HELLENIC REPUBLIC
MINISTRY OF ENVIRONMENT, ENERGY AND CLIMATE CHANGE

ΥΠΟΥΡΓΕΙΟ ΠΕΡΙΒΑΛΛΟΝΤΟΣ ΕΝΕΡΓΕΙΑΣ & ΚΛΙΜΑΤΙΚΗΣ ΑΛΛΑΓΗΣ

2nd NATIONAL ENERGY EFFICIENCY ACTION PLAN

2008-2016

PURSUANT TO DIRECTIVE 2006/32/EC

Athens, September 2011

Foreword

Energy savings is the biggest, most important and untapped reservoir of energy sources in Greece. A country which is the most wasteful and energy intensive region of Europe and which, through measures of rationalization of energy sources, could save over €200 million per year.

Meanwhile, actions to reduce energy waste particularly in the energy sector are an important development intervention that contributes decisively to the creation of new jobs and the exploitation of raw materials derived from the Greek industry. Several energy saving programmes for residential buildings, local authorities, public buildings, schools etc., which are co-financed by EC Funds, are already underway.

This 2nd Energy Efficiency Action Plan is issued as part of the implementation of Directive 2006/32/EC on energy end-use efficiency and Law 3855/2010 (Government Gazette, Series I, No 95) "Measures to improve energy end-use efficiency, energy services and other provisions", has been prepared by the Centre for Renewable Energy Sources (CRES) and incorporates the methodology of Ministerial Decision D6/7094/2011 "Framework methodology for measuring and verifying energy savings for achieving the national indicative energy end-use savings target-List of indicative eligible measures to improve energy efficiency-Energy content of fuels for end use" in order to monitor the progress in achieving the national energy savings target by 2016.

The focus of the new European energy policy and also the main strategic energy target is the commitment to reduce the emissions of gaseous pollutants at EU level by 20% until 2020 compared with 1990 levels. In this context, the European Energy Action Plan outlines the measures and policies to be adopted and implemented to achieve this main energy target.

The effective implementation of the policies and actions set out in this Plan and the projected commitments by Member States, is further discussed by achieving three associated sub-goals for 2020, relating to: achieving energy savings of 20%, increasing RES participation in the gross final energy consumption to 20%, and achieving a 10% share of biofuels in transport by 2020.

However, because some deviations have already been observed during the monitoring of progress made in achieving this main target , it was deemed appropriate to update both the commitments and the mechanisms that should be implemented. As a result, in March 2011, the European Commission adopted the updated Energy Efficiency Action Plan (COM (2011) 109 final), providing directions for establishing and implementing specific measures and additional actions, as it is clear that the key European target of 20% energy savings by 2020 will not be achieved simply by continuing to apply the existing policies.

Given that energy efficiency is a key tool for strengthening Europe's competitiveness, that it also helps to reduce energy dependence on third countries and also reduces the level of greenhouse gas emissions, this action plan sets out a series of measures intended to create significant benefits for households, businesses and public bodies.

Specifically, the target is to change the daily life of European citizens regarding their energy behaviour, to achieve significant cost savings and to improve EU competitiveness at industry level with a view to creating more than two million jobs.

The progress made on improving energy efficiency and energy savings through the implementation of policies, measures, market mechanisms, and research and development activities, as described and addressed in the new Action Plan, creates a framework for achieving the main European target for energy savings by 2020.

Improving energy end-use efficiency is expected to be the most important measure for achieving the objectives of reducing greenhouse gas emissions and refers to energy efficiency and energy savings measures and investments in buildings, industry and transport. Comparatively speaking, almost all of these actions offer a faster return than other emission reduction measures and achieve the best ratio in the index of gaseous pollutants removal to investment unit, taking into account the total cost of ownership and life cycle costs of interventions.

A major advantage of such technological interventions is the fact that any future increase in the cost of conventional fuels is absorbed by the improvement of energy efficiency and therefore has no impact on the end-user’s budget. On the other hand, the implementation of successful end-use energy-saving measures reduces total energy demand, with multiplier effects both at the local and national level. Meanwhile, the market for energy-saving and energy efficiency improvement technologies is expected to reach a high growth rate by 2020, in view of the expected establishment of a package of measures and commitments on public and private sector building premises, and the establishment of new market mechanisms, such as white certificates, voluntary agreements, energy efficiency contracts through energy service companies will form a new business sector, which is likely to be able to offset the current recession in building activity, and is expected to continue to some extent in the coming years. Actions to improve energy efficiency, both in the tertiary sector and industry, are expected to include comprehensive energy production solutions from RES, to contribute to the development of a 'smart' demand production and management system and, generally, to enhance the development of a dispersed power production system.

Transport is the sector that, along with the building sector, has probably the greatest potential for energy savings, where the goal is to develop technological applications for fuel economy and promote more biofuels to replace conventional fuels. There is also great potential in the development of new technologies for transport means through the development and marketing of electric and hybrid vehicles, initially, and solar and fuel cell vehicles, subsequently.

Developments on the transport market will have repercussions in other energy sectors (oil, natural gas) and could potentially combine energy storage capabilities, adding more benefits to the adoption of these technological capabilities. Specifically, the penetration of biofuels in transport fuels contributes to greater diversification of energy sources, energy savings and less consumption of fossil liquid fuels, less $C0_2$ emissions and air pollutants and to the development of new economic activities and highly-efficient technological methods. Relevant actions and technological applications are also expected in the field of sea, air and rail transport, thus eventually creating great potential for energy saving and air pollution reduction.
In all cases, a coordinated energy policy needs to be implemented, in order to generally develop market sectors related to RES, energy savings and sustainable transport. The implementation of such policies and supporting measures will yield even greater growth and benefits, in terms of employment and creation of new jobs, and will also absorb any negative impact of the shift towards cleaner technologies on some employment sectors.

Specifically in Greece, there was clearly a constant upward trend in final energy consumption from 1990 to 2007, which is mainly attributable to the growth rate of the Greek economy, better living standards and population growth. Furthermore, it should be noted that due to low energy prices during this period, but most importantly due to the lack of institutional measures and even technological interventions that promote energy efficiency and energy savings, no emphasis has been placed on making use of saving potential and, basically, any improvement of energy efficiency indicators should be attributed primarily to technological advances, infrastructure and network development and the gradual replacement of old equipment with new, more energy-efficient equipment and, secondarily, to the implementation of targeted measures to improve energy end-use efficiency.

The main pillar of all the efforts towards achieving the EU target of improving energy efficiency is Directive 2006/32/EC, transposed into Greek legislation by means of Law 3855/2010. Under this Directive, and by extension the aforementioned Law, the National Energy Efficiency Action Plans (N-EEAPs) provide a framework for the development of a strategy at national level, to further improve energy end-use efficiency through the implementation of concrete measures and policies in the various energy end-use sectors. Moreover, the EEAPs provide the framework for using this methodology to enable the energy savings achieved as a result of these measures and strategies to be evaluated.

In this context, national EEAPs can be a useful policy tool not only for meeting the obligation of reporting to the EU on the applied and planned measures for energy end-use and savings achieved, but also as a national energy policy tool focusing on the improvement of energy efficiency. Moreover, they can also be used as an energy policy tool both at Community level, to help extract aggregate and comparative results at EU level, and will contribute to developing a common European energy policy.

The new draft Directive on energy efficiency, which is a step in this direction, will essentially review Directives 2006/32/EC and 2004/8/EC on energy services and high efficiency cogeneration, respectively, will promote the common energy policy to achieve the target of 20% primary energy savings by 2020 and will initiate the implementation of measures to further improve energy efficiency, extending the time horizon of this Directive.

An important aspect of this issue is the subsequent geographical approach to the breakdown by geographical unit and region of the country. We all know that the energy footprint per energy use varies depending on the geographical area of Greece. The exact determination of this breakdown may lead to the respective decentralized regional and sectoral savings indicators.

Considering the above, the measures to improve energy efficiency that are planned and adopted by Greece form part of this overall concept, exceeding the target established by Directive 2006/32/EC of 9% energy savings in final energy consumption by 2016. The main line of action is to implement the necessary measures and policies so that the 2020 target for primary energy savings is not only achieved but also leads to multiplier effects that will be able to contribute to energy savings beyond 2020.

Clearly, no National Action Plan can succeed if it is kept shut away in the pages of a bureaucratic text. The only hope is for it to be used to stimulate dialogue, criticism and creativity among producers, institutional representatives of citizens, and eventually every Greek citizen individually. Energy savings and energy efficiency are a major challenge for Greece which, if taken up, will bring exceptional multiplier benefits to our national economy.

The Deputy Minister for
Environment, Energy and Climate
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Ioannis Maniatis

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ABBREVIATIONS:

HEI: **Higher Education Institution**

GDP: Gross Domestic Product

TPP: Thermal Power Plant

RES: Renewable Energy Sources

IBZ: Industrial Business Zones

IZ: Industrial Zones

TL: Transmission Lines

PPC SA: Public Power Corporation

HTSO: Hellenic Transmission System Operator

SSEEI: Special Secretariat for the Environment and Energy Inspectorate

OPCE: Operational Programme "Competitiveness and Entrepreneurship"

OPESD: Operational Programme "Environment and Sustainable Development"

ERT: **Hellenic Broadcasting Corporation**

SSEI: Special Service of Energy Inspectors

EDOE: Alternative Vehicle Management of Greece

EU: European Union

ESCO: Energy Service Companies

EL.STAT.: Hellenic Statistical Authority

OPC: Operational Programme "Competitiveness"

NEEAP: National Energy Efficiency Action Plan

NSRF: National Strategic Reference Framework

ESYE: National Statistical Service of Greece

ERDF: European Regional Development Fund

OPC SMS: Operational Programme "Competitiveness and Entrepreneurship" Special Management Service

EYSED EN/B: Special Service for the Coordination and Implementation of Actions in the fields of Energy, Natural Resources and Manufacturing

DHW: Domestic hot water

ISAP: Athens Piraeus Electric Railways

TSS: Thermal solar systems P.U.: Private Use

KENAK: Regulation on the Energy Performance of Buildings

CTSS: Central Thermal Solar Systems

CSF: Community Support Framework

JMD: Joint Ministerial Decision

EHVC: Extra-High Voltage Centres

PTSDS: Power Transmission System Development Study

PT: Public transport

NPDD: Legal Person governed by Public Law

NPID: Legal Person governed by Private Law

LA: Local Authorities

GPP: Green Public Procurement

ROP: Regional Operational Programmes

RAE: Regulatory Authority for Energy

EEAP: Energy Efficiency Action Plan

PPJV: Public and private joint ventures

EPC: Energy performance contracts

AMVIR: Association of Motor Vehicle Importers Representatives

EMS: Energy management system

TCE: Total Consumption Expenditure

DC: Direct current

TOE: Tons of oil equivalent

TCG: Technical Chamber of Greece

TEI: Technological Educational Institute

S/S: Substations

MD: Ministerial decision

YPEKA: Ministry of Environment, Energy and Climate Change

YYMD: Ministry of Transport, Infrastructure and Networks

NG: Natural gas

VAT: Value added tax

TPF: Third-party financing

BU: Bottom-Up

DPF: Diesel Particle Filter

ENTSO-E: European Network of Transmission System Operators for Electricity

EPBD: Energy Performance of Buildings Directive

ESD: Energy Services Directive

LDV: Light Duty Vehicle

MARKAL: Computational Tool for the Analysis of Energy Systems [MARKet ALlocation]

ODEX: Energy efficiency index

PPS: Purchanging Power Standards

RES: Renewable Energy Sources

SPF: Seasonal Performance Factor

TD: Top-Down

1. OVERALL CONTEXT OF THE 2nd EEAP

The 2nd EEAP presents the aggregate data of the national strategy for energy savings in all sectors of final energy consumption.

The main actions and measures that were launched from 2007 onwards as part of achieving energy savings target at a rate of 9% in end-use until 2016, were implemented at national level and mainly involved the development of the institutional and regulatory framework for adopting policies, obligations and strategies in all end-use sectors, as part of improving energy efficiency.

Specifically, a comprehensive institutional framework for the energy efficiency and certification of buildings, the technical specifications of new buildings, the obligations of the public sector and energy providers, and the mechanism to monitor and assess progress in the achievement of the national target was developed.

Emphasis was put on developing the appropriate structures (records, databases, technical guides), necessary for implementing the regulatory framework developed, as well as on public consultation with market players, with a view to ensure that this regulatory framework is widely accepted.

However, the most crucial fact both in terms of analysing the achieved energy savings in end-use for the period 2007-2010 in Greece, and in analysing and evaluating the success of implementing specific measures to improve energy efficiency, is nothing but the economic recession, whose impact is visible to a greater or lesser extent, in all sectors of final energy consumption in Greece, especially from 2009 onwards.

This plan attempts to relieve the impact of the economic recession through the evaluation of specific measures to improve energy efficiency by 2010, but the assessment of substantial progress in achieving the national target for 2016 using the methodology presented in this EEAP should currently be rather used as an indication of the trend and progress than as an absolute magnitude of the achieved energy savings, given that the impact and overlaps of the economic recession and the implementation of measures to improve energy efficiency should be analysed and studied in the longer run.

However, it should be considered that the impact of the economic recession, to the extent that it leads to no phenomena of energy poverty, may be a cause for adopting a more rational behaviour in the use of energy, and strategic planning of new energy efficiency improvement tools (or adaptation of old ones) to be used to the benefit of both society and market in the new economic circumstances (e.g. energy services market, increase of guided transport systems share).

1.1. HIGHLIGHTS OF THE 2nd EEAP

This plan describes and evaluates all the measures that have been, are being or are planned to be implemented to energy end-use sectors in Greece. It includes an extensive description of the energy savings achieved through energy efficiency improvement measures by direct reference to the 1st EEAP. It also presents the progress in meeting the interim target for energy savings in 2010 based on data and estimates, and makes a forecast on energy savings for 2016. Finally, it describes the national strategies related to the forecasts and targets for primary energy savings.

The implementation of new rules and regulations on the operation of energy end-use market was delayed, mainly due to the complexity of the arrangements requiring the involvement of several market institutions and the changes that occurred nationally in the structure and operation of the entire state apparatus. As a consequence of this delay, the performance of almost all measures related to energy efficiency of buildings was not possible to be measured and evaluated in this Action Plan, as the effective implementation of regulatory measures started at the beginning of 2011.

Meanwhile, a great number of measures envisaged concerning either pilot actions or actions that use financial instruments as part of the NSRF, despite the fact that in most cases requests of stakeholders have been designed and evaluated, have not proceeded yet to the implementation phase and therefore are not measured in this plan.

Based on the processing of final energy consumption data resulting from the energy balance for Greece for the years 2007 and 2009 and the estimates in accordance with the aggregated data for 2010, there is a decrease in final energy consumption in all end use sectors for the period 2007-2010 (see Table 2). In some sector, including the residential, industrial and rural sectors, the decrease was sustained throughout the three years, while the transport sector, despite the instantaneous increase in the sector's consumption in 2009, finally saw an overall decrease during the period in question. The only sector that actually has marginally increased energy consumption during these three years is the tertiary sector, which is justified to some extent by the relatively stable needs in energy use due to the nature of the sector's activities.

The **interim final energy savings target** for 2010 (5,1 TWh) is achieved. However, energy savings may not be largely attributed to energy efficiency measures. The achievement of the interim target is mainly due to the impact of economic recession in the final energy consumption, which specifically in the residential and industrial sector has been observed since 2009, while in the transport sector the impact has been observed mainly since 2010 onwards.

The methodological approach used to calculate **primary energy savings** is based on the strategies examined during the preparation of the National Action Plan for RES, and concludes that the overall primary energy savings estimated under the specific scenarios for 2020 equal to 33, 1 TWh. The major part of savings is mainly due to the implementation of measures in the final consumption by 2016, most notably due to the measures proposed in the 1st Energy Efficiency Action Plan, which also lead to savings in primary energy equal to 23,8 TWh. Moreover, savings resulting from the implementation of the projects for the interconnection of the island with the mainland system were also quantified and found to be equal to 2,3 TWh in 2020. Finally, the adoption and implementation of operations for the upgrade and streamlining of the existing power plants, and the operation of further district heating networks by PPC SA further contribute to achieving primary energy savings.

It is noteworthy that there were and still are difficulties in collecting primary data for the final energy consumption and quantitative data for all the parameters taken into account in calculating energy savings for 2010. Specifically, the official figures for 2009 were published in the first quarter of 2011 (e.g., energy balance, transport figures, economic indicators, etc.), and the official figures for 2010 are expected in early 2012. This, coupled with the economic recession, has made it very difficult to estimate the parameters and consumption for 2010.

1.2. NATIONAL CONTEXT OF ENERGY SAVINGS

The energy consumption in Greece has increased significantly over the last 20 years, following the course of both the figures of economic growth and new consumer habits adopted by final consumers.

However, both the implementation of measures to improve energy end-use efficiency and the recession have resulted in a significant reduction of final energy consumption in 2008-2010, thus exceeding both the interim and final end-use energy savings target, as defined in Directive 2006/32/EC.

The total final energy consumption during the period 1990-2007 shows an increasing trend of about 2.41% per year, mainly due to the increased consumption of petroleum products by 2.16% annually, which account for the largest share in the energy mix of Greece, and the average increase of power consumption by 4% per year.

As shown in Figure 1 below, energy consumption is maximized at 21,9 Mtoe in 2007 followed by a sharp decrease in the coming years, reaching 18,9 Mtoe in 2010, a decrease of 13.9% compared to 2007 and reaching in absolute terms the energy consumption in 2000 (18,7 Mtoe). The reduction in energy consumption during 2007-2010 is mainly due to the reduction in energy consumption of petroleum products by 20% over the same period, as shown in Table 1 below.

Table 1: Rates of change in the use of fuels in final energy consumption

	Average annual 1990-2007	**2007-2008**	**2008-2009**	**2009-2010**	**2007-2010**
Oil products	2,2%	-4,5%	-1,9%	-14,6%	-20,0%
Natural gas	35,4%	14,6%	1,6%	42,1%	65,3%
Electricity	4,0%	2,6%	-3,4%	-2,5%	-3,3%
Other fuels	-0,2%	-13,5%	-17,8%	7,5%	-23,6%
Total	**2,4%**	**-3,1%**	**-3,3%**	**-8,1%**	**-13,9%**

**Other fuels shall mean solid fuels, RES and heat, where RES represent 83% of the mix of other fuels.*

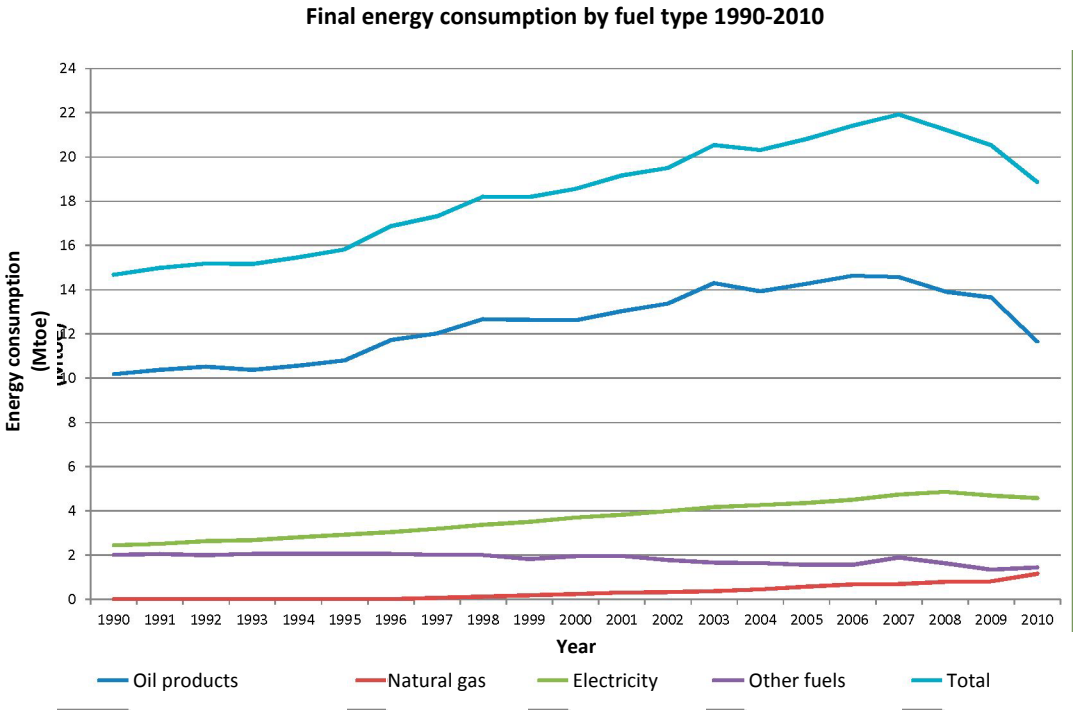

Figure 1: Final energy consumption by fuel type 1990-2010

Table 1 shows a significant increase in consumption of natural gas which, as also shown in Figure 2 below, replaces to a small extent oil products in the final energy consumption mix. Moreover, this graph also demonstrates an increase in the share of electricity in the country's energy mix.

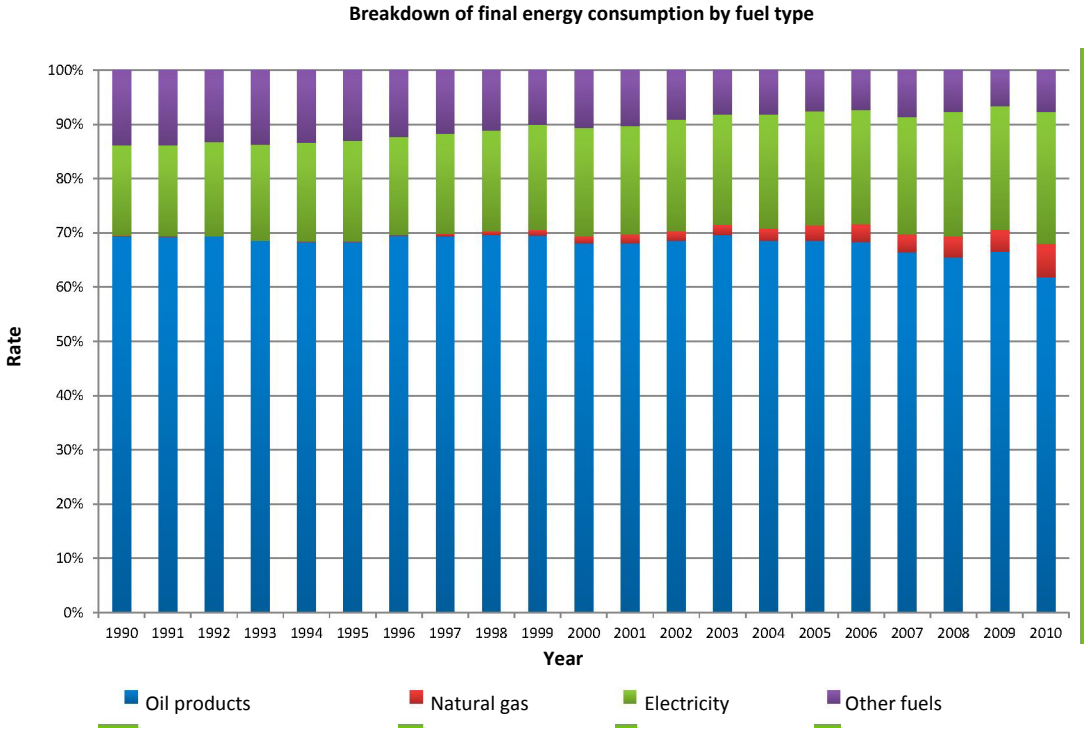

Figure 2: Breakdown of final energy consumption by fuel type 1990-2010

The sectors with the greatest increase in final energy consumption is the transport and building sector (residential and tertiary) and the average annual increase in energy consumption over the period 1990 to 2007 amounts to 2.4%, 3.4% and 6.8%, respectively. However, in both 2008 and 2009, and much more in 2010, there was a reduction in consumption specifically in the industrial, residential and tertiary sector, which is possibly due to the fact that these sectors were the first to sustain the effects of the economic recession in final energy consumption, which is further enhanced by the increase in energy prices. This decrease in consumption is particularly noticeable in the transport sector, where although there was an 8.1% increase in energy consumption in 2009 compared with 2008, the reduction of fuel consumption in the activities of the transport sector in 2010 was 13.7%, leading to an overall reduction of energy consumption in this sector of 8.9% for the period 2007-2010.

