3RD NATIONAL ENERGY EFFICIENCY ACTION PLAN OF CYPRUS

DIRECTIVE 2012/27/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2012

on energy efficiency, amending Directives 2009/125/EC and 2010/30/EC, and repealing Directives 2004/8/EC and 2006/32/EC

Nicosia

April 2014

Abbreviations

NEEAP = National Energy Efficiency Action Plan
EED = Energy Efficiency Directive (Directive 2012/27/EU)
EPBD = Energy Performance of Buildings Directive (Directive 2010/31/EU)
GNP= Gross National Product
TOE = Tons of oil equivalent
RES = Renewable Energy Sources
EU = European Union
ES = Energy Savings
SEAP = Sustainable Energy Action Plans
GPP = Green Public Procurement
MECIT = Ministry of Energy, Commerce, Industry and Tourism
ESD = Energy Services Directive (Directive 2006/32/EC)
EPC = Energy Performance Contracting
CERA = Cyprus Energy Regulatory Authority
toe= tons of oil equivalent
SME = Small and Medium-sized Enterprise
TSO = Transmission System Operator
RAA = Regulatory Administrative Acts
NEEP = National Energy Efficiency Programme
GPP = Green Public Procurement
ESP - Energy Service Providers

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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.

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Introduction:

Given that this is the third consecutive National Energy Efficiency Action Plan (NEEAP) for Cyprus, as a follow-up to the two plans submitted in 2007 and 2011 under Directive 2006/32/EC on energy end use efficiency and energy services, it will hereafter be referred to as the 3rd NEEAP. The NEEAPs are submitted to the European Commission every 3 years, in compliance with Article 24(2) of the Energy Efficiency Directive (EED) 2012/27/EU of the European Parliament. Cyprus has made every effort to include all details required under the EED both in this NEEAP and in the guidance document for the preparation of the plan.

Because of its national peculiarities, which make it a small and isolated system (an island country) without any interconnections to European or other energy networks (electricity, petroleum, natural gas) at present, Cyprus attaches great importance to energy efficiency aiming, inter alia, to improve energy supply security, increase competitiveness and ensure sustainable development/environmental protection.

There is significant potential for end use energy efficiency, as also referred to in the two previous NEEAPs, especially in buildings and in the transport sector, as confirmed by the results of the energy-saving effort made in 2012 and those expected to be achieved by 2016 and 2020. Note, as also mentioned in the 2nd NEEAP, that Cyprus has met the interim end use energy savings target for 2010.

The measures taken so far, combined with the measures expected to be taken in implementation of the EED and the EPBD, will allow Cyprus to largely exceed the end use target set for 2016, while laying the ground for achieving the 2020 primary Energy Saving target. Raising consumer awareness in combination with the measures promoted by Cyprus under the EU Directives for improving energy efficiency have contributed decisively to the reduction in the growth rate of energy consumed and have brought positive results for the economy and employment sector.

The 3rd NEEAP took account of comments submitted during the public consultation exercise held in the period 15 April 2014-25 April 2014. Furthermore, note that an open public hearing was held on 17 April 2014.

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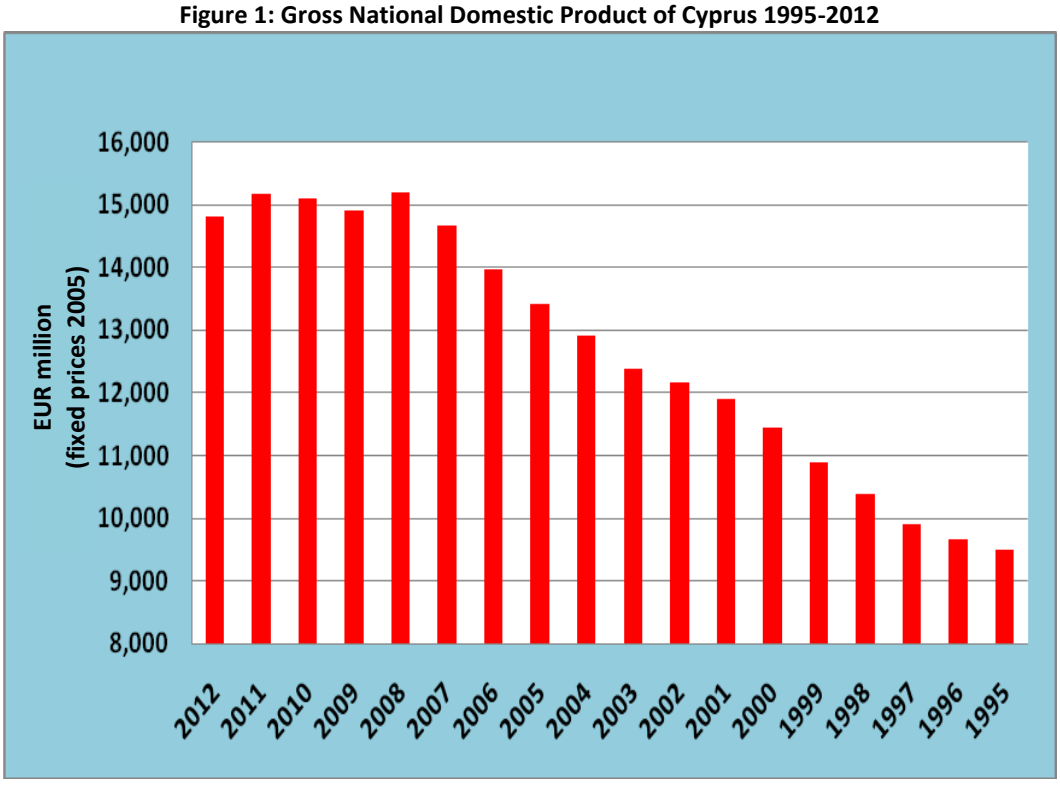
1. INTRODUCTION

1. Cyprus has experienced high economic growth rates in recent years, driven by private initiative, investment in construction and export of services. The highest growth rates were found in the construction, banking and real estate sectors, as well as in international business units. Due to the impact of the global economic crisis, which has also affected Cyprus, there was a contraction in the country's economy in 2009 and GDP growth rate dropped by 1.9%, as compared to 2008.

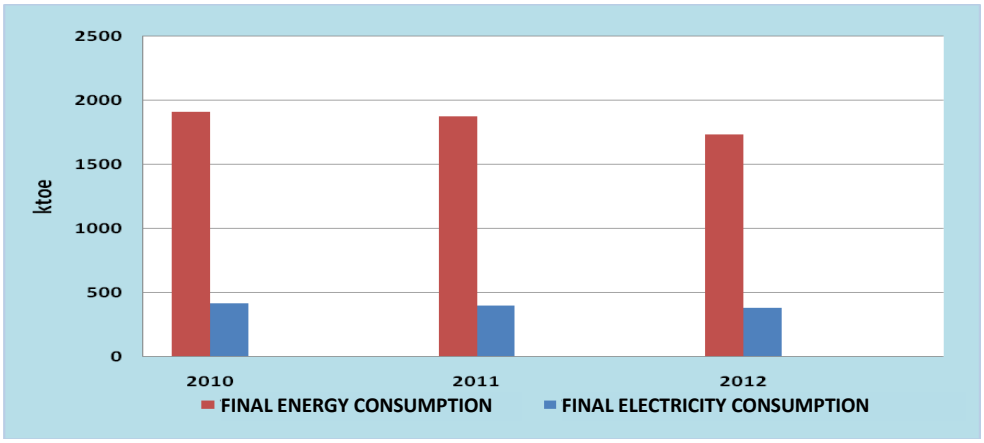
2. However, there were signs of rebound in 2010, as the GDP growth rate amounted to almost 1.3% as compared to 2009. In 2012, GDP amounted to EUR 14.81 billion (in constant 2005 prices), marking a sizeable contraction, whereas GDP growth rate dropped by 2.5% as compared to 2011.

Figure 1: Gross National Domestic Product of Cyprus 1995-2012



3. Focusing on the last three years, we can see that the energy needs of Cyprus are slightly reduced, apace with the decrease in the gross national domestic product.

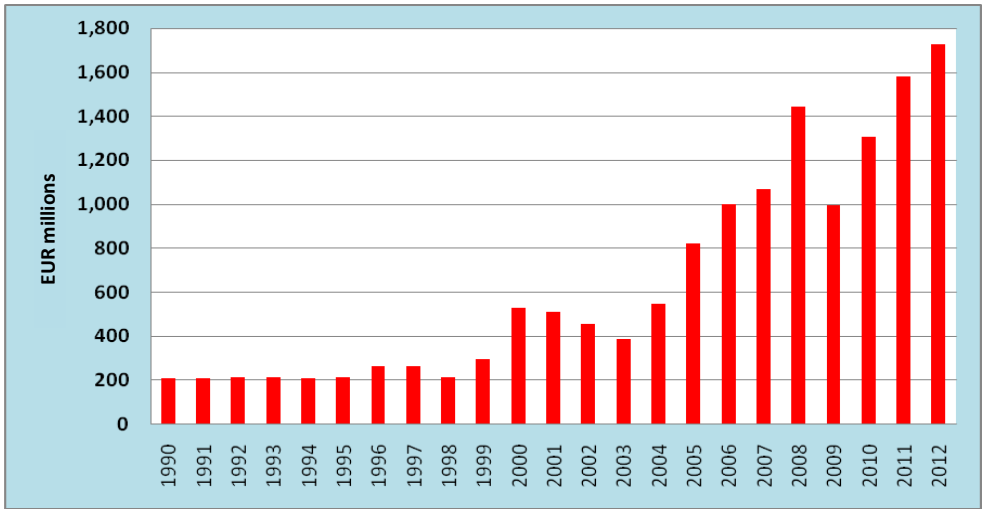
Figure 2: Final Energy Consumption 2010-2012



4. In the period 2010-2012, final energy consumption and electricity consumption dropped by an annual average rate of 4.6% and 4.4%, respectively, whereas in the same period the gross national product dropped by an annual average rate of 0.25%.

5. 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 the national economy's growth rate. This cost reached EUR 1 728 million in 2012, representing 30.1% of the total import costs incurred by the Republic of Cyprus, and 11.7% of its gross national product.

