



LIFE – Environment

**«Applying European Emissions Trading & Renewable Energy
Support Mechanisms in the Greek Electricity Sector» (ETRES)
LIFE03 ENV/GR/000219**



**Some constructive results for the Greek Electricity Sector
(LAYMAN'S REPORT)**



January 2007

The project «**Applying European Emissions Trading & Renewable Energy Support Mechanisms in the Greek Electricity Sector (ETRES)**» with Contract No LIFE03 ENV/GR/000219 and total budget € 1.834.000 was co-funded (50%) under the European Union's Programme **LIFE-Environment** and supported by the Hellenic Ministry for the Environment, Physical Planning and Public Works. Beneficiary of the ETRES project is the Centre for Renewable Energy Sources (**CRES**). Four partners from Greek organizations are directly in the ETRES consortium, namely: the Regulatory Authority for Energy (**RAE**), the **E³M Lab** of the National Technical University of Athens (NTUA) and the Greek Association of Renewable Energy Sources Investors (**GARI**). The duration of the project was 30 months, from October 2003 until March 2006. The overall project coordination was managed by Mr Minas Iatridis and Mr Konstantinos Sioulas.

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1. SUMMARY OF PROJECT SCOPE AND OBJECTIVES

Greece entered an important period in the evolution of the electricity industry, including the RE sector. Several significant domestic and international developments are foreseen to have important impacts on the future structure and operation of the sector.

The overall objectives of the ETRES project were to:

- make significant steps in the application of EU climate change and Renewable Energy (RE) policies and measures (particularly market instruments) in the Greek electricity sector
- gain experience that is transferable to other Greek industry sectors and similar economies in EU and Accession countries.

Specific aims were to:

- assess the integration of Emissions Trading (ET) and alternative RE support mechanisms in the Greek electricity sector
- assess the role and impact of ET and alternative RE support mechanisms in the Greek electricity sector
- develop a combined vision for the Greek electricity sector participation in ET and RE support
- establish a framework for ET and RE support, including salient market features, and determine the strategy – i.e. the appropriate steps – to achieve this
- transfer relevant experience from other EU Member States
- demonstrate opportunities and barriers and encourage “learning by doing” steps by the Greek electricity sector and its stakeholders
- disseminate to, and consult with, the Greek electricity industry, its stakeholders, especially governing authorities, and wider afield.

2. DESCRIPTION OF THE TECHNIQUES/METHODOLOGY IMPLEMENTED

International and Domestic Developments

Emissions Trading and Renewable Energy Support schemes are a developing field and are dynamic changing. Within the first project phase the International developments in ET and RE support mechanisms were reviewed. The main results of this work included the ET and RE support developments in Europe and elsewhere, with a particular attention to aspects pertinent to the Greek Electricity sector and the relationship between ET and market-based RE support schemes.

Thus, a database was developed that provides overview details of ET schemes and RE support mechanisms in Europe. With the benefit of the overview provided by the above database, the ETRES partners agreed to review the ETS and the support mechanisms for generating electricity from RE sources (RES-E) in Germany, Spain and Great Britain. Additional, new information was added to the database and the reports were republished as 2nd issues. This was important because the field is evolving rapidly and there were important new developments that affected ETRES implementation.

The next phase concentrated on the Integration of ET and alternative RE support mechanisms in the Greek Electricity Sector. The reports that were prepared presented the requirements for the Greek Electricity Sector to participate in ET and to utilise RE support mechanisms. They also included a summary of priority considerations for integration of ET into the Greek Electricity Sector and integration of the most suitable RE support scheme.

Some of the main points of the above work are as follows:

- The electricity generation is the single largest contributor to GHG emissions but the transport sector – which is not included in ET – is a sizeable contributor as well, and is growing very rapidly.
- Some particular considerations for the electricity sector are the choice of baseline, new entrants and closure, combined heat and power (CHP). The way in which National Allocation Plans (NAPs) treat these issues has important commercial implications for electricity sector actors.
- Some main characteristics of the Greek electricity sector that have important implications for ET, are namely: the de facto monopoly of the Public Power Corporation (PPC) in generation, transmission, distribution and supply; the liberalization process; dominance of lignite in electricity generation; non-interconnected islands; international interconnectors.
- there are many important considerations of fundamental competition, regulation and overall Greek government strategy for the electricity industry that are relevant to emissions trading such as, a) the area of fuel switching, b) new competitors in the generation sector, c) initiation of a daily electricity market and promotion of Renewables that are highly relevant to emissions trading d) the potential for Greece to engage with the Kyoto mechanisms – Clean Development Mechanism and Joint Implementation – especially in nearby Balkan countries.
- the Greek target under the RES-E Directive 2001/77/EC, is to cover 20.1% of total electricity demand from renewables (including large hydro) by the year 2010. It stresses that this is very challenging, requiring an additional 2800-3000MW capacity to be installed, or a 6-fold increase over the country's currently installed RE capacity.
- the report gives considerable details on Greek laws, ministerial decrees and energy programmes which directly influence the Greek RE sector. This includes the feed-in tariff system and cash subsidies and, in addition, licensing, planning, taxation etc.
- It is reported that there are a number of severe problems for the RE sector and the symptoms are clear: there has been a sharp drop in the rate of new RE installations in recent years (2002-2004) with few new installations planned and loss of interest by foreign investors. The report identifies four major problems: licensing procedures, grid connection, public attitudes, legal issues. The report analyses these and gives detailed recommendations on steps that may be taken to overcome these problems.
- The report also makes a number of recommendations for gradual change of the existing financial support framework, maintaining the current bases of the scheme – the feed-in tariff and the capital grant – but amending faults. For example, introduction of greater technology differentiation in the tariff system is advised.

