2nd NATIONAL ENERGY EFFICIENCY ACTION PLAN OF CYPRUS

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ABBREVIATIONS/DEFINITIONS

MCIT: Ministry of Commerce, Industry and Tourism

CIE: Cyprus Institute of Energy

EEAP: Energy Efficiency Action Plan

toe: tonnes of oil equivalent

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2010 Intermediate Indicative Target: The target adopted by the Republic of Cyprus for 2010 in accordance with the 1st EEAP, amounting to 60 000 tonnes of oil equivalent (toe)

2016 Final Indicative Target: The target adopted by the Republic of Cyprus for 2010 in accordance with the 1st EEAP, amounting to 185 000 tonnes of oil equivalent (toe)

Special Fund: Special Fund for Renewable Energy Sources and Energy Saving

TSO: Transmission System Operator

EAC: Electricity Authority of Cyprus

NZEB: Nearly Zero Energy Buildings

ES: Energy Saving

RES: Renewable Energy Sources

NG = Natural Gas

GPP: Green Public Procurement

Energy Saving Directive: Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Directive 93/76/EEC

Buildings Directive: Directives 2010/31/EU and 2002/91/EC on the energy performance of buildings.

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We also want to express our special thanks to Dr Theodoros Zachariadis, assistant professor at the Cyprus University of Technology, for his invaluable cooperation.

[1] **The following employees of CIE also worked for making energy saving calculations relating to the 2004-2010 Sponsorship Plans: Ioannis Thomas, Marios Manoli, Alexandros Stylianidis, Nikolas Kountouris, Kyriakos Kyrizis. Nikos Chatzinikolaou, an MCIT employee, also worked for making energy saving calculations relating to the application of the Directive on the energy efficiency of buildings.**

Introduction:

The national action plan is submitted to the European Commission in compliance with Article 14 of Directive 2006/32/EC of the European Parliament. The Directive fixes 30 June 2011 as the deadline for submission of the action plan.

Cyprus has used the template created by the European Union, to the degree possible and as far as permitted by available information, for the structure of the national action plan. Given that the template prepared is not mandatory for Member States, it was deemed necessary to provide more detailed and complete information/particulars/data concerning certain aspects – which have to be presented in detail in accordance with the Energy Saving Directive – while providing only available and/or absolutely necessary information concerning other aspects and/or special energy consumption sectors. In every case we have endeavoured to cover all the particulars that must be included in the action plan under the Directive, as well as those requested in the proposed template.

Because of its national peculiarities, namely of having a small and isolated system (as an island state) without interconnections to European or other energy networks (electricity, petroleum, natural gas) and no indigenous energy sources except a small contribution from renewable sources, Cyprus has attached great importance to energy saving and energy efficiency in the last five years, also in compliance with the Energy Saving Directive, as it is the cleanest, most effective and quickest way to achieve all its energy policy objectives. Namely, it has endeavoured to improve energy supply security, increase competitiveness and ensure sustainable development / environmental protection.

There is significant potential for end-use energy efficiency, as referred to in the 1st EEAP too, in buildings and in the transport sector, and also in industry to an extent, as confirmed by the results of the energy saving effort made in 2010 too, and is expected to be achieved by 2016. In summary, through a set of targeted measures implemented from 2004 to 2010 in conjunction with compliance with the Buildings Directive, the country has managed to achieve and exceed the energy saving target set for 2010 and has also laid the foundation for achieving the 2016 target and the national indicative target for primary energy saving in 2020. Thanks to the measures implemented, Cyprus has managed to increase energy awareness among consumers to a great extent. Consequently, the applicable legislation of the European Union has made a big contribution to energy saving and led to other benefits for the economy and employment.

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1 *GENERAL FRAMEWORK OF THE SECOND EEAP*

The 2nd EEAP is a follow-up to the 1st EEAP and presents energy savings information in all the sectors referred to in the 1st EEAP; it also includes measures and information which are not mandatory under the Energy Saving Directive, but can help one realise, to a significant extent, the events , actions and changes taking place in the country concerning energy saving.

It should be noted that the average final consumption in the 2001-2005 reference period was calculated at 1 842 730 toe, taking into account all the assumptions referred to in the 1st EEAP. Cyprus adopted an intermediate indicative target of 60 000 toe, or 3.3% of consumption in the reference period. The final indicative target adopted for 2016 was 185 000 toe, or 10%[2] energy saving as compared to consumption in the reference period. Electricity consumptions were converted into toe by using a factor of 1 kwh = 0.086 * 10^{-3} toe and then they were multiplied by a factor of 3.1, as electricity in Cyprus is generated from heavy fuel oil and the average efficiency is estimated approximately at 32%.

This efficiency factor is expected to change to 2.27 by 2015, as the procedures for importing natural gas to be used in power generation must have been completed by then. This change has not been taken into account in making calculations concerning final-consumption energy savings and the measures to be affected. It was taken into account, however, in drawing up scenarios for the determination of the national indicative target for primary energy savings for 2020. If natural gas reaches Cyprus before the 3rd EEAP is submitted, in June 2014, the necessary corrosions will be made and submitted with the 3rd EEAP.

In accordance with the end-use energy savings targets stated in the 1st EEAP, Cyprus has achieved its targets, as the energy saving achieved in 2010 amounted to **65 729 toe,** corresponding to 3.57% of the average final energy consumption in the period 2001-2005, as compared to the target of 60 000 toe. Concerning the final target for the year 2016, the estimated energy savings to be achieved, thanks to the measures implemented only, will amount to **190 751 toe,** or 10.35% of consumption in the abovementioned period, as compared to 185 000 toe, which is the country's target.

Concerning the national indicative target for primary energy saving, by implementing additional measures other than those implemented by 2010, it will amount to 463 000 toe in 2020 in accordance with a study prepared by MCIT.

It should be noted that the above savings for the years 2010 and 2016 result from measures implemented in the period 2004-2010 and in effect in the year relating to each target, without taking into account the additional measures to be implemented in the years to come, which will also contribute towards the achievement of the 2016 and 2020 targets. As it was evident that the 2010 and 2016 targets are being achieved through the existing measures, it was deemed appropriate to present the estimated savings resulting from additional measures separately.

[2] Under Directive 2006/32/EC on energy end-use efficiency and energy services, the minimum objective shall be 9%.

The following chapters include available information on the measures and energy savings which have been achieved or are expected to be achieved in excess of the obligations set forth in the Energy Saving Directive. In particular, reference is made to the measures implemented or planned in connection with the supply, transmission and distribution of electricity and of the amounts of energy saved, if available. Information is provided on the primary consumption measures and energy savings and on the measures implemented in compliance with the Buildings Directive.

It should be noted that the end-use energy savings measures were presented after being broken down into the same sectors as those used in the 1st EEAP. That is, into the Residential sector, Tertiary sector (Public sector and general government and enterprises), Industrial sector, Transport sector, and finally into horizontal and cross-sectoral measures. This breakdown has been used for purely practical reasons, as the information and savings had been recorded and calculated for these sectors. This also helps compare the calculated savings against those stated in the 1st EEAP more easily.

Calculations for the 2020 target were made thanks to the invaluable cooperation of Dr Theodoros Zachariadis, assistant professor at the Cyprus University of Technology. Moreover, in making end-use energy savings calculations, information was obtained from the Cyprus Institute of Energy, the Special Fund for RES and ES, the IT Services Department, the State Purchasing and Procurement Department, the Road Transport Department, the Electric Services Department, the Transmission System Operator, the Public Works Department, the Union of Cyprus Municipalities and the website of the Cyprus Statistical Service.

1.1 Highlights from the second EEAP

A review of the energy savings measures implemented in the period 2004-2010 indicates that the biggest contribution was made by the residential sector, followed by the tertiary sector (enterprises, public and wider public sector), the transport sector and finally the industrial sector Table 1 presents each sector's contribution towards the achievement of the respective energy savings targets, expressed in toe.

Table 1: Contribution made by the different sectors towards the achievement of energy savings targets

No	Sector	CONTRIBUTION TOWARDS THE INTERMEDIATE INDICATIVE TARGET (2010, 60 000 toe)		CONTRIBUTION TO THE FINAL TARGET (2016, 185 000 toe)		CONTRIBUTION FOR THE YEAR 2020
		toe	%	toe	%	toe
1	*Residential sector*	51 164	85.27%	161 877	87.50%	232 109
2	*Tertiary sector (Public sector and general government and enterprises)*	8 942	14.90%	23 681	12.80%	34 061
3	*Industrial sector (including the agricultural sector)*	1 714	2.86%	1 284	0.69%	1 141
4	*Transport sector*	3 909	6.52%	3 909	2.11%	3 909
TOTAL		65 729	109.55%	19 0751	103.1%	271 220

As expected, the energy savings contribution from the residential sector is the biggest one concerning all targets.

Enterprises and industries are making a substantial contribution towards the achievement of energy savings targets; however, the investments made in these sectors appear to be short-lived (in the industrial sector in particular), and as a result a number of them make no contribution towards the achievement of all targets. Moreover, as far as the industrial sector is concerned, it should be noted that subsidies have been granted for 14 energy savings investments implemented by enterprises which are subject to the Emissions Trading Directive and, as a result, these are exempted from the end-use Energy Saving Directive; however, they will be included in the saving of primary energy. For information purposes, the energy savings resulting from these investments will reach 5 200 toe in 2010.

The transport sector is making a substantial contribution towards the achievement of the targets; however, as not all planned measures have been implemented yet, the resulting savings are quite limited in as compared to the potential for energy savings in this sector.

It should be noted, anyway, that in addition to the fact that the various measures have been assessed and thus we are aware of the efficiency of each one of them, the measures already implemented are enough to achieve the 2010 target and it appears that the 2016 target will also be achieved.

The relevant information and assessment indicates that the 1st EEAP may be called successful, although it could have been more efficient by implementing a number of measures which had been included but proved to be impossible to implement finally. A number of the measures not implemented as part of the 1st EEAP are expected to be implemented as part of the 2nd EEAP to a great extent, as explained in the following paragraphs.

The development and impact of the energy savings measures indicates that Cyprus is capable of saving rather large amounts of energy relatively easily through targeted measures, at least in the first years of implementation of energy savings legislation and energy policy. This is due to the fact that the country had not implemented any specific energy savings policy before its accession to the European Union, due to a lack of relevant legislative frameworks. In the years to come additional energy savings measures are to be implemented in all sectors, as the ones already implemented are still at an early stage and have not yielded maximum results yet.

The main problem arising from the implementation of the 1st EEAP has to do with the gathering of the data required for calculating the energy savings resulting from all the measures implemented in the different sectors, as, in most cases, their format and level of detail are not as adequate as necessary for implementing the proposed methodologies. Moreover, concerning transport in particular, there are no data other than those relating to specific targeted measures implemented in this sector. No top-down methodologies were used for any energy savings calculations due to a total or partial lack of data. An effort is being made by the Energy Service to inform all public departments involved and the Cyprus Statistical Service with a view to keeping the required data, and thus an improvement is expected in this respect.

Table 2 presents the categories of measures implemented in previous years, along with the respective contribution towards the achievement of targets. In the following chapters, the measures are presented in detail.

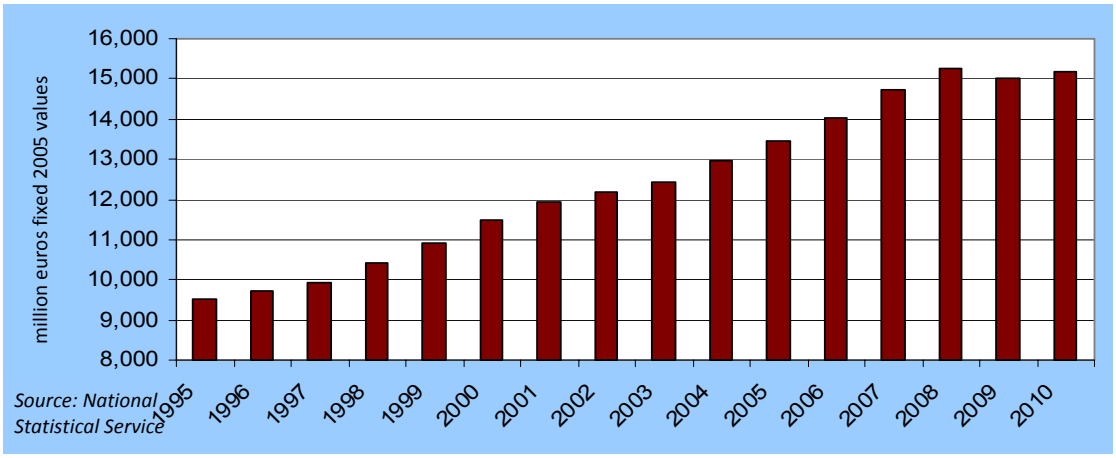
Table 2: Contribution made by the different measures towards the achievement of energy savings targets

No	MEASURE DESCRIPTION	IMPLEMENTATION PERIOD	CONTRIBUTION TOWARDS THE INTERMEDIATE INDICATIVE TARGET (2010, 60 000 toe)		CONTRIBUTION TO THE FINAL INDICATIVE TARGET (2016, 185 000 toe)		CONTRIBUTION FOR THE YEAR 2020
			toe	%	toe	%	toe
1	**BUILDINGS DIRECTIVE**	**2008-**	**17 428**	**29.05%**	**141 905**	**76.71%**	**227 545**
1.1	RESIDENTIAL SECTOR		15 428	25.71%	124 284	67.18%	199 026
1.2	TERTIARY SECTOR		2 000	3.33%	17 621	9.53%	28 519
2	**RES PLANS**		**12 536**	**20.89%**	**12536**	**6.78%**	**12 536**
2.1	RESIDENTIAL SECTOR		11 916	19.86%	11916	6.44%	11 916
2.2	TERTIARY SECTOR - ENTERPRISES	2004-2010	600	1.00%	600	0.32%	600
2.3	INDUSTRIAL SECTOR		10	0.02%	10	0.01%	10
2.4	AGRICULTURAL SECTOR		11	0 02%	11	0.01%	11
3	**ES PLANS**		**17 651**	**29.42%**	**16 616**	**8.98%**	**16 014**
3.1	RESIDENTIAL SECTOR		9 952	16.59%	9 952	5.38%	9 952
3.2	TERTIARY SECTOR - STATE	2004-2009	110	0.18%	110	0.06%	110
3.3	TERTIARY SECTOR - ENTERPRISES		5 896	9.83%	5 291	2.86%	4 832
3.4	INDUSTRIAL SECTOR		1 692	2.82%	1 263	0.68%	1 120
4	**GREEN PROCUREMENT**	2007-2009	**337**	**0.56%**	**59**	0.03%	**0**
5	**TRANSPORT (SCRAPPING)**	2008-2010	**2 825**	**4.71%**	**2 825**	**1.53%**	**2 825**
6	**GRANTS SCHEME FOR VEHICLES**	2004-2009	**1 084**	**1.81%**	**1 084**	0.59%	**1 084**
7	**FLUORESCENT LAMPS**	2007-2011	**13 868**	**23.11%**	**15 725**	8.50%	**11 215**
TOTAL			**65.729**	**109.55%**	**65 729**	**109.55%**	**190 751**

1.2 Energy Savings national plan

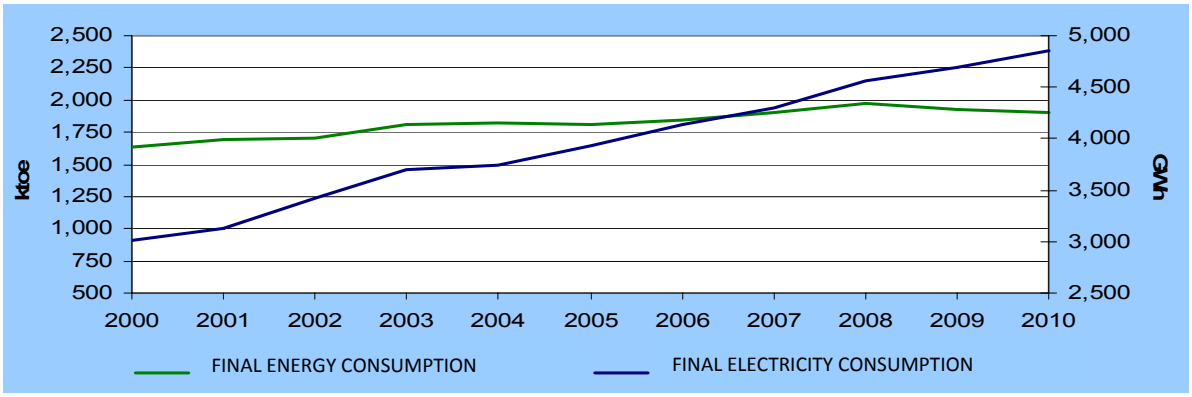
Cyprus has experienced high economic growth rates in recent years, driven by private initiative, investment in construction and export of services. As far as economic activity sectors are concerned, the highest growth rates were realised in construction, banking, real estate and international business units. Due to the impacts of the global economic crisis, which affected Cyprus later, there was a contraction in the economy of Cyprus in 2009 and RES growth rate dropped by -1.7%, as compared to 2008. However, there were signs of rebound in 2010, as the RES growth rate reached rose almost by 1% as compared to 2009. There were increases in the services, financial activities and tourism sectors, but the construction and the wider trade and services sectors experienced negative growth rates. The RES reached EUR 15.17 billion in 2010 (fixed 2005 values).

Table 3: Domestic Gross National Product



Focusing on the last decade, we can see that the energy needs of Cyprus, in line with regional development in Europe, are constantly rising, in pace with the increase in gross domestic product.

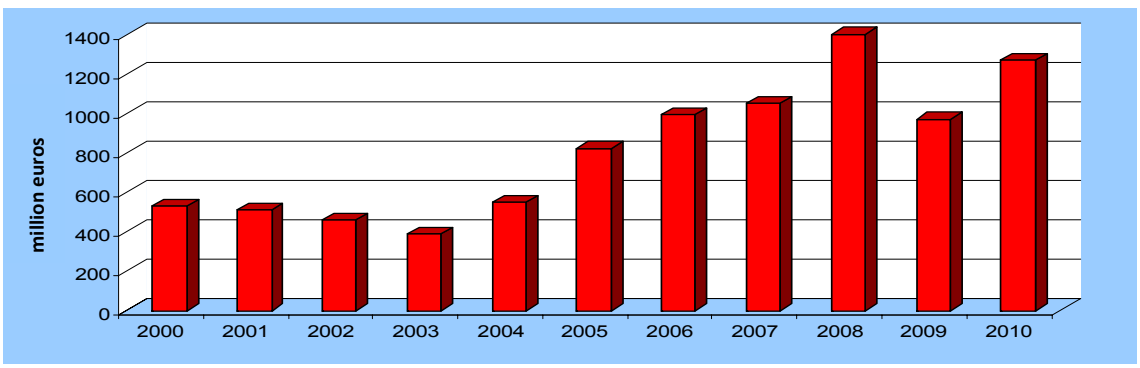
Table 4: Final energy consumption 2000-2010



In 2000-2010, final energy consumption and electricity consumption rose by an annual average rate of 1.7% and 6.1%, respectively, whereas in the same period the gross national product rose by an annual average rate of 3.2%.

Given that domestic energy resources are limited, Cyprus is a highly energy dependent country, whose energy dependence rate is much higher than the EU-27 average. Energy resource import costs are an important parameter affecting national economy growth rate. This cost reached EUR 1 270 million in 2010, representing 19.7% of the total import costs incurred by the Republic of Cyprus, and 7.3% of its gross domestic product.

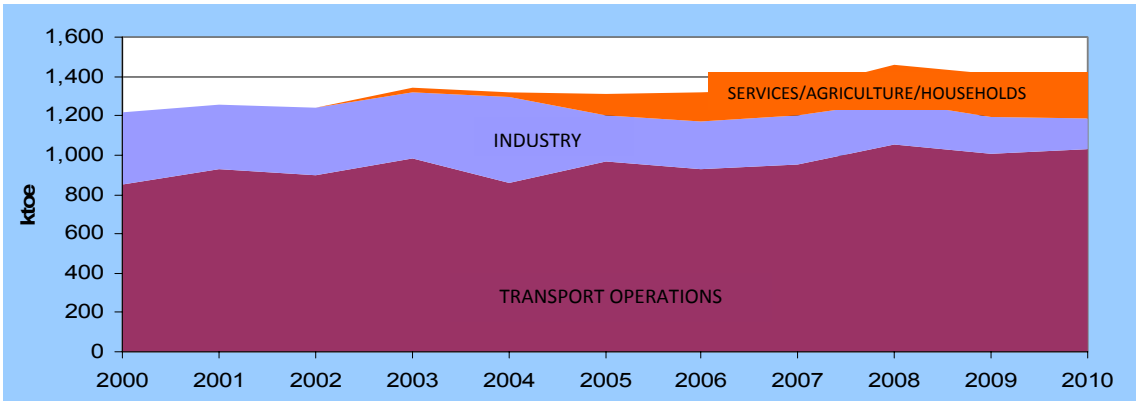
Table 5: Oil Product Imports in Cyprus



As far as the energy intensity of the national economy (i.e. the energy consumed per unit of GDP) is concerned, a positive fact is that, from 1997 to 2007, the ratio of the total energy consumed to the country's GDP dropped by 10.8%, indicating that energy is consumed more efficiently than in the past. However, although Cyprus is in the twelfth highest position, like most newcomers to the EU, it is far from the EU-27 average energy intensity by 25%.

As far as its 2010 total final consumption is concerned, 1.38 million toe of oil products were consumed. Its ratio of the total final consumption was 72.2%, a slight decrease as compared to 79.7% in 2000. Oil products are mainly used in the transport sector, with a consumption of 1.03 million toe, i.e. 74.6% of the total final oil product consumption. Other sectors (services, agriculture, households) consumed 191 000 toe, i.e. 13.9% of the total consumption, and industry consumed 158 000 toe, i.e. 11.5% of the total oil product consumption.
In 2010, 74.5% of the total oil product consumption in transport pertained to road transport operations (766 000 toe).

Table 6. Final Oil Product Consumption



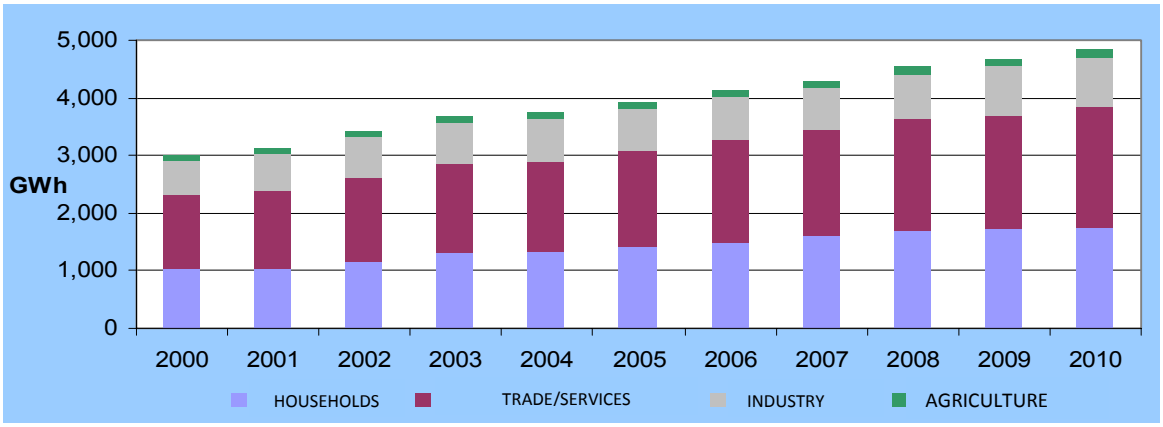
Despite the environmental impacts caused by burning solid fuels, these are preferred by domestic, as well as international, cement industries due to their competitive prices. In 2010, 19 200 toe of solid fuels were used by the domestic cement industry, i.e. 1% of the total end-use energy consumed. This represents a decrease as compared to 2000 (2.1%).

The contribution of RES to the final consumption of energy in 2010 reached 5.3%, i.e. 102 200 toe. Out of this energy, the following amounts were used: 19 100 toe of thermal energy generated from biomass (49.6% in industry, 39.6% in services/households, and 10.8% in agriculture), 61 000 toe generated by hot water producing solar thermal systems (85% was used by households and the rest was used in the services sector), 6 200 toe of RES-generated electricity, and 700 toe of thermal energy generated by low-enthalpy geothermal systems. Finally, 15 000 toe of biofuels were consumed in the transport sector, i.e. 1.96% of the total energy content of the fuels consumed in road transport.

Electricity (generated both by conventional fuels and RES) represented 21.8% (416 000 toe) of the final consumption of energy in 2010, a 60.9% increase as compared to 2000. The increase in the

electricity consumed was caused mainly by the residential and trade sectors, where 1 749 GWh and 2 079 GWh of electricity was consumed, respectively in 2010. This represents an increase of 65.8% and 63.9% for each sector, respectively, as compared to 2000. There was also a 44.8% increase in the energy consumed by the industrial sector in 2010 (860 GWh), as compared to 2000 (594 GWh).

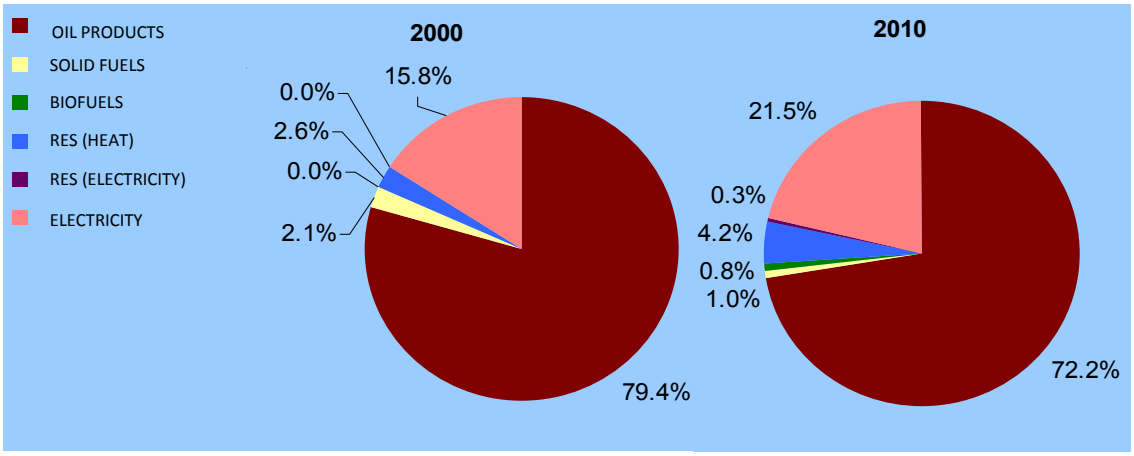
Table 7: Consumption of Electricity per Sector



The primary energy consumed in Cyprus reached almost 2.77 million toe in 2010. This is approximately a 16.4% increase as compared to 2000, when the gross domestic consumption was 2.38 million toe, an annual average increase rate of 1.6%. Oil products had the largest share in the energy mix with approximately 2.65 million toe (95.6%), then came solar energy and other RES (thermal energy and electricity) with 102 200 toe (3.7%), and solid fuels (mainly coal) were last with 19 200 toe (0.7%). This picture has remained almost unchanged over time, with fossil fuels dominating, with a share of almost 96.5% of primary energy in the last decade.

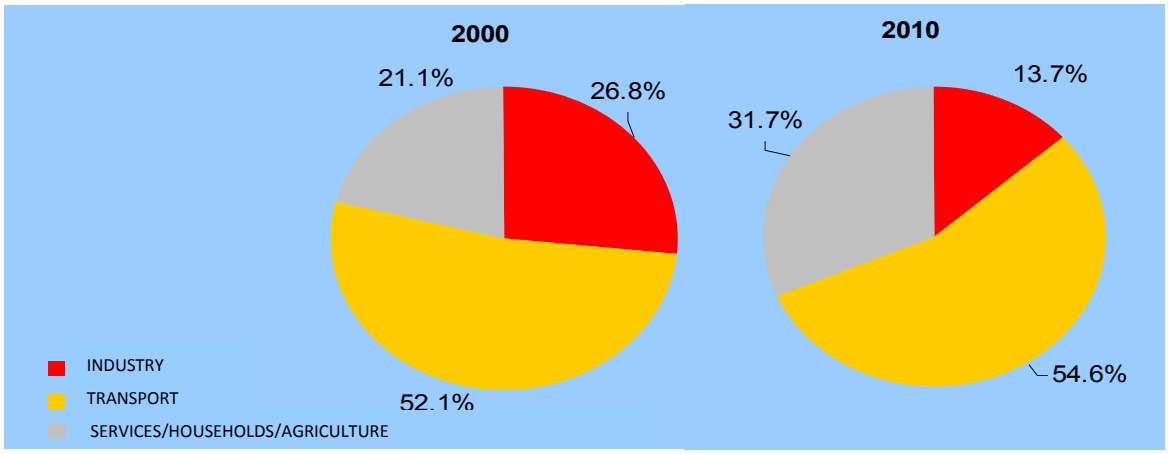
The final consumption of energy in Cyprus rose by 17% in 2000-2010, mainly due to the economic growth, from 1.63 million toe in 2000 to 1.91 million toe in 2010, representing a 6.2% increase in the final consumption of oil products (from 1.29 million toe in 2000 to 1.38 million toe in 2010), and a rather significant increase in the consumption of electricity generated from conventional fuels, i.e. 59.1%, from 258 000 toe in 2000 to 410 000 toe in 2010.

Table 8: Energy Mix – Final Energy Consumption



As far as final energy consumption in individual sectors is concerned, the share of the transport sector in the demand for energy is still the highest, with 1.04 million toe (73.8% in road transport and 26.2% in air transport), a 22.5% increase as compared to 2000 (an average annual increase rate of 2.25%). The respective share of the residential, services and agricultural sectors in the demand was 31.7% in 2010, as compared to 21.1% in 2000, i.e. an average annual increase rate of 7.6% in the reference period). Finally, the share of industry in the final consumption of energy in 2000-2010 dropped from 26.8% to 13.7%.

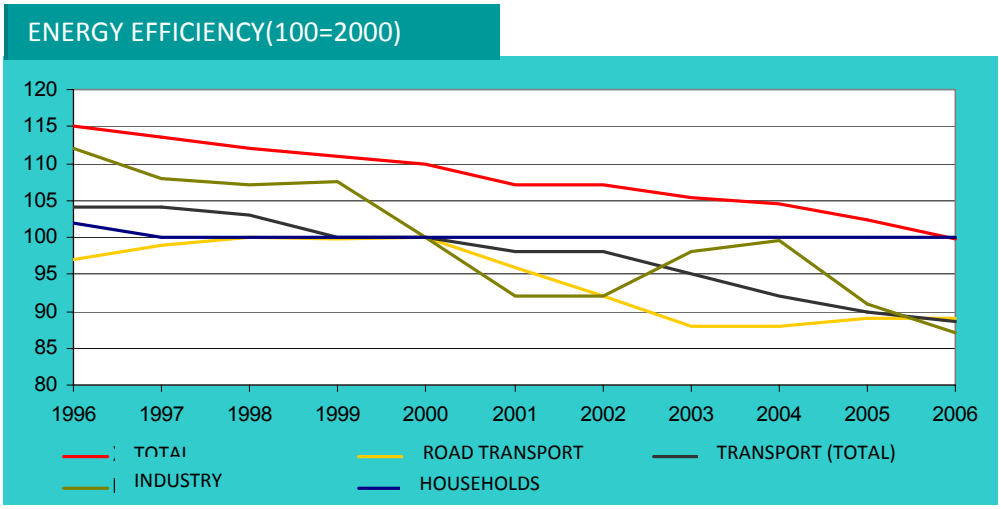
Table 9: Final energy consumption per Sector



The domestic energy system has experienced a steady drop in final energy intensity in recent years. The energy intensity in the industrial sector is rather low as compared to those of other EU Member States, due to the nature of the industrial sector. However, the energy efficiency in the industrial sector has improved significantly, as the branch of industry that is subject to the greenhouse gas emissions trading scheme (which consumes approximately 50% of the total final energy consumed by the industrial sector) has now implemented energy savings measures and used combined heat and power technology (cement industry).

The energy intensity in households is lower than the European average level, which is due to the country's moderate climate; however, it tends to rise as the population's revenues are increasing, the standard of living is rising and more air conditioners are used. Following accession of Cyprus to the EU in 2004, measures and policies have been implemented towards improving the energy efficiency of buildings and domestic appliances.

Table 10: Energy Efficiency



Finally, the energy intensity in the transport sector is among the highest in the EU, mainly due to the large percentage of road transport operations. However, there has been a remarkable improvement in this sector in recent years. The increase in the energy efficiency of private vehicles and the import of smaller and more efficient cars have led to better results although public transport in Cyprus are not adequately developed. The transport sector, along with the electricity generation and building sectors, is one of those sectors that offer a significant potential for energy efficiency improvement. The details on the potential for primary energy savings provided in paragraph 2 and in Annex IV are relevant.

An important financing tool for supporting private investment in energy savings technologies is the Grants Scheme for energy investment in the field of energy saving. The incentives granted include promoting investment initiatives by granting capital aid funding to natural and legal persons, organisations, industries and public sector entities implementing energy savings programmes in enterprises (e.g. BEMS, replacement of energy-consuming equipment with more efficient equipment), in the residential sector (thermal insulation in buildings), in transport (purchasing electric, hybrid, dual propulsion and low CO_2 emissions vehicles) or engaging in the cogeneration of electricity and heat. The Scheme, which has been implemented since February 2004, is financed by the Special Fund for RES and Energy Savings and has been met with great response so far.

The building sector in Cyprus consumes approximately 37% of our total need for energy. On the basis of surveys from the Energy Service, as well as from the experience gained from the operation of the Grants Scheme, the potential for energy savings in the residential sector through the implementation of proper thermal insulation measures is significant, ranging between 25% and 50%, as the case may be. In addition to thermal insulation, another important field where energy can be saved in buildings is that of heating and cooling systems, regular maintenance of which can ensure important energy and environmental benefits.

A long failure to adopt compulsory thermal insulation regulations for new buildings in Cyprus has resulted in the construction of a large number of buildings of poor to average thermal performance which needed increased amounts of energy for maintaining a desired level of comfort, thus resulting in the consumption of increased amounts of energy. Implementing the Directive of the energy

efficiency of buildings is expected to make a significant contribution towards energy savings in the building sector.

1.3 Reviewing energy savings targets and achievements

A review of the 1st EEAP reveals that, in addition to the achievement of all quantitative goals for 2010 and 2016, most individual quantitative estimates for each measure stated were not confirmed. This is mainly due to the fact that a number of measures included in the 1st EEAP have not been implemented yet, or implementation thereof started later than planned, or they are in effect that there are no energy savings calculation data available, and thus the contribution of such measures is lower than expected.

There are certain exceptions, however, such as the Grants Scheme for energy savings in the residential sector, the Grants Scheme for encouraging the use of RES in the residential sector, the campaign for the offer of free Compact Fluorescent Lamps to beneficiaries among domestic electricity consumers, and the Grants Scheme for energy savings in the tertiary sector (existing enterprises), where energy saving has exceeded initial estimates concerning the contribution of such enterprises in the 2010 goal. This is due to the fact that these measures were partly promoted more intensely and were widely accepted by all parties involved (private persons and different groups of professionals).

Table 11 includes all measures (each measure is described in Annex III), as presented in the 1st EEAP, along with the estimated and actual contribution of each measure towards the achievement of each goal.

Table 11: Comparative energy savings data from the 1st EEAP as compared to what has been achieved

	Estimated energy savings in accordance with the 1st EEAP		**Actual calculated energy savings**	
Measures in the residential sector.				
No	Estimated annual energy savings in 2010 (toe)	Estimated annual energy savings in 2016 (toe)	Annual energy savings in 2010 (toe)	Annual energy savings in 2016 (toe)
1	57 297	171 891	**15 428**	**124 284**
2	……	……	……	……
3	10 000	26 667	……	……
4	……	……	……	……
5	8 000	20 000	**9 952**	**9 952**
6	10 000	32 200	**13 868**	**15 725**
7	9 930	13 220	**11 916**	**11 916**
Measures in the tertiary sector.				
1	2 000	6 000	**337**	**59**
2	200	1 000	**110**	**110**
3	……	……	……	……
4	9 168	27 504	**2 000**	**17 621**
5	……	……	……	……
6	1 325	5 300	……	……
7	……	……	……	……
8	800	……	**5 896**	**5 291**
9	610	1530	**600**	**600**
Measures in the industrial sector.				
1	10 000	20 000	**1 692**	**1 263**
2	500	5 000-10 000	……	……

3	500	3 000	……	……
4	1 250	1 900	**21**	**21**
Measures in the transport sector.				
1	2 500	13 750	**1 084**	**1 084**
2	……	50 000	**2 825**	**2 825**
Horizontal and cross-sectoral measures.				
1	……	……	……	……
2	……	……	……	……
3	……	……	……	……
TOTAL	124 080	376 762	**65 729**	**190 751**

Information on each individual measure is provided in the respective paragraph in the following chapters.

In accordance with calculations concerning final energy, the measures implemented so far are expected to result in energy savings of the order to 190 751 toe in 2016. This means that the measures implemented will ensure the achievement of the 2016 marginally. Given, however, that the savings arising from a number of measures which are under development or have just been implemented, for which no safe estimates can be made currently, have not been taken into account in calculating the target for 2016, it is estimated that the implementation of these measures will help exceed this target by far.

In particular, these measures pertain to the implementation of the Buildings Directive for nearly zero energy buildings, the Action Plan for the promotion of Public Transport, the maintenance and inspection of boilers and heating installations, the maintenance and inspection of air conditioning systems of a power of more than 12kW, the minimum requirements on the energy efficiency of buildings undergoing major renovation (Law 142/2006), the Action Plan for the Promotion of Green Public Procurement, and continued implementation of the Plans for Energy Savings and Renewable Energy Sources in the residential, tertiary and industrial sectors.

Detailed information on primary consumption savings is provided in the following chapter. Table 12 presents a short description of the goals set for primary and final energy.

Table 12, Short description of the goals and energy savings (achieved/estimated) concerning primary and final energy.

	Primary energy		**Final energy**		
			Energy saving Directive		**Buildings Directive**
	Target, in toe	**Estimate/forecast, in toe**	**Energy savings targets as set out in the 1st EEAP or amendments thereto, in toe**	**Energy savings target achieved (2010) or calculated/estimated (2016), in toe**	**Target for zero energy buildings**
2010	-	-	60 000	**65 729**	
2015	286 000	256 280			No target has been set yet. The target is expected to be set in 2012.
2016	371 000	343 187	185 000	**190 751**	
2020	463 000	463 303	-	-	100%

2 PRIMARY ENERGY SAVINGS

As part of the National Reformation Plan (NRP) for Cyprus, which is being prepared as part of the Europe 2020 strategy, Cyprus was invited to, and did, set a national primary energy savings target for 2020. The target was 463 000 toe between 2010 and 2020, by implementing additional measures/policies. With a view to ensuring that the 2nd EEAP is a document that contains all the country's energy savings measures and policies (in addition to the scope of Directive 2006/32/EC), by means of the 2nd EEAP, Cyprus is also submitting the National Action Plan for primary energy savings until 2020, presenting a specific timeframe and measures implemented for the achievement of the national indicative primary energy savings target for 2020.

2.1 Primary energy consumption targets and estimates

An energy model was developed in cooperation of Dr Theodoros Zachariadis, assistant professor at the Cyprus University of Technology, for estimating the consumption of energy in Cyprus. It should be noted that the same model had been used for the National Action Plan for Renewable Energy until 2020, which was submitted to the European Commission under Directive 2009/28/EC, as well as for other energy forecasts made by Cyprus Energy Regulatory Authority. The model calculates energy consumption in key fields of activity (agricultural, industrial, residential, tertiary, transport) taking into account official forecasts on macroeconomic indices and fuel prices. It then calculates the share of energy consumption (per sector and per fuel) taking into account the technology cost, the penetration of various new technologies, and the technical and other factors reducing the level of penetration in Cyprus.

It should be noted that the energy model has been partly revised as compared to that used for the Action Plan for RES, since: (a) it uses official data from the energy balance of the years 2005-2009, which means that it takes into account the impacts of the economic crisis on the energy sector; and (b) takes into account the savings calculated on account of measures implemented by the State by 2010 without, however, changing the total potential for savings between the two scenarios, i.e. the one that calculates the contribution of existing measures and policies implemented by 2010 (reference scenario) and the one that calculates additional measures to implemented between 2010 and 2020 (energy efficiency scenario). A more detailed description of the model used and tables presenting the results of energy forecasts are presented in a report attached to Annex IV (a detailed description of energy savings between the 2 scenarios is provided in paragraph 4 of the Annex).

In particular, the reference scenario assumes that no additional (both primary and final consumption) energy savings measures will be implemented after 2010 (both at national and European levels) other than those implemented and/or adopted by law by 2010. That is, this scenario takes into account the continued implementation of the Directives transposed into national legislation by 2010 and calculates the savings resulting from the energy savings grants schemes in effect by 2010, the measure implemented for scrapping older vehicles, etc. It should be noted that energy savings resulting from the Grants Schemes for residential RES, which reduces the amount of energy purchased, is not taken into account as the model has already included forecasts for the penetration of RES until 2020; however, the investments implemented through the Grants Scheme by enterprises engaging in activities falling within the scope of the emissions trading system are taken

into account. Neither does the reference scenario take into account the use of natural gas in power generation until 2020 and assumes that the fuels already used in the sector will continue to be used.

The energy efficiency scenario pertains to forecasts in any energy sector by implementing additional measures other than those implemented by 2010. That is, it assumes that the energy savings grants schemes will be continued for the next ten years, that public transport will be further developed and used, that stricter revised European Directives on energy saving will be transposed in the national legislation (i.e. the Energy Efficiency Action Plan 2011, as prepared by the European Commission, will be implemented at a national scale). It should be noted that, as far as primary consumption is concerned, this scenario has predicted the use of natural gas instead of HFO for power generation from 2015 onwards, in accordance with recent forecasts and estimates.

Following is a summary of the two scenarios and a comparison thereof:

Table 13: Reference Scenario without NG in 2015

Reference scenario without NG in 2015	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gross inland consumption	2799	2821	2880	2935	2992	3051	3107	3156	3202	3243	3280
Fuel inputs for Power generation	1257	1278	1321	1342	1364	1389	1413	1430	1443	1451	1455
RES input for power generation	20	21	22	31	39	46	53	63	74	87	101
Non-energy uses	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*
Final non-electricity consumption	1461	1460	1475	1501	1528	1555	1579	1602	1624	1644	1663
Residential	*179*	*170*	*164*	*158*	*153*	*147*	*141*	*135*	*129*	*124*	*118*
Cement Industry	*143*	*145*	*148*	*153*	*157*	*162*	*166*	*171*	*175*	*179*	*183*
Other Industry + Tertiary	*133*	*133*	*134*	*137*	*139*	*141*	*143*	*145*	*147*	*148*	*150*
Agriculture	*26*	*26*	*26*	*27*	*27*	*28*	*28*	*29*	*29*	*29*	*30*
Road Transport	*723*	*728*	*739*	*755*	*772*	*789*	*805*	*820*	*834*	*847*	*860*
Air Transport	*257*	*259*	*264*	*272*	*280*	*288*	*296*	*303*	*310*	*317*	*323*
National energy consumption	2738	2760	2819	2874	2931	2990	3046	3095	3141	3182	3219

Table 14: Energy efficiency Scenario

Energy efficiency scenario	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gross inland consumption	2792	2796	2835	2870	2908	2765	2736	2761	2783	2801	2817
Fuel inputs for Power generation	1254	1264	1293	1299	1310	1140	1088	1089	1089	1085	1082
RES input for power generation	20	21	22	31	39	46	53	63	74	87	101
Non-energy uses	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*	*61*
Final non-electricity consumption	1457	1451	1460	1478	1498	1518	1534	1548	1559	1568	1573
Residential	*179*	*169*	*162*	*156*	*150*	*144*	*138*	*131*	*125*	*117*	*109*
Cement Industry	*143*	*145*	*148*	*152*	*157*	*161*	*166*	*170*	*175*	*179*	*183*
Other Industry + Tertiary	*133*	*132*	*133*	*134*	*135*	*136*	*137*	*138*	*138*	*137*	*136*
Agriculture	*26*	*26*	*26*	*27*	*27*	*28*	*28*	*29*	*29*	*29*	*30*
Road Transport	*720*	*721*	*728*	*740*	*752*	*764*	*774*	*783*	*791*	*798*	*803*
Air Transport	*256*	*258*	*262*	*269*	*277*	*284*	*291*	*297*	*303*	*308*	*313*
National energy consumption	2731	2735	2774	2809	2847	2704	2675	2700	2722	2740	2756

Table 15: Savings-Efficiency (Reference without NG)

Savings, efficiency - (reference without NG)

(ktoe)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Savings in final non-electricity consumption	4	10	16	23	30	37	46	54	64	76	90
Residential	0	1	1	2	3	3	3	4	5	6	8
Total Industry	0	0	0	0	0	0	0	0	1	1	1
Tertiary	0	1	2	3	4	5	6	7	9	11	14
Agriculture	0	0	0	0	0	0	0	0	0	0	0
Road Transport	3	7	11	15	20	25	31	37	43	50	57
Air Transport	1	1	2	2	3	4	5	6	7	8	10
Savings in final electricity consumption	1	5	11	16	21	26	31	37	42	47	50
Savings in primary electricity production because of savings in final electricity	3	15	29	42	55	58	66	77	87	96	102
Savings in primary electricity due to introduction of natural gas*	0	0	0	0	0	190	259	264	267	270	271
Total savings in primary electricity	3	15	29	42	55	249	325	340	354	365	373
Savings in national energy consumption	7	24	45	65	84	286	371	394	418	442	**463**
	0.2%	0.9%	1.6%	2.3%	2.9%	9.6%	12.2%	12.7%	13.3%	13.9%	**14.4%**

* including energy savings in primary energy from additional measures in trasmission/distribution system

2.2 List of energy savings strategy measures in the primary sector

The key strategy measure for implementing the national potential for energy savings is the use of natural gas in power generation after 2015 (see paragraph 2.3). Moreover, continuation of the grants schemes for energy savings and implementation of stricter laws on energy consumption in all fields of activity are considered important. The potential for energy savings in the road transport sector is deemed to be remarkable. In accordance with the World Statistics 2009 of the International Road Federation 2009, Cyprus has the higher percentage of private vehicles per resident, with 742 vehicles 1000 people. An effort started in mid 2010 towards a further development of Public Transport. In accordance with the plans made by the Ministry of Communications and Works, a target has been set for increasing the contribution of Public Transport from 2% in 2009 to 10% in 2015.