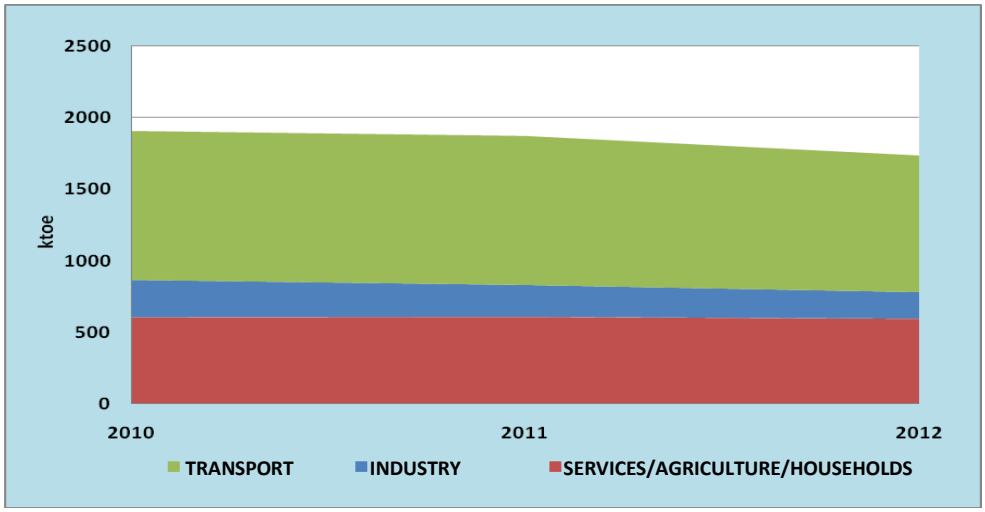
Figure 3: Oil Product Imports in Cyprus 1990-2012



6. As far as its 2012 total final consumption is concerned, 1.26 million TOE of oil products were consumed. Its ratio to total final consumption was 72.4 %. Oil products are mainly used in the transport sector, with an average consumption of 1 million TOE in the period 2010-2012, i.e., 74.5% of total final oil product consumption. Other sectors (services, agriculture, households) consumed an average of 195 000 TOE in the period 2010-2012, i.e., 14.5% of total

consumption, whereas industry consumed 148 000 TOE, i.e., 11% of total oil product consumption.

Figure 4. Final Oil Product Consumption 2010-2012

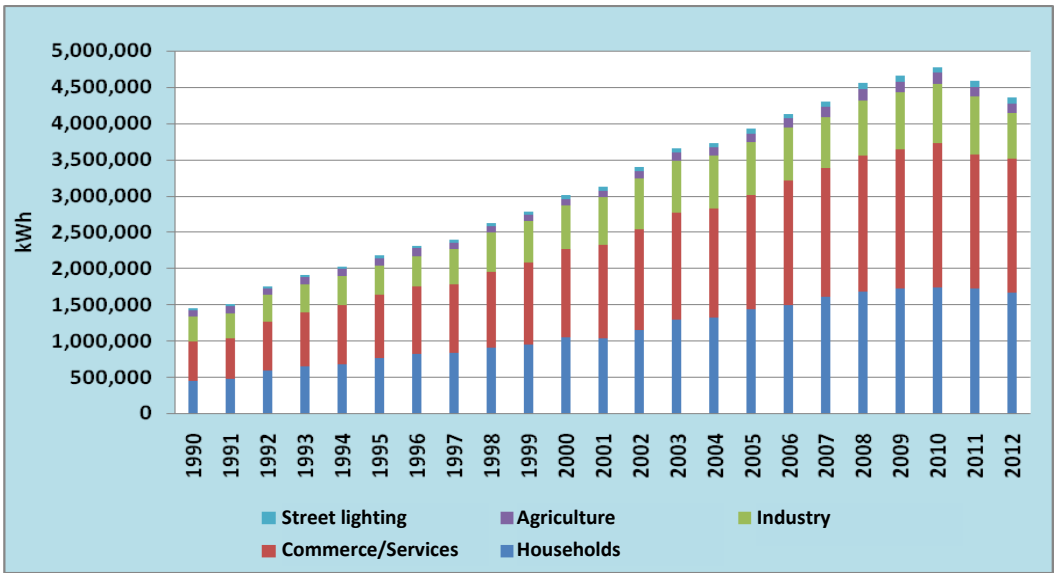


7. Despite the environmental impacts caused by burning solid fuels, these are preferred by domestic, as well as international, cement industries due to their competitive prices. In 2012, 71 340 TOE of solid fuels were used by the domestic cement industry, i.e., 4.1% of total end use energy consumed. The contribution of RES to final consumption of energy in 2012 reached 6%, i.e., 104 055 TOE. Out of this energy, the following amounts were used: 15 995 TOE of thermal energy generated from biomass (22.4% in industry, 50.6% in services/households, and 27% in agriculture), 64 477 TOE generated by hot water producing solar thermal systems (85% was used by households and the remaining 15% was used in the services sector), 22 105 TOE of RES-generated electricity and 1 477 TOE of thermal energy generated by low-enthalpy geothermal systems. Finally, 17 001 TOE of biofuels were consumed in the transport sector, i.e., 1.8% of total energy content of the fuels consumed in road transport.

8. Electricity (generated both by conventional fuels and RES) represented 21.9% (381 147 TOE) of final energy consumption in 2012. In Cyprus, the largest energy consumers are the residential and trade sectors, with an energy consumption of 1.671GWh and 1.837GWh in 2012, respectively. This represents an increase of 58.4% and 51.2% for each sector as compared to 2000. There was also a 6.4 % increase in the energy consumed by the industrial sector in 2012, where energy consumption reached 632 GWh as compared to 594GWh in 2000.

9. In 2010, energy consumption in the residential, trade and industry sectors amounted to 1 737GWh, 1 991GWh and 816GWh, respectively. The significant drop in energy consumption observed in 2012 is largely due to the energy crisis that hit Cyprus after the destruction of its second-largest power station (Vasilikos Power Station).

Figure 5: Consumption of Electricity per Sector 1990-2012



10. The primary energy consumed in Cyprus reached almost 2.77 million TOE in 2010, whereas in 2012 it dropped to 2.51 million TOE. This is an approximately 9.7% reduction. In 2012, oil products had the largest share in the energy mix with approximately 1.18 million TOE (68.3%), followed by electricity with 359 042 TOE (20.7%), solar energy and other RES (thermal energy and electricity) with 104 055 TOE (6%), solid fuels (mainly coal) with 71 340 TOE (4.1%) and, finally, biofuels with 17 001 TOE (1%). This picture has remained almost unchanged over time, with fossil fuels dominating, with a share of almost 93% of final energy consumption.

Figure 6: Energy Mix – Final Energy Consumption 2010

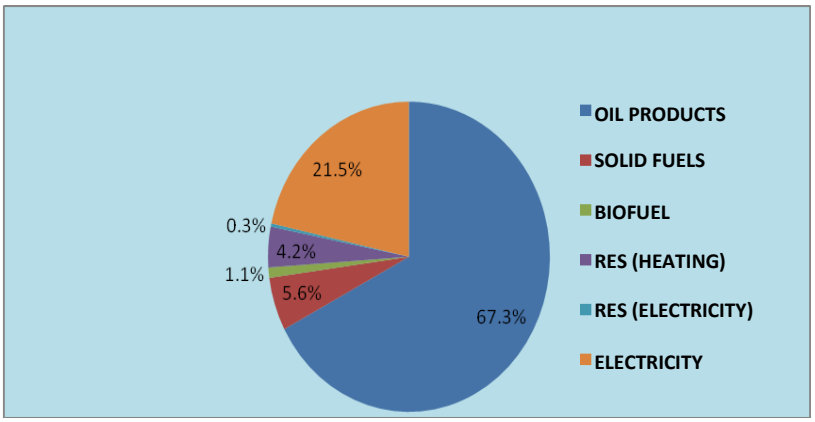


Figure 7: Energy Mix – Final Energy Consumption 2011

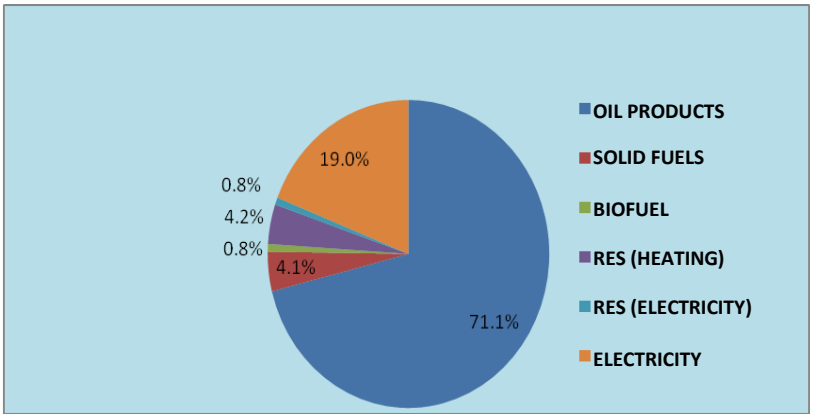
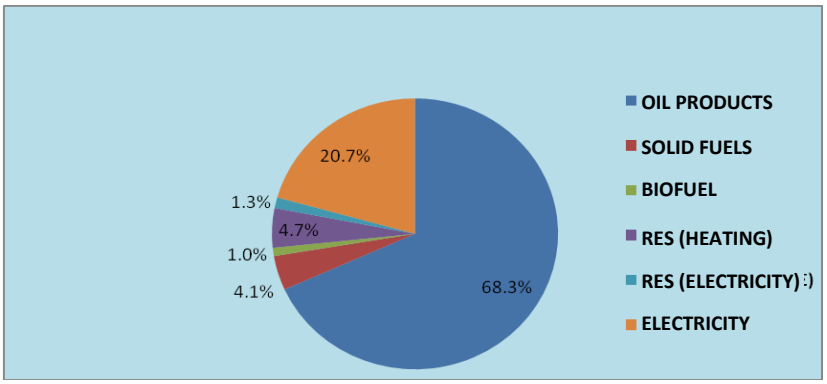


Figure 8: Energy Mix – Final Energy Consumption 2012



11. As far as final energy consumption in the individual sectors is concerned, the share of the transport sector in the demand for energy is still the highest, with 0.96 million TOE (72.5% in road transport and 27.5% in air transport).The respective share of the residential, services and agricultural sectors in the demand was 31.7% in 2010 and 34.2% in 2012. Finally, the share of industry in the final consumption of energy in 2000-2012 dropped from 26.8% to 12.1%.