Table 2: Rate of change of energy consumption by end-use sector

Average annual change	1990-2007	2007-2008	2008-2009	2009-2010	2007-2010
Industry	0.9%	-8.5%	-17.7%	-1.6%	-26.0%
Transport	2.4%	-2.3%	8.1%	-13.7%	-8.9%
Residential sector	3.4%	-3.1%	-7.0%	-5.4%	-14.7%
Tertiary sector	6.8%	3.9%	-3.3%	0.3%	0.7%
Agriculture sector	0.5%	-0.4%	-20.0%	-10.3%	-28.5%
Total	**2.4%**	**-3.1%**	**-3.3%**	**-8.1%**	**-13.9%**

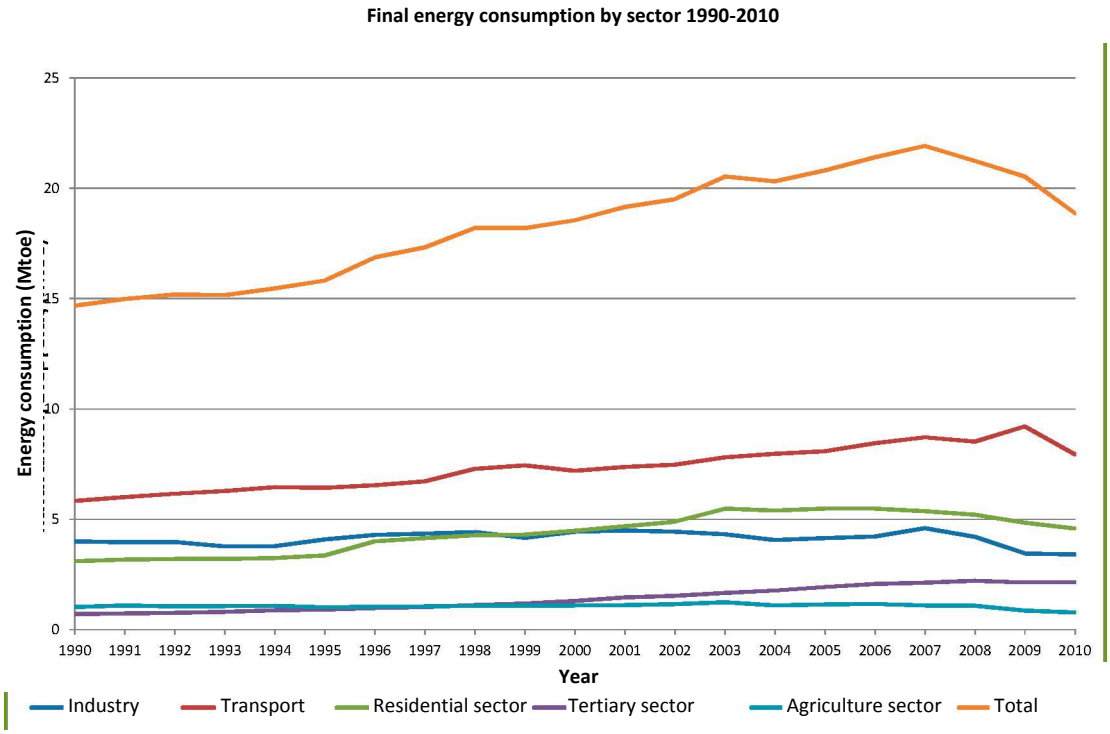

Figure 3: Final energy consumption by final consumption sector 1990-2010

The analysis of the share of final energy consumption by sector for the period from 1990 to 2010 yields significant conclusions regarding the evolution of energy consumption and efficiency of the individual economic activity sectors in Greece.

It appears that the transport sector presents a significant increase in final energy consumption, accounting for a higher share than the other sectors (Figure 4) and is particularly problematic in terms of energy efficiency, as far as both urban and long distance travel is concerned. The transport sector in Greece is characterised by limited infrastructure in fixed-rail transport, excessive use of air transport, reduced use of public urban transport, as well as unregulated and wasteful expansion of road freight transport.

Final energy consumption in the industrial sector remains essentially constant with its share in final consumption showing a decrease of 9.3%. This is due to the significant increase in the contribution of the residential and especially the tertiary sector in Greece's final energy consumption (3.2% and 6.4% respectively), which is consistent with the orientation of the Greek economy, which is increasingly evolving into a service economy, where the tertiary sector is gaining an ever increasing market share.

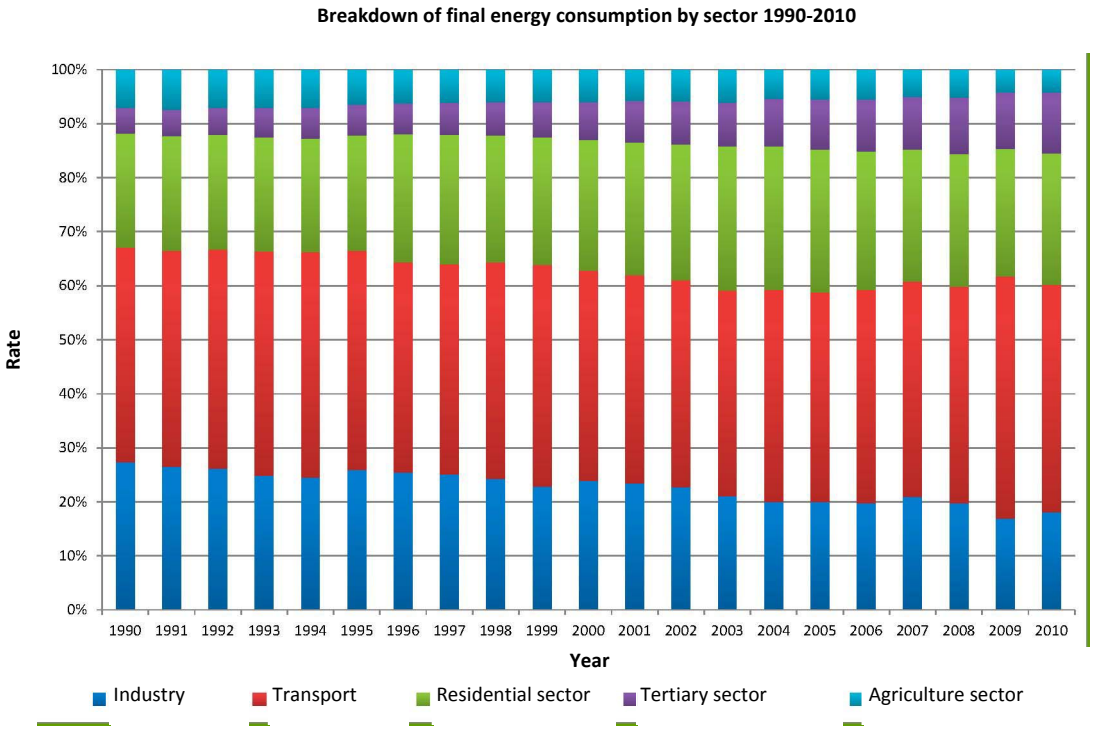

Figure 4: Breakdown of final energy consumption by final consumption sector 1990-2010

The two major determining factors that influenced and led to the reduction in final consumption for the period 2007-2010 are the slowdown of economic growth due to economic recession and the effects of improved energy efficiency achieved either through implementation of appropriate actions and measures or through the adjustment of the energy behaviour of consumers towards less energy intensive products, without affecting the current standard of living.

The latter factor was also influenced by the fact that Greece's energy policy has been changing over the last years in an effort to comply with the relevant European environmental policy and more specifically with the 20-20-20 EU package of energy and climate targets for 2020. Moreover, particular emphasis is placed on energy savings by setting the binding target for Member States to achieve primary energy savings of 20% by 2020, but most important of all is to promote energy saving measures, a critical parameter for achieving the other targets set for 2020, i.e. penetration of 20% RES in final consumption and 20% reduction in CO_2.

Achieving the target of 20% energy savings requires the adoption of an integrated policy framework and the promotion of cost-effective measures to make effective use of the available energy savings potential. Undoubtedly, this will be facilitated by the implementation of Law 3855/2010 "Measures to improve end-use energy efficiency, energy services and other provisions", which harmonises national legislation with Directive 2006/32/EC and is expected to contribute to promoting coordinated policies and measures for end-use energy savings resulting in savings of at least 16,41 TWh by 2016, thus meeting the national target for energy savings equal to 9% of the average annual final reference energy consumption. Furthermore, Law 3661/2008 "Measures to reduce energy consumption in buildings and other provisions" harmonises national law with Directive

2002/91/EC and focuses exclusively on energy efficiency in the building sector with the implementation of the Regulation on the energy performance of buildings (KENAK).

The benefits arising from the implementation of measures to achieve energy savings are very important for the entire national economy. It is noted, *inter alia*, that their implementation will contribute to the country's energy security by reducing dependence on imported fuels, promoting innovation through the promotion of new technologies, increasing employment and boosting the competitiveness of the economy at national and regional level, thus addressing some of the major effects of the economic recession. Finally, it should be noted that the impact of the economic recession is expected to directly or indirectly affect the energy sector because the difficulties faced in the financing of renewable energy projects and energy saving actions are even threatening to suspend already scheduled projects and therefore there should be continued monitoring of financial flows in order to reduce delays or even cancellations of projects with high multiplier effects on saving energy resources and security of energy supply.

Currently, the Greek market lags behind other EU countries on energy efficiency. In particular, energy efficiency, energy saving and rational use of energy still have great potential to grow and to be established in the energy behaviour of final consumers. The poorly developed market for energy services and access for all consumers and market players to integrated and high-quality energy services provides a high potential for future growth in energy efficiency and will be a key priority for Greece's energy policy.

Therefore, improving energy efficiency and energy savings is a significant parameter in the country's energy policy both from a theoretical point of view by establishing an appropriate legislative framework and from a realistic point of view by means of the emerging increase in energy savings. The outlook may be regarded as particularly promising because the savings potential is very high. More specifically, some of the areas identified as particularly energy-intensive can lead, through appropriate interventions, to satisfactory levels of savings in a short time.

More specifically, the residential sector is a sector with very high savings potential, representing 24% of total final energy consumption in Greece in 2009. For example, it is noted that since the majority of buildings was constructed before 1980, they do not meet the requirements of the Regulation on thermal insulation and therefore their energy saving potential is very high. Therefore, by making effective and rational use of energy-saving technologies, both technically and economically, it is possible to improve the energy efficiency of these buildings leading to significant environmental and social benefits.

Institutional interventions concerning the energy certification of buildings are expected to contribute significantly to achieving this, and the goal that new buildings should cover their entire primary energy consumption with energy supply systems based on renewable energy sources is expected to radically restructure the energy performance of buildings.

Meanwhile, emphasis should be placed on the provision of incentives for the implementing and / or disincentives for not implementing measures to improve energy efficiency identified when issuing energy certificates.

However, as recognized at EU level, the energy upgrade of existing buildings is the biggest challenge for meeting the energy savings targets in the building sector, as the energy behaviour of the existing building stock will in effect determine the future energy efficiency index in the building sector. In this context, the mix of measures that will be selected at national level is of major importance so that the rate of energy upgrading of buildings is able to achieve individual energy targets.

The development of market mechanisms, such as Energy Service Companies (ESCOs) to promote energy efficient services will significantly help in this direction, especially in tertiary sector buildings, where such actions should be supported both financially and regulatorily.

Whatever institutional and financial incentives are ultimately developed, they will not be enough on their own to help achieve the energy saving target, because especially in the building sector, the factor of human behaviour plays a key role in energy consumption. In this context, it is necessary to ensure the continued adoption and implementation of measures related to informing and educating consumers so that they choose highly energy-efficient buildings / products and changes their behaviour regarding energy use and consumption.

Another sector presenting significant energy savings potential is the transport sector, representing 45% of total final energy consumption in 2009.

Because of the increasing energy demand in the transport sector (up to 2010 it appears to be the sector that is comparatively most affected by the economic recession and the increase in fuel prices), this is the sector that should be targeted by a number of energy policy actions. The parameters associated with energy demand in transport have increased the need for effective planning, which should be taken into account when designing and implementing energy policy. In this way, public transportation may be associated and combined with the use of public transport and alternative transport means. Respectively, particular attention must be paid in the transport of goods, which should be driven by the operation of local / regional distribution centres and the optimal functioning of supply chains.

Promoting education on eco-driving and changing driving behaviour in combination with using information and communication technologies are tools that can improve mobility. Education, in conjunction with the implementation of the necessary design and infrastructure works, can contribute to shifting the volume of movements to more efficient means, increasing the use of fixed-rail transport, and boosting the demand and availability of energy efficient vehicles in the market.

As regards transport sector measures, particular emphasis will be placed on ways of managing traffic operations in urban centres, and support through incentives and/or disincentives of the use of vehicles depending on their energy consumption.

According to the analysis of the potential for energy savings with the current quota and use of transport sectors, the greatest potential for energy savings in the transport sector is at the level of passenger cars, and to a lesser extent in the area of freight transport using trucks.

The industrial sector also plays a key role in stimulating the economy and achieving energy savings, as it presents high energy consumption levels.

However, the highly energy-intensive industrial sector that is covered by the emissions trading system has already taken actions to adopt specific measures, and continuation of the mechanism in its fully developed form , as is stipulated, is expected in the mid-term to ensure that the industrial facilities covered by the mechanism undergo continuous energy improvement.

Successful mechanisms have been implemented in several countries, with long and short term results, and could significantly contribute to increased energy efficiency within individual industrial sectors. More specifically, it is necessary to consider and promote the implementation of market mechanisms and long-term voluntary agreements to further unlock the energy savings potential. The combined implementation of energy audit programmes and integrated energy management systems could further mobilize the industrial sector.

In the industrial sector, savings are due to the reduction of electricity consumption, the reduction of thermal energy consumption and combined heat and power generation. The industrial sector has also the specificity that the emerging high energy and fuel prices are expected to provide an incentive for adopting energy saving actions to reduce operating costs.

Lastly, the public sector is also characterised by high energy consumption rates, since the annual energy costs of public buildings exceed 450 million euros. Therefore, it is very important for the public sector to take significant energy-saving measures, both to reduce its operating costs and to set an example for all market players to further develop energy-saving measures.

1.3. REVIEW/OVERVIEW OF ENERGY SAVING TARGETS AND ACHIEVEMENTS

In preparing the first EEAP, an extensive study was carried out to identify all the factors that will contribute to the implementation of Directive 2006/32/EC on energy end-use efficiency and energy services. Specifically, the study included the following:

- Quantitative determination of the national energy savings target in GWh. Quantification is based on published official data of Eurostat on final energy consumption in Greece in the five-year period 2001-2005;
- Analysis of final energy consumption and prediction of consumption per energy product, sector and use for the period of nine (9) years in the reference scenario and the savings scenario determining the optimum distribution of the target on the basis of the MARKAL model
- Expected savings derived as the difference between the reference scenario and the savings scenario for the same period. This determines the optimum distribution of the energy end-use savings target for all sectors of activity on the basis of the technological measures of which the model takes account for the period from 2008 to 2016. The intermediate target for 2010 is also calculated;
- The proposed measures, which are already being implemented, constitute a decodification of the energy savings results, as derived with the help of the MARKAL calculation model, in the form of a selected mix of technologies which are technically and financially the best for each sector and use. The measures offer incentives and alternative financing mechanisms for achievement of the savings target through institutional, regulatory, management and technological provisions.

This shapes out an integrated national energy efficiency improvement programme the implementation of which will lead to achievement of the energy target. The measures of this programme have been arrived at by taking account of the existing energy situation per sector of activity, national priorities (further penetration of natural gas and RES) and the policies and measures to which Greece is committed and which it is implementing at the European and global levels in relation to selection of the energy mix, environmental commitments and obligations and employment and social cohesion.

As already mentioned in sections 1.1 and 1.2, and detailed in Chapter 3, the intermediate target for energy savings has been exceeded, mainly due to the economic recession and not to the triggering of the measures specified in the first EEAP. However, because of the specificity of the parameters that resulted in energy savings in 2010, it is impossible to predict the progress in achieving energy savings target for 2016. Although this study attempts to quantify the impact of the economic recession in final energy consumption, it is necessary to monitor for a longer period of time the economic and energy developments, in order to develop a representative methodology for assessing the impact of economic recession in final energy consumption.

Table 3 presents the aggregate results of calculation of intermediate energy saving target for 2010, as they result from the methodology of "top down" calculation as defined in the proposed methodology of the European Commission “Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services” and described in section 3.3.1 (without taking into account the effect of economic recession), the aggregate energy savings targets as they emerged from the development of the first EEAP, and the predictable primary energy savings for 2020, as shown by the analysis of section 2.

The achieved energy savings for 2010 presented in Table 3 is indicative, as it does not take into account the effect of economic recession in final energy consumption. Section 3.3.1. develops an approximate methodology for evaluating the impact of economic recession to quantify the impact of energy consumption. The methodology develops three (3) scenarios using economic indicators, leading to a different savings by end-use sector. As the methodology developed is a first approach to the impact of economic recession, it is appropriate to establish a range of savings achieved for the period 2007-2010 and not to show the energy savings in absolute terms. The range of energy saving obtained and presented in detail in the following sections is also the estimated savings for the period 2007-2010, which are attributed to measures for improving energy efficiency. It is possible to review the achievement of the intermediate target for 2010 in future studies, once a representative methodology for assessing the economic recession in final energy consumption has been developed.

Table 3: Summary table of savings targets in primary and final energy consumption

	Primary energy		Final energy		
			ESD		EPBD
	Target	Forecast (TWh)	Energy savings target as set out in the first EEAP (TWh)	Target achievement for 2010 / for 2016 (TWh)	Target for near zero energy buildings (all new buildings, rate (%) or extension of requirements for energy performance)
2010			5.1	9.24*	
2016		23.8	16.46	16.46	
2020		33.1			100%

** The assessment of the impact of economic recession is quantified in detail in Chapter 3, leading to a range of assessed energy savings for 2010*

2. PRIMARY ENERGY SAVINGS

This section presents the forecasts for consumption and targets for primary energy savings. It lists both the measures taken and those being implemented or planned in order to achieve primary energy savings in the production, supply, distribution and transportation of energy. Lastly, it identifies the primary energy savings for 2020, taking into account the scenarios developed during the preparation of the National Action Plan for RES.

2.1. TARGETS FOR PRIMARY ENERGY, FORECASTS FOR PRIMARY ENERGY CONSUMPTION

The determination of primary energy savings was based on scenarios developed during the preparation of the National Action Plan for RES, which was filed by the Ministry of the Environment, Energy and Climate Change to the EU in 2010. The aim of this analysis was to investigate the possibility to customise the energy system of Greece in the energy and climate package of 2020, and more specifically to the objectives set in relation to the penetration of RES, energy savings and the reduction of greenhouse gas emissions.

For Greece, in particular, the targets set were both the reduction of greenhouse gas emissions by 4% in non-emission trading sectors compared to the levels of 2005 and the penetration of RES at a rate of 18% in final energy consumption. Additionally, the target for RES was reviewed in accordance with Law 3851/2010 "Accelerating the development of Renewable Energy Sources to address climate change and other provisions relating to issues with the competence of the Ministry of Environment, Energy and Climate Change" in order to be adapted to the 20% contribution of RES to final consumption, a rate which is broken down to 40% in electricity, 20% thermal RES and 10% biofuels. Lastly, as far as energy savings are concerned, the target of 9% energy savings in final energy consumption by 2016 pursuant to Directive 2006/32/EC, which as set in the first Energy Efficiency Action Plan, was adopted.

The evolution of the energy system was examined by developing two different scenarios: a scenario based on the existing policies (Reference Scenario) and a compliance scenario aimed at achieving the commitments undertaken through the European energy and climate package and specifications made for Greece (Fulfilment of Targets Scenario). The main driving parameters for the formulation and development of the two scenarios was the evolution of economic activity in Greece, changes in international fuel prices, alternative levels of use of coal, the price effect of RES technologies in their penetration and effect of interconnections in the electricity market.

These two scenarios are similar in respect of the data used on the demand for useful energy derived from the considered macroeconomic data, international fuel prices, planned accessions and withdrawals of power plants in the interconnected system. Their main difference lies in the fact that the Fulfilment of Targets Scenario provides for the implementation of both energy saving measures, as they are included in the first Energy Efficiency Action Plan, and measures to achieve RES targets.

The determination of primary energy savings was made by calculating the difference in total available energy between the two scenarios under consideration.

The data of the two scenarios used in the calculation are presented in Table 4, and the identified primary energy savings for 2020 are shown in Table 5.

Table 4: Total available energy **for the Reference Scenarios and the Fulfilment of Targets Scenario (ktoe)**

		2010	2015	2020
Reference Scenario	Solid fuel	8628	6990	5518
	Liquid fuel	17527	18851	19225
	RES	2131	2790	3623
	Natural gas	3766	4855	6374
	Electricity	239	0	0
	Total	**32292**	**33486**	**34739**
Fulfilment of Targets Scenario	Solid fuel	8628	6249	4540
	Liquid fuel	17527	16976	16558
	RES	2131	3496	5119
	Natural gas	3766	4843	5674
	Electricity	239	0	0
	Total	**32292**	**31563**	**31891**

Table 5: **Total primary energy savings (TWh)**

	2015	2020
Total	22.4	33.1

2.2. LIST OF STRATEGIES ADDRESSED TO PRIMARY ENERGY SAVINGS

The total primary energy savings identified in the previous paragraph amount to 22.4 TWh in 2015 and 33.1 TWh in 2020. These savings achieved are due mainly to energy savings in final consumption and less to greater penetration of RES in the Fulfilment of Targets Scenario (RES penetration in final consumption reaches 15% in 2015 and 20% in 2020) compared to the Reference Scenario (RES penetration in final consumption reaches 12% in 2015 and 14% in 2020).