2.3 Primary energy savings measures

In accordance with the above tables, the potential for saving primary energy in 2020 is 463 000 toe, representing a 14.3% saving as compared to the anticipated energy consumption as per the reference scenario. The largest part of the target appears to be achieved thanks to the penetration of natural gas in power generation from 2015 onwards (predicted savings of 271 000 toe due to the use of a different fuel in power generation). The total primary energy savings, in addition to the contribution made by the use of natural gas, is expected to reach 192 000 toe, including 57 000 toe in road transport and 10 000 toe in air transport. The saving of 192 000 toe is achieved through continuation of the Grants Scheme for energy savings and the implementation of additional measures for promoting the cogeneration of electricity and heat and energy audits, implementation of additional legislative measures for primary energy savings at a national scale, as laid down in the Energy Efficiency Action Plan 2011 (taking into account the adoption of additional legislative measures from 2013 onwards, following amendment to the energy saving Directives), additional implementation of legal provisions on energy savings in buildings relating to the inspection of boilers and air conditioners, implementation of the commitments of Municipalities and communities which have prepared, and/or will prepare, Energy Action Plans and implementation of the new Action Plan for Green Public Procurement, as well as implementation of measures in the transport sector.

It should be noted that in setting the compulsory target for the share of RES in the energy balance of Cyprus to 13% until 2020, the same scenarios have been prepared as those providing for a saving of 90 000 toe in the final consumption of electricity in all sectors (residential, tertiary, industrial, agricultural, road transport, air transport) and a saving of 50 ktoe in the end use of electricity. That is, a saving of 140 000 toe in the final consumption of energy (i.e. 192 000 toe of primary energy) has already been taken into account and must be achieved with a view to achieving the compulsory target for RES. This means that the measures presented and proposed (other than that relating to natural gas) also contribute towards the achievement of the target for RES (13% until 2020).

To achieve the target of saving 90 000 toe of primary energy (i.e. savings of 90 000 toe in final, non-electricity consumption in all sectors), the measures to be implemented and the relevant implementation timeframe is presented in the following table:

Table 16: Savings in final, non-electricity consumption

SAVING IN NON-ELECTRICITY											
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
		toe	toe	toe	toe	toe	toe	toe	toe	toe	toe
	RESIDENTIAL SECTOR										
1	**CONTRIBUTION OF ENERGY SAVING PLANS**	**816.9**	**1633.9**	**2450.8**	**3267.7**	**4084.7**	**4901.6**	**5718.5**	**6535.4**	**7352.4**	**8169.3**
1.1	**LOWLAND AREAS**	**619.7**	**1239.4**	**1859.1**	**2478.9**	**3098.6**	**3718.3**	**4338.0**	**4957.7**	**5577.4**	**6197.1**
1.1.1	Thermal insulation - Windows	175.8	351.6	527.4	703.2	879.0	1054.8	1230.6	1406.3	1582.1	1757.9
1.1.2	Thermal insulation - Roofs	398.1	796.2	1194.3	1592.4	1990.5	2388.6	2786.6	3184.7	3582.8	3980.9
1.1.3	Thermal insulation - Walls	45.8	91.7	137.5	183.3	229.1	275.0	320.8	366.6	412.5	458.3
1.2	**MOUNTAINOUS AREAS**	**197.2**	**394.4**	**591.6**	**788.9**	**986.1**	**1183.3**	**1380.5**	**1577.7**	**1774.9**	**1972.2**
1.2.1	Thermal insulation - Windows	59.6	119.2	178.8	238.4	298.0	357.6	417.2	476.8	536.3	595.9
1.2.2	Thermal insulation - Roofs	121.9	243.7	365.6	487.4	609.3	731.1	853.0	974.9	1096.7	1218.6
1.2.3	Thermal insulation - Walls	15.8	31.5	47.3	63.1	78.8	94.6	110.4	126.1	141.9	157.6
2	**Maintenance and inspection of boilers and heating installations.**	**300.0**	**1500.0**	**3000.0**	**5000.0**	**7000.0**	**9000.0**	**11000.0**	**12500.0**	**13500.0**	**15000.0**
	RESIDENTIAL SECTOR TOTAL	**1116.9**	**3133.9**	**5450.8**	**8267.7**	**11084.7**	**13901.6**	**16718.5**	**19035.4**	**20852.4**	**23169.3**
	RESIDENTIAL SECTOR TARGET	**705.9**	**1354.1**	**1960.6**	**2518.4**	**3026.5**	**3480.2**	**3883.0**	**4904.3**	**6439.1**	**8376.6**
	TERTIARY SECTOR										
3	**CONTRIBUTION OF ENERGY SAVING PLANS**	**69.4**	**138.8**	**208.2**	**277.6**	**347.0**	**416.4**	**485.8**	**555.2**	**624.6**	**694.0**
4	**Maintenance and inspection of boilers and heating installations.**	**200.0**	**500.0**	**900.0**	**1100.0**	**1400.0**	**1700.0**	**2000.0**	**2300.0**	**2750.0**	**3000.0**
5	**Implementation of the Energy Eff. Plan 2011 prepared by the EU**	**0.0**	**0.0**	**150.0**	**300.0**	**500.0**	**800.0**	**2000.0**	**5000.0**	**8000.0**	**10000.0**
6	**High Efficiency Cogeneration (Grants Schemes)**	**500.0**	**1000.0**	**1500.0**	**2000.0**	**2500.0**	**3000.0**	**3500.0**	**4000.0**	**4500.0**	**5079.0**
	TERTIARY SECTOR TOTAL	**269.4**	**638.8**	**1258.2**	**1677.6**	**2247.0**	**2916.4**	**4485.8**	**7855.2**	**11374.6**	**18773.0**
	TERTIARY SECTOR TARGET	**919.7**	**1852.4**	**2813.6**	**3800.8**	**4812.6**	**5834.6**	**6870.9**	**8618.9**	**11076.9**	**14228.9**
	INDUSTRIAL SECTOR										
7	**CONTRIBUTION OF ENERGY SAVING PLANS**	**6.2**	**12.3**	**18.5**	**24.7**	**30.9**	**37.0**	**43.2**	**49.4**	**55.5**	**61.7**
8	**High Efficiency Cogeneration (Grants Schemes)**	**800.0**	**2000.0**	**3500.0**	**6000.0**	**9000.0**	**12000.0**	**14500.0**	**17500.0**	**20000.0**	**22227.0**
	INDUSTRIAL SECTOR TOTAL	**806.2**	**2012.3**	**3518.5**	**6024.7**	**9030.9**	**12037.0**	**14543.2**	**17549.4**	**20055.5**	**22288.7**
	INDUSTRIAL SECTOR TARGET	**58.0**	**118.5**	**183.0**	**251.3**	**323.4**	**398.8**	**477.6**	**559.5**	**644.3**	**731.8**
	AGRICULTURAL SECTOR										
9	**CONTRIBUTION OF ENERGY SAVING PLANS**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	AGRICULTURAL SECTOR TARGET	**2.6**	**5.3**	**8.0**	**10.9**	**13.9**	**16.9**	**20.0**	**23.1**	**26.3**	**29.5**
	TRANSPORT SECTOR TARGET	**6913.2**	**10857.6**	**15232.1**	**20022.5**	**25233.0**	**30810.1**	**36775.0**	**43119.9**	**49834.3**	**56904.7**
	AIR TRANSPORT TARGET	**1074.0**	**1701.7**	**2413.6**	**3208.3**	**4088.2**	**5040.8**	**6073.3**	**7185.3**	**8375.5**	**9642.2**
	TOTAL/TARGET	**9673.4**	**15889.5**	**22610.9**	**29812.2**	**37497.6**	**45581.5**	**54099.8**	**64411.0**	**76396.4**	**89913.7**
	TOTAL CONTRIBUTION OF ALL MEASURES (ON CONDITION THAT TARGETS ARE ACHIEVED IN THE TRANSPORT AND AIR TRANSPORT SECTORS)	**9379.7**	**16344.3**	**24373.2**	**33200.8**	**42683.7**	**52706.0**	**64095.8**	**77245.2**	**90492.3**	**130777.9**

As compared to the target for the transport industry, the savings target of 57 000 toe by implementing additional measures (relevant are measures M3. and M4 under paragraph 3.3.2) must be achieved through measures to be implemented by the Road Transport Department for further promoting Public Transport, through the plan for scrapping older vehicles with more recent low-fuel cars and possibly through the imposition of charges relating to CO_2 emissions on vehicles. The saving of 57 000 toe in transport, between the reference scenario and the energy efficiency scenario, has already been set as a goal in the Action Plan for the development of RES too, as submitted to the EU under Directive 2009/28/EC, as detailed in Annex IV too. To achieve the target of saving 102 000 toe of primary energy (i.e. saving of 50,000 toe in final energy consumption) because of savings in end-use electricity , the measures to be implemented and the relevant implementation timeframe is presented in the following table:

Table 17: Savings in final electricity because of savings in final electricity

SAVINGS IN ELECTRICITY											
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
		toe	**toe**	**toe**	**toe**	**toe**	**toe**	**toe**	**toe**	**toe**	**toe**
	RESIDENTIAL SECTOR										
1	**CONTRIBUTION OF ENERGY SAVING PLANS**	**332**	**658**	**976**	**1287**	**1373**	**1542**	**1779**	**2010**	**2236**	**2457**
1.1	**LOWLAND AREAS**	**271**	**536**	**795**	**1049**	**1119**	**1257**	**1450**	**1638**	**1822**	**2002**
1.1.1	Thermal insulation - Windows	77	152	226	297	317	357	411	465	517	568
1.1.2	Thermal insulation - Roofs	174	344	511	674	719	807	931	1052	1171	1286
1.1.3	Thermal insulation - Walls	20	40	59	78	83	93	107	121	135	148
1.2	**MOUNTAINOUS AREAS**	**62**	**122**	**180**	**238**	**254**	**285**	**329**	**372**	**414**	**455**
1.2.1	Thermal insulation - Windows	19	37	55	72	77	86	99	112	125	137
1.2.2	Thermal insulation - Roofs	38	75	112	147	157	176	203	230	256	281
1.2.3	Thermal insulation - Walls	5	10	14	19	20	23	26	30	33	36
3	**Maintenance and inspection of air conditioning systems of an effective rated output of more than 12 kW.**	**177.5**	**702.2**	**1302.3**	**1975**	**2272.7**	**2745.3**	**3256.7**	**3756.5**	**4245.1**	**4591.7**
	RESIDENTIAL SECTOR TOTAL	**510.0**	**1359.8**	**2277.9**	**3261.9**	**3645.6**	**4287.7**	**5035.5**	**5766.4**	**6480.9**	**7048.4**
	TERTIARY SECTOR										
4	TERTIARY SECTOR – CONTRIBUTION - SCHEME	1517	2664	3952	5212	5561	6248	7205	8141	9057	9952
5	**Maintenance and inspection of air conditioning systems of an effective rated output of more than 12 kW.**	178	527	868	1288	1466	1716	2035	2482	2852	3280
6	**Implementation of the Energy Eff. Plan 2011 prepared by the EU**	0	0	868	2577	5865	10295	13570	16770	19899	22959
7	**Green Public Procurement**	89	176	260	344	367	412	475	537	597	656
8	**CONTRIBUTION – Municipalities' Action Plans – Agreement concluded by Mayors**	0	1000	2000	2500	4000	5500	7000	8500	10500	12815
	TERTIARY SECTOR TOTAL	**1783**	**4366**	**7949**	**11920**	**17259**	**24170**	**30285**	**36430**	**42905**	**49661**
	INDUSTRIAL SECTOR										
9	**CONTRIBUTION - PLANS**	**734**	**1289**	**1912**	**2522**	**2691**	**3024**	**3487**	**3940**	**4383**	**4816**
	TOTAL/TARGET	**14697**	**28.688**	**42.373**	**54.616**	**58.443**	**65.779**	**76.869**	**86.814**	**95.653**	**101673.6**
	TOTAL CONTRIBUTION OF ALL MEASURES	**3028**	**7015**	**12139**	**17704**	**23596**	**31482**	**38808**	**46137**	**53769**	**61526**
	TOTAL SAVINGS IN ELECTRICITY AND NON-ELECTRICITY	**12407**	**23359**	**36512**	**50905**	**66280**	**84187**	**102904**	**123382**	**144261**	**192303**

The energy savings resulting from the implementation of the measures relating to the continuation of the Grants Scheme is calculated as follows:

Table 18: Contribution of Grants Schemes towards primary energy savings

CONTRIBUTION OF GRANTS SCHEMES			
RESIDENTIAL SECTOR			
	LOWLAND AREAS	**MOUNTAINOUS AREAS**	**TOTAL**
ES PLAN	8199	2427	10626
TERTIARY SECTOR			
ES PLAN	10646		
COGENERATION PLAN	5079		
TERTIARY SECTOR TOTAL	15725		
INDUSTRIAL SECTOR			
ES PLAN	4878		
COGENERATION PLAN	22227		
INDUSTRIAL SECTOR TOTAL	27105		
GRANTS SCHEMES TOTAL IN ALL SECTORS	**53455.5**		

Timeframes and budget for the Special Fund relating to measures associated with grants in the field of energy savings and contribution thereof towards energy savings as shown in the tables below:

Table 19: Timeframe and budget for the Special Fund for Grants Schemes for ES in existing dwellings 2011-2020

Grants Scheme for energy savings in existing dwellings	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Budget (€)	€ 52 680 000									
Number of requests	28 400									
Contribution towards energy savings (toe) in 2020	10 626									

Table 20: Timeframe and budget for the Special Fund for Grants Schemes for ES in existing enterprises 2011-2020

Grants Scheme for energy savings in existing enterprises (tertiary and industrial sectors)	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Budget (€)	€ 8 383 277.68									
Number of requests	774									
Contribution towards energy savings (toe) in 2020	15 524									

Table 21: Timeframe and budget for the Special Fund for Grants Schemes for high efficiency cogeneration 2011-2020

Grants Scheme for cogeneration of high efficiency heat and power and/or cooling	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Budget (€)	€ 16 200 000									
Number of requests	124									
Contribution towards energy savings (toe) in 2020	13 000									

Table 22: Aggregate data on energy savings and on the budget for the Grants Scheme for ES and Cogeneration for the period 2011-2020

TOTAL REQUESTS IN ALL CATEGORIES	**29 298**
BUDGET TOTAL IN ALL CATEGORIES	**€ 77 263 278**
ENERGY SAVINGS TOTAL IN ALL CATEGORIES FOR 2020 (TOE)	**53 455.5**

The per cent contribution of all measures towards the achievement of the national indicative target for saving 463 000 toe of primary energy by 2020 is shown in the table below:

Table 23: Contribution of Measures towards the achievement of the Primary Energy Savings target

Measures for implementing the primary energy savings target (463 000 toe by 2020)	Energy savings (toe)	Per cent contribution towards the achievement of the target (%)
Energy savings due to the use of natural gas in power generation from 2015 onwards and due to energy savings measures in the distribution system	271 000	58.5
Energy savings due to continuation of the Grants Schemes for energy savings	53 500	11.5
Energy savings due to gradual implementation of new compulsory legislative measures promoted by the EU through the EU Energy Efficiency Action Plan 2011	33 000	7.1
Energy savings due to interventions implemented through compulsory maintenance and inspection of boilers and air conditioning systems of an effective rated output of more than 12 kW	25 900	5.6
Energy savings due to additional energy savings measures in transport	56 900	12.3
Energy savings due to measures in air transport	9 600	2.1
Energy savings due to implementation of the new Action Plan and Green Public Procurement	700	0.1
Energy savings due to implementation of the Grants Schemes for energy savings	12 800	2.8
TOTAL	**463 400**	**100**

It should be noted that the national action plan for the achievement of the national indicative primary energy savings target will be revised and resubmitted in 2014 as part of the 3rd EEAP, possibly with relevant modifications, taking into account the progress made in implementing the plan by the reference year.

2.3.1 Energy savings measures in supply

The most important measure towards improving energy efficiency in power generation (transformation sector) is expected to be the use of natural gas in power plants through combined cycle technology in power generation.

2.3.2 Energy savings measures in the transmission and distribution of electricity

As mentioned above, the TSO, in cooperation with the Electricity Authority of Cyprus, has studied and promoted the implementation of a number of measures to be implemented in the following decade with a view to increasing the efficiency of the transmission network by reducing energy losses and saving energy.

Taking into account the projects included in the approved Ten-year Plan for the Development of the Transmission System, the project planned exclusively for energy savings purposes is the development of capacitor units in transmission substations. The project will be implemented with a view to improving the power factor of substations. Capacitor banks will be connected to the medium voltage busbars (11 kV) of substations. Improving the power factor is aimed primarily to reducing thermal losses in the transmission system. Moreover, the active power capacity of the system equipment, such as interconnections, power transformers and generators, is also improved.

In addition, the construction of new interconnections of increased capacity (Rubus Twin type) between power plants and cities, aimed primarily at ensuring the long-term reliability of the operation of the transmission system, will result in significant energy savings in the period in question (2011-2016) as compared to ordinary transmission lines.

Table 24: Energy efficiency measures to be implemented in the transmission and distribution of electricity

	Measure Description	Implementation Period	Energy savings in the period 2011-2016(toe)	Budget
1	Installation of new 125 MVArs Capacitor Banks in 11kV busbars in selected transmission substations	2011-2016	1 766	€4 410 000
2	Construction of Rubus Twin type overhead lines between Power Plants (PPs) and Cities: • Vasiliko PP – Tseri Substation • Vasiliko PP – Moni PP • Vasiliko PP – Alambra Substation	2011-2016	5 771	€7 647 205

The average annual load loss coefficient used to calculate annual energy savings was equal LLF = 0.36.

2.3.3 Other measures relating to primary energy savings

As far as the utilisation of the national potential for high efficiency cogeneration of heat and power (HECHP) is concerned, a relevant assessment for Cyprus indicated a potential for primary energy savings due to new cogeneration plants in Cyprus as shown in the tables below:

Table 25: Primary energy savings due to cogeneration plants per year and per type of activity in MWh

	Primary Energy Savings		
Field of activity	**2010**	**2015**	**2020**
	(MWh)	**(MWh)**	**(MWh)**
Hotels	19.289	61.725	152.479
Hospitals	1.706	5.459	17.290
Office buildings & shops	3.614	11.563	21.840
TERTIARY SECTOR TOTAL	**24.608**	**78.747**	**191.609**
Food, drink and tobacco industries	23.596	45.506	158.210
Non-metallic minerals	11.378	249.523	499045
Non-iron minerals	576	57.633	128.073
INDUSTRIAL SECTOR TOTAL	**35.550**	**382.662**	**785.329**
Agriculture & Stock Farming	30.381	97.220	110.573
Biogas	16.472	52.711	59.951
Waste Treatment and Landfills	6.318	20.218	22.995
TOTAL	**113.330**	**631.557**	**1.170.457**

Table 26: Primary energy savings due to cogeneration plants per year and per type of activity in toe

Field of activity	**2010 (toe)**	**2015 (toe)**	**2020 (toe)**
Hotels	1.659	5.308	13.113
Hospitals	147	469	1.487
Office buildings & shops	311	994	1.878
TERTIARY SECTOR TOTAL	**2.116**	**6.772**	**16.478**
Food, drink and tobacco industries	2.029	3.914	13.606
Non-metal minerals	979	21.459	42.917
Non-iron minerals	50	4.956	11.014

INDUSTRIAL SECTOR TOTAL	**3.057**	**32.909**	**67.538**
Agriculture & Stock Farming	2.613	8.361	9.509
Biogas	1.417	4.533	5.156
Waste Treatment and Landfills	543	1.739	1.978
TOTAL	**9.746**	**54.314**	**100.659**

To develop the potential for cogeneration of heat and power in Cyprus, in accordance with the Assessment of the National Potential for Cogeneration in Cyprus, additional capital grants should be provided to small and very small HECHP systems (tertiary sector systems of an electric capacity of less than 1 MWe), in addition to making sure that the tariff of the generated electricity fed into the EAC Network is approximately at the same level as the long-term marginal cost incurred for electricity generation (in Cyprus the feed-in tariff has been set at the same level as the purchasing cost of RES-generated energy, which is calculated on the basis of the prevention cost for EAC). In accordance with the assessment, HECHP systems of an electric capacity of less than 1 MWe in the industrial sector should receive 20% capital grants, and 'high efficiency cogeneration of heat and power' systems installed in buildings in the tertiary sector or small systems in other sectors should receive 30% capital grants. Finally, in accordance with the assessment, large HECHP systems (1-30 MWe) mainly in the industrial sector are less sensitive to fuel price changes and are able to remain viable without any capital grants, only by setting an attractive feed-in tariff for the cogenerated electric energy fed into the network (feed-in tariff).

Given the fact that so far no interest has been expressed for investing in high efficiency cogeneration plants in Cyprus and taking into account the climatic conditions and the lack of natural gas in the energy mix, it is estimated that it will be difficult to achieve such levels of penetration of cogeneration as provided for in the assessment by 2020.

For the purposes of the 2nd EEAP, it is estimated that the potential for primary energy savings due to cogeneration until 2020 will be at the same level as that predicted by the assessment for 2015. Consequently, it is estimated that the potential for primary energy savings due to cogeneration until 2020 will be of the order of 54 134 toe (124 MWe).

To realise this potential, grants schemes must be planned and implemented with a view to encouraging such investments, in accordance with the conclusions of the assessment, mainly concerning the provision of capital investments. It should be noted that, within the framework of the 3rd EEAP and in accordance with the level of penetration of HECHP systems by that time, the HECHP target for 2020 may be revised.

Taking into account the primary energy savings realised in the examples presented in the assessment (by the use of conventional fuels other than natural gas), a cogeneration investment in buildings in the tertiary sector (less than 1 MWe) may result in primary energy savings of the order of 4.5 TJ, i.e. approximately 105 toe annually, an investment in buildings in the tertiary sector (more than 1 MWe) may result in primary energy savings of the order of 20 TJ, i.e. approximately 470 toe

annually, and an investment in an industrial plant (non-metal minerals - more than 1 MWe) may result in energy savings of the order of 37 TJ, i.e. approximately 900 toe.

To realise savings of 6 772 toe, as calculated in the assessment for the tertiary sector until 2015, an acknowledgement has been made that 3/4 of the systems will be less than 1 MWe and 1/4 of the systems will be more than 1 MWe. The capital grant that corresponds to saving 3/4 of the 6 772 toe (i.e. savings of 5 079 toe) must be equal to 30% of the initial cost, i.e. approximately €165 000 per investment of an initial cost of approximately €550 000. A total of 47 investments in buildings in the tertiary sector will receive grants, resulting in a total cost for the special fund amounting to EUR 7.7 million in the period 2011-2020.

As far as industry is concerned, it is estimated that 1/4 of the potential for the saving of 32 909 toe, relating to HECHP systems in the industrial sector, will pertain to systems of a capacity of less than 1 MWe, which will receive, in accordance with the assessment, capital grants equal to 20% of the initial cost. This means that 8 227 toe will be saved by systems receiving grants equal to 20% of the initial cost (initial investment cost amounting approximately to €550 000), with a grant amounting approximately to €110 000. In accordance with the above, a total of 77 investments will receive grants, resulting in a total cost for the special fund amounting to EUR 8.5 million in the period 2011-2020.

The total cost for the special fund for realising the potential for primary energy savings due to cogeneration is expected to reach EUR 16.2 million for the period 2011-2020 and will pertain to grants provided to a total of 124 HECHP systems (of an installed capacity of less than 1 MWe), which will help save at least 13 000 toe.

It is also estimated that systems of more than 1 MWe installed without any capital grants, which however will take advantage of the subsidy offered for the sale of the generated electricity to EAC, will be no more than 25-27 and will help save another 14 000 toe.

Consequently, it is estimated that approximately half of the total potential for energy savings due to cogeneration for 2020 (54 314 toe, corresponding to 124.4 MWe) will be realised, i.e. cogeneration systems of a capacity of 62 MWe will be installed by 2020 resulting in saving 27 000 toe of primary energy (13 000 toe from the 124 systems of a capacity of less than 1 MWe and 14 000 toe from the 25-27 systems of a capacity of more than 1 MWe) .

It should be noted that, on the basis of the experience gained during the first year of operation of the scheme, the criteria of the Grants Scheme will be reassessed with a view to making sure that the amount of EUR 16.2 million to be spent on the promotion of HECHP systems in Cyprus is allocated in the best possible way so as to achieve the maximum possible levels of energy savings due to cogeneration in Cyprus.

No other measures have been planned so far for primary energy savings purposes, or there are no available data to be submitted other than the ones described in the above paragraphs.

3 *END-USE ENERGY SAVINGS*

This chapter includes a detailed presentation of the end-use energy savings targets and of the progress made towards the achievement of these targets. Information is presented on zero energy buildings and relevant developments. The methodologies used in calculating energy savings are detailed. Information is presented concerning the Public Sector and its responsibility to become a role model. Finally, reference is made to specific aspects of the Energy Saving Directive (purchasing energy services, ensuring the availability of advice and information, etc.) and the progress made or actions planned.

3.1 Review and achievement of end-use energy savings targets

This paragraph provides information on the achievement of the end-use energy savings targets for 2010 and 2016 and on the targets relating to nearly zero energy buildings.

3.1.1 National end-use energy savings targets and progress thereof

In accordance with energy savings calculations relating to the measures implemented in previous years, Cyprus has been achieving its targets stated in the 1st EEAP, as the energy saving achieved in 2010 amounted to 65 729 toe, corresponding to 3.57% of the average final energy consumption in the period 2001-2005, as compared to the target of 60 000 toe. Concerning the final target for the year 2016, the estimated energy savings to be achieved, thanks to the measures implemented only, will amount to 190 751 toe, or 10.35% of consumption in the abovementioned period, as compared to 185 000 toe, which is the country's target. Furthermore, the table below includes a separate presentation of the energy savings to be achieved in 2016 due to measures which are expected or estimated to be implemented in the period 2011-2020.

Table 27. Overview of final energy savings due to measures included in the Energy Saving Directive

		End-use energy savings target		End-use energy savings target achieved or calculated	
		Absolute value in toe	***Savings percentage (%) as compared to the average final energy consumption stated in the 1st EEAP***	**Absolute value in toe**	***Savings percentage (%) as compared to the average final consumption stated in the 1st EEAP***
Contribution of measures already implemented and to be implemented by 31/12/2010	2010 (interim period)	**60 .000**	**3.3**	**65 729**	**3.57**
	2016 (final period)	**185 000**	**10**	**190 751**	**10.35**

Contribution of measures expected to be implemented after 31/12/2010	2010 (interim period)				
	2016 (final period)	**185 000**	**10**	**83 828**	**4.55**

3.1.1.1 Achievement of the interim end-use energy savings target in 2010

In accordance with calculations of the energy savings achieved due to the measures implemented, the interim target of 60 000 toe (3.3% of the average final energy consumption in the period 2001-2005) as stated in the 1st EEAP for 2010 is achieved, as the energy savings achieved amounted to **65 729 toe** (3.57% of the consumption in the above period). The energy savings achieved exceeded the target set, i.e. 9.5%. This is primarily due to the successful operation of the Grants Schemes for Energy Savings and Renewable Energy Sources, which were operated on an intensified basis in the period 2004-2009 and contributed towards the achievement of the target by 31 272 toe (12 537 toe from RES Schemes, 17 651 toe from Energy Savings Schemes, and 1 084 toe from Energy Savings Schemes for vehicles), to the Buildings Directive, which contributed by 17 428 toe, to the free lamp offering campaign, which contributed by 13 868 toe, to the Vehicle Scrapping Plan, which contributed by 2 825 toe, and finally to the Green Public Procurement, which contributed by 337 toe.

3.1.1.2 Expected end-use energy savings as compared to the final target in the year 2016

In accordance with an evaluation of the measures implemented in previous years, the target of 185 000 toe for 2016 (10% of the average final energy consumption in the period 2001-2005) as stated in the 1st EEAP appears to be achieved, as the energy savings to be achieved is calculated to **190 751 toe** (10.35% of the consumption in the above period). The energy savings achieved exceeded the target set, i.e. 3%. If we also include the possible savings resulting from measures which are expected to be implemented in the following years, the energy savings are expected to reach 274 579 toe, or 15 % of the consumption in the reference period. The largest contribution towards the achievement of this target is made by the Buildings Directive relating to the minimum requirements for the energy efficiency of new dwellings and buildings, as the energy savings resulting from the implementation of this measure is expected to reach 141 905 toe, or 77% of the target. The Grants Schemes for Energy Savings and Renewable Energy Sources contribute by 30 237 toe, (12 537 toe from RES Schemes, 16 616 toe from Energy Savings Schemes, and 1 084 toe from Energy Savings Schemes for vehicles), the free lamp offering campaign contributes by 15 725 toe, the Vehicle Scrapping Plan contributes by 2 825 toe, and finally the Green Public Procurement contributes by 59 toe. In case the target is not achieved and the contribution of the Buildings Directive is not realised, the additional measures referred to above have already been initiated and will be intensified, if necessary, in the period 2014-2016.

3.1.2 National targets for zero energy buildings

The Energy Service of the MCIT, in cooperation with experts, will prepare a study in 2011 with a view to determining the technical and financial parameters of NZEBs.

- Setting the target for the penetration percentage of NZEBs per type of building.
- Laying down a certification plan for all parties involved in the design and construction of NZEBs in accordance with their degree of involvement in the project.
- Setting out financial incentives, if necessary.
- Laying down a plan/programme for reviewing minimum energy efficiency requirements in conjunction with the optimum financial level, so as to ensure the smoothest possible transition to NZEBs.
- Targeted information to groups of professionals and parties directly involved in the real estate market.

Consequently, no target has been implemented for 2015.

3.1.3 Other energy savings targets, achievements and/or forecasts

No targets have been set or adopted other than the ones described in the above paragraphs, at least at a national level.

3.2 List of strategy measures affecting the demand for final energy

The strategies and measures implemented with a view to realizing end-use energy savings are detailed in paragraphs 3.1, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10. Measures and strategies affecting the demand for end-use energy are described in paragraph 2 and in Annex IV.

3.3 Final-consumption measures and energy savings

This paragraph includes a presentation of all methodologies (national ones or those proposed under the Energy Saving Directive), to the maximum possible degree of detail, implemented for calculating the energy savings resulting from the measures implemented in previous years. Any national methodologies used are described in Annex II. Annex II also includes tables with the calculations relating to the methodologies used. Finally, there is a detailed presentation of all measures adopted, or expected to be adopted, in the following years.

3.3.1 Calculation methodologies

In calculating energy savings, national methodologies and some of those proposed within the framework of Directive 2006/32/EC were used in most of the cases, due to the lack of all requested information. Only bottom-up methodologies are referred to and described below, as no top-down ones have been used.

1. **Methodology used in calculating energy savings in buildings within the framework of the Buildings Directive (Measures OIK.1 , T3).**

The Regulation of the Energy Efficiency of Buildings Laws of 2006 and 2009 enable the Minister for Commerce, Industry and Tourism to lay down by decree the minimum energy efficiency requirements for new buildings and buildings of a floor area of more than one thousand square metres undergoing major renovation. The first decree was issued on 21 December 2007 and the minimum requirements pertained only to maximum thermal transmittance coefficients. The second decree, which entered into force on 1 January 2010, laid down the same thermal transmittance coefficients, but set the following minimum requirements: achievement of the average thermal transmittance coefficient and issue of an energy efficiency certificate for energy efficiency class II. In calculating energy savings levels, the buildings deemed to have been constructed in accordance with the first Ministerial Decree were considered as having the maximum thermal transmittance coefficients. The buildings deemed to have been constructed in accordance with the second Ministerial Decree were considered as having lower thermal transmittance coefficients, since as the issue of an energy efficiency certificate for energy efficiency class II is a holistic energy requirement leading indirectly to lower thermal transmittance coefficients for the individual structural components. To calculate the thermal transmittance coefficients of the individual structural components of energy efficiency class II buildings, calculations have been made by the SBEMcy software, which simulates the Building Energy Efficiency Calculation Methodology.

The methodology is described, including all acknowledgements, in paragraph 1.1 of Annex II.

2. Methodology used in calculating savings due to the fluorescent lamp campaign (Measure OIK.3)

In calculating energy savings, the methodology proposed on page 77 (2.9 Replacement or new installation of Lamps in residential buildings) was used with the following acknowledgements:

- As there were no available data on the average power of the lamps being replaced, a predefined value of 47kWh/year was taken as the energy savings per lamp, as described in table 1.2, page 84, in the proposed methodologies section.
- The predefined value of 1000 hours/year was taken as the average operating hours, as described in table 1.2, page 84, in the proposed methodologies section.
- The average life cycle of the lamps distributed in 2007, 2008 and 2010-2011 is 6 000, 8 000 and 10 000 hours, respectively. Consequently the lamps distributed in 2007 and 2008 did not contribute towards the achievement of the target for 2016.
- A coefficient of 3.1 for electricity was used in making the calculation, as referred to in the introduction to the 1st chapter.

Calculation tables are attached to paragraph 1.2 of Annex II.

3. Methodology used in calculating savings due to the Grants Scheme for Energy Savings in the Residential Sector – Thermal insulation in windows, walls, roofs (Measure OIK.2)

In calculating energy savings, the methodology proposed on page 65 (2.2 Insulation refurbishment measures applied to building components (walls, roofs, windows) in existing residential and tertiary buildings) was used with the following acknowledgements:

- We knew that, out of all requests made, 81% pertained to windows, 8% to walls, and 11% to roofs.
- The requests were broken down into lowland area requests (elevation of less than 600 m) and mountainous area requests for each province (Nicosia, Larnaca, Paphos, Limassol, Ammochostos).
- They were also broken down into existing and newly constructed houses (those built during the operation of the Grants Scheme, having obtained a building permit prior to the entry into force of the law on the compulsory thermal insulation of houses).
- Since 27 000 investments were realised and subsidised in the period 2004-2009 falling within the above subcategories and the data required for the formula were not available in electronic format, a sample of 1 340 requests was taken.
- On the basis of the sample requests taken, the average value for each type of investment (lowland areas, mountainous areas), the thermal transmittance coefficient (U-Value) after the investment, and the square metres of the investment were calculated.
- Since no thermal transmittance coefficient (U-Value) was required by the Scheme before the investment during the request submittal period, it was acknowledged, in accordance with the practice followed for the construction of houses before entry into force of the laws on the compulsory thermal insulation of houses, that windows had single glazing, walls were built with one layer of bricks and ordinary plaster, and roofs had no thermal insulation at all. By using these acknowledgements, the thermal transmittance coefficients were calculated for the above 3 categories.
- As far as the degree days required by the energy savings calculation formula are concerned, in accordance with the data provided by the Meteorological Service for 35 stations in lowland areas and 14 stations in mountainous areas, an individual average value was calculated for each province both for lowland and mountainous areas.
- On the basis of the data provided by the Energy Service and the Institute of Energy, approximately 85% of the houses use conventional fuel boilers for heating and 15% of them use an electrical resistor.
- The predefined values referred to on page 65 were used for the coefficients a, b, and c required in the proposed methodology.
- A factor of 3.1 was used for electricity.

For practical reasons, paragraph 1.3 of Annex II includes only the method used for calculating energy savings for windows in newly-constructed buildings in Nicosia both in lowland and mountainous areas.

As the proposed methodology calculates energy savings only for heating, in the case of cooling-related calculations, the methodology used by the Energy Service, along with all its acknowledgments, is referred to in the abovementioned paragraph of Annex II.

4. Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Independent Photovoltaic Systems and Independent Photovoltaic Systems used for drawing water (Measures OIK.4.1, OIK.4.2, T.5.1, B.2.3, B.2.4)

In calculating energy savings due to Independent Photovoltaic Systems, the national methodology described in paragraph 1.4 of Annex II was used.

5. Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Residential solar hot water systems (Measure OIK.4.3)

In calculating energy savings, the methodology proposed on page 73 (2.7 Solar water heating in residential and tertiary buildings) was used with the following acknowledgements:

- Since this category pertained to 37 396 systems subsidised in the period 2004-2008 and the data required for the formula were not in electronic format, a random sample of 2 500 requests, in all years, was taken.
- The sample was used to determine the annual energy generated by each system. Then the average square metres of the collectors per installed system and the average energy generated per system and per year were determined. The average values were used in calculating all requests.
- The following formula was used to determine the annual energy generated by each system in the sample:

TSC*AEG/3600, where:

TSC: The total area of the solar collectors installed for a system (m^2)

AEG: Annual energy generated (GJ/m^2), in accordance with the official statistics provided by Eurostat on solar hot water systems. Following are the relevant data for Cyprus:

YEAR	AEG (GJ/m^2)
2005	2 368
2006	2 368

2007	2 800
2008	2 800

3600: The result is divided by 3600 in order to convert energy values from GJ into MWh.

- The value used for the coefficient $\eta_{stock\_average\_heating\_system}$ in the proposed methodology was 1, as there were no available data.
- 70% of the systems replaced are deemed to be (as stated in the 1st EEAP) conventional fuel boilers and 30% were deemed to be electric systems.
- A factor of 3.1 was used for electricity.

Calculation tables are attached to paragraph 1.5 of Annex II.

6. Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Residential space heating and/or cooling systems (Measure OIK.4.4, T.5.2, B.2.1)

In calculating energy savings, the national methodology described in paragraph 1.6 of Annex II was used.

7. Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Central active solar hot water systems (Measures OIK.4.5, T.5.3, B.2.2)

In calculating energy savings, the national methodology described in paragraph 1.7 of Annex II was used.

8. Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Solar swimming pool heating systems (Measures OIK.4.6, T.5.4)

In calculating energy savings, the national methodology described in paragraph 1.8 of Annex II was used.

9. Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Heat pump with a geoexchange used for space heating and cooling (Measures OIK.4.7, T.5.5)

In calculating energy savings, the national methodology described in paragraph 1.9 of Annex II was used.

10. Methodology used in calculating savings due to the Green Public Procurement Grants Scheme – Fluorescent lamps in the Public Sector (Measure T.1.1)

In calculating energy savings, the methodology proposed on page 77 (2.9 Replacement or new installation of Lamps in residential buildings) was used with the following acknowledgements:

- As there were no available data on the average power of the lamps being replaced, a predefined value of 118kWh/year was taken as the energy savings per lamp, as described in table 1.2, page 84, in the proposed methodologies section.
- The predefined value of 2,500 hours/year was taken as the average operating hours, as described in table 1.2, page 84, in the proposed methodologies section.
- The average life cycle of the lamps distributed in the period 2007-2011 is 6 000 hours. Consequently the lamps distributed in 2007 and 2008 did not contribute towards the achievement of the target for 2010 and the lamps expected to be distributed in 2011 will not contribute towards the achievement of any target.
- A coefficient of 3.1 for electricity was used in making the calculation, as referred to in the introduction to the 1st chapter.

The data on lamps (quantities, types, etc.) were provided by the State Purchasing and Procurement Department. Calculation tables are attached to paragraph 1.10 of Annex II.

11. Methodology used in calculating savings due to the Green Public Procurement Grants Scheme – Replacement and/or installation of new air conditioners in the Public Sector (Measure T.1.2)

In calculating energy savings, the methodology proposed on page 71 (2.6 Installation or replacement of air conditioning split system (<12kW) in residential and tertiary buildings) was used with the following acknowledgements:

REPLACEMENT OF AIR CONDITIONERS

- The predefined value of 2.50 was used for the EERaverage parameter, like in the software (ISBEM) used for issuing energy efficiency certificates for buildings in Cyprus.
- The data for the EER best_perf_on_market parameter per type of air conditioner and per year were provided by the Electrical Services Department of Cyprus, which is responsible for the replacement of air conditioners and application of the measure in question.
- The power for each type of air conditioner (Pfn) per year was provided by the Electrical and Mechanical Services Department.
- The annual operating horus (nsh parameter) were set to 1400. This value was provided by the Electrical Services Department.

- The predefined value of 58%, as referred to in the methodology, was used for the fu coefficient.
- The expected life cycle of air conditioners was set to 10 years, on the basis of the predefined value referred to in the table on page 86.

INSTALLATION OF NEW AIR CONDITIONERS

- Concerning the EERaverage parameter, it was held that, if the measure was not implemented in 2007, the parameter would be 2.50 for the installation of air conditioners, whereas it would be 2.86 or 2.84 for the years 2008 and 2009 (in accordance with the power of the air conditioner).
- The data for the EER best_perf_on_market parameter per type of air conditioner and per year were provided by the Electrical and Mechanical Services Department of Cyprus, which is responsible for the replacement of air conditioners and application of the measure in question.
- The power for each type of air conditioner (Pfn) per year was provided by the Electrical and Mechanical Services Department.
- The annual operating hours (nsh parameter) were set to 1400. This value was provided by the Electrical and Mechanical Services Department.
- The predefined value of 58%, as referred to in the methodology, was used for the fu coefficient.
- The expected life cycle of air conditioners was set to 10 years, on the basis of the predefined value referred to in the table on page 86.

Calculation tables are attached to paragraph 1.11 of Annex II.

12. Methodology used in calculating savings due to the Green Public Procurement Grants Scheme – Replacement of office computers in the Public Sector (Measure T.1.3)

In calculating energy savings, the predefined values referred to in table 1.2 on page 84 and in the table on page 86, in the proposed methodology section, were used. In particular:

- The predefined value of 39kWh/year was used for the energy savings per computer.
- The predefined value of 3 years was used for the average life cycle.
- A coefficient of 3.1 for electricity was used in making the calculation, as referred to in the introduction to the 1st chapter.

The data on computers (quantities per year) were provided by the IT Services Department. Calculation tables are attached to paragraph 1.12 of Annex II.

13. **Methodology used in calculating savings due to the Green Public Procurement Grants Scheme – Replacement of computer monitors (Measure T.1.4)**

In calculating energy savings, the predefined values referred to in table 1.2 on page 84 and in the table on page 86, in the proposed methodology section, were used. In particular:

- The predefined value of 11kWh/year was used for the energy savings per computer.
- The predefined value of 3 years was used for the average life cycle.
- A coefficient of 3.1 for electricity was used in making the calculation, as referred to in the introduction to the 1st chapter.

The data on computers (quantities per year) were provided by the IT Services Department. Calculation tables are attached to paragraph 1.13 of Annex II.

14. **Methodology used in calculating savings due to the Grants Scheme for Energy Savings in the Public Sector, in the wider Public Sector and in the Tertiary and Industrial Sectors - (Measure T.2.1, T.4 and B.1.)**

In calculating energy savings, the national methodologies described in paragraph 1.14 of Annex II were used.

15. **Methodology used in calculating energy savings due to the Grants Scheme for Energy Savings in the Transport Sector (Hybrid, electric and low-emission vehicles) – (Measures M.1.1, M.1.2, M.1.3)**

In calculating energy savings, the national methodology described in paragraph 1.15 of Annex II was used.

16. **Methodology used in calculating energy savings due to the vehicle scrapping plan (Measure M.2)**

In calculating energy savings, the national methodology described in paragraph 1.16 of Annex II was used.

3.3.2 All measures individually

This paragraph presents all the individual measures implemented in Cyprus in the period 2004-2010, as well as those expected to be implemented in the period 2011-2020. As mentioned above, the measures have been broken down into five sectors:

- Residential sector
- Tertiary sector (Enterprises, Public and Wider Public Sector)
- Industrial sector

- Transport sector
- Horizontal measures

Four (4) measures were implemented in the Residential Sector (OIK.1-OIK.4) by 2010 and another five (5) measures are expected to be implemented (OIK.5-OIK.9) by 2020. Five (5) measures have been implemented in the Tertiary Sector (T.1.-T.5.) and another eight (8) measures are expected to be implemented (T.6.-T.13.). by 2020. Two (2) measures have been implemented in the Industrial Sector (B.1-B.2.) and another three (3) measures are expected to be implemented (B.3 -B.5) by 2020. Two (2) measures have been implemented in the Transport Sector (M.1.-M.2.) and another two (2) measures are expected to be implemented by 2020. Finally, twelve (12) horizontal measures have been implemented (O.1-O.12), eleven (11) of which are still in effect and are expected to remain in effect in the following years.

RESIDENTIAL SECTOR

Table 28. Measure OIK.1: Energy efficiency of new dwellings.