Figure 9: Final Energy Consumption by Sector 2010

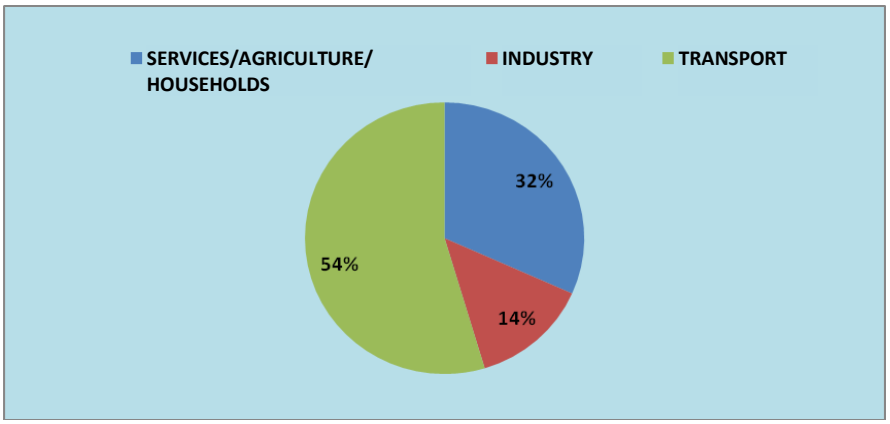


Figure 10: Final Energy Consumption by Sector 2011

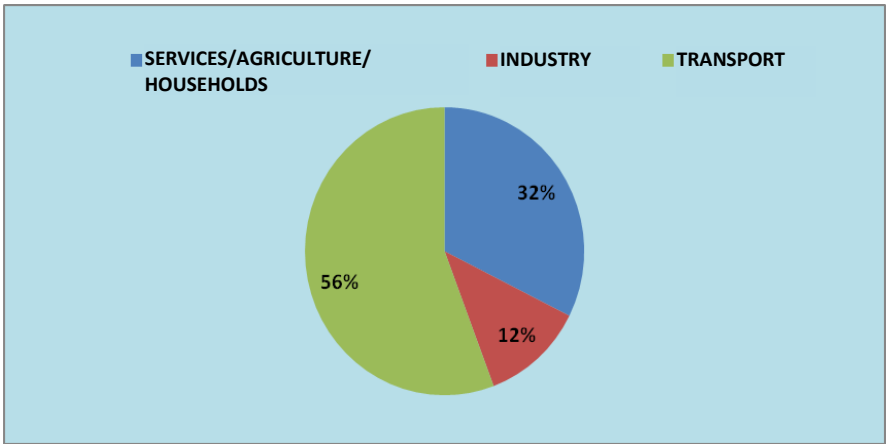
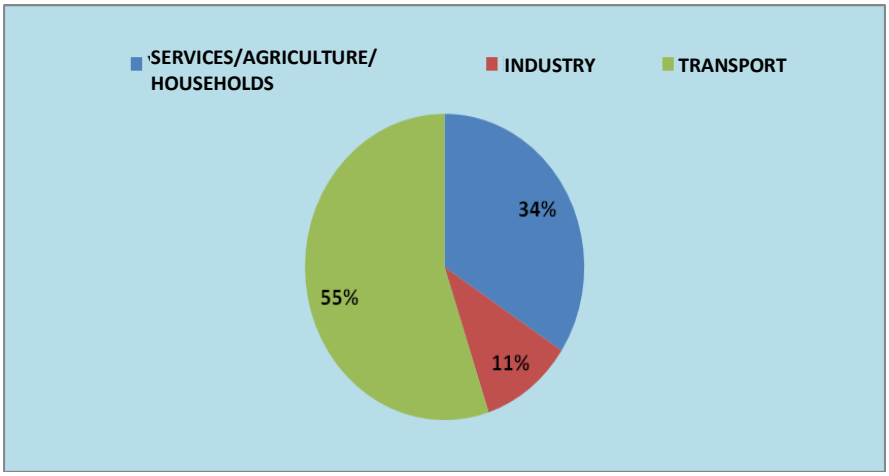


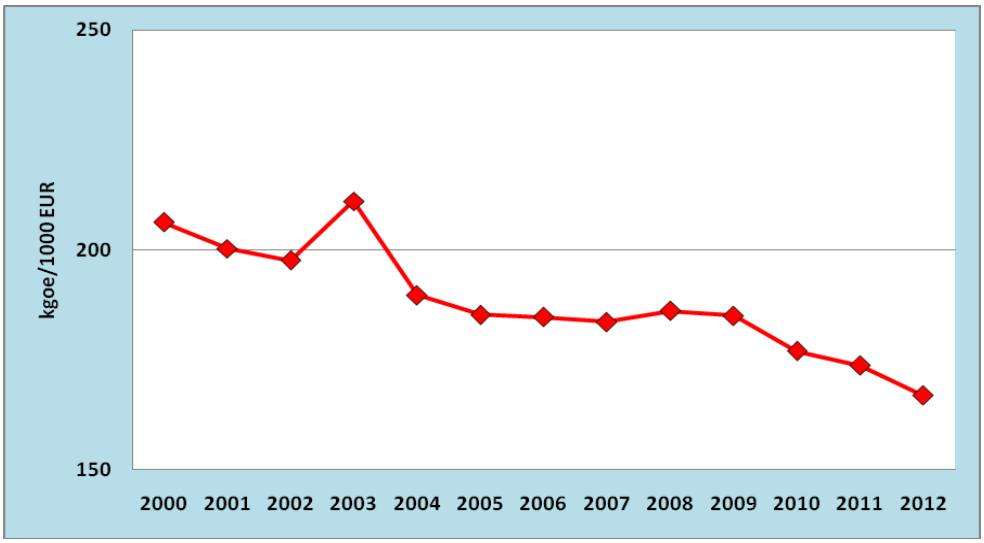
Figure 11: Final Energy Consumption by Sector 2012



12. 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, 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-saving measures and used combined heat and power technology (quarries).

13. The energy intensity of households is lower than the European average level, due to the country's moderate climate; however, it is tending to rise as the population's revenues are increasing, the standard of living improves 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.

Figure 12: Energy intensity of the economy (net domestic energy consumption/GDP) (kg of oil equivalent per EUR 1 000)



14. 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.

15. 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.

16. 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. Implementing the Energy Performance of Buildings Directive and the EED is expected to make a significant contribution towards energy savings in the building sector.

17. Recognising the important role which local/regional authorities can play in reaching the Union's 2020 targets (20% reduction of carbon dioxide emissions, 20% share of renewable energy sources in the energy mix, 20% reduction in the demand for energy through energy efficiency), the European Union has developed a series of initiatives (Covenant of Mayors, Pact of Islands, European Energy Award), with the participation of 15 Municipalities and 6 Communities of Cyprus. In this context, these authorities are preparing Sustainable Energy Action Plans (SEAPs) and are taking actions in order to increase energy efficiency and the use of RES both in the public and private sector within Municipalities, whereas they are also organising Energy Days.

18. Tables 1 and 2 illustrate the municipalities and communities of Cyprus which participate in one of the available European Initiatives. As most Action Plans by local authorities are either in early implementation or, in some cases, have not yet started to be implemented, their contribution towards the achievement of national energy savings targets (2016 indicative target and 2020 indicative target) will be presented in the 4th NEEAP to be submitted in 2017. The SEAPs of the Cypriot local authorities are posted on the website of the Cyprus Energy Agency, as indicated in **Annex I**.

Table 1: List of Cypriot Municipalities participating in EU initiatives and having prepared Sustainable Energy Action Plans

S/N	Municipality	Covenant of Mayors	Pact of Islands	European Energy Award
1	Strovolos	√	√	√
2	Larnaca	√	√	√
3	Lakatamia	√	√	**x**
4	Paralimni	√	√	**x**
5	Aradippou	√	√	**x**
6	Aglantzia	√	√	√
7	Aghios Athanasios	√	√	√
8	Latsia	√	√	√
9	Dali	**x**	√	**x**
10	Geri	**x**	√	**x**
11	Engomi	√	√	√
12	Polis Chrysochous	√	√	√
13	Lefkara	√	√	√
14	Deryneia	√	**x**	**x**
15	Nicosia	√	**x**	**x**

Table 2: List of Cypriot Communities participating in EU initiatives and having prepared Sustainable Energy Action Plans

S/N	Community	Covenant of Mayors	Pact of Islands
1	Ergates	**x**	√
2	Psimolofou	**x**	√
3	Platres	√	**x**
4	Agros	√	**x**
5	Lythrodontas	√	**x**
6	Episkopi Limassol	√	**x**

19. The main Energy Efficiency and RES actions included in the (SEAPs) involve:

- Energy Savings Interventions on public buildings
- RES system installation and/or replacement
- Interventions in street lighting systems

- Energy savings through information campaigns
- Energy savings in transport

20. With regard to the Public and Broader Public Sector, the 1st Green Public Procurement Action Plan (GPP) was implemented in Cyprus in the period 2007-2009. The Environment Department of the Ministry of Agriculture, Natural Resources and Environment coordinates the implementation of the Action Plan. The revised plan, including new categories and criteria, has been in force since 2012. Despite the fact that the contribution of GPP to the energy savings targets set for 2016 with regard to final consumption and 2020 with regard to primary consumption is small, it is expected to gradually rise in the future. The action plan is posted on the website of the Environment Department. The link is provided in **Annex I.**

21. In addition, **Annex L** sets out the energy strategy implemented by the Hellenic Bank Group, as an example of an integrated strategy that enterprises may follow in order to achieve high energy savings in the Tertiary Sector. Note that through this strategy the Hellenic Bank Group managed to achieve almost 30% electricity savings in 2013 as compared to average consumption in the period 2009-2011

2. OVERVIEW OF NATIONAL TARGETS ON ENERGY AND THE ENERGY SAVINGS ACHIEVED

1. According to the 1st NEEAP submitted by Cyprus, average final consumption in the 2001-2005 reporting period was calculated at 1 842 730 TOE, taking into account all the assumptions mentioned therein. The final indicative target adopted for 2016 was 185 000 TOE, or 10%[2] energy savings as compared to consumption in the reference period. The target was expressed in primary energy, i.e., electricity was converted into primary energy consumption using a 3.1. factor, as the average efficiency of the electricity generated in Cyprus during the period in question was approximately 32%.

2. Electricity consumption values under energy efficiency measures implemented up until 2010 were converted into TOE using the factor 1 kWh = 0.086 * 10^{-3} TOE and were then multiplied by the 3.1 factor. A 2.9 factor was used for the period 2011-2013, as there has been an improvement of average efficiency according to the data provided by the Electricity Authority of Cyprus (EAC). The efficiency factor is expected to further improve after the introduction and use of natural gas for power generation after 2016, ranging between 2.22 to 2.03 in 2020. This change has not been taken into account in making calculations concerning final-consumption energy savings and the measures to be affected. However, it was taken into account in drawing up scenarios for the determination of the national indicative target for primary energy savings for 2020.

