20% target itself. Moreover, harmonization of RES support mechanisms (article 18(9)), would make sense if a single electricity market existed. At present we have 27 different electricity markets with different electricity prices. The creation of a single - truly competitive- internal electricity market should precede and not follow the establishment of a single support mechanism for RES.

I thank you for taking the above into consideration.

Yours faithfully



Christos Zolias

«THE SUPPORT OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES»

[Commission Staff Working Document, COM (2008)19, SEC (2008)57]

Summary (p.3)

«This report presents an updated review of the performance of support schemes using the same indicators presented in the 2005 report. It finds that, as in 2005, well-adapted feed in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity.»

2.3 The performance of support schemes (p. 8)

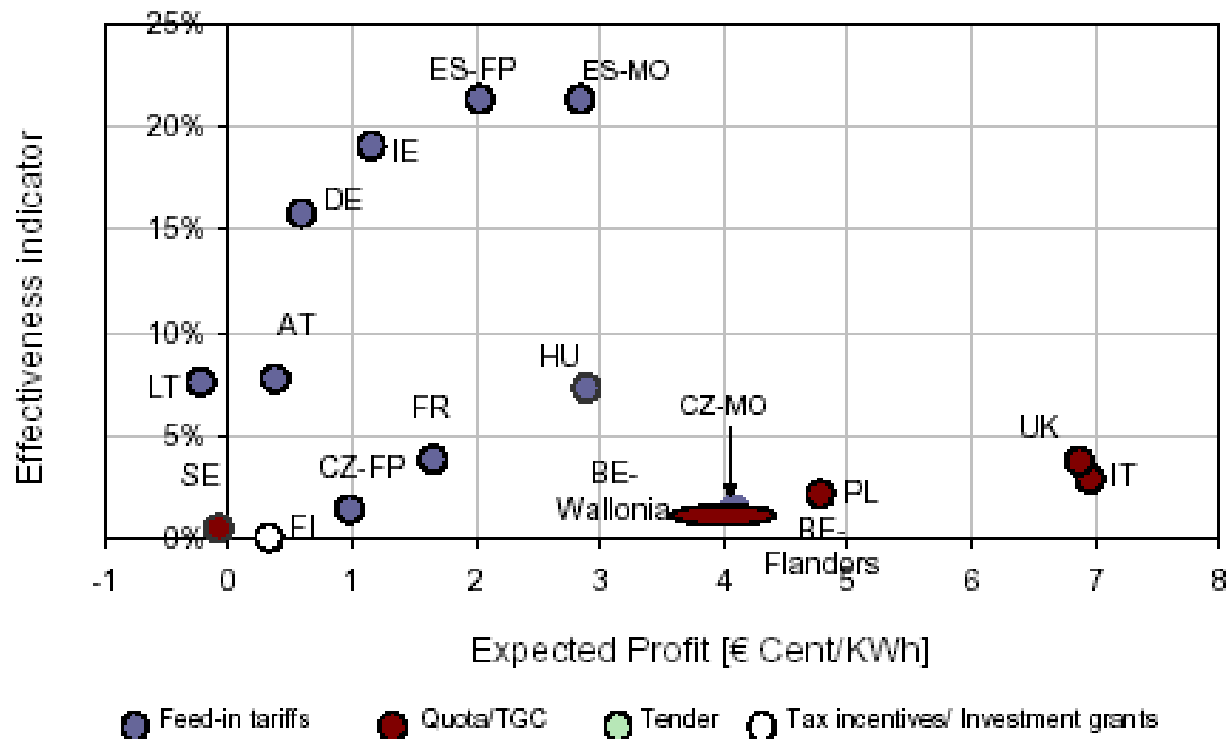
«Comparing the two main types of support schemes, namely quota obligations and feed-in tariffs, historic observations from EU Member States suggest that feed-in tariffs achieve greater renewable energy penetration, and do so at lower costs for consumers..... The effectiveness of policies promoting wind energy, biogas and photovoltaics technologies has been highest in countries using feed-in tariffs as their main support scheme.»

«THE SUPPORT OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES»

[Commission Staff Working Document, COM (2008)19, SEC (2008)57]

HISTORICALLY OBSERVED EFFICIENCY OF SUPPORT

ONSHORE WIND: Effectiveness indicator compared to the expected profit for the year 2006



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«As a general conclusion it can be stated that for onshore wind in 2006 well-adapted feed-in tariff systems are typically more effective at a relatively low producer profit.