Title of the energy efficiency improvement measure (EEI)		All new dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2008, Expiry date: - These codes, which have been in effect since 2008, were revised in 2010 and another revision thereof is expected before 2016.
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of new buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Residential sector buildings
	Target group	New dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006).
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). • The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	National methodology. Described in Annex II.
	Energy savings achieved in 2010.*	**15 428 toe**
	Energy savings expected in 2016.*	**124 284 toe**
	Energy savings expected in 2020 (if possible).	**199 026 toe**

	Assumptions*	In calculating energy savings, data were received from the National Statistical Service concerning the average number of dwellings constructed annually. The slight annual increase in the number of dwellings constructed was not taken into account in making calculations. Moreover, it was deemed that 90% of the dwellings are using a conventional heating system, as compared to 10% which are using an electric resistor. As far as cooling is concerned, it was deemed that all dwellings are using electric air conditioning systems.
	Overlaps	Not applicable

Table 29. Measure OIK.2: Grants Scheme for energy savings in the residential sector (existing dwellings) 2004-2009.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for energy savings in the residential sector (existing dwellings).
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2009.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants for realising energy savings (ES) investments. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to purchasing and installing new materials. The investments must pertain to established technologies/materials, not those that are still at a research and development stage. Following installation of the new thermal insulation materials, the respective thermal transmittance coefficients shall be achieved as laid down in the Minimum Energy Efficiency Requirements Decree. The purpose of this measure is, on the one hand, to ensure that thermal insulation is installed in as many existing or new dwellings constructed prior to application of the laws on compulsory thermal insulation in new dwellings as possible and, on the other hand, to increase energy saving awareness in the population.
	End-use category	Residential sector buildings
	Target group	Existing dwellings
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Thermal insulation (walls) Thermal insulation (windows) Thermal insulation (roofs)
	Budget and source	€ 32 072 646 (pertains to all the above subcategories) The data were provided by the Special Fund for Renewable Energy Sources and Energy Saving
	Implementing organisation	Special Fund for RES and ES

	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	A sample of 1 338 requests was taken from the 26 982 investments realised under the above categories, as the data required for calculating energy savings were not in electronic format. The sample was used to calculate the thermal transmittance coefficient (u-value) and the average square metres of the investment in each individual, and then the bottom-up methodology was used, as referred to on page 64 in the section with the methodologies proposed by the European Commission for each type of investment. The above methodology pertains to calculating energy savings for heating systems. As for cooling systems, the national methodology described in Annex II was used.
	Energy savings achieved in 2010.*	**9 952 toe** Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1
	Energy savings expected in 2016.*	**9 952 toe** Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1
	Energy savings expected in 2020 (if possible).	**9 952 toe** Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1
	Assumptions*	During the implementation of the measure, a total of 26 982 investments were realised under the above subcategories. Following are the investments realised broken down per category: Investment Category — No of investments Thermal insulation - Walls — 2 176 Thermal insulation - Windows — 21 86 Thermal insulation - Roofs — 2 93 Concerning heating-related energy savings calculations, since degree days measurements are collected from 49 different stations in the territory of Cyprus, it is practically difficult and time-consuming to correlate the area where an investment is to be realised to the respective measurement station, and thus the average degree days per province was used for the calculations. Moreover, for calculation purposes, it was deemed that 85% of the dwellings are using a conventional heating system, as compared to 15% which are using an electric resistor. Concerning cooing, the assumptions are referred to in Annex I.
	Overlaps	Not applicable

Table 30. Measure OIK.3: Distribution of free compact fluorescent lamps

Title of the energy efficiency improvement measure (EEI)		Distribution of free fluorescent lamps
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2007, Expiry date: 2011.
	Purpose / short description	The measure pertains to the free distribution of 6 compact fluorescent lamps to each residential electricity consumer in the period 2006-2010 by virtue of a decision taken by the Council of Ministers. Beneficiaries are all residential consumers of EAC falling within price categories 05, 06, 07 and 08, as well as all Non-profit Organisations, Churches, Schools, Welfare Associations and Charity Institutions. Families with many children and Non-profit organisations, Churches, etc. are entitled to 10 compact fluorescent lamps. As it was impossible to distribute all lamps by the end of 2010, it was decided to extent the period of distribution to 2011. The purpose of this measure is to get people acquainted with new lighting technologies, to promote these lamps as they help save large amounts of energy, as well as make a contribution towards the achievement of energy savings targets.
	End-use category	Buildings in the residential and tertiary sectors (Non-profit Organisations, Churches, Schools, Welfare Associations and Charity Institutions).
	Target group	All building in the above two sectors.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Decision No 62.738Z of the Council of Ministers of 13/10/2005.
	Budget and source	€ 2 713 138 The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	The bottom-up methodology was used, as referred to on page 77 in the section with the methodologies proposed by the European Commission, with certain acknowledgements referred to in Annex II.
	Energy savings achieved in 2010.*	**13 868 toe**
	Energy savings expected in 2016.*	**15 725 toe**
	Energy savings expected in 2020 (if	

	possible).	**11 215 toe**
	Assumptions*	During the implementation of the measure, a total of 2 001 748 compact fluorescent lamps were distributed. Following are the quantities broken down per year: YEAR QUANTITY 207 7374 200 373.37 2010 30.000 201 89.000 The lamps are deemed to have replaced older conventional lamps immediately.
	Overlaps	Not applicable

Table 31. Measure OIK.4: Grants scheme to encourage the use of RES in the residential sector, 2004-2010

Title of the energy efficiency improvement measure (EEI)		Grants scheme to encourage the use of RES (end use) in the residential sector.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2010.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants and/or subsidies for realising investments encouraging the use of Renewable Energy Sources (RES). The Scheme covers investments relating to purchasing and installing new equipment. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. The purpose of the measure is to promote RES in the residential sector, to increase awareness concerning RES among ordinary people, to make a contribution towards the achievement of RES and Energy Saving targets.
	End-use category	Residential sector buildings
	Target group	1. natural persons residing permanently in areas under the control of the Republic of Cyprus, insofar as they do not exercise an economic activity. 2. Organisations which provide services to society as a whole and other services of a social or individual nature (school boards, charitable institutions, monasteries, churches, municipalities, communities, state agencies, etc.) which are active in areas under the control of the Republic of Cyprus, insofar as they do not exercise an economic activity.
	Area of application	All of Cyprus
Information concerning	**List and description of actions for measure verification**	• Independent photovoltaic systems • Household solar systems

<table>
<tr><td rowspan="4">implementation</td><td></td><td>• Space heating/cooling by solar energy
• Central active solar hot water systems
• Solar swimming pool heating systems
• Heat pump with a geoexchange used for space heating and cooling</td></tr>
<tr><td>Budget and source</td><td>€ 14 658 440
The data were provided by the Special Fund for RES and ES.</td></tr>
<tr><td>Implementing organisation</td><td>Special Fund for RES and ES</td></tr>
<tr><td>Competent monitoring authority</td><td>Energy Service – Ministry of Commerce, Industry and Tourism</td></tr>
<tr><td rowspan="6">Energy savings*</td><td>Method used for monitoring/calculating energy savings</td><td>In calculating energy savings for each type of investment, the national methodologies described Annex II were used.</td></tr>
<tr><td>Energy savings achieved in 2010.*</td><td>11 916 toe
Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1</td></tr>
<tr><td>Energy savings expected in 2016.*</td><td>11 916 toe
Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1</td></tr>
<tr><td>Energy savings expected in 2020 (if possible).</td><td>11 916 toe
Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1</td></tr>
<tr><td>Assumptions*</td><td>During the implementation of the measure, a total of 38,099 systems were installed under the above subcategories. Following are the quantities broken down per subcategory:
Investment Category — Number of systems
Independent photovoltaic systems — 286
Household solar systems — 37.396
Space heating/cooling by solar energy — 77
Central active solar hot water systems — 1
Solar swimming pool heating systems — 37
Heat pump with a geoexchange used for space heating and cooling — 84
TOTAL — 38.099</td></tr>
<tr><td>Overlaps</td><td>Not applicable</td></tr>
</table>

Table 32. Measure OIK.5: Energy efficiency of dwellings undergoing major renovation

Title of the energy efficiency improvement measure (EEI)		All existing dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), which undergo comprehensive renovation (as specified in the relevant law) must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2008, Expiry date: These codes, which have been in effect since 2008, were revised in 2010 and another revision thereof is expected before 2016.
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of new buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Existing residential sector buildings
	Target group	Existing dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006).
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). • The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service and are not based on factual data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**600 toe**
	Energy savings expected in 2020 (if possible).	**0 toe**
	Assumptions*	There are no specific data available. The Energy Service intends to gather data and submit them with the 3rd EEAP.

	Overlaps	Not applicable

Table 33. Measure OIK.6: Maintenance and inspection of boilers and heating installations

Title of the energy efficiency improvement measure (EEI)		Maintenance and inspection of boilers and heating installations at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2009, Expiry date:
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Residential sector buildings
	Target group	Existing dwellings
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). • The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service and are not based on factual data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**9,000 toe**
	Energy savings expected in 2020 (if possible).	**15,000 toe**
	Assumptions*	There are no specific data available. The Energy Service intends to gather data and submit them with the 3rd EEAP.
	Overlaps	Not applicable

Table 34. Measure OIK.7: Maintenance and inspection of air conditioning systems of an effective rated output of more than 12 kW.

Title of the energy efficiency improvement measure (EEI)		Maintenance and inspection of air conditioning systems with effective rated output greater than 12 kW at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2009, Expiry date: -
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Residential sector buildings
	Target group	Existing dwellings
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). • The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service and are not based on factual data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**4,000 toe**
	Energy savings expected in 2020 (if possible).	**7,000 toe**
	Assumptions*	There are no specific data available. The Energy Service intends to gather data and submit them with the 3rd EEAP.
	Overlaps	Not applicable

Table 35. Measure OIK.8: Grants Scheme for energy savings in the residential sector (existing dwellings) 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for energy savings in the residential sector (existing dwellings) for the period 2011-2020.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants for realising energy savings (ES) investments. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to purchasing and installing new materials. The investments must pertain to established technologies/materials, not those that are still at a research and development stage. Following installation of the new thermal insulation materials, the respective thermal transmittance coefficients shall be achieved as laid down in the Minimum Energy Efficiency Requirements Decree. The purpose of this measure is to ensure that thermal insulation is installed in as many existing dwellings constructed prior to application of the laws on compulsory thermal insulation in new dwellings as possible.
	End-use category	Residential sector buildings
	Target group	Existing dwellings.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Thermal insulation (windows) Thermal insulation (walls) Thermal insulation (roofs)
	Budget and source	€ 52 680 000 (pertains to all the above subcategories). In particular, the following amounts are expected to be granted per category: Windows € 35 488 423 Roofs € 6 097 76 Walls € 11 093 831 Estimate made by the Energy Service.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	In calculating energy savings, the findings from the operation of the Grants Scheme for the period 2004-2009 were used. In particular, the average energy savings levels per type of investment were used, which were multiplied by the estimated number of investments to be implemented in the period in question.

	Energy savings achieved in 2010.*	Not applicable
	Energy savings expected in 2016.*	**7 148 toe** Windows 2 057 · Roofs 4 553 · Walls 538 · TOTAL 7 148
	Energy savings expected in 2020 (if possible).	**11 914 toe** Windows .9 · Roofs 7 588 · Walls 97 · TOTAL 11 94
	Assumptions*	Based on estimates, during the implementation of the measure, a total of 28 400 investments will be realised under the above subcategories. Following are the estimated investments realised broken down per category: Thermal insulation (windows) 19 134 Thermal insulation (walls) 5 980 Thermal insulation (roofs) 3 287
	Overlaps	Not applicable

Table 36. Measure OIK.9: Grants scheme to encourage the use of RES in the residential sector, 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants scheme to encourage the use of RES (end use) in the residential sector.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2010, Expiry date: 2020.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants and/or subsidies for realising investments encouraging the use of Renewable Energy Sources (RES). The Scheme covers investments relating to purchasing and installing new equipment. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. The purpose of the measure is to promote RES in the residential sector, to increase awareness concerning RES among ordinary people, to make a contribution towards the achievement of RES and Energy Saving targets.

	End-use category	Residential sector buildings
	Target group	1. natural persons residing permanently in areas under the control of the Republic of Cyprus, insofar as they do not exercise an economic activity. 2. Organisations which provide services to society as a whole and other services of a social or individual nature (school boards, charitable institutions, monasteries, churches, municipalities, communities, state agencies, etc.) which are active in areas under the control of the Republic of Cyprus, insofar as they do not exercise an economic activity.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• Independent photovoltaic systems • Household solar systems • Space heating/cooling by solar energy • Central active solar hot water systems • Solar swimming pool heating systems • Heat pump with a geoexchange used for space heating and cooling
	Budget and source	€ 9 100 000 (pertains to all the above subcategories) Estimate made by the Energy Service.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	In calculating energy savings, the findings from the operation of the Grants Scheme for the period 2004-2009 were used. In particular, the average energy savings levels per type of investment were used, which were multiplied by the estimated number of investments to be implemented in the period in question.
	Energy savings achieved in 2010.*	**NOT APPLICABLE**
	Energy savings expected in 2016.*	**1 805 toe** Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1
	Energy savings expected in 2020 (if possible).	**3 610 toe** Information on the energy savings ensured by each subcategory of thermal insulation is provided in paragraph 3.3.2.1

	Assumptions*	According to estimates, during the implementation of the measure, a total of approximately 10,800 investments will be realised under the above subcategories. Following are the estimated investments realised broken down per category: **Investment Category** — **Number of systems** Independent photovoltaic systems — 300 Household solar systems — 10 000 Space heating/cooling by solar energy — 350 Central active solar hot water systems — 2 Solar swimming pool heating systems — 50 Heat pump with a geoexchange used for space heating and cooling — 100
	Overlaps	Not applicable

TERTIARY SECTOR

Table 37. Measure T.1: National action plan for Green Public Procurement, 2007-2009

Title of the energy efficiency improvement measure (EEI)		National action plan for green public procurement.
Description	**Category**	4.3 Public Procurement
	Timeframe	Start date: 2007, Expiry date: 31/12/2009
	Purpose / short description	Green Public Procurement (GPP) means that public purchasers take account of environmental factors when buying products, services or works falling within the scope of the two Laws on the coordination of procedures for the award of public contracts (Law 11(I)/2006 and Law 12(I)/2006), with a view to ensuring progress in environmental performance, by reducing environmental impacts and maintaining economic sustainability. Energy savings actions included in such contracts are related to the following: **Office equipment and supplies**: Photocopiers, fax machines, computers, etc. **Electric appliances and products:** This field includes purchasing energy-saving road lights by the use of economy lamps, using photovoltaic systems for road sign and pedestrian crossing lighting purposes, purchasing energy-efficient electric equipment (refrigerators, air conditioners, etc.), installing photovoltaic systems in public buildings, using solar energy for the heating of buildings, using natural gas instead of diesel in central heating systems, installing light/movement sensors in building areas where no continuous light is required and installing photocells for switching on/off lights in the perimeter of roads and in large perimetric buildings. **New/renovated buildings:** This field includes the preparation of energy designs for all new buildings or the ones to be renovated,

		irrespective of size, by the use of state-of-the-art materials that need less maintenance.
	End-use category	Public sector
	Target group	Public and wider public sector (lights, computer equipment).
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Decision No 65191 of the Council of Ministers of 21/3/2007.
	Budget and source	€ 24 300 for purchasing fluorescent lamps € 328 880 for purchasing new air conditioners installed where a new need has come up € 301 167 for purchasing new air conditioners in replacement of existing ones € 3 988 321 for purchasing office computers € 265 226 for purchasing new LCD monitors
	Implementing organisation	Environment Service (the State Purchasing Department is responsible for fluorescent lamps, the Electrical and Mechanical Services Department is responsible for air conditioners, and the IT Services Department is responsible for monitors).
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	The bottom-up methodology was used for fluorescent lamps, as referred to on page 77 in the section with proposed methodologies (2.9 Replacement or new installation of Lamps in residential buildings). The bottom-up methodology was used for air conditioners, as referred to on page 71 in the section with proposed methodologies (2.6 Installation or replacement of air conditioning split system (<12kW) in residential and tertiary buildings). The predefined values referred to in table 1.2 on page 84 and in the table on page 86, in the proposed methodology section, were used for computers and monitors. The acknowledgements taken into account in making calculations for the above categories are referred to in paragraph 3.3.1 and in the calculation tables included in Annex II.
	Energy savings achieved in 2010.*	**337 toe** Savings in each subcategory are as follows: **Measure** **Amount, in toe** Fluorescent lamps 18.16 Installation of air conditioners 8.9 Replacement of air conditioners 4.2 Office computers 68.52

		LCD monitors 2.9 **TOTAL** **337**
	Energy savings expected in 2016.*	**59 toe** Savings in each subcategory are as follows: **Measure** **Amount, in toe** Installation of air conditioners 1.19 Replacement of air conditioners 4.92 **TOTAL** **59**
	Energy savings expected in 2020 (if possible).	**0 toe**
	Assumptions*	The measure pertains to: The supply of compact fluorescent lamps by the State Purchasing and Procurement Department, so that they are used in buildings used by State departments. The lamps supplied have an average expected lifespan of 6 000 hours. Due to the short expected lifespan, many of these lamps do not contribute towards the achievement of the final target. The table below lists the quantities which have been, or will be, distributed per year. **YEAR** **QUANTITY** **200** 2 694 **200** 3 1 **2009** 2 983 **2010** 2 998 **2011** 3 000 The installation of 692 air conditioners and replacement of 573 air conditioners in the Public Sector. The table below lists the quantities of air conditioners installed or replaced per year: **YEAR** **Installation QUANTITY** **Replacement QUANTITY** **2007** 272 254

			Computers	**LCD monitors**
		YEAR	**QUANTITY**	**QUANTITY**
		2007	**78**	**954**
		2008	**1 199**	**1 347**
		2009	**5 391**	**5 809**
		TOTAL	**7 468**	**8 110**
	Overlaps	Not applicable		

Table 38. Measure T.2: Government grants scheme for energy savings/RES for the public and wider public sector, 2004-2009.

Title of the energy efficiency improvement measure (EEI)		Government grants scheme for energy savings/RES for the public and wider public sector.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2010.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants and/or subsidies, or specific grants, for realising investments in the field of Energy Saving (ES) and encouraging the use of Renewable Energy Sources (RES). The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to purchasing and installing new equipment and/or materials. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. The purpose of the measure is to promote RES and Energy Saving in the Public and Wider Public Sector, to increase awareness concerning RES and ES among public servants, to make a contribution towards the achievement of RES and Energy Saving targets.
	End-use category	Public sector
	Target group	Buildings in the Public and Wider Public Sector
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Decision No 64825 of the Council of Ministers of 2007.
	Budget and source	€ 37.908,10 The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism

Energy savings*	**Method used for monitoring/calculating energy savings**	The Scheme includes as provision stipulating that a beneficiary under this category must submit a technical and financial study establishing that the system to be installed will ensure at least 10% energy savings, before the subsidy is granted. The Energy Savings resulting from each individual study, as confirmed by the Cyprus Institute of Energy, was used in determining the final energy savings stated below. Consequently, national methodologies were used, as described in Annex II.
	Energy savings achieved in 2010.*	**110 toe**
	Energy savings expected in 2016.*	**110 toe**
	Energy savings expected in 2020 (if possible).	**110 toe**
	Assumptions*	Three (3) investments were realised during the implementation of the measure. **Type of investment** — **Number of investments** LED LAMPS — 1 THERMAL INSULATION IN ROOF — 1 REPLACING SINGLE GLAZING WITH DOUBLE GLAZING All the above investments apply to all targets due to their long duration.
	Overlaps	Not applicable

Table 39. Measure T.3: Energy efficiency of new buildings in the tertiary sector.

Title of the energy efficiency improvement measure (EEI)		All new tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2008, Expiry date: These codes, which have been in effect since 2008, were revised in 2010 and another revision thereof is expected before 2016.
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Tertiary sector buildings
	Target group	New tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006).
	Area of application	All of Cyprus

Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	National methodology. Described in Annex II.
	Energy savings achieved in 2010.*	**2 000 toe**
	Energy savings expected in 2016.*	**17 621 toe**
	Energy savings expected in 2020 (if possible).	**28 519 toe**
	Assumptions*	In calculating energy savings, data were received from the National Statistical Service concerning the average number of buildings constructed annually. The slight annual increase in the number of buildings constructed was not taken into account in making calculations. Moreover, it was deemed that 20% of the buildings are using a conventional heating system, as compared to 80% which are using electric systems. As far as cooling is concerned, it was deemed that all buildings are using electric air conditioning systems. All other assumptions are referred to in Annex II.
	Overlaps	Not applicable

Table 40. Measure T.4: Grants Scheme for (end-use) energy savings in the tertiary sector (existing enterprises) 2004-2009.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for (end-use) energy savings in the tertiary sector (existing enterprises).
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2009.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants, or specific grants, for realising energy savings (ES) investments. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to

		purchasing and installing new equipment and/or materials. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. Energy savings investment means an investment in systems, equipment and materials whose installation achieves at least 10% energy savings in a specific application. The maximum grant amount, in accordance with the type of investment and the form of the ligible grant (regional, de minimis/ specific grant) amounted to € 250 000 per unit. The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Tertiary sector (enterprises)
	Target group	Tertiary Sector buildings Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	This category pertains to investments falling under the following subcategories: Purchase/installation of new equipment for the recovery of wasted energy, either directly or indirectly by recovery/recycling of discarded materials, products or employed media. Purchase/integration of new materials and equipment to reduce unproductive energy consumption and energy losses. Purchase/integration of new equipment for the production, transmission, distribution and use of energy. Purchase/installation of a new energy management IT system and/or integration of automated direct energy regulation/switch-off devices Replacement of existing materials and/or equipment pertaining to the above subcategories.
	Budget and source	€ 2 141 440.01 The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	The Scheme includes as provision stipulating that a beneficiary under this category must submit a technical and financial study establishing that the system to be installed will ensure at least 10% energy savings, before the subsidy is granted. The Energy Savings resulting from each individual study, as confirmed by the Cyprus Institute of Energy, was used in determining the final energy savings stated below. Consequently, national methodologies were used, as described in Annex II.
	Energy savings achieved in 2010.*	**5 896 toe**

	Energy savings expected in 2016.*	**5 291 toe**
	Energy savings expected in 2020 (if possible).	**4 832 toe**
	Assumptions*	A total of 202 investments were realised in this category during the implementation of the measure. Following is a detailed presentation of the types of investments:

DESCRIPTION OF INVESTMENT	**NUMBER OF INVESTMENTS**	**DURATION OF INVESTMENT**
ELEC-SAVER	21	15
REPLACING AN OLDER AIR COMPRESSOR WITH A NEW MORE EFFICIENT ONE	1	15
POWER PLANNER	1	15
INVERTERS	3	15
THERMAL INSULATION IN ROOF/BUILDING	6	25
ElectroFlow	6	7
P.F.C.U.	2	5
P.F.C.U.	11	
Electricity saving systems	1	6
Pipe thermal insulation	1	
EMS	1	5
ELEC-SAVER		7
ELEC-SAVER	1	10
POWER PLANNER	1	1
HEAT RECOVERY SYSTEM	6	20
P.F.C.U.	1	15
Electricity saving system	1	10
Chiller	1	10

		Replacing older air conditioners with new more efficient ones 1 1 B.E.M.S. 2 5 B.E.M.S. 1 6 Ke Fob 20 Power Save 2 7 Power Save 1 1 It is understood those of the above investments that do not apply to any of the energy savings targets (in accordance with the year of implementation) are not included in these targets.
	Overlaps	Not applicable

Table 41. Measure T.5: Grants scheme to encourage the use of RES (end use) in the tertiary sector, 2004-2010.

Title of the energy efficiency improvement measure (EEI)		Grants scheme to encourage the use of RES (end use) in the tertiary sector.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2010.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants and/or subsidies for realising investments encouraging the use of Renewable Energy Sources (RES). The Scheme covers investments relating to purchasing and installing new equipment. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Tertiary sector
	Target group	Tertiary Sector buildings Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus
Information	**List and description of actions for**	• Independent photovoltaic systems

concerning implementation	**measure verification**	• Space heating/cooling by solar energy • Central active solar hot water systems • Solar swimming pool heating systems • Heat pump with a geoexchange used for space heating and cooling
	Budget and source	€ 1.399.503 The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	The Scheme includes as provision stipulating that a beneficiary under this category must submit a technical and financial study establishing that the system to be installed will ensure at least 10% energy savings, before the subsidy is granted. The Energy Savings resulting from each individual study, as confirmed by the Cyprus Institute of Energy, was used in determining the final energy savings stated below. In making calculations, the national methodologies described in Annex II were used.
	Energy savings achieved in 2010.*	**600 toe**
	Energy savings expected in 2016.*	**600 toe**
	Energy savings expected in 2020 (if possible).	**600 toe**
	Assumptions*	A total of 98 investments were realised in all the subcategories of this category during the implementation of the measure. Following are the quantities of systems implemented per subcategory: **Investment Category** — **Number of systems** Independent photovoltaic systems — 6 Space heating/cooling by solar energy — 1 Central active solar hot water systems — 72 Solar swimming pool heating systems — 8 Heat pump with a geoexchange used for space heating and cooling — 2
	Overlaps	Not applicable

Table 42. Measure T.6: Energy efficiency of tertiary buildings undergoing major renovation.

Title of the energy efficiency improvement measure (EEI)	All existing tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), which undergo comprehensive renovation (as stipulated in the relevant law) must satisfy the minimum energy

		efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2008, Expiry date: These codes, which have been in effect since 2008, were revised in 2010 and another revision thereof is expected before 2016.
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Tertiary sector buildings
	Target group	New buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006).
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). • The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service and are not based on factual data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**400 toe**
	Energy savings expected in 2020 (if possible).	**0 toe**
	Assumptions*	There are no specific data available. The Energy Service intends to gather data and submit them with the 3rd EEAP.
	Overlaps	Not applicable

Table 43. Measure T.7: Maintenance and inspection of boilers and heating installations in the tertiary sector.

Title of the energy efficiency improvement measure (EEI)		Maintenance and inspection of boilers and heating installations at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2009, Expiry date: These codes, which have been in effect since 2008, were revised in 2010 and another revision thereof is expected before 2016.
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Existing tertiary sector buildings
	Target group	All existing tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006).
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). • The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service and are not based on factual data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**1 700 toe**
	Energy savings expected in 2020 (if possible).	**3 000 toe**
	Assumptions*	There are no specific data available. The Energy Service intends to gather data and submit them with the 3rd EEAP.
	Overlaps	Not applicable

Table 44. Measure T.8: Maintenance and inspection of air conditioning systems of an effective rated output of more than 12 kW in the Tertiary Sector

Title of the energy efficiency improvement measure (EEI)		Maintenance and inspection of air conditioning systems with effective rated output greater than 12 kW at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
Description	**Category**	1.1 Building codes and enforcement
	Timeframe	Start date: 2009, Expiry date: These codes, which have been in effect since 2008, were revised in 2010 and another revision thereof is expected before 2016.
	Purpose / short description	The measure arises from Cyprus' obligation to implement the Buildings Directive concerning the energy efficiency of buildings. The purpose of the measure is described in the wider purpose of applying the Directive in question.
	End-use category	Existing tertiary sector buildings
	Target group	All existing tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006).
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• The Regulation of Streets and Buildings Law (Law 101(I)/2006). • The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006). • The Streets and Buildings (Energy Efficiency of Buildings) Regulations (RAA 429/2006).
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service and are not based on factual data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**2 500 toe**
	Energy savings expected in 2020 (if possible).	**5 000 toe**

	Assumptions*	There are no specific data available. The Energy Service intends to gather data and submit them with the 3rd EEAP.
	Overlaps	Not applicable

Table 45. Measure T.9: National action plan for Green Public Procurement, 2010-2020

Title of the energy efficiency improvement measure (EEI)		National action plan for green public procurement.
Description	**Category**	4.3 Public Procurement
	Timeframe	Start date: 2010, Expiry date: 2020
	Purpose / short description	Green Public Procurement (GPP) means that public purchasers take account of environmental factors when buying products, services or works falling within the scope of the two Laws on the coordination of procedures for the award of public contracts (Law 11(I)/2006 and Law 12(I)/2006), with a view to ensuring progress in environmental performance, by reducing environmental impacts and maintaining economic sustainability. Energy savings actions included in such contracts are related to the following: **Office equipment and supplies**: Photocopiers, fax machines, computers, etc. **Electric appliances and products:** This field includes purchasing energy-saving road lights by the use of economy lamps, using photovoltaic systems for road sign and pedestrian crossing lighting purposes, purchasing energy-efficient electric equipment (refrigerators, air conditioners, etc.), installing photovoltaic systems in public buildings, using solar energy for the heating of buildings, using natural gas instead of diesel in central heating systems, installing light/movement sensors in building areas where no continuous light is required and installing photocells for switching on/off lights in the perimeter of roads and in large perimetric buildings. **New/renovated buildings:** This field includes the preparation of energy designs for all new buildings or the ones to be renovated, irrespective of size, by the use of state-of-the-art materials that need less maintenance.
	End-use category	Public sector
	Target group	Public sector and general government (lights, computer equipment).
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	A decision of the Council of Ministers is expected.
	Budget and source	Not applicable
	Implementing organisation	Environment Service
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism

Energy savings*	**Method used for monitoring/calculating energy savings**	Since the scheme was not approved during preparation of the 2nd EEAP, the savings referred to below are estimates made by the Energy Service and are not based on factual data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**600 toe**
	Energy savings expected in 2020 (if possible).	**1 000 toe**
	Assumptions*	There are no specific data available, as the scheme has not been approved yet.
	Overlaps	Not applicable

Table 46. Measure T.10: Grants Scheme for (end-use) energy savings in the tertiary sector (existing enterprises) 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for (end-use) energy savings in the tertiary sector (existing buildings).
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants, or specific grants, for realising energy savings (ES) investments. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to purchasing and installing new equipment and/or materials. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. Energy savings investment means an investment in systems, equipment and materials whose installation achieves at least 10% energy savings in a specific application. The maximum grant amount, in accordance with the type of investment and the form of the ligible grant (regional, de minimis/ specific grant) amounted to € 250 000 per unit. The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Tertiary sector
	Target group	Tertiary Sector buildings Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.

	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	This category pertains to investments falling under the following subcategories: Purchase/installation of new equipment for the recovery of wasted energy, either directly or indirectly by recovery/recycling of discarded materials, products or employed media. Purchase/integration of new materials and equipment to reduce unproductive energy consumption and energy losses. Purchase/integration of new equipment for the production, transmission, distribution and use of energy. Purchase/installation of a new energy management IT system and/or integration of automated direct energy regulation/switch-off devices Replacement of existing materials and/or equipment connected with the above subcategories.
	Budget and source	€ 5 791 464. Estimate made by the Energy Service.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service based on the findings from the operation of the Grants Scheme in the period 2004-2009.
	Energy savings achieved in 2010. *	**0 τ.ι.π.**
	Annual energy savings expected in 2016 *	**10 671 toe**
	Energy savings expected in 2020 (if possible)	**17 785 toe**
	Assumptions*	Based on estimates, during the implementation of the measure, a total of approximately 600 investments will be realised under the above subcategories. Following are the estimated investments realised broken down per category:

DESCRIPTION OF INVESTMENT	NUMBER OF INVESTMENTS
ELEC-SAVER	6
REPLACING AN OLDER AIR COMPRESSOR WITH A NEW MORE EFFICIENT ONE	3
POWER PLANNER	48
INVERTERS	

		THERMAL INSULATION IN ROOF 6 THERMAL INSULATION IN BUILDING 129 ElectroFlow 18 P.F.C.U. 39 Electricity saving systems 6 Pipe thermal insulation 3 ??? [Translator's note: EMS or BMS?] ELEC-SAVER 6 HEAT RECOVERY SYSTEM 48 P.F.C.U. 30 Chiller 6 BMS 9 Replacing single glazing with double glazing 63 Economisers 3 Replacing lamps 30 Replacing older air conditioners with new more efficient ones 3 B.E.M.S. 9 Ke Fob 3 Power Save 9 TOTAL 606 No assumptions were made other than the fact that the Scheme would function until 2020 with a respective response from enterprises.
	Overlaps	Not applicable

Table 47. Measure T.11: Grants scheme to encourage the use of RES (end use) in the tertiary sector, 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants scheme to encourage the use of RES (end use) in the tertiary sector.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants and/or subsidies for realising investments encouraging the use of Renewable Energy Sources (RES). The Scheme covers investments relating to purchasing and installing new equipment. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage.

		The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Tertiary sector
	Target group	Tertiary Sector buildings Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	This category pertains to the following types of investments: **Investment Category** Independent photovoltaic systems Space heating/cooling by solar energy Central active solar hot water systems Solar swimming pool heating systems Heat pump with a geoexchange used for space heating and cooling
	Budget and source	€ 2 600 000 Estimate made by the Energy Service.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service based on the findings from the operation of the Grants Scheme in the period 2004-2009.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**560 toe**
	Energy savings expected in 2020 (if possible).	**1 120 toe**
	Assumptions*	Based on estimates, during the implementation of the measure, a total of approximately 169 investments will be realised under the above subcategories. Following are the estimated investments realised broken down per category: **Investment Category** **Number of systems**

		Independent photovoltaic systems 10 Space heating/cooling by solar energy 15 Central active solar hot water systems 10 Solar swimming pool heating systems 10 Heat pump with a geoexchange used for space heating and cooling 4 No assumptions were made other than the fact that the Scheme would function until 2020.
	Overlaps	Not applicable

Table 48. Measure T.12: Grants Scheme for cogeneration of high efficiency heat and power in the Tertiary Sector, 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for cogeneration of high efficiency heat and power in the Tertiary Sector, 2011-2020.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The Scheme will be aimed at providing economic incentives in the form of government capital grants equal to 30% of the initial cost, i.e. approximately €165 000 for each investment. Only systems of an electric power of less than 1 MWe will be financed. The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Tertiary sector
	Target group	Tertiary Sector buildings Investors in the following categories may apply: 1. Natural persons and organisations, insofar as they exercise an economic activity. 2. Natural and legal persons, insofar as they exercise an economic activity. 3. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The measure is expected to be activated in 2011
	Budget and source	€ 7 700 000 Estimate made by the Energy Service.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism

Energy savings*	**Method used for monitoring/calculating energy savings**	On the basis of an assessment of the national potential for cogeneration.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**2 000 toe**
	Energy savings expected in 2020 (if possible).	**5 079 toe**
	Assumptions*	A total of 47 investments are expected to be realised during the implementation of the measure. Each investment may lead to an average energy savings of 107 toe. That is, for 2020 the total energy savings contribution will be 5 079 toe. All acknowledgements are detailed in paragraph 2.3.3.
	Overlaps	Not applicable

Table 49. Measure T.13: Action Plans of Municipalities and Communities, 2010-2020.

Title of the energy efficiency improvement measure (EEI)		Action Plans of Municipalities and Communities, 2010-2020.
Description	**Category**	2.7 Exemplary role of the public sector 2.1 Information campaigns 6.2 Upgrading of public transport
	Timeframe	Start date: 2010, Expiry date: 2020.
	Purpose / short description	The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	General government
	Target group	Buildings of the general government, street lighting, transport, citizens, students, general government personnel,
	Area of application	All of Cyprus

Information concerning implementation	**List and description of actions for measure verification**	Some Municipalities and Communities have prepared, or will prepare, Energy Action Plans within the framework of their participation in the Agreement of Mayors and/or the Agreements of Islands with a view to ensuring a 20% reduction in CO2 emissions in their territories by 2020. Only 3 Municipalities have started implementing the Energy Action Plans prepared, and another 11 local authorities are currently preparing the Plans. The Action Plans include information/training campaigns for citizens (annual seminars, energy days, student training, local citizen information, advisory services, forms and information messages). It should also be noted that the Action Plans of Local Authorities include quantified energy savings targets until 2020. In addition to campaigns for providing local citizens with information, in an effort to achieve the relevant targets, local authorities have been initiating actions for saving energy in Municipal buildings, in transport (free parking for electric and hybrid vehicles, electric vehicle charging stations, personnel training, purchasing eco-vehicles, setting up bicycle rental systems) and in road lighting. The Union of Municipalities estimates that the implementation of Energy Plans by local authorities can result in energy savings of the order or 12 627 toe by 2020. The implementation of Action Plans by Local Authorities and their contribution towards the achievement of national energy savings targets (2016 indicative target and 2020 indicative target) will be presented in the 3rd EEAP to be submitted in 2014.
	Budget and source	No such data have been provided yet.
	Implementing organisation	Municipalities and Communities
	Competent monitoring authority	Cyprus Energy Agency.
Energy savings*	**Method used for monitoring/calculating energy savings**	Energy savings are based on data provided by Municipalities and Communities which have prepared Action Plans with assistance from the Cyprus Energy Agency. The methodology used for calculating the savings to be achieved, as stated by municipalities and communities, has not been checked yet. Information on the subject will be submitted with the 3rd EEAP.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**3 000 toe**
	Energy savings expected in 2020 (if possible).	**6 300 toe**
	Assumptions*	Although the Union of Municipalities estimates that the implementation of Energy Plans by local authorities can result in energy savings of the order or 12 627 toe by 2020, due to the fact that a number of measures pertain to information campaigns, we feel that the energy savings to be achieved will be approximately half of that estimated. Detailed information on the subject will be submitted with the 3rd EEAP.
	Overlaps	Not applicable

INDUSTRIAL SECTOR

Table 50. Measure B.1: Grants Scheme for energy savings (in existing industrial enterprises), 2004-2009.

Title of the energy efficiency improvement measure (EEI)		Grants scheme for energy savings (in existing industrial enterprises).
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2009.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants, or specific grants, for realising energy savings (ES) investments. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to purchasing and installing new equipment and/or materials. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. Energy savings investment means an investment in systems, equipment and materials whose installation achieves at least 10% energy savings in a specific application. The maximum grant amount, in accordance with the type of investment and the form of the eligible grant (regional, de minimis/ specific grant) amounted to € 250 000 per unit. The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Industrial sector
	Target group	Enterprises (buildings and equipment) in the Industrial Sector Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	This category pertains to investments falling under the following subcategories: Purchase/installation of new equipment for the recovery of wasted energy, either directly or indirectly by recovery/recycling of discarded materials, products or employed media. Purchase/integration of new materials and equipment to reduce unproductive energy consumption and energy losses. Purchase/integration of new equipment for the production, transmission, distribution and use of energy. Purchase/installation of a new energy management IT system and/or integration of automated direct energy regulation/switch-off

		devices Replacement of existing materials and/or equipment connected with the above subcategories.
	Budget and source	€ 653 054.41 The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	The Scheme includes as provision stipulating that a beneficiary under this category must submit a technical and financial study establishing that the system to be installed will ensure at least 10% energy savings, before the subsidy is granted. The Energy Savings resulting from each individual study, as confirmed by the Cyprus Institute of Energy, was used in determining the final energy savings stated below. Consequently, national methodologies were used, as described in Annex II.
	Energy savings achieved in 2010.*	**1 692 toe**
	Energy savings expected in 2016.*	**1 263 toe**
	Energy savings expected in 2020 (if possible).	**1 120 toe**
	Assumptions*	A total of 37 investments were realised in this category during the implementation of the measure. Following is a detailed presentation of the types of investments:

DESCRIPTION OF INVESTMENT	NUMBER OF INVESTMENTS	DURATION OF INVESTMENT
EMS	1	1
ELEC-SAVER	5	15
REPLACING AN OLDER AIR COMPRESSOR WITH A NEW MORE EFFICIENT ONE	5	1
POWER PLANNER	1	15
INVERTERS	3	6
HEAT RECOVERY SYSTEM	3	15
THERMAL INSULATION IN ROOF	2	25
THERMAL INSULATION IN BUILDING	2	25
ElectroFlow	1	1
ElectroFlow		7

		Electricity saving system 1 7 Electricity saving system 1 6 Pipe thermal insulation 1 5 Chiller 1 20 BMS 1 0 TOTAL 37 It is understood those of the above investments that do not apply to any of the energy savings targets (in accordance with the year of implementation) are not included in these targets.
	Overlaps	Not applicable

Table 51. Measure B.2: Grants scheme to encourage the use of RES (end use) in the industrial sector and agriculture, 2004-2010.

Title of the energy efficiency improvement measure (EEI)		Grants scheme to encourage the use of RES (end use) in the industrial sector and agriculture.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2010.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants and/or subsidies for realising investments encouraging the use of Renewable Energy Sources (RES). The Scheme covers investments relating to purchasing and installing new equipment. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. The purpose of this measure is, on the one hand, to increase energy saving awareness among industrialists and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Industrial sector
	Target group	Existing industrial sector buildings Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus

<table>
<tr><td rowspan="4">Information concerning implementation</td><td>List and description of actions for measure verification</td><td>This category pertains to investments realised in Industry and Agriculture falling under the following subcategories:
Investment Category
Independent photovoltaic systems
Independent photovoltaic systems for drawing water
Space heating/cooling by solar energy
Central active solar hot water systems</td></tr>
<tr><td>Budget and source</td><td>€ 187 597
The data were provided by the Special Fund for RES and ES.</td></tr>
<tr><td>Implementing organisation</td><td>Special Fund for RES and ES</td></tr>
<tr><td>Competent monitoring authority</td><td>Energy Service – Ministry of Commerce, Industry and Tourism</td></tr>
<tr><td rowspan="5">Energy savings*</td><td>Method used for monitoring/calculating energy savings</td><td>The Scheme includes as provision stipulating that a beneficiary under this category must submit a technical and financial study establishing that the system to be installed will ensure at least 10% energy savings, before the subsidy is granted. The Energy Savings resulting from each individual study, as confirmed by the Cyprus Institute of Energy, was used in determining the final energy savings stated below. Consequently, national methodologies were used, as described in Annex II.</td></tr>
<tr><td>Energy savings achieved in 2010.*</td><td>21 toe</td></tr>
<tr><td>Energy savings expected in 2016.*</td><td>21 toe</td></tr>
<tr><td>Energy savings expected in 2020 (if possible).</td><td>21 toe</td></tr>
<tr><td>Assumptions*</td><td>A total of 34 investments were realised during the implementation of the measure, 3 of them in Industry and 31 in Agriculture. Following is a detailed presentation of the types of investments:

Investment Category — Number of systems
INDUSTRY
Space heating/cooling by solar energy
Central active solar hot water systems — 2
AGRICULTURE
Independent photovoltaic systems for drawing water — 26
Independent photovoltaic systems — 5</td></tr>
</table>

	Overlaps	Not applicable

Table 52. Measure B.3: Grants Scheme for energy savings (in existing industrial enterprises), 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for energy savings (in existing industrial enterprises), 2011-2020.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants, or specific grants, for realising energy savings (ES) investments. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to purchasing and installing new equipment and/or materials. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. Energy savings investment means an investment in systems, equipment and materials whose installation achieves at least 10% energy savings in a specific application. The maximum grant amount, in accordance with the type of investment and the form of the eligible grant (regional, de minimis/ specific grant) amounted to € 250 000 per unit. The purpose of this measure is, on the one hand, to increase energy saving awareness among businessmen and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Industrial sector
	Target group	Enterprises (buildings and equipment) in the Industrial Sector Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus

<table>
<tr><td rowspan="4">Information concerning implementation</td><td>List and description of actions for measure verification</td><td>This category pertains to investments falling under the following subcategories:
Purchase/installation of new equipment for the recovery of wasted energy, either directly or indirectly by recovery/recycling of discarded materials, products or employed media.
Purchase/integration of new materials and equipment to reduce unproductive energy consumption and energy losses.
Purchase of new equipment for the production, transmission, distribution and use of energy.
Purchase/installation of a new energy management IT system and/or integration of automated direct energy regulation/switch-off devices
Replacement of existing materials and/or equipment pertaining to the above subcategories.</td></tr>
<tr><td>Budget and source</td><td>€ 2 591 813
Estimate made by the Energy Service.</td></tr>
<tr><td>Implementing organisation</td><td>Special Fund for RES and ES</td></tr>
<tr><td>Competent monitoring authority</td><td>Energy Service – Ministry of Commerce, Industry and Tourism</td></tr>
<tr><td rowspan="5">Energy savings*</td><td>Method used for monitoring/calculating energy savings</td><td>No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service based on the findings from the operation of the Grants Scheme in the period 2004-2009.</td></tr>
<tr><td>Energy savings achieved in 2010.*</td><td>0 toe</td></tr>
<tr><td>Energy savings expected in 2016.*</td><td>5 000 toe</td></tr>
<tr><td>Energy savings expected in 2020 (if possible).</td><td>8 333 toe</td></tr>
<tr><td>Assumptions*</td><td>Based on estimates, during the implementation of the measure, a total of approximately 168 investments will be realised under the above subcategories. Following are the estimated investments realised broken down per category:
<table><tr><td>INVESTMENT DESCRIPTION</td><td>NUMBER OF INVESTMENTS</td><td>DURATION OF INVESTMENT</td></tr><tr><td>??? [Translator’s note: EMS or BMS?]</td><td>8</td><td>15</td></tr><tr><td>ELEC-SAVER</td><td>16</td><td>15</td></tr><tr><td>REPLACING AN OLDER AIR COMPRESSOR WITH A NEW MORE EFFICIENT ONE</td><td>20</td><td>15</td></tr><tr><td>POWER PLANNER</td><td>4</td><td>15</td></tr><tr><td>INVERTERS</td><td>4</td><td>6</td></tr><tr><td>HEAT RECOVERY SYSTEM</td><td>12</td><td>15</td></tr></table></td></tr>
</table>

		THERMAL INSULATION IN ROOF 20 25 THERMAL INSULATION IN BUILDING 8 25 ElectroFlow 8 15 ElectroFlow 4 7 P.F.C.U. 28 5 P.F.C.U. 8 7 Electricity saving system 8 7 Electricity saving system 4 6 Pipe thermal insulation 4 5 Chiller 4 0 BMS 4 0 **TOTAL** **168** No assumptions were made other than the fact that the Scheme would function until 2020.
	Overlaps	Not applicable

Table 53. Measure B.4: Grants scheme to encourage the use of RES (end use) in the industrial sector and agriculture, 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants scheme to encourage the use of RES (end use) in the industrial sector and agriculture, 2011-2020.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants and/or subsidies for realising investments encouraging the use of Renewable Energy Sources (RES). The Scheme covers investments relating to purchasing and installing new equipment. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. The purpose of this measure is, on the one hand, to increase energy saving awareness among industrialists and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Industrial sector
	Target group	Enterprises (buildings) in the industrial sector Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity. 2. Public sector bodies, insofar as they exercise an economic activity.

	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	This category pertains to the following types of investments: **Investment Category** Independent photovoltaic systems Independent photovoltaic systems for drawing water Space heating/cooling by solar energy Central active solar hot water systems Solar swimming pool heating systems Heat pump with a geoexchange used for space heating and cooling
	Budget and source	€ 424 000 Estimate made by the Energy Service.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service based on the findings from the operation of the Grants Scheme in the period 2004-2009.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**28 toe**
	Energy savings expected in 2020 (if possible).	**60 toe**
	Assumptions*	Based on estimates, during the implementation of the measure, a total of approximately 60 investments will be realised under the above subcategories. Following are the estimated investments realised broken down per category: **Investment Category** — **Number of systems** **INDUSTRY** Space heating/cooling by solar energy — 4 Central active solar hot water systems — 6 **AGRICULTURE** Independent photovoltaic systems for drawing water — 40 Independent photovoltaic systems — 10 No assumptions were made other than the fact that the average number investments implemented in previous years, when the Grants

		Scheme was in operation, will still be implemented every year.
	Overlaps	Not applicable

Table 54. Measure B.5: Grants Scheme for cogeneration of high efficiency heat and power in the Industrial Sector, 2011-2020.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for cogeneration of high efficiency heat and power in the Industrial Sector, 2011-2020.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The Scheme will be aimed at providing economic incentives in the form of government capital grants equal to 20% of the initial cost, i.e. approximately €110,000 for each investment. Only systems of an electric power of less than 1 MWe will be financed. The purpose of this measure is, on the one hand, to increase energy saving awareness among industrialists and, on the other hand, to ensure that this sector also contributes towards the achievement of savings targets.
	End-use category	Tertiary sector
	Target group	Industrial Sector buildings Investors in the following categories may apply: 1. Natural and legal persons, insofar as they exercise an economic activity.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The measure is expected to be activated in 2011
	Budget and source	€ 8 500 000 Estimate made by the Energy Service.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	On the basis of an assessment of the national potential for cogeneration.
	Energy savings achieved in 2010.*	**0 toe**

	Energy savings expected in 2016.*	**4 000 toe**
	Energy savings expected in 2020 (if possible).	**8 227 toe**
	Assumptions*	A total of 77 investments are expected to be realised during the implementation of the measure. Each investment may lead to an average energy savings of 107 toe. That is, for 2020 the total energy savings contribution will be 8,227 toe. All acknowledgements are detailed in paragraph 2.3.3.
	Overlaps	Not applicable

TRANSPORT SECTOR

Table 55. Measure M.1: Grants Scheme for energy saving in transport (purchase of hybrid vehicles, electric vehicles and low-emissions vehicles), 2004-2009.