3. Based on the end use energy savings target set out in the 1st NEEAP, Cyprus appears to have achieved its target for 2016, as energy savings through the measures implemented by 2013 and those expected to be implemented in the period 2014-2016 are estimated to amount to 238 908 TOE in 2016, namely approximately 13% of energy consumption in the reporting period.

4. Concerning the national indicative target for primary energy savings, by implementing additional measures other than those already implemented by 2010, this will amount to 375 000 TOE in 2020, according to a study prepared by the MECIT and following a revision performed in 2014 as set out in Chapter 2.1. The energy savings achieved through the measures implemented in the period 2010-2013, and in force in 2020, amount to 23 272 TOE or 6.2% of the target. Following the implementation of the additional measures in the period 2014-2020, the estimated energy savings for 2020 are expected to amount to **381 372** TOE or approximately 102% of the target.

5. End use and primary energy savings were calculated on the basis of the data provided by the agencies under **Annex K**. Note that both end use and primary energy savings were calculated

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

only with regard to the measures for which information was available. Other energy efficiency measures were also implemented in Cyprus but there was either no available information in order to perform calculations or they were not included herein because the 2016 target is achieved through the measures included so far. Some of these measures, which contribute to the 2020 target, may be included in the 4th NEEAP in 2017.

2.1. Overview of national energy efficiency targets for 2020

1. The progress of Cyprus with regard to the implementation of the 2020 national indicative primary energy savings target (primary energy savings amounting to 14.5% in 2020 compared to the national reference scenario), was monitored through an assessment performed in January 2014, which demonstrated that in 2012 the annual primary energy savings sub-target was exceeded. In particular, as set out in the 2nd NEEAP, the projected primary energy savings for 2012 were 1.58%. During the assessment it was found that the actual primary energy savings, as compared to the reference scenario, amounted to 12.3%. Gross primary energy consumption in 2012 amounted to 2 507 ktoe, whereas according to the national energy efficiency scenario it would have been 2 835 ktoe.

2. The reduction in energy consumption in 2012 is mainly due to the reduction of electricity consumption (it dropped by 116 ktoe more than expected), the drop in the use of fuels for power generation purposes (it dropped by 201 ktoe more than expected), as well as the drop in the use of fuels which are not intended for power generation (it dropped by 103 ktoe more than expected)

3. It should be generally noted that in the years 2010, 2011 and 2012 the drop in primary energy consumption was sharper than expected under the national energy efficiency scenario (reduction of 1.8%, 4.3% and 12.34% instead of 0.2%, 0.9% and 1.58%, respectively). Furthermore, the energy intensity index, namely the ratio of primary energy consumption to the GDP, was examined as it reflects the overall annual energy efficiency of the national economy. For the period 2008-2012, the index seems to have a downward trend, thus demonstrating the efficiency of the measures taken and, therefore, the improvement of the energy efficiency of Cyprus' economy. Please refer to table 3 below.

Table 3: Energy intensity index

National indicators	Units	2005	2008	2009	2010	2011	2012
GDP eurostat	Million euro, chain-linked volumes, reference year 2005	13 598.2	15 414.6	15 128.7	15 326.7	15 394.2	15 022.8
Gross inland consumption of primary energy, eurostat data	1000toe	2 518	2 869.0	2 799.0	2 711.0	2 672.0	2 506.9
Gross inland consumption of primary energy, eurostat data	kgoe	2 518 000	2 869 000	2 799 000	2 711 000	2 672 000	2 506 871
Energy intensity, eurostat data	kgoe/million euro	**185.2**	**186.1**	**185.0**	**176.9**	**173.6**	**166.9**
							→

4. In April 2013, Cyprus submitted to the European Commission a report on the national indicative primary energy savings target and the progress made towards achieving it. The report was drawn up in compliance with Article 3, Article 24(1) and Annex XIV, Part I, to Directive 2012/27/EU on energy efficiency. According to the report, the national indicative primary energy savings target for 2020 would amount to 14.3% primary energy savings as compared to the national reference scenario (as established in 2011 in the 2nd NEEAP), i.e., savings amounting to 463 000 toe in 2020.

5. In the same report, Cyprus mentioned that the data included in the report and, in particular, those used to calculate the national indicative energy savings target for 2020, were notified to the European Commission with all due caution, as the national indicative primary energy savings target is expected to be revised in April 2014, under the 3rd NEEAP. This was due to the uncertain economic figures of Cyprus in April 2013 (one month from the downsizing and restructuring of the country's banking sector, in order to bring public debt to viable levels3). Therefore, it was impossible to make projections on future trends with regard to the economic and energy data of Cyprus for the year 2020 at the time. Such data include, inter alia, projections on GDP growth, changes with regard to the penetration of natural gas into the market, changes regarding electricity, motor and heating fuel use, the penetration of RES, etc.

6. In March 2014, Cyprus revised its national energy forecasts for the period 2014-2020 (**Annex H**), taking into account its new energy and economic data. For the purposes of this review, a study was conducted in cooperation with Dr. Theodoros Zachariadis, Assistant Professor at the Cyprus University of Technology. In this context, there was a revision of both the national reference scenario and the national energy efficiency scenario. Under the new model, future annual energy consumption and energy prices are calculated for each sector of significant economic activity in Cyprus (agriculture, industry, households, services, transport) as a function of future macroeconomic variables.

7. At the same time, the model is used to calculate the fuel share of each sector, taking into account the cost of the technologies used (investments, operation, maintenance and fuel cost), the penetration potential of different technologies and technical restrictions for their use, whereas it permits calculations on future trends with regard to final consumption per sector and per fuel. The model is described in **Annex H**, where detailed tables on the data used and on the calculation results are also provided. As shown in **Annex H**, the indexes used under the new model (e.g., the GDP and the private consumption index) are in line with the macroeconomic projections of the European Commission as published in February 2014. Regarding the evolution of crude oil prices (which also affect the energy perspectives of Cyprus), the model uses the latest oil price projections published by the International

[3] Cyprus' economic and financial adjustment programme was agreed upon between the national authorities and the Troika (European Commission, European Central Bank and International Monetary Fund), leading to the signature of a Memorandum of Understanding on 2 April 2013. The adjustment programme resulted in an intense downsizing of Cyprus' economy in the period 2013-2014 - mainly due to the significant reduction of private and public consumption, as well as of investments

Energy Agency (IEA) in November 2013. The projections on the future use of fuels for power generation were provided by the Electricity Authority of Cyprus.

8. Under the new reference scenario, no further measures (both with regard to primary and final consumption) will be adopted after 2010 (both at the national and at the EU level), in addition to those implemented and/or adopted by law up to 2010. Therefore, this scenario continues the application of the Guidelines adopted at the national level up to 2010, estimates savings from energy-saving grant schemes implemented up to 2010, as well as from other energy-saving measures implemented up to 2010. It must be noted that this scenario is not the same as the 'reference scenario' used in the 2nd NEEAP, as it includes the latest macroeconomic data and price developments. In addition, this scenario does not take into account the use of natural gas in power generation up to 2020, whereas it assumes that the fuels already used in the sector (fuel oil) will continue to be used.

9. The energy efficiency scenario includes projections on all energy sectors through the adoption of additional measures to the ones implemented up to 2010. This means that it provides for the adoption of energy-saving grant schemes for the next ten years, the broader development and use of public transport and the transposition and implementation, at the national level, of the recent EU Directives on energy saving (such as the Energy Efficiency Directive, the Energy Performance of Buildings Directive, etc.). 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 2016 onwards, in accordance with recent forecasts and estimates.

Table 4 : Reference scenario without NG in 2016

Reference scenario without NG in 2016	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Primary energy input for power generation	1 194	1 146	1 097	1 011	940	936	950	989	1 041	1 091	1 132
Fuel inputs for power generation	1 174	1 125	1 075	980	901	890	897	926	967	1 004	1 030
Renewables input for power generation	20	21	22	31	39	46	53	63	74	87	101
Final non-electricity consumption	1 494	1 498	1 397	1 274	1 177	1 164	1 181	1 234	1 310	1 382	1 444
Industry	176	140	124	108	99	98	100	105	112	119	125
Services	50	74	77	72	69	71	72	76	82	89	95
Households	172	183	176	164	156	152	154	162	170	179	188
Road Transport	785	766	714	653	598	592	601	625	659	692	721
Air Transport	285	311	278	250	230	226	230	243	264	280	291
Agriculture	26	25	29	27	25	24	23	23	23	24	24
Final electricity consumption	415	397	392	362	346	352	364	387	416	444	471
National energy consumption	2 688	2 643	2 494	2 284	2 118	2 100	2 131	2 223	2 351	2 473	2 575

Table 5: Reference scenario with NG in 2016

Energy efficiency scenario with NG in 2016	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Primary energy input for power generation	1 194	1 146	1 097	1 011	913	891	772	766	800	823	848
Fuel inputs for power generation	1 174	1 125	1 075	980	874	845	719	703	726	736	747
Renewables input for power generation	20	21	22	31	39	46	53	63	74	87	101
Final non-electricity consumption	1 494	1 498	1 397	1 274	1 169	1 149	1 159	1 202	1 261	1 311	1 352
Industry	176	140	124	108	99	98	100	105	112	118	123
Services	50	74	77	72	68	68	69	72	75	78	80
Households	172	183	176	164	153	149	151	155	158	161	164
Road Transport	785	766	714	653	595	585	589	608	636	660	680
Air Transport	285	311	278	250	228	224	227	239	257	271	281
Agriculture	26	25	29	27	25	24	23	23	23	24	24
Final electricity consumption	415	397	392	362	337	336	345	364	388	408	430
National energy consumption	2 688	2 643	2 494	2 284	2 082	2 040	1 931	1 968	2 061	2 134	2 201

Table 6: 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											91
Industry					0	0	0	0	0	1	2
Services					2	2	3	4	7	11	15
Households					3	3	4	7	12	18	24
Road Transport					3	7	12	17	23	33	41
Air Transport					1	2	3	4	7	9	9
Total Transport					4	10	15	22	30	42	50
Agriculture					0	0	0	0	0	0	0
Savings in final electricity consumption					9	16	19	23	27	36	41
Savings in primary electricity production because of savings in final electricity					27	45	46	53	61	81	91
Savings in primary electricity due to introduction of natural gas					0	0	132	171	179	187	192
Total savings in primary electricity					27	45	178	223	240	268	283
Savings in national energy consumption					**36**	**61**	**200**	**255**	**290**	**339**	**375**
					1.7%	**2.9%**	**9.4%**	**11.5%**	**12.3%**	**13.7%**	**14.5%**