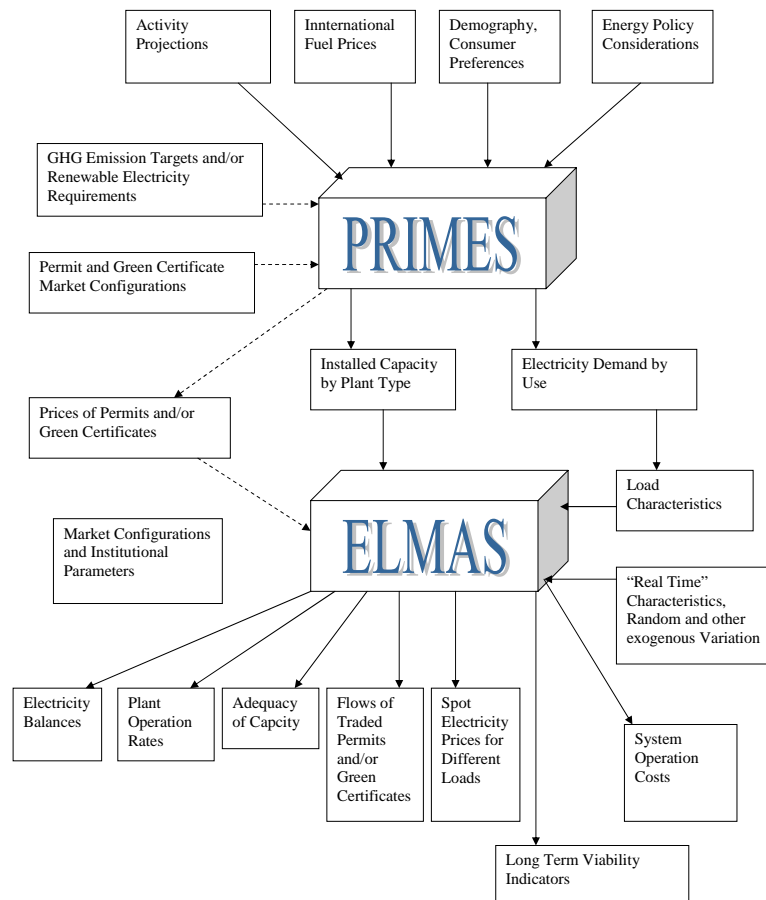
Modelling

The consortium had the opportunity to use two models, namely, the PRIMES and, more particularly the ELMAS model in order to provide the quantitative and qualitative analysis within the ETRES project. All the mentioned in the above sections were gathered in the previous phases of the project and was used as model input too.

PRIMES has been used extensively by the EC, national governments and companies to examine, among other things, the role of flexibility instruments in meeting environmental targets (including specific targets on RES). Within the ETRES project, PRIMES was used to provide long term (10 to 20 years) projections of the Greek overall energy and electricity sectors, as well as to provide the essential input with regard to alternative international permit trade conditions. In order to enable a detailed and realistic representation of electricity markets, a very high resolution (in terms of time) much more detailed Electricity Market Simulator, ELMAS, was developed allowing hourly load representation and individual plant and operator identification, using detailed data obtained from actual operation. In this sense ELMAS allows to simulate “real time” operation of the market. The ELMAS model is a new tool and unique in its type in Greece. ELMAS was developed under the ETRES project.

The following flow chart outlines the interaction of the two models for the purposes of the ETRES project, indicating the main types of input and analytical output.

Utilisation of Models in the Project



Finally, the consortium took the opportunity to formulate a vision, framework and outline strategy for the Greek electricity sector to participate in ET and RE support mechanisms.