Title of the energy efficiency improvement measure (EEI)		Grants Scheme for energy saving in transport (purchase of hybrid vehicles, electric vehicles and low-emissions vehicles), 2004-2009.
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2004, Expiry date: 2009.
	Purpose / short description	The Scheme is aimed at providing economic incentives in the form of government grants, or specific grants, for realising energy savings (ES) investments. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers only investments realised where there are no national or Community standards. The Scheme covers investments relating to purchasing and installing new equipment and/or materials. It also covers the cost of designs, where necessary. The investments must pertain to established technologies, not those that are still at a research and development stage. A grant is provided for purchasing up to seven (7) new vehicles for enterprises and up to one vehicle for natural persons, for the vehicle categories referred to above.
	End-use category	Transport sector
	Target group	Investors in the following categories may apply: 1. natural persons residing permanently in areas under the control of the Republic of Cyprus, insofar as they do not exercise an

		economic activity. 2. Organisations which provide services to society as a whole and other services of a social or individual nature (school boards, charitable institutions, monasteries, churches, municipalities, communities, state agencies, etc.) which are active in areas under the control of the Republic of Cyprus, insofar as they do not exercise an economic activity. 3. Natural and legal persons, insofar as they exercise an economic activity. 4. Public sector bodies, insofar as they exercise an economic activity.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The measure pertains to grants for the following types of vehicles: • Hybrid vehicles • Vehicles with dual propulsion systems • Electric vehicles • Vehicles with carbon dioxide emissions below 120 g/km.
	Budget and source	€ 2 596 823 The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	National methodology. Described in Annex II.
	Energy savings achieved in 2010.*	**1 084 toe**
	Energy savings expected in 2016.*	**1 084 toe**
	Energy savings expected in 2020 (if possible).	**1 084 toe**
	Assumptions*	A total of 3 118 investments were realised during the implementation of the measure. Following are the quantities per category: **Category** — **Quantity** Hybrid vehicles — 842 Electric vehicles — 36 Vehicles with carbon dioxide emissions below 120g/km. — 2.20

	Overlaps	Not applicable

Table 56. Measure M.2: Scrapping of Vehicles, 2008-2010

Title of the energy efficiency improvement measure (EEI)		Scrapping of Vehicles, 2008-2010
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2008, Expiry date: 2010.
	Purpose / short description	The purpose of the Scrapping Plan is to protect the environment and improve road safety.
	End-use category	Transport sector
	Target group	Scrapping of vehicles older than 15 years.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Grant category C(i) (€ 1 283) – Scrapping of Vehicle with active registration and circulation license within the last 12 months before the scheme start date. – Purchase of a new vehicle with fuel consumption of 5-7 litres / 100 kilometres or motorcycle is required. Grant Category C(ii) (€ 1 710) – Scrapping of Vehicle with active registration and circulation license within the last 12 months before the scheme start date. – Purchase of a new vehicle with fuel consumption of a maximum of 5 litres / 100 kilometres or motorcycle is required.
	Budget and source	€ 5 785 055.00 Road Transport Department
	Implementing organisation	Road Transport Department
	Competent monitoring authority	Road Transport Department
Energy savings*	**Method used for monitoring/calculating energy savings**	National methodology. Described in Annex II.
	Energy savings achieved in 2010.*	**2 825 toe**
	Energy savings expected in 2016.*	**2 825 toe**

	Energy savings expected in 2020 (if possible).	**2 825 toe**
	Assumptions*	Grants were provided for 3 081 vehicles in category C(i) and 991 vehicles in category C(ii) during the implementation of the measure.
	Overlaps	Not applicable

Table 57. Measure M.3: Scrapping of Vehicles, 20011-2020.[3]

Title of the energy efficiency improvement measure (EEI)		Scrapping of Vehicles, 2011-2020
Description	**Category**	3.1. Grants
	Timeframe	Start date: 2011, Expiry date: 2020.
	Purpose / short description	The purpose of the Scrapping Plan is to protect the environment and improve road safety.
	End-use category	Transport sector
	Target group	Very old vehicles.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Scrapping is expected to be done in accordance with such criteria as those applied in the period 2008-2009.
	Budget and source	Not applicable
	Implementing organisation	Road Transport Department
	Competent monitoring authority	Road Transport Department
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service based on the findings from the operation of the scrapping plan in the period 2008-2010.

[3] Each plan for the scrapping and replacement of older vehicles is approved by the Cabinet of Ministers on condition that a relevant fund is included in the Budget of the Road Transport Department (RTD). The latest plan for the scrapping and replacement of older vehicles was announced on 11/10/2010 and RTD accepted relevant requests until 13/12/2010. **Consequently, additional scrapping plans will be announced if there are approved funds.** This means that the implementation of the measure is not certain.

	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**3 000 toe**
	Energy savings expected in 2020 (if possible).	**6 000 toe**
	Assumptions*	The only assumption made was the fact that the scrapping plan shall be twice as intense as that implemented in 2008-2009
	Overlaps	Not applicable

Table 58. Measure M.4: Action plan to strengthen public transport

Title of the energy efficiency improvement measure (EEI)		Action plan to strengthen public transport
Description	**Category**	6.2 Upgrading of public transport
	Timeframe	Start date: 2010, Expiry date: 2016.
	Purpose / short description	Cyprus does not have a developed public transport system, and there is serious traffic congestion in the major cities. The purpose of the Plan is to promote and develop measures/projects/proposals to contribute to alleviating traffic congestion in large cities. New buses were purchased in large cities in June 2010, as a first step towards implementing the Plan. Furthermore, scheduled bus services were established in 2009 between large urban centres and the Larnaca Airport. The measures taken are still at an early stage, and more important developments are expected in the sector, as transport is responsible for almost 50% of the final consumption of energy in the country. In accordance with information from the Ministry of Transport and Works, a target has been set for increasing the percentage of Public Transport form 2% in 2009 to 10% in 2015.
	End-use category	Transport sector
	Target group	Public Transport
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Purchase of new buses Creation of bus lanes Establishment of a school bus system
	Budget and source	Not applicable

	Implementing organisation	Road Transport Department
	Competent monitoring authority	Road Transport Department
Energy savings*	**Method used for monitoring/calculating energy savings**	No national or proposed methodology was used in calculating savings. The savings referred to below are estimates made by the Energy Service, since the measure was first implemented in June 2010 and there are no available data.
	Energy savings achieved in 2010.*	**0 toe**
	Energy savings expected in 2016.*	**27 810 toe**
	Energy savings expected in 2020 (if possible).	**50 904 toe**
	Assumptions*	
	Overlaps	Not applicable

HORIZONTAL MEASURES

Table 59. Measure O.1: Information campaign on energy saving issues.

Title of the energy efficiency improvement measure (EEI)		Information campaign on energy saving issues.
Description	**Category**	2.1 Information campaigns
	Timeframe	Start date: 2008, Expiry date: 2009.
	Purpose / short description	The purpose of the campaign is to provide information and increase awareness among the general public concerning RES and ES issues.
	End-use category	All sectors
	Target group	The general public
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The campaign pertained to a number of actions, as follows: • Designing and entering an advertisement in newspapers and magazines concerning energy savings • Designing and distributing an information publication (25 000 copies) • Producing and broadcasting, on TV stations, a 30-minute movie (advertising spot) on Energy Saving • Producing and broadcasting, on TV stations, a 30-minute movie (advertising spot) on Renewable Energy Sources • Producing and broadcasting a 30-minute radio message (advertising spot) on Energy Saving • Producing and broadcasting a 30-minute radio message (advertising spot) on Renewable Energy Sources • Designing and entering on websites an advertisement concerning energy saving • Producing and distributing a 15-minute information film on DVD describing the history, work, function and structure of the Special Fund. • Organizing information day events to promote the Special Fund, as well as promote RES and ES.
	Budget and source	The cost incurred for the above amounted approximately to € 210 000. The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism

Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 60. Measure O.2: Online student training programmes.

Title of the energy efficiency improvement measure (EEI)		Online student training programmes
Description	**Category**	2.1 Information campaigns 2.5 Training and education
	Timeframe	Start date: 2010, Expiry date: -
	Purpose / short description	The purpose of the programs is to provide education and increase awareness concerning energy issues among students.
	End-use category	Schools
	Target group	Primary and secondary school students
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Two training programmes were prepared for students and are available at the website of the Cyprus Institute of Energy at www.cie.org.cy. The one is addressed to primary school students and the other is for secondary school students
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism

Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 61. Measure O.3: Publishing educational books for students.

Title of the energy efficiency improvement measure (EEI)		Publishing educational books for students.
Description	**Category**	2.1 Information campaigns 2.5 Training and education
	Timeframe	Start date: 2010, Expiry date: -
	Purpose / short description	In addition to online training programmes, 2 books were published with a view to providing education and increasing awareness concerning energy issues among students.
	End-use category	Schools
	Target group	Primary and secondary school students
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The one is addressed to primary school students and the other is for secondary school students A total of 6 000 books were published. The books are distributed at schools, to students and teachers. They are approved by the Ministry of Education and Culture as teaching aids for school teachers as part of the new curricula. Each school library in Cyprus will have one book. The books are also available in electronic format at the website of the Energy Service.
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism

	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 62. Measure O.4: Publishing 2 special information publications for young children.

Title of the energy efficiency improvement measure (EEI)		Publishing 2 special information publications for young children
Description	**Category**	2.1 Information campaigns 2.5 Training and education
	Timeframe	Start date: 2010, Expiry date: -
	Purpose / short description	The purpose of the measure is to provide education and increase awareness concerning energy issues among students.
	End-use category	Schools
	Target group	Elementary school students (aged 5-12)
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Two publications were published for children entitled “student’s twelve rules to save energy” and ““Renewable energy sources in simple words”. The publications are available at schools and are also distributed during lectures given at schools.
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism

Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 63. Measure O.5: Publishing and distributing posters and stickers on energy saving.

Title of the energy efficiency improvement measure (EEI)		Publishing and distributing posters and stickers on energy saving.
Description	**Category**	2.1 Information campaigns
	Timeframe	Start date: 2010, Expiry date: -
	Purpose / short description	The purpose of the measure is to increase awareness concerning energy issues among Public Servants and students.
	End-use category	All schools and public buildings
	Target group	Employees in the Public sector and the General Government, and elementary school students
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Three different posters and adhesives were prepared urging people to save energy. The material was distributed and put up in buildings of the public sector and the general government and in schools.
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.

	savings	
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 64. Measure O.6: Establishing a student competition for students' projects on RES and ES, with 3 monetary awards

Title of the energy efficiency improvement measure (EEI)		Establishing a student competition for students' projects on RES and ES, with 3 monetary awards
Description	**Category**	2.1 Information campaigns 2.5 Training and education
	Timeframe	Start date: 2010, Expiry date:
	Purpose / short description	The purpose of the measure is to increase awareness concerning energy issues among students.
	End-use category	Secondary and technical education schools
	Target group	Secondary and technical school students (aged 13-18)
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	A student competition among secondary and technical education schools has been established since school year 2010-2011 with a view to offering awards for students' projects relating to energy saving or renewable energy sources. Evaluation criteria were established, and awards amounting to EUR 800.00, 600.00 and 300.00 were offered for the three best projects. Awarding is done during an official ceremony in one of the schools receiving the awards. The cost of the awards is covered by the Special Fund for Renewable Energy Sources and Energy Conservation.
	Budget and source	€ 1 700 annually
	Implementing organisation	Energy Service / Special Fund

	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 65. Measure O.7 Lectures on RES and ES at schools.

Title of the energy efficiency improvement measure (EEI)		Lectures on RES and ES at schools.
Description	**Category**	2.1 Information campaigns 2.5 Training and education
	Timeframe	Start date: 2010, Expiry date:
	Purpose / short description	The purpose of the measure is to provide education and increase awareness concerning energy issues among students.
	End-use category	Schools
	Target group	School teachers and students of all levels (aged 5-18)
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The Energy Service and the Institute of Energy organised lectures on renewable energy sources and energy saving at 123 schools of all levels (from kindergartens to senior high schools) in all provinces in 2010. A total of 13 000 students and more than 800 teachers were trained in 2010. These lectures are still being given in 2011, while at the same time special lectures are organizing with a view to training teachers on how to promote energy saving at school.
	Budget and source	Not applicable

	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism / Institute of Energy
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 66. Measure O.8: Publishing and distributing various information publications and guides on RES and ES investment

Title of the energy efficiency improvement measure (EEI)		Publishing and distributing various information publications and guides on RES and ES investment
Description	**Category**	2.1 Information campaigns
	Timeframe	Start date: 2004, Expiry date: -
	Purpose / short description	The purpose of the measure is to increase awareness concerning energy issues among the general public.
	End-use category	All sectors
	Target group	The general public.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The Energy Service publishes and distributes a number of publications and Guides for the public, on an annual basis, with a view to providing them with correct information and increasing energy awareness.
	Budget and source	Not applicable

	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 67. Measure O.9: Energy saving report

Title of the energy efficiency improvement measure (EEI)		Energy saving report
Description	**Category**	2.1 Information campaigns
	Timeframe	Start date: 2005, Expiry date: -
	Purpose / short description	The purpose of the measure is to increase awareness concerning energy issues among the general public.
	End-use category	All sectors
	Target group	The general public.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	As part of the efforts to promote rational use of energy and encourage the use of renewable energy sources, the Energy Service organises a special exhibition for RES and energy saving systems (Save Energy) at the Cyprus International Fair grounds in cooperation with the Cyprus Employers & Industrialists Federation and the support of the Electricity Authority of Cyprus. Participation of a large number of exhibitors, the great turnout and overall great interest demonstrated by the public make the energy saving exhibition the most significant public information/awareness activity on issues related to energy saving and the use of renewable energy sources.

	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 68. Measure O.10: Energy Saving Award

Title of the energy efficiency improvement measure (EEI)		Energy Saving Award
Description	**Category**	2.1 Information campaigns
	Timeframe	Start date: 2005, Expiry date: -
	Purpose / short description	The purpose of the measure is to increase awareness concerning energy issues among the general public.
	End-use category	All sectors
	Target group	Enterprises and households
	Area of application	All of Cyprus
Information concerning	**List and description of actions for measure verification**	In cooperation with the Cyprus Employers & Industrialists Federation (OEB), the Energy Service established a special Annual Energy Saving Award. The purpose of this institution is to recognise and award enterprises/households that make efforts towards the more

implementation		efficient use of energy in their premises. One prize will be awarded to an enterprise and one to a household which have achieved the best energy savings results in accordance with predefined criteria. The choice for awarding the prize will be done by a five-member Committee comprised of representatives from the Ministry of Commerce, Industry and Tourism, the Cyprus Employers & Industrialists Federation and the Electricity Authority of Cyprus. They will choose from among households and enterprises having implemented energy savings measures by participating in the Grants Scheme for energy saving implemented by the Special Fund for RES and ES.
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism / Institute of Energy / Electricity Authority of Cyprus / OEB
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 69. Measure O.11: Organizing training seminars and day events for citizens and organised groups of people

Title of the energy efficiency improvement measure (EEI)		Organizing training seminars and day events for citizens and organised groups of people
Description	**Category**	2.1 Information campaigns 2.5 Training and education
	Timeframe	Start date: 2005, Expiry date: -
	Purpose / short description	The purpose of the measure is to increase awareness concerning energy issues among the general public.

	End-use category	All sectors
	Target group	The general public.
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	With a view to providing information and increasing awareness among the public, day events are organised in different cities every year in an effort to diffuse information on the provisions of the Grants Schemes and on the implementation of laws relating to energy saving.
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism
Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

Table 70. Measure O.12: Energy Awareness and reducing energy consumption program in buildings in the Public sector and general government

Title of the energy efficiency improvement measure (EEI)		Energy Awareness and reducing energy consumption program in buildings in the Public sector and general government
Description	**Category**	2.1 Information campaigns 2.5 Training and education
	Timeframe	Start date: 2009, Expiry date: -
	Purpose / short description	The purpose of the measure is to increase awareness among employees in the Public sector and general government concerning

		energy issues and provide them with relevant training.
	End-use category	Public sector and general government
	Target group	All employees in the Public sector and general government
	Area of application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	The Energy Service has implemented a coordinated programme with a view to Energy Awareness and reducing energy consumption program in buildings in the Public sector and general government since2009. The purpose of the programme is to ensure that the Public Sector becomes a role model concerning the consumption of energy. To this end, 316 officers responsible for energy saving have been appointed in the various Public sector and general government buildings, and 186 competent officers/teachers have been appointed at schools. These officers have received special training on how to apply simple zero-cost measures and increase energy awareness among staff members with a view to reducing the consumption of energy in buildings used by their respective organisations. They have also taken action, by implementing low and high cost measures as widely as possible, with a view to reducing the waste of energy in buildings. The energy savings actions implemented and the consumption of energy in these buildings are monitored on an annual basis through the Annual Report on Energy Consumption and Actions. These organisations are kept up-to-date on opportunitities for subsidised investments through the Grants Scheme and promote the procedures for their participation in the Grants Scheme. Energy savings officers also monitor the implementation of national legislation on the energy efficiency of buildings, and in particular the provisions laid down in relevant legislation for public buildings and buildings in the wider public sector In addition, an annual day event entitled “Energy Saving in the Public sector and general government” is organised on an annual basis, which is attended by Energy Saving Officers of the Public sector and general government participate and for which there is an open invitation to the public and agencies of the Private Sector. The goal of this event is to provide these officers and all present ongoing training on energy saving issues. The event includes a demonstration of actions implemented by public and broader public sector agencies, the energy savings achieved and new actions scheduled aiming to inform citizens and private agencies and set an example for related actions. There is a special part of the website of the Energy Service (www.mcit.gov.cy) where all training material, instructions and presentations, relevant announcements, the annual report and a list of energy savings officers are posted, along with contact details so that exchange of information is possible. Moreover, during the 2010 day event, the Energy Service awarded commendations to all buildings which had managed to reduce the consumption of energy in 2009, as compared to 2008, and all buildings in which important energy savings actions had been implemented during and after construction.
	Budget and source	Not applicable
	Implementing organisation	Energy Service – Ministry of Commerce, Industry and Tourism
	Competent monitoring authority	Energy Service – Ministry of Commerce, Industry and Tourism

Energy savings*	**Method used for monitoring/calculating energy savings**	It was impossible to make any estimates or calculations. Since no national methodology has been developed for calculating energy savings due to horizontal measures.
	Energy savings achieved in 2010.*	**- toe**
	Energy savings expected in 2016.*	**- toe**
	Energy savings expected in 2020 (if possible).	**- toe**
	Assumptions*	Not applicable
	Overlaps	Not applicable

3.3.2.1 Measures in the Residential Sector

The table below summarises all individual measures implemented in the Residential Sector, including all subcategories in each measure. The table is broken down into two parts. The first part includes measures OIK.1 to OIK.4, which are in still effect, along with their respective contribution towards the achievement of the targets set for 2010 and 2016. The second part includes measures OIK.5 to OIK.9, which are still in effect without, however, having any available data for calculating the respective energy savings, or which are planned to be implemented in the following years. Concerning the measures included in the second part, the savings referred to are only estimates or forecasts, but are not based on factual data. The aggregate savings from both types of measures are referred to at the bottom of the table.

Table 71. Overview of individual measures in the residential sector

No	Title of the EEI measure	End-use category	Duration	Energy savings achieved in 2010 (toe)	Energy savings expected in 2016 (toe)
OIK.1.	**All new dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.**	**New residential sector buildings**	**2008 -**	**15 428**	**124 284**
OIK.1.1	Energy efficiency requirements in 2008-2009		2008-2009	15 428.99	30 855.98
OIK.1.2	Energy efficiency requirements in 2010		2010-	0	93 427.73
OIK.2.	**Grants Scheme for energy savings in the residential sector (existing dwellings) 2004-2009**	**Existing residential sector buildings**	**2004 - 2009**	**9 952**	**9 952**
OIK.2.1	Thermal insulation (walls)			889.80	889.80
OIK.2.2	Thermal insulation (windows)			5 291.46	5 291.46
OIK.2.3	Thermal insulation (roofs)			3 770.76	3 770.76
OIK.3.	**Distribution of free fluorescent lamps**	**Buildings in the residential and tertiary sector**	**2007 - 2011**	**13 868**	**15 725**
OIK.4.	**Grants scheme to encourage the use of RES (end use) in the residential sector, 2004-2010.**	**Residential sector buildings**	**2004 - 2010**	**11 916**	**11 916**
OIK.4.1	Independent photovoltaic systems			96.86	96.86
OIK.4.2	Independent photovoltaic systems for drawing water			32.33	32.33
OIK.4.3	Household solar systems			11 180.07	11 180.07
OIK.4.4	Space heating/cooling by solar energy			291.32	291.32
OIK.4.5	Central active solar hot water systems			24.83	24.83
OIK.4.6	Solar swimming pool heating systems			33.82	33.82
OIK.4.7	Heat pump with a geoexchange used for space heating and cooling			288.81	288.81
TOTAL SAVINGS DUE TO MEASURES IN EFFECT				**51 164**	**161 877**
OIK.5.	**0**	**600**	**2008 -**	**0**	**600**
OIK.6.	**0**	**9 000**	**2008 -**	**0**	**9.000**
OIK.7.	**0**	**4 000**	**2008 -**	**0**	**4.000**
OIK.8.	**0**	**7 148**	**2011 - 2020**	**0**	**7.148**
OIK.8.1	0	2 057		0	2.057

OIK.8.2	0	538		0	538
OIK.8.3	0	4 553		0	4.553
OIK.9.	**0**	**1 805**		**0**	**1.805**
OIK.9.1	0	60		0	60
OIK.9.2	0	1 350		0	1.350
OIK.9.3	0	184	**2011 - 2020**	0	184
OIK.9.4	0	16		0	16
OIK.9.5	0	23		0	23
OIK.9.6	0	172		0	172
TOTAL SAVINGS DUE TO MEASURES EXPECTED TO BE IMPLEMENTED				**0**	**22 553**
TOTAL SAVINGS				**51 163.5**	**184 430**

In conclusion, if all measures planned for the following years, which have not been in effect yet, are implemented, Cyprus will achieve the target set for 2016 only from the residential sector, as the total savings will reach 184 410 toe, instead of the quantitative target of 185 000 toe.

3.3.2.2 Measures in the tertiary sector

Table 72 summarises all individual measures implemented in the Tertiary Sector, including all subcategories in each measure. The table is broken down into two parts. The first part includes measures T.1 to T.5, which are still in effect, along with their respective contribution towards the achievement of the targets set for 2010 and 2016. The second part includes measures T.6 to T.13, which are still in effect without, however, having any available data for calculating exactly the respective energy savings, or which are planned to be implemented in the following years. Concerning the measures included in the second part, the savings referred to are only estimates or forecasts, but are not based on factual data. The aggregate savings from both types of measures are referred to at the bottom of the table.

Table 72. Overview of individual measures in the tertiary sector

A/A	Title of the EEI measure	End-use category	Duration	Energy savings achieved in 2010 (toe)	Energy savings expected in 2016 (toe)
T.1.	**National action plan for green public procurement, 2007-2010.**	**Public sector (lights, computer equipment).**		**337**	**59**
T.1.1	Fluorescent lights in the public sector	Public sector		188.16	0
T.1.2	Installing air conditioners in the public sector	Public sector	**2007-2009**	18.19	18.19
T.1.2	Replacing air conditioners in the public sector	Public sector		40.92	40.92
T.1.4	Replacing computers in the public sector	Public sector		68.52	0
T.1.5	Replacing computer monitors in the public sector	Public sector		20.99	0
T.2.	**Government grants scheme for energy savings/RES for the Public sector and general government, 2004-2010.**	**Public sector buildings**	**2004-2010**	**110**	**110**
T.2.1.	Grants schemes for energy savings for the Public sector and general government	Existing public sector buildings	2004-2009	110.20	110.20

T.2.2	Grants schemes for RES for the Public sector and general government	Public sector buildings	2004-2010	0	0
T.3.	**All new tertiary sector buildings, except those described in the Annex to the Law regulating the Energy Efficiency of Buildings (Law 142(I)2006) must meet minimum energy efficiency requirements**	**New tertiary sector buildings**	**2008-**	**2 000**	**17 621**
T.3.1.	Energy efficiency requirements in 2008-2009		2008-2009	1 999.60	3 999.20
T.3.2.	Energy efficiency requirements in 2010		2010-	0	13 622.16
T.4.	**Grants Scheme for (end-use) energy savings in the tertiary sector (existing buildings) 2004-2009.**	**Existing tertiary sector buildings (enterprises)**	**2004-2009**	**5 896**	**5 291**
T.5.	**Grants scheme to encourage the use of RES (end use) in the tertiary sector, 2004-2010.**	**Existing tertiary sector buildings (enterprises)**	**2004-2010**	**600**	**600**
T.5.1.	Independent photovoltaic systems			1.93	1.93
T.5.2.	Space heating/cooling by solar energy			20.18	20.18
T.5.3.	Central active solar hot water systems			206.90	206.90
T.5.4.	Solar swimming pool heating systems			31.25	31.25
T.5.5.	Heat pump with a geoexchange used for space heating and cooling			339.63	339.63
TOTAL ENERGY SAVINGS DUE TO MEASURES IN EFFECT				**8.943**	**23.681**
T.6.	**All existing tertiary sector buildings, except those described in the Annex to the Law regulating the Energy Efficiency of Buildings (Law 142(I)2006), which undergo comprehensive renovation (as stipulated in the relevant law) must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.**	**Existing tertiary sector buildings**	**2008-**	**0**	**400**
T.7.	**Maintenance and inspection of boilers and heating installations at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.**	**Existing tertiary sector buildings**	**2008-**	**0**	**1 700**
T.8.	**Maintenance and inspection of air conditioning systems with effective rated output greater than 12 kW at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.**	**Existing tertiary sector buildings**	**2008-**	**0**	**2 500**
T.9.	**National action plan for green public procurement, 2010-2012.**	**Public sector (lights, computer equipment).**	**2011-2020**	0	**600**
T.10.	**Grants Scheme for (end-use) energy savings in the tertiary sector (existing buildings) 2011-2020.**	**Existing tertiary sector buildings**	**2011-2020**	0	**10 671**
T.11.	**Grants scheme to encourage the use of RES (end use) in the tertiary sector, 2011-2020.**	**Tertiary sector buildings**	**2011-2020**	0	**560**
T.12.	**Grants Scheme for cogeneration of high efficiency heat and power in the Tertiary Sector, 2011-2020.**	**Tertiary sector buildings**	**2011-2020**	0	**2 000**
T.13.	**Action Plans of Municipalities and Communities, 2010-2020.**	**Buildings in the wider public sector, Road lights, Transport, citizens, students.**	**2010-2020**	0	**3 000**
TOTAL ENERGY SAVINGS DUE TO MEASURES EXPECTED TO BE IMPLEMENTED				**0**	**21 431**
TOTAL SAVINGS				**8 943**	**45 112**

3.3.2.3 *Measures in the industrial sector*

Table 73 summarises all individual measures implemented in the Industrial Sector, including all subcategories in each measure. The table is broken down into two parts. The first part includes measures B.1 - B.2, which are still in effect, along with their respective contribution towards the achievement of the targets set for 2010 and 2016. The second part includes measures B.3 - B.5, which are planned to be implemented in the following years. Concerning the measures included in the second part, the savings referred to are only estimates or forecasts, but are not based on factual data. The aggregate savings from both types of measures are included too.

Table 73. Overview of individual measures in the industrial sector

No	Title of the EEI measure	End-use category	Duration	Energy savings achieved in 2010 (toe)	Energy savings expected in 2016 (toe)
B1.	**Grants Scheme for energy savings (in existing industrial enterprises), 2004-2009.**	**Existing industrial sector buildings**	**2004-2009**	**1 693**	**1 263**
B2.	**Grants scheme to encourage the use of RES (end use) in the industrial sector and agriculture, 2004-2010.**	**Industrial sector buildings**	**2004-2010**	**21**	**21**
B.2.1	Space heating/cooling by solar energy			8.59	8.59
B.2.2	Central active solar hot water systems			1.73	1.73
B.2.3	Independent photovoltaic systems (agriculture)			1.36	1.36
B.2.4	Independent photovoltaic systems for drawing water (agriculture)			9.53	9.53
TOTAL SAVINGS DUE TO MEASURES IN EFFECT				**1 714**	**1 284**
B.3.	**Grants Scheme for energy savings (in existing industrial enterprises), 2011-2020.**	**Existing industrial sector buildings**	**2011-2020**	**0**	**5 000**
B.4.	**Grants scheme to encourage the use of RES (end use) in the industrial sector and agriculture, 2011-2020.**	**Industrial sector buildings**	**2011-2020**	**0**	**28**
B.5	**Grants Scheme for cogeneration of high efficiency heat and power in the Tertiary Sector, 2011-2020.**	**Industrial sector buildings**	**2011-2020**	**0**	**4 000**
TOTAL SAVINGS DUE TO MEASURES EXPECTED TO BE IMPLEMENTED				**0**	**9 028**
TOTAL SAVINGS				**1 714**	**10 312**

3.3.2.4 Measures in transportation

Table 74 summarises all individual measures implemented in the Transport Sector, including all subcategories in each measure. The table is broken down into two parts. The first part includes measures M.1 and M.2, which are still in effect, along with their respective contribution. The second part includes measures M.3 and M.4, which are still in effect without, however, having any available data for calculating exactly the respective energy savings, or which are planned to be implemented in the following years. Concerning the measures included in the second part, the savings referred to are only estimates or forecasts, but are not based on factual data. The aggregate savings from both types of measures are included too.

Table 74. Overview of separate measures in the Transport sector

No	Title of the EEI measure	End-use category	Duration	Energy savings achieved in 2010 (toe)	Energy savings expected in 2016 (toe)
M.1.	**Grants Scheme for energy saving in transport (purchase of hybrid vehicles, electric vehicles and low-emissions vehicles), 2004-2009.**	**Road transport**	**2004-2009**	**1 084**	**1 084**
M.1.1	Hybrid vehicles			357.01	357.01
M.1.2	Electric vehicles			22.39	22.39
M.1.3	Vehicles with carbon dioxide emissions below 120g/km.			704.26	704.26
M.2.	**Vehicle scrapping plan**	**Road transport**	**2008-2009**	**2 825**	**2 825**
TOTAL SAVINGS DUE TO MEASURES IN EFFECT				**3 909**	**3 909**
M.3.	**Vehicle scrapping plan 2011-2020.**	**Road transport**	**2011-2020**	**0**	**3 000**
M.4.	**Action plan to strengthen public transport.**	**Road transport**	**2011-2020**	**0**	**27 816**
TOTAL SAVINGS DUE TO MEASURES EXPECTED TO BE IMPLEMENTED				**0**	**30 816**
TOTAL SAVINGS				**3 909**	**34 725**

3.3.2.5 Horizontal measures

Table 75 describes horizontal measures implemented in previous years, which have been completed or are still in effect. As there is no proposed or national methodology, it is impossible to calculate the energy savings arising from the implementation of these measures. For this reason, their contribution towards the achievement of energy savings targets is deemed to be zero.

The horizontal measures implemented by the Energy Service in recent years were aimed at providing more information to the general public, employees in the Public sector and general government, as well as students concerning energy saving and renewable energy sources issues.

Table 75. Overview of horizontal measures

No	Title of the EEI measure	End-use category	Duration	Energy savings achieved in 2010 (toe)	Energy savings expected in 2016 (toe)
O.1.	Information campaign on energy saving issues.	The general public	2008-2009	-	-
O.2.	Online student training programmes.	Schools	2010 - today	-	-
O.3.	Publishing educational books for students.	Schools	2010 - today	-	-
O.4.	Publishing 2 special information publications for young children.	Schools	2010 - today	-	-
O.5.	Publishing and distributing posters and stickers on energy saving.	All schools and public buildings	2010 - today	-	-
O.6.	Establishing a student competition for students' projects on RES and ES, with 3 monetary awards	Secondary and technical school students (aged 13-18)	2010 - today	-	-
O.7.	Lectures on RES and ES at schools.	Schools	2010 - today	-	-
O.8.	Publishing and distributing various information publications and guides on RES and ES investment	The general public.	2004 - today	-	-
O.9.	Energy saving report	All sectors	2005 - today	-	-
O.10.	Energy Saving Award	All sectors	2005 - today	-	-
O.11.	Organising training seminars and day events for citizens and organised groups of people	All sectors	2005 - today	-	-
O.12.	Energy Awareness and reducing energy consumption program in buildings in the Public sector and general government	Public sector and general government	2009 - today	-	-
TOTAL SAVINGS				-	-

In addition to the above actions, horizontal measures are implemented and/or planned to be implemented by Municipalities and Communities which have prepared, or will prepare, Energy Action Plans within the framework of their participation in the Agreement of Mayors and/or the Agreements of Islands with a view to ensuring a 20% reduction in CO_2 emissions in their territories by 2020. Only 3 Municipalities have started implementing the Energy Action Plans prepared, and another 11 local authorities are currently preparing the Plans. The Action Plans include

information/training campaigns for citizens (annual seminars, energy days, student training, local citizen information, advisory services, forms and information messages).

It should also be noted that the Action Plans of Local Authorities include quantified energy savings targets until 2020. In addition to campaigns for providing local citizens with information, in an effort to achieve the relevant targets, local authorities have been initiating actions for saving energy in Municipal buildings, in transport (free parking for electric and hybrid vehicles, electric vehicle charging stations, personnel training, purchasing eco-vehicles, setting up bicycle rental systems) and in road lighting. The Union of Municipalities estimates that the implementation of Energy Plans by local authorities can result in energy savings of the order or 12 627 toe by 2020 (146 815 MWh). The implementation of Action Plans by Local Authorities and their contribution towards the achievement of national energy savings targets (2016 indicative target and 2020 indicative target) will be presented in the 3rd EEAP to be submitted in 2014.

Horizontal measures for public training and information are also implemented by the Cyprus Energy Agency. The relevant actions include organising training seminars and day events, lectures to students, as well as preparing and distributing posters, forms and guides concerning energy saving and renewable energy sources.

Moreover, with a view to transposing Directive 2009/125/EC in the legislation of the Republic of Cyprus, the House of Representatives adopted the 2011 Law concerning the setting of ecodesign requirements for energy-related products (Law 17(I)/2011). To ensure full implementation of the Law on market supervision, the competent authority (Energy Service) has taken the following steps:

- To appoint inspectors duly authorised to perform market supervision.
- To prepare an information guide and a triptych with a view to providing the public with information on ecodesign.
- To organise day events with a view to providing the general public and professionals with information and instruction.

Finally, as part of the training reformation and on the occasion of the introduction of the new curriculum on Environmental/Sustainable Development Training, the Ministry of Education and Culture has included in the fundamental sections of the curriculum a section on energy, for all levels of education.

3.3.3 Summary on energy savings

The table below includes all aggregate data concerning all measures implemented and in force, which are contributing towards the achievement of the relevant energy savings targets, as well as those measures expected to be implemented in the following years, making a respective contribution towards energy savings. It should be noted that top-down methodologies were not used in making calculations. Only bottom-up methodologies (national methodologies and methodologies proposed by the Directive) were used.

Table 76: Summary on end-use energy savings

Sector/subsector	Reference to measures referred to in chapter 3.3.2	Calculation methodology	Energy savings achieved in 2010 (toe)	Energy savings expected in 2016 (toe)	Estimated energy savings in 2020 (toe)
MEASURES IMPLEMENTED IN THE PAST, WHICH ARE STILL IN EFFECT					
Residential sector					
OIK.1.	**3.3.2.1**	National methodology	**15 428**	**124 284**	**199 026**
OIK.2.	**3.3.2.1**	*Sample – Bottom-up – p. 64 of the Directive, in the section with the proposed methodologies*	**9 952**	**9 952**	**9 952**
OIK.3.	**3.3.2.1**	*Bottom-up – p. 77 of the Directive, in the section with the proposed methodologies*	**13 868**	**15 725**	**11 215**
OIK.4.	**3.3.2.1**	National methodologies were used for all subcategories except 4.3, for which the bottom-up methodology was used – p. *73 of the Directive, in the section with the proposed methodologies*	**11 916**	**11 916**	**11 916**
RESIDENTIAL SECTOR TOTAL			**51 164**	**161 877**	**232 109**
Tertiary sector					
T.1.	*3.3.2.2*	***Fluorescent lamps:*** *Bottom-up methodology referred to on p. 77 of the Directive, in the section with the proposed methodologies* ***Air conditioners:*** *Bottom-up methodology referred to on p. 71 of the Directive, in the section with the proposed methodologies* ***Office computers and monitors:*** *The predefined values referred to in table 1.2 on page 84 and in the table on page 86, in the proposed methodology section, were used.*	**337**	**59**	**0**
T.2.	**3.3.2.2**	National methodology	**110**	**110**	**110**
T.3.	**3.3.2.2**	National methodology	**2 000**	**17 621**	**28 519**
T.4.	**3.3.2.2**	National methodology	**5 896**	**5 291**	**4 832**
T.5.	**3.3.2.2**	National methodology	**600**	**600**	**600**
TERTIARY SECTOR TOTAL			**8 942**	**23 681**	**34 061**
Industrial sector					
B1.	**3.3.2.3**	National methodology	**1 693**	**1 263**	**1 120**
B.2.	**3.3.2.3**	National methodology	**21**	**21**	**21**

INDUSTRIAL SECTOR TOTAL			**1 714**	**1 284**	**1 141**
Transport sector					
M.1.	**3.3.2.4**	National methodology	**1 084**	**1 084**	**1 084**
M.2.	**3.3.2.4**	National methodology	**2 825**	**2 825**	**2 825**
TRANSPORT SECTOR TOTAL			**3 909**	**3 909**	**3 909**
Horizontal measures					
O.1.	**3.3.2.5**	No methodology	-	-	-
O.2.	**3.3.2.5**	No methodology	-	-	-
O.3.	**3.3.2.5**	No methodology	-	-	-
O.4.	**3.3.2.5**	No methodology	-	-	-
O.5.	**3.3.2.5**	No methodology	-	-	-
O.6.	**3.3.2.5**	No methodology	-	-	-
O.7.	**3.3.2.5**	No methodology	-	-	-
O.8.	**3.3.2.5**	No methodology	-	-	-
O.9.	**3.3.2.5**	No methodology	-	-	-
O.10.	**3.3.2.5**	No methodology	-	-	-
O.11.	**3.3.2.5**	No methodology	-	-	-
O.12.	**3.3.2.5**	No methodology	-	-	-
HORIZONTAL MEASURES TOTAL			**-**	**-**	**-**
Total energy savings due to measures implemented in the past, which are still in effect			**65 729**	**190 751**	**271 220**
MEASURES EXPECTED TO BE IMPLEMENTED IN THE PERIOD 2011-2020					
Residential sector					
OIK.5.	**3.3.2.1**	Estimate	**0**	**600**	**0**
OIK.6.	**3.3.2.1**	Estimate	**0**	**9 000**	**15 000**
OIK.7.	**3.3.2.1**	Estimate	**0**	**4 000**	**7 000**
OIK.8.	**3.3.2.1**	Estimate - National methodology	**0**	**7 148**	**11 915**
OIK.9.	**3.3.2.1**	Estimate - National methodology	**0**	**1 805**	**3 610**
RESIDENTIAL SECTOR TOTAL			**0**	**22 553**	**37 525**
Tertiary sector					
T.6.	**3.3.2.2**	Estimate	**0**	**400**	**0**
T.7.	**3.3.2.2**	Estimate	**0**	**1 700**	**3 000**
T.8.	**3.3.2.2**	Estimate	**0**	**2 500**	**5 000**
T.9.	**3.3.2.2**	Estimate	0	**600**	**1 000**
T.10.	**3.3.2.2**	Estimate - National methodology	0	**10 671**	**17 785**
T.11.	**3.3.2.2**	Estimate - National methodology	0	**560**	**1 120**
T.12.	**3.3.2.2**	Estimate - National methodology	0	**2 000**	**5 079**
T.13.	**3.3.2.2**	Estimate	0	**3 000**	**6 300**
TERTIARY SECTOR TOTAL			**0**	**21 431**	**39 284**
Industrial sector					
B.3.	**3.3.2.3**	Estimate - National methodology	**0**	**5 000**	**8 333**
B.4.	**3.3.2.3**	Estimate - National methodology	**0**	**28**	**60**
B.5	**3.3.2.3**	Estimate - National methodology	**0**	**4 000**	**8 227**

INDUSTRIAL SECTOR TOTAL			**0**	**9 028**	**16 620**
Transport sector					
M.3.	**3.3.2.4**	Estimate - National methodology	**0**	**3 000**	**6 000**
M.4.	**3.3.2.4**	Estimate - National methodology	**0**	**27 816**	**50 904**
TRANSPORT SECTOR TOTAL			**0**	**30 816**	**56 904**
Total energy savings due to measures expected to be implemented in the period 2011-2020			**0**	**83 828**	**150 333**
TOTAL SAVINGS			**65 729**	**274 579**	**421 553**
Total savings, falling within the scope of Directive 2006/32/EC, due to measures which are still in effect			**48 302**	**48 846**	**43 675**
Total savings, falling outside the scope of Directive 2006/32/EC, due to measures which are still in effect			**17 428**	**141 905**	**227 545**
Total savings, falling within the scope of Directive 2006/32/EC, due to measures which are expected to be implemented			**0**	**65 628**	**120 333**
Total savings, falling outside the scope of Directive 2006/32/EC, due to measures which are expected to be implemented			**0**	**18 200**	**30 000**

* In this case, the savings referred to here is due to Directive on the energy performance of buildings (2002/91/EU and 2010/31/EU).

3.4 Public sector

Cyprus has complied with Article 5 of Directive 2006/32/EC through Green Public Procurement. The implementation of green public procurement and its contribution towards the achievement of national targets on the energy savings targets saving of energy are described in detailed in paragraphs 3.4.3 and 3.3.2 (Table 31). Moreover, a Grants Scheme was in operation in the period 2004-2009 for encouraging energy saving investments in the Public sector and general government, whose contribution is described in detail in paragraph 3.3.2 (Table 32). In addition, the actions implemented in the Public Sector are monitored through the programme for savings in the Public sector and general government, as described in detail in paragraph 3.3.2.5

3.4.1 Exemplary role of the Public Sector

The exemplary role of the Public Sector concerning Green Public Procurement is described in paragraph 3.4.3. It should be noted that information is available to the public concerning the level of implementation of the Action Plan and the actions implemented by awarding authorities concerning Green Public Procurement on the website of the Environment Department, which is responsible for coordinating the implementation of the Action Plan on Green Public Procurement. The criteria/specifications used for choosing the relevant products and the level of implementation of Green Public Procurement are also posted on the website of the Environment Department.

Information is also available to citizens and companies concerning all the actions implemented by the Public Sector through the annual day event concerning savings in the Public sector and general government organised by the Energy Service, as well as on the website of the Energy Service. In addition, the posting of a list of the contact details of energy savings officers on the website of the Energy Service facilitates the exchange of best practices between Public Authorities. There is also an opportunity to exchange practices during the annual day event attended by energy savings officers every year.

3.4.2 The leading role of the Public Sector concerning the Buildings Directive (EPBD)

Concerning Article 9.2 of the Buildings Directive, as mentioned above, a study will be prepared to be used as an aid in laying down the planning and policy to be followed in the Public Sector, so that public sector buildings are gradually converted into Nearly Zero Energy Buildings.

Concerning Article 11.5 of the Directive, public services have already been informed about legal provisions relating to the issue of the energy efficiency certificate for rented and newly built public buildings, as well as buildings used by the public sector which are larger than 1 000 square metres and are visited by the public frequently. The Energy Service, as the authority responsible for the implementation of relevant laws, has already started issuing energy efficiency certificates for such existing public buildings, and plans are being made for a broader implementation of the measure. Plans are also being made for issuing a guide for public services on how to implement the law in public buildings.

3.4.3 Specific measures for public procurement

Action plan for Green Public Procurement

Green Public Procurement (GPP) means that public purchasers take account of environmental factors when buying products, services or works falling within the scope of the Laws on the coordination of procedures for the award of public contracts (Law 11(I)/2006 and Law 12(I)/2006), with a view to reducing environmental impacts and maintaining economic sustainability.

Initial action plan for Green Public Procurement

Cyprus has prepared the initial Action Plan for Green Public Procurement (GPP) to be implemented in 2007-2009, which was approved by the Cabinet of Ministers in March 2007 and was then implemented by the Public Service. The Environment Department of the Ministry of Agriculture, Natural Resources and Environment coordinates the implementation of the Action Plan.

The Action Plan was addressed to all Public Awarding Authorities. Organisations governed by Public Law and Local Authorities were required to prepare their own Action Plans, submit them to the Environment Department (former Environment Service) and implement them.

The purpose of Green Public Procurement is that Awarding Authorities in the Public sector and general government take account of environmental factors when buying products, services or works, with a view to minimising the environmental impacts resulting from the entire life cycle of relevant products or services, which are equally competitive to others and serve the same purpose. As far as products are concerned, they have higher energy efficiency and cause less or no pollution.

The targets set by the initial plan were focused on:

- Information, training, monitoring;
- Using energy saving methods;
- Generating energy from renewable sources;
- Saving water;
- Reducing waste and packaging waste;
- Reducing hazardous waste;
- Promoting organic farming;
- Recycling and using recycled materials;
- Using products resulting in fewer environmental impacts; and
- Encouraging industries in Cyprus to produce more environmental friendly products.

In particular, the measures provided for in the initial Action Plan for Green Public Procurement and aimed at saving energy are broken down into the following categories: (a) Office equipment and supplies; (b) Electric appliances and products; (c) Vehicles/internal combustion engines; and (d) New/renovated buildings.

Category (a) includes purchasing computer equipment (computers, printers, etc.). The products have an eco-label on them (EU Flower, or TCO99, or Nordic Swan, or Blue Angel, or equivalent), or the manufacturer applies a certain environmental policy.

Category (b) includes using road lights ensuring minimum electricity consumption and maximum efficiency, using economy lamps in public buildings for office lighting purposes, using photovoltaic systems for road sign and pedestrian crossing lighting purposes, purchasing energy-efficient electric equipment (refrigerators, air conditioners, etc.), installing photovoltaic systems in public buildings for generating energy from renewable energy sources, using solar energy for the heating of buildings, using natural gas instead of diesel in central heating systems, installing light/movement sensors in building areas where no continuous light is required and installing photocells for switching on/off lights in the perimeter of roads and in large perimetric buildings, and installing springs on doors. The above actions are aimed mainly at saving energy, using more environmental friendly forms of energy, such as natural gas, and using renewable energy sources, such as solar energy.