10. As is clear from the above table, Cyprus may achieve a reduction of 14.5% in primary energy consumption in 2020, as compared to the national reference scenario. This percentage is approximately equal to the one set out in the 2nd NEEAP (14.3%). The primary energy consumption forecast for 2020 under the new reference scenario amounts to 2 575 ktoe, i.e., it is 20% lower than the primary energy consumption forecast for 2020 under the

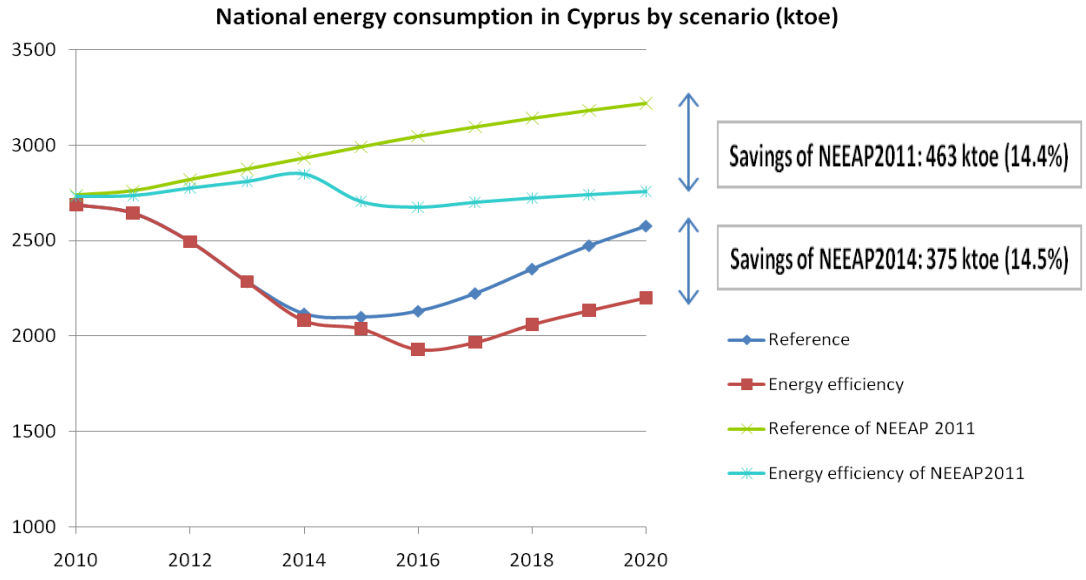
reference scenario of the 2nd NEEAP, which amounted to 3 219 ktoe. Therefore, this 20% reduction also applies to the energy efficiency scenario where the new primary energy consumption forecast amounts to 2 201ktoe (namely, 20% lower than the energy efficiency scenario of the 2nd NEEAP, which amounted to 2 756 ktoe). Please refer to the following table:

Table 7: Primary energy consumption projections for 2020

	Primary energy consumption projections for 2020 (national energy efficiency scenario), ktoe	Final energy consumption projections for 2020 (national energy efficiency scenario), ktoe
Results of the energy model 2011	2 756	2 205
Results of the energy model 2014	2 201	1 782

11. As shown in Figure 13, the projected national energy consumption is significantly lower as compared to the forecasts of the 2nd NEEAP. There is nothing surprising in that as, according to the 2012 energy balance, overall energy demand dropped as a consequence of lower incomes and the reduction of economic activities. Therefore, the energy savings which can be achieved through energy efficiency measures will be inevitably lower. The economic recession is further exacerbated by the reduction of capital-intensive investments and the lack of sufficient public resources, leading to delays in the implementation of new energy-saving investments. However, in view of the energy-saving obligations established by EU and national legislation and in the context of the efforts to use the 2014-2020 European Structural and Investment Funds to carry out energy-saving investments, the economic crisis is not expected to affect significantly Cyprus' progress towards a more energy-efficient economy.

Figure 13: Projected national energy consumption for 2020.



12. In the light of the above, the 2020 national indicative primary energy savings target [which is equal to the difference between primary energy consumption in 2020 under the revised

energy efficiency scenario (2 201 ktoe) and primary energy consumption in 2020 under the revised reference scenario (2 575 ktoe)] amounts to 14.5% and involves savings of 375 ktoe in primary energy consumption for the year 2020 (instead of 463 ktoe, as set out in the 2nd NEEAP). The target involves savings of 182 ktoe from end use energy-saving measures and 192 ktoe from primary energy consumption measures (related mainly to improving energy efficiency in power generation through the use of natural gas). Note that the national annual indicative sub-targets for the period 2014-2020 have been revised accordingly.

13. The national indicative 14.5% energy savings target, i.e., savings amounting to 375 ktoe in 2020, will be met by adopting end use measures for energy savings of 182 ktoe and primary energy measures for energy savings of 192 ktoe. These measures will be adopted in the period 2014-2020 in order to meet the target and are being presented in paragraph 2.3 below.

14. The following table includes projections on important energy indicators for the year 2020, where applicable.

Table 8: Estimates on national energy production and consumption in the year 2020

Energy consumption estimates for 2020	***ktoe units***
Total primary energy consumption in 2020	2 205
Electricity transformation input (power generation in thermal power stations)	*747*
Power generation output (power generation in thermal power stations)	*367*
CHP transformation input	*-*[4]
CHP transformation output - thermal	
CHP transformation output - electricity	
Losses from energy distribution (all fuels)	*39*
Total final energy consumption	1 782
Final energy consumption - Industry	*123*
Final energy consumption - Transport	*961*
Final energy consumption - Households	*164*
Final energy consumption - Services	*80*
Final energy consumption - Agriculture	*24*

[4] These indicators will be calculated through a comprehensive assessment of the applicability of the cogeneration of heat and electricity, which is scheduled to be completed by 31 December 2015.

2.2. Additional energy efficiency targets

1. There have been no significant additional national targets on energy efficiency to date, regarding the overall economy or specific sectors, except for those set out in the introduction to this Chapter.

2. The national targets on nearly zero energy buildings are set out in detail in the National Action Plan for Nearly Zero Energy Buildings (**Annex C**).

2.3. Primary energy savings overview

1. This section provides an overview of energy savings in primary consumption achieved through the energy efficiency improvement measures implemented in the period 2010-2013, which will be in force in the year 2020 and will, therefore, contribute to the 2020 target. In addition, it provides an overview of the measures expected to be implemented in the period 2014-2020 along with the estimated energy savings for the year 2020.

2. According to the assessment of the energy efficiency improvement measures adopted in the period 2010-2013, the estimated energy savings in 2012 amount to 107 888 TOE. Furthermore, the contribution of these measures to the 2020 target amounts to 23 272 TOE or 6.2% of the target. The following table illustrates the measures taken in the period 2010-2013 and the corresponding energy savings for the years 2012 and 2020. Annex G provides an overview of these measures classified by sector (Residential, Tertiary, Industrial and Transport).

Table 9: Energy savings achieved per sector toward the 2020 target.

S/N	DESCRIPTION OF MEASURE[5]	IMPLEMENTATION PERIOD	ENERGY SAVINGS IN 2012 PRIMARY CONSUMPTION	CONTRIBUTION TO THE INDICATIVE TARGET FOR PRIMARY CONSUMPTION IN 2020 (375 000 TOE)[6]	
			TOE	TOE	%
1	**Minimum requirements for the energy performance of new buildings (Law 142/2006)**	**2010-2013**	**-**[7]	**-**	**-**
1.1	RESIDENTIAL SECTOR		-	-	-
1.2	TERTIARY SECTOR		-	-	-
2	**RES PLANS**	**2010-2013**	**916.24**	**1 102**	**0.29%**

[5] A detailed description of measures is provided in Annex D (Implemented Measures).
[6] Note that the energy savings indicated in this column relate to measures implemented by the end of 2013.
[7] No calculations were made as the compulsory heat insulation indicators were modified in 2013 and they must be taken into account for calculations. These calculations will be included in the 4thNEEAP in 2017.

2.1	RESIDENTIAL SECTOR		826.25	1 011	0.27%
2.2	TERTIARY SECTOR - ENTERPRISES		85	85	0.02%
2.3	INDUSTRY SECTOR		5	6	0.00%
3	**ES PLANS**	**2010-2013**	**1 967.06**	**2 555**	**0.68%**
3.1	RESIDENTIAL SECTOR		571.80	1 137	0.30%
3.2	TERTIARY SECTOR PUBLIC SECTOR		0.00	0	0.00%
3.3	TERTIARY SECTOR - ENTERPRISES		745.54	768	0.20%
3.4	INDUSTRY SECTOR		649.72	650	0.17%
4	**GRANT SCHEME FOR INSTALLING PV SYSTEMS USING THE NET – METERING METHOD (UNDER GRANT)**	**2013**	**0.0**	**48**	**0.01%**
5	**INSTALLING PV SYSTEMS USING THE NET – METERING METHOD (NO GRANT)**	**2013**	**0.0**	**1 624**	**0.43%**
6	**GREEN PUBLIC PROCUREMENT**	**2010-2013**	**598.1**	**178**	**0.05%**
7	**VEHICLE RETIREMENT SCHEME**	**2010**	**167**	**167**	**0.04%**
8	**GRANTS SCHEME FOR VEHICLES**	**2010-2013**	**0.0**	**0**	**0.00%**
9	**FLUORESCENT LAMPS CAMPAIGN**	**2010-2012**	**15 001.88**	**10 491**	**2.80%**
10	**DEVICE REPLACEMENT (ECODESIGN Directive)**	**2010-2013**	**5 535**	**7 207**	**1.92%**
11	**TRANSPORT ACTION PLAN**	**2010-2013**	**83 703**[8]	**-**	**-**
TOTAL			**107 888.3**	**23 372**	**6.2%**

3. Note that a detailed description of the measures and the relevant tables with detailed information/data are attached hereto as **Annex D**. Note that the methodologies used with regard to end use are the same as in the 2nd NEEAP and are attached hereto as **Annex E**. Furthermore, note that data on savings for the target under Article 7 of the EED are not included herein, as this obligation starts as of 2014.

[8] Note that the energy savings calculated for the year 2012 in the transport sector amount to 83 870 TOE. The quantities under points 7 and 8 of the above table have been subtracted from the overall quantity in order avoid double counting. In addition, energy savings for 2020 were not included in this table as we are not aware of which part of the energy savings made in 2012 will remain in 2020, given that we used a top-down methodology to calculate savings.