In contrast, it can be observed that the quota systems achieve a rather low effectiveness at comparably higher profit margins for onshore wind.»

Source : OPTRES, 2007

«THE SUPPORT OF ELECTRICITY FROM RENEWABLE ENERGY SOURCES»

[Commission Staff Working Document, COM (2008)19, SEC (2008)57]

4.3 Harmonisation (p. 14 & 15)

«The Commission considers that it is currently inappropriate to harmonise European support schemes for (the following) reasons:

- The introduction of one harmonised system would create a lot of uncertainty and disruption in the market for renewables, as it would abolish well-established national support schemes.
- In a harmonised system, it might be difficult to differentiate between different costs for different technologies in different countries. If this is the case, additional support measures would be needed for technologies which are still relatively far from producing renewable electricity at market price.
- National support schemes are often designed so that they also promote regional development, for example the use of small biomass in Austria and Germany or the promotion of biowaste energy as part of a national waste strategy. Harmonisation might oblige Member States to find other ways to promote regional development.»

NATIONAL OVERALL TARGETS FOR THE SHARE OF ENERGY FROM RENEWABLE SOURCES IN FINAL CONSUMPTION OF ENERGY IN 2020

	Share of energy from renewable sources in final consumption of energy 2005 (S ₂₀₀₅)	Target for share of energy from renewable sources in final consumption of energy 2020 (S ₂₀₂₀)
Belgium	2.2%	13%
Bulgaria	9.4%	16%
The Czech Republic	6.1%	13%
Denmark	17.0%	30%
Germany	5.8%	18%
Estonia	18.0%	25%
Ireland	3.1%	16%
Greece	6.9%	18%
Spain	8.7%	20%
France	10.3%	23%
Italy	5.2%	17%
Cyprus	2.9%	13%
Latvia	34.9%	42%
Lithuania	15.0%	23%
Luxembourg	0.9%	11%
Hungary	4.3%	13%
Malta	0.0%	10%
The Netherlands	2.4%	14%
Austria	23.3%	34%
Poland	7.2%	15%
Portugal	20.5%	31%
Romania	17.8%	24%
Slovenia	16.0%	25%
The Slovak Republic	6.7%	14%
Finland	28.5%	38%
Sweden	39.8%	49%
United Kingdom	1.3%	15%

INDICATIVE TRAJECTORY

The indicative trajectory for reaching the mandatory national targets shall respect the following shares of energy from renewable sources:

$S_{2005} + 0.25 (S_{2020} - S_{2005})$, as an average for the two-year period 2011 to 2012;

$S_{2005} + 0.35 (S_{2020} - S_{2005})$, as an average for the two-year period 2013 to 2014;

$S_{2005} + 0.45 (S_{2020} - S_{2005})$, as an average for the two-year period 2015 to 2016; and

$S_{2005} + 0.65 (S_{2020} - S_{2005})$, as an average for the two-year period 2017 to 2018,