Since 2007, the Electrical and Mechanical Services Department has, in preparing specifications for purchasing cars and internal combustion engines, taken into account their characteristics both as regards fuel consumption and carbon dioxide emissions. The Electrical and Mechanical Services Department also purchased two hybrid vehicles in 2007 with a view to evaluating them both concerning function and maintenance thereof.

Category (d) includes preparing energy studies for saving energy in heating and lighting systems for all privately-owned government buildings, which are renovated or are planned to be constructed, irrespective of their floor area.

The Table below presents the level of implementation of each measure on the basis of an assessment of the actions included in the Action Plan for GPP.

Table 77: Action Plan for promoting Green Public Procurement

Office equipment and supplies	
Measure	Level of implementation
Purchasing computerised equipment (computers, printers, etc.)	Computerised equipment and computers are compatible with EU standards.
Electric appliances and products	
Using road lights ensuring minimum electricity consumption and maximum efficiency	Installing high pressure sodium lamps in the national network.
Using economy lamps in public buildings for office lighting purposes	95% of the lamps purchased by the State Purchasing and Procurement Department are economy lamps.
Using photovoltaic systems for road sign and pedestrian crossing lighting purposes	Installing photovoltaic systems in 10 pedestrian crossings.
Purchasing energy-efficient electric equipment (refrigerators, air conditioners, etc.)	Energy-efficient products are preferred.
Installing photovoltaic systems in public buildings for generating energy from renewable energy sources	Installing photovoltaic systems in 29 schools.
Using solar energy for the heating of buildings	Not implemented.
Using LPG instead of diesel in central heating systems	Implemented only in military camp kitchens. It was decided not to implement the measure in schools and other buildings for safety reasons.
Installing light/movement sensors in building areas where no continuous light is required	60% of state departments have installed light/movement sensors in certain areas (car parks, toilets, corridors, etc.).
Installing photocells for switching on/off lights in the perimeter of roads and in large perimetric buildings	Implemented by 50%.
Installing springs on doors	Implemented by 85%.
Vehicles and internal combustion engines	
Purchasing hybrid vehicles for energy saving purposes	The measure has been implemented by the Electrical and Mechanical Services Department on a trial basis by purchasing two vehicles. Evaluation – slight difference in preventive maintenance costs (5-10%). Corrective maintenance in 3 years (since purchasing); results are expected.
New/renovated buildings	
Energy studies	The Regulation of the Energy Efficiency of Buildings Law (Law 142(I)/2006) is applied.

Revised action plan for Green Public Procurement

Due to the need for laying down clear and ambitious environmental criteria for products and services and the increase in Green Public Procurement, the European Commission proceeded to set up a GPP Toolkit including different product categories for which uniform environmental criteria have been laid down (based on European and national criteria for the award of the eco-label, as well as on information from various bodies in the industrial sector and in the information society), including energy efficiency criteria, if possible.

In 2010 the Environment Department of the Ministry of Agriculture, Natural Resources and Environment proceeded to revise the Action Plan on Green Public Procurement by including the new categories and criteria proposed by the EU. The revised plan lays down more specific targets for RES, e.g. conditions for signing public procurement contracts for the use of RES, the cogeneration of heat and power, and energy savings measures. The plan has been completed is about to be submitted to the Cabinet of Ministers for approval.

In particular, these new categories relating to energy-consuming products are:

- Office equipment and supplies
    - Computer equipment
        - Computers (PCs and laptops)
        - Monitors
        - Printers
        - Photocopiers
        - Fax machines
        - Scanners
        - All-in-ones

- Electric appliances and products
    - Electric appliances for home and public use
        - Air conditioners
        - Heat pumps
        - Boilers
        - Refrigerators, washing machines, ovens, vacuum cleaners, etc.
        - Light and movement sensors
        - Photocells used for outdoor lights
    - Products
        - Lamps for home use
        - Lamps for road lights
        - Springs on doors

- Electricity
    - Renewable Energy sources
        - Installing photovoltaic systems on the roofs of government buildings
        - Installing photovoltaic systems in pedestrian crossings and road signs
        - Installing solar panels for heating purposes in schools
    - Combined heat
    - Thermal insulation

- Building and road construction - management

    - Buildings construction
        - Energy studies
        - Energy efficiency
        - Windows

- Transportation equipment
    - Passenger vehicles
    - Public transport vehicles and services
    - Garbage trucks and services

The Revised Action Plan on Green Public Procurement also includes ordinary energy savings measures applicable to all employees in the Public sector and general government, as well as any contractors to which projects are awarded, with a view to increasing energy awareness.

All relevant documents, information material on Green Public Procurement, as well as all the implementation stages of Action Plans on Green Public Procurement are posted on the website of the Environment Department (http://www.moa.gov.cy/moa/agriculture.nsf/environment_gr/environment_gr?OpenDocument).

3.5 Ensuring the availability of advice and information

With a view to (a) providing information, in a transparent way, on energy efficiency schemes and the financial and legal frameworks adopted for achieving the national indicative energy savings target, (b) making sure that such information is widely diffused to interested market actors, and (c) adopting incentives for market actors to provide more information and advice to end customers concerning end-use energy efficiency and promoting end-use energy efficiency in general, the Energy Service, as part of the actions referred to in paragraph 3.3.2.5., has been promoting information actions concerning participation in Grants Schemes for RES and ES since 2004. The actions are aimed at providing sufficient information to natural and legal persons who are eligible for financial aid with a view to realising RES and ES investments through participation in Grants Schemes. The measures implemented within this framework included the preparation and distribution of information publications on the different end-use energy savings technologies and guides for citizens concerning participation in the Grants Schemes, organising day events for providing information to the public, businessmen and other market actors in different cities, carrying out an advertising campaign on the media, organising an annual exhibition on energy saving, and establishing an annual energy savings award. The above measures are described in detail in paragraph 3.3.2.5.

Moreover, the provisions laid down in the Grants Schemes and the respective application forms are posted on the website of the Cyprus Institute of Energy. All interested parties are able to contact the Cyprus Institute of Energy and the Energy Service (by phone through a telephone exchange, by e-mail or in person) to obtain additional information concerning the manner and details of participating in the different type of energy savings categories covered by a Grants Scheme. In addition, they are able to receive information concerning specific loans offered by private banks for taking advantage of RES and ES investments. The website of the Institute of Energy also includes a

list of importers, installers and consultant engineers active in Cyprus focusing on RES and ES technologies and investments.

3.6 Obligations of energy companies for promoting final-consumption energy savings

No obligation has been imposed by law on relevant companies for promoting end-use energy efficiency. However, measures are already implemented by companies for promoting end-use energy savings as follows:

The sole distribution company in Cyprus, being also the distribution system operator (Electricity Authority of Cyprus), implements measures for promoting end-use energy savings by providing simple instructions on how to save energy through an energy savings guide prepared and posted on its website (www.eac.com.cy) and through a special part of its website providing the public with instructions on how to save electricity. Advertising campaigns are also organised on electronic media very often, including messages with instructions on how to save energy. Detailed electricity bills also include a message concerning the effort to save energy. In addition, from 01/10/2008 to 01/10/2009, a 20% discount on the total amount charged was offered to domestic users consuming less than 500kWh of electricity per two months (under a decision taken by the Minister for MCIT on imposing Public Utility Obligations in accordance with the Regulation of the Energy Efficiency of Buildings Law).

As regards retail sellers of energy, some of them urge consumers at gas stations to check their tyre pressure with a view to saving fuel. They have also posted important instructions on their website on how to save fuel by eco-driving (e.g. http://www.eko.com.cy)

3.7 Energy services market

Cyprus did not have any full-blown system for energy audits and the provision of energy services before adoption of Directive 2006/32/EC. After the fundamental Law (31(I) of 2009) was adopted, transposing the above Directive into the law of Cyprus, the Regulations on End-Use Energy Efficiency and Energy Services (Energy Auditors) were prepared with a view to establishing a legal framework for carrying out energy audits in Cyprus. In particular, the above Regulations are adopted in order to lay down the terms and conditions for issuing, renewing, amending and withdrawing an energy auditor's authorisation by the Competent Authority (Energy Service), the qualifications, level of knowledge and participation in specialized training programmes and examinations for energy auditors, the norms and principles that should govern their work, the categories of energy auditors, the scope and extent of operations under each category, as well as the establishment of a register of energy auditors. The above Regulations have been approved by the Cabinet of Ministers. The procedure for adoption of the Regulations by the House of Representatives is expected to be completed by 2011 so as to begin the performance of energy audits in Cyprus soon and expand the energy services market. Relevant regulations on the operation of companies providing energy services are expected to be adopted in 2012 too.
It should be noted that the Decree laying down the methodology and other requirements for performing energy audits, including the Technical Guide on Energy Audits, has already been prepared and will be issued following adoption of the Regulations on Energy Auditors. The purpose of the Guide is to lay down procedures, general requirements, codes of practice and instructions to be complied with and applied by an energy auditor when performing energy audits on the facilities

and areas of an industrial or building complex, or an energy system in general. It should be noted that the Guide will be revised later on, following issue of a European standard (CEN) relating to the performance of energy audits in all areas.

As for promoting measures and energy savings technologies, measures have already been implemented for promoting investments by natural and legal persons since 2004 through the Grants Scheme for RES and ES. The measures promoted and their contribution towards energy savings are described in detail in paragraph 3.3.2

3.8 Strategy for increasing the number of Nearly Zero Energy Buildings

No strategy has been established yet for increasing the number of NZEBs. A policy is expected to be established along with the respective framework of operations in 2011 and following preparation of a relevant study in cooperation with experts, as mentioned above.

3.9 Alternative measures for heating and air conditioning systems

The following actions have been implemented so far in this field:

- providing the public with information through a guide on energy savings measures for home heating systems using a boiler;
- distributing information publications to the general public concerning the importance of carrying out regular inspections and maintenance on air conditioning and heating systems;
- establishing a register of air-conditioning installations inspectors;
- carrying out inspections on home boilers by inspectors from the Energy Service; and
- issuing guides on how to carry out inspections on air conditioning and heating systems.

These actions are aimed at ensuring full implementation of relevant legal provisions in 2011 and expanding the relevant laws to include issues relating to dimensions, installation and configuration. As these measures are horizontal for the time being, we are unable to make any calculations as to the resulting energy savings.

3.10 Support measures for implementing the Buildings Directive (EPBD)

No decisions on support measures have been taken yet since, as mentioned above, a study will be prepared in 2011 to be used as an aid in laying down the planning and policy to be followed in this field. Consequently, the decisions on whether any support measures are required and the degree of such measures will be taken in accordance with the results/findings of the study.

4 ESTABLISHING COMPETENT BODIES AND ORGANISATIONS

The Energy Service of the MCIT is the competent authority responsible for following up on the implementation of Directives 2006/32/EC and 2010/31/EU on energy end-use efficiency and on the energy performance of buildings, respectively.

In accordance with the above, the Energy Service is the Competent Authority responsible for:

- the overall checking and supervision of the energy savings target specified in Article 4.4 of Directive 2006/32/EC;
- applying the provisions laid down in Article 5 of the Directive, relating to the exemplary role of the public sector and the implementation of measures for improving its energy performance; and
- implementing/establishing independent control systems for energy performance certificates and reports on the inspection of heating and air-conditioning systems, as specified in Article 18.2 of Directive 2010/31/EU on the energy performance of buildings.

In addition to the Energy Service, the Special Fund for RES and ES and the Cyprus Institute of Energy are also active in the renewable energy sources and energy saving field.

The Special Fund for RES and ES was established under Article 3 of the Law on Promoting and Encouraging the use of Renewable Energy Sources and Energy Savings of 2003 (Law (33)I/2003).

The revenues of the Special Fund from the energy fee imposed on the consumption of electricity are used, without prejudice to the provisions laid down in any plans/programmes in force, for providing aid or financing for:

- generating or, on a case-by-case-basis, purchasing electricity from RES;
- energy savings installations, equipment and other activities; and
- programmes for promoting RES, energy saving, including cogeneration of heat and power, and providing the public with information.

The Cyprus Institute of Energy was established in 2000 by the Minister for Commerce, Industry and Tourism, following approval by the Cabinet of Ministers, and it is responsible for developing and promoting renewable energy sources in Cyprus, promoting the saving and rational use of energy and the carrying out of all kinds of activities contributing to the promotion of the above fields, aiming at expanding the use of financially sustainable energy technologies.

One of the current activities of the Cyprus Institute of Energy is carrying out the procedure for accepting, registering and evaluating requests concerning the Grants Schemes operated by the Special Fund for encouraging the use of renewable energy sources and energy saving. Within the framework of this activity, the Institute also calculates the energy savings arising from the aforementioned Grants Schemes and then submit these calculations to the Energy Service for verification and ratification.

Table 78. Authorities and competent organisations.

Description of Duties	Energy Service	Special Fund for RES and ES	Cyprus Institute of Energy
Supervising the achievement of the Energy Savings Target (Directive on Energy Saving)	X		
Checking in the public sector (Directive on Energy Saving	X		
Management of Scheme Plans		X	
Evaluation of requests submitted within the framework of the Grants Schemes			X
Calculating energy savings resulting from the implementation of Grants Schemes	X		X
Checking and verifying energy savings resulting from the implementation of Grants Schemes	X		
Implementing and following up on the Buildings Directive	X		
Implementing/applying independent control systems (Buildings Directive, Article 18.2)	X		
Supervising and calculating energy savings relating to the Primary Energy Savings target	X		

ANNEX I. CATEGORIES AND EXAMPLES OF END-USE ENERGY EFFICIENCY MEASURES

Category	Example
1. Regulation	Standards and norms: 1.1 Building codes and enforcement 1.2. Minimum energy performance of equipment
2. Updating and mandatory measures on the provision of information	2.1 Information campaigns 2.2 Energy marking plans (mandatory or optional) 2.3 Information centres 2.4 Energy auditors 2.5 Training and education 2.6. Demonstration 2.7 Exemplary role of the public sector 2.8 Measurements and information bills
3. Financial instruments	3.1. Grants (Schemes) 3.2 Tax relief 3.3 Loans (subsidised)
4. Voluntary agreements and cooperative bodies	4.1 Voluntary agreements in Industries 4.2 Voluntary agreements in Commercial Organisations and Institutes 4.3 Energy performance in public procurement 4.4. Mass purchasing 4.5 Technology procurement
5. Energy services and energy savings	5.1 Guarantee of energy savings contracts 5.2 Third-party procurement financing 5.3 Energy performance contracting 5.4 Transporting energy
6. Specific measures in transportation	6.1. Charges (tolls, traffic expenses, etc.) 6.2 Upgrading of public transport

6 Energy savings schemes and other subcategories	7.1 Obligation of public service for energy enterprises concerning energy savings, including “white certificates” 7.2 Voluntary agreements with energy producers, transporters and distributors 7.3 Funds and guarantees for energy efficiency

ANNEX II. ADDITIONAL INFORMATION ON CALCULATING ENERGY SAVINGS TARGETS

1.1 Methodology used in calculating energy savings in buildings within the framework of the Buildings Directive (Measures OIK.1 , T3).

As there were no available data to apply the calculation methodology proposed by the Energy Saving Directive, the methodology used by the Energy Service in calculating savings resulting from the mandatory thermal insulation of new buildings was used. In calculating savings, the buildings that fall within relevant legal provisions were broken down into residential sector buildings (houses and apartments separately) and tertiary sector buildings. Certain acknowledgements were made and certain parameters were taken into account, as described below.

- Energy savings were calculated by deducting the energy consumption level achieved for each type of building (houses, apartments, tertiary sector buildings) following application of mandatory thermal insulation from the energy consumption level prior to implementation of the law.

- In making energy savings calculations for all years (2008-2020) the number of building permits issued in 2008 (from the National Statistical Service) was used for each type of building. That is, the fact that there might be a slight annual increase in this number in the years to come was not taken into account.

- It is deemed that it takes 2 years to complete construction of a building from the time when the relevant building permit is obtained. For example, for those buildings that obtained a building permit in 2008 energy savings will be calculated from 2010, for those that obtained a building permit in 2009, they will be calculated from 2011 and so on.

- Based on information from the same source (the National Statistical Service), the average floor area of each storey was calculated for each type of building (houses, apartments, tertiary sector buildings).

- A factor of 3.1 was used for electricity savings.

- Separate calculations were made concerning energy savings in heating systems and those in cooling systems.

The parameters taken into account in making the calculations, along with the respective tables, are presented separately on the following pages for each category of building:

The mathematical formulas used in making calculations both for cooling and heating systems are the ones used in the Building Energy Efficiency Calculation Methodology, as laid down in a relevant decree issued under Law 142(I)/2006 on the energy efficiency of buildings.

Calculation of energy consumption in Houses

The following parameters were taken into account for houses (single-family houses):

- **Months summer**= Summer in Cyprus is deemed to last for 4 months (the months in which cooling systems are used). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Months winter**= Winter in Cyprus is deemed to last for 4.5 months (the months in which heating systems are used). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Hours Summer**= The average operating hours of cooling systems per day are deemed to be 4 (assuming that all closed spaces in a house are cooled in this period). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Hours winter**= The average operating hours of heating systems per day are deemed to be 6 (assuming that all closed spaces in a house are heated in this period). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Floor Area**= The average floor area of each storey per house is 216 (calculated on the basis of data from the National Statistical Service for the year 2008).
- **Roof Area**= The average roof area per house is 216 square meters (the same as the floor area, in accordance with typical house construction in Cyprus). Acknowledgement made by the Energy Service.
- **Perimetric Area**= The average perimetric area per house is 194.4 square meters, i.e. 90% of the floor area (acknowledgement made by the Energy Service, in accordance with typical house construction in Cyprus).
- **Glazing Area**= The average glazing area per house is 48.6 square meters, i.e. 25% of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical house construction in Cyprus).
- **Walls**= The average wall area per house is 106.25 square meters, i.e. 55 % of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical house construction in Cyprus).
- **Columns/beams**= The average column and beam area per house is 38.88 square meters, i.e. 20% of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical house construction in Cyprus).

- **Exposed floor**= The exposed floor area is 0 square metres (acknowledgement made by the Energy Service, in accordance with typical house construction in Cyprus).
- **ΔT (K)**= The desirable average difference between inside and outside temperature is 10 degrees. Acknowledgement made by the Energy Service.
- **Nr of new buildings=** The number of houses that obtained a building permit in 2008 is 6 263. The relevant data were obtained from the National Statistical Service.
- **cooling efficiency (el) old=** The efficiency of cooling systems prior to implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 2.80. Acknowledgement made by the Energy Service.
- **heating efficiency (ff) old=** The efficiency of conventional heating systems prior to implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 0.75. Acknowledgement made by the Energy Service.
- **heating fosil fuel=** The percentage of houses using a conventional heating system is deemed to be 90%. Acknowledgement made by the Energy Service.
- **heating electric.=** The percentage of houses using an electric heating system is deemed to be 10%. Acknowledgement made by the Energy Service.
- **q (kWh/m2/sum)=** It is the monthly average sunlight on a flat surface, as used in the Building Energy Efficiency Calculation Methodology. The calculated average is 128.30.
- **cooling efficiency (el) new=** The efficiency of conventional heating systems following implementation of the law on mandatory thermal insulation (after 2008) is deemed to be 3.20. This is the average value used by the SBEM-CY software for issuing energy efficiency certificates, so that houses can be classified as energy efficiency class II buildings, which is the minimum classification for this category of buildings in accordance with the law.
- **heating efficiency (ff) new=** The efficiency of heating systems following implementation of the law on mandatory thermal insulation (after 2008) is deemed to be 0.95. This is based on data from the Energy Service concerning new systems available in the market.

Cooling

Following is the mathematical formula used to calculate a building's cooling demand by transmission for each component (roof, walls, exposed floor, glazing, columns and beams):

$$Q_{\text{cooling Demand by transmission}} = U*A*\Delta T*t$$

Where U is the component's thermal transmittance coefficient, A is the component's area in square metres, ΔT is the different between inside and outside temperature, and t is the duration for which cooling demand is calculated.

Following is the mathematical formula used to calculate a building's cooling demand by radiation for the roof only, as the relevant calculations for other components would be complex:

$$Q_{\text{cooling Demand by radiation}} = f*q*U*A$$

Where f is a factor whose value is equal to 0.045 — i.e. the undimensioned sunlight absorption coefficient of an opaque structure, whose value is assumed to be equal to 0.9, multiplied by the external thermal resistance of a surface, whose value is assumed to be 0.05m^2K/W — q is the amount of sunlight, U is the roof's thermal transmittance coefficient, and A is the roof's area in square metres.

The sum of all components arising from the above formula is the total cooling demand of the building, which is then multiplied by the total number of buildings to obtain the total cooling demand of all new houses in a specific year. After obtaining the cooling demand of all new houses before and after implementation of the law, the energy savings is equal to the difference between these two values.

Heating

The same mathematical formula and methodology are used for heating; however, no heating demand by radiation is calculated.
Cooling and heating calculations are presented in the following tables:

Primary energy c.f.	
Fossil fuel	1.00
Electricity	3.10

months summer	months winter	hours summer	hours winter	floor area	roof area	glazing area	walls	columns / beams	exposed floor	Perimatric area
4.00	4.50	4.00	6.00	216.00	216.00	48.60	106.92	38.88	0.00	194.40
ΔT (K)	**Nr of new buildings**	**cooling efficiency (el) old**	**heating efficiency (ff) old**	**heating efficiency (el)**	**heating fosil fuel**	**heating electric.**	**q (kWh/m2/sum)**	**cooling efficiency (el) new**	**heating efficiency (ff) new**	
10.00	6263.00	2.80	0.75	1.00	0.90	0.10	128.30	3.20	0.95	

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE PREVIOUS CODE, BEFORE 2008

Cooling calculations	U-value (W/m2K) before 2008	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	1.38	106.92	1475.50	708.24		708.24	252.94	784.12	0.07
Exposed floor	2.85	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Glazing	6.00	48.60	2916.00	1399.68		1399.68	499.89	1549.65	0.13
Roof	3.40	216.00	7344.00	3525.12	4240.06	7765.18	2773.28	8597.16	0.74
Columns/ Beams	3.25	38.88	1263.60	606.53		606.53	216.62	671.51	0.06
			12999.10	**6239.57**	**4240.06**	**10479.62**	**3742.72**	**11602.44**	**0.99**

Heating calculations	U-value (W/m2K) before 2008	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	1.38	106.92	1475.50	1195.15	1593.54	1593.54	3704.97	0.14	0.32
Exposed floor	2.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glazing	6.00	48.60	2916.00	2361.96	3149.28	3149.28	7322.08	0.27	0.63
Roof	3.40	216.00	7344.00	5948.64	7931.52	7931.52	18440.78	0.68	1.58
Columns/ Beams	3.25	38.88	1263.60	1023.52	1364.69	1364.69	3172.90	0.12	0.27
			12999.10	**10529.27**	**14039.02**	**14039.02**	**32640.73**	**1.20**	**2.79**

Energy consumption in accordance with the previous Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
6220.22	**6773.85**	**1749.91**	**14743.98**

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE INTERIM CODE (2008-2009)

Cooling calculations	U-value (W/m2K) 2008-2009	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	0.85	106.92	908.82	436.23		436.23	155.80	482.97	0.04
Exposed floor	0.75	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Glazing	3.80	48.60	1846.80	886.46		886.46	316.59	981.44	0.08
Roof	0.75	216.00	1620.00	777.60	935.31	1712.91	611.75	1896.43	0.16
Columns/ Beams	0.85	38.88	330.48	158.63		158.63	56.65	175.63	0.02
			4706.10	**2258.93**	**935.31**	**3194.24**	**1140.80**	**3536.47**	**0.30**

Heating calculations	U-value (W/m2K) 2008-2009	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	0.85	106.92	908.82	736.14	981.53	981.53	2282.05	0.08	0.20
Exposed floor	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glazing	3.80	48.60	1846.80	1495.91	1994.54	1994.54	4637.31	0.17	0.40
Roof	0.75	216.00	1620.00	1312.20	1749.60	1749.60	4067.82	0.15	0.35
Columns/ Beams	0.85	38.88	330.48	267.69	356.92	356.92	829.84	0.03	0.07
			4706.10	**3811.94**	**5082.59**	**5082.59**	**11817.02**	**0.44**	**1.01**

Energy consumption in accordance with the interim Code			
Total consumption for cooling (toe/year)	Total consumption for heating ff (toe/year)	Total consumption for heating el (toe/year)	Total consumption (toe/year)
1895.95	**2452.36**	**633.53**	**4981.83**

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE NEW CODE (2010)

Cooling calculations	U-value (W/m2K) after 2009	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	0.40	106.92	427.68	205.29		205.29	64.15	198.87	0.02
Exposed floor	0.75	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Glazing	2.80	48.60	1360.80	653.18		653.18	204.12	632.77	0.05
Roof	0.50	216.00	1080.00	518.40	623.54	1141.94	356.86	1106.25	0.09
Columns/ Beams	0.60	38.88	233.28	111.97		111.97	34.99	108.48	0.01
			3101.76	**1488.84**	**623.54**	**2112.38**	**660.12**	**2046.37**	**0.18**

Heating calculations	U-value (W/m2K) after 2009	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	0.40	106.92	427.68	346.42	364.65	364.65	1073.90	0.03	0.09
Exposed floor	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glazing	2.80	48.60	1360.80	1102.25	1160.26	1160.26	3416.97	0.10	0.29
Roof	0.50	216.00	1080.00	874.80	920.84	920.84	2711.88	0.08	0.23
Columns/ Beams	0.60	38.88	233.28	188.96	198.90	198.90	585.77	0.02	0.05
			3101.76	**2512.43**	**2644.66**	**2644.66**	**7788.52**	**0.23**	**0.67**

Energy consumption in accordance with the new Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
1097.09	**1346.94**	**417.55**	**2861.58**

Calculation of energy consumption in Apartments

The following parameters were taken into account for apartments:

- **Months summer**= Summer in Cyprus is deemed to last for 4 months (the months in which cooling systems are used). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Months winter**= Winter in Cyprus is deemed to last for 4.5 months (the months in which heating systems are used). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Hours Summer**= The average operating hours of cooling systems per day are deemed to be 4 (assuming that all closed spaces in a apartment are cooled in this period). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Hours winter**= The average operating hours of heating systems per day are deemed to be 6 (assuming that all closed spaces in a apartment are heated in this period). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Floor Area**= The average floor area of each storey per apartment is 132 (calculated on the basis of data from the National Statistical Service for the year 2008).
- **Roof Area**= The average roof area per apartment is 26.4 square meters, i.e. 20% of the floor area (acknowledgement made by the Energy Service, in accordance with typical apartment construction in Cyprus).
- **Perimetric Area**= The average perimetric area per apartment is 92.4 square meters, i.e. 70% of the floor area (acknowledgement made by the Energy Service, in accordance with typical apartment construction in Cyprus).
- **Glazing Area**= The average glazing area per apartment is 23.1 square meters, i.e. 25% of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical apartment construction in Cyprus).
- **Walls**= The average wall area per apartment is 50.82 square meters, i.e. 55 % of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical apartment construction in Cyprus).
- **Columns/beams**= The average column and beam area per apartment is 18.48 square meters, i.e. 20% of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical apartment construction in Cyprus).
- **Exposed floor**= The exposed floor area is 26.4 square metres, i.e. 20% of the floor area (acknowledgement made by the Energy Service, in accordance with typical apartment construction in Cyprus).
- **ΔT (K)**= The desirable average difference between inside and outside temperature is 10 degrees. Acknowledgement made by the Energy Service.
- **Nr of new buildings=** The number of apartments that obtained a building permit in 2008 is 13 819. The relevant data were obtained from the National Statistical Service.

- **cooling efficiency (el) old=** The efficiency of cooling systems prior to implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 2.80. Acknowledgement made by the Energy Service.
- **heating efficiency (ff) old=** The efficiency of conventional heating systems prior to implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 0.75. Acknowledgement made by the Energy Service.
- **heating fosil fuel=** The percentage of houses using a conventional heating system is deemed to be 90%. Acknowledgement made by the Energy Service.
- **heating electric.=** The percentage of houses using an electric heating system is deemed to be 10%. Acknowledgement made by the Energy Service.
- **q (kWh/m2/sum)=** It is the monthly average sunlight on a flat surface, as used in the Building Energy Efficiency Calculation Methodology. The calculated average is 128.30.
- **cooling efficiency (el) new=** The efficiency of conventional heating systems following implementation of the law on mandatory thermal insulation (after 2008) is deemed to be 3.20. This is the average value used by the SBEM-CY software for issuing energy efficiency certificates, so that apartments can be classified as energy efficiency class II buildings, which is the minimum classification for this category of buildings in accordance with the law.
- **heating efficiency (ff) new=** The efficiency of heating systems following implementation of the law on mandatory thermal insulation (after 2008) is deemed to be 0.95. This is based on data from the Energy Service concerning new systems available in the market.

The mathematical formulas used for calculating cooling and heating demand for apartments are the ones used for houses.

Cooling and heating calculations are presented in the following tables:

Primary energy c.f.	
Fossil fuel	1.00
Electricity	3.10

months summer	months winter	hours summer	hours winter	floor area	roof area	glazing area	walls	columns / beams	exposed floor	Perimatic area
4	4.5	4	6	132	26.4	23.1	50.82	18.48	26.4	92.4
ΔT (K)	**Nr of new buildings**	**cooling efficiency (el) old**	**heating efficiency (ff) old**	**heating efficiency (el)**	**heating fosil fuel**	**heating electric.**	**q (kWh/m2/sum)**	**cooling efficiency (el) new**	**heating efficiency (ff) new**	
10	13819	2.8	0.75	1	0.9	0.1	128.3	3.2	0.95	

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE PREVIOUS CODE, BEFORE 2008

Cooling calculations	U-value (W/m2K) before 2008	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	1.38	50.82	701.32	336.63		336.63	120.23	372.70	0.03
Exposed floor	2.85	26.40	752.40	361.15		361.15	128.98	399.85	0.03
Glazing	6.00	23.10	1386.00	665.28		665.28	237.60	736.56	0.06
Roof	3.40	26.40	897.60	430.85	518.23	949.08	338.96	1050.76	0.09
Columns/ Beams	3.25	18.48	600.60	288.29		288.29	102.96	319.18	0.03
			4337.92	**2082.20**	**518.23**	**2600.43**	**928.72**	**2879.05**	**0.25**

Heating calculations	U-value (W/m2K) before 2008	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	1.38	50.82	701.32	568.07	757.42	757.42	1761.00	0.06	0.15
Exposed floor	2.85	26.40	752.40	609.44	812.59	812.59	1889.28	0.07	0.16
Glazing	6.00	23.10	1386.00	1122.66	1496.88	1496.88	3480.25	0.13	0.30
Roof	3.40	26.40	897.60	727.06	969.41	969.41	2253.87	0.08	0.19
Columns/ Beams	3.25	18.48	600.60	486.49	648.65	648.65	1508.11	0.06	0.13
			4337.92	**3513.71**	**4684.95**	**4684.95**	**10892.51**	**0.40**	**0.93**

Energy consumption in accordance with the previous Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
3405.64	**4987.67**	**1288.48**	**9681.79**

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE INTERIM CODE (2008-2009)

Cooling calculations	U-value (W/m2K) 2008-2009	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	0.85	50.82	431.97	207.35		207.35	74.05	229.56	0.02
Exposed floor	0.75	26.40	198.00	95.04		95.04	33.94	105.22	0.01
Glazing	3.80	23.10	877.80	421.34		421.34	150.48	466.49	0.04
Roof	0.75	26.40	198.00	95.04	114.32	209.36	74.77	231.79	0.02
Columns/ Beams	0.85	18.48	157.08	75.40		75.40	26.93	83.48	0.01
			1862.85	**894.17**	**114.32**	**1008.48**	**360.17**	**1116.54**	**0.10**

Heating calculations	U-value (W/m2K) 2008-2009	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	0.85	50.82	431.97	349.90	466.53	466.53	1084.68	0.04	0.09
Exposed floor	0.75	26.40	198.00	160.38	213.84	213.84	497.18	0.02	0.04
Glazing	3.80	23.10	877.80	711.02	948.02	948.02	2204.16	0.08	0.19
Roof	0.75	26.40	198.00	160.38	213.84	213.84	497.18	0.02	0.04
Columns/ Beams	0.85	18.48	157.08	127.23	169.65	169.65	394.43	0.01	0.03
			1862.85	**1508.91**	**2011.88**	**2011.88**	**4677.62**	**0.17**	**0.40**

Energy consumption in accordance with the interim Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
1320.76	**2141.88**	**553.32**	**4015.95**

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE NEW CODE (2010)

Cooling calculations	U-value (W/m2K) after 2009	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	0.72	50.82	365.90	175.63		175.63	54.89	170.15	0.01
Exposed floor	0.63	26.40	166.32	79.83		79.83	24.95	77.34	0.01
Glazing	3.23	23.10	746.13	358.14		358.14	111.92	346.95	0.03
Roof	0.63	26.40	166.32	79.83	96.02	175.86	54.96	170.36	0.01
Columns/ Beams	0.72	18.48	133.06	63.87		63.87	19.96	61.87	0.01
			1577.73	**757.31**	**96.02**	**853.34**	**266.67**	**826.67**	**0.07**

Heating calculations	U-value (W/m2K) after 2009	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	0.72	50.82	365.90	296.38	311.98	311.98	918.78	0.03	0.08
Exposed floor	0.63	26.40	166.32	134.72	141.81	141.81	417.63	0.01	0.04
Glazing	3.23	23.10	746.13	604.37	636.17	636.17	1873.53	0.05	0.16
Roof	0.63	26.40	166.32	134.72	141.81	141.81	417.63	0.01	0.04
Columns/ Beams	0.72	18.48	133.06	107.78	113.45	113.45	334.10	0.01	0.03
			1577.73	**1277.96**	**1345.22**	**1345.22**	**3961.68**	**0.12**	**0.34**

Energy consumption in accordance with the new Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
977.87	**1432.14**	**468.63**	**2878.65**

Calculation of energy consumption in tertiary sector buildings

The following parameters were taken into account for tertiary sector buildings:

- **Months summer**= Summer in Cyprus is deemed to last for 4 months (the months in which cooling systems are used). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Months winter**= Winter in Cyprus is deemed to last for 4.5 months (the months in which heating systems are used). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Hours Summer**= The average operating hours of cooling systems per day are deemed to be 6 (assuming that all closed spaces in a building are cooled in this period). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Hours winter**= The average operating hours of heating systems per day are deemed to be 6 (assuming that all closed spaces in a building are heated in this period). This number is an acknowledgement based on the climatic conditions prevailing in Cyprus.
- **Floor Area**= The average floor area of each storey per building is 573 (calculated on the basis of data from the National Statistical Service for the year 2008).
- **Roof Area**= The average roof area per building is 286.5 square meters, i.e. 50% of the floor area (acknowledgement made by the Energy Service, in accordance with typical building construction in Cyprus).
- **Perimetric Area**= The average perimetric area per building is 1146 square meters, i.e. two times the floor area (acknowledgement made by the Energy Service, in accordance with typical building construction in Cyprus).
- **Glazing Area**= The average glazing area per building is 573 square meters, i.e. 50% of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical building construction in Cyprus).
- **Walls**= The average wall area per building is 343.8 square meters, i.e. 30 % of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical building construction in Cyprus).
- **Columns/beams**= The average column and beam area per building is 229.2 square meters, i.e. 20% of the perimetric area (acknowledgement made by the Energy Service, in accordance with typical building construction in Cyprus).
- **Exposed floor**= The exposed floor area is 0 square metres (acknowledgement made by the Energy Service, in accordance with typical building construction in Cyprus).
- **ΔT (K)**= The desirable average difference between inside and outside temperature is 10 degrees. Acknowledgement made by the Energy Service.
- **Nr of new buildings=** The number of buildings that obtained a building permit in 2008 is 454. The relevant data were obtained from the National Statistical Service.
- **cooling efficiency (el) old=** The efficiency of cooling systems prior to implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 2.80. Acknowledgement made by the Energy Service.

- **heating efficiency (ff) old=** The efficiency of conventional heating systems prior to implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 0.75. Acknowledgement made by the Energy Service.
- **heating efficiency (el) old=** The efficiency of heating systems prior to implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 3. Acknowledgement made by the Energy Service.
- **heating fosil fuel=** The percentage of buildings using a conventional heating system is deemed to be 20%. Acknowledgement made by the Energy Service.
- **heating electric.=** The percentage of buildings using an electric heating system is deemed to be 80%. Acknowledgement made by the Energy Service.
- **q (kWh/m2/sum)=** It is the monthly average sunlight on a flat surface, as used in the Building Energy Efficiency Calculation Methodology. The calculated average is 128.30.
- **cooling efficiency (el) new=** The efficiency of conventional heating systems following implementation of the law on mandatory thermal insulation (after 2008) is deemed to be 4. This is the average value used by the SBEM-CY software for issuing energy efficiency certificates, so that houses can be classified as energy efficiency class II buildings, which is the minimum classification for this category of buildings in accordance with the law.
- **heating efficiency (ff) new=** The efficiency of conventional heating systems following implementation of the law on mandatory thermal insulation (after 2008) is deemed to be 0.95. This is based on data from the Energy Service concerning new systems available in the market.
- **heating efficiency (el) old=** The efficiency of electric heating systems after implementation of the law on mandatory thermal insulation (before 2008) is deemed to be 4. This is based on data from the Energy Service on new systems available in the market.

The mathematical formulas used for calculating cooling and heating demand for tertiary sector buildings are the ones used for houses.

Cooling and heating calculations are presented in the following tables:

Primary energy c.f.	
Fossil fuel	1.00
Electricity	3.10

months summer	months winter	hours summer	hours winter	floor area	roof area	glazing area	walls	columns / beams	exposed floor	Perimatic area
4	4.5	6	6	573	286.5	573	343.8	229.2	0	1146
ΔT (K)	**Nr of new buildings**	**cooling efficiency (el) old**	**heating efficiency (ff) old**	**heating efficiency (el)**	**heating fosil fuel**	**heating electric.**	**q (kWh/m2/sum)**	**cooling efficiency (el) new**	**heating efficiency (ff) new**	**heating efficiency (el) new**
10	454	2.8	0.75	3	0.2	0.8	128.3	4	0.95	4

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE PREVIOUS CODE, BEFORE 2008

Cooling calculations	U-value (W/m2K) before 2008	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	1.38	343.80	4744.44	3416.00		3416.00	1220.00	3782.00	0.32
Exposed floor	2.85	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Glazing	6.00	573.00	34380.00	24753.60		24753.60	8840.57	27405.77	2.35
Roof	3.40	286.50	9741.00	7013.52	5623.97	12637.49	4513.39	13991.50	1.20
Columns/ Beams	3.25	229.20	7449.00	5363.28		5363.28	1915.46	5937.92	0.51
			56314.44	**40546.40**	**5623.97**	**46170.36**	**16489.42**	**51117.19**	**4.38**

Heating calculations	U-value (W/m2K) before 2008	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	1.38	343.80	4744.44	3843.00	5124.00	5124.00	3971.10	0.44	0.34
Exposed floor	2.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glazing	6.00	573.00	34380.00	27847.80	37130.40	37130.40	28776.06	3.18	2.46
Roof	3.40	286.50	9741.00	7890.21	10520.28	10520.28	8153.22	0.90	0.70
Columns/ Beams	3.25	229.20	7449.00	6033.69	8044.92	8044.92	6234.81	0.69	0.53
			56314.44	**45614.70**	**60819.60**	**60819.60**	**47135.19**	**5.21**	**4.03**

Energy consumption in accordance with the previous Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
1986.54	**472.72**	**1465.43**	**3924.68**

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE INTERIM CODE (2008-2009)

Cooling calculations	U-value (W/m2K) 2008-2009	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	0.80	343.80	2750.40	1980.29		1980.29	707.25	2192.46	0.19
Exposed floor	0.75	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Glazing	3.80	573.00	21774.00	15677.28		15677.28	5599.03	17356.99	1.49
Roof	0.75	286.50	2148.75	1547.10	1240.58	2787.68	995.60	3086.36	0.26
Columns/ Beams	0.85	229.20	1948.20	1402.70		1402.70	500.97	1552.99	0.13
			28621.35	**20607.37**	**1240.58**	**21847.95**	**7802.84**	**24188.80**	**2.07**

Heating calculations	U-value (W/m2K) 2008-2009	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	0.80	343.80	2750.40	2227.82	2970.43	2970.43	2302.08	0.25	0.20
Exposed floor	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glazing	3.80	573.00	21774.00	17636.94	23515.92	23515.92	18224.84	2.01	1.56
Roof	0.75	286.50	2148.75	1740.49	2320.65	2320.65	1798.50	0.20	0.15
Columns/ Beams	0.85	229.20	1948.20	1578.04	2104.06	2104.06	1630.64	0.18	0.14
			28621.35	**23183.29**	**30911.06**	**30911.06**	**23956.07**	**2.65**	**2.05**

Energy consumption in accordance with the interim Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
940.04	**240.26**	**744.79**	**1925.08**

CALCULATING ENERGY CONSUMPTION IN ACCORDANCE WITH THE NEW CODE (2010)

Cooling calculations	U-value (W/m2K) after 2009	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radi. (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
Walls	0.72	343.80	2475.36	1782.26		1782.26	445.56	1381.25	0.12
Exposed floor	0.63	0.00	0.00	0.00		0.00	0.00	0.00	0.00
Glazing	3.23	573.00	18507.90	13325.69		13325.69	3331.42	10327.41	0.88
Roof	0.63	286.50	1804.95	1299.56	1042.09	2341.65	585.41	1814.78	0.16
Columns/ Beams	0.72	229.20	1650.24	1188.17		1188.17	297.04	920.83	0.08
			24438.45	**17595.68**	**1042.09**	**18637.77**	**4659.44**	**14444.27**	**1.24**

Heating calculations	U-value (W/m2K) after 2009	m2	Watt	Heating demand (kWh/year)	Total Heating energy use fosil fuel (kWh/year)	Total Heating primary energy fosil fuel (kWh/year)	Total Heating primary energy electricity (kWh/year)	Energy consumption for heating with ff per house (toe)	Energy consumption for heating with el per house (toe)
Walls	0.72	343.80	2475.36	2005.04	2110.57	2110.57	1553.91	0.18	0.13
Exposed floor	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Glazing	3.23	573.00	18507.90	14991.40	15780.42	15780.42	11618.33	1.35	0.99
Roof	0.63	286.50	1804.95	1462.01	1538.96	1538.96	1133.06	0.13	0.10
Columns/ Beams	0.72	229.20	1650.24	1336.69	1407.05	1407.05	1035.94	0.12	0.09
			24438.45	**19795.14**	**20836.99**	**20836.99**	**15341.24**	**1.78**	**1.31**

Energy consumption in accordance with the new Code			
Total consumption for cooling (toe/year)	**Total consumption for heating ff (toe/year)**	**Total consumption for heating el (toe/year)**	**Total consumption (toe/year)**
561.34	**161.96**	**476.96**	**1200.25**

CALCULATION OF ENERGY SAVINGS FOR ALL TYPES OF BUILDINGS

	ENERGY CONSUMPTION PER YEAR (toe)			ENERGY SAVINGS PER YEAR (toe)	
	Prior to implementation of the Law (2007)	Interim Code (2008-2009)	New Code (2010)	Energy savings under the interim Code, as compared to that prior to implementation of the Law	Energy savings under the new Code, as compared to that prior to implementation of the Law
Houses	14743.98	4981.83	2861.58	9762.15	11882.40
Apartments	9681.79	4015.95	2878.65	5665.84	6803.15
Tertiary sector buildings	3924.68	1925.08	1200.25	1999.60	2724.43
TOTAL	28350.46	10922.87	6940.48	17427.59	21409.98

		FORECASTS FOR ENERGY SAVINGS IN BUILDINGS – RESIDENTIAL SECTOR									
	Year of issue of Building Permit	2008	2009	2010	2011	2012	2013	2014	2015	2016	2020
INTERIM CODE	2008	0.00	0.00	15427.99	15427.99	15427.99	15427.99	15427.99	15427.99	15427.99	15427.99
	2009	0.00	0.00	0.00	15427.99	15427.99	15427.99	15427.99	15427.99	15427.99	15427.99
TOTAL		0.00	0.00	15427.99	30855.98	30855.98	30855.98	30855.98	30855.98	30855.98	30855.98
NEW CODE	2010	0.00	0.00	0.00	0.00	18685.55	18685.55	18685.55	18685.55	18685.55	18685.55
	2011	0.00	0.00	0.00	0.00	0.00	18685.55	18685.55	18685.55	18685.55	18685.55
	2012	0.00	0.00	0.00	0.00	0.00	0.00	18685.55	18685.55	18685.55	18685.55
	2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18685.55	18685.546	18685.55
	2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18685.55	18685.55
	2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18685.55
	2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18685.55
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18685.55
	2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18685.55
TOTAL		0.00	0.00	0.00	0.00	18685.55	37371.09	56056.64	74742.18	93427.73	168169.91

		FORECASTS FOR ENERGY SAVINGS IN BUILDINGS – TERTIARY SECTOR									
	Year of issue of Building Permit	2008	2009	2010	2011	2012	2013	2014	2015	2016	2020
INTERIM CODE	2008	0.00	0.00	1999.60	1999.60	1999.60	1999.60	1999.60	1999.60	1999.60	1999.60
	2009	0.00	0.00	0.00	1999.60	1999.60	1999.60	1999.60	1999.60	1999.60	1999.60
TOTAL		0.00	0.00	1999.60	3999.20	3999.20	3999.20	3999.20	3999.20	3999.20	3999.20
NEW CODE	2010	0.00	0.00	0.00	0.00	2724.43	2724.43	2724.43	2724.43	2724.43	2724.43
	2011	0.00	0.00	0.00	0.00	0.00	2724.43	2724.43	2724.43	2724.43	2724.43
	2012	0.00	0.00	0.00	0.00	0.00	0.00	2724.43	2724.43	2724.43	2724.43
	2013	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2724.43	2724.4328	2724.43
	2014	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2724.43	2724.43
	2015	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2724.43
	2016	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2724.43
	2017	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2724.43
	2018	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2724.43
TOTAL		0.00	0.00	0.00	0.00	2724.43	5448.87	8173.30	10897.73	13622.16	24519.90

1.2 Methodology used in calculating energy savings due to the fluorescent lamp campaign (Measure OIK.3)

	Year	Number of CFL lamps distributed	Unitary energy savings GLS to CFL (kWh/year)	Energy saving in KWh/year	Energy saving in toe/year	Average Lifetime	Total Cost incl. 15% VAT
1	2007	373374	**47**	17548578	4678	6000	€ 700,000.00
2	2008	373374	**47**	17548578	4678	8000	€ 685,793.00
3	2010	360000	**47**	16920000	4511	10000	€ 1,375,266.00
4	2011	895000	**47**	42065000	11215	10000	

Calculation of energy saving in toe/year																
		Energy saving in toe/year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	2007	4678	4678	4678	4678	4678	4678	4678	0	0	0	**0**	0	0	0	0
2	2008	4678	0	4678	4678	4678	4678	4678	4678	4678	4678	0	0	0	0	0
3	2010	4511	0	0	0	**4511**	**4511**	**4511**	**4511**	**4511**	**4511**	**4511**	**4511**	**4511**	**4511**	0
4	2011	11215	0	0	0	**0**	11215	11215	11215	11215	11215	11215	11215	11215	11215	11215
Total Energy saving per year (toe)			4678	9357	9357	**13868**	25082	25082	20404	20404	20404	**15725**	15725	15725	15725	**11215**

Item No.	Year	Quantity	Total Price	Contribution in (2010) toe	%	Contribution in (2016) toe	%	Contribution in (2020) toe	%
1	**2007**	373374	€ 643,206.00	4678	7.8%	0	0.0%	0	0.00%
2	**2008**	373374	€ 694,666.00	4678	7.8%	0	0.0%	0	0.00%
3	**2010**	360000	€1,375,266.00	4511	7.5%	4511	2.4%	0	0.00%
4	**2011**	895000		0	0.0%	11215	6.1%	11215	2.42%
ΣΥΝΟΛΟ		2001748	€ 2,713,138.00	13867.77	23.1%	15725.40	8.5%	11214.53	2.42%

1.3 Methodology used in calculating savings due to the Grants Scheme for Energy Savings in the Residential Sector – Thermal insulation in windows, walls, roofs (Measure OIK.3)

Table presenting the average areas in square metres and thermal transmittance coefficients (U-values) obtained for the sample of 1 340 requests.