2.3. PRIMARY ENERGY SAVINGS MEASURES

Most of primary energy savings is mainly due to the adoption of final consumption measures until 2016.

To quantitatively determine the specific energy savings, the estimated energy savings in 2016 were distinguished into thermal and electrical energy and broken down by form of energy in primary energy savings in accordance with the conversion rates published in the Joint Ministerial Decision No D6/B/oik. 5825/2010 “Approval of Regulation on the Energy Performance of Buildings”. According to this Joint Ministerial Decision, the rate of 2.9 was used for the discount of electricity and the value of 1 was chosen for the discount of thermal energy regardless of the nature of the energy cycle. Based on this methodology, the total energy savings equal to 23.8 TWh in 2016. The respective savings in 2015 equal to 21.4 TWh, which is slightly less than the savings identified (22.4 TWh) for the entire energy system.

2.3.1. ENERGY SAVINGS MEASURES CONCERNING ENERGY PRODUCTION / SUPPLY

In view of improving energy efficiency, PPC has designed and completed actions to upgrade and streamline its existing units. The main interventions that have already been implemented include large-scale upgrades of turbines [(Unit III of Agios Dimitrios Thermal Power Plant (TPP)], upgrades of cooling towers (Unit III of Agios Dimitrios TPP, Unit III of Megalopolis A TPP and Unit II of Kardia TPP), upgrades of unit condensate preheating systems (Unit III of Agios Dimitrios TPP), supply and installation of continuous (on-line) measuring systems for the efficiency of the units (Units of Agios Dimitrios TPP) and upgrade of lignite consumption measuring systems (belt weighing devices) in all units. Meanwhile, actions have been taken for the installation of automatic samplers for solid fuel and systems for the identification of the lowest calorific value of lignite, the feasibility of both the installation of exhaust gases-water heat exchanges in Units I and II of Kardia TPP and upgrading of the steam turbine and the condensate preheating system in Unit IV of Agios Dimitrios or alternatively in one of the two units of Amyntaio TPP is examined, and the upgrade of the condensate preheating system in Units I and II of Agios Dimitrios TPP is planned (Source: relevant issue of PPC SA, , 2009).

2.3.2. ENERGY SAVINGS MEASURES CONCERNING ENERGY DISTRIBUTION AND TRANSFER

In recent years, the electricity transmission and distribution system has been the object of increased investor interest because of the need for upgrading and expanding it. As a result, major interventions have already been launched, which should lead to significant savings in primary energy. More specifically, the planned projects under the "Transmission System Development Study (MASM)" (2010) prepared by the HTSO for the period 2010-2014 involve a) the enhancement of the System with Transmission Lines – TL (150 and 400kV), Ultra High Voltage Centres – UHVC (400/150kV) and Substations – S/S (150/20kV), to ensure smooth transfer of power, b) necessary works to improve the operation and economy of the System, in accordance with the requirements of Regulations and c) projects to support the existing and new interconnections with neighbouring countries in line with the obligations of Greece towards the EU, as defined under ENTSO-E. Table 6 summarizes the planned investment projects by category with their total cost.

Table 6: Existing and planned projects to enhance the distribution and transmission system

Category of projects	Existing projects in 2009	Planned projects under the MASM 2010-2014	
		Planned	Cost (million euros)
TL 400kV (km)	4,420	905	379
UHVC 400/150kV	15	6	427
TL 150kV (km)	11,734	1,117	231
S/S 150/20kV	284	130	74
Total			**1,111**

The reported cost of planned projects does not involve the total construction cost for the new S/S, but only projects for their enhancement (e.g. improvements of S/S, addition of switches, compensation facilities, etc.).

Furthermore, new projects will be implemented upon connecting and integrating new power plants to the system (either conventional or renewable energy units) and new S/S to supply distribution networks or high-power consumers directly connected to the 150kV network.

The prospect of interconnecting the non-interconnected system with the continental is of particular interest, because this intervention may lead to significant primary energy savings. The expected savings will be achieved by subsisting electricity generated from the existing oil plants of the insular system by equivalent electricity generated from the continental system.

For the rational development of the interconnection network of the Aegean islands to the System, the HTSO prepared a "Study on the Interconnections of the Aegean Islands to the Continental System Phase A" (2010), which covers all the Aegean islands. The study concludes that the following interconnection projects will have been completed by 2020:

(a) Interconnection of Cyclades, for which a tender notice has already been issued by the PPC, with an estimated time of inclusion in 2014-2015. Then, depending on the perspective of using the geothermal potential of Milos, the expansion of the Cyclades Interconnection to Milos, and possibly to Santorini, will be determined.

(b) The interconnection of Northern Aegean islands (Limnos, Lesvos and Chios, through a DC network loop at the Philippi UHVC – Larymna UHVC). A Production Licence has been granted to this investment project and therefore the time of its implementation depends on the rate of achievement of other licences and construction.

(c) Interconnection of Crete which is deemed feasible by 2020, provided that relevant procedures will be speeded up. A Work Group consisting of the HTSO, the RAE and the PPC reviewed and confirmed the economic and technical efficiency of this interconnection project in their study "Development Study of the electrical system of Crete – Interconnection with the continental system" (2011).

The calculation of primary energy savings through the implementation of interconnection projects was based on the assumption that the projects for the interconnection of the Cyclades, the islands of the north-eastern Aegean and Crete will have been completed by 2020.

The electricity generated from oil plants which is expected to be replaced equals to 3,806.4 GWh in 2020. The calculation was performed according to the 2009 output data for the units to be interconnected (Cyclades (Santorini, Kythnos, Milos, Mykonos, Paros, Naxos, Serifos and Sifnos), NE Aegean (Limnos, Lesvos, Chios, Samos, Ikaria) and Crete) and the progress rate of electricity demand as estimated by the National Action Plan for RES.

The efficiency of power generation technologies was selected from the available values of the Ministerial Decision No D5-IL/G/F 1/oik.15606/2009 "Defining harmonized reference efficiency values for separate production of electricity and thermal energy". The values used are presented in Table 7. It should be noted that for determining the most conservative estimates, the estimates of efficiency in case the plants were built in 2006-2011 were used, since the majority of lignite and oil plants were built earlier unlike the respective natural gas plants.

Table 7: Efficiency of electricity generation technologies

Fuel	Efficiency
Lignite	41.8%
Natural gas	52.5%
Oil	44.2%

The rates of electricity generation per energy cycle for 2020 according to the National Action Plan are shown in Table 8.

Table 8: Rates of electricity generation per energy cycle in 2020

Fuel	Electricity generation
Lignite	25%
Natural gas	33%
Oil	2%
RES	40%

Using the above assumptions and data, it is estimated that the total primary energy savings resulting from the projects for the interconnection of the island to the mainland system will be equal to 2.3 TWh in 2020.

Another measure which contributes to primary energy savings is energy supply through hot water for the district heating of towns. The PPC has already been engaged in this sector through the operation of district heating systems in 7 of its production plants (Ptolemaida III (50 MWth), Agios Dimitrios III (67 MWth), IV (67 MWth), V (70 MWth), Amyntaio (20 MWth), Megalopolis III (25 MWth) and LIPTOL (25 MWth)). The expansion of the district heating system of the municipality of Kozani from Agios Dimitrios TPP (maximum district heating potential of 137 MWth) was completed in 2008, and the interconnection of the district heating system of Ptolemaida municipality with Kardia TPP and Florina town with Melitis TPP is underway (70 MWth) .

Lastly, the new Unit II of Melitis TPP (70 MWth) and the new Unit of Ptolemaida (140 MWth) are expected to be used for district heating purposes, when constructed (Source: relevant issue of PPC SA, , 2009).
Regarding the adoption of energy saving measures in the demand for electricity, an investment plan has been announced by PPC involving the installation of electronic meters and telemetering devices to its consumers.

2.3.3. OTHER PRIMARY ENERGY SAVINGS MEASURES

No additional primary energy savings measures have been designed or planned.

3. ENERGY SAVINGS IN FINAL CONSUMPTION

This chapter provides a detailed description and evaluation of the energy saving measures that have been implemented, thus contributing to the achievement of the intermediate energy savings target for 2010, and the description of the measures implemented or designed and planned to be implemented in energy end-use in Greece to achieve the final energy savings target for 2016. Information is provided on the methodology for calculating the intermediate energy savings target for 2010. Lastly, data are presented on the progress of implementation of the provisions/articles of Directive 2006/32/EC concerning the exemplary role of the public sector, the energy services market and the availability of advice and information.

3.1. REVIEW OF END USE ENERGY SAVINGS TARGET AND ENERGY SAVINGS ACHIEVED

This section presents the energy savings targets. The national energy-savings intermediate and final target is evaluated on an aggregate basis and a first approach to the objectives for zero energy buildings is carried out.

3.1.1. NATIONAL END USE ENERGY SAVINGS TARGET AND ENERGY SAVINGS ACHIEVED

The main actions and measures that were launched from 2007 onwards as part of achieving energy savings target at a rate of 9% in end-use until 2016, were implemented at national level and mainly involved the development of the institutional and regulatory framework for adopting policies, obligations and strategies in all end-use sectors, as part of improving energy efficiency, as described in chapter 2.

As already mentioned in sections 1.1 and 1.2, the intermediate energy savings target has been exceeded. This is rather due to the economic recession than to the implementation of the measures specified in the first EEAP. However, the economic recession, combined with public awareness operations on energy saving and environmental protection, have resulted in a behavioural change towards more rational use of energy, and strategic planning of new Energy Efficiency Improvement measures (adaptation of old ones) to be used to the benefit of both society and market in the new economic circumstances. Table 9 provides a summary representation of energy savings, as it results both from the calculation of indices under the "top down" methodology, and from the approximate methodology for assessing the impact of economic recession. Table 10 lists the respective results by sector.

Table 9: **Summary representation of end-use energy savings from the implementation of measures under Directive 2006/32/EC**

	End-use energy savings target (TWh)		Range of estimated end-use energy savings (TWh)[1]		Estimated end-use energy savings based on the EU methodology (TWh)[2]	
	In absolute values (TWh)	Percentage (%) (relating to the reference consumption under ESD)	In absolute values (TWh)	Percentage (%) (relating to the reference consumption under ESD)	In absolute values (TWh)	Percentage (%) (relating to the reference consumption under ESD)
2010 (intermediate period)	5.1	2.8	9.24-19.87	5.1-10.9	21.37	11.7
2016 (total period)	16.46	9				

1. *approximate methodology for evaluating the impact of economic recession*
2. *top-down calculation method defined in the proposed European Commission methodology «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services»*

Table 10: Total end-use energy savings from the implementation of measures under Directive 2006/32/EC

Sector	End-use energy savings target (TWh)	Range of estimated end-use energy savings (TWh)[1]	Estimated end-use energy savings based on the EU methodology (TWh)[2]
Residential	1.68	1.76-7.23	7.83
industrial	0.13	0.37-1.87	1.98
Tertiary	1.53	0.05	0.11
Transport	1.79	7.12-10.71	11.45
Total	**5.12**	**9.24-19.87**	**21.37**

[1] *approximate methodology for evaluating the impact of economic recession*

[2] *top-down calculation method defined in the proposed European Commission methodology «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services»*

ACHIEVEMENT OF INTERMEDIATE END USE ENERGY SAVINGS TARGET FOR 2010

The range of energy savings calculated using the methodology described in section 3.1.1 reaches 9.24-19.87 TWh, which corresponds to 5.1 to 10.9% of average consumption for the period 2001-2005, compared to 5.1 TWh, which was the intermediate energy savings target (2.8% of average consumption for the period 2001-2005) in 2010. Although most of the measures proposed in the first EEAP, as stated in previous sections and detailed in section 3.3.2, had not been initiated by the end of 2010, with the exception of legislative reforms, programmes of financial assistance to undertakings and measures in the transport sector, it is observed that the economic recession has led to significant savings in energy, which is mainly explained by the increase in the prices of energy products together with a reduction in the income of consumers, resulting in a change in the energy behaviour of consumers.

EXPECTED SAVINGS COMPARED WITH THE TOTAL END USE ENERGY SAVINGS TARGET FOR 2016

The calculation of energy savings for 2010, as previously reported, shows that the intermediate target has been exceeded, as represented in the first EEAP. Because of the specificity of the parameters that led to energy savings by 2010, it is not possible to estimate the further progress in achieving the energy savings target for 2016 and to take into account in the calculation of this target the impact caused by the economic recession. Although this plan attempts to unblock the impact of the economic recession from the evaluation of specific measures to improve energy efficiency by 2010 is not possible to evaluate the substantive progress in achieving the national target for 2016. Therefore, in this study, the final energy savings target remains the same as the one prescribed in the first EEAP, corresponding to 16.46 TWh energy savings for 2016 and 9% energy savings compared to the average energy consumption for the period 2001-2005. A review of the target can be made in a future study (third EEAP, 2014), when it will be possible both to quantify the impact of the economic recession on final energy consumption, and to separate this impact from the energy savings measures and schemes promoted as of 2011 onwards.

3.1.2. NATIONAL TARGET FOR NEARLY ZERO ENERGY BUILDINGS

Law 3661/2008 on the energy efficiency of buildings, Law 3851/2010 on the acceleration of the development of Renewable Energy Sources and climate change, and Law 3855/2010 on the improvement of the energy end-use efficiency have set the grounds for the transition to low energy consumption buildings and identify a set of measures and mechanisms for this transition.

Meanwhile, the new Regulation on the energy performance of buildings (KENAK) introduces an integrated energy design in the sector of buildings to improve the energy efficiency of buildings, energy savings and environmental protection, and also sets two key requirements:

1) submission of a Study on the Energy Performance of Buildings for issue of a building permit,

2) performance of Energy Inspections to Buildings, Boilers, Heating and Air Conditioning Systems.

The institutional interventions for the energy certification of buildings is expected to contribute significantly in this direction, and the goal that new buildings should cover their entire primary energy consumption with energy supply systems based on renewable energy sources is expected to restructure radically the energy performance of buildings.

More specifically, Law 3851/2010 makes reference to the amendment of Article 4 of Law 3661/2008 where the following paragraphs 3 and 4 are inserted as follows:

- Paragraph 3. Buildings for which an application for issue of a building permit is submitted to the relevant Planning Service after 1.1.2011 are required to cover part of their needs for domestic hot water with solar thermal systems. The minimum percentage of solar share on an annual basis is set to 60%. This requirement does not apply to the exceptions referred to in Article 11, and when demand for domestic hot water is covered by other energy supply systems based on renewable energy sources, electricity and heat cogeneration, district or block heating systems, and heat pumps with seasonal performance factor (SPF) as defined in paragraph 2. Failure to apply this percentage requires sufficient technical documentation in accordance with applicable law and prevailing conditions.

- Paragraph 4. No later than 31.12.2019, all new buildings should cover their entire primary energy consumption with energy supply systems based on renewable energy sources, electricity and heat cogeneration, district or block heating systems, and heat pumps with seasonal performance factor (SPF) as defined in paragraph 2 of this Article. For new buildings where government and public services are housed, this obligation should enter into force no later than 31.12.2014.

3.1.3. OTHER TARGETS AND/OR FORECASTS AND FINAL ENERGY SAVINGS ACHIEVEMENTS

National targets and forecasts on final energy savings are presented in this Action Plan. When this Plan was drafted, no additional final energy savings targets had been set.

3.2. LIST OF STRATEGIES AFFECTING FINAL ENERGY DEMAND

A detailed analysis of all the strategies affecting the final energy demand has already been presented in previous sections and is further detailed in sections 3.3-3.8 below.

3.3. MEASURES FOR FINAL CONSUMPTION AND FINAL ENERGY SAVINGS

This section develops the methodology for calculating the intermediate energy savings target and details the measures in place or to be shortly implemented to achieve the final energy savings target for 2016.

3.3.1. CALCULATION METHODOLOGY

The evaluation of energy savings for 2010 was based on the standard "top down" calculation method as defined in the proposed methodology developed by the European Commission «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services» and incorporated into the Greek law with Ministerial Decision D6/7094/23.6.2011 "Framework methodology for measuring and verifying energy savings for achieving the national indicative energy end-use savings target - List of indicative eligible measures to improve energy efficiency- Energy content of fuels for end use."

Based on this methodology, energy savings are calculated using aggregate consumption and quality data by final consumption sector, with reference years 2007 and 2010. The results are then normalised by taking into account factors such as heating / cooling degree days, structural changes in economic activity sectors, etc. The development of this methodology is based on the ODEX model (standard developed under the European Project ODYSSE-MURE of the Intelligent Energy Europe programme).

The energy consumption data for the reference year 2007 were taken from official national and European sources, which are detailed at the end of this section, and the respective data for 2010 are estimated based on the official data for 2009 and the following assumptions:

1. Knowing the total consumption of oil products and natural gas in 2010 (YPEKA), allocation of consumption by end-use sector is based on the respective allocation for the year 2009, as it appears in the energy balance.
2. According to HTSO, the total electricity consumption in the interconnected grid for 2010 decreased by 0.8% compared to 2009. It is assumed that this decrease involves the total electricity consumption, and allocation by end-use sector is based on the figures of 2009.
3. The consumption of solid fuels in industry is constant and equal to the consumption in 2009
4. The energy consumption from RES is constant and equal to the consumption in 2009
5. In transport, a 10% reduction in passenger-km of passenger vehicles and a 15% increase in passenger-km in public transport is assumed
6. The stock of passenger vehicles results from the stock of vehicles in 2009 in conjunction with sales of new vehicles (Source: AMVIR - Association of Motor Vehicle Importers Representatives) and the number of vehicles recycled (Source: EDOA - Alternative Vehicle Management of Greece).
7. The data on the number of first residences result by taking into account ELSTAT's data from the census of buildings in 2001, the residential buildings licences issued on an annual basis and data from the Public Power Corporation (PPC) on the number of first and secondary residences.

8. Heating degree days were collected from the website www.degreedays.net **RESIDENTIAL**

SECTOR

M1 and M2[1] energy efficiency indicators are used to calculate the energy savings in the residential sector, which involve the total electrical and other energy consumption, respectively, in the domestic sector compared to the number of first residences.

TERTIARY SECTOR

Energy savings in the tertiary sector is calculated using M3 and M4[1] indicators, which take into account the total electricity and other energy consumption, respectively, and the number of workers in the tertiary sector. Energy consumption data are data from the National energy balance and the number of workers in the tertiary sector is from Eurostat.

TRANSPORT SECTOR

In the transport sector, M5, M6, R12 and P13[1] indicators are used to calculate energy savings:

- **M5 Indicator:** Energy consumption of road vehicles in TOE per vehicle equivalent. To calculate this indicator, the total energy consumption of road transport and stock of vehicles are taken into account. Presentation of vehicles in vehicle equivalent is made using the conversion factors presented in the standard methodology «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services»
- **M6 Indicator:** Energy consumption of rail transport in OE grams per tonne-km. The indicator is calculated by taking into account the total energy consumption of rail transport as well as passenger and commercial traffic of these services.
- **P12 Indicator:** Share of public transport in the total passenger land transport (%). The total passenger traffic in passenger-km, passenger traffic of public transport in passenger-km, specific energy consumption of passenger vehicles and specific consumption of public transport in OE grams/tonne- km are taken into account in the calculation of the indicator.
- **P13 Indicator:** Share of rail freight public transport in the total freight transport (%). The indicator is calculated by taking into account the total freight traffic, expressed in tonne-km, freight traffic by rail in tonne-km, specific consumption of road freight transport and specific consumption of rail freight transport in OE grams /tonne- km.

INDUSTRY SECTOR

To calculate energy savings in the industrial sector the P14[1] indicator is used by taking into account the final energy consumption of each industry subsector, the production indicator of each subsector, and the percentage of each subsector within the scope of Directive 2006/32/EC.

The subsectors are set based on the classification of sectors under the new NACE Rev.2 classification by Eurostat.

ECONOMIC RECESSION IMPACT ASSESSMENT

Given the significant impact of the economic recession in all human activities, it was considered appropriate to quantify, even on an approximate basis, its impact on energy consumption. The absence of a published methodological framework has hampered this effort, however this methodology is based on the effort to adapt the estimated final consumption by sector in 2010 to the levels that might have existed without the impact of the economic recession. This was achieved by calculating the ratio of specific indicators for 2007, which is considered as the reference year, and 2010. The indicators used are the following:

a) the value of GDP at current rates of purchasing power standard per capita

b) the total consumption expenditure (TCE), expressed in current rates of purchasing power standard per capita

c) the ratio of total consumption expenditure expressing in current rates of purchasing power standard per capita to the representative rates of energy products per sector. Specifically in the residential sector, the electricity price in the domestic tariff was used for electricity consumption and the price of heating oil was used for heating energy consumption, while in the tertiary and industry sector, electricity price in the industrial tariff was used for electricity consumption and the price of diesel was used for heating energy consumption. Lastly, in transport, the ratio was determined by dividing the weighted price of petrol and diesel in the total number of vehicles in 2010.

The impact of the economic recession was evaluated by inserting the above reduction factors in each indicator of the methodology used (M1-M2 indicators in the residential sector, M3-M4 in the tertiary sector, P14 in the industrial sector and M5-M6 in the transport sector).

The reduction factors used are listed below:

Indicator 1: GDP (PPS/capita) (2007) / GDP (PPS /capita) (2010)

Indicator 2: TCE (PPS/capita) (2007) / TCE (PPS /capita) (2010)

Indicator 3: TCE (PPS/capita) (2007) Price of energy product (2007)) / TCE (PPS /capita) (2010) / Price energy product (2010))

The calculated values of indicators are presented in Table 11.

Table 11: Reduction factors for evaluating the impact of economic recession

Size	Variation 2007/2010
GDP (PPS/capita)	106%
TCE (PPS/capita)	101%
TCE **(PPS/capita) / Price of electricity (residential tariff)**	115%
TCE (PPS/capita) / Price of petrol	143%
TCE (PPS/capita) **/ Price of diesel**	128%
TCE (PPS/capita) **/ Price of fuel oil**	113%
TCE **(PPS/capita)** / Price of electricity (industrial tariff)	127%

Table 12 lists the results obtained by applying the above methodology and more specifically the energy savings estimated having removed the impact of economic recession. The results suggest that a significant percentage of the total energy savings may be attributed to the economic recession. It should be noted that the zero values in Table 12 suggest estimates of non energy savings that, based on the "top down" methodology, are not taken into account in the calculation of energy savings.