where

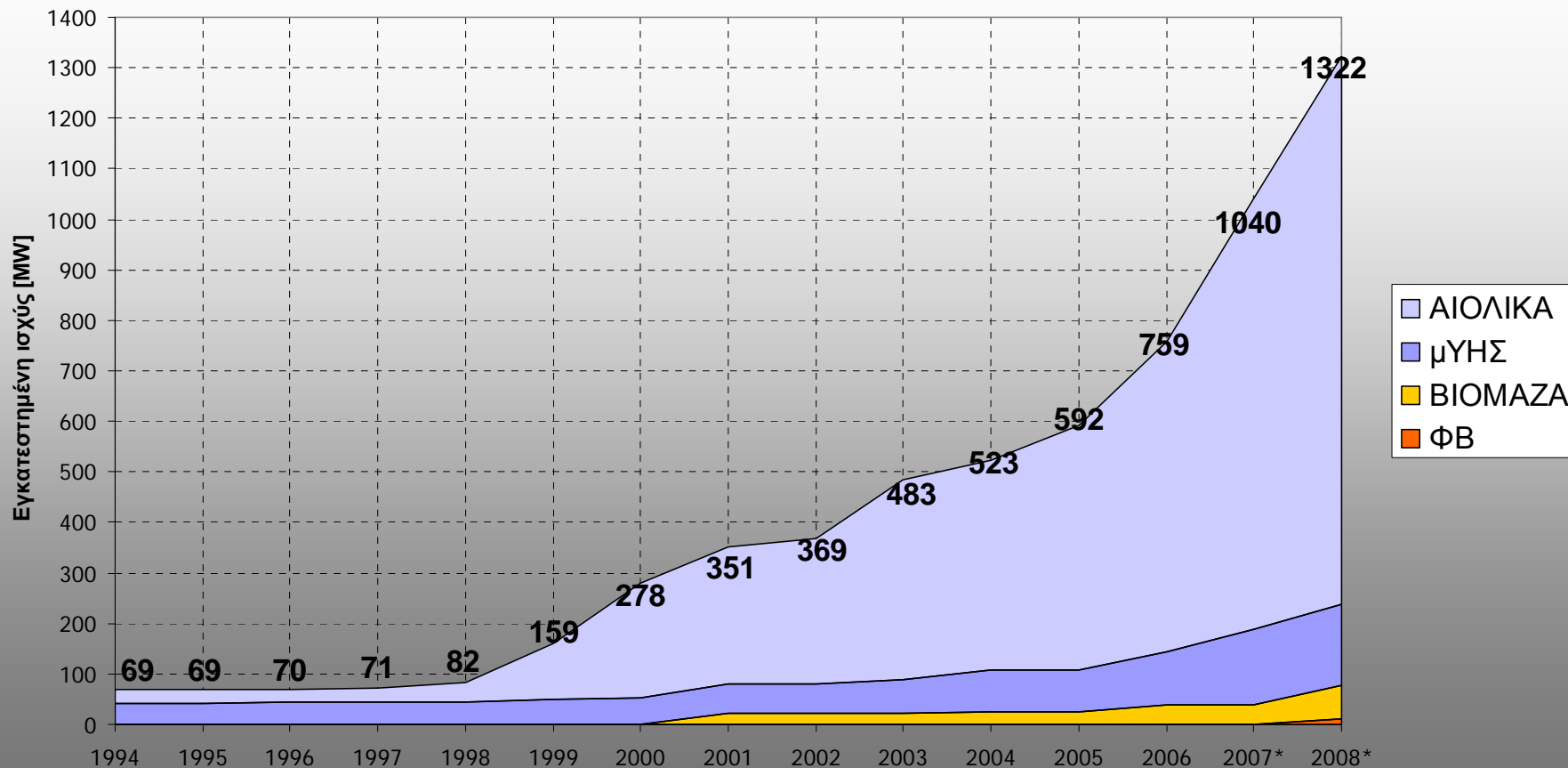
S_{2005} = the share for that Member State in 2005 as indicated in the previous table

and

S_{2020} = the share for that Member State in 2020 as indicated in the previous table

EVOLUTION OF THE RES INSTALLED POWER CAPACITY IN GREECE (MW_E)

Εξέλιξη εγκατεστημένης ισχύος ΑΠΕ



THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES AND ITS IMPLICATIONS ON THE GREEK ENERGY SECTOR

**BINDING RES TARGET FOR GREECE (2020) : 18% PARTICIPATION IN THE
FINAL ENERGY CONSUMPTION (BASE YEAR - 2005 : 6.9%)**



??? RES MW 2020

**(energy demand evolution scenaria, incorporation of the 20% energy
conservation binding target by 2020, evolution scenaria of non-wind RES,
assumptions concerning the mean capacity factor of wind projects, etc.)**



~ 10,000 RES MW (not including large hydro)

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	2005	2010	2015	2020
18% Final Consumption from RES (ktoe)	3427	4075	4471	4372
10% biofuels in transport	641	718 [406]	799 [467]	858 [501]
Biomass and industrial waste (ktoe)	235	332	452	604
Biomass-thermal	482	426	366	315
Biomass-electrical (100 MW)				56
Solar and other RES (ktoe)	108	133	154	179
Geothermal (100 MW Electrical)				56
P/V 750 MW, L. 3468 plus 250 MW (1600 kWh / kWstc)				130
Hydro (4100 MW 1.36 GWh / MW)	[371]			480
Remainder				1694 {19.65 TWh}