	EXISTING RESIDENTIAL BUILDINGS			NEW RESIDENTIAL BUILDINGS		
	Uinit	**Unew**	**Area**	**Uinit**	**Unew**	**Area**
DG	6	3.53	23.02	6	3.54	36.56
ROOF	3.42	0.65	126.13	3.42	0.65	145.93
WALL	1.39	0.50	94.95	1.39	0.46	210.72

Example of how energy savings were calculated for newly-built dwellings in the Nicosia province – Windows-Heating

Elevation lower than 600m							Elevation more than 600m						
Year	Quantity	Average Area in m^2	Uinit	Unew	Total Area in m^2	HDD (Nicosia)	ΕΤΟΣ	Quantity	Average Area in m^2	Uinit	Unew	Total Area in m^2	HDD (Nicosia)
2004	30	36.56	6	3.54	1096.67	1304	2004	0	36.56	6	3.54	0	2480
2005	153				5593.04		2005	16				584.89	
2006	1093				39955.50		2006	315				11515.08	
2007	1308				47815.00		2007	157				5739.26	
2008	2090				76401.64		2008	161				5885.49	
2009	1351				49386.90		2009	110				4021.14	
	6025				220248.76			759				27745.86	

Calculation of energy saving in toe/year - Elevation lower than 600m-windows-new residential buildings-Nicosia													
Item No.	Year	Uinit_windows (W/m² °K) *	Unew_windows (W/m² °K)	HDD (Nicosia)	a	b (direct electric heating)	b (fossil fuel boilers)	c	Percentage of buildings using direct electric heating	Percentage of buildings using fosil fuel boilers	UFESindow kWh/m²	Annual Energy saving kWh	Annual Energy saving (toe)
1	2004	6	3.54	1304	1	0.95	0.6	0.5	0.15	0.85	73.358	80449.6	6.9
2	2005	6	3.54		1	0.95	0.6	0.5	0.15	0.85	73.358	410293.2	35.3
3	2006	6	3.54		1	0.95	0.6	0.5	0.15	0.85	73.358	2931048.6	252.1
4	2007	6	3.54		1	0.95	0.6	0.5	0.15	0.85	73.358	3507604.4	301.7
5	2008	6	3.54		1	0.95	0.6	0.5	0.15	0.85	73.358	5604658.4	482.0
6	2009	6	3.54		1	0.95	0.6	0.5	0.15	0.85	73.358	3622915.5	311.6
TOTAL ENERGY SAVING												16156969.7	1389.5

Calculation of energy saving in toe/year - Elevation more than 600m-windows-new residential buildings-Nicosia													
Item No.	Year	Uinit_windows (W/m² °K) *	Unew_windows (W/m² °K)	HDD (Nicosia)	a	b (direct electric heating)	b (fossil fuel boilers)	c	Percentage of buildings using direct electric heating	Percentage of buildings using fosil fuel boilers	UFESindow kWh/m²	Annual Energy saving	Annual Energy saving (toe)
1	2004	6	3.54	2480	1	0.95	0.6	0.5	0.15	0.85	139.498	0.0	0 000
2	2005	6	3.54		1	0.95	0.6	0.5	0.15	0.85	139.498	81591.5	7.017
3	2006	6	3.54		1	0.95	0.6	0.5	0.15	0.85	139.498	1606332.4	138.145
4	2007	6	3.54		1	0.95	0.6	0.5	0.15	0.85	139.498	800616.5	68.853
5	2008	6	3.54		1	0.95	0.6	0.5	0.15	0.85	139.498	821014.4	70.607
6	2009	6	3.54		1	0.95	0.6	0.5	0.15	0.85	139.498	560941.5	48.241
TOTAL ENERGY SAVING												3870496.3	332.86268

Aggregate data on savings in lowland and mountainous areas from heating

Elevation less than 600m – Savings from Heating													
New Residential Buildings								Existing Residential Buildings					
		Windows		Floors		Walls		Windows		Floors		Walls	
Item No.	Year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year
1	2004	63	13.62	2	1.89	3	1.43	33	4.50	10	8.23	5	1.03
2	2005	326	70.52	14	13.36	21	10.05	169	23.06	52	42.99	30	6.18
3	2006	2326	503.24	99	94.64	146	70.11	1198	163.51	374	308.89	205	42.27
4	2007	2783	602.14	119	113.79	173	83.12	1433	195.57	448	370.17	247	50.93
5	2008	4447	962.12	191	182.62	278	133.49	2291	312.67	717	592.35	392	80.83
6	2009	2874	621.82	123	117.52	179	85.95	1481	202.14	462	381.81	255	52.58
Total		**12819**	**2773.46**	**548**	**523.82**	**800**	**384.14**	**6605**	**901.45**	**2063**	**1704.44**	**1134**	**233.81**
		Average Savings per building toe/year		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**	
		0.22		0.96		0.48		0.14		0.83		0.21	

Elevation more than 600m – Savings from Heating													
New Residential Buildings								Existing Residential Buildings					
		Windows		Floors		Walls		Windows		Floors		Walls	
Item No.	Year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year
1	2004	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00
2	2005	33	13.03	0	0	1	0.96	17	4.17	5	7.44	3	1.21
3	2006	671	261.98	28	45.81	42	36.64	345	84.94	108	153.66	59	22.35
4	2007	334	130.37	14	22.79	21	18.32	172	42.40	54	76.83	30	11.28
5	2008	343	133.77	15	24.76	21	18.32	176	43.35	56	79.06	30	11.28
6	2009	233	91.11	10	16.26	14	12.19	120	29.48	38	53.45	21	7.85
Total		1614	630.26	67	109.61	99	86.44	830	204.33	260	370.44	143	53.96
		Average Savings per building toe/year		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**	
		0.39		1.64		0.87		0.25		1.42		0.38	

Methodology used in calculating energy savings from cooling for all types of investments

For the calculations shall be used the data found for the sample (i.e. Uin, Unew, Area)

1) **Calculation of cooling demand before the implementation of the refurbishment measure:**

a. **Calculation of cooling demand by transmission:** Multiplication of the U-value by the hours of cooling (operation hours of the air conditioning systems), the insulated area and the difference between inside and outside temperature (ΔT=10K).

$$\textbf{Cooling Demand}_{\text{(by transmission)}} = \textbf{U}_{\text{init}} * \textbf{Hrs}_{\text{(cooling)}} * \textbf{Area} * \Delta\textbf{T} / \textbf{1000} \quad \textit{[kWh/yr]}$$

b. **Calculation of cooling demand by radiation:** Multiplication of U-value by the insulated area, the solar radiation (q=128.3 kWh/m2/sum) and a correction factor (0.045).

$$\textbf{Cooling Demand}_{\text{(by radiation)}} = \textbf{U}_{\text{init}} * \textbf{Area} * \textbf{q} * \textbf{0.045} \textit{ [kWh/yr]}$$

This formula will be used only for the roofs, as very difficult to be applied for the walls or windows.

c. Addition of the two above results to find the total cooling demand.

$$\textbf{Cooling Demand}_{\text{(total)}} = \textbf{Cooling Demand}_{\text{(by radiation)}} + \textbf{Cooling Demand}_{\text{(by transimission)}}$$

d. Division of cooling demand by the average Seasonal Energy Efficiency Ratio (SEER=2.8) of the air conditioning systems to find the total cooling energy used.

Electricity Demand = Cooling Demand$_{(total)}$ **/ SEER** *[kWh/yr]*

e. Multiplication of the above result by 3.1 to convert Electricity Demand to Primary Energy.

Total Cooling Primary Energy = Electricity Demand * 3.1 *[kWh/yr]*

2) Calculation of cooling demand after the implementation of the refurbishment measure:

a. We shall apply steps **a** to **f** using the new U-Value and the new Seasonal Energy Efficiency Ratio (in cases where this has been changed).

3) The difference of the Total Cooling Primary Energy before and after the implementation of the measure will be the energy savings for Cooling.

The above methodology shall be applied for windows, walls and roofs.

Example of how energy savings were calculated for newly-built dwellings in the Nicosia province – Windows-Cooling

Calculations for Elevation lower than 600m

						Primary energy c.f.	
months summer	**hours summer**	**glazing area**	**ΔT (K)**	**Nr of new buildings**	**cooling efficiency (el) old**	Fossil fuel	1.00
4.00	4.00	36.56	10.00	12819.00	2.80	Electricity	3.10

U-value (W/m2K) before measure	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radiation (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
6.00	36.56	2193.35	1052.81		1052.81	376.00	1165.61	0.10

U-value (W/m2K) after measure	m2	Watt	Cooling Demand by trans. (kWh/year)	Cooling Demand by radiation (kWh/year)	Cooling demand total (kWh/year)	Total Cooling energy use electricity (kWh/year)	Total Cooling primary energy (kWh/year)	Energy consumption for cooling per house (toe)
3.54	36.56	1294.08	621.16		621.16	221.84	687.71	0.06

Windows	Consumption (toe/yr)	Saving (toe/yr)	Saving per house (toe/yr)
BEFORE THE INSULATION MEASURE	1279.03	524.40	0.041
AFTER THE INSULATION MEASURE	754.63		

Aggregate data on savings in lowland and mountainous areas from cooling

Elevation less than 600m – Savings from cooling													
New Residential Buildings								Existing Residential Buildings					
		Windows		Floors		Walls		Windows		Floors		Walls	
Item No.	Year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year
1	2004	63	2.58	2	0.81	3	0.27	33	0.85	10	3.50	5	0.20
2	2005	326	13.34	14	5.67	21	1.87	169	4.35	52	18.20	30	1.21
3	2006	2326	95.15	99	40.10	146	13.02	1198	30.86	374	130.93	205	8.23
4	2007	2783	113.85	119	48.20	173	15.42	1433	36.91	448	156.84	247	9.92
5	2008	4447	181.92	191	77.37	278	24.78	2291	59.02	717	251.02	392	15.75
6	2009	2874	117.57	123	49.82	179	15.96	1481	38.15	462	161.74	255	10.24
Total		**12819**	**524.40**	**548**	**221.97**	**800**	**71.32**	**6605**	**170.14**	**2063**	**722.24**	**1134**	**45.55**
		Average Savings per building toe/year		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**	
		0.04		0.41		0.09		0.03		0.35		0.04	

Elevation more than 600m – Savings from cooling													
New Residential Buildings								**Existing Residential Buildings**					
		Windows		**Floors**		**Walls**		**Windows**		**Floors**		**Walls**	
Item No.	Year	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**
1	2004	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00
2	2005	33	1.34997003	0	0	1	0.09	17	0.44	5	1.84	3	0.12
3	2006	671	27.4493906	28	11.34156648	42	3.74	345	8.89	108	37.79	59	2.37
4	2007	334	13.663333	14	5.67078324	21	1.87	172	4.43	54	18.89	30	1.21
5	2008	343	14.0315066	15	6.075839186	21	1.87	176	4.53	56	19.44	30	1.21
6	2009	233	9.53160656	10	4.050559457	14	1.25	120	3.09	38	13.14	21	0.84
Total		1614	66.03	67	27.14	99	8.83	830	21.38	260	91.10	143	5.74
		Average Savings per building toe/year		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**		**Average Savings per building toe/year**	
		0.04		0.41		0.09		0.03		0.35		0.04	

Aggregate data on savings in lowland and mountainous areas (cooling and heating) for all types of investments in lowland and mountainous areas

Elevation less than 600m – Energy savings in all categories													
New Residential Buildings								**Existing Residential Buildings**					
		Windows		**Floors**		**Walls**		**Windows**		**Floors**		**Walls**	
Item No.	Year	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**	Quantity	**Savings toe/year**
1	2004	63	16.20	2	2.70	3	1.70	33	5.35	10	11.73	5	1.23
2	2005	326	83.86	14	19.03	21	11.92	169	27.41	52	61.19	30	7.38
3	2006	2326	598.39	99	134.74	146	83.12	1198	194.37	374	439.83	205	50.50
4	2007	2783	715.98	119	161.99	173	98.54	1433	232.49	448	527.01	247	60.85
5	2008	4447	1144.04	191	259.98	278	158.28	2291	371.69	717	843.37	392	96.57
6	2009	2874	739.39	123	167.35	179	101.91	1481	240.29	462	543.55	255	62.82
Total		**12819**	**3297.86**	**548**	**745.79**	**800**	**455.46**	**6605**	**1071.60**	**2063**	**2426.68**	**1134**	**279.36**

Elevation more than 600m – Energy savings in all categories													
New Residential Buildings								Existing Residential Buildings					
		Windows		Floors		Walls		Windows		Floors		Walls	
Item No.	Year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year	Quantity	Savings toe/year
1	2004	0	0	0	0	0	0	0	0	0	0	0	0
2	2005	33	14.38	0	0	1	1.05	17	4.61	5	9.28	3	1.33
3	2006	671	289.43	28	57.15	42	40.38	345	93.82	108	191.45	59	24.72
4	2007	334	144.04	14	28.46	21	20.20	172	46.83	54	95.72	30	12.48
5	2008	343	147.80	15	30.83	21	20.20	176	47.88	56	98.50	30	12.48
6	2009	233	100.64	10	20.31	14	13.44	120	32.57	38	66.59	21	8.70
Total		**1614**	**696.29**	**67**	**136.75**	**99**	**95.26**	**830**	**225.71**	**260**	**461.54**	**143**	**59.71**

Aggregate data on savings in lowland and mountainous areas (cooling and heating) for all types of investments per year

	Item No.	Quantity	Savings toe/year	Lifetime	YEAR	2004	2005	2006	2007	2008	2009	2010	2011	2016	2020	2028	2034	2035	2036	2037	2038
WINDOWS	1	**96**	**21.6**	**30**	2004	22	22	22	22	22	22	22	22	22	22	22	0	0	0	0	0
	2	**545**	**130.3**	**30**	2005	0	130	130	130	130	130	130	130	130	130	130	130	0	0	0	0
	3	**4540**	**1176.0**	**30**	2006	0	0	1176	1176	1176	1176	1176	1176	1176	1176	1176	1176	1176	0	0	0
	4	**4722**	**1139.3**	**30**	2007	0	0	0	1139	1139	1139	1139	1139	1139	1139	1139	1139	1139	1139	0	0
	5	**7257**	**1711.4**	**30**	2008	**0**	**0**	**0**	**0**	1711	1711	1711	1711	1711	1711	1711	1711	1711	1711	1711	0
	6	**4708**	**1112.9**	**30**	2009	**0**	**0**	**0**	**0**	**0**	1113	1113	1113	1113	1113	1113	1113	1113	1113	1113	1113
TOTAL		**21868**	**5291.5**			**22**	**152**	**1328**	**2467**	**4179**	**5291**	**5291**	**5291**	**5291**	**5291**	**5291**	**5270**	**5140**	**3964**	**2824**	**1113**
FLOORS	1	**12**	**14.44**	**25**	2004	14	14	14	14	14	14	14	14	14	14	14	**0**	**0**	**0**	**0**	**0**
	2	**71**	**89.51**	**25**	2005	0	90	90	90	90	90	90	90	90	90	90	**0**	**0**	**0**	**0**	**0**
	3	**609**	**823.17**	**25**	2006	0	0	823	823	823	823	823	823	823	823	823	**0**	**0**	**0**	**0**	**0**
	4	**635**	**813.18**	**25**	2007	0	0	0	813	813	813	813	813	813	813	813	**0**	**0**	**0**	**0**	**0**
	5	**979**	**1232.68**	**25**	**2008**	**0**	**0**	**0**	**0**	1233	1233	1233	1233	1233	1233	1233	**0**	**0**	**0**	**0**	**0**
	6	**633**	**797.79**	**25**	**2009**	**0**	**0**	**0**	**0**	**0**	798	798	798	798	798	798	**0**	**0**	**0**	**0**	**0**
TOTAL		**2938**	**3770.8**			**14**	**104**	**927**	**1740**	**2973**	**3771**	**3771**	**3771**	**3771**	**3771**	**3771**	**0**	**0**	**0**	**0**	**0**

WALLS	1	**8**	**2.93**	**30**	2004	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0
	2	**55**	**21.69**	**30**	2005	0	22	22	22	22	22	22	22	22	22	22	22	0	0	**0**	**0**
	3	**452**	**198.72**	**30**	2006	0	0	199	199	199	199	199	199	199	199	199	199	199	0	**0**	**0**
	4	**471**	**192.07**	**30**	2007	0	0	0	192	192	192	192	192	192	192	192	192	192	192	**0**	**0**
	5	**721**	**287.53**	**30**	**2008**	**0**	**0**	**0**	**0**	288	288	288	288	288	288	288	288	288	288	288	**0**
	6	**469**	**186.87**	**30**	**2009**	**0**	**0**	**0**	**0**	**0**	187	187	187	187	187	187	187	187	187	187	187
TOTAL		**2176**	**889.8**			**3**	**25**	**223**	**415**	**703**	**890**	**890**	**890**	**890**	**890**	**890**	**887**	**865**	**666**	**474**	**187**
TOTAL		26982	9952.02			39	280	2478	4623	7854	9952	9952	9952	9952	9952	9952	6157	6005	4630	3299	1300

Tables presenting the contribution of each type of thermal insulation towards the achievement of targets separately

Windows 2004-2009								
Item No.	Year	Quantity	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe	%
1	**2004**	96	21.55	0.04%	21.55	0.01%	21.55	0.00%
2	**2005**	545	130.26	0.22%	130.26	0.07%	130.26	0.03%
3	**2006**	4540	1176.01	1.96%	1176.01	0.64%	1176.01	0.25%
4	**2007**	4722	1139.34	1.90%	1139.34	0.62%	1139.34	0.25%
5	**2008**	7257	1711.41	2.85%	1711.41	0.93%	1711.41	0.37%
6	**2009**	4708	1112.89	1.85%	1112.89	0.60%	1112.89	0.24%
TOTAL		**21868**	**5291.46**	**8.82%**	**5291.46**	**2.86%**	**5291.46**	**1.14%**

Roofs 2004-2009								
Item No.	Year	Quantity	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe	%
1	**2004**	12	14.44	0.02%	14.44	0.01%	14.44	0.00%
2	**2005**	71	89.51	0.15%	89.51	0.05%	89.51	0.02%
3	**2006**	609	823.17	1.37%	823.17	0.44%	823.17	0.18%
4	**2007**	635	813.18	1.36%	813.18	0.44%	813.18	0.18%
5	**2008**	979	1232.68	2.05%	1232.68	0.67%	1232.68	0.27%
6	**2009**	633	797.79	1.33%	797.79	0.43%	797.79	0.17%
TOTAL		**2938**	**3770.76**	**6.28%**	**3770.76**	**2.04%**	**3770.76**	**0.81%**

Walls 2004-2009								
Item No.	Year	Quantity	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe	%
1	2004	8	2.93	0.00%	2.93	0.00%	2.93	0.00%
2	2005	55	21.69	0.04%	21.69	0.01%	21.69	0.00%
3	2006	452	198.72	0.33%	198.72	0.11%	198.72	0.04%
4	2007	471	192.07	0.32%	192.07	0.10%	192.07	0.04%
5	2008	721	287.53	0.48%	287.53	0.16%	287.53	0.06%
6	2009	469	186.87	0.31%	186.87	0.10%	186.87	0.04%
TOTAL		2176	889.80	1.48%	889.80	0.48%	889.80	0.19%

Table presenting aggregate data for all types of investment

All categories 2004-2009									
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe	%
1	2004	116	€ 32,072,646	38.92	0.06%	38.92	0.02%	38.92	0.01%
2	2005	671		241.45	0.40%	241.45	0.13%	241.45	0.05%
3	2006	5601		2197.90	3.66%	2197.90	1.19%	2197.90	0.47%
4	2007	5828		2144.58	3.57%	2144.58	1.16%	2144.58	0.46%
5	2008	8957		3231.62	5.39%	3231.62	1.75%	3231.62	0.70%
6	2009	5810		2097.56	3.50%	2097.56	1.13%	2097.56	0.45%
TOTAL		26982	€ 32,072,646	9952.02	16.59%	9952.02	5.38%	9952.02	2.15%

1.4 Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Independent Photovoltaic Systems and Independent Photovoltaic Systems used for drawing water (Measures OIK.4.1, OIK.4.2, T.5.1, B.2.3, B.2.4)

In accordance with data concerning the solar potential in Cyprus, as provided by the Cyprus Meteorological Service, and on the basis of relevant studies and measurements concerning photovoltaic systems already installed in Cyprus, a polycrystalline or monocrystalline photovoltaic system of a rated capacity of one Kilowatt (1kWp), with panel angle of 27-30^{o} and a southern direction, with immovable panels, generates approximately 1500KWh per year during its first 20 years of operation.

When it comes to independent photovoltaic systems, for which the energy generated is not measured, a practical (approximate) calculation of the annual energy generated by such an independent photovoltaic system can be made by multiplying the maximum capacity of each system by 1500kWh.

The following formula is used to calculate the energy generated:

Sunlight x Capacity x coefficient of performance

The coefficient of performance may be different in each case as it depends on ambient temperature, panel angle and orientation, dust in the atmosphere, panel age, etc. Consequently, a study is carried out to calculate the energy generated.

In our case, concerning the Grants Scheme for independent photovoltaic systems, where there were available studies prepared by registered engineers, the relevant data were used. Where there were no available studies, the predefined value of 1500kWh per kilowatt was used.

Tables presenting the contribution of each sector (Residential, Tertiary, Agricultural) towards the achievement of savings targets.

RESIDENTIAL SECTOR 2005-2010								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2005	4	€ 22,550.12	1.9	0.003%	1.9	0.0010%	1.9
2	2006	40	€ 369,112.33	17.4	0.029%	17.4	0.0094%	17.4
3	2007	48	€ 254,039.08	17.3	0.029%	17.3	0.0094%	17.3
4	2008	99	€ 463,597.63	33.7	0.056%	33.7	0.0182%	33.7
5	2009	67	€ 268,605.60	19.3	0.032%	19.3	0.0104%	19.3
6	2010	28	€ 92,118.00	7.3	0.012%	7.3	0.0040%	7.3
TOTAL		**286**	**€ 1,470,022.77**	**96.9**	**0.161%**	**96.9**	**0.0524%**	**96.9**

TERTIARY SECTOR 2004-2010								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2005	0	€ -	0.0	0 000%	0.0	0 0000%	0.0

2	**2006**	1	€	2,043.00	0.2	0 000%	0.2	0 0001%	0.2
3	**2007**	1	€	2,147.71	0.2	0 000%	0.2	0 0001%	0.2
4	**2008**	3	€	11,428.00	1.3	0.002%	1.3	0 0007%	1.3
5	**2009**	1	€	2,080.00	0.2	0 000%	0.2	0 0001%	0.2
6	**2010**	0	€	-	0.0	0 000%	0.0	0 0000%	0.0
TOTAL		**6**	**€**	**17,698.71**	**1.9**	**0.003%**	**1.9**	**0.0010%**	**1.9**

AGRICULTURAL SECTOR 2004-2009								
Item No.	**Year**	**Quantity**	**Subsidy Cost**	**Contribution on 2010 toe**	**%**	**Contribution on 2016 toe**	**%**	**Contribution on 2020 toe**
1	**2005**	0	€ -	0.0	0 000%	0.0	0 0000%	0.0
2	**2006**	2	€ 5,725.00	0.4	0.001%	0.4	0 0002%	0.4
3	**2007**	3	€ 11,673.00	0.9	0.002%	0.9	0 0005%	0.9
4	**2008**	0	€ -	0.0	0 000%	0.0	0 0000%	0.0
5	**2009**	0	€ -	0.0	0 000%	0.0	0 0000%	0.0
6	**2010**	0	€ -	0.0	0 000%	0.0	0 0000%	0.0
TOTAL		**5**	**€ 17,398.00**	**1.4**	**0.002%**	**1.4**	**0 0007%**	**1.4**

AGRICULTURAL SECTOR/WATER PUMP 2005-2010								
Item No.	**Year**	**Quantity**	**Subsidy Cost**	**Contribution on 2010 toe**	**%**	**Contribution on 2016 toe**	**%**	**Contribution on 2020 toe**
1	**2005**	0	€ -	0.0	0 000%	0.0	0 0000%	0.0
2	**2006**	3	€ 13,215.00	0.8	0.001%	0.8	0 0004%	0.8
3	**2007**	0	€ -	0.0	0 000%	0.0	0 0000%	0.0
4	**2008**	13	€ 56,724.00	4.7	0.008%	4.7	0.0025%	4.7
5	**2009**	10	€ 46,779.00	4.0	0.007%	4.0	0.0022%	4.0
6	**2010**	0	€ -	0.0	0 000%	0.0	0 0000%	0.0
TOTAL		**26**	**€ 116,718.00**	**9.5**	**0.016%**	**9.5**	**0.0051%**	**9.5**

1.5 Tables presenting energy savings calculations for the Grants Scheme for encouraging RES in the Residential Sector – Residential solar hot water systems (Measure OIK.4.3)

CALCULATIONS FOR THE SAMPLE								
Item No.	Year	Quantity	Area of panels	Energy Production / YEAR (MWhr)	Energy Production / YEAR (toe)	Lifetime (Years)	Average Area of panels per system	Average Energy Production per system (MWhr)
1	2004	209	512	336.78	28.96	20	2.45	1.61
2	2005	323	994	653.63	56.21	20	3.08	2.02
3	2006	574	1584	1042	90	20	2.76	1.82
4	2007	1054	3029	2356	292	20	2.87	2.24
5	2008	342	1020	793	68	20	2.98	2.32
TOTAL		2502	7139	5181.62	535	20		

Energy calculations for all systems								
Item No.	Year	Quantity	Average Area of panels per system	Average Energy Production per system (MWhr)	Average Energy Production per system (toe)	Percentage of buildings using fossil fuel boilers	Percentage of buildings using direct electric heating	Total Energy Production (toe)
1	2004	1829	2.45	1.61	0.139	70%	30%	413.15
2	2005	4905	3.08	2.02	0.174	70%	30%	1391.42
3	2006	6673	2.76	1.82	0.156	70%	30%	1698.19
4	2007	10399	2.87	2.24	0.192	70%	30%	3258.20
5	2008	13590	2.98	2.32	0.199	70%	30%	4419.11
TOTAL		37396						**11180.07**

Contribution per year																			
Item No.	Quantity	Energy Savings toe/year	Lifetime	Year	2004	2005	2006	2007	2008	2010	2011	2016	2020	2023	2024	2025	2026	2027	2029
1	1829	413.15	20	2004	413	413	413	413	413	413	413	413	413	413	0	0	0	0	0
2	4905	1391.42	20	2005	0	1391	1391	1391	1391	1391	1391	1391	1391	1391	1391	0	0	0	0
3	6673	1698.19	20	2006	0	0	1698	1698	1698	1698	1698	1698	1698	1698	1698	1698	0	0	0
4	10399	3258.20	20	2007	0	0	0	3258	3258	3258	3258	3258	3258	3258	3258	3258	3258	0	0
5	13590	4419.11	20	2008	0	0	0	0	4419	4419	4419	4419	4419	4419	4419	4419	4419	4419	0
TOTAL	37396	11180			413	1805	3503	6761	11180	11180	11180	11180	11180	11180	10767	9376	7677	4419	0

Item No.	YEAR	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2004	1829	€ 9,084,010.00	413.15	0.69%	413.15	0.22%	413.15
2	2005	4905		1391.42	2.32%	1391.42	0.75%	1391.42
3	2006	6673		1698.19	2.83%	1698.19	0.92%	1698.19
4	2007	10399		3258.20	5.43%	3258.20	1.76%	3258.20
5	2008	13590		4419.11	7.37%	4419.11	2.39%	4419.11
TOTAL		37396	€ 9,084,010.00	11180.07	18.6%	11180.07	6.04%	11180.07

1.6 National methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Residential space heating and/or cooling systems (Measure OIK.4.4, T.5.2, B.2.1)

The methodology used for Household Solar Systems could not be used for this specific category, as the following parameters should be taken into account in making calculations:

- These systems usually operate for 5-6 months per year
- These systems can be used for heating or cooling or both
- These systems can be used for producing hot water
- These systems can be used for heating water in swimming pools

Consequently, under the circumstances, the only available way to calculate the energy savings achieved by each system was to obtain them form the study submitted with the subsidy request. These studies are prepared by Mechanical Engineers registered in the Scientific and Technical Chamber of Cyprus. The TISOL or POLYSUN software is used to calculate energy savings. Following are the parameters used by the above software in making calculations:

T*SOL

- Climatic data from the area
- Average daily consumption of hot water
- Temperature of hot water and water used for space heating, at the cylinder
- Heating load
- Desirable temperature in the building
- Type of liquid in collectors
- Type of solar heating system
- Number of collectors
- Collector manufacturer
- Collector type
- Collector area
- Collector shading
- Cylinder type
- Cylinder volume
- Cylinder thermal insulation
- Type and mode of connection of heat exchanger
- Type of conventional energy source
- Conventional system performance

B) RETSCREEN

- Climatic data from the area
- Type of solar heating system
- Daily consumption in Lt
- Water temperature at the cylinder
- Operating hours of the system
- Percentage of use / month
- Collector angle
- Deviation from the south
- Collector type
- Collector area
- Collector performance and losses
- Other losses
- Cylinder volume
- Exchanger performance
- Pump capacity
- Electricity value
- Type of conventional source
- Conventional system performance

POLYSUN

- Climatic data from the area
- Type of solar heating system
- Daily consumption in Lt
- Water temperature at the cylinder
- Collector angle
- Deviation from the south
- Collector type
- Collector area
- Collector performance and losses
- Cylinder volume
- Type of conventional source
- Conventional system performance
- Conventional energy source capacity

The tables below present data relating to this category.

RESIDENTIAL SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2004	12	€ 81,328.08	11.3	0.019%	11.3	0.006%	11.32
2	2005	10	€ 39,832.24	7.1	0.012%	7.1	0.004%	7.11
3	2006	42	€ 312,299.96	39.6	0.066%	39.6	0.021%	39.59

4	**2007**	81	€	732,017.92	71.2	0.119%	71.2	0.039%	71.25
5	**2008**	132	€	1,180,373.00	122.8	0.205%	122.8	0.066%	122.79
6	**2009**	48	€	446,424.00	39.3	0.065%	39.3	0.021%	39.27
TOTAL		**277**	**€**	**2,792,275.19**	**291.32**	**0.486%**	**291.32**	**0.157%**	**291.32**

TERTIARY SECTOR									
Item No.	**Year**	**Quantity**	**Subsidy Cost**		**Contribution on 2010 toe**	**%**	**Contribution on 2016 toe**	**%**	**Contribution on 2020 toe**
1	**2004**	1	€	8,677.99	1.9	0.003%	1.9	0.001%	1.93
2	**2006**	1	€	39,021.00	4.6	0.008%	4.6	0.002%	4.56
3	**2007**	2	€	24,525.00	5.0	0.008%	5.0	0.003%	4.98
4	**2008**	5	€	61,659.00	8.7	0.015%	8.7	0.005%	8.71
5	**2009**	1	€	7,844.00					
TOTAL		**10**	**€**	**133,882.99**	**20.18**	**0.034%**	**20.18**	**0.011%**	**20.18**

INDUSTRIAL SECTOR										
Item No.	**Year**	**Quantity**	**Subsidy Cost**		**Contribution on 2010 toe**	**%**	**Contribution on 2016 toe**	**%**	**Contribution on 2020 toe**	
1	**2005**	1	€	49,280.00	8.6	0.014%	8.6	0.005%	8.59	
TOTAL		**1**	**€**	**49,280.00**	**8.6**	**0.014%**	**8.6**	**0.005%**	**8.59**	

1.7 Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Central active solar hot water systems (Measures OIK.4.5, T.5.3, B.2.2)

The methodology used for Household Solar Systems could not be used for this specific category, as the following parameters should be taken into account in making calculations:

- These systems are installed mainly in hotel establishments operating on a 12-month or seasonal basis. Consequently, the energy generated by these systems may not be considered as savings.

Consequently, under the circumstances, the only available way to calculate the energy savings achieved by each system was to obtain them form the study submitted with the subsidy request. These studies are prepared by Mechanical Engineers registered in the Scientific and Technical Chamber of Cyprus. The T*SOL or POLYSUN or RETSCREEN software is used to calculate energy savings, by the use of the parameters described below.

The tables below present data relating to this category.

RESIDENTIAL SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2004	1	€ 3,819.00	1.2	0.002%	1.2	0.001%	1.2
2	2005	4	€ 13,168.53	9.8	0.016%	9.8	0.005%	9.8
3	2006	3	€ 14,897.68	6.2	0.010%	6.2	0.003%	6.2
4	2007	1	€ 2,897.00	0.6	0.001%	0.6	0 000%	0.6
5	2008	8	€ 22,317.00	5.1	0.009%	5.1	0.003%	5.1
6	2009	2	€ 5,439.00	1.9	0.003%	1.9	0.001%	1.9
TOTAL		**19**	**€ 62,538.22**	**24.8**	**0.041%**	**24.8**	**0.013%**	**24.8**

TERTIARY SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2004	16	€ 133,306.79	66.0	0.110%	66.0	0.036%	66.0
2	2005	27	€ 216,179.42	77.4	0.129%	77.4	0.042%	77.4
3	2006	8	€ 27,398.72	12.1	0.020%	12.1	0.007%	12.1
4	2007	12	€ 69,855.00	37.3	0.062%	37.3	0.020%	37.3
5	2008	6	€ 30,060.00	11.8	0.020%	11.8	0.006%	11.8
6	2009	3	€ 8,306.00	2.4	0.004%	2.4	0.001%	2.4
TOTAL		**72**	**€ 485,105.94**	**206.9**	**0.345%**	**206.9**	**0.112%**	**206.9**

INDUSTRIAL SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2006	2	€ 4,201.00	1.7	0.003%	1.7	0.001%	1.7
TOTAL		**2**	**€ 4,201.00**	**1.7**	**0.003%**	**1.7**	**0.001%**	**1.7**

1.8 Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Solar swimming pool heating systems (Measures OIK.4.6, T.5.4)

The methodology used for Household Solar Systems could not be used for this specific category, as the following parameters should be taken into account in making calculations:

- These systems usually operate for 4-6 months per year, depending on the region in which they are installed. Consequently, the energy generated by these systems may not be considered as savings.

Consequently, under the circumstances, the only available way to calculate the energy savings achieved by each system was to obtain them form the study submitted with the subsidy request. These studies are prepared by Mechanical Engineers registered in the Scientific and Technical Chamber of Cyprus. The TISOL or POLYSUN or RETSCREEN software is used to calculate energy savings, by the use of the parameters described below.

The tables below present data relating to this category.

RESIDENTIAL SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2004	2	€ 4,476.54	3.6	0.006%	3.6	0.002%	3.6
2	2005	5	€ 11,367.33	5.3	0.009%	5.3	0.003%	5.3
3	2006	1	€ 3,562.00	1.4	0.002%	1.4	0.001%	1.4
4	2007	15	€ 61,968.24	13.2	0.022%	13.2	0.007%	13.2
5	2008	14	€ 45,793.00	10.4	0.017%	10.4	0.006%	10.4
TOTAL		**37**	**€ 127,167.10**	**33.8**	**0.056%**	**33.8**	**0.018%**	**33.8**

TERTIARY SECTOR									
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe	
1	2004	4	€ 27,332.50	17.8	0.030%	17.8	0.010%	17.8	
2	2005	2	€ 19,712.13	11.7	0.020%	11.7	0.006%	11.7	
4	2007	2	€ 6,799.44	1.7	0.003%	1.7	0.001%	1.7	
TOTAL		**8**	**€ 53,844.07**	**31.3**	**0.052%**	**31.3**	**0.017%**	**31.3**	

1.9 Methodology used in calculating savings due to the Grants Scheme for encouraging RES in the Residential Sector – Heat pump with a geoexchange used for space heating and cooling (Measures OIK.4.7, T.5.5)

The methodology used in calculating savings due to the investment included in the following category was based on the following acknowledgements:

1. Typical conventional boiler performance: 85%
2. Typical conventional air conditioner performance (EER): 300%
3. Typical electricity generation performance for power plants: 34%
4. Fuel calorific value (Cp - calorific value) (kWh/l): 11,04

Following is the calculation procedure:

1. Calculation procedure for the Cooling cycle:

    - Where there are no quantifiable data, the energy consumed for cooling the building, in kWh of electricity, is used, as calculated by an engineer registered in the Technical Chamber of Cyprus, who has prepared the study.
    - The electricity spent by the heat pump for meeting the same thermal energy demand of the building for Cooling by the use of a conventional system is calculated. In making this calculation, the heat pump performance in a Cooling cycle — as calculated by the designer — is used, taking into account temperature, subsoil and other data for Cyprus.
    - The difference between these two values is translated into kWh_{th} of primary energy by using the typical electricity generation performance of power plants.

2. Calculation procedure for the Heating cycle:

- Where there are no quantifiable data, the energy consumed for heating the building, in kWhth of diesel, is used, as calculated by the engineer who has prepared the study.
- The electricity spent by the heat pump for meeting the same thermal energy demand of the building for Heating by the use of a conventional system is calculated. In making this calculation, the heat pump performance in a Heating cycle — as calculated by the designer — is used, taking into account temperature, subsoil and other data for Cyprus.
- The above energy is translated into kWhth of primary energy by using the typical electricity generation performance of power plants.
- The two consumptions are deducted and the savings achieved in the Heating cycle is calculated in kWhth of primary energy.

By adding the two savings we obtain the annual energy savings for heating and cooling from the heat pump, as compared to conventional systems. The energy savings data were provided by the Cyprus Institute of Energy and the Special Fund for RES and ES.

RESIDENTIAL SECTOR													
			COOLING				HEATING						
Item No.	Year	Quantity	Energy Consumption (conventional system) (kWhe/y)	Energy Consumption (Heating Pump) (kWhe/y)	Savings Cooling (kWhe/y)	Savings Cooling (toe/y)	Energy Consumption (conventional system) (kWh/y)	Energy Consumption (Heating Pump) (kWh/y)	Savings Cooling (kWh/y)	Savings Cooling (toe/y)	Total Savings (toe/y)	Lifetime (Years)	Subsidy Cost (€)
1	2006	12	14539.00	9211	5328	1.42	441181	293388	147793	13	14.13	25	€ 107,099.00
2	2007	12	32511.00	20186	12325	3.29	505581	291968	213613	18	21.66	25	€ 140,288.00
3	2008	14	78208.00	57117	21091	5.62	1178162	737732	440430	38	43.50	25	€ 155,518.00
4	2009	46	157236.00	120488	36748	9.80	6498145	4175747	2322398	200	209.52	25	€ 719,522.00
TOTAL		84	282494.00	207002	75492	**20.13**	8623069	5498835	3124234	**269**	**288.81**		€ 1,122,427.00

TERTIARY SECTOR														
			COOLING				HEATING							
Item No.	Year	Quantity	Energy Consumption (conventional system) (kWhe/y)	Energy Consumption (Heating Pump) (kWhe/y)	Savings Cooling (kWhe/y)	Savings Cooling (toe/y)	Energy Consumption (conventional system) (kWh/y)	Energy Consumption (Heating Pump) (kWh/y)	Savings Cooling (kWh/y)	Savings Cooling (toe/y)	Total Savings (toe/y)	Lifetime (Years)	Subsidy Cost (€)	
1	2008	1	3968110.00	3187147	780963	208.20	2050824	945046	1105778	95	303.30	25	€	166,471.00
2	2009	1	0.00	0	69800	18.61	0	0	206000	18	36.32	25	€	542,500.00
TOTAL		2	3968110.00	3187147	850763	226.81	2050824	945046	1311778	113	339.63		€	708,971.00

RESIDENTIAL SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	**2006**	12	€ 107,099.00	14.1306	0.02%	14.1	0.008%	14.1
2	**2007**	12	€ 140,288.00	21.6566	0.04%	21.7	0.012%	21.7
3	**2008**	14	€ 155,518.00	43.4998	0.07%	43.5	0.024%	43.5
4	**2009**	46	€ 719,522.00	209.5232	0.35%	209.5	0.113%	209.5
TOTAL		**84**	**€ 1,122,427.00**	**288.8103**	**0.48%**	**288.8**	**0.1561%**	**288.8**

TERTIARY SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	**2008**	1	€ 166,471.00	303.3	0.506%	303.3	0.16%	303.3
2	**2009**	1	€ 542,500.00	36.3	0.061%	36.3	0.02%	36.3
TOTAL		**2**	**€ 708,971.00**	**339.6**	**0.566%**	**339.6**	**0.1836%**	**339.6**

1.10 Tables presenting energy savings calculations for the Green Public Procurement Grants Scheme – Fluorescent lamps in the Public Sector (Measure T.1.1)

	Year	Number of CFL lamps distributed	Unitary energy savings GLS to CFL (kWh/year)	Energy saving in KWh/year	Energy saving in toe/year	Average Lifetime	Total Cost incl. 15% VAT
1	2007	2694	**118**	317892	84.8	6000	€ 4,310.40
2	2008	3513	**118**	414534	110.5	6000	€ 5,620.80
3	2009	2983	**118**	351994	93.8	6000	€ 4,772.80
4	2010	2998	**118**	353764	94.3	6000	€ 4,796.80
5	2011	3000	**118**	354000	94.4	6000	€ 4,800.00

Calculation of energy saving in toe/year											
		Energy saving in toe/year	2007	2008	2009	2010	2011	2012	2013	2016	2020
1	2007	84.8	84.8	84.8		0.00	0.00	0.00	0.00	**0**	0
2	2008	110.5	0	110.5	110.5	**0.0**	0.0	0.0	0.0	0	0
3	2009	93.8	0	0	93.8	**93.8**	0.0	0.0	0.0	0	0
4	2010	94.3	0	0	0.00	**94.3**	94.3	0.0	0.0	0	0
5	2011	94.4	0	0	0.00	**0.00**	94.4	94.4	0.0	0	0
Total Energy saving per year (toe)			85	195	204	**188.16**	189	94	0	**0**	**0**

Item No.	Year	Quantity	Total Price	Contribution in (2010) toe	%	Contribution in (2016) toe	%	Contribution in (2020) toe	%
1	**2007**	2694	€ 4,310.40	0	0.00%	0	0%	0	0%
2	**2008**	3513	€ 5,620.80	0.0	0.00%	0	0%	0	0%
3	**2009**	2983	€ 4,772.80	93.8	0.16%	0	0%	0	0%
3	**2010**	2998	€ 4,796.80	94.3	0.16%	0	0%	0	0%
4	**2011**	3000	€ 4,800.00	0	0.00%	0	0%	0	0%
TOTAL		15188	€ 24,300.80	188.16	0.31%	0.00	0.00%	0.00	0.00%

1.11 Tables presenting savings calculations for the Green Public Procurement Grants Scheme – Replacement and/or installation of new air conditioners in the Public Sector (Measure T.1.2)

REPLACEMENT OF AIR CONDITIONERS

REPLACEMENT OF AIR CONDITIONS IN PUBLIC SECTOR								
Year	**Quantity**	**COOLING CAPACITY [Kw]**	**EER best_perf_on_market**	**EER average**	**nh**	**UFES [kWh/unit/year]**	**Total Saving [kWh/year]**	**Total Saving [toe/year]**
2007	1	2.64	2.86	2.5	812	107.93	107.93	0.03
2007	102	3.50	2.86	2.5	812	143.09	14595.56	3.89
2007	58	4.70	2.86	2.5	812	192.15	11144.96	2.97
2007	10	5.80	2.84	2.5	812	225.53	2255.30	0.60
2007	83	7.00	2.84	2.5	812	272.19	22591.90	6.02
TOTAL 2007						940.90	50695.65	13.52
2008	9	2.64	3.22	2.5	812	191.73	1725.60	0.46
2008	74	3.50	3.20	2.5	812	248.68	18401.95	4.91
2008	5	4.70	3.20	2.5	812	333.94	1669.68	0.45
2008	29	5.27	3.21	2.5	812	378.60	10979.38	2.93
2008	9	6.40	3.20	2.5	812	454.72	4092.48	1.09
2008	57	7.00	3.02	2.5	812	391.48	22314.41	5.95
TOTAL 2008						1999.14	59183.49	15.78
2009	8	2.64	3.22	2.5	812	191.73	1533.86	0.41
2009	53	3.50	3.20	2.5	812	248.68	13179.78	3.51
2009	3	4.70	3.20	2.5	812	333.94	1001.81	0.27
2009	32	5.27	3.21	2.5	812	378.60	12115.18	3.23
2009	1	5.86	3.40	2.5	812	503.82	503.82	0.13
2009	39	7.00	3.02	2.5	812	391.48	15267.75	4.07
TOTAL 2009						2048.25	43602.20	11.62
TOTAL 2007-2009						4988.29	153481.33	40.92

Calculation of energy saving in toe/year - REPLACEMENT OF AIR CONDITIONS IN PUBLIC SECTOR															
		Energy saving in toe/year	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2020**
1	2007	13.5	13.52	13.52	13.52	13.52	13.52	13.52	13.52	13.52	13.52	13.52	0.00	0.00	0.00
2	2008	15.8	0.00	15.78	15.78	15.78	15.78	15.78	15.78	15.78	15.78	15.78	15.78	0.00	0.00
3	2009	11.6	0.00	0.00	11.62	11.62	11.62	11.62	11.62	11.62	11.62	11.62	11.62	11.62	0.00
Total Energy saving per year (toe)			13.52	29.29	40.92	**40.92**	40.92	40.92	40.92	40.92	40.92	**40.92**	27.40	11.62	**0.00**

INSTALLATION OF NEW AIR CONDITIONERS

INSTALLATION OF AIR CONDITIONS IN PUBLIC SECTOR								
Year	Quantity	COOLING CAPACITY [Kw]	EER best_perf_on_market	EER average	nh	UFES [kWh/unit/year]	Total Saving [kWh/year]	Total Saving [toe/year]
2007	2	2.64	2.86	2.5	812	107.93	215.87	0.06
2007	106	2.86	2.86	2.5	812	116.93	12394.37	3.30
2007	56	2.86	2.86	2.5	812	116.93	6547.97	1.75
2007	15	2.84	2.84	2.5	812	110.43	1656.48	0.44
2007	93	2.84	2.84	2.5	812	110.43	10270.18	2.74
TOTAL 2007						562.65	31084.86	8.29
2008	37	3.22	3.22	2.86	812	102.21	3781.76	1.01
2008	53	3.20	3.20	2.86	812	96.53	5116.17	1.36
2008	6	3.20	3.20	2.86	812	96.53	579.19	0.15
2008	46	3.21	3.21	2.84	812	105.79	4866.28	1.30
2008	0	3.20	3.20	2.84	812	102.93	0.00	0.00
2008	62	3.02	3.02	2.84	812	51.46	3190.82	0.85
TOTAL 2008						555.46	17534.22	4.67
2009	28	3.22	3.22	2.86	812	102.21	2861.87	0.76
2009	74	3.20	3.20	2.86	812	96.53	7143.33	1.90
2009	11	3.20	3.20	2.86	812	96.53	1061.85	0.28
2009	46	3.21	3.21	2.84	812	105.79	4866.28	1.30
2009	7	3.40	3.40	2.84	812	160.11	1120.79	0.30
2009	50	3.02	3.02	2.84	812	51.46	2573.24	0.69
TOTAL 2009						612.64	19627.36	5.23
TOTAL 2007-2009						1730.75	68246.44	18.19

INSTALLATION OF AIR CONDITIONS IN PUBLIC SECTOR - Calculation of energy saving in toe/year														
		Energy saving in toe/year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2020
1	2007	8.3	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	8.29	0.00	0.00	0.00
2	2008	4.7	0.00	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	0.00	0.00
3	2009	5.2	0.00	0.00	5.23	5.23	5.23	5.23	5.23	5.23	5.23	5.23	5.23	5.23	0.00
Total Energy saving per year (toe)			8.29	12.96	18.19	**18.19**	18.19	18.19	18.19	18.19	18.19	**18.19**	9.91	5.23	**0.00**

1.12. Tables presenting savings calculations for to the Green Public Procurement Grants Scheme – Replacement of office computers in the Public Sector (Measure T.1.3)

NEW DESKTOP PC IN PUBLIC SECTOR					
YEAR	**COST**	**QUANTITY**	**ENERGY SAVINGS [Kwh/year]**	**TOTAL ENERGY SAVINGS [Kwh/year]**	**TOTAL ENERGY SAVINGS [toe/year]**
2007	€ 3,988,322.08	878	39	34242.00	9.13
2008		1199	39	46761.00	12.47
2009		5391	39	210249.00	56.05
TOTAL	€ 3,988,322.08	7468		291252.00	77.65

NEW DESKTOP PC IN PUBLIC SECTOR - Calculation of energy saving in toe/year									
Lifetime = 3 years		**Energy saving in toe/year**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2016**
1	2007	9.1	9.13	9.13	9.13	0.00	0.00	0.00	0.00
2	2008	12.5	0.00	12.47	12.47	12.47	0.00	0.00	0.00
3	2009	56.1	0.00	0.00	56.05	56.05	56.05	0.00	0.00
Total Energy saving per year (toe)			9.13	21.60	77.65	**68.52**	56.05	0.00	**0.00**

1.13 Tables presenting savings for to the Green Public Procurement Grants Scheme – Replacement of computer monitors (Measure T.1.4)

NEW LCD MONITORS					
YEAR	**COST**	**QUANTITY**	**ENERGY SAVINGS [Kwh/year]**	**TOTAL ENERGY SAVINGS [Kwh/year]**	**TOTAL ENERGY SAVINGS [toe/year]**
2007	€ 265,226.00	954.00	11	10494.00	2.80
2008		1347.00	11	14817.00	3.95
2009		5809.00	11	63899.00	17.04
TOTAL	€ 265,226.00	8110.00		89210.00	23.78

NEW LCD MONITORS IN PUBLIC SECTOR - Calculation of energy saving in toe/year									
Lifetime = 3 years		**Energy saving in toe/year**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2016**
1	2007	2.80	2.80	2.80	2.80	0.00	0.00	0.00	0.00
2	2008	3.95	0.00	3.95	3.95	3.95	0.00	0.00	0.00
3	2009	17.04	0.00	0.00	17.04	17.04	17.04	0.00	0.00
Total Energy saving per year (toe)			2.80	6.75	23.78	**20.99**	17.04	0.00	**0.00**

1.14 Tables presenting savings calculations for the Grants Scheme for Energy Savings in the Tertiary Sector (Enterprises) – (Measure T.4), in the Public sector and general government – (Measure T.2), and in the Industrial Sector - (Measure B.1)

The Grants Scheme includes as provision stipulating that a beneficiary under these categories must submit a technical and financial study establishing that the system to be installed will ensure at least 10% energy savings, before the subsidy is granted. The Energy Savings resulting from each individual study, as confirmed by the Cyprus Institute of Energy, was calculated on the basis of one of the following methodologies, depending on the type of investment.