4. The following table provides an overview of the measures expected to be adopted in the period 2014-2020 for achieving the 2020 target.

Table 10: Estimated energy savings from the implementation of additional measures toward the 2020 target.

s/n	Measures[9] scheduled to be adopted for achieving the 2020 target	Energy savings (TOE)	Contribution rate towards target achievement (%) 375 000 TOE
1	Energy savings from the use of natural gas in power generation from 2016 onwards and the implementation of energy-saving measures in the distribution system	192 000	51.20%
2	Energy savings from the implementation of measures adopted in compliance with the EED (especially Articles 5,6,7,8,9).	60 000	16.00%
3	Implementation of the new provisions of the Energy Performance of Buildings Directive.	30 000	8.00%
4	Energy savings from additional measures for energy savings in the transport sector.	41 000	10.93%
5	Energy savings from measures in air transport.	9 000	2.40%
6	Energy savings through the implementation of the Green Public Procurement Action Plan.	1 000	0.27%
7	Energy savings from the implementation of the Action Plans of Municipalities and Communities.	12 000	3.20%
8	Implementation of new EU legislation on the energy labelling of devices.	13 000	2.67%
9	Contribution of the measures implemented in the period 2010-2013 and will continue to be in force in 2020	**23 372**	**6.2%**
TOTAL		**381 372**	**101.7%**

5. Therefore, it is estimated that in 2020 energy savings in primary consumption, through the measures implemented in the period 2010-2013 and those expected to be implemented in the period 2014-2020, will amount to 381 372 TOE or 101.7% of the target.

2.4. Final energy savings overview

1. This section provides an overview of energy savings in primary consumption achieved through the energy efficiency improvement measures implemented in the period 2004-2013, which will be in force in the year 2016 and will, therefore, contribute to the 2016 target. In addition, it provides an overview of the measures expected to be implemented in the period 2014-2016 along with the estimated energy savings for the year 2016.

[9] A detailed description of measure 7 is provided in Annex D (Measures scheduled to be implemented in the future). The remaining measures are either measures already implemented and included in Annex D or measures described in the main text of the NEEAP.

2. As already mentioned, for the purposes of Directive 2006/32/EC, the end use target set for Cyprus is expressed in primary energy. According to the assessment of the energy efficiency improvement measures adopted in the period 2004-2013, it seems that the 185 000 TOE end use target for the year 2016 is being met, as the estimated energy savings resulting from the measures implemented up to 2013 alone amounts to 163 158 TOE or 88.2% of the target.

3. The following table illustrates the measures taken in the period 2004-2013 and the corresponding energy savings for the years 2012 and 2016. Annex G **provides an overview of these measures classified by sector (Residential, Tertiary, Industrial and Transport).**

Table 11: Energy savings achieved per sector toward the 2016 end use target.

S/N	DESCRIPTION OF MEASURE	IMPLEMENTATION PERIOD	ENERGY SAVINGS IN 2012 FROM END USE MEASURES	CONTRIBUTION TO THE FINAL END USE INDICATIVE TARGET (2016, 185 000 TOE)[10]	
			TOE	TOE	%
1	**Minimum requirements for the energy performance of new buildings (Law 142/2006)**	**2008-2013**	**85 760.4**	**95 991.6**	**51.89%**
1.1	RESIDENTIAL SECTOR		78 050	87 101	47.08%
1.2	TERTIARY SECTOR		7 710	8 891	4.81%
2	**RES PLANS**	**2004-2013**	**14 650.40**	**14 836.04**	**8.02%**
2.1	RESIDENTIAL SECTOR		13 443.06	13 628	7.37%
2.2	TERTIARY SECTOR - ENTERPRISES		1 177	1 177	0.64%
2.3	INDUSTRY SECTOR		30	31	0.02%
3	**ES PLANS**	**2004-2013**	**23 888.50**	**24 215.05**	**13.09%**
3.1	RESIDENTIAL SECTOR		10 523.83	11 089	5.99%
3.2	TERTIARY SECTOR PUBLIC SECTOR		110.20	110	0.06%
3.3	TERTIARY SECTOR -ENTERPRISES		10 331.57	10 293	5.56%
3.4	INDUSTRY SECTOR		2 922.91	2 722	1.47%
4	**GRANT SCHEME FOR INSTALLING**	**2013**	**0.0**	**47.6**	**0.03%**

[10] Note that the energy savings indicated in this column relate to measures implemented by the end of 2013.

	PV SYSTEMS USING THE NET – METERING METHOD (UNDER GRANT)				
5	**INSTALLING PV SYSTEMS USING THE NET – METERING METHOD (NO GRANT)**	**2013**	**0.0**	**1 624.5**	**0.88%**
6	**GREEN PUBLIC PROCUREMENT**	**2007-2013**	**667.1**	**337.9**	**0.18%**
7	**VEHICLE RETIREMENT SCHEME**	**2008-2010**	**2 822.8**	**2 822.8**	**1.53%**
8	**GRANTS SCHEME FOR VEHICLES**	**2004-2009**	**1 073.5**	**1 073.5**	**0.58%**
9	**FLUORESCENT LAMPS CAMPAIGN**	**2007-2012**	**24 358.78**	**15 002**	**8.11%**
10	**DEVICE REPLACEMENT (ECODESIGN Directive)**	**2010-2013**	**5 535**	**7 207**	**3.90%**
11	**TRANSPORT ACTION PLAN**	**2007-2013**	**63 311.7**[11]	**-**	**-**
TOTAL			**222 068.2**	**163 158**	**88.2%**

4. The greatest contribution towards this target is achieved by the EPBD as energy savings from the measure's implementation up to 2013 amount to 95 992 TOE or 51.89% of the target. Energy Saving and Renewable Energy Sources Grant Schemes come next with 39 613 TOE (14 650 TOE from RES Schemes, 23 888 TOE from ES Schemes and 1 074 TOE from ES Schemes for vehicles), followed by the distribution of free fluorescent lamps campaign with 15 002 TOE, etc.

5. The energy savings expected to be achieved through the measures to be implemented in the period 2014-2016 are estimated to amount to 75 750 TOE or 41% of the target, as shown in the following table. Therefore, taking into account the energy savings achieved up to 2013

[11] Note that the energy savings calculated for the year 2012 in the transport sector amount to 67 208 TOE. The quantities under points 7 and 8 of the above table have been subtracted from the overall quantity in order avoid double counting. In addition, energy savings for 2016 were not included in this table as we are not aware of which part of the energy savings made in 2012 will remain in 2016.

and those expected to be achieved in the period 2014-2016, the overall end use energy savings for 2016 are expected to amount to 238 908 TOE or 129% of the target.

6.

Table 12: Estimated energy savings from the implementation of additional measures for the 2016 end use target.

S/N	Additional measures[12] to be implemented up to 2016.	Energy savings (TOE)	Contribution towards target achievement (%) 185 000 TOE
1	Energy savings from the implementation of measures adopted in compliance with the EED (especially Articles 5,6,7,8,9).	27 500	14.86%
2	Minimum requirements for the energy performance of new buildings (Law 142/2006)	28 550	15.43%
3	Energy savings from additional measures for energy savings in the transport sector.	8 000	4.32%
4	Energy savings from measures in air transport.	2 000	1.08%
5	Energy savings through the implementation of the Green Public Procurement Action Plan.	700	0.38%
6	Energy savings from the implementation of the Action Plans of Municipalities and Communities.	4 000	2.16%
7	Implementation of new EU legislation on the energy labelling of devices.	5 000	2.70%
TOTAL		**75 750**	**41%**

7. Note that a detailed description of the measures and the relevant tables with detailed information/data are attached hereto as **Annex D**. Note that the methodologies used are the same as in the 2nd NEEAP and are attached hereto as **Annex E**.

[12] A detailed description of some measures that are to be implemented is provided in Annex D (Measures scheduled to be implemented in the future). The remaining measures are either measures already implemented and included in Annex D or measures described in the main text of the NEEAP.

3. POLICY MEASURES IN IMPLEMENTATION OF THE ENERGY EFFICIENCY DIRECTIVE (EED)

3.1. Horizontal measures

3.1.1. Energy efficiency obligation schemes and alternative policy measures (Article 7)

1. In application of the provisions of Article 7(9) of the Directive, as an alternative to the adoption of an energy efficiency obligation scheme, Cyprus has prepared a National Energy Efficiency Programme (NEEP) for the purpose of achieving the cumulative end use energy savings target referred to in Article 7(1). The NEEP was notified to the European Commission in December 2013.

2. Note that some of the measures selected for inclusion in the NEEP relate to proposals submitted for project co-financing by EU Structural and Investment Funds. Grant Schemes will be put in place for the implementation of these measures. In particular, these measures are:

   - An annual renovation of 3% of the surface of air conditioned and heated public buildings owned by the State and used by the central government.
   - Conducting energy inspections in industries and implementing investments in energy savings.
   - Energy upgrading of existing residences so that they may comply with the minimum energy efficiency requirements.
   - Installation of roof thermal insulation on dwellings.
   - Energy upgrading of existing buildings so that they may comply with the minimum energy efficiency requirements for buildings.
   - Infrastructure for supporting and promoting electric vehicles in Cyprus.
   - Installing an integrated AMI system with 500 000 smart metres.

3. At the time of preparation of the 3rd NEEAP (April 2014), it was decided, acting on a recommendation from the European Commission, that the NEEP should be revised with regard both to the cumulative end use energy savings target for the period 2014-2020 and the measures to achieve the target. Therefore, it was not found appropriate to provide further information until the revision is completed. Note that the 1st edition of the NEEP is posted on the relevant website of the European Union at the address provided in **Annex I**. The revised NEEP will be submitted by Cyprus to the European Commission before 5 June 2014, in line with relevant EU legislation.

3.1.2. *Energy audits and energy management systems (Article 8)*

1. For the purpose of harmonisation with the ESD (Directive 2006/32/EC), Cyprus has put into force on 25 May 2012, the Energy Efficiency in End Use and Energy Services (Energy Auditors) Regulations of 2012 (Regulatory Administrative Act 184 /2012). These Regulations cover, inter alia, questions concerning the establishment of an energy auditors registry in Cyprus, the registration procedure of natural and legal persons therein, the education of candidate energy auditors, the available categories of energy auditors, the qualifications that someone must have in order to be included in the registry, the test and quality assessment procedure of energy auditors by the Competent Authority (Energy Department), the registration procedure in the Community Energy Auditors Registry, the fact that energy auditors act independently, the duties and obligations of energy auditors, etc.