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TWO (2) CRUCIAL QUESTIONS :

- **Where and how will the required 10,000 RES MW (~ 8,500 wind MW), not including big hydro, be sited ;**
- **How and under which conditions will the above RES energy production be absorbed by the National Electrical System ?**

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CHAPTER B' SPACE PLANNING RULES FOR WIND INSTALLATIONS Article 4 Targets

The space planning for wind installations is targeted at :

1. The determination of appropriate (geographical) areas which would allow, depending on their particularities :
 - a. the largest possible geographical concentration of wind installations
 - b. the achievement of economies of scale in reference to the required networks
2. The establishment of rules and criteria for space planning which would allow, on the one hand, the development of viable wind energy installations and, on the other, their harmonious integration in the natural and human local environment and landscape
3. The establishment of an effective wind installation space planning mechanism, in order to approach, as much as possible, the national and European policy targets

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BASIC COMPONENTS OF AN OPERATIONAL SPACE PLANNING NATIONAL RES FRAMEWORK

- Exact determination of exclusion zones
 - Clarity of definition and terms (i.e. what do the terms “established” or “sandy” shores mean ? ? ?)
 - Only legally characterised areas (with a Presidential Decree, etc.)
 - No massive area exclusions, which are against existing legislation (i.e. NATURA protected areas, areas of high agricultural productivity, reforestation areas, etc.)
- “The largest geographical concentration of RES installations” is developed exactly where the RES potential is located
 - It cannot be determined administratively (i.e. through Local Administration Decisions / Programmes); nor can the RES potential be “sliced” or transferred

THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES AND ITS IMPLICATIONS ON THE GREEK ENERGY SECTOR

BASIC COMPONENTS OF AN OPERATIONAL SPACE PLANNING NATIONAL RES FRAMEWORK (cont.)

- Flexibility in the incorporation of technological developments
 - Avoid determination / reference to the technical details (i.e. distances between wind generators, “level of peak demand”, etc.) that are bound to become obsolete in the immediate future as a result of rapid technological developments
- “Maximisation of effectiveness in reaching the National and European policy targets” : For example, how can the 10,000 MW RES target for 2020 be incorporated in the Space Planning Framework ? ?
 - Total “Potential Capacity” of Wind Energy priority Areas : Annex III, p. 33 of the Draft CMD)

THE GREEK ELECTRICAL SYSTEM : AN UNEASY BASE FOR WIND APPLICATIONS

- The Greek Electrical System is composed of two (2) basic subsystems:
 - ✓ The Interconnected System, encompassing the mainland and a number of neighboring islands electrically connected to it
 - ✓ The Non-Interconnected Islands System
- Installed power capacity of the Greek Electrical System *(in MW, end of 2006)*