THERMAL INSULATION / REPLACEMENT OF GLAZING

Software (e.g. Hevacomp, Carrier) is used for this category of investment, to which the different data are entered (e.g. orientation and location of buildings, area of the different surfaces, use of the building, thermal transmittance coefficient of the structural components, etc.) in order to calculate the heating and cooling demand in kW. The required energy in kWh is calculated in accordance with the hours of operation and use of the building.

When certain structural components are replaced and/or new ones are added to the building shell, or when glazing is replaced, the same software is used to calculate the new heating and cooling demand in kWh.

The difference arising between the two calculations represents the energy savings achieved.

LAMPS

As far as lamps are concerned, the total electric power and operating hours thereof are known. Being aware of the total electric power of new lamps, the arising difference in energy consumption (in kWh) represents the energy savings achieved.

EMS-BMS / ELEC SAVER / POWER PLANNER / ELECTROFLOW / POWER FACTOR/AIR COMPRESSORS/LIFT/INVERTERS/AIR CONDITIONERS/KEY FOB

When it comes to energy saving technologies, energy savings calculations are based on real-time measurements taken before and after installing the relevant system, on the basis of electricity bills issued over a period beginning two (2) years before installation and ending one (1) year after installation.

HEAT RECOVERY SYSTEM

Energy savings calculations are based on real-time measurements taken before and after installing the relevant system, on the basis of electricity bills issued over a period beginning two (2) years before installation and ending one (1) year after installation where hot water was produced by an electric system, or on the basis of diesel invoices issued over a period beginning two (2) years before installation and ending one (1) year after installation where hot water was produced by a diesel system.

The tables below present data relating to this category.

Public sector and general government – (Measure T.2)

PUBLIC SECTOR								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2004	1	€ 5,598.10	5.08	0.008%	5.084	0.0027%	5.08
2	2008	2	€ 32,310.00	105.11	0.17%	105.11	0.0568%	105.11
TOTAL		3	€ 37,908.10	110.19	0.18%	110.19	0.0596%	110.19

YEAR	No	FILE NO	SECTOR	DESCRIPTION OF INVESTMENT	SUBSIDISED AMOUNT (IN €)	ENERGY SAVINGS (toe/year)	SAVINGS PERCENTAGE	DURATION OF INVESTMENT
2005	1	N60	MUNICIPALITY	LED lamps	€ 5,598.10	5.08399535	85.00%	20
	TOTAL 2005				€ 5,598.10	5.08		
2008	1	N21	CYPRUS STATE FAIRS AUTHORITY	THERMAL INSULATION IN ROOF	€ 6,810.00	4.4340912	36%	25
	2	N22	CYPRUS PORTS AUTHORITY	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€ 25,500.00	100.6777576	51%	30
	TOTAL 2008				€ 32,310.00	105.11		

Tertiary sector (enterprises) – (Measure T.4)

TERTIARY SECTOR – AGGREGATE DATA ON ENTERPRISES								
Item No.	Year	Quantity	Subsidy Cost	Contribution on 2010 toe	%	Contribution on 2016 toe	%	Contribution on 2020 toe
1	2004	31	€ 145,127.81	387.42	0.65%	174.96	0.09%	17.977268
2	2005	33	€ 185,387.40	504.82	0.84%	330.19	0.18%	56.05
3	2006	43	€ 279,023.04	248.37	0.41%	201.39	0.11%	201.39
4	2007	48	€ 442,334.00	3046.80	5.08%	2960.29	1.60%	2947.50
5	2008	34	€ 434,109.00	1320.73	2.20%	1286.86	0.70%	1271.95
6	2009	13	€ 655,458.76	387.86	0.65%	337.13	0.18%	337.13
TOTAL		202	€ 2,141,440.01	5895.99	9.83%	5290.82	2.86%	4832.00

TERTIARY SECTOR – ENTERPRISES 2004							
No	FILE NO	SECTOR	DESCRIPTION OF INVESTMENT	SUBSIDISED AMOUNT (IN €)	ENERGY SAVINGS (toe/year)	SAVINGS PERCENTAGE	DURATION OF INVESTMENT
1	N30	HYPERMARKET	POWER PLANNER	€ 5,069.40	4.127	10.60%	15
2	N1	WATERPARK	ECONOMISERS	€ 30,294.00	77.230	10.84%	15
3	N31	BAKERY	POWER PLANNER	€ 1,504.50	1.596	10.60%	15
4	N32	SHOP	POWER PLANNER	€ 719.10	0.632	10.60%	15
5	N8	HYPERMARKET	ELEC-SAVER	€ 3,748.50	13.548	11%	15
6	N3	MEAT MARKET	ELEC-SAVER	€ 1,530.00	5.425	15%	15
7	N18 (1)	RESTAURANT	ELEC-SAVER	€ 1,412.70	7.414	16%	15
8	N17	RESTAURANT	ELEC-SAVER	€ 2,119.90	7.582	16%	15
9	N16	GARAGE	THERMAL INSULATION IN ROOF	€ 1,153.11	1.313	27%	25
10	N15	CARPENTRY SHOP	THERMAL INSULATION IN SHELL	€ 1,963.50	1.184	27%	25
11	N36	JEWELLERY SHOP	POWER PLANNER	€ 1,030.20	0.789	10.60%	15

12	N35	IMPORTERS	POWER PLANNER	€	1,040.40	0.848	10.60%	15
13	N33	CAR IMPORTERS	POWER PLANNER	€	3,927.00	2.970	10.60%	15
14	N10	HOTEL	REPLACING AN OLDER CHILLER WITH A NEW MORE EFFICIENT ONE	€	36,631.60	166.568	15.50%	10
15	N21	OLD PEOPLE'S HOME	THERMAL INSULATION IN ROOF	€	4,080.00	2.316	25%	25
16	N28	POTATO AND VEGETABLE PROCESSING AND TRADING	POWER FACTOR CORRECTION UNIT	€	877.20	0.709	35%	15
17	N14 (1)	PRINTING HOUSE	ELEC-SAVER	€	7,078.80	5.452	15%	15
18	N14	PRINTING HOUSE	ELEC-SAVER	€	7,078.80	5.452	15%	15
19	N18	RESTAURANT	ELEC-SAVER	€	1,412.70	4.769	12%	15
20	N22	HYPERMARKET	THERMAL INSULATION IN ROOF	€	1,275.00	1.641	27%	25
21	N24 (1)	LAUNDERETTES	THERMAL INSULATION IN STEAM PIPES	€	1,309.00	3.884	92%	5
22	N24	LAUNDERETTES	REPLACING LAMPS	€	926.50	2.614	41.90%	4
23	N18 (2)	RESTAURANT	ELEC-SAVER	€	1,412.70	8.619	17%	15
24	N38	CAR IMPORTERS	POWER PLANNER	€	1,836.00	1.540	10.60%	15
25	N40	LAND DEVELOPMENT COMPANY	THERMAL INSULATION IN SHELL	€	5,658.45	4.133	44.28%	25
26	N11	HOTEL	ELECTRICITY SAVING SYSTEMS	€	9,072.90	45.891	10%	10
27	N23	ADVISORY SERVICES	HEAT RECOVERY	€	5,077.90	5.865	40%	20
28	N17 (1)	RESTAURANT	ELEC-SAVER	€	2,119.05	7.582	16%	15
29	N19	LAW OFFICE	THERMAL INSULATION IN SHELL	€	1,966.90	0.880	30%	25
30	N19	LAW OFFICE	REPLACING OLDER AIR CONDITIONERS WITH A NEW MORE EFFICIENT ONES			0.697	23.75%	15
31	N20	FARM	THERMAL INSULATION IN ROOF	€	1,802.00	0.645	22.20%	25
TOTAL 2004				€	145,127.81	**393.914**		

TERTIARY SECTOR – ENTERPRISES 2005							
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**	**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N82	Recording Studio	Thermal insulation in roof	€ 2,997.10	2.868	57.00%	25
2	N85	Monastery	Thermal insulation in shell	€ 13,680.00	6.267	37.00%	25
3	N86	Monastery	Thermal insulation in shell	€ 8,130.00	4.649	31%	25
4	N84	Monastery	Thermal insulation in shell	€ 13,525.20	6.189	46.99%	25
5	N87	Monastery	Double glazing	€ 6,980.20	0.382	25.00%	30
6	N89	Monastery	Thermal insulation in roof	€ 1,989.00	1.742	23%	25
7	N57 (2)	Restaurant	Elec – Saver	€ 1,458.60	4.860	11%	15
8	N57 (3)	Restaurant	Elec – Saver	€ 1,458.60	3.959	10%	15
9	N41	Retail sales	Absorption Chillers	€ 5,431.50	7.229	38%	25
10	N61	Garage	Lamps	€ 2,764.20	3.923	30%	4
11	N64	Catering	Power Planner	€ 1,632.00	1.385	14.00%	15
12	N65	Restaurant	Power Planner	€ 601.80	0.782	10.60%	15
13	N68	Restaurant	Power Planner	€ 3,468.00	6.953	10.00%	15
14	N62	Car rental company	Power Planner	€ 1,606.50	1.642	11.60%	15
15	N62 (1)	Car rental company	Power Planner	€ 1,836.00	1.797	11.60%	15
16	N62 (2)	Car rental company	Power Planner	€ 765.00	0.965	12.40%	15
17	N63	Furniture trade	Power Planner	€ 3,758.70	2.363	12.20%	15
18	N65 (1)	Restaurant	Power Planner	€ 724.20	1.207	10.60%	15
19	N59	Restaurant	Thermal insulation in roof	€ 1,773.10	0.772	24.82%	25
20	N42 (3)	Cement	P.F.C.U.	€ 1,912.50	42.565	10.31%	5
21	N44	Hotel	B.E.M.S.	€ 40,851.00	186.314	17.01%	15
22	N44	Hotel	B.E.M.S.		26.401	12.76%	15
23	N78	Hotel	B.E.M.S.	€ 32,532.90	166.760	12.00%	6
24	N51	Hypermarket	ElectroFlow	€ 2,142.00	7.873	15.50%	7
25	N46	Pig farm	P.F.C.U.	€ 753.10	7.050	15.70%	5
26	N50	SPE	Thermal insulation in roof	€ 984.30	0.77226	24.82%	25
27	N56 (1)	Restaurant	Elec - Saver	€ 1,458.60	6.808	12.00%	15
28	N57	Restaurant	Elec - Saver	€ 2,187.90	3.357	11.00%	15
29	N57 (1)	Restaurant	Elec - Saver	€ 729.30	3.436	10.70%	15
30	N74	Hypermarket	Elec - Saver	€ 5,610.00	17.539	10.00%	15

31	N56	Restaurant	Elec - Saver	€	1,458.60	4.370	11.20%	15
32	N49	Hotel	Key Fob	€	4,896.00	3.664	14.00%	20
33	N72	TV company	Thermal insulation in roof	€	15,291.50	21.519	28.10%	25
TOTAL 2005				€	185,387.40	**558.36**		

TERTIARY SECTOR – ENTERPRISES 2006								
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**		**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N2	ARCHITECTURAL OFFICE	THERMAL INSULATION IN SHELL	€	10,205.10	6.169	71.4%	25
2	N44	APARTMENTS FOR RENT	POWER PLANNER	€	6,120.00	6.558	14.0%	10
3	N11 (1)	HOTEL	REPLACING LAMPS	€	3,230.00	5.631	80.0%	10
4	N21	COMPANY	THERMAL INSULATION IN SHELL	€	3,207.90	4.027	56.0%	25
5	N9	CARPENTRY SHOP	REPLACING AN OLDER AIR COMPRESSOR WITH A NEW MORE EFFICIENT ONE	€	1,059.10	2.724	55.1%	15
6	N25	COMPANY	PFCU	€	469.20	2.111	25.0%	15
7	N12	GUILD	LAMPS	€	205.70	2.544	83.7%	10
8	N12 (1)	GUILD	LAMPS	€	183.60	2.563	89.0%	10
9	N26	OPTICAL SHOP	PFCU	€	637.50	5.609	25.0%	15
10	N16	EDUCATION CENTRE	THERMAL INSULATION IN SHELL	€	28,078.54	10.589	42.0%	25
11	N24	FAST FOOD	PFCU	€	408.00	3.010	40.0%	15
12	N24		INVERTERS			0.631	12.0%	15
13	N5	HOTEL	HEAT RECOVERY	€	5,559.00	5.677	19.5%	20
14	N11	HOTEL	THERMAL INSULATION IN SHELL	€	3,570.00	2.280	29.1%	25
15	N65 (1)	RETAIL SALES COMPANY	LAMPS	€	7,952.00	7.656	47.0%	10
16	N20(1)	CARPENTRY SHOP	PFCU	€	469.20	5.205	32.0%	15
17	N18	HOTEL	HEAT RECOVERY	€	7,777.50	7.157	21.0%	20
18	N62 (2)	HYPERMARKET	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	4,401.30	1.893	11.5%	30
19	N3	RESTAURANT	ELECTRO FLOW	€	3,213.00	1.628	10.0%	7
20	N16	PRIVATE SCHOOL	THERMAL INSULATION IN SHELL	€	14,520.00	6.749	44.5%	25
21	N48	MONASTERY	THERMAL INSULATION IN SHELL	€	13,797.00	10.931	37.0%	25

22	N60	MONASTERY	THERMAL INSULATION IN SHELL	€	13,814.00	12.794	31.2%	25
23	N30	MONASTERY	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	1,621.80	1.888	16.5%	30
24	N60	HYPERMARKET	ELECTRO FLOW	€	2,142.00	5.702	10.0%	7
25	N14	RESTAURANT	LAMPS	€	489.60	3.923	84.0%	4
26	N20	CARPENTRY SHOP	PFCU	€	469.20	2.608	25.0%	15
27	N1	MONASTERY	THERMAL INSULATION IN SHELL	€	1,356.60	0.8819	33.2%	25
28	N17	MONASTERY	THERMAL INSULATION IN SHELL	€	10,278.20	3 000	33.0%	25
29	N49	MONASTERY	THERMAL INSULATION IN SHELL	€	14,801.00	5.065	31.6%	25
30	N47	HOTEL	HEAT RECOVERY	€	6,808.50	12.387	33.0%	20
31	N65	SALES COMPANY	HEAT RECOVERY	€	6,808.50	8.452	43.0%	20
32	N19	DEVELOPER	THERMAL INSULATION IN BUILDING	€	1,659.20	1.196	34.1%	25
33	N 31	ELECTRIC APPLIANCES SALES COMPANY	THERMAL INSULATION IN BUILDING	€	41,161.00	55.699	64.5%	25
34	N35	RESTAURANT	PFCU	€	469.20	0.777	12.0%	15
35	N33	CONFECTIONARY	PFCU	€	938.40	2.229	12.0%	15
36	N38	FISH SALES	PFCU	€	637.50	1.003	20.7%	7
37	N23	CAR WASH	ELECTRO FLOW	€	3,003.90	5.573	11.0%	7
38	N59	PRINTING HOUSE	ELECTRO FLOW	€	2,142.00	3.309	11.0%	7
39	N58	HYPERMARKET	ELEC SAVER	€	1,479.00	4.817	11.0%	7
40	N62 (1)	OFFICES	REPLACING SINGLE GLAZING	€	9,664.50	4.355	17.3%	30
41	N62	OFFICES	HEAT RECOVERY	€	1,453.50	2.443	11.8%	20
42	N32	PRIVATE SCHOOL	THERMAL INSULATION IN SHELL	€	42,109.00	12.3656	57.3%	25
43	N28	SHOP	THERMAL INSULATION IN SHELL	€	652.80	0.488	20.4%	25
TOTAL 2006				€	279,023.04	**252.30**		

TERTIARY SECTOR – ENTERPRISES 2007								
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**		**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N2	PRINTING HOUSE	PFCU	€	846.00	2.956	11%	7
2	N3	CARPENTRY SHOP	PFCU	€	846.00	5.418	13%	7
3	N4	FISH MARKET	PFCU	€	846.00	5.342	12%	7
4	N5	RETAIL TRADE	PFCU	€	898.00	7.423	20%	7

5	N6	BEER HOUSE	PFCU	€	846.00	3.579	13%	7
6	N9	HOTEL	LAMPS	€	2,563.00	36.727	82%	2
7	N11	RESTAURANT	ELECTROFLOW	€	5,059.00	12.562	10%	7
8	N13	POULTRY FARM & SHOP	THERMAL INSULATION IN SHELL	€	7,500.00	205.3478	28%	25
9	N16	APARTMENTS FOR RENT	THERMAL INSULATION IN SHELL	€	4,577.00	1.29823536	48%	25
10	N19	CENTRAL HEATING SYSTEM INSTALLERS	THERMAL INSULATION IN SHELL	€	1,627.00	1.64650827	16%	25
11	N20	HOTEL	HEAT RECOVERY SYSTEM	€	15,305.00	24.49	16%	20
12	N21	ELECTRONIC SIGN ASSEMBLY	THERMAL INSULATION IN ROOF	€	1,538.00	1.3988502	23%	25
13	N22	POLLING ORGANISATIONS	ELECTRICITY SAVING SYSTEM	€	7,252.00	14.522	14%	6
14	N25	APARTMENTS FOR RENT	THERMAL INSULATION IN BUILDING	€	8,406.00	3.8503705	11%	25
15	N27	APARTMENTS FOR RENT	THERMAL INSULATION IN BUILDING	€	3,992.00	1.8662	14%	25
16	N28	HOTEL	HEAT RECOVERY	€	2,870.00	14.0147	56%	20
17	N29	ADVISORY SERVICES	THERMAL INSULATION IN ROOF	€	1,794.00	0.774473	38%	25
18	N34	SPE	THERMAL INSULATION IN ROOF	€	2,087.00	1.0461384	23%	25
19	N41	BEER HOUSE	DOUBLE GLAZING	€	2,061.00	1.2234	12%	30
20	N44	RESTAURANT	THERMAL INSULATION IN BUILDING	€	3,828.00	4.4479544	31%	25
21	N15	COPPER MINES	HEAT RECOVERY SYSTEM	€	81,739.00	2321.44	70%	20
22	N78	HOTEL	THERMAL INSULATION IN BUILDING	€	82,013.00	236.54085	30%	25
23	N101	RESTAURANT	THERMAL INSULATION IN ROOF	€	1,641.00	1.599	25%	25
24	N71	HOTEL	HEAT RECOVERY	€	4,024.00	12.78696	40%	20
25	N72	HOTEL	THERMAL INSULATION IN BUILDING	€	27,226.00	21.42898808	45%	25
26	N73	SHOPS FOR RENT	THERMAL INSULATION IN BUILDING	€	23,771.00	6.749568186	45%	25
27	N75	HOTEL	HEAT RECOVERY	€	4,536.00	10.88397	35%	20
28	N76	HOTEL	HEAT RECOVERY	€	6,279.00	14.88545	44%	20
29	N81	APARTMENTS FOR RENT	THERMAL INSULATION IN APARTMENTS	€	12,143.00	2.931362976	24%	25
30	N82	HOTEL	HEAT RECOVERY	€	9,484.00	5.48199	100%	20
31	N89	HOTEL	HEAT RECOVERY	€	15,967.00	7.57429	90%	20
32	N91	HOTEL	PFCU	€	795.00	0.820	12%	7

33	N92	BAKERY	PFCU	€	795.00	3.477	27%	7
34	N93	SALES ESTABLISHMENT	PFCU	€	846.00	0.821	20%	7
35	N94	SALES ESTABLISHMENT	PFCU	€	846.00	0.821	27%	7
36	N95	OFFICE	THERMAL INSULATION WITH DOUBLE GLAZING	€	1,984.00	1.416933678	29%	30
37	N96	BAKERY	PFCU	€	436.00	1.614	19%	7
38	N97	RESTAURANT	ALUMINIUM FRAMES	€	3,998.00	1.154	13%	30
39	N99	HOTEL	EMS	€	14,353.00	27.151	12%	5
40	N100	HOTEL	ALUMINIUM FRAMES	€	7,549.00	3.398	28%	30
41	N47	BAR	THERMAL INSULATION IN BUILDING	€	2,451.00	1.418312	23%	25
42	N50	HOTEL	BMS	€	35,881.00	33.394	21%	15
43	N51	SHOP	THERMAL INSULATION IN ROOF	€	3,896.00	1.9507122	23%	25
44	N52	SHOP	THERMAL INSULATION IN ROOF	€	2,307.00	1.6841122	23%	25
45	N53	SHOP	THERMAL INSULATION IN ROOF	€	4,148.00	3.4167456	23%	25
46	N54	SHOP	THERMAL INSULATION IN ROOF	€	2,276.00	1.787553	23%	25
47	N48	RESTAURANT	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	2,894.00	0.14	12%	30
48	N66	APARTMENTS FOR RENT	THERMAL INSULATION IN BUILDING	€	13,315.00	6.8238936	51%	25
TOTAL 2007				€	442,334.00	**3083.53**		

TERTIARY SECTOR – ENTERPRISES 2008								
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**		**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N2	HOTEL	HEAT RECOVERY SYSTEM	€	30,918.00	214.2936	55%	20
2	N3	MONEY TRANSFER	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	16,501.00	8.086	21%	30
3	N5	APARTMENTS FOR RENT	THERMAL INSULATION IN BUILDING	€	7,184.00	4.468	57%	25
4	N6	GARAGE	THERMAL INSULATION IN BUILDING	€	2,850.00	3.196	63%	25
5	N7	PRINTING HOUSE	POWER SAVE	€	1,650.00	2.462	10%	7
6	N8	LITHOGRAPHY PLANT	POWER SAVE	€	2,319.00	6.695	10%	7
7	N9	IMPORTERS	THERMAL INSULATION IN ROOF	€	1,154.00	1.558	16%	25

8	N10	CAR SALES	THERMAL INSULATION IN ROOF	€	2,220.00	2.139	10%	25
9	N12	TOURIST SHOP	THERMAL INSULATION IN ROOF	€	3,960.00	4.580	41%	25
10	N13	METAL CONTRUCTIONS	POWER SAVE & ELEC-SAVER	€	2,700.00	3.878	10%	10
11	N14	OLD PEOPLE'S HOME	THERMAL INSULATION IN ROOF	€	1,970.00	2.9677	24%	25
12	N17	GENERAL TRADE	REPLACING SINGLE GLAZING	€	3,457.00	2.552	54%	30
13	N27	HOTEL	INVERTERS	€	1,950.00	8.350	58%	15
14	N30	RESTAURANT	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	9,085.00	6.237	55%	30
15	N33	COSMETICS TRADE	THERMAL INSULATION IN ROOF	€	3,192.00	2.575	92%	25
16	N41	HOTEL	PFCU	€	1,923.00	9.679	12%	15
17	N75	DANCE SCHOOL	INSTALLING DOUBLE GLAZING	€	2,911.00	2.136	16%	30
18	N78	APARTMENTS FOR RENT	THERMAL INSULATION IN BUILDING	€	18,807.00	12.920	33%	25
19	N99	DISCO	PFCU	€	1,001.00	1.010	22%	15
20	N102	RESTAURANT CLUB	THERMAL INSULATION IN BUILDING	€	28,335.00	25.026	36%	25
21	N11	HOTEL	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	12,633.00	5.986	18%	30
22	N15	HOTEL	REPLACING LAMPS	€	859.00	24.708	82%	5
23	N16	FURNITURE SALES COMPANY	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	33,483.00	20.801	84%	30
24	N23	OLIVE PRESS	ELEC-SAVER	€	9,954.00	11.035	10%	10
25	N29	CARPENTRY SHOP	ELEC-SAVER	€	9,954.00	9.166	10%	15
26	N40	HOTEL	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	25,825.00	17.364	57%	30
27	N45	OFFICES FOR RENT	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	24,000.00	15.377	16%	30
28	N50	APARTMENTS FOR RENT	THERMAL INSULATION IN BUILDING	€	10,532.00	17.407	17%	25
29	N67	FRUIT SHOP	ELEC-SAVER	€	5,062.00	11.776	10%	15
30	N68	PRINTING HOUSE	ELEC-SAVER	€	7,240.00	5.703	10%	15
31	N73	HOTEL	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	18,114.00	40.274	19%	30
32	N74	HOTEL	HEAT RECOVERY SYSTEM	€	69,660.00	60.345	85%	20
33	N88	MALL MANAGER	INVERTERS	€	41,526.00	743.466	20%	15
34	N101	HOTEL	REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	€	21,180.00	12.512	15%	30
ΣΥΝΟΛΟ 2008				€	434,109.00	**1320.73**		

TERTIARY SECTOR – ENTERPRISES 2009							
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**	**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N16	BETTING AGENCY	THERMAL INSULATION IN BUILDING	€ 15,539.14	12.159	45%	25
2	N38	HOTEL	THERMAL INSULATION IN BUILDING	€ 157,029.20	54.706	35%	25
3			BMS	€ 32,745.42	27.096	13%	15
4	N52	CAR REPAIR SHOP	THERMAL INSULATION IN BUILDING	€ 13,241.00	6.505	82%	25
5	N65	WINERY	ELEC SAVER	€ 9,310.00	9.986	10%	15
6	N80	OFFICES	THERMAL INSULATION IN BUILDING	€ 175,000.00	52.299	36%	25
7	N128	HOTEL	REPLACING LAMPS WITH LED LAMPS	€ 7,232.00	50.729	80%	5
8	N155	TAVERN	THERMAL INSULATION IN BUILDING	€ 2,100.00	0.910	47%	25
9	N21	HYPERMARKET	ELEC SAVER	€ 7,170.00	20.830	13%	15
10	N39	APARTMENTS FOR RENT	DOUBLE GLAZING	€ 7,262.00	2.453	13%	30
11	N142	HEART SURGERY CENTRE	BMS	€ 103,351.00	88.962	15%	15
12	N143	HEART SURGERY CENTRE	THERMAL INSULATION	€ 120,000.00	58.814	30%	25
13	N43	APARTMENTS FOR RENT	DOUBLE GLAZING	€ 5,479.00	2.407	61%	30
TOTAL 2009				€ 655,458.76	**387.86**		

industrial sector (Measure B.1.)

INDUSTRIAL SECTOR								
Item No.	**Year**	**Quantity**	**Subsidy Cost**	**Contribution on 2010**		**Contribution on 2016**		**Contribution on 2020**
				toe	**%**	**toe**	**%**	**toe**
1	2004	6	€ 14,805.12	46.79	0.08%	46.80	0.03%	1.29
2	2005	15	€ 152,270.30	362.59	0.60%	101.69	0.05%	14.64
3	2006	7	€ 109,169.60	213.63	0.36%	47.98	0.03%	38.02
4	2007	3	€ 129,462.39	148.19	0.25%	144.89	0.08%	144.89
5	2008	5	€ 242,246.00	916.46	1.53%	916.46	0.495%	916.46
6	2009	1	€ 5,101.00	4.77	0.01%	4.78	0.00%	4.78
TOTAL		37	€ 653,054.41	1692.47	2.82%	1262.59	0.68%	1120.07

INDUSTRIAL SECTOR 2004							
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**	**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N27	BEER INDUSTRY	EMS	€ 3,038.28	18.17	18.40%	15
2	N13	FROZEN FOOD FACTORY	ELEC-SAVER	€ 6,151.74	13.16	12%	15
3	N4	GRID PRODUCING COMPANY	REPLACING AN OLDER AIR COMPRESSOR WITH A NEW MORE EFFICIENT ONE	€ 2,142.00	7.98	21%	15
4	N37	KNITTING INDUSTRY	POWER PLANNER	€ 765.00	0.91	10.60%	15
5	N9	ANIMAL FEED FACTORY	THERMAL INSULATION IN ROOF	€ 1,356.60	1.29	26.67%	25
6	N5	BAKERY INDUSTRY	ELEC-SAVER	€ 1,351.50	5.29	14%	15
TOTAL 2004				€ 14,805.12	**46.80**		

INDUSTRIAL SECTOR 2005							
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**	**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N75	Production and packaging of drinks	ElectroFlow	€ 16,065.00	55.04	12.00%	7
2	N77	Production and sale of metal pipes	ElectroFlow	€ 15,300.00	28.68	13.50%	7
3	N43	Plastic factory	ElectroFlow	€ 15,294.90	86.39	10%	15
4	N80	Beer industry	Inverters	€ 1,509.60	8.06	25%	6
5	N58	Building material company	Replacing air compressor	€ 2,963.10	11.26	17%	10
6	N42 (1)	Cement	P.F.C.U.	€ 2,170.90	106.05	10%	5
7	N42 (2)	Cement	P.F.C.U.	€ 2,473.50	137.59	10.30%	5

8	N76	Manufacture and sale of solar systems	ElectroFlow	€	2,677.50	4.38	12.50%	7
9	N42	Cement	ElectroFlow	€	8,721.00	57.89	10.75%	7
10	N58 (1)	Building material company	Electricity saving system	€	4,369.00	25.73	10.30%	6
11	N45	Pork processing establishment	Electricity saving system	€	7,010.80	46.52	10.72%	7
12	N48	Soap manufacturing establishment	Replacing air compressor	€	816.00	0.66	14.00%	15
13	N71	Biscuits - Cereals	Pipe thermal insulation			151.928	88.97%	5
14	N71	Biscuits - Cereals	Chiller	€	72,899.00	14.64	21.51%	20
15	N71	Biscuits - Cereals	BMS			23.34	12.00%	10
TOTAL 2005				€	152,270.30	**758.16**		

INDUSTRIAL SECTOR 2006-2009								
INDUSTRIAL SECTOR 2006								
No	**FILE NO**	**SECTOR**	**DESCRIPTION OF INVESTMENT**	**SUBSIDISED AMOUNT (IN €)**		**ENERGY SAVINGS (toe/year)**	**SAVINGS PERCENTAGE**	**DURATION OF INVESTMENT**
1	N61 (1)	ALUMINIUM COMPANY	ELECTRO FLOW	€	69,968.00	144.44	10.0%	7
2	N7	PESTICIDE INDUSTRY	THERMAL INSULATION IN SHELL	€	15,830.00	20.74	73.4%	25
3	N7	PESTICIDE INDUSTRY	HEAT RECOVERY			9.96	35.3%	15
4	N4	BEER INDUSTRY	INVERTER	€	278.80	2.86	25.0%	6
5	N39	FROZEN FOOD MANUFACTURING ESTABLISHMENT	PFCU	€	469.20	0.92	27.0%	7
6	N27	CEMENT MANUFACTURING PLANT	ELECTRO FLOW	€	8,348.70	17.44	11.0%	7
7	N68	PHARMACEUTICAL INDUSTRY	REPLACING AIR COMPRESSOR	€	14,274.90	17.28	18.0%	15
TOTAL 2006				€	109,169.60	**213.63**		
INDUSTRIAL SECTOR 2007								
1	N1	WATER BOTTLING PLANT	INVERTER	€	871.00	3.31	15.20%	6
2	N36	PACKAGING PLANT	THERMAL INSULATION IN ROOF	€	3,870.00	2.89	93%	25
3	N65	MANUFACTURE & SALE OF ALUMINIUM FRAMES	HEAT RECOVERY SYSTEM	€	124,721.39	142	71%	15

TOTAL 2007				€	129,462.39	148.20		
INDUSTRIAL SECTOR 2008								
1	N1	FUEL TANK CONSTRUCTIONS	REPLACING AIR COMPRESSOR	€	718.00	1.58	36%	15
2	N38	FACTORY	THERMAL INSULATION IN BUILDING	€	21,870.00	52.22	68%	25
3	N65	FACTORY	ELEC SAVER	€	31,200.00	38.56	10%	15
4	N66	PACKAGING PLANT	ELEC SAVER	€	17,597.00	56.58	10%	15
5	N70	DESALINATION PLANT	HEAT RECOVERY SYSTEM	€	170,861.00	767.51	19%	15
TOTAL 2008				€	242,246.00	**916.46**		
INDUSTRIAL SECTOR 2009								
1	N48	FACTORY	ELEC SAVER		5101	4.78	15%	15
TOTAL 2009				€	5,101.00	**4.78**		

1.15 Methodology used in calculating energy savings due to the Grants Scheme for Energy Savings in the Transport Sector (Hybrid, electric and low-emission vehicles) – (Measures M.1.1, M.1.2, M.1.3)

In calculating energy savings due to the above measure during the implementation of the measure (2006-2009), the number of electric, hybrid and low CO_2 emission vehicles purchased in aggregate through participation in the Grants Scheme was taken into account. A total of 3 118 vehicles were purchased as shown in the table below:

Category	**Quantity**	**Grant amount (in €)**
Hybrid vehicles	842	1200
Electric vehicles	36	700
Vehicles with carbon dioxide emissions below 120g/km.	2240	700

In calculating energy savings from vehicles purchased through the Grants Scheme, it was acknowledged that the purchase of such a vehicle is replacement for the purchase of an average gasoline-fuelled urban vehicle. In particular, the following acknowledgements were made in making the calculations:

1. Each private vehicle covers a maximum distance of 20 000 km (~ 55 km/day)

2. It was calculated that, to generate one kilowatt hour of electricity, 2.39×10^{-4} toe of HFO.

   Calculating the HFO primary energy required for generating 1 kWh of electricity

   $$1\text{kWh} = 0.086 * 10^{-3}\text{toe}$$

   $$0.086 * 10^{-3}\text{toe} * \frac{1}{0}.36 = 2.39 * 10^{-4}\text{toe HFO}$$

   Where 0.36: the performance of an HFO-fuelled power plant

3. The density of 95 gasoline is 750Kg/m3.
4. A factor of 0.86×10^{-4} was used to convert one kWh of electricity in toe and a factor of 1 051 was used to convert one metric tonne of 95 gasoline into toe.
5. Concerning hybrid vehicles, it was acknowledged that the average fuel consumption of the hybrid vehicles purchased was 4.3l/100km
6. Concerning electric vehicles, it was acknowledged that the average fuel consumption of the electric vehicles purchased was 0.1kWh/km
7. Concerning low CO_2 emission vehicles (vehicles with carbon dioxide emissions below 120 g/Km), it was acknowledged that the average fuel consumption of the vehicles purchased was 5l/100km
8. As compared to the vehicles whose purchase was avoided due to the Grants Scheme, it was acknowledged that the average fuel consumption of a non-purchased vehicle was 7l/100km

   The table below presents the calculation results:

	Total number of vehicles	Energy consumption of preferred vehicles (toe)	Respective energy consumption of non-purchased vehicles (toe)	Energy savings (toe)
savings due to hybrid vehicles sed under the Grants Scheme	842	569.17	926.55	357.39
savings due to electric vehicles sed under the Grants Scheme	36	17.21	39.62	22.41
savings due to low emission s purchased under the Grants e	2240	1760.67	2464.94	704.27
	3118	**2347.05**	**3431.11**	**1084.06**

1.16 Methodology used in calculating energy savings due to the Vehicle scrapping Plan - (Measure M.2)

Calculating energy savings due to the operation of the Plan providing for the scrapping of old vehicles and replacement thereof with low fuel consumption vehicles, which was in effect from in the period 2008-2010

Some of the provisions included in the Scrapping Plan were:

- ✓ Category C(i): Grant (€1 283) for the scrapping of a vehicle aged more than 10 years with active registration and circulation license within the last 12 months before the scheme start date and purchase of a new vehicle with a fuel consumption of 5-7l/100km or a motorcycle.
- ✓ Category C(ii): Grant (€1 710) for the scrapping of a vehicle aged more than 10 years with active registration and circulation license within the last 12 months before the scheme start date and purchase of a new vehicle with a fuel consumption of 5l/100km.

According to information from the Road Transport Department, a total of 2 815 vehicles were purchased in category C(i) and a total of 991 vehicles were purchased in category C(ii) in the period 2008-2009. Moreover, the scrapping plan was also in effect in 2010; 226 low emission vehicles were purchased under the plan. No specific information was obtained from the Road Transport Department for category C(i) or C(ii)), under which 226 vehicles. Consequently, for calculation purposes, it was acknowledged that all of them fell within Plan C(i).

Acknowledgements 1 and 3 above apply to energy savings calculations. Moreover, it was acknowledged that the new vehicles purchased under scrapping plan C(i) had an average fuel consumption of 6l/100km, and those purchased under scrapping plan C(ii) had an average fuel consumption of 4.3l/100km. Concerning scrapped vehicles which were replaced with new ones purchased under categories C(i) and C(ii), it was acknowledged that they were gasoline-fuelled vehicles with an average fuel consumption of 10l/100km.

The table below presents the calculation results:

	Total number of vehicles	Energy consumption of preferred vehicles (toe)	Respective energy consumption of non-purchased vehicles (toe)	Energy savings (toe)
Category C(i) – Energy savings due to the operation of the plan for scrapping older vehicles aged more than 10 years and purchasing new ones of an average fuel consumption of 6l/100km	3081.00	2906.05	4843.42	1937.37
Category C(ii) – Energy savings due to the operation of the plan for scrapping older vehicles aged more than 10 years and purchasing new ones of an average fuel consumption of 4.3l/100km	991.00	669.89	1557.88	887.99
Total	**4072.00**	**3575.94**	**6401.30**	**2825.36**

The total savings from the operation of the above plans are presented in the table below:

	Total number of vehicles purchased under the Schemes and the Plan	Energy savings (toe)
Grants Scheme for RES and ES, 2006-2009	3118.00	1084.06
Scrappage Plan for purchasing new low-fuel vehicles, 2008-2010	4072.00	2825.36
Total	**7190.00**	**3909.42**

ANNEX III. DESCRIPTION OF ENERGY SAVING MEASURES AS PRESENTED IN THE 1ST EEAP

No	MEASURE DESCRIPTION
MEASURES IN THE RESIDENTIAL SECTOR	
1	All new dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
2	All existing dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), which undergo comprehensive renovation (as specified in the relevant law) must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
3	Maintenance and inspection of boilers and heating installations at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
4	Maintenance and inspection of air conditioning systems with effective rated output greater than 12 kW at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
5	Grants Scheme for energy savings in the residential sector (existing dwellings).
6	Distribution of free fluorescent lamps
7	Grants scheme to encourage the use of RES (end use) in the residential sector.
MEASURES IN THE TERTIARY SECTOR	
1	National action plan for green public procurement.
2	Government grants scheme for energy savings/RES for the Public sector and general government.
3	Five-year action plan for energy savings in existing public buildings.
4	All new tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
5	All existing tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006), which undergo comprehensive renovation (as stipulated in the relevant law) must satisfy the minimum energy efficiency requirements laid down in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
6	Maintenance and inspection of boilers and heating installations at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
7	Maintenance and inspection of air conditioning systems with effective rated output greater than 12 kW at regular intervals determined in the relevant decree issued by the Minister for Commerce, Industry and Tourism.
8	Grants Scheme for (end-use) energy savings in the tertiary sector (existing buildings).
9	Grants scheme to encourage the use of RES (end use) in the tertiary sector.
MEASURES IN THE INDUSTRIAL SECTOR	
1	Grants scheme for energy savings (in existing industrial enterprises).
2	Implementation of Directive 2004/8/EC via Law 142/2006. Grants scheme for energy savings and to encourage the use of renewable energy sources. (Cogeneration of heat

	and power and/or high efficiency cooling).
3	Education/information programmes run by organised industry bodies for technical staff in industry on energy saving/energy management subjects.
4	Grants scheme to encourage the use of RES (end use) in the industrial sector and agriculture.
MEASURES IN THE TRANSPORT SECTOR	
1	Grants scheme for energy saving in transport (purchase of hybrid, electric vehicles).
2	Action plan to strengthen public transport.
HORIZONTAL AND CROSS-SECTORAL MEASURES	
1	Education/information provision for awarding authorities on the green procurement policy, with seminars and preparation of training material. Provision of information to entrepreneurs and organised bodies (traders' association, industrialists' association) to enable them to supply the public sector with green products. Provision of information to and awareness-raising among large private sector organisations/suppliers concerning the importance of the policy. Information and awareness-raising aimed at the general public.
2	Information, awareness-raising and training for civil servants to promote energy saving in the workplace, energy consciousness and simple good habits. Organisation of seminars and provision of information leaflets. Designation of an officer to monitor the energy-saving programme.
3	Information campaign on energy saving issues.
MEASURES TO IMPLEMENT ARTICLE 7 ON AVAILABILITY OF INFORMATION	
1	Detailed billing and advice from energy suppliers.
2	Creation of local energy agencies.
3	Energy certification of buildings.
MEASURES TO IMPLEMENT ARTICLE 5 ON THE PUBLIC SECTOR	
1	Action plan for green public procurement. Incorporation of energy efficiency/energy saving/RES in specifications for the purchase of products and services and as an evaluation criterion in public tendering procedures:
(a)	requirements to purchase energy-efficient equipment, electrical/electronic appliances and vehicles/internal combustion engines;
(b)	requirements to purchase equipment with low energy consumption in standby mode;
(c)	energy study concerning the construction/renovation of public buildings.
2	A government grants scheme for investment in energy efficiency and RES in the public sector and the wider public sector.
3	A five-year government action plan, including 900 000 euro annually for investment in energy saving in existing public buildings.