2. In addition, the 2012 Decree on the Methodology and Other Requirements for Conducting Energy Audits (RAA 171/2012) entered into force on 7 May 2012. The Decree includes a Technical Guide of Energy Audits which must be implemented by energy auditors during audits. The Technical Guide covers a broad range of subjects including, **inter alia**, energy audit types (cursory energy audit, extended energy audit and detailed energy study) that may be carried out in each case, the methodologies used to collect and record data, the methodology for measuring energy use, the calculation of reference consumption, ex ante estimation of consumption and energy savings, data verification, ex post estimation of energy savings, energy allocation per use, the methodology for assessing parameters, the extended audit report, the available portable audit instruments, standards and legislation to be implemented, etc. Both the regulations and the decree are posted on the MECIT website at the address provided in Annex I.

3. Note that the first training programmes for candidate energy auditors were carried out in 2013 by training institutions approved by the Competent Authority, whereas the first energy auditors have already been included in the registry. This registry is posted on the MECIT website and is accessible to final consumers. **Annex I** provides a link to the webpage where the registry is posted.

4. Many of the provisions of Article 8 EED had been included either in Regulations 184/2012 or in the Decree 171/2012, whereas the remaining provisions of the Article have been included, for the purpose of partial harmonisation with the EED, in the 2014 Law on Energy Efficiency in End Use and Energy Services (Amending Law), which is expected to enter into force by June 2014. The Energy Department of the MECIT is the Competent Authority for the implementation and monitoring of the above pieces of legislation. Note that **Annex I**

contains cross reference tables between the National Legislation of Cyprus and the EED, where the transposition of all Articles of the EED is illustrated.

5. In light of the above, no optional or mandatory energy audits have been conducted so far by auditors included in the Registry of Energy Auditors of Cyprus, according to the relevant legislation. The energy audits carried out prior to the adoption of the above legislation were mainly related to ensuring compliance with the provisions of the Grant Schemes which were in force in the previous years and involved the submission of a study by an engineer proving that the implementation of the proposed measures would lead to at least 10% energy savings. Regarding the obligation of enterprises that are **not** SMEs to be subjected to mandatory energy audits or to be exempted from this obligation as far as they are implementing an energy or environmental management system which involves energy audits, the relevant provisions have been included in the aforementioned 2014 Amending Law. Furthermore, the Amending Law also stipulates that the Competent Authority may keep a registry of enterprises that are **not** SMEs for the purpose of enforcing the obligation for an energy audit.

6. This registry is expected to be completed by the end of 2014. The registry will include all enterprises that are **not** SMEs independently of whether the audit is carried out by an independent or an in-house certified energy auditor or by an independent/in-house certified energy auditor under voluntary agreements or by an independent or an in-house certified energy auditor in implementation of the energy or environmental management system.

7. Regarding the minimum criteria for energy audits under Article 8(1) and Annex VI to the EED, it should be noted that some of the minimum criteria under Annex VI have been included either in the Regulations RAA 184/2012 or in the Technical Guide of Decree 171/2012, or in the 2014 Amending Law mentioned above. In addition, note that no feasibility study on the connection to a district heating or cooling grid is required under energy audits.

8. The supervision and control of energy auditors as well as the quality assessment of the energy audits conducted are the responsibility of the Competent Authority in accordance with Regulations RAA 184/2012. For this purpose, energy auditors must submit to the competent authority, when so requested, any data, measurements, reports and any other items which may be necessary for making the assessment. Audits are being performed on a sample basis, ex officio or following a complaint. In addition, according to RAA 184/2012, energy auditors must prepare, inter alia, a report of results and must keep a file of reports and measurements from the energy audits carried out in the previous ten years. Furthermore, they must submit to the Competent Authority, within 30 days from the end of each calendar year, an annual list of the energy audits carried out within the previous ten years. Therefore, the Competent Authority is able to verify at any moment whether the

minimum criteria set out in the national legislation and, by extension, in Annex VI to the EED are being included in the energy audits.

9. In light of the above, in enterprises which are exempt from energy audits and which apply an energy or environmental control system that provides for performing energy audits, such audits must be conducted by energy auditors entered in the registry, who must comply with the minimum requirements laid down in the relevant legislation.

10. Information for final consumers with regard to the registry of licenced energy auditors, the benefits of conducting energy audits and relevant legislation is posted on the website of the Energy Department. In addition, information on these matters is provided through the information material printed and distributed by the Energy Department during the information days organised by it, as well as during its participation in Expositions and other events.

11. The content of available training programmes is approved and supervised by the Energy Department. The RAA 184/2012 sets out the minimum requirements to be fulfilled by educational institutions with regard to the content and the duration of training and traineeships for each category of candidate energy auditors (there are 3 categories: for buildings, industry and the transport sector), as well as the qualifications of instructors. In addition, it establishes the approval conditions of exam agencies and the conditions for passing the tests. Up to now, approximately 70 persons in the buildings category and 40 persons in the industry category have been trained. Training and tests are conducted by 2 organisations, which have been approved by the Energy Department. The training and licensing of energy auditors in the transport sector is expected to start after the adoption of the Decree on the Methodology and Other Requirements for Conducting Energy Audits (Transport), which is currently under Legislative Drafting. Following an inspection of training and examination programmes, the Energy Department makes recommendations to the organisers thereof on the ways to improve the programmes offered. Note that both the licencing of energy auditors and the training programmes are being monitored by the Energy Auditors' Committee which has been established in order to assist the Energy Department with regard to monitoring matters related to energy auditors.

12. Up to now, Cyprus has not cooperated with other Member States for the recognition of qualifications or equivalent schemes. Matters related to the recognition of qualifications or equivalent schemes for energy auditors licensed in other Member States are regulated by RAA 184/2012.

13. New grant schemes for promoting energy-saving investments in buildings and industries have been planned and are expected to be implemented in 2014, in order to encourage SMEs to be subjected to energy audits and to implement the recommendations thereof. The Scheme includes grants for energy audits and for the implementation of the

recommendations included in the energy audit report, inter alia. In addition, the Energy Department has informed both the representatives of SMEs and households on the benefits of energy audits during events, expositions and meetings, through information leaflets published and distributed for this purpose, as well as through its website. The Energy Department intends to promote additional actions for this purpose within 2014.

14. The Energy Department participates in events for the exchange of best practices on energy management systems in SMEs. For this purpose, the Cyprus Organisation for Standardisation holds information events in order to inform all enterprises on the benefits arising from the implementation of energy management systems, involving the exchange of good practices. The Energy Department intends to promote additional actions for this purpose within 2014.

3.1.3. Metering and billing (Articles 9-11)

1. The provisions of the 2014 Draft Law on Energy Efficiency in End Use and Energy Services (Amending Law) regulate the following matters:

   - Providing to end users of district heating, cooling and hot water for domestic use individual meters indicating the actual consumption and time of use, unless this is not technically feasible or financially viable. This will occur upon replacement of the existing meter (unless it is not technically feasible or financially viable in relation to the energy savings potential) and upon connection of a new building or a building under major renovation to the grid.

   - Buildings or mixed-use building blocks with central cooling and heating, will be provided with a consumption meter at the distribution point as well as with individual meters (if this is not technically feasible or financially viable alternative solutions must be sought)

   - The allocation of billing costs for individual heating and cooling in building blocks will be free of charge. If this task is outsourced to third parties (that will undertake the metering, allocation and calculation of actual individual consumption), this cost may be transferred to end users, provided that it is reasonable.

     Note that the provisions of the Directive concerning the new arrangements for the metering and billing of electricity and natural gas fall within the competence of the CERA and are not included in the above draft law. All the actions required for harmonisation therewith and implementation thereof will be undertaken by the CERA.

2. By the time the 3rd NEEAP was completed there was no available information by the Cyprus Regulatory Energy Authority on Articles 9, 10 and 11 regarding the metering and billing of electricity and natural gas.

3.1.4. Consumer information and training programmes (Articles 12 and 17)

1. Both the Energy Department and other bodies[13] pay particular attention to the information of citizens on energy issues, in the context of their efforts to raise awareness among citizens and among different professionals. For this purpose, the Energy Department has organised, in cooperation with other bodies:

   i. An annual Pupil Competition, where all public and approved private secondary and technical education schools may participate. The competition includes research projects by pupils and/or experimental/laboratory applications, which are directly related to RES or energy saving. Projects must focus on smart and functional ways to save energy, as well as on ways or technologies which may be used to improve energy efficiency. The best three projects from Secondary Schools and the best three projects from High Schools/Technical Schools are awarded pecuniary prizes in an official ceremony held at the end of each school year.

   ii. Presentations in schools of all levels (preschool, primary and secondary education) on energy savings and renewable energy sources.

   iii. Appointment of Energy Savings Officers. The aim is to appoint at least one ES Officer in each building (owned or leased), which is used by the services of the public or broader public sector. ES Officers ensure that energy-saving measures are implemented in the building as much as possible, especially zero-cost measures. In addition, they draw up an annual Report on Energy Consumption and Actions in relation to the building under their responsibility. An event and training meetings of ES Officer groups are organised on an annual basis by the Energy Department, for the training and information of ES Officers.

   iv. Officers of the Energy Institute and of the Energy Department perform inspections in buildings used by services of the public sector (owned or leased), aiming to provide advice on energy saving to staff-members. If necessary, in addition to building inspections, officers may make presentations on energy savings and RES.

   v. Preparing and publishing information leaflets on:

      (a). 'Guide on fuel economy and the reduction of carbon dioxide emissions in passenger vehicles'.
      (b). 'Zero-cost measures for energy savings at the workplace and at home'.
      (c). 'Ecodesign leaflet'.
      (d). 'Technical guide on nearly zero-energy buildings'.
      (e). 'Cogeneration of heat and power'.

[13] Such bodies are, for instance, the Cyprus Energy Agency, the Cyprus Scientific and Technical Chamber, Municipalities and Communities, Professional Associations and the Productivity Centre.