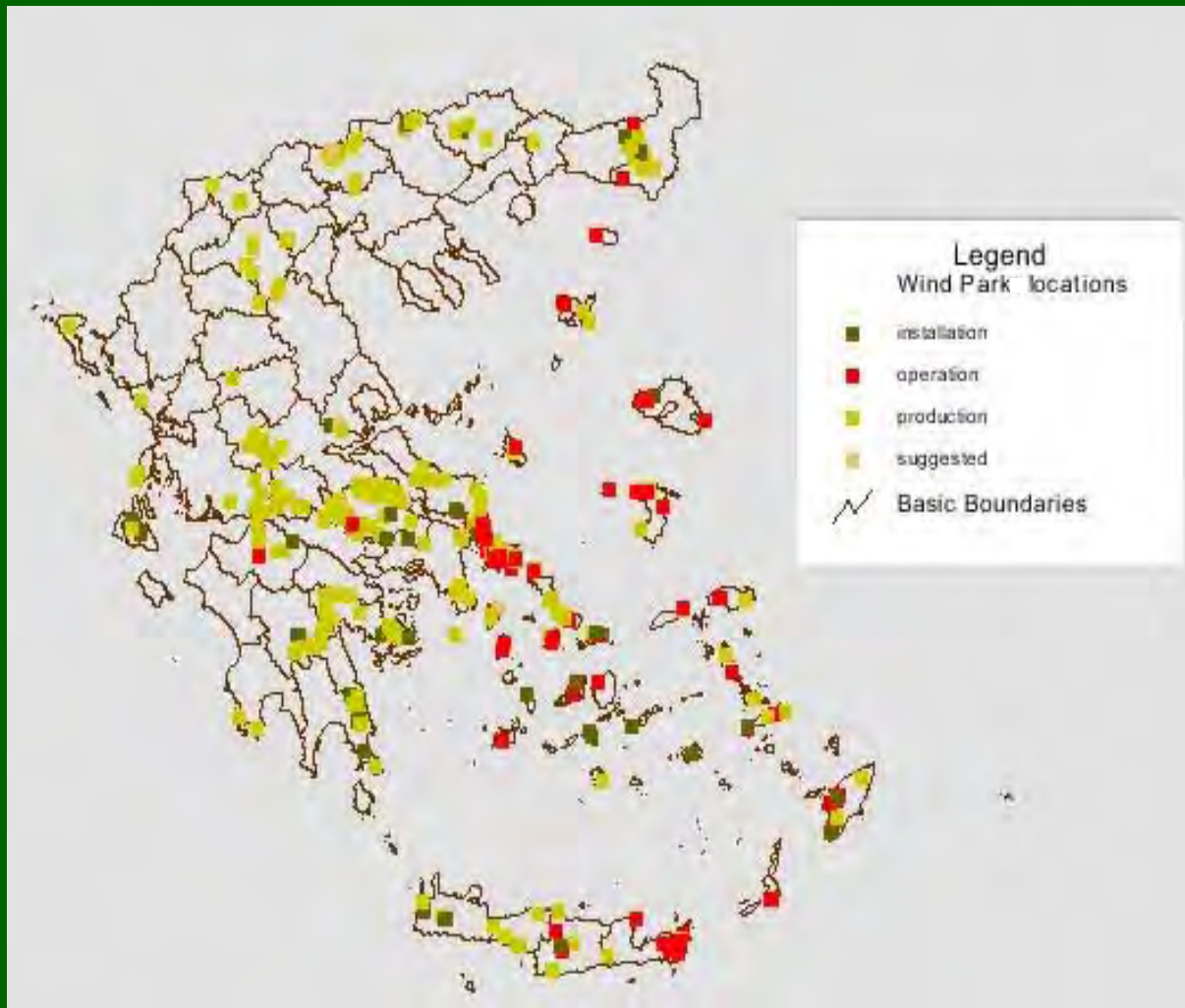
Generation Units	Interconnected System	Non-Interconnected Islands	Total
Lignite-fired	5,288		5,288
Oil-fired	750	1,740	2,490
Natural gas-fired	2,501		2,501
Big-Hydroelectric	3,060		3,060
Renewables	688	204	892
Auto-producers	230		230
Total	12,517	1,944	14,461