ANNEX IV. LONG-TERM ENERGY FORECASTS FOR CYPRUS: SCENARIOS AND POLICY OPTIONS

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SUMMARY

This paper presents the results from an energy forecast model developed by the author specifically for the energy sector of the Republic of Cyprus. The model was used during the year 2010 to assist Cypriot authorities in their preparation of the National Renewable Energy Action Plan of Cyprus in line with the requirements of Directive 2009/28/EC, as well as for the assessment of the energy efficiency potential in view of ongoing discussions within the EU for the adoption of mandatory national energy efficiency targets. Major macroeconomic and price assumptions of the model are presented, and results from model application under different assumptions with regard to a) the penetration of renewable energy technologies and b) energy efficiency options are outlined and discussed. On the basis of these scenarios the paper discusses the relevant policy implications for Cyprus, and more specifically issues related to compliance with EU energy and climate legislation and the consequences for national greenhouse gas emissions.

1. Introduction

In Cyprus, like in any other country, there is an increasing need for the existence of a comprehensive mathematical model that performs forecasts of energy production, energy use and energy-related emissions of greenhouse gases and air pollutants, and whose results should be widely acceptable by governmental authorities so that it can be used for the submission of reports to international bodies such as the European Commission, the European Environment Agency and the United Nations Framework Convention on Climate Change. However, there has been no such model in Cyprus up to now, and each authority is using own projections of energy use and emissions, depending on individual requirements.

For this reason, the author is currently developing an energy model for Cyprus, which has been used up to now by the Cyprus Energy Service and the Cypriot Regulatory Authority for Energy for the preparation of renewable energy penetration and energy efficiency scenarios in the framework of national obligations of the Republic of Cyprus within the EU.

The model calculates future annual energy consumption in each major economic sector of Cyprus (agriculture, cement industry, other industry, households, services, road transport and air transport) as a function of future macroeconomic variables and future oil prices. Then it calculates fuel shares in each sector, depending on technology costs, the penetration potential of various technologies, and technical constraints for the uptake of new technologies, and allows computing future final energy consumption by sector and fuel.

The forecasts shown here are based on data from official energy balances of the period 2005-2009 provided by the Cyprus Energy Service. Developments in year 2009 were particularly important for these projections because 2009 was a year of economic recession, which is also reflected in the decrease observed in the final consumption of some energy products. Therefore, compared to earlier forecasts performed in spring 2010, forecasts have been revised downwards for most sectors and fuels, following the economic downturn that continued to some extent in year 2010 as well. Compared to the projections used by the Republic of Cyprus in June 2010 in its National Renewable Energy Action Plan, the projections shown here are lower due to a revised estimation of energy savings from existing measures, which was provided by the Cyprus Energy Service to the author in early 2011; however, total energy savings between the two basic scenarios that will be described in Section 4 below have remained the same as in the June 2010 National Renewable Energy Action Plan.

This paper reports on the assumptions and the results of model calculations.

2. Macroeconomic and Energy Price Assumptions

Forecasts of economic growth in Cyprus (both aggregate and for each one of the main economic sectors mentioned above) are shown in Table 1. They were obtained from the most recent announcements of official sources (available up to June 2010) such as the Cyprus Statistical Service, the government of Cyprus, the European Commission and the International Monetary Fund. According to these, Cyprus was expected to experience a second year of negative growth in 2010 (−0.4% in real Gross Domestic Product compared to 2009) and then gradually turn to positive growth in 2011 (with real GDP increasing by 1.3% compared to 2010). GDP was expected to exceed the levels of year 2008 only in year 2012; this explains to a large extent the decrease or stagnation of final energy consumption which is projected for the period 2010−2012. After 2012 stronger growth is assumed, which is expected to exceed 3% per year (in real terms) in 2015 and then to stabilize at about 2.5% in the year 2020. Private consumption is expected to follow the general trends of GDP. The contribution of industry and agriculture to total GDP is expected to fall slightly in the coming decade. As usual, the same organisations published revised forecasts during the second half of 2010, but since the above assumptions were used in the official projections of the Republic of Cyprus, in this paper we report results based on these assumptions.

As regards international crude oil prices, the most recent forecast of the International Energy Agency was used (as available in June 2010). According to this, a modest growth in prices is assumed for the next decade, and oil prices are expected to reach 100 US$ per barrel at 2008 prices in 2020 – or about 134 US$ per barrel in current prices of that year. This evolution is displayed in Table 2.

3. Sectoral Fuel Shares in Final Energy Consumption

Having computed total energy consumption for each main economic sector, it is necessary as a next step to calculate – for each future year – how this consumption is allocated among different fuels. For this purpose, it is necessary to simulate the uptake of different technologies/fuels by sector, based on each technology's costs as well as on the technically exploitable potential of each technological option. This Section reports on such assumptions for all end-use sectors and fuels except electricity, which is dealt with separately in Section 5.

To calculate future sectoral fuel shares, detailed technical information was obtained from the Cyprus Energy Service on the basis of earlier specialised sectoral studies. In principle it was assumed that no drastic changes in the fuel mix of final energy consumption will take place in the decade 2010–2020, apart from some shifts towards renewable energy forms (including biomass and biofuels) to ensure compliance with related EU legislation. Results of these projections show that, in the household sector, the shares of LPG and kerosene are projected to continue decreasing, from 24% and 10% respectively in year 2005 to 20% and 5% respectively in year 2020. A slight increase in the share of solar thermal is foreseen – from 20% in 2005 and 27% in 2008 to 34% in 2020 – because, although there is little scope for further increases in the use of solar panels for water heating purposes, some increase in the use of solar technologies for space heating and cooling is foreseen. The share of biomass is projected to rise a little, from 3.5% in 2008 to 6% in 2020. Some use of geothermal energy is also foreseen; up to 2020 it is expected to reach 1.5% final non-electricity household consumption in comparison to 0.2% in year 2009.

Cement industry and agriculture are assumed to basically use the same fuels as today. As regards the other industrial and services sectors, an almost tripling of the share of solar thermal energy use is projected (from 6% in 2005 and 2008 to 17% in 2020) in view of increasingly available solar technologies for space heating and cooling that may also be promoted by governmental grants. Biomass is also expected to grow, from 3.3% of total non-electricity consumption in 2008 to 7% in year 2020.

In the road transport sector, a gradual penetration of biofuels is forecast, in an attempt to fulfil EU requirements. Up to the year 2015, the biofuel share is assumed to be fully taken up by biodiesel. In line with information available from the Cyprus Energy Service, it is currently technically feasible to blend up to 7% biodiesel (by volume) with conventional diesel fuel; in energy terms, this corresponds to a fraction of about 6% biodiesel. Since diesel fuel constitutes about half of the current fuel use in road transport – and is assumed to remain at these levels in the next decade – the biofuel share in total automotive fuel consumption was assumed to reach 3% by 2015. In the second half of the coming decade we assumed that it will be feasible to blend biodiesel with conventional diesel oil at greater ratios, and that the use of biofuels (such as bioethanol) in conventional gasoline will become more widespread at European level. Hence the share of biofuels in total automotive fuel consumption is projected to increase gradually and reach 4.9% in the year 2020.

In the absence of any breakthrough technologies, electricity use in road transport is expected to rise very slowly, from essentially zero in 2009 to 0.4% in 2020. LPG may appear as a new fuel in this sector in light

of recent governmental intentions to promote public transport using partly LPG-powered buses. No introduction of hydrogen-powered vehicles is projected until 2020. Finally, no substitution of jet fuel by biofuels or hydrogen was assumed to take place in aviation up to the year 2020.

4. Energy Efficiency of Final Consumption Sectors

To simulate the effect of energy efficiency measures on national energy consumption, three distinct scenarios have been set up, in line with the needs of the Cyprus Energy Service and the Cypriot Regulatory Authority for Energy, leading to three different energy forecasts. The scenarios contain different assumptions with regard to the implementation of energy efficiency measures in the residential, industrial, tertiary and transport sectors. Such measures include both:

– Actions taken as a result of mandatory compliance with EU legislation, such as the 'Energy Services Directive' (2006/32/EC), the Directive on labelling and standard product information of the energy consumption by energy-related products (2010/30/EC) and the Directive on energy performance of buildings (2010/31/EC); and

– Additional national measures such as subsidies for energy efficiency and renewable energy investments by households and firms.

More specifically, the following scenarios were considered:

1. A 'do nothing' scenario, simulating what would happen until 2020 if no energy efficiency measures had been taken after the mid-2000s. This is a rather theoretical scenario as it assumes that even the existing EU legislation and national measures are not implemented. As a result of this scenario, no autonomous efficiency improvement is assumed to take place from 2010 onwards; the only possible increase in energy efficiency is induced by higher energy prices.

2. A 'reference' scenario, which assumes that no additional measures – at EU and national level – are implemented after 2010. In other words, Directives adopted in year 2010 and national subsidies up to the year 2010 are assumed to take effect, but no post-2010 actions are included. According to bottom-up calculations of the Cyprus Energy Service, measures included in this scenario will lead to savings – compared to the 'do nothing' scenario – of 163.8 ktoe in final energy consumption (50.5 ktoe in final electricity consumption and 113.3 ktoe in final consumption of all other fuels). If measures that encourage the domestic generation of renewable energy whereby reducing the amount of purchased energy are excluded (because they have already been included in the renewable projections explained in Section 3 of this paper and hence the savings induced by these measures should not be counted again), this scenario includes savings – compared to the 'do nothing' scenario – of 156.7 ktoe in final energy consumption (48.6 ktoe in final electricity consumption and 108.2 ktoe in final consumption of all other fuels).

3. A 'energy efficiency' scenario, assuming that further energy efficiency measures are adopted in the post-2010 period, such as a continuation of national subsidies for investments in energy saving

technologies, the implementation of the 'recast Buildings Directive' at EU level and the adoption of further legislation on near-zero energy buildings later in this decade, and generally the gradual implementation of the EU Energy Efficiency Action Plan 2011.

The effect of each scenario on sectoral efficiency development is as follows:

– In road transport, a small efficiency improvement is foreseen in the 'reference scenario' in view of a) governmental plans to promote public transport modes and b) a limited number of subsidies for hybrid, electric and low-CO_2 cars. The 'energy efficiency scenario' assumes an accelerated introduction of more fuel efficient cars due to CO_2-related vehicle taxes and a stronger use of public transportation, leading to savings of 57 ktoe compared to the 'reference scenario'. Small efficiency improvements are expected in aviation too due to better utilisation of existing aircraft, thanks also to the introduction of aviation in the EU Emissions Trading System; these are forecast to cause 10 ktoe of savings compared to the 'reference scenario'.

– In the rest of the economic sectors, primarily in buildings in the residential and tertiary sectors, further energy savings of 23 ktoe in final non-electricity consumption are calculated compared to the 'reference scenario'. Since almost all energy saving potential in the residential and industrial sectors is expected to have been utilised already in the 'reference scenario', only about one third (8 ktoe) of the additional savings are foreseen to be achieved in the residential sector, less than 1 ktoe in industry and 14 ktoe in the service sectors of the economy, in which there is still more unexploited potential (e.g. in office buildings).

5. Power Generation

The electricity sector is not modelled explicitly by our energy model in its current form; instead official forecasts of the power generation sector (adopted by the Cypriot Energy Regulatory Authority) are used as input in our model, and fuel inputs for power generation are then calculated on the basis of appropriate assumptions. In this case, total electricity generation for each one of the three scenarios mentioned above was assumed as follows:

– For the 'reference scenario' and the 'energy efficiency scenario', the corresponding June 2010 forecasts of the Regulatory Authority were used. According to these, electricity production will reach 633 and 683 ktoe in year 2020 for the 'reference scenario' and the 'energy efficiency scenario' respectively. These forecasts were included by the government of Cyprus in the National Renewable Energy Action Plan submitted to the European Commission in June 2010.

– For the 'do-nothing' scenario, it was assumed that electricity generation will be higher than the 'reference scenario' forecast by 53.5 ktoe, which is equal to the savings of 48.6 ktoe in final electricity between the two scenarios as mentioned in Section 4 of this paper, multiplied by 1.1 to account for 10%

of transmission and distribution losses in order to calculate savings in electricity generation on the basis of savings in final electricity.

As regards fuel inputs in power generation, for each one of the 'do nothing' and 'reference' scenarios two alternatives were examined: one alternative assuming the introduction of natural gas in the energy system from year 2015 onwards, and one alternative assuming that natural gas will not penetrate in power generation of the country until 2020. These two alternatives are intended to illustrate the effect from the introduction of natural gas on primary energy consumption of Cyprus. The 'energy efficiency scenario' was calculated by assuming that natural gas will enter the market in 2015, as foreseen by the Regulatory Authority in its official forecasts.

In all cases it was assumed that renewable electricity generation will reach the levels foreseen by the official Renewable Energy Action Plan of June 2010, i.e. 16% of total power generation (101 ktoe) in the year 2020.

For all three scenarios, the thermal efficiency of power generation under the case with natural gas was calculated on the basis of the official forecasts of the Regulatory Authority. Overall thermal efficiency of non-renewable power plants is forecast to increase considerably thanks to the introduction of natural gas, from about 35% in year 2009 to 49.2% in 2020. Fuel inputs for each year of the period 2011–2020 were assumed after personal communication with the Cyprus Energy Service, whose information led to assumptions on the utilisation of different power plants during this period. As is obvious from the Regulatory Authority's forecasts, most of the power generation in year 2020 will take place in natural gas fired combined cycle gas turbine (CCGT) power plants. A considerable fraction of electricity will be produced by renewable energy sources, and only a tiny fraction of fuel oil and diesel oil will be used.

For the alternative case of no natural gas penetration, it was assumed that the thermal efficiency of non-renewable power plants will improve slightly, from about 35% in year 2009 to 40% in 2020. This may happen because all newly built power plants in Cyprus use the CCGT technology. Even though their utilisation will not be as high as in the case of natural gas (because in the absence of natural gas they have to operate with more expensive diesel oil and plant operators will prefer to use cheaper fuel oil burning power plants more intensively than CCGT plants), and despite a somewhat lower thermal efficiency of these plants when they operate on diesel oil instead of natural gas, still they will improve the average thermal efficiency to some extent, so that a gradual increase of average efficiency up to 40% in 2020 seems to be justified.

6. Detailed Results

Tables 3 to 8 present the energy demand forecasts by fuel up to the year 2020, for the main economic sectors covered: households, agriculture, cement industry, services and rest of industry, road transport and air transport. Results of both the 'reference scenario' and the 'energy efficiency scenario' are displayed; results of the 'do nothing scenario' are not reported here for brevity but are available upon request. Tables 9 and 10 report total final energy demand forecasts, for 'heating and cooling' (i.e. all

sectors except transport and all final energy forms except electricity) and transport respectively, whereas Tables 11 and 12 show total final non-electricity consumption for all sectors, by sector and fuel respectively. Finally, Tables 13 displays the projected energy savings between the 'reference' and 'energy efficiency' scenarios, and Table 14 presents total savings to be attained by all energy efficiency-related measures in the 'energy efficiency' scenario compared to the 'do nothing' scenario. As is evident from the latter two tables, the maximum savings in national energy consumption that can be attained in the 'energy efficiency' scenario is 14.4% compared to the 'reference scenario', which lies behind the indicative EU-wide target of 20% savings expressed by the European Commission in the energy and climate package of 2009. Moreover, the greatest part of these savings comes from the introduction of natural gas in the energy system of Cyprus; if natural gas penetration is considered as part of the 'reference scenario', total savings to be achieved in the 'energy efficiency scenario' are limited to 192 ktoe or 6%.

7. Comparison with European Commission Forecasts

Table 15 shows a comparison between the forecasts of our two scenarios with the projected energy demand according to the latest baseline scenario of the European Commission (PRIMES 2009 Baseline), whose results are the basis of the Commission Communication COM (2010) 265 entitled 'Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage' that was released in an unofficial version on 26 May 2010. When comparing these forecasts it is necessary to keep in mind the important differences in the underlying macroeconomic assumptions, which are also shown on top of Table 11: According to the Commission, whose assumptions are based on macroeconomic forecasts available up to May 2009, real GDP of Cyprus is expected to rise by 44% over the period 2010-2020. Our forecasts, which are based on information available up to May 2010, assume a real GDP growth of 32% over the same decade.

As a result of this GDP difference and also because of different assumptions on the evolution of energy efficiency in buildings, our energy demand projections are lower than those of the European Commission, particularly in the 'additional energy efficiency' scenario. Note that our model is much more 'optimistic' (i.e. foresees much lower energy consumption in 2020) than the Commission for heating and cooling, and considerably more 'pessimistic' (i.e. forecasts higher consumption than the Commission) in road transport, whereas projections are similar in the case of air transport.

If we observe energy intensity (i.e. the amount of energy consumed per unit of GDP) it turns out that, even under the 'additional energy efficiency' scenario, our forecast shows a slower decrease in energy intensity over the period 2010–2020 than the Commission forecast (see bottom of Table 15). This means that our forecast is less 'optimistic' in terms of the potential for energy efficiency improvements, which is appropriate for an official governmental energy forecast: if too high decreases in energy intensity are foreseen – which are difficult to achieve in reality – then the country may not be well prepared to address problems associated with security of energy supply and greenhouse gas emissions.

8. Conclusions and Policy Implications

The scenarios examined in this paper lead to the following policy-related conclusions:

– Even under optimistic assumptions on the effectiveness of national and EU-wide measures on the energy efficiency of buildings, it does not seem to be possible for the Republic of Cyprus to achieve a 20% reduction in national energy consumption in the year 2020 compared to a reference scenario.

– The maximum improvement seems to be of the order of 14% – compared to a reference scenario – and this can only be achieved if the reference scenario does not account for the introduction of natural gas in the energy system of Cyprus. If natural gas is included in the reference case, then the attainable savings in an 'energy efficiency' scenario are less than half of the 14% mentioned above.

– A large part of the energy saving potential in buildings – particularly residential buildings – has been already exploited thanks to the implementation of the EU Directives on the energy performance of buildings and the introduction of relevant national subsidies. There seems to still be more unexploited potential in buildings in the service sectors.

– Attempts to further improve the energy efficiency of the Cypriot energy system must be focused on road transport, which is the sector consuming by far the greatest part of non-electricity energy. No serious nationwide energy savings can be attained in the coming years if road transport is overlooked. A substantial push of public transport modes, along with CO_2-based vehicle taxation that rewards low-CO_2 (and low fuel consuming) cars can contribute to this target. This policy priority is fully in line with the obligation of the Republic of Cyprus to reduce greenhouse gas emissions of non-ETS sectors (i.e. sectors not subject to the EU Emissions Trading System) by 5% in 2020 compared to 2005; it is impossible to even approach this 5% target without a serious emission reduction effort in road transport.

– As regards the renewable energy objectives, it seems that the only possibility to meet the 2020 target of 10% renewables in transport (as foreseen by Directive 2009/28/EC) is to ensure that all biofuels consumed in Cyprus in 2020 will come from wastes, residues, non-food cellulosic or other material that counts double towards this target. Currently a very small fraction of biofuels (about 260 toe according to the Cyprus Energy Service) come from such material. It follows that compliance with the 10% renewables target in transport will require producing or (mainly) importing this type of bio fuels only.

– Renewable energy targets in heating and cooling are also relatively ambitious, and it remains to be seen whether they can be achieved in the coming years. For this purpose, a continuation of national subsidies for the installation of renewables in the residential and tertiary sectors is clearly needed.

Following this modelling work, a major recommendation for governmental authorities of the Republic of Cyprus is to realise the great need for a comprehensive national energy model, which will perform forecasts of energy production and consumption under different scenarios on the basis of state-of-the-art forecasting techniques, and will also calculate greenhouse gas emissions. Such a modelling tool will be able to address most of the needs of governmental authorities in preparing their energy and

environmental assessments as well as in submitting reports in line with their reporting obligations in the European Commission and other international organisations.

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Table 1: Macroeconomic assumptions.

Year	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Real GDP (mio Euros at 2005 prices)	13462	15270	15004	14944	15138	15516	16024	16559	17105	17642	18167	18679	19176	19656
Real private consumption (mio Euros at 2005 prices)	8699	10794	10468	10353	10571	10966	11482	11986	12474	12943	13389	13808	14196	14551
Sectoral shares of GDP:														
Agriculture	2.8%	2.1%	2.1%	2.1%	2.1%	2.0%	2.0%	2.0%	2.0%	2.0%	1.9%	1.9%	1.9%	1.9%
Industry	11.3%	10.2%	9.9%	9.9%	9.9%	9.8%	9.8%	9.7%	9.7%	9.6%	9.6%	9.5%	9.5%	9.5%
Construction	8.2%	8.7%	8.2%	8.2%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.3%	8.4%	8.4%
Services	77.7%	79.0%	79.7%	79.8%	79.8%	79.9%	79.9%	80.0%	80.0%	80.1%	80.1%	80.2%	80.2%	80.3%

Sources:

Official national accounts, Statistical Service of the Republic of Cyprus, March 2010

European Commission, Spring macroeconomic forecasts for years 2010-2011, May 2010

Stability Programme submitted by the Republic of Cyprus to the European Commission, March 2010

IMF World Economic Outlook for years 2012-2015, April 2010

Forecasts of the Cypriot Ministry of Finance for year 2020

Forecasts of sectoral GDP shares made by the author

Table 2: Crude oil price assumptions.

Year	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Crude oil import prices (US$ per barrel at 2008 prices)	59.6	77.7	79.5	81.4	83.3	85.1	87.0	89.6	92.2	94.8	97.4	100.0

Source: International Energy Agency World Energy Outlook 2009, Paris, France

Table 3: Final non-electricity consumption forecasts for the households sector (toe).

	Households – Reference scenario						
	LPG	Kerosene	Gasoil	Solar thermal	Geothermal	Biomass	Total
2005	38334	14964	71400	30953	0	1771	157422
2008	38558	12670	68900	47656	0	6037	173821
2009	39838	17000	71070	49476	351	7190	184925
2010	37596	16113	67892	50128	340	6961	179030
2011	35557	14631	63764	48657	546	6974	170130
2012	34009	13407	60558	47743	739	7048	163503
2013	32739	12337	57880	47132	922	7151	158161
2014	31453	11299	55200	46416	1090	7226	152683
2015	30154	10297	52529	45599	1243	7272	147094
2016	28814	9322	49816	44634	1378	7282	141246
2017	27478	8392	47141	43586	1498	7264	135359
2018	26150	7508	44513	42462	1603	7221	129456
2019	24836	6672	41939	41269	1692	7153	123561
2020	23539	5885	39427	40016	1765	7062	117694

	Households – Additional energy efficiency scenario						
	LPG	Kerosene	Gasoil	Solar thermal		Biomass	Total
2005	38334	14964	71400	30953	0	1771	157422
2008	38558	12670	68900	47656	0	6037	173821
2009	39838	17000	71070	49476	351	7190	184925
2010	37596	16113	67892	50128	340	6961	179030
2011	35410	14570	63500	48455	544	6945	169424
2012	33727	13296	60056	47347	733	6989	162149
2013	32333	12184	57162	46548	910	7063	156200
2014	30934	11112	54289	45650	1072	7107	150164
2015	29534	10085	51448	44661	1217	7123	144068
2016	28104	9093	48588	43534	1344	7102	137766
2017	26690	8152	45789	42335	1455	7056	131476
2018	25160	7224	42827	40853	1542	6947	124552
2019	23541	6325	39754	39119	1603	6780	117122
2020	21863	5466	36621	37168	1640	6559	109317

Table 4: Final non-electricity consumption forecasts for agriculture (toe).

	Agriculture – Reference scenario			
	LPG	Gasoil	Biomass	Total
2005		27283	103	27386
2008	2337	27262	0	29599
2009	1229	24418	959	26606
2010	1200	23738	1039	25977
2011	1186	23795	1041	26022
2012	1183	24076	1052	26312
2013	1187	24507	1071	26764
2014	1191	24958	1090	27238
2015	1194	25407	1108	27710
2016	1195	25821	1126	28142
2017	1195	26208	1142	28545
2018	1192	26567	1157	28916
2019	1188	26897	1170	29255
2020	1182	27195	1182	29560

Agriculture – Additional energy efficiency scenario

	LPG	Gasoil	Biomass	Total
2005	0	27283	103	27386
2008	2337	27262	0	29599
2009	1229	24418	959	26606
2010	1200	23738	1039	25977
2011	1186	23793	1041	26019
2012	1183	24071	1052	26306
2013	1186	24500	1070	26756
2014	1190	24948	1089	27227
2015	1194	25395	1108	27696
2016	1195	25806	1125	28125
2017	1194	26190	1141	28525
2018	1192	26546	1156	28893
2019	1187	26872	1169	29229
2020	1181	27168	1181	29530

Table 5: Final non-electricity consumption forecasts for the cement industry (toe).

	Cement Industry – Reference scenario						
	LFO	HFO	Pet coke	Coal	Other	Biomass	Total
2005	7038	17053	112368	36405	3308	671	176843
2008	2423	10084	115533	25574	5712	6727	166053
2009	733	6893	110811	13097	7070	6705	145309
2010	722	6792	109195	12906	6967	6607	143189
2011	731	6872	110481	13058	7049	6685	144877
2012	747	7027	112973	13353	7208	6836	148144
2013	769	7235	116310	13747	7421	7038	152520
2014	793	7453	119819	14162	7645	7250	157121
2015	816	7676	123392	14584	7873	7466	161807
2016	839	7890	126846	14992	8093	7675	166336
2017	861	8100	130220	15391	8308	7879	170760
2018	883	8305	133502	15779	8518	8078	175065
2019	904	8502	136681	16155	8721	8270	179233
2020	924	8693	139744	16517	8916	8456	183250

	Cement Industry – Additional energy efficiency scenario						
	LFO	HFO	Pet coke	Coal	Other	Biomass	Total
2005	7038	17053	112368	36405	3308	671	176843
2008	2423	10084	115533	25574	5712	6727	166053
2009	733	6893	110811	13097	7070	6705	145309
2010	722	6792	109195	12906	6967	6607	143189
2011	731	6870	110437	13053	7046	6682	144819
2012	747	7022	112883	13342	7202	6830	148026
2013	768	7226	116170	13730	7412	7029	152337
2014	791	7441	119627	14139	7632	7238	156870
2015	815	7660	123146	14555	7857	7451	161484
2016	837	7872	126542	14956	8074	7657	165937
2017	859	8078	129856	15348	8285	7857	170283
2018	880	8278	133076	15729	8491	8052	174505
2019	901	8472	136190	16097	8689	8241	178589
2020	921	8658	139186	16451	8880	8422	182518

Table 6: Final non-electricity consumption forecasts for rest of industry and services sectors (toe).

	Services + Other Industry – Reference scenario							
	LPG	Kerosene	Gasoil	Solar thermal	Biomass	LFO	HFO	Total
2005	20778	1649	80697	10318	1650	52820	0	167912
2008	17526	1539	53518	8410	4615	29381	25657	140646
2009	20222	1924	54308	8731	3831	28897	18331	136244
2010	19697	1874	52510	8891	3731	28146	17855	132705
2011	19741	1878	50830	10281	4297	28081	17895	133004
2012	19951	1898	49553	11775	4906	28250	18085	134418
2013	20272	1929	48503	13371	5556	28572	18376	136580
2014	20609	1961	47433	15024	6231	28914	18682	138854
2015	20949	1993	46306	16725	6924	29254	18990	141141
2016	21238	2021	45009	18430	7619	29519	19252	143088
2017	21511	2047	43629	20160	8324	29759	19499	144929
2018	21768	2071	42166	21911	9038	29972	19732	146657
2019	22007	2094	40624	23678	9758	30158	19949	148267
2020	22227	2115	39006	25458	10483	30316	20149	149753

	Services + Industry – Additional energy efficiency scenario							
	LPG	Kerosene	Gasoil	Solar thermal	Biomass	LFO	HFO	Total
2005	20778	1649	80697	10318	1650	52820	0	167912
2008	17526	1539	53518	8410	4615	29381	25657	140646
2009	20222	1924	54308	8731	3831	28897	18331	136244
2010	19697	1874	52510	8891	3731	28146	17855	132705
2011	19605	1865	50479	10210	4267	27887	17771	132084
2012	19676	1872	48870	11613	4838	27861	17836	132566
2013	19854	1889	47504	13096	5442	27984	17998	133766
2014	20045	1907	46135	14613	6060	28123	18171	135054
2015	20235	1925	44727	16155	6688	28257	18342	136328
2016	20372	1938	43174	17678	7308	28316	18467	137253
2017	20491	1950	41560	19204	7929	28348	18575	138058
2018	20488	1949	39688	20623	8506	28211	18572	138038
2019	20362	1937	37589	21909	9029	27905	18458	137190
2020	20115	1914	35300	23039	9487	27435	18234	135525

Table 7: Final energy consumption forecasts in road transport (toe).

	Road Transport – Reference scenario						
	LPG	Gasoline	Diesel	Biofuels	Electricity	Hydrogen	Total
2005	0	321006	359305	0	5719	0	686030
2008	0	391744	364025	14179	6556	0	776504
2009	0	401804	334519	15131	0	0	751454
2010	0	385552	321978	15753	0	0	723283
2011	291	387717	322557	17050	291	0	727906
2012	592	393604	326205	18538	592	0	739531
2013	907	402028	331908	20193	907	0	755943
2014	1237	410879	337907	21924	1237	0	773184
2015	1581	419822	343922	23719	1581	0	790625
2016	1936	424552	350836	27260	1936	0	806519
2017	2301	428825	357491	30900	2301	0	821818
2018	2677	432622	363864	34630	2677	0	836469
2019	3062	435925	369932	38439	3062	0	850419
2020	3454	438718	375674	42317	3454	0	863619

	Road Transport – Additional energy efficiency scenario						
	LPG	Gasoline	Diesel	Biofuels	Electricity	Hydrogen	Total
2005	0	321006	359305	0	5719	0	686030
2008	0	391744	364025	14179	6556	0	776504
2009	0	401804	334519	15131	0	0	751454
2010	0	383778	320497	15680	0	0	719955
2011	288	384033	319492	16888	288	0	720990
2012	583	387821	321412	18266	583	0	728665
2013	889	393918	325212	19785	889	0	740693
2014	1205	400222	329142	21356	1205	0	753130
2015	1531	406396	332923	22960	1531	0	765341
2016	1862	408294	337401	26216	1862	0	775635
2017	2198	409582	341449	29514	2198	0	784940
2018	2538	410248	345046	32839	2538	0	793210
2019	2881	410287	348176	36178	2881	0	800405
2020	3226	409695	350821	39518	3226	0	806486

Table 8: Final energy consumption forecasts in air transport (toe).

	Air Transport – Reference scenario			
	Kerosene	Biofuels	Hydrogen	Total
2005	300595	0	0	300595
2008	295432	0	0	295432
2009	273669	0	0	273669
2010	256939	0	0	256939
2011	258814	0	0	258814
2012	264127	0	0	264127
2013	271828	0	0	271828
2014	279991	0	0	279991
2015	288308	0	0	288308
2016	295793	0	0	295793
2017	303019	0	0	303019
2018	309954	0	0	309954
2019	316567	0	0	316567
2020	322825	0	0	322825

Air Transport – Additional energy efficiency scenario

	Kerosene	Biofuels	Hydrogen	Total
2005	300595	0	0	300595
2008	295432	0	0	295432
2009	273669	0	0	273669
2010	256425	0	0	256425
2011	257740	0	0	257740
2012	262426	0	0	262426
2013	269415	0	0	269415
2014	276783	0	0	276783
2015	284220	0	0	284220
2016	290752	0	0	290752
2017	296946	0	0	296946
2018	302769	0	0	302769
2019	308191	0	0	308191
2020	313182	0	0	313182

Table 9: Total final non-electricity consumption forecasts for heating and cooling (toe).

	Heating and cooling – Reference scenario											
	LPG	Kerosene	Gasoil	Solar thermal	Geothermal	Biomass	LFO	HFO	Pet coke	Coal	Other	Grand total
2005	59112	16613	179380	41271	0	4195	59858	17053	112368	36405	3308	529563
2008	58421	14209	149680	56066	0	17379	31804	35741	115533	25574	5712	510119
2009	61289	18924	149796	58207	351	18685	29630	25224	110811	13097	7070	493084
2010	58493	17987	144140	59020	340	18339	28869	24647	109195	12906	6967	480902
2011	56484	16509	138389	58938	546	18997	28812	24768	110481	13058	7049	474032
2012	55142	15305	134187	59518	739	19842	28997	25113	112973	13353	7208	472377
2013	54198	14265	130890	60503	922	20816	29342	25611	116310	13747	7421	474025
2014	53253	13259	127591	61440	1090	21796	29707	26136	119819	14162	7645	475896
2015	52297	12290	124242	62324	1243	22771	30070	26665	123392	14584	7873	477752
2016	51247	11343	120646	63063	1378	23702	30358	27142	126846	14992	8093	478812
2017	50184	10439	116978	63745	1498	24609	30620	27600	130220	15391	8308	479593
2018	49110	9580	113246	64372	1603	25493	30855	28037	133502	15779	8518	480095
2019	48031	8766	109460	64948	1692	26351	31062	28451	136681	16155	8721	480317
2020	46948	7999	105629	65474	1765	27182	31240	28841	139744	16517	8916	480257

	Heating and cooling – Additional energy efficiency scenario											
	LPG	Kerosene	Gasoil	Solar thermal	Geothermal	Biomass	LFO	HFO	Pet coke	Coal	Other	Grand total
2005	59112	16613	179380	41271	0	4195	59858	17053	112368	36405	3308	529563
2008	58421	14209	149680	56066	0	17379	31804	35741	115533	25574	5712	510119
2009	61289	18924	149796	58207	351	18685	29630	25224	110811	13097	7070	493084
2010	58493	17987	144140	59020	340	18339	28869	24647	109195	12906	6967	480902
2011	56200	16436	137771	58665	544	18935	28618	24641	110437	13053	7046	472346
2012	54586	15168	132998	58960	733	19710	28607	24858	112883	13342	7202	469046
2013	53374	14073	129166	59643	910	20604	28752	25224	116170	13730	7412	469059
2014	52169	13019	125372	60263	1072	21495	28914	25612	119627	14139	7632	469315
2015	50962	12010	121569	60816	1217	22370	29071	26003	123146	14555	7857	469576
2016	49671	11031	117568	61212	1344	23192	29153	26338	126542	14956	8074	469081
2017	48375	10101	113539	61539	1455	23983	29207	26653	129856	15348	8285	468341
2018	46839	9173	109060	61476	1542	24661	29091	26850	133076	15729	8491	465989
2019	45091	8262	104215	61028	1603	25218	28806	26930	136190	16097	8689	462130
2020	43160	7380	99089	60207	1640	25649	28356	26892	139186	16451	8880	456890

Table 10: Total final energy consumption forecasts in road and air transport (toe).

	Transport – Reference scenario							
	LPG	Gasoline	Diesel	Kerosene	Biofuels	Electricity	Hydrogen	Grand total
2005	0	321006	359305	300595	0	5719	0	986625
2008	0	391744	364025	295432	14179	6556	0	1071936
2009	0	401804	334519	273669	15131	0	0	1025123
2010	0	385552	321978	256939	15753	0	0	980222
2011	291	387717	322557	258814	17050	291	0	986721
2012	592	393604	326205	264127	18538	592	0	1003659
2013	907	402028	331908	271828	20193	907	0	1027771
2014	1237	410879	337907	279991	21924	1237	0	1053175
2015	1581	419822	343922	288308	23719	1581	0	1078933
2016	1936	424552	350836	295793	27260	1936	0	1102312
2017	2301	428825	357491	303019	30900	2301	0	1124837
2018	2677	432622	363864	309954	34630	2677	0	1146423
2019	3062	435925	369932	316567	38439	3062	0	1166986
2020	3454	438718	375674	322825	42317	3454	0	1186443

	Transport – Additional energy efficiency scenario							
	LPG	Gasoline	Diesel	Kerosene	Biofuels	Electricity	Hydrogen	Grand total
2005	0	321006	359305	300595	0	5719	0	986625
2008	0	391744	364025	295432	14179	6556	0	1071936
2009	0	401804	334519	273669	15131	0	0	1025123
2010	0	383778	320497	256425	15680	0	0	976379
2011	288	384033	319492	257740	16888	288	0	978731
2012	583	387821	321412	262426	18266	583	0	991091
2013	889	393918	325212	269415	19785	889	0	1010107
2014	1205	400222	329142	276783	21356	1205	0	1029913
2015	1531	406396	332923	284220	22960	1531	0	1049561
2016	1862	408294	337401	290752	26216	1862	0	1066387
2017	2198	409582	341449	296946	29514	2198	0	1081886
2018	2538	410248	345046	302769	32839	2538	0	1095979
2019	2881	410287	348176	308191	36178	2881	0	1108596
2020	3226	409695	350821	313182	39518	3226	0	1119668

Table 11: Total final non-electricity consumption forecasts for all sectors, by sector (ktoe).

	Reference scenario						
	Households	Agriculture	Cement Industry	Services + Other Industry	Road Transport	Air Transport	Total
2005	157	27	177	168	680	301	1510
2008	174	30	166	141	770	295	1575
2009	185	27	145	136	751	274	1518
2010	179	26	143	133	723	257	1461
2011	170	26	145	133	728	259	1460
2012	164	26	148	134	739	264	1475
2013	158	27	153	137	755	272	1501
2014	153	27	157	139	772	280	1528
2015	147	28	162	141	789	288	1555
2016	141	28	166	143	805	296	1579
2017	135	29	171	145	820	303	1602
2018	129	29	175	147	834	310	1624
2019	124	29	179	148	847	317	1644
2020	118	30	183	150	860	323	1663

	Additional energy efficiency scenario						
	Households	Agriculture	Cement Industry	Services + Other Industry	Road Transport	Air Transport	Total
2005	157	27	177	168	680	301	1510
2008	174	30	166	141	770	295	1575
2009	185	27	145	136	751	274	1518
2010	179	26	143	133	720	256	1457
2011	169	26	145	132	721	258	1451
2012	162	26	148	133	728	262	1460
2013	156	27	152	134	740	269	1478
2014	150	27	157	135	752	277	1498
2015	144	28	161	136	764	284	1518
2016	138	28	166	137	774	291	1534
2017	131	29	170	138	783	297	1548
2018	125	29	175	138	791	303	1559
2019	117	29	179	137	798	308	1568
2020	109	30	183	136	803	313	1573

Table 12: Total final non-electricity consumption forecasts for all sectors, by fuel (ktoe).

	Reference scenario																
	LPG	Kerosene	Gasoil	LFO	HFO	Pet coke	Coal	Gasoline	Diesel	Jet fuel	Biofuels	Hydrogen	Solar	Geothermal	Biomass	Other	Total
2005	59	17	179	60	17	112	36	321	359	301	0	0	41	0	4	3	1510
2008	58	14	150	32	36	116	26	392	364	295	14	0	56	0	17	6	1575
2009	61	19	150	30	25	111	13	402	335	274	15	0	58	0	19	7	1518
2010	58	18	144	29	25	109	13	386	322	257	16	0	59	0	18	7	1461
2011	57	17	138	29	25	110	13	388	323	259	17	0	59	1	19	7	1460
2012	56	15	134	29	25	113	13	394	326	264	19	0	60	1	20	7	1475
2013	55	14	131	29	26	116	14	402	332	272	20	0	61	1	21	7	1501
2014	54	13	128	30	26	120	14	411	338	280	22	0	61	1	22	8	1528
2015	54	12	124	30	27	123	15	420	344	288	24	0	62	1	23	8	1555
2016	53	11	121	30	27	127	15	425	351	296	27	0	63	1	24	8	1579
2017	52	10	117	31	28	130	15	429	357	303	31	0	64	1	25	8	1602
2018	52	10	113	31	28	134	16	433	364	310	35	0	64	2	25	9	1624
2019	51	9	109	31	28	137	16	436	370	317	38	0	65	2	26	9	1644
2020	50	8	106	31	29	140	17	439	376	323	42	0	65	2	27	9	1663

	Additional energy efficiency scenario																
	LPG	Kerosene	Gasoil	LFO	HFO	Pet coke	Coal	Gasoline	Diesel	Jet fuel	Biofuels	Hydrogen	Solar	Geotherma	Biomass	Other	Total
2005	59	17	179	60	17	112	36	321	359	301	0	0	41	0	4	3	1510
2008	58	14	150	32	36	116	26	392	364	295	14	0	56	0	17	6	1575
2009	61	19	150	30	25	111	13	402	335	274	15	0	58	0	19	7	1518
2010	58	18	144	29	25	109	13	384	320	256	16	0	59	0	18	7	1457
2011	56	16	138	29	25	110	13	384	319	258	17	0	59	1	19	7	1451
2012	55	15	133	29	25	113	13	388	321	262	18	0	59	1	20	7	1460
2013	54	14	129	29	25	116	14	394	325	269	20	0	60	1	21	7	1478
2014	53	13	125	29	26	120	14	400	329	277	21	0	60	1	21	8	1498
2015	52	12	122	29	26	123	15	406	333	284	23	0	61	1	22	8	1518
2016	52	11	118	29	26	127	15	408	337	291	26	0	61	1	23	8	1534
2017	51	10	114	29	27	130	15	410	341	297	30	0	62	1	24	8	1548
2018	49	9	109	29	27	133	16	410	345	303	33	0	61	2	25	8	1559
2019	48	8	104	29	27	136	16	410	348	308	36	0	61	2	25	9	1568
2020	46	7	99	28	27	139	16	410	351	313	40	0	60	2	26	9	1573

Table 13: Forecast of energy savings to be achieved between 'energy efficiency' and 'reference' scenarios.

(ktoe)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Savings in final non-electricity consumption	4	10	16	23	30	37	46	54	64	76	90
Residential	0	1	1	2	3	3	3	4	5	6	8
Total Industry	0	0	0	0	0	0	0	0	1	1	1
Tertiary	0	1	2	3	4	5	6	7	9	11	14
Agriculture	0	0	0	0	0	0	0	0	0	0	0
Road Transport	3	7	11	15	20	25	31	37	43	50	57
Air Transport	1	1	2	2	3	4	5	6	7	8	10
Savings in final electricity consumption	1	5	11	16	21	26	31	37	42	47	50
Savings in primary electricity production because of savings in final electricity	3	15	29	42	55	58	66	77	87	96	102
Savings in primary electricity due to introduction of natural gas*	0	0	0	0	0	190	259	264	267	270	271
Total savings in primary electricity	3	15	29	42	55	249	325	340	354	365	373
Savings in national energy consumption	7	24	45	65	84	286	371	394	418	442	463
As a fraction of reference energy consumption	*0.2%*	*0.9%*	*1.6%*	*2.3%*	*2.9%*	*9.6%*	*12.2%*	*12.7%*	*13.3%*	*13.9%*	*14.4%*

*including energy savings in primary energy from additional measures in transmission/distribution system

Table 14: Forecast of energy savings to be achieved between 'energy efficiency' and 'do nothing' scenarios.

(ktoe)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Savings in final non-electricity consumption	5	22	40	58	77	96	116	135	156	179	202
Residential	0	12	23	34	45	56	67	77	88	99	109
Total Industry	0	0	0	0	0	1	1	1	1	1	1
Tertiary	0	1	2	4	5	6	8	9	11	14	17
Agriculture	0	0	0	0	0	0	0	0	0	0	0
Road Transport	4	7	12	16	22	27	33	39	46	53	61
Air Transport	1	2	2	4	5	6	7	9	10	12	13
Savings in final electricity consumption	1	11	21	32	42	52	62	73	83	93	103
Savings in primary electricity production because of savings in final electricity	3	28	55	83	109	119	133	153	172	192	210
Savings in primary electricity due to introduction of natural gas	0	0	0	0	0	200	278	288	297	305	309
Total savings in primary electricity	3	28	55	83	109	319	410	441	470	496	519
Savings in national energy consumption	7	50	95	141	187	415	526	576	626	675	721
As a fraction of reference energy consumption	*0.3%*	*1.8%*	*3.3%*	*4.8%*	*6.2%*	*13.3%*	*16.4%*	*17.6%*	*18.7%*	*19.8%*	*20.7%*

Table 15: Comparison of our forecasts with the latest baseline energy forecasts for Cyprus (PRIMES 2009 Baseline) that were released by the European Commission on 26 May 2010 as background information for Commission Communication COM(2010) 265.

GDP assumptions				
(MEuros'1995)	2005	2010	2020	Difference 2020-2010
Our scenarios	13462	14944	19656	31.5%
COM(2010) 265 baseline	13700	15600	22500	44.2%
1. Non-electricity consumption for heating and cooling in residential, services and industry sectors				
(ktoe)	2005	2010	2020	Difference 2020-2010
Our reference scenario	530	481	480	-0.1%
Our energy efficiency scenario	530	481	457	-5.0%
COM(2010) 265 baseline	540	636	779	22.5%
2. Road Transport				
(ktoe)	2005	2010	2020	Difference 2020-2010
Our reference scenario	686	723	864	19.4%
Our energy efficiency scenario	686	720	806	12.0%
COM(2010) 265 baseline	673	726	769	5.9%
3. Air Transport				
(ktoe)	2005	2010	2020	Difference 2020-2010
Our reference scenario	301	257	323	25.6%

Our energy efficiency scenario	301	256	313	22.1%
COM(2010) 265 baseline	299	344	434	26.2%
4. Total Final Non-Electricity Demand*				
(ktoe)	2005	2010	2020	Difference 2020-2010
Our reference scenario	1516	1461	1667	14.1%
Our energy efficiency scenario	1516	1457	1577	8.2%
COM(2010) 265 baseline	1512	1706	1982	16.2%
5. Total Final Non-Electricity Intensity* (Demand per Unit of GDP)				
(toe/Meuro'1995)	2005	2010	2020	Difference 2020-2010
Our reference scenario	113	98	85	-13.3%
Our energy efficiency scenario	113	98	80	-17.7%
COM(2010) 265 baseline	110	109	88	-19.4%

* Note: transport includes a very small amount of electricit