Table 12: Estimates of energy savings by sector in 2010 without taking into account the impact of the economic recession (TWh)

Sector	Indicator 1	Indicator 2	Indicator 3
Residential	4.69	7.23	**1.76**
Tertiary	0	**0.05**	0
industrial	1.36	1.87	**0.37**
Transport	**7.12**	10.71	0
Total	13.17	19.87	2.12

The results of the above table show that the minimum energy savings achieved having removed the impact of the economic recession, equals to 1.76 TWh in the residential sector, 0.05 TWh in the tertiary sector, 0.37 TWh in the industrial sector and 7.12 TWh in the transport sector. In this case, the estimated total energy savings equal to **9.24 TWh**. Certainly, the fact that the estimates of aggregates for the two years under consideration are temporary suggests that these results may significantly underestimate the impact of economic recession, because the real aggregates may ultimately be significantly lower.

Table 13: Table of data sources

Data	Source
Final energy consumption by sector	National energy balance - Eurostat
Quantitative data for the transport sector	EU transport in figures - Statistical pocketbook 2011 - European Commission
Index of industrial production	Hellenic Statistical Authority (ELSTAT)
National accounts	Hellenic Statistical Authority (ELSTAT)

3.3.2. EXTENSIVE PRESENTATION OF THE MEASURES

This section gives a detailed presentation of individual measures that have contributed to achieving energy savings in 2010 or will contribute to achieving the final target for 2016. It provides an evaluation of the measures prescribed in the first EEAP, lays down the main changes and presents new measures in the process of being implemented.

The formulation and presentation of the measures is the same as the one presented in the first EEAP. Therefore, the measures are classified into six categories as follows:

1. **Horizontal measures**
2. **Cross-sectoral measures**
3. **Residential sector**
4. **Tertiary sector**
   - **4.1 Private sector**
   - **4.2 Public sector**
5. **Industry**
6. **Transport**

At the beginning of each section, there is a summary table of the individual measures which shows their contribution to the achievement of the intermediate target and the aggregate savings range calculated using the methodology laid down in Section 3.1.1. for 2010. As regards the estimated savings for 2016, given that, as already analysed in previous sections, it is not possible to quantify the impact of the economic recession, the table shows the expected savings in the individual categories, as they occurred during the preparation of the first EEAP. After developing a proper evaluation methodology for the impact of the economic recession in final energy consumption, a future evaluation of energy savings for 2016 shall follow.

13.3.2.1. HORIZONTAL MEASURES

The measures are horizontal and their actions are not closely linked to a specific sector or branch. Some of the measures are considered essential for the implementation and monitoring of all of the supported actions in all the sectors.

Their implementation is considered necessary for the success of an integrated programme of energy savings and achievement of the target. They centre principally on the collection and evaluation of relevant information and on the provision of education and information to all the parties involved, as well as on the provision of financial support through the operational programmes.

The main changes in this Action Plan compared to the first EEAP involve the adjustment of the title of measure O1 and the addition of one more measure, measure O4. Table 13 below shows the horizontal measures. Energy savings are achieved by implementing each measure and are counted using the "top down" methodology in the areas targeted by the measure.

Table 14: Overview table for horizontal measures

No	Title of measure	End-use targeted	Duration	Achieved energy savings in 2010 (GWh)	Energy savings expected in 2016 (GWh)
O1	**Information system for monitoring energy efficiency improvement and energy savings achievement**	• Market research in all areas of final energy consumption • Methodologies for data collection in the areas of final energy consumption and database creation	Start: 1/7/2009 End: 31/12/2012	Calculation using the "top down" methodology in the targeted areas	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
O2	**Targeted education campaigns, provision of information and rewarding of "good practices"**	Use of energy efficient appliances and rational use of energy use by all citizens and in all end-use sectors	Start: 2008	Calculation using the "top down" methodology in the targeted areas	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
O3	**Programmes to provide financial support for investment in energy-saving technologies and research**	Penetration of energy efficient systems for heating, cooling, electricity generation and building construction products	Start: 2000	Calculation using the "top down" methodology in the targeted areas	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
O4	**Tax exemptions of energy savings interventions**	Energy efficient technologies / interventions in all end-use areas	Start: 2000	Calculation using the "top down" methodology in the targeted areas	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
O5	**Financing of Environmental Interventions-Establishment of Green Fund**	Energy efficient technologies / interventions in all end-use areas	Start: 2010	Does not contribute to energy savings in the period in question.	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP

A detailed presentation of the horizontal measures shown in Table 14 is provided further below in this section.

Title		**Information system for monitoring energy efficiency improvement and energy savings achievement**
Code of measure		**O1**
Description	Category	Support action
	Implementation timeframe:	Start: 1/7/2009 End: 31/12/2012
	Purpose / brief description	The purpose of this measure is to develop an information system incorporating all necessary digital services for energy modelling and statistical databases to support the national policy for improving energy end-use efficiency, under the relevant national energy targets.
	End use	Market research in all areas of final energy consumption. Methodologies for data collection in the areas of final energy consumption and database creation.
	Target group	The target groups of this measure are: The energy sector of the Ministry of the Environment, Energy and Climate Change, where the maximum use of infrastructure and systems to be developed, will enable the efficient monitoring of the directives on energy end-use efficiency and energy services, and other directives relating to energy savings. Businesses and professionals active in the field of energy savings and cogeneration, as well as those to be active in the coming years, e.g. energy service companies, energy inspectors, etc. Final consumers in the residential, tertiary, industrial, agriculture and transport sector.
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Through the implementation of the information system, all the necessary tools related to the quantitative monitoring of national targets will be provided, so that Energy Efficiency Action Plans are designed and planned, and it will be further possible to ex post evaluate the degree of implementation of the measures and the achievement of the National Energy Savings Targets contained therein. The information system will be extroverted and will also form a key support tool for the operators

Title	Information system for monitoring energy efficiency improvement and energy savings achievement
	of the energy market, including companies providing energy services and energy efficient equipment, end users, energy inspectors, energy decision makers etc. Specifically, the Information System developed has the following key objectives: • Analysis of energy consumption in all end-use sectors, through the collection and statistical analysis of energy data, by also conducting market research, where appropriate. • Recording, representation and updating of the necessary statistical data of energy consumption and the respective energy indicators. • Development of all records and databases provided for to support the monitoring of the national energy savings target (Record of inspections in buildings, inspectors record, record of energy service companies, record of energy efficiency contracts, aggregated statistics from market operators subject to energy consumption limitations). • Energy Planning of Energy Savings and High Efficiency Cogeneration. • Monitoring, with computational models, of the energy planning of Energy Efficiency Action Plans and the progress made in their implementation. • Supporting the development of the energy services and energy-efficient equipment market. • Provision of information to energy distributors, providers of energy efficiency improvement measures and final energy consumers on the ways and opportunities to improve energy efficiency and to support the process for making optimum energy decisions through the provision of appropriate information tools on the market, legislation and good practice. • Preparation of market studies to evaluate the energy efficiency in all end-use sectors, and development of monitoring indicators as part of the national target for 2016. Meanwhile, it is envisaged to develop infrastructure (databases, records) and to create an integrated information system and the methodology to collect primary data.
Budget and source	The project is nationwide and co-financed by the European Regional Development Fund (ERDF)

Title		Information system for monitoring energy efficiency improvement and energy savings achievement
	of financing	and by national resources. Operation integrated into the OP "Digital Convergence", NSRF. Title of operation: "National Information System for Measuring Energy Efficiency under Directive 2006/32" Budget: 2.78 million euros
	Implementation body	Managing Authority of Operational Programme "Digital Convergence" of the Ministry of Environment, Energy and Climate Change, CRES

Title		Targeted education campaigns, provision of information and rewarding of “good practices”
Code of measure		**O2**
Description	Category	Provision of information
	Implementation timeframe:	Start: 2008
	Purpose / brief description	Targeted education campaigns, provision of information and rewarding of “good practices” in order to spread the message to the general public about the benefits and the prospects for the entire development effort of Greece, the reduction of air pollution and the long-term conservation and rehabilitation of the environment that can flow from the adoption of energy-saving measures. Making people aware of the direct financial benefit to be gained by the application of simple energy-saving measures, thus encouraging them to adopt those measures.
	End use	Use of energy efficient appliances and rational use of energy use by all citizens and in all end-use sectors
	Target group	• The general public. • All sectors of the economy. • Public sector.
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	This measure included the following actions in 2007-2010: • A national campaign programme by RAE, with the slogan "actively engaged" to raise awareness of savings issues. • Campaign of the Ministry of Development for energy savings by distributing leaflets entitled: “Energy savings. The one who knows is the one who wins”.

Title		Targeted education campaigns, provision of information and rewarding of “good practices”
		• Development of a web-based tool for determining the ecological footprint of schools in partnership with the Directorate of Primary Education of Serres, PPC, YPEKA, CRES, TEI of Serres and ERT. Award of praise to the students who participated in the programme. • Implementation of a project under the Operational Programme “Competitiveness” of the 3rd CSF entitled "Information and awareness-raising actions to promote Cogeneration of Heat and Power (CHP) and Renewable Energy Sources (RES)." • Implementation of a project under the Operational Programme “Competitiveness” of the 3rd CSF by RAE entitled "Strategy and implementation of a RES communications policy to inform energy consumers."
	Budget and funding	3RD CSF, self-financing
	Implementation body	Ministry of Environment, Energy and Climate Change, RAE, Directorate of Primary Education of Serres, Special Managing Service of the Operational Programme “Competitiveness”

Title		Programmes to provide financial support for investment in energy-saving technologies and research
Code of measure		**O3**
Description	Category	State aid
	Implementation timeframe:	Start: 2000
	Purpose / brief description	• Public aid for private investment in renewable energy sources, cogeneration of heat / power / cooling, energy saving and the substitution of conventional fuels through the resources of the operational programmes and of the development law. • Public aid to promote cooperation between undertakings, research bodies and education establishments on technological development and demonstration research projects with long-term relevance to stimulate the production of innovative products and services with the objective of: - reducing cost and promoting renewable energy sources (RES); - developing new technological applications, systems and materials to promote energy saving in buildings, industry and transport.
	End use	Penetration of energy efficient systems for heating, cooling, electricity generation, building construction and transport.
	Target group	• Industry. • Tertiary sector • Transport • Research centres, institutes • Universities, institutes of technological education.

Title		Programmes to provide financial support for investment in energy-saving technologies and research
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	The following programmes to provide financial support for investment in energy-saving technologies and research have been completed: • The “Competitiveness” operational programme has provided co-financing to several hundred projects relating to energy saving, the cogeneration of heat and power and RES. Specifically: - the “Competitiveness” operational programme (Ministry of Development) (Measure 2.1.3.) of CSF III 2000-2006, with total public expenditure of EUR 100m on energy-saving projects; - the “Competitiveness” operational programme (Ministry of Development) of CSF III 2000-2006, financing of energy investments under Measure 6.5: “Promotion of the penetration of RES systems in the country's energy system”, with total public expenditure for energy savings projects of EUR 15m. - the “Competitiveness” operational programme (Ministry of Development) of CSF III 2000-2006 (Measure 4.5), providing grants for research and demonstration projects in the fields of renewable energy sources and energy saving, with budgeted expenditure of EUR 15m, in the framework of the action “Research and technological development joint ventures in national priority sectors”. • Development Law 3299/2004 providing grants for investment in RES, energy saving and cogeneration under . The following programmes are underway: • the “Entrepreneurship and Competitiveness” Operational Programme, Priority Axis 4 “Integration of the energy system of the country and enhancing sustainability (NSRF) 2007-2013, Ministry of Development. This axis aims, among others, at ensuring the rational management of natural resources and promoting renewable energy sources. • “Green Business” by the Ministry of Economy, Competitiveness and Shipping. • “Green Tourism” by the Ministry of Economy, Competitiveness and Shipping and the Ministry of Culture and Tourism. • “Innovation Vouchers” by the General Secretariat for Research and Technology of the Ministry of Development. • The new Development Law 3908/2011 "Enhancing Private Investments for Growth, Entrepreneurship and Regional Cohesion", which aims to the provision of financial support to investments promoting green economy.

Title		Programmes to provide financial support for investment in energy-saving technologies and research
		Other actions that provide financial support to energy saving and research technologies are: • Law 3851/2010 "Accelerating the development of Renewable Energy Sources to address climate change and other provisions relating to issues with the competence of the Ministry of Environment, Energy and Climate Change", article 5(5)(b), which provides for a favourable selling price for electricity coming from High Efficiency Combined Heat and Power Production plants using Natural Gas.
	Budget and funding	European Regional Development Fund (ERDF), European Social Fund (ESF), the Greek government, private resources
	Implementation bodies	Ministry of Development, Competitiveness and Shipping, Ministry of Environment, Energy and Climate Change, Ministry of Finance

Title		Tax exemptions of energy savings interventions
Code of measure		**O4**
Description	Category	Tax incentives
	Implementation timeframe:	Start: 2000
	Purpose / brief description	The purpose of the measure is to introduce tax incentives to promote energy efficient technologies / interventions
	End use	Energy efficient technologies / interventions in all end-use areas
	Target group	Final consumers, natural and legal persons
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	Law 3522/2006 "Changes in income tax, simplifications to the Code of Books and Records and other provisions" Article 2(2), providing for a 20% deduction from revenue of expenditure up to amount of 700 euros for the implementation of energy efficiency improvement interventions. Law 3842/2010 "Restoring tax fairness, tackling tax evasion and other provisions" Article 1(4)(i) provides for a 10% tax deduction of expenditure for building upgrade interventions following energy inspection, pursuant to the provisions of Law 3661/2008 and its delegated acts. The amount of expenditure, based on which the deduction is determined, may not exceed 6,000 euros.
	Budget and funding	-
	Implementation body	Ministry of Finance

Title		Financing of Environmental Interventions-Establishment of Green Fund
Code of measure		**O5**
Description	Category	Financing mechanism
	Implementation timeframe	Start: 2010
	Purpose / brief description	Law 3889/2010 establishes a comprehensive and specific financing system for environmental interventions. A Green Fund is founded whose purpose is to promote development through environmental protection with the management, financial, technical and financial assistance of programs, measures, interventions and activities designed to enhance and restore the environment and address climate change, to support the environmental policy of Greece and to serve the public and social interest through the administration, management and exploitation of resources, as defined in Articles 3 and 8 of said law.
	End use	Energy efficient technologies / interventions in all end-use areas
	Target group	Final consumers, natural and legal persons
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	The Green Fund may finance programmes established by the Ministry of Environment, Energy and Climate Change or other Ministries and their supervised entities. The basic structure of financing programmes may include, but not be limited to: a) Priority axis specifying the national environmental strategy. b) Measures specifying priority axis. c) Actions specifying the measures, which include operations and projects implemented by the beneficiaries. The financing programme is accompanied by a planning supplement which specifies the budget and is broken down over the term of the programme.

Title	Financing of Environmental Interventions-Establishment of Green Fund
	The recipients of financing are specified in the financing programme. The evaluation and selection criteria for operations and projects may be specified as to the nature and type of operations by programme. The criteria must include eligibility, maturity, completeness, appropriateness and consistency of the programme with the relevant national and EU policies and national and European legislation, and the managing capacity of the implementing body. Every financing programme for a budgeted expenditure, excluding value added tax (VAT), of an amount greater than or equal to fifty thousand (50,000) euros shall be approved by the Minister of Environment, Energy and Climate Change, on the recommendation of the Board of Directors of the Green Fund. Every financing programme for a budgeted expenditure, excluding VAT, of an amount less than fifty thousand (50,000) euros shall be approved by decision of the Board of Directors of the Fund. These decisions shall set the amount and way of payment of the grants or loans, the procedures and conditions of payment and any other issue relating to the implementation of the programmes. Before approving any programme, a summary of the programme and its individual data (such as categories of actions, timeframe, financial planning, categories of beneficiaries), and any other relevant details shall be posted on the Green Fund's website. Anyone may submit comments on the proposed programme. Contributions as defined in Article 3 of Law 3889/2010 shall also constitute resources of the Green Fund.
Budget and funding	Resources of the Green Fund: a) Green Resources (resources of the Special Fund for the Implementation of Regulatory and Planning Projects (ETERPS), resources of the Special Forestry Agency, resources of the Environmental Balance Fund, contributions of energy distributors, distribution system operators and energy retailers, other charges and special fines), b) funding from programmes and initiatives of the European Union and international organizations, c) profits, interest or other income derived from participation of the Green Fund to other private entities,

Title	Financing of Environmental Interventions-Establishment of Green Fund
	d) grants and donations by natural or legal persons of public or private law, e) revenue from the management, operation and utilization of movable and immovable property, f) grants from the state budget and funding from the public investment programme and any other income from a legitimate source.
Implementation body	Ministry of Environment, Energy and Climate Change, Green Fund

CROSS SECTORAL MEASURES

These measures are implemented in more than one sector and encompass institutional, strategic, management and technological aspects. In specific terms they concern standards and norms, such as, for example, the implementation of the Directive on the energy performance of buildings, energy labelling schemes, metering of consumption with intelligent metering systems and detailed billing and training and education leading to the application of energy-efficient technologies and techniques. In this way actions are selected which have high potential and maximised range. At the same time the conditions are established for economies of scale which contribute to stabilisation and job creation.

The main changes in this Action Plan compared to the first EEAP include the removal of the D2 measure concerning further integration of Natural Gas and LPG, because savings achieved from this measure involve primary energy, and the addition of the D7 measure concerning the project "Building the Future." Table 16 below shows the cross-sectoral measures. Energy savings achieved by implementing each measure are counted using the "top down" methodology in the areas involved.

Table 15: Overview table for cross-sectoral measures

No	Title of measure	End-use targeted	Duration	Achieved energy savings in 2010 (GWh)	Energy savings expected in 2016 (GWh)
Δ1	**Energy performance of buildings**	Specifications on the design, envelope and electromechanical installations of buildings	Start: 1/1/2011	Does not contribute to energy savings in the period in question	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
D2	**Energy labelling of appliances and minimum energy efficiency requirements**	Energy consumption of electrical and electronics appliances	Start: 2008	Calculation using the "bottom-up" methodology in the areas involved	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
D3	**Implementation of an energy management system (EMS) in the tertiary and public sectors**	Total energy consumption of the target group	Start: 2012	Does not contribute to energy savings in the period in question	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
D4	**Energy upgrading of existing buildings through Energy Services Companies under Energy Performance Contracts (EPC)**	Total energy consumption of the target group	Start: 2012	Does not contribute to energy savings in the period in question	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
D5	**Installation of electronic and intelligent metering of electricity**	Total energy consumption of the target group	Start: 2009	Calculation using the "bottom-up" methodology in the areas involved	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP

No	Title of measure	End-use targeted	Duration	Achieved energy savings in **2010 (GWh)**	**Energy savings expected in 2016 (GWh)**
Δ6	**and natural gas consumers Promotion of cogeneration of high-efficiency heat and power (CHP) and district heating systems**	Energy consumption for heating, domestic hot water and thermal processes	Start: 2009	Calculation using the "bottom-up" methodology in the areas involved	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP
D7	**"Building the Future" Project**	Energy consumption for domestic hot water, heating-cooling	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the "top down" methodology in the targeted areas, based on the 1st EEAP

A detailed presentation of the cross-sectoral measures shown in the above table is provided further below in this section.

Title		Energy performance of buildings
	Category	Institutional / regulatory
Description	Implementation timeframe	Start: 2011
	Purpose / brief description	Law 3661/2008 "Measures to reduce energy consumption in buildings and other provisions", Government Gazette No 89/19 May 2008, harmonises Greek legislation with Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 "on the energy efficiency of buildings" (OJ L1, 4.1.2003). Law 3661/2008 incorporates all the provisions of the Directive, provides for the adoption of a Regulation on the Energy Performance of Buildings and distinguishes five main themes: definition of minimum energy performance requirements and the method for calculating energy performance (Article 3) of new and existing buildings (Articles 4 and 5), issue of energy performance certificate (Article 6), inspections to boilers and air-conditioning systems (Articles 7 and 8), provision of qualified and accredited energy inspectors (Article 9).
	End use	Specifications on the design, envelope and electromechanical installations of buildings
	Target group	All buildings with surface area of more than 50m^2, either new or existing, which undergo complete renovation, existing buildings with surface area of more than 50m^2 or parts thereof, when they are sold or leased, and all buildings of the public sector.
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	The regulation on the energy performance of buildings (KENAK) introduces an integrated energy design in the sector of buildings to improve the energy efficiency of buildings, energy savings and environmental protection through specific actions:

Title	Energy performance of buildings
Code of measure	**D1**

1. Preparation of a study on the Energy Performance of Buildings
2. Establishing of minimum requirements for energy efficiency in buildings
3. Energy Rating of Buildings (Energy Performance Certificate)

Energy inspections to buildings, boilers and heating and air conditioning systems

The Study on the Energy Performance of Buildings replaces the study on heat insulation and shall be prepared for every new or existing building (over 50m^2), which undergoes a complete renovation and shall be based on a specific methodology covering:

a) the requirement to meet minimum standards on the design, envelope and electromechanical installations of buildings and

b) its comparison with the reference building. Reference building means a building with the same geometry, position, orientation, use and operating characteristics as the building concerned, which also meets minimum standards and has specific technical characteristics. The Energy Performance Certificate is valid for ten years and applies to all buildings with surface area of more than 50m^2, either new or existing, which undergo complete renovation, existing buildings with surface area of more than 50m^2 or parts thereof, when they are sold or leased, and all buildings of the public sector. The requirement for Energy Performance Certificate in case of purchase, sale and lease of buildings, shall apply as of January 9, 2011.

The Energy Performance Certificate includes, among others, the results of the evaluation by the energy inspector and recommendations for improving the energy efficiency of the building, so that consumers are able to compare and evaluate their actual consumption and any opportunities for improving energy performance. The issue of certificate is mandatory.

Energy inspection is an important tool for identifying the energy condition of existing buildings and its potential for improvement, as well as for verifying the implementation of legislation on energy efficiency of new buildings.

Title		Energy performance of buildings
Code of measure		**D1**
		A private energy inspector, who has joined in the Energy Inspectors Record of YPEKA, shall inspect the building and shall place it in an energy category based on the ratio of the building's consumption to the reference building's consumption. **Verification of the proper implementation of the institutional framework shall be carried out by the Special Service of Energy Inspectors, which is established by the Special Secretariat for Inspection and Energy of YPEKA and staffed with officers from the public and wider public sector.**
	Budget and funding	-
	Implementation body	Ministry of Environment, Energy and Climate Change, Technical Chamber of Greece, Special Service of Energy Inspectors

Title		Energy labelling of appliances and minimum energy efficiency requirements
Code of measure		**D2**
Description	Category of measure	• Institutional • Provision of information and obligatory information measures
	Implementation timeframe	Start: 2008
	Purpose / brief description	Energy labelling of appliances is aimed at informing consumers about the electricity consumption and the energy efficiency rating of these appliances, and the requirement for a minimum energy efficiency of appliances ensures a significant reduction of both energy and environmental costs incurred by consumers.
	End-use category	Energy consumption of electrical and electronics appliances
	Target group	• The general public. • Residential • The public and tertiary sectors.
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	Article 7 of Joint Ministerial Decision D6/V/14826/17-06-2008 "Measures to improve energy efficiency and energy savings in the public and the wider public sector" stipulates that the appliances procured by entities of the public sector must bear an energy mark and a certified energy efficiency label, and sets the minimum energy requirements for specific types of appliances. Ministerial Decision D6/7094/23-05-2011 “Framework methodology for measuring and verifying energy savings for achieving the national indicative energy savings target in end use-List of indicative eligible measures to improve energy efficiency-Energy content of fuels for end use” includes the energy labelling schemes in the list of indicative eligible measures to improve energy efficiency. The Regulatory Authority for Energy (RAE) implemented a national campaign programme with the slogan "actively engaged" to raise awareness of savings and energy savings issues. Declaration by the Ministry of Development of the years 2005-2010 as energy savings years. Under this initiative, two information campaigns were organised involving the distribution of: A. three leaflets entitled: 1. "Saving energy for a better quality of life and a clean environment." 2. "Drive economically: Seven golden rules for fuel economy."