- Nationwide electricity demand *(GWh, end of 2006)*

Interconnected System	Non-Interconnected Islands	Total
54,207	5,105	59,312

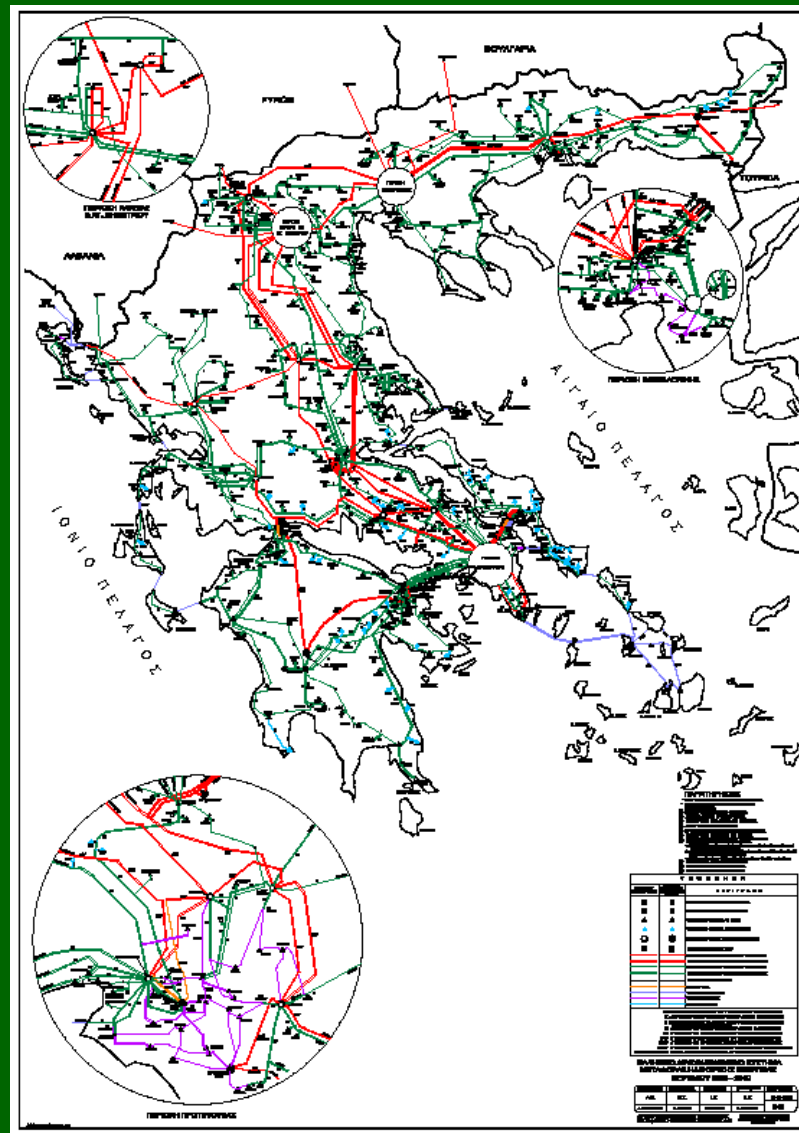
LOCATION OF EXISTING AND PLANNED WIND PROJECTS IN GREECE

(CRES, 2006)



- The majority of the wind projects in operation are currently located in:
 - ✓ Eastern Macedonia and Thrace: 197 MW (northeastern mainland)
 - ✓ Evia: 158 MW (interconnected island)
 - ✓ Peloponnese: 120 MW (southern mainland)
 - ✓ Crete: 125 MW (non-interconnected island)

THE NATIONAL INTERCONNECTED TRANSMISSION SYSTEM



THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES AND ITS IMPLICATIONS ON THE GREEK ENERGY SECTOR

“Stability Analysis of the Interconnected System at High Wind Penetration and Evaluation of the Transitional Behavior of Wind Turbines in Cases of Voltage Drops / Sinkages” (NTUA Study, November 2007)

7. CONCLUSIONS (p.p. 105 - 112)

7.2.5 Wind Penetration Limits

“In conclusion the result of all relevant studies is that wind station penetration of up to 5,500 MW in the Greek Interconnected System is technically feasible, provided that the following measures are realised :

- Capacity of uninterrupted supply to the grid under Low Tension for all new Wind Parks**
- Possibility of imposition of an upper limit of power production to all Wind Parks**
- Ensuring the safety of power supply during the connection of large Wind Parks**

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“Stability Analysis of the Interconnected System at High Wind Penetration and Evaluation of the Transitional Behavior of Wind Turbines in Cases of Voltage Drops / Sinkages” (NTUA Study, November 2007) (cont.)

.....Finally, it is to be noted that the absorption of wind capacity of the order of 5,000 - 5,500 MW requires the realisation of important transmission projects which have been programmed (extension 400 kV towards Peloponese and Thrace, underwater cable connection N. Makri-Polipotamos, etc.), as well as of projects programmed to enhance the 150 kV system. Also significant are the projects concerning the interconnection of wind parks (TL 150 kV and substations) based on the N-1 criteria. Delays in the realisation of these projects may result in a weakness to absorb wind power production.

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7.2.4. Implications in the operation of the System and the Market

“It is to be noted that the penetration of the wind power production limits the market share for Combined Cycle Units. In particular, for the five wind power penetration scenaria that have been examined (nominal installed capacity 3, 4, 4.5, 5 and 5.5 GW) the equivalent duration of operation of Combined Cycle units is reduced to 5149, 4904, 4675, 4749, 4642 hours /year.

Furthermore, the aforementioned results presuppose increased flexibility of the generation units in regard to load changes; such flexibility can be achieved through the installation of peak load units (i.e. open cycle gas turbines). One of the assumptions of this Study is that by the year 2012 the total installed capacity of such flexible units will be the order of 750 MW. This particular assumption is extremely important for ensuring smooth operation at increased wind penetration.”

THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES AND ITS IMPLICATIONS ON THE GREEK ENERGY SECTOR

BASIC TERMS AND CONDITIONS FOR THE SMOOTH AND EFFICIENT INTEGRATION (INFLUX / ABSORPTION) OF THE PRODUCTION OF 10 GW RES IN THE NATIONAL ELECTRICAL SYSTEM

- **Interconnection of almost all non-interconnected islands to the mainland system**
 - NTUA Study (December 2006) : The electrical interconnection of the autonomous islands is technically feasible and financially attractive, even if their wind potential were not to be exploited. The increase in RES penetration in the non-interconnected islands **reduces** their total electrification/interconnection cost with the mainland system
- **Significant** increase of the number and the capacity of the electrical interconnections of the Greek with the European Electrical System

THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES AND ITS IMPLICATIONS ON THE GREEK ENERGY SECTOR

BASIC TERMS AND CONDITIONS FOR THE SMOOTH AND EFFICIENT INTEGRATION (INFLUX / ABSORPTION) OF THE PRODUCTION OF 10 GW RES IN THE NATIONAL ELECTRICAL SYSTEM (cont.)

- **Immediate** determination of national RES penetration targets for 2020 and integration within the National Long Term Energy Plan :
 - Composition of conventional production / operational characteristics of new units (start up and shut off time, production rate flexibility, etc.)
 - Selection of the new conventional production unit types / minimisation of the need to increase the installed capacity (simply for reasons of compensating for wind production)
 - Promotion / optimisation of the utilisation of economic energy storage systems (pumping storage units, RES hybrid systems, etc.)

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THE MYTH OF THE “BENEFITS” FOR THE GREEK RES PRODUCERS FROM THEIR POTENTIAL PARTICIPATION IN A EUROPEAN MECHANISM OF VIRTUAL TRADING OF GOs

- Only for **new** RES installations (>30.03.2010) (Article 9, par. 3 of the Directive Draft)
- Limited to (?) RES installations, whose “generation of electrical or thermal energy are not entitled to receive any financial support through a RES national support scheme” [Article 8, par. 1 & Article 2, par. (h)]
- Applies only (?) to Member-States which **have achieved** the intermediate national RES targets :

2010 - 2012	:	25%	Coverage of the difference from the	2020 target
2013 - 2014	:	35%	“ “ “ “ “ “ “ “	“ “ “ “
2015 - 2016	:	45%	“ “ “ “ “ “ “ “	“ “ “ “
2017 - 2018	:	65%	“ “ “ “ “ “ “ “	“ “ “ “

THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES AND ITS IMPLICATIONS ON THE GREEK ENERGY SECTOR

- Weakness in preparing and funding RES business plans, especially on behalf of small and medium sized producers (non-guaranteed power absorption contracts)
- Promotion of monopolistic conditions, mainly in favor of large international electricity companies
- Collapse of the national RES feed-in system :
 - "Escape" of the "cheap", competitive RES (i.e. wind) abroad, through massive GO exports
 - Drastic increase in the cost of fulfillment of the national RES binding targets, using "expensive" local RES and national imports of "expensive" GOs

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- “Separation” of the “physical” incorporation of the nationally RES generated power from its “logistical” incorporation in the national targets of **other** Member-States through the GOs
- Weakness in carrying out strategic energy design / planning regarding infrastructures (loss of programming control – need to oversize)
- Increase of RES special tax
- Strong public reactions (because of the export of locally produced added value without benefits even at the national level)

THE NEW EU STRATEGIC AND LEGISLATIVE FRAMEWORK FOR RES AND ITS IMPLICATIONS ON THE GREEK ENERGY SECTOR

IN CONCLUSION :

Adapting to the mandates of the new Community legislative framework for RES requires **drastic** changes in :

- The philosophy, the targets and the fundamental regulations of the National Space Planning framework for RES
- The perceptions and practices linked to the space planning, licensing and realisation of RES installations, particularly in reference to the role of the Local Authorities and the Council of the State
- The structure and operation of the **entire** national energy system, especially the electrical one
- The efforts to enforce and upgrade the national institutional and legislative RES framework for the development of RES (feed-in, incentives, etc.)