Some of the main findings/suggestions of the vision/framework/strategy for the Greek electricity sector are as follows:

1. It is still early to make any accurate quantifiable estimations on the effect of the ETS on the Greek economy, industry and electricity sector. However an increase in the price of energy products should be expected.
2. In the current period no significant changes in the electricity sector are expected due to the limited time frame and the tight margins of the Greek System. In the mid-term an increased penetration of natural gas and RES is expected.
3. The vision for the creation of a liberalised electricity market in Greece in the spirit of the EU Directives is not only an obligation as a Member State but also a strategic choice of the Greek economy and society
4. The start of operation of the first privately owned power plants and the finalization of the regulatory framework is expected to boost the liberalisation process.
5. Construction of the necessary grid expansions, adoption of the relevant land planning framework and simplification of the licensing procedures are essential for the further development of RES projects in Greece. The existing support framework should remain broadly unchanged in the short term.



Demonstration

Two (2) interactive workshops were organised, where the results of the ELMAS model were demonstrated to the Greek Electricity industry players and other stakeholders. The main aim of the workshops was to raise awareness and knowledge among the participants regarding opportunities, threats and steps required.

Specifically, the 1st demonstration workshop mainly included the presentation of the results of model ELMAS for the ETRES project. This workshop was based on the deliverables from PRIMES and ELMAS capabilities and especially on the deliverable, namely, “Peer reviewed report providing a comprehensive account of potential quantitative economic impacts and qualitative impacts of ET and RE support in the Greek electricity sector”. The event was directly applicable to the participants, with realistic examples-scenarios results, and focus on business financial impacts mainly in the long term but also in the short term. During this demonstration event all the recommendations and feedback from the participants were gathered and was the “raw material” as input for the “new model runs”.

The 2nd demonstration workshop mainly included the presentation of the results of model ELMAS new scenarios for the ETRES project based on the participants needs from the 1st workshop. The challenge of this event was to use the audience recommendations and comments expressed during the 1st workshop and to present the new model results.



Dissemination

The ETRES project resulted and will also result after its lifetime in an improved understanding of developments in ET and RE support mechanisms, including the interactions between these. ETRES will furthermore result in an understanding of how ET and RE mechanisms impact upon the Greek electricity sector, both through computer modelling / scenario analysis and through reviews with industry stakeholders. ETRES has delivered the priority considerations for the Greek electricity sector. The Task Force established by ETRES had already delivered a vision for the future direction of the Greek electricity sector plus recommended steps to achieve this vision. The knowledge and results that are gained are being transferred widely within the Greek electricity sector via various means, including demonstration events and guidelines. Dissemination activities include events, publications, the web and other forms of correspondence with stakeholders.

Specifically, Dissemination was a horizontal activity of the ETRES project, taking place throughout the projects life and was one of the crucial tasks of ETRES. Various events organised through the course of this project. The main dissemination activities include the following:

1. A project web-site was set-up and was updated with each new published deliverable from the project. The web-site was reviewed on a regular basis (see www.cres.gr/etres). All the deliverables that have been approved by the EC are available on the ETRES web-site (see www.cres.gr/etres/documents.htm).
2. CRES held a Conference on November 19th, 2004 entitled “Emissions Trading and Renewable Energy Support Mechanisms”, in Athens. 170 individuals attended the Conference. This Conference was deemed necessary to be held, in order to inform the target audience for salient aspects of ET and RE support, especially in view of the forthcoming NAP and the industries’ respective obligations.
3. CRES held a Workshop on June 30th, 2005 entitled “Emissions Trading Scheme – Renewable Energy Support Mechanisms. The Role of Industry and the Energy Sector in Greece in the years to come”, in Athens. During this event, the main aspects of ET and RE support mechanisms were presented, among a others and project promotional material was distributed.
4. CRES held a Workshop on December 16th 2005, entitled “Demonstration Event 1: Results presentation for Model simulations for the ETRES project” in Athens. During this event, the Guidelines of ET and RE support mechanisms were presented and project promotional material was distributed.
5. CRES held a Workshop on February 23rd 2006 entitled “Demonstration Event 2: Results presentation for Model simulations for the ETRES project” in Athens. During this event, main aspects of ET and RE support mechanisms were presented and project promotional material was distributed.
6. CRES held the end of project Conference on March 31st 2006 entitled “Emissions Trading and Renewable Energy Support” in Athens. During this event, the main results of the ETRES project and of ET and RE support mechanisms were presented and project promotional material was distributed. For the purposes of this Conference special promotional material was also produced. More than 230 individuals attended the Conference including members of every audience and target group of the ETRES project.
7. Two Guidelines were published concerning the implementation of ET in Greece and the RE support mechanisms and distributed to the events and the target audience. Several

events concerning the transfer of experience and “learning by doing” were scheduled and demonstrated based on the Guidelines and exercises for industry were executed.