Title		Energy labelling of appliances and minimum energy efficiency requirements
Code of measure		**D2**
		3. “Heating-Cooling: Saving energy without compromising comfort.” B. leaflets entitled: “Energy savings. The one who knows is the one who wins”. The Public Power Corporation, PPC SA, as part of its obligation arising out of Law 3855/2010 on providing information and raising awareness of ways to save energy, urges consumers to use energy-efficient appliances through measures including: • Distribution of information material along with the electricity bills. • Distribution of information material at the stations of the Athens Piraeus Electric Railways (ISAP), at selected department stores in Athens and Thessaloniki, PPC agencies and tolls. • Informational posters on energy saving in metro stations, etc. • Provision of information on PPC’s website (www.dei.gr). The power to impose fines for breaches of legislation on energy labelling of household appliances is transferred to the Regions. Law 2647/1998 "Transfer of powers to the Regions and Local Authorities and other provisions", Article 1, B. Powers of the Minister of Development, paragraph 3 h.
	Budget and funding	-
	Implementation body	Ministry of Development, Competitiveness and Shipping, Ministry of Finance, Ministry of Interior, Ministry of Administrative Reform and e-Government, Ministry of Environment, Energy and Climate Change, Competent Regions

Title		Implementation of an energy management system (EMS) in the tertiary and public sectors
Code of measure		**D3**
Description	Category of measure	• Institutional / regulatory
	Implementation timeframe	Start: 2012
	Purpose / brief description	The Energy Management System is a process based on the international or European standard (EN 16001 or ISO 50001) which aims at monitoring the energy performance of a system to improve its energy efficiency and reduce energy costs.
	End-use category	Total energy consumption of the target group
	Target group	• Compulsory implementation in all public sector buildings. • Buildings with overall surface area exceeding 1 000 m^2
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Article 8(1) of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” provides for the gradual implementation of an energy management system to all agencies of the public and the wider public sector. Moreover, Article 8(1) of the same Law states that the principles, requirements and guidelines of the Energy Management System shall be determined in accordance with the International or European Standard (EN 16001), as each time applicable.
	Budget and funding	-
	Implementation body	Ministry of Environment, Energy and Climate Change, Competent Ministries

Title		Energy upgrading of existing buildings through Energy Services Companies under Energy Performance Contracts (EPC)
Code of measure		**D4**
Description	Category of measure	• Institutional • Funding mechanism
	Implementation timeframe	Start: 2012
	Purpose / brief description	Energy Performance Contracting (EPC), Third-Party Financing (TPF) and Public and Private Joint Ventures (PPJV) are funding mechanisms promoting investments in energy saving projects.
	End-use category	Total energy consumption of the target group
	Target group	Buildings of the residential and tertiary sectors
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Article 16 of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” details the legislative framework concerning the Energy Performance Contracts and Energy Service Companies, and provides for the possibility of using the Third-Party Financing mechanism. Ministerial Decision D6/13280 (Government Gazette, Series II, No 1228/14 June 2011) "Energy Service Companies. Operation, Register, Code of Conduct and relevant provisions" establishes an Energy Service Companies Record, addresses procedural and operational issues concerning the Energy Service Companies Record, and provides for the mandatory entry in such record of the details of Energy Performance Contracts. It further stipulates the following: • Financing of investments in environmental management projects through PPJV, by putting a premium on those leading to greater energy efficiency during the selection process.

Title		Energy upgrading of existing buildings through Energy Services Companies under Energy Performance Contracts (EPC)
		• Pilot implementation by CRES of projects demonstrating energy efficiency improvement and development of energy services in public buildings through Energy Performance Contracts. • Memorandum of understanding between PPC and CRES for the pilot implementation of projects demonstrating energy efficiency improvement and development of energy services to the public.
	Budget and funding	Financing through PPJV
	Implementation body	Ministry of Interior, Ministry of Administrative Reform and e-Government, Ministry of Finance, Ministry of Economy, Competitiveness and Shipping, Ministry of Environment, Energy and Climate Change

Title		Installation of electronic and intelligent metering of electricity and natural gas consumers
Code of measure		**D5**
Description	Category	• Institutional / regulatory • Financial incentives • Provision of information
	Implementation timeframe	Start: 2009
	Purpose / brief description	• The use of electronic metering to measure hourly electricity consumption enables effective collection of necessary information about the consumption behaviour of industrial, commercial and residential consumers and facilitates the promotion of financial or other incentives to promote rational organisation of consumption behaviour. • Installation by the energy suppliers of electronic meters with time measuring and telemetric capability and direct charting of the energy behaviour of consumers in order to be able to give the consumers better information.
	End use	Total energy consumption of the target group
	Target group	• Buildings (residential and tertiary sectors) • Industry
	Regional application	All of Greece (areas which have a natural gas distribution network)
Information on implementation	List and description of energy saving measures	Article 15(1) of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” stipulates that energy suppliers must provide end users with individual meters indicating their actual energy consumption and additional information about saving energy. PPC has already completed a pilot project involving the installation of meters with the specified characteristics to 9,000 MV consumers (tertiary sector and industry). Furthermore, it announced a project as part of which 220,000 meters will be installed to low voltage consumers in April 2010, 60,000 of which will be installed to large commercial consumers.

Title		Installation of electronic and intelligent metering of electricity and natural gas consumers
Code of measure		**D5**
		Meters will record the actual consumption of consumers and will send the data to a central system of PPC where they will be collected and processed.
	Budget and funding	The budget for the installation of meters is 27 million euros. 50% of the budget comes from EU funds and the remaining 50% is funded by the National Strategic Reference Framework 2007-2013 (NSRF)
	Implementation body	PPC SA

Title		Promotion of high-efficiency cogeneration of heat and power (CHP) and district heating systems
Code of measure		**D6**
Description	Category	• Institutional • Funding mechanism
	Implementation timeframe	Start: 2009
	Purpose / brief description	The purpose of the measure is to promote cogeneration of heat and power and district heating systems, as these systems achieve primary energy savings.
	End use	Energy consumption for heating, domestic hot water and thermal processes
	Target group	• Residential sector • Tertiary sector • Public sector • Industry
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	Directive 2004/08/EC is transposed into the Greek law with Law 3734/2009 "Promotion of cogeneration of two or more useful energy forms, regulation of issues related to the Mesochora Hydroelectric Project and other provisions". Ministerial Decision D5-IL/G/F1/oik.15606 & 15641 / 15.07.2009 set the aligned reference efficiency levels for the non-combined generation of heat and power, as well as the details of the method for calculating power from cogeneration and efficiency of cogeneration. Law 3851/2010 "Accelerating the development of Renewable Energy Sources to address climate change and other provisions relating to issues with the competence of the Ministry of Environment, Energy and Climate Change" streamlined the approval process concerning licences for production, installation and operation of cogeneration systems. Furthermore, financial incentives were given by means of a subsidy for electricity produced by high-efficiency cogeneration of heat and power plants.

Title		Promotion of high-efficiency cogeneration of heat and power (CHP) and district heating systems
		The immediate application of Ministerial Decision D6/F1/oik.8786/14.5.2010 "Implementation of the System of Guarantee of the Origin of Electricity from RES and high-efficiency cogeneration of heat and power systems and its Safeguard Mechanism" will contribute to the development of district heating networks, as only cogeneration plants which are demonstrated to be of high-efficiency have the right to issue a Certificate. Based on the methodology for calculating primary energy savings, an indicator used to determine the high-efficiency CHP plants, it is necessary to use the heat produced, in order to be treated as beneficial and be counted in the primary energy savings indicator. In 2010, 35 CHP plants were operating.
	Budget and funding	Sources of financing: RES Special Fee, NSRF, Law 3908/2011
	Implementation body	Ministry of the Environment, Energy and Climate Change, RAE, PPC SA, HTSO, CRES

Title		"Building the Future" Project
Code of measure		**D7**
Description	Category	• Energy efficiency improvement mechanisms • Voluntary agreements on energy savings
	Implementation timeframe	Start: 2011
	Purpose / brief description	"Building the Future" project is an integrated programme for the energy upgrade of the building stock of Greece. Is a partnership between the public sector, construction industry and citizens, aimed at both residential buildings, and commercial buildings. It includes actions at three levels: 1. Level of response to the whole building stock using mature technologies 2. Level of demonstration of innovative systems and products for large-scale demonstration projects 3. Level of industrial and applied research to develop innovative products
	End use	Energy consumption for domestic hot water, heating-cooling
	Target group	Buildings of the residential and tertiary sector
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	The project includes a total of twelve interventions involving residential and commercial buildings. Seven interventions in residential buildings • Replacing frames with similar ones of high-standards • Replacing single glass panes with double low-e ones • Installing central solar heating systems • Installing cool roofs • Roof insulation • Facade insulation

Title		"Building the Future" Project
Code of measure		**D7**
		• Replacing conventional heating-cooling systems with high performance systems Five interventions in commercial buildings • Installing of integrated high-specification facades, i.e. frames, glass panes and shading systems • Installing insulation • Replacing heating-cooling-air conditioning system with high performance systems • Replacing artificial lighting system • Replacing or installing advanced energy audit systems The project is based on voluntary agreements between the public and the private sector, under which the parties involved in the implementation of interventions (manufacturers and product suppliers, installers, service providers) are required to provide great and real discounts to citizens. The measure incorporates and replaces measure T2 “Promotion of voluntary agreements for energy upgrading interventions in tertiary sector buildings” of the first EEAP.
	Budget and funding	National Strategic Reference Framework 2007-2013 (NSRF) and Private sector. Amount of financing planned 41 billion euros
	Implementation body	Operational Programme "Environment and Sustainable Development" Special Management Service, CRES

RESIDENTIAL SECTOR

In the residential sector, modifications have been made to the measures specified in the first EEAP. The measures for energy upgrade of the building envelope and electromechanical equipment of residential buildings have been incorporated in the "Energy saving at home" programme (OIK1 measure), whose implementation started in 2011, and therefore it cannot be counted in the intermediate target for 2010. The same applies to the OIK2 measure for mandatory installation of central solar heating systems. The "Changing my old air-conditioner" action (OIK3 measure) is virtually the only measure applied in the residential sector, and contributes to energy savings of the residential sector. However, given the economic recession, the actions to inform consumers on energy saving issues and tax incentives to promote energy efficient technologies/interventions (OR2, OR4, D2 measures), the energy savings of the residential sector seems to exceed the target for 2010 presented in the first EEAP.

Table 16: Overview table of measures in the residential sector

No	Title of measure	End-use targeted	Duration	Achieved energy savings in 2010 (GWh)	Energy savings expected in 2016 (GWh)
OIK1	**"Energy saving at home" programme – Energy upgrading of residential building envelopes - Financial aid for the upgrading of heating system boilers / burner units in existing buildings**	Energy consumption for domestic hot water, heating-cooling	Start: 1/2/2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
OIK2	**Compulsory installation of central solar thermal systems in new residential buildings and financial incentives for further penetration of small-scale solar thermal systems in residential buildings**	Energy consumption for domestic hot water, heating-cooling	Start: 2012	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
OIK3	**“Changing my old air-conditioner" action**	Energy consumption for cooling	Start: 10/6/2009 End: 22/8/2009	Calculation using the "top-down" methodology in the residential sector	Calculation using the methodology developed as part of the first EEAP
OIK4	**Energy upgrading of social housing buildings-“Green Neighbourhood” programme**	Total energy consumption of the target group	Start: 2011 End: 2012	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
			Total savings:	**1.76-7.23 TWh[1]** **7.83 TWh[2]**	**5.533 TWh**

[1] *approximate methodology for evaluating the impact of economic recession*

[2] *top-down calculation method defined in the proposed European Commission methodology «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services»*

A detailed description of each measure is provided below.

Title		**"Energy saving at home" programme – Energy upgrading of residential building envelopes - Financial aid for the upgrading of heating system boilers / burner units in existing buildings**
Code of measure		**OIK1**
Description	Category	Financial incentives
	Implementation timeframe	Start: 2011
	Purpose / brief description	The "Energy saving at home" programme aims at providing financial incentives for energy-saving interventions in the residential building sector with a view to reducing energy needs. The programme covers old, authorised buildings, which were not built under the Thermal Insulation Regulation (Presidential Decree dated 1.5/4.7.1979, Government Gazette, Issue IV, No 362), are located in areas with a zone price less than or equal to 2,100 euros/m^2, are used as primary or secondary residence and whose owners meet certain income criteria.
	End use	Energy consumption for domestic hot water, heating-cooling
	Target group	Existing residential buildings constructed before 1990
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	The eligible categories of energy upgrading interventions are: 1. Replacing frames / glass panes and installing shading systems 2. Installing thermal insulation in the building envelope, including the roof and pilotis 3. Upgrading the heating and domestic hot water system The income categories of beneficiaries are as follows: Category A Owners of eligible residences whose individual or family declared income does not exceed 40,000 euros or 60,000 euros respectively. The incentives include 100% interest subsidy (interest-free loan) as well as 35% grant.

Title		**"Energy saving at home" programme – Energy upgrading of residential building envelopes - Financial aid for the upgrading of heating system boilers / burner units in existing buildings**
		Category B Owners of eligible residences whose individual or family declared income is between 40,000 and 60,000 or 60,000 euros and 80,000 euros respectively. The incentives include 100% interest subsidy (interest-free loan) as well as 15% grant. Verification of both the current energy condition of the building and the energy condition after the completion of energy-saving interventions, shall be carried out by an Energy Inspector, who in both cases, shall issue an Energy Performance Certificate for the building / residence. The actions are funded through the programme, provided that the building / residence, after the energy upgrade, has risen by at least one energy category (as defined in the Regulation on the energy performance of buildings).
	Budget and funding	The programme is financed by the European Union (European Regional Development Fund (ERDF)) and by National Resources, through the Regional Operational Programmes (ROP) and the Operational Programme "Competitiveness and Entrepreneurship" (OPCE) and "Environment and Sustainable Development" (OPESD) under the NSRF 2007-2013. • Budget: 396 million euros • Eligible budget per beneficiary application ≤ 15,000 euros
	Implementation body	Ministry of Environment, Energy and Climate Change, Operational Programme "Competitiveness and Entrepreneurship" Special Management Service

Title		**Compulsory installation of central solar thermal systems in new residential buildings and financial incentives for further penetration of small-scale solar thermal systems in residential buildings**
Code of measure		**OIK2**
Description	Category	Legislation Financial incentives
	Implementation timeframe	Start: 2012
	Purpose / brief description	Solar thermal systems will replace 50-100% of conventional fuels and electricity, depending on the climatic conditions in each area, the load and the position of the building.
	End use	Energy consumption for domestic hot water, heating-cooling
	Target group	New and existing residential buildings
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Ministerial Decision D6/B/oik.5825/9.4.2010 "Adoption of Regulation on the Energy Performance of Buildings", Article 8(3)(f) and Law 3851/2010 "Accelerating the development of Renewable Energy Sources to address climate change and other provisions relating to issues with the competence of the Ministry of Environment, Energy and Climate Change", article 10(3) provide for the mandatory use of solar thermal systems to cover part of the needs in domestic hot water. Further incentives, mainly financial, should be offered for a greater penetration of solar thermal systems in existing residential buildings. Financial incentives: • Grants (Public Aid) A subsidy is proposed for standard solar energy installations for the production of domestic hot water. • Decrease in VAT as in the case of the natural gas and electricity market. • Loans (low-interest and/or subsidised).

Title		Compulsory installation of central solar thermal systems in new residential buildings and financial incentives for further penetration of small-scale solar thermal systems in residential buildings
	Budget and funding	-
	Implementation body	Ministry of Interior, Ministry of Finance, Ministry of Environment, Energy and Climate Change, Ministry of Development, Competitiveness and Shipping, Ministry of Infrastructure, Transport and Communications, Town Planning offices

Title		**"Changing my old air-conditioner" action**
Indicator		**OIK3**
Description	Category	Financial incentives
	Implementation timeframe	Start: 10/6/2009 End: 22/8/2009
	Purpose / brief description	The "Changing my old air-conditioner" **action** involves the provision of subsidies for replacing and recycling of old, energy-intensive household air conditioners. The action is addressed to all citizens/consumers who have old household air conditioners in operation and wish to replace them. Devices which may be replaced include all types of old air conditioners (regardless of year of construction). Every consumer may replace up to two (2) air-conditioners and buy new ones, of inverter-type and high energy class, from any air conditioner store participating in the action.
	End use	Energy consumption for cooling
	Target group	Residential consumers
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	The subsidy amounts to 35% of the retail selling price of each new air-conditioner, with a maximum subsidy of 500 euros. When buying a new air conditioner, consumers will only pay their own share. The amount of subsidy for the consumer will be attributed to the store supplied the new appliance, after submitting the necessary documents and following the relevant verification procedures by the company "Appliances Recycling SA." "Appliances Recycling SA." was the intermediary between the Ministry and air-conditioner retail stores. The obligations and involvement of the system in the implementation of the programme start upon forwarding the air conditioners to be recycled from the stores, where they are stored, after previously having been uninstalled on the responsibility of retailers or consumers who

Title		"Changing my old air-conditioner" action
		participated in the action. More specifically, the system undertakes: ✓ the procedure of receiving all air conditioners withdrawn ✓ transport of air conditioners to certified processing plants ✓ detailed check of sale documents in accordance with the Ministry's instructions (11 documents per retailer, i.e. 1.5 million documents to be checked) ✓ issuing of a receipt of acceptance of withdrawn air conditioners ✓ and processing of the payment to beneficiaries in order to serve the market in the most responsible, accurate and transparent manner. 141,323 was the number of old air conditioners that were replaced and recycled as part of the action. This number is three times the original target of 45,000. Similarly, the budget of the action reached 46.9 million euros, from 15 million that was the original one, due to increased demand and the great response from consumers.
	Budget and funding	Co-financing by the European Regional Development Fund (ERDF) and National Resources. Implemented under the NSRF 2007-2013, through the Operational Programme "Competitiveness and Entrepreneurship (OPCE II)" and the Regional Operational Programmes including Transitional Support Areas. Budget: 46.9 million euros
	Implementation body	Special Service for the Coordination and Implementation of Actions in the fields of Energy, Natural Resources and Manufacturing of the Ministry of Development

Title		**Energy upgrading of social housing buildings-"Green Neighbourhood" programme**
Code of measure		**OIK4**
Description	Category	Financial incentives
	Implementation timeframe	Start: 2011 End: 2012
	Purpose / brief description	The objective of the programme is to upgrade four industrial buildings to nearly zero energy buildings and optimise the local microclimate.
	End use	Total energy consumption of the target group
	Target group	Social housing buildings
	Regional application	Attica Basin
Information on implementation	List and description of energy saving measures	The programme will present the pilot-demonstration and innovative implementation of integrated development and implementation of green and sustainable urban housing units, which are occupied by low-income citizens, and are part of an optimized urban environment. Main criteria for the selection of neighbourhoods were the economic level of residents, the potential energy savings in the buildings and the prospects for significant improvement of the local microclimate. The implementation plan of projects for each neighbourhood includes the following stages: Stage 1: Information, social and business awareness and involvement Stage 2: Energy recording of buildings and microclimate conditions Stage 3: Energy study and drafting of specifications issue Stage 4: Tender notice for the projects Stage 5: Evaluation of proposals and selection of contractors Stage 6: Construction, supervision and delivery of project Stage 7: Evaluation of benefits and demonstration activities

Title		Energy upgrading of social housing buildings-“Green Neighbourhood” programme
		Based on voluntary agreements
	Budget and funding	The budget of the programme amounts to 7 million euros. It will be financed with the participation and contribution of many Greek industries and commercial companies, which are fully financing parts of the project under voluntary agreements signed, and through the Operational Programme "Environment and Sustainable Development" (OPESD)
	Implementation body	Ministry of Environment, Energy and Climate Change, CRES

TERTIARY SECTOR

The tertiary sector is examined separately for the private and public sectors. The following table lists the measures involving the entire tertiary sector, both private and public. Most measures involve the public sector, thus showing the exemplary role it has to play in the implementation of Directive 2006/32/EC.

Table 17: Overview table of measures in the tertiary sector

No	Title of measure	End-use targeted	Duration	Achieved energy savings in 2010 (GWh)	Energy savings expected in 2016 (GWh)
T1	**Compulsory installation of central solar thermal systems in the buildings of the tertiary sector**	Energy consumption for domestic hot water, heating-cooling	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
DM1	**Compulsory installation of central solar thermal systems to meet domestic hot water requirements**	Energy consumption for domestic hot water	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
DM2	**Compulsory procurement procedures with respect to public buildings (green procurement – energy-efficient and RES technologies)**	Total energy consumption of the target group	Start: 2008	Calculation using the "top-down" methodology in the tertiary sector	Calculation using the methodology developed as part of the first EEAP
DM3	**Integrated energy planning by municipalities – ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme**	Total energy consumption of the target group Fuel consumption in transport	Start: 2009	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
DM4	**Compulsory replacement of all light fittings with low energy efficiency in the public sector and the wider public sector**	Energy consumption for lighting	Start: 2006	Calculation using the "top-down" methodology in the tertiary sector	Calculation using the methodology developed as part of the first EEAP

No	Title of measure	End-use targeted	Duration	Achieved energy savings in 2010 (GWh)	Energy savings expected in 2016 (GWh)
DM5	Implementation of Green Roofs to public buildings	Energy consumption for cooling-heating	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
DM6	Programme of Bioclimatic Urban Reformation	Energy consumption for cooling-heating	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
DM7	**Installation of high-efficiency cogeneration of heat and power (CHP) systems with natural gas in hospitals**	Energy consumption for heating, domestic hot water, electricity production	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
DM8	**Interventions for improving energy efficiency in school buildings**	Final energy consumption in new or under construction school buildings	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
DM9	**Energy saving interventions in public buildings**	Final energy consumption of the buildings in the target group	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
		_____	**Total savings:**	**0.05 TWh[1]** **0.11 TWh[2]**	**5,751 TWh**

[1] *approximate methodology for evaluating the impact of economic recession*

[2] *top-down calculation method defined in the proposed European Commission methodology «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services»*

Title		Compulsory installation of central solar thermal systems in the buildings of the tertiary sector
Code of measure		**T1**
Description	Category	Legislation Financial incentives
	Implementation timeframe	Start: 2011
	Purpose / brief description	Solar thermal systems will replace 50-100% of conventional fuels and electricity, depending on the climatic conditions in each area, the load and the position of the building.
	End use	Energy consumption for domestic hot water, heating-cooling
	Target group	Tertiary sector building installations
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Ministerial Decision D6/B/oik.5825/9.4.2010 "Adoption of Regulation on the Energy Performance of Buildings", Article 8(3)(f) and Law 3851/2010 "Accelerating the development of Renewable Energy Sources to address climate change and other provisions relating to issues with the competence of the Ministry of Environment, Energy and Climate Change", article 10(3) provide for the use of solar thermal systems to cover part of the needs in hot water, for a building permit to be issued. Further incentives, mainly financial, should be offered for a greater penetration of solar thermal systems in existing residential buildings. Financial incentives: • Grants (Public Aid) A subsidy is proposed for standard solar energy installations for the production of domestic hot water. • Decrease in VAT as in the case of the natural gas and electricity market.

Title		Compulsory installation of central solar thermal systems in the buildings of the tertiary sector
		• Loans (low-interest and/or subsidised).
	Budget and funding	
	Implementation body	Ministry of Interior, Ministry of Administrative Reform and e-Government, Ministry of Finance, Ministry of Development, Competitiveness and Shipping, Ministry of Environment, Energy and Climate Change, Town Planning Offices

Title		**Compulsory installation of central solar thermal systems to meet domestic hot water requirements**
Code of measure		**DM1**
Description	Category	Institutional Exemplary role of the public sector
	Implementation timeframe	Start: 2011
	Purpose / brief description	Solar thermal systems will replace 50-100% of conventional fuels and electricity, depending on the climatic conditions in each area, the load and the position of the building.
	End use	Energy consumption for domestic hot water
	Target group	New and existing buildings of the public sector and the wider public sector.
	Regional application	All of Greece
Information on implementation		Ministerial Decision D6/B/oik.5825/9.4.2010 "Adoption of Regulation on the Energy Performance of Buildings", Article 8(3)(f)
		and Law 3851/2010 "Accelerating the development of Renewable Energy Sources to address climate change and other provisions relating to issues with the competence of the Ministry of Environment, Energy and Climate Change", article 10(3) provide for the use of solar thermal systems to cover part of the needs in hot water, for a building permit to be issued.
	List and description of energy saving measures	Meanwhile, for existing buildings, Article 8(2) of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” provides for that the gradual installation of central solar heating systems or other RES technologies is mandatory.
	Budget and funding	
		Ministry of Interior, Ministry of Administrative Reform and e-Government,
	Implementation body	Ministry of Finance, Ministry of Development, Competitiveness and Shipping, Ministry of Environment, Energy and Climate Change, Town Planning Offices

Title		Compulsory procurement procedures with respect to public buildings (green procurement – energy-efficient and RES technologies)
Code of measure		**DM2**
Description	Category	Institutional Exemplary role of the public sector
	Implementation timeframe	Start: 2008
	Purpose / brief description	Public expenditure on goods, services and works, at pan-European level, account for about 17% of the European GDP every year. They involve, among others, the procurement of electronic and electrical equipment, devices, computer hardware, construction, textile, food, energy, paper, furniture, transport and cleaning. All these goods, services and works have significant environmental impacts during their entire life cycle, from production, use up to their withdrawal. They are responsible for greenhouse gas emissions, pollution, reduced biodiversity and depletion of natural resources. Green Public Procurement (GPP) is a tool that provides the necessary incentives to significantly reduce these negative impacts.
	End use	Total energy consumption of the target group
	Target group	All public buildings. Private buildings leased by public bodies are included.
Information on implementation	Regional application	All of Greece
	List and description of energy saving measures	Article 7 of Ministerial Decision D6/B/14826/17-06-2008 "Measures to improve energy efficiency and energy savings in the public and broader public sector" stipulates that energy labelling and certified energy efficiency indication of appliances supplied by the State is mandatory. Article 8(1) of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” lays down the minimum energy efficiency requirements for procurement by bodies of the public and the wider public sector. As part of implementing the above provisions, the Green Office was created and an Interministerial Committee for Green Public Procurement was established, which will support the timely information of suppliers of the public sector and the market in general, creating a framework for cooperation, setting up working groups and coordinating the necessary actions

Title		Compulsory procurement procedures with respect to public buildings (green procurement – energy-efficient and RES technologies)
		for the drafting of environmental criteria, and the selection of product and service categories that will be applied to environmental criteria. Its duty is also to plan the national policy and to draft the National Action Plan for promoting Green Procurement, which is to be completed by the end of 2012. A survey of products and services with environmental features is carried out in the Greek market with a view to assessing the readiness of the Greek market to accept the introduction of 'green' standards upon public procurement. The survey, ending on July 15, 2011, involves the main categories of goods and services purchased by the Greek State. Its results will help in creating an Index and in preparing the National Action Plan for the Promotion of Green Public Procurement.
	Budget and funding	-
	Implementation body	Ministry of Interior, Ministry of Administrative Reform and e-Government, Ministry of Finance, Ministry of Development, Competitiveness and Shipping, Ministry of Environment, Energy and Climate Change, Ministry of Infrastructure, Transport and Networks, Public and wider public sector

Title		Integrated energy planning by municipalities – ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme, Covenant of Mayors
Code of measure		**DM3**
Description	Category	Institutional Exemplary role of the public sector
	Implementation timeframe	Start: 2009
	Purpose / brief description	The purpose of the ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme is the implementation of actions and proven best practices for reducing energy consumption in the urban environment, with emphasis on the building sector (municipal buildings) and the upgrade of public spaces, on one hand, and in the area of municipal and private transport and energy intensive municipal facilities, on the other, through the implementation of technical interventions and actions to raise awareness and mobilise citizens, the local government, businesses and bodies. Furthermore, the participation of Greek municipalities in the European initiative "Covenant of Mayors" which aims at integrated energy planning at the local level and achieving specific environmental objectives is supported and promoted both at central and at regional level.
	End use	Total energy consumption of the target group Fuel consumption in transport
	Target group	For the ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) programme: First Grade Local Authorities (municipalities) with a population of over 10,000 residents (based on the census of the National Statistical Service of Greece as of 2001), and capitals of prefectures regardless of population criteria.
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Under the ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) programme, interested Local Authorities submitted an Integrated Action Plan setting out a detailed documentation of the proposed actions/measures for the period 2009-2010, establishing the medium-term strategy for energy efficiency at the municipal level, and an Implementation Plan which details, as to their natural object and cost, the selected actions of the following five priority axis: **Axis 1:** Interventions to existing municipal buildings

Title	**Integrated energy planning by municipalities – ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme,** Covenant of Mayors
	Aims at improving the energy efficiency of existing municipal buildings, with an overall reduction in consumption by 30%, i.e. 11.14 GWh (958 toe) per year, 7.8 GWh of which is for heat and 3.34 GWh for electricity. The annual CO_2 savings amount to 4,97 kt. **Axis 2:** Interventions to public areas of the urban environment 2.1. Municipal lighting: estimated electricity savings of 4.5 GWh (387 toe). CO_2: 3.9 kt 2.2. Microclimate improvement It is estimated that there is potential for reducing energy consumption for cooling in adjacent buildings by 30%, which can amount to a total electricity savings of about 1.1 GWh (96 toe) per year and a respective reduction in CO_2 emissions of 0.98 kt. **Axis 3:** Pilot interventions in urban transport Action 3.1. Fuel conversion measures in municipal vehicles (heavy and passenger vehicles). Approximately 1,023.9 toe of conventional fuel is expected to be replaced/saved. The resulting reduction in CO_2 emissions amounts to 0.943 kt. Action 3.2. Improving urban mobility by planning and implementing urban mobility projects in areas of municipalities where there is a large aggregation of people. The expected energy benefit of the action is expected to reach 386 toe and 0.648 kt CO_2. With the implementation of projects in the long run, the action is expected to reach 772 toe and 1.3 kt CO_2. Action 3.3. Transport studies will be developed with a focus on increasing the share of public transport in municipalities and addressing problems that increase fuel consumption by private and public transport means. The immediate expected energy benefit of the action 3.3 is estimated at 300 toe and 0.5 kt, and it is expected to achieve savings of 1,500 toe in the long-term and to avoid a release of 2.51 kt CO_2. **Axis 4:** Interventions in other urban (municipal) infrastructure This action involves predominantly studies accompanies by selected low-cost interventions for improving energy efficiency at pumping stations, wastewater treatment, etc. In this case, a preliminary feasibility study should be submitted, which shall lay down the characteristics and energy consumption of facilities and a technical-economic analysis and shall aim at achieving significant savings. Expected savings of 2.5 GWh (307 toe) per year, corresponding to a reduction of emissions by 3.1 kt.

Title	**Integrated energy planning by municipalities – ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme,** Covenant of Mayors

Axis 5: Dissemination, networking and information actions

This Axis includes targeted information and awareness raising actions, especially addressed to municipal officers, concerning energy monitoring of the effects on the operations under the Programme.
It is estimated that only through the EcoDriving actions, it is possible to achieve savings of around 1.09 GWh (94toe) per year and 0.29 kt CO_2.

Regarding participation in the Covenant of Mayors, 73 municipalities have signed for the moment and have joined in this initiative, and are now bound to achieve results exceeding the EU targets for reducing CO_2 emissions through measures to promote energy efficiency and renewable energy sources.
Among them, 17 municipalities have already proceeded to Reference Emission Inventory and have submitted the relevant local Sustainable Energy Action Plan - SEAP, whereby the following are proposed:

- overall emission reduction measures in public buildings, infrastructure, public lighting, transport
- integration of RES at municipal level
- dissemination and awareness raising to improve energy efficiency in the private sector
- creation of new structures within the local authorities to implement, monitor and record the implementation of the measures under the programme

It is noted that support structures have already been or are being developed and the agencies that coordinate these efforts, are the following:

- Centre for Renewable Energy Sources (CRES)
- Region of Central Macedonia
- Region of Crete
- Dafni Network
- Local Union of Municipalities and Communities of Attica (TEDKNA)

Furthermore, financing tools for both the design and implementation of SEAP are promoted at the national level by local authorities participating in the above initiative.

Title		**Integrated energy planning by municipalities – ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme,** Covenant of Mayors
	Budget and funding of ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme	Total budget: 100 million euros Co-financing: • by 70% from the National Strategic Reference Framework (NSRF) 2007-2013 • by 30% from own contribution
	Implementation body	The budget for each local authority is determined by the population of each municipality Ministry of Environment, Energy and Climate Change, CRES

Title		**Compulsory replacement of all light fittings with low energy efficiency in the public sector and the wider public sector**
Code of measure		**DM4**
Description	Category	Institutional / regulatory
	Implementation timeframe	Start: 2006
	Purpose / brief description	The replacement of filament lamps by compact fluorescent lamps or by other low-consumption lamps which use 80% less energy and have a lifespan which is almost ten times longer will produce immediate substantial results. For this purpose, the following are mandatory: • replacing all lighting units with low energy efficiency by units with high efficiency (lamps, ballasts, reflectors, etc.). • annual recording / reporting of energy interventions and redetermination of the target for further improvement.
	End use	Energy consumption for lighting
	Target group	• All buildings of the public sector and the wider public sector. • Public facilities (sports centres, etc.). • Street lighting and public lighting.
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Joint Ministerial Decision Δ5-ΗΛ/Β/ΟΙΚ.20168/2006 (Government Gazette, Series II, No 1554/24.10.2006, which provides for the replacement of lamps in public sector buildings and in the buildings of local authorities and supervised bodies (owned or leased), is being implemented. The ministerial decision stipulates compulsory replacement of all lighting units consisting of filament lamps or of fluorescent lamps of an energy efficiency class lower than B by fluorescent lamps of energy efficiency class A or B with integral or external electronic ballast. Furthermore, Article 5 of Ministerial Decision Δ6/Β/14826/17-06-2008 "Measures to improve energy efficiency and energy savings in the public and broader public sector" stipulates compulsory gradual replacement of all lighting units consisting of filament lamps, after expiry of the existing stock of lighting units.

Title		Compulsory replacement of all light fittings with low energy efficiency in the public sector and the wider public sector
		Furthermore, brightness levels are specified according to standard EN12464-1. Immediate implementation for the entire 2008-2016 period with the target of achieving preponderance of lamps with the maximum energy efficiency (A, A+, A++).
	Budget and funding	-
	Implementation body	Ministry of Interior, Ministry of Development, Ministry of Environment, Energy and Climate Change, Public and wider public sector

Title		**Implementation of Green Roofs to public buildings**
Code of measure		**DM5**
Description	Category	Exemplary role of the public sector
	Implementation timeframe	Start: 2011
	Purpose / brief description	Aims to improve the thermal, optical and environmental conditions of the users of public buildings, to familiarize citizens with the techniques, advantages and features of Green Roofs, to reduce energy consumption and emission of greenhouse gases and therefore, to help reversing climate change. It aims at: • improving thermal, optical and environmental conditions of the users of public buildings • informing more people of the techniques, advantages and features of Green Roofs • reducing energy consumption, limiting the emission of greenhouse gases and therefore contributing to climate change reversal
	End use	Energy consumption for cooling-heating
	Target group	Public buildings
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	The programme lays down the requirements of green roofs for pilot applications and the methodology for the selection of buildings in the public sector where the pilot projects will be implemented.
	Budget and funding	Total financing: 20 million euros Source: NSRF - OPESD
	Implementation body	Ministry of Environment, Energy and Climate Change, CRES

Title		**Programme of Bioclimatic Urban Reformation**
Code of measure		**DM6**
Description	Category	Exemplary role of the public sector
	Implementation timeframe	Start: 2011
		The program involves bioclimatic interventions in areas where significant climate problems are observed and its main objective is to improve the quality of life, to slow down and ultimately to reverse the urban climate change and to improve the economic and social parameters associated with it. Projects meeting specific climate targets and for which fully mature studies have been prepared are eligible.
	Purpose / brief description	The programme's objectives are: • Improving the life and environmental comfort of the residents of areas facing climate problems • Reducing energy consumption, limiting the emission of greenhouse gases and therefore contributing to climate change reversal • Setting the bio-climatic/environmental principles for urban areas, which will be the beginning of a debate on the "climate design" of Greek cities • Implementing bioclimatic urban reformation on a pilot basis, with a view to preparing a larger program
	End use	Energy consumption for cooling-heating
	Target group	• Urban environment • The general public.
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	Projects eligible for the "Bioclimatic Urban Reformation" programme will be those that meet specific climate targets and are accompanied by fully developed studies, based on the programme's specifications manual.

Title		Installation of **high-efficiency cogeneration of heat and power (CHP) systems with natural** gas in public hospitals
Code of measure		**DM7**
Description	Category	Exemplary role of the public sector
	Implementation timeframe	Start: 2011
	Purpose / brief description	Installation high-efficiency cogeneration of heat and power units with natural gas to hospitals, with a view to improve energy efficiency
	End use	Energy consumption for heating, domestic hot water, electricity
	Target group	Public hospitals
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	High-efficiency cogeneration of heat and power (CHP) projects and refrigeration systems using natural gas in public hospitals will be financed through the programme "Energy efficiency, cogeneration, energy management". The actions to be financed include:. a) construction of a high efficiency cogeneration of heat and power facility b) construction of a facility for making use of the heat produced from the CHP and/or RES facility for cooling purposes c) works required for the safe operation of the system d) construction of systems to assist heating/cooling systems with RES e) necessary connections to existing generation-distribution systems f) necessary connections with utility networks g) system for recording and monitoring these facilities and equipment h) Technical-Energy Consultant services i) publicity actions A total of 3 applications have been submitted for evaluation

Title		Installation of **high-efficiency cogeneration of heat and power (CHP) systems with natural** gas in public hospitals
Code of measure		**DM7**
	Budget and funding	Total financing: 15 million euros Source: NSRF - OPESD
	Implementation body	Ministry of Environment, Energy and Climate Change, Ministry of Health and Social Solidarity, Ministry of National Defence, NHS, DEPANOM SA

Title		**Interventions for improving energy efficiency in school buildings**
Code of measure		**DM8**
Description	Category	Exemplary role of the public sector
	Implementation timeframe	Start: 2011
	Purpose / brief description	Implementation of projects in existing and new or under construction school buildings to improve energy efficiency
	End use	Final energy consumption in new or under construction school buildings
	Target group-{}-	Public school buildings
	Regional application	All of Greece.
Information on implementation		
	List and description of energy saving measures	1. The "Bioclimatic Demonstration Schools" programme promotes bioclimatic design interventions in new or under construction primary and secondary education schools aimed at achieving energy savings. The actions funded include: a) constructing school buildings having fully integrated the principles of bioclimatic design, b) supplying and installing passive and active solar systems, hybrid systems and renewable energy systems, including natural lighting and ventilation systems, solar chimneys, solar protection and shading systems and green roofs, c) various support systems and network connections, including data metering, recording and monitoring systems for the energy systems of buildings, as well as control and operational management systems for electromechanical installations, d) studies and other actions. 2. The programme "Standards for demonstration projects on the use of RES and/or ES measures in existing public primary and secondary education school buildings" includes projects to be implemented in existing primary and secondary education school buildings to increase heating and/or cooling energy generated from RES and energy saving by reducing energy losses.

Title		Interventions for improving energy efficiency in school buildings
Code of measure		DM8
		the energy efficiency of building shells b) use of special coatings-cold materials-on roofs c) replacement of window frames and glass panes with new certified, energy-efficient ones d) passive solar heating systems e) natural and artificial lighting systems f) natural and/or hybrid ventilation and cooling systems and techniques g) roof planting h) bioclimatic interventions in the surrounding area i) upgrading and modifying existing central heating and/or conditioning installations, premises and installations of Domestic Hot Water DHW j) connections with the public natural gas distribution network Essential condition of the programme is that the building be upgraded by at least one energy class. A total of 10 applications have been submitted for evaluation.
	Budget and funding	Total financing for the programme “Bioclimatic Demonstration Schools”: 25 million euros Source: NSRF - OPESD Total financing of the programme "Model demonstration projects on the use of RES and/or ES in public buildings": 40 million euros Source: NSRF - OPESD
	Implementation body	Ministry of Education Lifelong Learning and Religious Affairs, Ministry of Environment, Energy and Climate Change, Local Authorities, School Buildings Organisation

Title		Energy saving interventions in public buildings
Code of measure		**DM9**
Description	Category	Exemplary role of the public sector
	Implementation timeframe	Start: 2011
	Purpose / brief description	Implementation of energy interventions in public buildings to improve energy efficiency
	End use	Final energy consumption of the buildings in the target group
	Target group	Public buildings housing ministerial departments and legal persons governed by public law
	Regional application	All of Greece.
Information on implementation		
	List and description of energy saving measures	Projects involving heating and/or cooling energy generation from RES and energy saving will be financed under the programme "Standards for demonstration projects on the use of Renewable Energy Sources (RES) and/or Energy Saving (ES) in public buildings" to reduce energy requirements for heating, cooling, lighting and domestic hot water. The actions to be financed include:. a) applying insulation b) replacing window frames and glass panes c) passive solar systems d) natural lighting and ventilation systems, external shading systems for the openings of the building e) mechanical cooling-ventilation systems f) extensive roof planting

Title	Energy saving interventions in public buildings
Code of measure	**DM9**
	g) interventions for a compensation system in the burner / boiler and insulation of pipes h) installation of measuring, data recording and monitoring systems for the energy installations in buildings A total of 63 applications have been submitted for evaluation.
Budget and funding	Total financing: 40 million euros Source: NSRF - OPESD
Implementation body	Ministry of Environment, Energy and Climate Change, Competent Ministries, legal persons governed by public law (excluding local authorities)

MEASURES IN THE INDUSTRY SECTOR

The contribution of the industry sector to energy saving is small because the energy intensive industries are covered by the Emissions Trading Directive and are not included. Nevertheless, as indicated in previous sections, although only one measure has been implemented (according to the corresponding table in the first EEAP), the industry sector is one of the first sectors where the impact of the economic recession became apparent.

Table 18: Overview table of measures in the industry sector

No	Title of measure	End-use targeted	Duration	Achieved energy savings **in 2010 (GWh)**	Energy savings expected **in 2016 (GWh)**
B1	**Creating "Green Business Parks" - Enhancing investment projects in Industrial and Business Areas & Innovation Zones**	Total energy consumption of the target group	Start: 2010	Calculation using the "top-down" methodology in the industry sector	Calculation using the methodology developed as part of the first EEAP
			Total savings:	0.37-1.87 TWh[1] 1.98 TWh[2]	**0.68 TWh**

1. *approximate methodology for evaluating the impact of economic recession*
2. *top-down calculation method defined in the proposed European Commission methodology «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services»*

Title		**Creating "Green Business Parks" - Enhancing investment projects in Industrial and Business Areas & Innovation Zones**
Code of measure		**B1**
Description	Category	• **Energy services** (outsourcing) • Financial aid
	Implementation timeframe	Start: 2010
	Purpose / brief description	Total energy consumption of the target group
	End use	Final consumption in Industrial Estates
	Target group	All Industrial Estates
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	The 4-year development programme submitted in collaboration of the Ministry of Economy Competitiveness and Shipping, the Ministry of Environment, Energy and Climate Change and Piraeus Bank, through the company ETVA – VI.PE. SA aims to promote investment in Industrial Areas and to create "green business parks." The proposed programme actions include: **Action 1:** Creation of 3 new green industrial areas with energy efficient and low carbon facilities. **Action 2:** Environmental upgrading of existing industrial area with emphasis on measures relating to waste management, water management and monitoring of gaseous emissions.

Title		**Creating “Green Business Parks" - Enhancing investment projects in Industrial and Business Areas & Innovation Zones**
Code of measure		**B1**
	Budget and funding	**Action 3:** 10 integrated environmental business parks (IEBP) on islands. Article 5(12) of Development Law 3908/2011 "Enhancing Private Investments for Growth, Entrepreneurship and Regional Cohesion" stipulates the conditional enhancement by 5 additional percentage points on the percentages foreseen for the implementation of investment projects installed in Industrial Business Areas and Innovation Zones. Green Business Parks: Action 1: budget: 440 million euros Action 2: budget: 70 million euros Action 3: budget: 560 million euros Source: NSRF - OPCE Law 3908/2011: There is no predetermined budget
	Implementation body	Ministry of Economy, Competitiveness and Shipping, Ministry of Environment, Energy and Climate Change, and Piraeus Bank through the company ETVA – VI.PE. SA

MEASURES IN THE TRANSPORT SECTOR

As the transport sector is contributing to a greater extent in final energy consumption in Greece than other sectors, it was the one where most of the measures specified in the first EEAP were implemented. This, coupled with the economic recession, has resulted in this sector presenting the greatest savings achieved during the period 2007-2010.