Guideline 1: ETS application in Greece



Guideline 2: The framework of RES application in Greece

3. ENVIRONMENTAL IMPACT, COST-BENEFIT OF THE PROJECT

ETRES offers very substantial environmental gains with negligible costs. This project targeted the electricity sector, which accounts for 38% of emissions in Greece (2003), therefore it is a highly significant player in tackling climate change. The project encouraged first steps to be taken in curbing emissions growth. It is now evident that this project had the potential to make very significant contributions to GHG mitigation, with actions initiated during the project and that will be continued beyond its end. These actions include the first steps towards major investments in infrastructure refurbishment/retrofit using GHG mitigation technology, construction of RE plants etc. It is not possible, at this stage, to estimate the quantitative affect in terms of tonnes of CO₂ equivalent. This depends on which companies will take steps and the nature of their actions.

Furthermore, the formulation of the vision/framework/strategy for the Greek Electricity sector make the project team to feel confident that this project output will help the involved stakeholders and policy makers further in the future.

4. PROBLEMS ENCOUNTERED

The main difficulty encountered was the uncertain participation of GARI in the project implementation due to its status, which caused a delay in the first project months. Although the final decision of the Commission concerning the acceptance of GARI's participation was sent during December 2003, the main steps for the successful execution of the project had already been made (eg. kick-off meeting, press release, task planning, inception report) by CRES, with partners support including GARI. Thus, there was no necessity for an extension of the project duration and the project was progressing according to the foreseen timetable and no major delays for that reason were foreseen.

Another problem encountered, which in turn caused a series of problems in producing a number of deliverables on time, was the delayed publication of the Greek NAP and the uncertainties resulting from that. After the submission of the Greek NAP (December 31st, 2004) the project executed according to the schedule and made-up for the above mentioned delays.

5. TRANSFERABILITY OF PROJECT RESULTS

Although the main target of the ETRES project is the Greek electricity sector, the results and experience of this work will be transferable in two important ways:

- to other Greek industry sectors (that account for around 15% of national emissions).
- to electricity and other industry in southern EU Member States and EU Accession countries.

There are many similarities between the Greek economy and those of southern European countries (eg. Italy, Spain, Portugal) and Accession states. There are many important similarities in the electricity sectors in these countries. Governments in these countries have, relative to northern Europe, given less attention to environmental legislation and regulations because of more pressing short term economic prerogatives. Business in these countries has low levels of awareness of new paradigms of environmental (and corporate) responsibility, and limited knowledge of environmental risk. It is not surprising that there is very little use of environmental financial instruments in these countries, while their use is increasing rapidly in northern Europe. Southern European Member States and Accession countries have low environmental capacity, in government, in business and in non-government sectors.

There are some broad similarities in the electricity and RE sectors specifically. The privatisation of electricity markets is relatively poorly advanced in Member States in southern Europe with relatively low levels of market opening and relatively few major players in comparison to most Member States in northern Europe. Accession countries all have state-owned electricity industries. Southern Europe and Accession countries generally have ill-developed RE sectors (with notable exceptions such as wind energy in Spain), which are given little support, and there is scant use of market-based mechanisms.

The agreement signed by all Balkan countries and some neighbours, notably Turkey to form a south- east Europe, integrated regional electricity market, is pertinent to this project, since ET and / or RE support adopted in Greece will have an impact on this power pool, and vice versa. Without any doubt, conditions in these countries vary and different solutions will have to be adopted in most cases. However, there will certainly be

government and industry stakeholders in southern EU and Accession countries that will gain awareness and insights from the dissemination of the results of this work.

6. FORESEEN ACTIONS

The following schedule sets out the main steps on how the ETRES project team plans to continue dissemination and communication of the project results after the end of the project.

- The ETRES web-site was one of the first dissemination activities and lasted throughout the project life. Since it is hosted on the CRES web-site the project web-site will be there permanently.
- The guidelines of the ET and RE support mechanisms were updated further by the partners and have also been produced in the form of a friendly publication (guide-book) and distributed to the event participants and the target audience. The Beneficiary strongly believes that a new version of the Guidelines (one for the ET including the new NAP and one for the RES issue including the provisions of the new RES law, 3468/2006) would be helpful for the RES investors and ET Scheme Industries.
- The Beneficiary and the partners want to widely communicate the project results. Although three articles have already been published, 1 or 2 articles in international journals (papers) are being drafted.
- CRES and RAE play an important advisory or/and consultative role to the Greek Ministry of Development. Thus, it is expected that all the outputs of the project will be used in many ways and for several purposes.
- CRES and the other partners take part in all the major events in Greece concerning Energy and Environmental matters (eg. HELECO, ECOLIFE, ENERGY 2006, SUN & SHADOW, THESSALONIKI INTERNATIONAL FAIR). The project promotional material will be distributed during these events to all the relevant participants.