The measures that contributed to the significant energy savings that seem to be achieved in the transport sector are mainly related to the linking of the taxation of vehicles with CO_2 emissions, information, public awareness and education measures to increase use of public transport and promotion of economical driving (Eco-Driving). The following tables show both aggregate and individual measures in the transport sector.

Table 19: Overview table of measures in the transport sector

No	Title of measure	End-use targeted	Duration	Achieved energy savings in 2010 (GWh)	Energy savings expected in 2016 (GWh)
M1	**Reshaping of the public transport system**	Energy consumption in passenger transport	Start: 2008	Calculation using the "top-down" methodology in the transport sector	Calculation using the methodology developed as part of the first EEAP
M2	**Transport infrastructure projects**	Total energy consumption of the sector	Start: 2006	Calculation using the "top-down" methodology in the transport sector	Calculation using the methodology developed as part of the first EEAP
M3	**Development of urban mobility plans**	Total energy consumption of the sector	Start: 2011	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
M4	**Promotion of economical, safe and eco-driving.**	Total energy consumption of the sector	Start: 2008	Calculation using the "top-down" methodology in the transport sector	Calculation using the methodology developed as part of the first EEAP
M5	**Incentives for the replacement of old vehicles**	Energy consumption in commercial road transport	Start: 2009	Calculation using the "top-down" methodology in the transport sector	Calculation using the methodology developed as part of the first EEAP
M6	**Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (vehicles fuelled by natural gas and biofuels and hybrid vehicles)**	Energy consumption in passenger transport	Start: 2009 End: 2012	Calculation using the "top-down" methodology in the transport sector	Calculation using the methodology developed as part of the first EEAP

M7	**Eco-labelling – Energy label for cars**	Energy consumption in road transport	Start: 2012	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
M8	**Compulsory quotas of vehicles with greater energy efficiency in the fleets of the public services and of public bodies**	Energy consumption in road transport	Start: 2012	Does not contribute to energy savings in the period in question	Calculation using the methodology developed as part of the first EEAP
M9	**Linking of vehicle taxation to energy efficiency and CO2 emissions**	Energy consumption in road transport	Start: 2010	Calculation using the "top-down" methodology in the transport sector	Calculation using the methodology developed as part of the first EEAP
			Sum of savings:	**7.12-10.71 TWh[1]** **11.45 TWh[2]**	**6.731 TWh**

[1] *approximate methodology for evaluating the impact of economic recession*

[2] *top-down calculation method defined in the proposed European Commission methodology «Recommendations on measurement and Verification methods in the framework of Directive 2006/32/EC on Energy end-use efficiency and energy services»*

Title		Reshaping of the public transport system
Code of measure		**M1**
Description	Category of measure	Energy efficiency improvement mechanism
	Implementation timeframe	Start: 2008
	Purpose / brief description	This measure aims to increase the percentage of citizens using public transport for their transfers. It involves facilitating the task of public transport with the objective of increasing the share of passenger demand for fixed rail and road public transport. The objective is to increase the percentage of public transport use from the present 26.6% in 2008[1] to 35% in 2016. Determination of the energy saving requires the application of a documented system for the collection and processing of information to permit monitoring and evaluation of the implementation of the measure.
	End-use category	Energy consumption in passenger transport
	Target group	• Experts specialising in transport subjects. • The central administration • Local government. • Transport project management bodies. • The general public (as the recipient of the result).
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Many of the actions of the measure have been completed in the capital region and include: • Improvement of public transport route planning.

[1] EUROSTAT: Panorama or Transport 2007, table 5.25 DGTREN pg 106

Title		Reshaping of the public transport system
		• Linking of new routes to existing ones. • Creation of organised parking near to bus stops and metro stations. • information systems for the travelling public. The following actions are in the planning stage for all the urban centres of the country that are subject to an organizational framework of operation for the public transport system. • improvement of the reliability of public transport by the use of smart control and management systems on transport networks. • Facilitation of connection and functionality in existing transport networks (i.e. as between different means and different geographical areas). • Smart ticket charging and cancelling systems. • Monitoring the quality of service provided by public transport to increase their share in passenger transport. Moreover, the 'ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme (Measure DM3), Axis 3, Action 3.3, enables the local authorities that have demonstrated their need to reform the public transport system, to include transport studies as an eligible action. This programme is in the stage of evaluation for selecting the municipalities that are candidate to receive funding.
	Budget and funding	-
	Implementation bodies	Ministry of Environment, Energy and Climate Change, Ministry of Infrastructure, Transport and Communications, Local Authorities, transport operators

Title		**Transport infrastructure projects**
Code of measure		**M2**
Description	Category of measure	Energy efficiency improvement mechanisms
	Implementation timeframe	Start: 2006
	Purpose / brief description	The objective is to shorten travel time for cars and public transport means and thereby to improve transport quality and safety and achieve energy savings. Additionally, the construction of appropriate infrastructure will increase the possibility of moving around by alternative means (walking, cycling, etc.). Increased use of fixed rail transport will help to reduce private car use and bring energy savings.
	End-use category	Total energy consumption of the sector
	Target group	The central administration Local government The general public.
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Through the development programme "Third Community Support Framework" 2000-2008, a series of infrastructure projects have been completed and delivered, contributing to the intermediate energy savings target for 2010. These include: • Extension of the Athens Metro • Extension of the commuter rail in the wider Athens region • New national and regional trunk routes. Moreover, the following actions in the area of constructions have been implemented at the initiative of Municipalities across the country: • Quiet streets • Pavements and cycling paths. • Street lighting using RES

Title		**Transport infrastructure projects**
		Actions that are underway and whose implementation will be completed by 2016 include: • Creation of new infrastructure (road improvements, new bus lanes, installation of smart traffic lights for public transport, modernisation and extension of the rail network, etc.). • New metro in Thessaloniki. • Installation of RES in urban and municipal transport remote service points (stops, ticket vendors, stationmasters etc.) for energy saving purposes
	Budget and funding	NSRF: Operational Programme "Improvement of Accessibility", Operational Programme "Environment and Sustainable Development"
	Implementation bodies	Ministry of Environment, Energy and Climate Change, Ministry of Infrastructure, Transport and Communications, Local Authorities, Operational Programme "Improvement of Accessibility" Special Management Service, Operational Programme "Environment and Sustainable Development" Special Management Service

Title		**Development of urban mobility plans**
Code of measure		**M3**
Description	Category of measure	• Regulatory • Administrative / regulatory framework • Voluntary agreements and joint ventures
	Implementation timeframe	Start: 2011
	Purpose / brief description	Improvement of mobility and of travel safety, curtailing of individual travel by private car, energy savings.
	End-use category	Total energy consumption in road transport
	Target group	• The central administration • Local government • Hospitals, schools and public services • Companies • Leasing companies • Owners of parking areas • The general public.
	Regional application	Urban centres throughout Greece
Information on implementation	List and description of energy saving measures	Implementation in the large municipalities of Athens and Thessaloniki and in other urban centres. Actions: • Optimisation of private car use (car-sharing). Car-sharing has been implemented successfully in other European cities (Barcelona, Bremen, etc.) and is used by bodies or in company schemes which have a lot of vehicles for the travel of members / customers between specific pick-up points and parking areas. The body or company pays the costs of purchase, operational management and maintenance of the fleet and the customer / member is charged according to the usage time and the distance covered.

Title		Development of urban mobility plans
		In Greece, and specifically in Athens, car-sharing is being run on a pilot basis by CRES in cooperation with a private rent a car company since the beginning of 2011. • Promotion of travel by foot and bicycle. (Greek cities with a bike paths network in Karditsa, Trikala, Thessaloniki) and several tens of kilometres in Athens and other cities and islands of Greece are planned to be developed In Athens, carriage of bikes on trams and the electric railway has been permitted. • Development of mobility plans at large companies, schools, tourism sites, hospitals and event venues, etc. The development of mobility plans involves actions which promote the avoidance of individual travel in separate cars by large numbers of people who have the same destination at a defined time; for example, free tickets for travel to and from the workplace by public transport, travel in buses of employers, access to park-and-ride and group car use. Gradual implementation, with pilot demonstration actions which will be an example for further development and other areas is contemplated. Moreover, through the 'ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme (Measure DM3), Axis 3, Action 3.2, urban mobility studies are eligible interventions.
	Budget and funding	Proposed budget: EUR 100,000,000/year
	Implementation bodies	Ministry of Environment, Energy and Climate Change, Ministry of Infrastructure, Transport and Communications, Local Authorities

Title		**Promotion of economical, safe and eco-driving.**
Code of measure		**M4**
Description	Category of measure	• Regulatory • Provision of information • Training and education
	Implementation timeframe	Start: 2008
	Purpose / brief description	Eco-driving is a new way of driving which combines simple driving techniques with rules of maintenance. This leads to a fuel saving of 5-20%, cuts pollutant emissions, causes less noise pollution and reduces the number of accidents.
	End-use category	Total energy consumption of the sector
	Target group	• Driving instructors • Professional drivers • Private vehicle drivers • Vehicle fleet managers.
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	CRES, as a promoter of the measure, has implemented the following actions: • Information campaign - Creation of the website for the National Campaign www.ecodriving.gr - Publication of printed and electronic information and educational material - Organisation and participation in numerous events to promote the economical-ecological event - Development of computational and educational tools • Training of professional drivers. Pilot training activities have been implemented concerning all types of vehicles for transport operators in the public, wider public and private sectors. Moreover, Article 8(3)(d) of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” stipulates the implementation of training courses to promote economical eco-driving to vehicle drivers of the public and the wider public sector.

Title		Promotion of economical, safe and eco-driving.
		• Incorporation of eco-driving in the training for the driving licence. Since 2009, the main principles of Economical-Ecological Driving have been incorporated in the new theoretical training textbooks of candidate drivers. The ultimate goal is to standardise the certification process of driving trainers and to integrate in a comprehensive way the economical-ecological driving in the process of theoretical and practical training of candidate drivers and in the retraining process of professional drivers. • Education of private vehicle drivers through seminars. It is to be applied on a large scale after the Incorporation of Eco-driving in the educational process for obtaining a driving license. The implementation of training courses to promote economical-ecological driving to vehicle drivers at the municipal level is also stipulated in Axis 5 of the "ENERGY EFFICIENCY'" (ΕΞΟΙΚΟΝΟΜΩ) programme.
	Budget and funding	
	Implementation bodies	Ministry of Transport, Infrastructure and Networks, CRESS, Driving Schools

Title		Incentives for the replacement of old vehicles
Code of measure		**M5**

Description	Category	• Pricing incentives for the improvement of energy efficiency
		• Regulatory
		• Institutional:
		  ○ implementation of Law 3423/2005 “Introduction of biofuels and other renewable fuels into the Greek market”
		  ○ implementation of Directives 2003/30/EC and 2003/96/EC

	Implementation timeframe	Start: 2009
	Purpose / brief description	The purpose of the measure was to provide financial and tax incentives to replace old energy-intensive vehicles with new, state-of-the-art ones and to promote energy efficient vehicles.
	End use	Energy consumption in commercial road transport
	Target group	• The central administration • Policymakers • over 3.5 tn and over 10 years of age
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Legislative Act 16/09/2009/2 "Measures to address air pollution" provides for the following financial incentives: • Tax incentives for alternative technology vehicles (natural gas vehicles, hybrid vehicles), and vehicles or improved engine specifications (Douros) (Article (2)(b) Circulation taxes are henceforth adjusted and calculated based on the engine capacity and the environmental pollution caused by the engine of vehicles.

Title		Incentives for the replacement of old vehicles
		• Financial incentives for scrapping of private cars (Article 3, paragraph 1, Tables 5 and 6) A subsidy is provided for vehicle scrapping. The amount of subsidy depends on the engine capacity of the vehicle withdrawn. Additional funding is provided for the purchase of new vehicles with EURO 4 and EURO 5 engine. The implementation of this legislative act stopped on 3/11/2009. The measure of private car scrapping that resumed by means of Ministerial Decision DEFK 5006718EX2001/11.2.2011 "Incentives to replace old technology cars" does not include financial incentives for heavy vehicle scrapping.
	Budget and funding	National Resources
	Implementation bodies	Ministry of Infrastructure, Transport and Communications, Ministry of Finance, Ministry of Environment, Energy and Climate Change

Title		**Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (vehicles fuelled by natural gas and biofuels and hybrid vehicles)**
Code of measure		**M6**

Description	Category	• Pricing incentives for the improvement of energy efficiency
		• Regulatory
		• Institutional:
		  ○ implementation of Law 3423/2005 “Introduction of biofuels and other renewable fuels into the Greek market”
		  ○ implementation of Directives 2003/30/EC and 2003/96/EC

	Implementation timeframe	Start: 2009 End: 2012
	Purpose / brief description	The purpose of the measure was to provide financial and tax incentives to replace old energy-intensive vehicles with new, state-of-the-art ones and to promote energy efficient vehicles.
	End use	Energy consumption in passenger transport
	Target group	• The central administration • Policymakers • Owners of private vehicles • Taxis • Light vehicles (LDV) < 3.5 tonnes. • Vehicles registered by 31.12.1998
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	Legislative act 16/09/2009/2 "Measures to address air pollution" provides for the following economic incentives: • Tax incentives for alternative technology vehicles (natural gas vehicles, hybrid vehicles), and vehicles or improved engine specifications (EuroVI) (Article (2)(1)(A) Circulation taxes are henceforth adjusted and calculated based on the engine capacity and the environmental pollution caused by the engine of vehicles. • Financial incentives for scrapping of private cars (Article 3, paragraph 1, Table 4). A subsidy is provided for vehicle scrapping. The amount of subsidy depends on the engine capacity of the vehicle withdrawn.

Title		Incentives for the replacement of private vehicles and to promote the use of energy-efficient vehicles (vehicles fuelled by natural gas and biofuels and hybrid vehicles)
		Additional funding is provided for the purchase of new vehicles with EURO 4 and EURO 5 engine. The implementation of this legislative act stopped on 3/11/2009 with 140,000 vehicles having been scrapped. The measure of private car scrapping was resumed by means of Ministerial Decision DEFK 5006718EX2001/11.2.2011 "Incentives to replace old technology cars". New private passenger cars with an engine capacity of up to 2,000 cc that meet the requirements of Directive 1998/69/EC "Phase B" or later, or Regulation, and are intended to replace private passenger cars withdrawn from circulation to be scrapped, are exempt from the registration fee at a rate that depends on the engine capacity and the taxable value of the new car, as defined in Law 3899/2010 "Urgent measures for the implementation of the assistance programme of the Greek economy", Article 8(2)(a).
	Budget and funding	National Resources
	Implementation bodies	Ministry of Infrastructure, Transport and Communications, Ministry of Finance, Ministry of Environment, Energy and Climate Change

Title		Eco-labelling – Energy label for cars
Code of measure		**M7**
Description	Category	• Regulatory • Updating and obligatory provision of information • Energy labelling of products.
	Implementation timeframe	Start: 2012
	Purpose / brief description	The measure is being implemented with a view to achieving preponderance of vehicles with improved energy efficiency and lower emissions.
	End use	Energy consumption in road transport
	Target group	• Car trading companies • Vehicle sellers

Title		Eco-labelling – Energy label for cars
		• The general public.
	Regional application	All of Greece
Information on implementation	List and description of energy saving measures	The measure has been implemented in Greece through Ministerial Decision 90364/31.01.2002 (harmonisation with Directive 1999/94/EC). The measure has not had the anticipated results because the responsible vehicle sellers have not publicised it appropriately at car shows. However, many companies highlight the label with the minimum requirements of the Directive. An amendment to Directive 1999/94/EC which will propose a uniform energy label for cars in all countries is expected in 2008. For this reason, it is necessary to take the following measures for immediate implementation of the measure: Road transport - mainly passenger cars: Sensitisation of the public about their contribution to the problems of climate change and environmental pollution. More specifically, actions to provide consumers with systematic information with the objective of achieving preponderance of vehicles with lower fuel consumption and lower emissions.
	Budget and funding	National Resources
	Implementation bodies	Ministry of Finance, Ministry of Infrastructure, Transport and Communications, Ministry of Environment, Energy and Climate Change

Title		**Compulsory quotas of vehicles with greater energy efficiency in the fleets of the public services and of public bodies**
Code of measure		**M8**
Description	Category	Administrative-regulatory Exemplary role of the public sector
	Implementation timeframe	Start: 2012
	Purpose / brief description	The measure is being implemented with a view to achieving preponderance of vehicles with improved energy efficiency and lower emissions.
	End use	Energy consumption in road transport
	Target group	• Policy makers • Public Services and Organisations
	Regional application	Public sector
Information on implementation	List and description of energy saving measures	As part of the Third Community Support Framework 2000-2006, 600 new buses were added to the fleet of urban transport. Article 8(3)(a) and (b) of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” stipulates the following mandatory conditions: • Quote of clean vehicles • Replacement of old medium and heavy duty vehicles • Setting energy efficiency as a selection criterion in the procurement process of public services and organisations. Moreover, through the 'ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) Programme (Measure DM3), Axis 3, Action 3.1, it is possible to

Title		Compulsory quotas of vehicles with greater energy efficiency in the fleets of the public services and of public bodies
		convert heavy vehicles using high biodiesel blends, to install Diesel Particle Filters (DPF) in municipal fleet vehicles constructed after 1995, to convert petrol-driven vehicles of municipal fleet into LPG vehicles and to convert petrol-driven vehicles of municipal fleet into bi-fuel natural gas vehicles.
	Budget and funding	-
	Implementation bodies	Ministry of Finance, Ministry of Infrastructure, Transport and Communications, Ministry of Environment, Energy and Climate Change

Title		**Linking of vehicle taxation to energy efficiency and CO_2 emissions**
Code of measure		**M9**
Description	Category	Regulatory
	Implementation timeframe	Start: 2010
	Purpose / brief description	The purpose of the measure is to promote vehicles with lower fuel consumption and lower emissions.
	End use	Energy consumption in road transport
	Target group	Vehicles owners.
	Regional application	All of Greece.
Information on implementation	List and description of energy saving measures	Circulation tax is henceforth directly linked with each vehicle's pollutants, namely carbon dioxide emissions. The amount of the tax is calculated by multiplying g / km CO_2 of the vehicle by the amount applicable to each scale. From 0 to 100 g CO_2/km — 0 From 101 to 120 g CO_2/km — 0.80 From 121 to 140 g CO_2/km — 1.00 From 141 to 160 g CO_2/km — 1.50 From 161 to 180 g CO_2/km — 2.00 From 181 to 200 g CO_2/km — 2.25 From 201 to 250 g CO_2/km — 2.50 Above 251 g CO_2/km — 3.00
	Budget and funding	-
	Implementation bodies	Ministry of Finance, Ministry of Infrastructure, Transport and Communications, Ministry of Environment, Energy and Climate Change

3.4. PUBLIC SECTOR

Pursuant to the provisions of Directive 2006/32/EC and the relevant Law 3855/2010, the public sector has to serve as an example for implementing measures to improve energy efficiency, contributing to the improvement of the public sector's social image and to encourage the private sector to follow, eventually leading to energy saving multiplier effects. Moreover, an important parameter to implement energy efficiency improvement measures in the public sector is to achieve substantial savings/reduction on fuel costs while improving operational and working conditions in the public organisations that will implement such measures.

As is clear from the presentation of the measures in section 3.3.2 and discussed in this chapter, provisions requiring the implementation of energy saving measures in all end-use sectors of the public and wider public sector and the use of energy efficiency criteria in the public procurement tendering procedures and contracts, have been adapted to the national law.

Moreover, the Greek government, through funding and market mechanism development schemes, is promoting energy upgrade programmes in various types of public buildings, having energy and economic efficiency of interventions as the main criterion for the assessment and eligibility of co-financed projects.

3.4.1. EXEMPLARY ROLE OF THE PUBLIC SECTOR

The first institutional energy saving intervention in the public sector was carried out under Ministerial Decision Δ6/B/14826/17-06-2008 "Measures to improve energy efficiency and energy savings in the public and broader public sector", specifying actions and commitments for achieving energy savings in all the buildings of the public and wider public sector, and which include the following:

- Connecting buildings to the natural gas network, where there is network availability
- Reducing idle power consumption
- Performing preventive maintenance to air conditioning installations
- Setting temperatures and quality of indoor air based on the relevant European standards
- Replacing light bulbs
- Installing automation devices
- Energy labelling of appliances supplied to the public
- Designating a person in charge of energy issues in buildings.

Furthermore, Article 8(3)(a) and (b) of Law 3855/2010 specifies the following conditions for the procurement of vehicles to public services and organisations:

- Quote of clean vehicles
- Replacement of old medium and heavy duty vehicles

- Procedure for procurement of vehicles based on fuel economy label, as a selection criterion

Moreover, section 3.4.2. of Law 3851/2010 sets requirements for the buildings of the public sector and stipulates that, as of 31.12.2014, new public buildings should cover their entire primary energy consumption with energy supply systems based on renewable energy sources, electricity and heat cogeneration, district or block heating systems, and heat pumps.

As part of monitoring and implementing the above provisions, the Ministry of Environment, Energy and Climate Change established the Green Office and an Interministerial Committee for Green Public Procurement. These structures are focused on providing support and timely information to suppliers of the public sector and the market in general, creating a framework for cooperation, setting up working groups and coordinating the necessary actions for the preparation of environmental criteria, and the selection of product categories and services to which the environmental criteria will be applied. An additional duty of the Committee is to plan the national policy and to draft the National Action Plan for promoting Green Procurement, which is to be completed by the end of 2012.

During the preparation of the 2nd EEAP, a survey of products and services with environmental features is carried out in the Greek market with a view to assessing the readiness of the Greek market to accept the introduction of 'green' standards upon public procurement. The survey covers the major categories of goods and services purchased by the Greek Government and its results will help in creating an Index and in preparing the National Action Plan for the Promotion of Green Public Procurement.

A key means for promoting the exemplary role of the public sector is the implementation of pilot projects and funding instruments (e.g. Energy Performance Contracts - EPC) under the National Strategic Reference Framework (NSRF), as detailed in the description of measures in Section 3.3.2.4.

Special reference should be made to the ''ENERGY EFFICIENCY'' (ΕΞΟΙΚΟΝΟΜΩ) programme, whose goal is to promote, by means of integrated planning, energy saving in local authorities through actions and proven best practices for reducing energy consumption in the urban environment, with emphasis on the building sector (municipal buildings) and the upgrade of public spaces, on one hand, and in the area of municipal and private transport and energy intensive municipal facilities, on the other, through the implementation of technical interventions and actions to raise awareness and mobilise citizens, the local government, businesses and bodies.

Finally, 73 municipalities in Greece have already signed and joined in the European initiative “Covenant of Mayors” that, pursuant to the accession obligations, are required to adopt a local action plan and are bound to achieve results exceeding the EU targets for reducing CO_2 emissions through measures to promote energy efficiency and renewable energy sources. With a view to supporting this initiative, memoranda of understanding have already been signed or are promoted between associations, municipalities and CRES, support structures (e.g. Dafni network) have been developed, and other actions involving the use of funding instruments are initiated (see measure DM3).

3.4.2. PRIMARY ROLE OF THE PUBLIC SECTOR IN THE IMPLEMENTATION OF THE DIRECTIVE ON BUILDINGS

Article 10(3) of Law 3851/2010 regulates some issues related to the content of Directive 2010/31/EC, making special reference to the coverage of primary energy consumption in new public buildings.

This section lays down the following: “No later than 31.12.2019, all new buildings should cover their entire primary energy consumption with energy supply systems based on renewable energy sources, electricity and heat cogeneration, district or block heating systems, and heat pumps with seasonal performance factor (SPF) as defined in paragraph 2 of this Article. For new buildings where government and public services are housed, this obligation should enter into force no later than 31.12.2014.”

Moreover, Article 6(5) of Law 3661/2008 makes reference to the leading and exemplary role to be undertaken by public institutions concerning the buildings they occupy.

This section lays down the following: "In buildings occupied by public agencies and institutions of the wider public sector, as each time defined, the energy performance certificate of the building, whose validity may not exceed ten (10) years, shall be placed in a prominent position. In such buildings, there may be a board listing the recommended and prevailing indoor temperatures, and any climatic factors that affect these temperatures."

As part of the exemplary role of the government, which is further detailed in measures DM5-DM9 in Table 18, pilot actions are promoted concerning bioclimatic design and energy efficiency improvement, in general, in the buildings of the public sector.

3.4.3. MEASURES SPECIFIC TO PUBLIC PROCUREMENT

Article 7 of Ministerial Decision Δ6/Β/14826/17-06-2008 "Measures to improve energy efficiency and energy savings in the public and broader public sector" stipulates that energy labelling and certified energy efficiency indication of appliances supplied by the State is mandatory.

Article 8(1) of Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” sets the minimum energy efficiency requirements for procurement by the public and wider public sector and an Interministerial Committee for Green Public Procurement has been established, whose primary target is to develop a National Action Plan for GPP, which takes into account the needs of public procurement, readiness of the Greek market and environmental impacts.

3.5. ENSURING AVAILABILITY OF INFORMATION AND ADVICE

Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions” provides for the creation of a special web site by the Ministry of Environment, Energy and Climate Change to provide all required information on energy saving at the technical, institutional and financial level.

By way of example, provision is made for the dissemination of all sorts of information on energy efficiency measures, available financial mechanisms and current energy-saving programs, voluntary agreements, the existing legislative framework, records of natural or legal persons active in this market, best practices, as well as training and publicity activities. Provision is also made for creating incentives to promote energy end-use efficiency by market participants by providing expert information and advice and creating the appropriate conditions for improving energy efficiency in final consumption. Last, this law contributes to the transparency of information provided and ensures their availability to all interested parties.

3.6. OBLIGATIONS OF ENERGY COMPANIES TO PROMOTE ENERGY END USE SAVINGS

The role of energy companies (energy distributors, distribution network operators and retail energy companies) in providing and promoting energy services and records may be essential to the promotion of energy saving as defined in Law 3855/2010 "Measures to improve energy end-use efficiency, energy services and other provisions". More specifically, in accordance with Article 9(1), energy companies are required to provide the Ministry of Environment, Energy and Climate Change with all available information they have on their final consumers annually. Such data include end-user consumption, the characteristics of the required load, the diversification of customers as to their type and location and implementation of energy services, controls and other energy saving measures. This measure aims at making optimum use of the data in designing effective strategies to improve energy efficiency and continuous monitoring of energy services and implementing energy saving measures.

Moreover, Article 9(2) stipulates that energy companies are required to provide energy services and audits to final consumers at competitive prices, to promote measures for improving energy efficiency and to enable the installation of remote management and energy saving systems to the lighting networks of public, common areas . In cases of non-compliance, Article 9(3) provides for the imposition of a fine ranging between EUR 5,000-250,000 by the Ministry of Environment, Energy and Climate Change. The fine depends on various factors, such as the gravity of the violation, the effects produced and the degree of liability or any possible recurrence of the offender.

Regarding the contribution of energy companies to energy service financing, Article 16(2) of the same Law enables them to participate as third parties through the Third-Party Financing mechanism in the Performance Contract to be drawn between the final consumer and the Energy Service Company.

A first measure for encouraging energy companies to be involved in the area of energy services is a Memorandum of Understanding between CRES and PPC for pilot implementation of demonstration projects on the improvement of energy efficiency and the development of energy services in the residential sector. The successful collaboration between these two entities, which will be accompanied by energy saving and energy efficiency improvement actions for final consumers in the residential sector, will lead to the development of a methodological framework to quantify the benefits of the expected savings in both physical and financial terms.

The implementation of this framework can be applied to determine the total benefit from the participation of other energy companies active in the Greek energy industry in the energy services market.

Lastly, Article 11 stipulates the future use of voluntary agreements, including the introduction of white certificates to improve energy efficiency in end-use sectors. However, there are no provisions so far on the way of evaluating, monitoring and controlling the system of white certificates, but future arrangements are expected.

3.7. ENERGY SERVICES MARKET

Stimulation of the energy services market can be achieved through the implementation of two components, i.e. the appropriate legislative framework and the pilot implementation of demonstration activities on the provision of energy services through Energy Performance Contracts.

First, as far as the institutional framework is concerned, the energy services market in Greece is regulated by Law 3855/2010 “Measures to improve energy efficiency in end use, energy services and other provisions”. This law has introduced for the first time the concept of Energy Service Companies (ESCOs) and describes the operational framework, obligations and tools for the promotion and solid development of this market.

Ministerial Decision D6/13280 "Energy Service Companies. Operation, Register, Code of Conduct and relevant provisions" aims to implement the existing legislative framework for ESCOs and to determine all the issues related to their development and operation in the Greek market. More specifically, the Ministerial Decision determines the following:

a) the content of the Register of Energy Service Companies (ESCO Register) and the agency in charge of keeping the Register,

b) the organisation, procedure, criteria and necessary documents for entry in the ESCO Register,

c) issues related to the update, removal and modification of entries, the administration and use of data in the Register,

d) the conditions for the establishment and operation of ESCOs, the criteria governing the performance of their work, incompatibilities with their work, administrative penalties which they are subject to, bodies imposing these penalties, relevant procedures,

e) Code of Ethics for ESCOs on the principles and commitments that ESCOs entered in the Register are required to keep in order to ensure the smooth operation and proper development of the energy services market.

Energy Performance Contracts, which are the core of this market, play a crucial role in the successful development of the energy services market. Article 16(1) of Law 3855/2010 analyses all the details on the preparation of Energy Performance Contracts (EPC) between the final consumer and the ESCOs.

It is stipulated that an ESCO must develop in detail the context in which energy services are provided, as well as the parameters for the design and management of energy services, the methodology for determining energy savings and measuring the total economic benefit, the rules for purchase, installation, operation and maintenance of energy equipment, determination of the total cost of the intervention and the time and manner of repayment. Article 16(2) explicitly clarifies that the final consumer must pay to the ESCO the profit from the provided energy service based on savings achieved, and in accordance with Article 16(3), the ESCO is required to ensure energy savings and economic benefit throughout the specified time and on all the agreed terms. Furthermore, it stipulates what applies in cases where the economic benefit from energy saving is either smaller or greater than what was agreed.

The Ministry of Environment, Energy and Climate Change will shortly issue a standard EPC to ensure that the parties thereto shall meet at least the terms ensuring a transparent and beneficial partnership between them with a view to achieving the desired result.

Lastly, the second major component in the development of energy services is the pilot implementation of demonstration projects for the improvement of energy efficiency and the development of energy services in public buildings through Energy Performance Contracts. This pilot action is conducted and organised by CRES and is aimed at successful implementation of energy interventions in public buildings through the provision of energy services by ESCOs.

3.8. STRATEGY TO INCREASE THE NUMBER OF NEARLY ZERO ENERGY BUILDINGS

There is no comprehensive plan for the implementation of the recast directive on buildings (EPBD) and the strategy to increase nearly zero energy buildings yet, except those listed in section 3.1.1.

4. DETERMINATION OF COMPETENT BODIES AND SPECIAL ORGANISATIONS

The primary responsibility for policy implementation and monitoring of national energy targets for improving energy end-use efficiency is borne by the Ministry of Environment, Energy and Climate Change (YPEKA). The Centre for Renewable Energy Sources (CRES), as a support institution, provides technical and scientific assistance to YPEKA. Furthermore, new functions were delegated to the newly established Special Secretariat for the Environment and Energy Inspectorate (SSEEI) of YPEKA to oversee and coordinate the competent departments at local and regional level in implementing the relevant environmental and energy legislation. The Special Service of Energy Inspectors (SSEI) forms part of the SSEEI and is in charge of controlling and monitoring the implementation of Law 3661/2008 and the measures stipulated therein concerning reduction of energy consumption of buildings, and issuing energy efficiency certificates. The Green Fund also plays a key role in monitoring the collection, control and allocation of Green Resources for the implementation of measures and actions to improve energy efficiency.

The body responsible for implementing the energy saving strategy and for monitoring the national indicative target and energy efficiency requirements under Article 7 of Law 3855/2010 is the Ministry of Environment, Energy and Climate Change (YPEKA). Specifically, it monitors and supervises the implementation of measures for achieving the national indicative energy savings target through the provision of energy services and other measures to improve energy efficiency, and prepares a report on their results. The Ministry of Environment, Energy and Climate Change has also the administrative, managing and executive responsibility of implementing the energy efficiency requirements of the "Energy Efficiency Action Plans" and relevant incentives and other measures to improve energy efficiency and those relating to the public and wider public sector.

As part of this project, and especially for obtaining technical and scientific support, the Ministry of Environment, Energy and Climate Change signs programme contracts with the Centre for Renewable Energy Sources (CRES). The support provided by CRES, particularly through studies, action plans and national reports, involves the fulfilment of national obligations under this Law and generally under national and European legislation relating to the energy efficiency of buildings, energy saving, renewable energy sources and cogeneration issues.

Furthermore, the Special Secretariat for the Environment and Energy Inspectorate (SSEEI) was recently established within the Ministry of Environment, Energy and Climatic Change under Article 6 of Law 3818/2010 “Establishment of services and other provisions".

SSEEI’s primary duty is to oversee and coordinate the relevant departments at central, regional, prefectural and local authorities level to ensure the enforcement of environmental and energy legislation.

Furthermore, within the jurisdiction of the Special Secretariat for the Environment and Energy Inspectorate is also the Special Service of Energy Inspectors (SSEI), whose mission is to control and monitor the achievement of the objectives of the national energy policy for energy saving and energy efficiency, as well as the implementation of Law 3661/2008 (Government Gazette, Series I, No 89) "Measures to reduce energy consumption in buildings and other provisions."

The duties of the SSEI include control and monitoring of the process of issuing energy performance certificates and the work of inspectors, monitoring of buildings, inspection of boilers and inspection of air conditioning systems, as well as keeping an electronic Buildings Inspection Record.

It is further in charge of the quality control process concerning the issue of energy performance certificates by Energy Inspectors and the collection, processing and study of the results of the control of energy performance certificates and the inspection of boilers and air conditioning systems.

Law 3889/2010 "Financing environmental interventions, Green Fund, Ratification of forest maps and other provisions" was implemented last October. This Law establishes the Green Fund, a comprehensive and specific financing system for environmental and energy interventions.

Its purpose is to promote development through environmental protection with the management, financial, technical and financial assistance of programs, measures, interventions and activities. Its primary duties are specifically the following:

a. Monitoring the collection, control and allocation of Green Resources.
b. Developing plans for the financing of protection measures and actions, the upgrade and rehabilitation of the environment as part of the environmental and energy policy.
c. Evaluating and selecting the proposals and programmes to be financed, as well as monitoring and ensuring their implementation.
d. Processing, elaborating and changing the general inclusion criteria, selecting programmes and recommending measures, actions and programmes to the Minister for Environment, Energy and Climate.
e. Carrying out the necessary procedures for the selection of individual promoters of the above actions and agreeing with them on the terms and conditions of financing these actions from the Green Resources.
f. Organising, monitoring and promoting the programmes and activities, as well as preparing annual reports on their implementation.

The Green Fund may finance programmes established by the Ministry of Environment, Energy and Climate Change or other Ministries and their supervised entities, decentralised general administrations, local authorities, legal entities of the wider public sector, as defined by the provisions of Article 1 of Law 1256/1982, and unions or other associations of legal and natural persons whose purpose, according to their Articles of Association, is to protect, improve and restore the environment.

The main resources of the Green Fund come from:

a. funding of programmes and initiatives from the EU and other resources from international organizations and environmental aid funds.

c. Profits, interest or other income derived from participation of the Green Fund to other legal persons of private law.

d. Grants and donations by natural or legal persons of public or private law.

e. Revenue from the management, operation and utilization of its movable and immovable property.

f. Grants from the state budget and funding from the public investment programme.

Ministerial Decision 45414/21.10.2010 (Government Gazette, Series II, No 1732/4.11.2010 established the Office of Green Procurement and Environmental Certification Standards in the Department of International Activities and Issues of the European Economic Community's Directorate-General for Planning and Works. The duties of the Offices are:

- To ensure the development and promotion of the use of environmental criteria in public procurement in accordance with the principles of Sustainable Development, and to monitor their implementation, in collaboration with the competent ministries and bodies of public and private Law.
- To ensure implementation and promotion of the strategy on Integrated Product Policy (IPP) which aims at developing the eco-design of products and providing information and incentives for the effective adoption and use of environmentally friendly products to consumers.
- To ensure implementation and promotion of the Community Eco-Label.
- To ensure implementation and promotion of the Community Environmental Management and Audit System (EMAS).
- To study on Green Procurement and Environmental Standards issues under the obligations of Greece towards the European Commission and international organizations.
- To support any kind of Committees and Working Groups set up at ministerial or interministerial level to develop and monitor the implementation of the National Action Plan for Green Public Procurement.
- To ensure continuous updating of the IT database and web services for recording green products, services and projects.
- To keep suppliers up to date on environmental criteria in public procurement and to ensure public awareness raising of the purchase and consumption of green products and services.
- To organise meetings, conferences, events in cooperation with competent bodies and services.
- To be represented in Community and International Meetings.
- To prepare or assign studies and programmes on green procurement and environmental standards.
- To ensure funding and grants to public entities, legal persons of public law, legal persons of private law and environmental NGOs to develop programmes of studies on Green Procurement and Environmental Standards.

The following table summarizes the competent public authorities and relevant bodies responsible for implementing and monitoring measures and actions aimed at improving energy end-use efficiency.

Table 20: Authorities and competent bodies

Tasks	Body 1:	Body 2:	Body 3	Body 4	Body 5	Body 6
	Ministry of Environment, Energy and Climate Change (YPEKA)					
To monitor the national target for Energy Efficiency Improvement under the ESD						
To monitor the public sector for Energy Efficiency Improvement under the ESD	Ministry of Environment, Energy and Climate Change (YPEKA)					
To provide technical and scientific support to YPEKA in the monitoring of the national target for Energy Efficiency Improvement under the ESD		Centre for Renewable Energy Sources (CRES)				
To provide technical and scientific support to YPEKA in the monitoring of the public sector for Energy Efficiency Improvement under the ESD		Centre for Renewable Energy Sources (CRES)				
To supervise and coordinate the relevant agencies at central, regional and prefectural level and at the level of Local Government to			Special Secretariat for the Environment and Energy Inspectorate			

Tasks	Body 1:	Body 2:	Body 3	Body 4	Body 5	Body 6
ensure the enforcement of environmental and energy legislation			**SSEEI**			
To control and monitor the implementation of Law 3661/2008 "Measures to reduce energy consumption in buildings and other provisions."				Special Service of Energy Inspectors (SSEI)		
To monitor the collection, control and allocation of Green Resources for implementation of measures and actions to improve energy efficiency.					Green Fund	
To monitor the process of Green Procurement and Environmental Standards, to issue the Ecolabel, to implement the Environmental Management and Audit System (EMAS).						Office of Green Procurement and Environmental Certification Standards

5. CONCLUSIONS

OVERVIEW OF THE EEAP

This EEAP evaluates all the measures that have been, are being or are planned to be implemented in energy end-use sectors in Greece.

It presents in detail the energy savings estimated to have been achieved by implementing energy efficiency improvement measures with direct reference to the first EEAP, as well as the progress in meeting the intermediate target for energy savings in 2010, based on the “top down” methodology of the European Commission whereby specific energy indicators are calculated using energy data and estimates.

Furthermore, an approximate methodology for evaluating the impact of economic recession in final energy consumption is developed, taking into account the change in economic indicators and energy product prices, to help identify the reduction in energy consumption in relation to the implementation of measures and not taking into account the effects of the recession.

The Action Plan also provides a description of national energy strategies associated with the primary energy savings targets by 2020, and presents the initiatives and actions that are underway to highlight the exemplary role of the public sector in achieving energy savings.

Lastly, it presents the steps taken to promote the energy services market and the objectives for nearly zero energy building, in accordance with the revised Directive on the Energy Performance of Buildings, as well as bodies responsible for policy implementation and monitoring of the progress in achieving the national energy savings target in accordance with Directive 2006/32/EC.

EVALUATION OF EEAP MEASURES / TARGETS

From the analysis of measures to improve energy efficiency it was found that the main actions that were launched from 2007 onwards mainly involved the development of the institutional and regulatory framework for adopting policies, obligations and strategies in all end-use sectors, as part of improving energy efficiency.

Specifically, a comprehensive institutional framework for the energy efficiency and certification of buildings, the technical specifications of new buildings, the obligations of the public sector and energy providers, and the mechanism to monitor and assess progress in the achievement of the national target was developed. This mechanism provides for the processing of Energy Performance Certificates data for buildings already entered in the Energy Inspections File, and the processing of Energy Performance Contracts data, consumption figures of public buildings and final energy consumption data that providers/energy companies are required to notify, from the databases to be created in the near future.

Given that application and implementation of the majority of specific energy efficiency improvement measures by final consumption sector proposed in the first EEAP has already started, they are presented in this Action Plan.

It is noted however that the main policy measures in the residential, tertiary and industrial sectors that have been taken lately are expected to yield after 2010 (e.g. Regulation on the energy performance of buildings, NSRF projects, etc) and will actually contribute to energy savings for the period 2011-2016. This does not apply to the transport sector where the majority of measures were initiated before 2011, and therefore this sector shows the greatest energy savings.

Furthermore, actions aimed at highlighting the exemplary role of the public sector are already underway and mainly involve the adaptation of provisions requiring the implementation of energy saving measures in the public sector and the use of energy efficiency criteria in the public procurement tendering procedures and contracts, into the national law. However, it is necessary to ensure the immediate implementation of these provisions in order to achieve the expected energy savings results.

Moreover, the Greek government, through funding and market mechanism development schemes, is promoting energy upgrade programmes in various types of public buildings, having energy and economic efficiency of interventions as the main criterion for the assessment and eligibility of co-financed projects.

The analysis of energy consumption in all sectors, based on energy balances for the period 2007-2010, shows a rapid decrease in energy consumption during this period. More specifically, despite that the total final energy consumption during the period 1990-2007 shows an increasing trend of about 2.4% per year, this trend was reversed in 2007-2010, with an average annual change of - 3.2% in the years 2007-2009. There is an even more rapid decrease in final energy consumption by -8.1% in the period 2009-2010, leading to an overall decrease in final energy consumption by -13.9% for the period 2007-2010. It is noteworthy that the total final energy consumption in 2010 was estimated at 18.9 Mtoe, reaching the final energy consumption of 2000 (18.7 Mtoe) in absolute terms.

The result of these findings concerning energy consumption is that by applying the standard "top down" methodology for each sector and using only the energy savings assessment indicators as proposed by the EU, the estimated energy savings exceed both the intermediate target for 2010, and the final energy savings target for 2016, reaching 21.37 TWh.

This, combined with the non-initiation of a great part of the specific measures until 2010, as well as the fact that the standard methodology does not take into account the undeniable effect of the economic recession in the final energy consumption, created an urgent need to develop an approximate methodology for evaluating and decoupling the impact of the economic recession in final energy consumption.

The presented methodology of decoupling the impact of the economic recession considers, in effect, three (3) economic indicators, whose application leads to different results of achieved energy savings by end-use sector. Since the methodology developed is a first approach to the impact of the economic recession in energy consumption, it was deemed appropriate to establish a range of savings achieved for the period 2007-2010 and not to present the energy savings in absolute terms. The range of energy savings obtained is the estimated energy savings for the period 2007-2010, which is attributed to the implementation of energy efficiency improvement measures, and reaches 9.3-19.87 TWh, which corresponds to 5.1 to 10.9% of average consumption for the period 2001-2005, compared to 5.1 TWh, which was the intermediate energy savings target (2.8% of average consumption for the period 2001-2005) in 2010.

Furthermore, a methodology based on the scenarios studied during the preparation of the National Action Plan for RES was applied for the calculation of primary energy savings. The total primary energy savings arising under the specific scenarios is equal to 33.1 TWh until 2020. The greatest part of savings is mainly due to the implementation of measures in the final consumption until 2016, most notably due to the measures proposed in the national Energy Efficiency Action Plan. Moreover, savings resulting from the implementation of the projects for the interconnection of the island with the mainland system, as well as the operations for the upgrade and streamlining of the existing power plants, and the operation of district heating networks were also quantified.

PROSPECTS CHALLENGES

The assessment of substantial progress in achieving the national target for 2016 using the methodology presented in this EEAP should currently be rather used as an indication of the trend and progress than as the achieved energy savings, given that the impact and overlaps of the economic recession and the implementation of measures to improve energy efficiency should be analyzed and studied in the longer run.

The implementation of measures and policies that will lead to a substantial reduction in energy consumption is a challenge for the national energy policy. The substantial reduction should be attributed solely to the improvement of energy efficiency and change of consumers' energy behaviour, and not to the difficult economic conditions, which by definition lead to a forced reduction of consumers' expenditure and, consequently, energy consumption. Undoubtedly, the main challenge will be to ensure the continuity of the energy savings trend, especially in applications related to human behaviour, where the necessary support structures should be developed to create the conditions for adoption of these behaviours regardless of whether the economy is in recession.

The completion of planned projects under the NSRF, as detailed in this Action Plan, is expected to contribute to the achievement of specific energy savings figures in all end-use sectors. Furthermore, these projects are designed to have a multiplier effect by mobilizing both market operators and potential beneficiaries to participate in energy saving initiatives beyond the physical object of the projects.

A significant energy savings perspective especially in the tertiary sector is also the integrated development of the energy services market for the first time, where the challenge is both to overcome the obstacles concerning the adoption of the mechanism mainly by public bodies, and to develop trust between ESCOs and operators wishing to sign EPC with them.

Lastly, the reported measures, policies and pilot actions are part of the national energy policy whose main target is achieving energy end-use savings, making optimum use of Renewable Energy Sources in the energy system, security of energy supply, reducing energy intensity, reducing environmental impact and sustainable development of the Greek economy.