(f). 'Energy efficiency in end use and energy services'.
(g) 'Energy savings guide'.
(h). 'Energy star labelling guide'.
(i). 'Energy auditors - energy audits'.
(j). 'Renewable energy sources in simple words'.
(k). 'Energy applications laboratory (Solar Collector and System Tests)'.
(l). 'Photovoltaic Systems with the offsetting method'.
(m). 'Labelling of tyres with respect to fuel efficiency and other essential parameters'.
(n). 'Twelve rules for pupils'

vi. In addition, the Energy Department has drawn up two textbooks on energy addressed to preschool and primary school pupils, as well as to secondary and technical education pupils. These textbooks have been approved by the Ministry of Education and Culture for inclusion in the school curriculum.

vii. Training seminars on energy management and RES are held on an annual basis, in cooperation with the Human Resources Development Authority of Cyprus (HRDA), the Productivity Centre and the Energy Institute. Four (4) seminars were held in 2013 in Nicosia, Limassol, Larnaca and Paphos, with a duration of 60 hours each. The seminars were addressed to unemployed engineers of all specialisations.

viii. Information days were held in Nicosia, Limassol and Paphos addressed mainly to engineers who are members of the Cyprus Scientific and Technical Chamber (ETEK), the Cyprus Employers and Industrialists Federation (OEB), the Cyprus Chamber of Commerce and Industry (KEBE), hotel owners, entrepreneurs, credit institutions, municipalities and communities, contractors and the general public. Information days focused on energy audits, the energy efficiency of buildings, energy labelling, energy-saving and RES technologies used for heating and cooling purposes.

ix. The Energy Department and the Energy Institute participate in the annual State fair organised by the Cyprus State Fairs Authority, as well as in the annual fair titled 'Save Energy' organised by the Cyprus Employers and Industrialists Federation in cooperation with the Energy Department and the Electricity Authority of Cyprus (EAC) sponsored, inter alia, by the Special RES and ES Fund. Printed information material on the different energy-saving and RES technologies is distributed at the fairs. In addition, information is provided to the general public with regard to the provisions of the grant schemes. The most efficient energy-saving investments made by natural or legal persons under the grant scheme of the Special Fund for RES and ES are rewarded at the 'Save Energy' fair.

x. Public awareness on energy saving is also raised through the energy bills of the EAC.

xi. Energy-saving information is provided at the websites of bodies active in the energy sector (e.g., Energy Department, Energy Institute, Cyprus Energy Agency, EAC, CERA, TSO, etc.).

xii. The following activities have been carried out or are expected to be carried out under the Action Plans of Municipalities having signed the Covenant of Mayors and the Pact of Islands (Municipalities of Strovolos, Larnaca, Lakatamia, Paralimni, Aradippou, Aglantzia, Aghios Athanasios, Latsia, Dali, Yeri, Engomi, Polis Chrysochous, Lefkara, Derynia and Nicosia): presentations on RES and ES, inter alia, no-light days, presentations addressed to pupils, advisory services to citizens, distribution of information leaflets, etc. In addition, their websites provide information on energy saving and renewable energy sources.

3.1.5. Qualification, accreditation and certification schemes (Article 16)

1. With regard to qualification, accreditation and certification schemes, harmonisation has been achieved through the RAA 184/2012 on Energy Auditors, whereas Energy Service Providers are covered by Regulations 3, 4, 5, 7, 8 of the 2014 Regulations on Energy Efficiency in End Use and Energy Services (Energy Service Providers) (RAA 210/2014), which were published in the Official Gazette of the Republic of Cyprus on 15 April 2014.

2. In addition, Article 7 of the amending law (amending Article 9 of the basic act) sets out the need to establish certification schemes and/or other equivalent professional qualification schemes for building envelope installers and the method of their notification.

3. Regarding the adequacy of the national level of technical competence, the objectivity and reliability of qualification, accreditation and certification schemes, as well as the way to provide transparency to consumers, reliability and contribution to national energy efficiency objectives when accreditation/certification schemes and training programmes are made available, it should be noted that according to the existing national legislation and/or the legislation under drafting:

   (1) The competent authority shall ensure that the energy end users are notified of how energy auditors and energy service providers are licensed and of the certification scheme and/or other equivalent qualification scheme applicable to building envelope installers.

   (2) The competent authority shall ensure that information relating to the available energy efficiency improvement mechanisms, as well as the financial and legal frameworks, is transparent and made widely public to all interested market operators, such as energy end users, builders, technical system installers, architects, engineers, experts, heating system inspectors, air conditioning system inspectors, energy auditors, as well as building envelope installers.

(3) The competent authority shall encourage provision of information to banks and other financial institutions concerning options for participating in financing programmes for energy efficiency improvement, such as options for participating in public-private partnerships.

(4) The competent authority shall establish appropriate conditions for market operators to provide adequate and targeted information and advice to energy end users on energy efficiency.

(5) The competent authority and the local and regional authorities shall promote information, mobilisation and training initiatives for informing the citizens about the benefits resulting from the adoption of energy efficiency improvement measures.

(6) The competent authority shall ensure that appropriate measures are taken to promote and facilitate an efficient use of energy by small energy end users, including domestic customers. These measures may encompass:

(a) fiscal incentives;

(b) access to finance, grants or subsidies;

(c) provision of information;

(d) exemplary projects;

(e) workplace activities;

(f) communication to the energy end users of changes that are cost-efficient and easy-to-implement relating to the use of energy and information about energy efficiency measures.

4. In addition, with regard to the EPBD, a description of the existing training schemes of professionals in the energy efficiency sector is provided in paragraph 4.3 of **Annex F** (Strategy for encouraging investments in building renovation).

5. The existing qualification, accreditation and certification schemes are summarised in the following table.

Table 13: Availability of qualification, accreditation and certification schemes.

S/N	Description of Existing Recognition Scheme	Qualifications
1	**Entering specialised experts into the register (RAA 164/2009), RAA 39/2014**	**Qualifications of Specialised Experts** **Dwellings:** At least 1 year of proven experience in the buildings sector or on energy issues or on systems in buildings and certification of successful completion of the tests held by the evaluation agency. Be registered with the ETEK (Cyprus Scientific and Technical Chamber) and the relevant Register kept by the competent authority. Architects, Civil Engineers, Mechanical Engineers, Electrical Engineers, Chemical Engineers, Environmental Engineers) **Non-residential buildings:** At least 3 years of proven experience in the buildings sector or on energy issues or on systems in buildings or issuance of at least 90 residence certificates, and certification of successful completion of the tests held by the evaluation agency. Be registered with the ETEK (Cyprus Scientific and Technical Chamber) and the relevant Register kept by the competent authority. Architects, Civil Engineers, Mechanical Engineers, Electrical Engineers)
2	**Inspection of Air Conditioning Systems (RAA 163/2009)**	**Qualifications of Air Conditioning Systems' Inspector:** Mechanical Engineer registered with the ETEK (Cyprus Scientific and Technical Chamber) or an equivalent organisation in another country, with 3 years of relevant experience and a certificate of successful completion of the exams organised by the evaluation agency and included in the list kept by the competent authority.
3	**Inspection of Heating Systems RAA 119/2011**	**Qualifications of Heating Systems' Inspector:** Mechanical Engineer registered with the ETEK (Cyprus Scientific and Technical Chamber) or an equivalent organisation in another country, with 3 years of relevant experience and a certificate of successful completion of the exams organised by the evaluation agency and included in the list kept by the competent authority.
4	**Certification of installers of small-scale RES systems (RAA 19/2014)**	**Installer categories:** Installers of boilers and biomass heating appliances; Installers of heat pumps; Installers of solar PV systems; Installers of solar thermal systems; Candidate installers who meet the requirements of the Regulation must attend and successfully complete, by examination, a specialised theoretical and practical training programme The competent authority grants a certificate of competency to each installer for a specific category or categories of systems for which they were registered

5	**Certification of Energy Auditors (RAA 184/2012)**	**Categories of Energy Auditors:** A: all buildings, regardless of their surface area and air conditioning system. Involves, inter alia, ports, airports, street lighting. B: industrial installations and processes, agricultural installations. Category C: transport **Qualifications of energy auditors:** Engineers registered with the ETEK (Cyprus Scientific and Technical Chamber), mandatory participation in a training programme; Passing the qualification examination, 3 years of relevant experience, inclusion in the register kept by the competent authority
6	**Certification of Energy Service Providers (RAA 210/2014)**	Relates mainly to the following: Employ or have a contract with at least one energy auditor. Have sufficient technical, administrative, organisational and legal capacities for negotiating and concluding the necessary energy efficiency contracts with customers. Be able to complete projects on the purchase, installation and/or replacement of materials and equipment, as well as the maintenance thereof, and monitoring and metering the savings achieved. Have an adequate knowledge of the market and of the prices of materials and equipment for energy-saving interventions, as well as the ability to carry out a cost analysis on the investment and to calculate the expected income and profits, while assessing risks and identifying ways to address them. Be able to handle and secure the financing of interventions. Be able to provide energy services with a guaranteed performance and to assume technical and financial risks for meeting the targets agreed upon.
7	**Certification of building envelope installers (regulations undergoing drafting)**	

3.1.6. Energy Services (Article 18)

1. For the following purposes:

(i) implementing Article 9 of the 2009 and 2012 Laws on Energy Efficiency in End Use and Energy Services [Law 31(I)/2009 and Law 53(I)/2012]; and

(ii) ensuring harmonisation with Articles 2(24), 2(27), 16(1), 18(1)(a)(i),(c), (d)(i) and (ii), (2)(a) and (c) and Annex XIII to the Directive of the European Commission with title: 'Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on

energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC';

The Ministry of Energy, Commerce, Industry and Tourism (MECIT) has drafted the Law on Energy Efficiency in End Use and Energy Services (Amending Law) and the 2014 Regulations on Energy Efficiency in End Use and Energy Services (Energy Service Providers). The Regulations were published in the Government Gazette of the Republic of Cyprus on 15 April 2014.

The aim of the 2014 Regulations on Energy Efficiency in End Use and Energy Services (Energy Service Providers) is to regulate issues relating to the provision of energy services and to the conclusion of energy efficiency contracts. In particular, the regulations cover questions related to:

(a) The operating conditions and the registration terms of energy service providers in the register of energy service providers and the issuance of the relevant licence by the competent authority (Energy Department of the MECIT).

(b) The duties of the Energy Auditors Committee in relation to energy service providers.

(c) The type of energy services provided to final consumers through energy efficiency contracts and the minimum provisions to be included in such contracts.

(d) The stages to be followed by energy service providers to confirm increasing energy and financial benefits.

(e) The way in which the competent authority must perform the audit and evaluation of the energy services provided.

The Regulations were drawn up taking into account the practices followed in other countries and the experience from the participation of the Energy Department of the MECIT in the EU programme 'Concerted action for the energy services Directive 2006/32/EC' (renamed as 'Concerted action for the energy efficiency Directive 2012/27/EC'), aiming to assist Member States in the implementation of the Directive's provisions.

The aim of the 2014 Energy Efficiency in End Use and Energy Services (Amending) Law is to give legal force to some of the Regulations' provisions and to establish/replace terms and definitions in compliance with the relevant provisions of Directive 2012/27/EU. In addition, the draft law includes provisions on the protection of commercial information and personal data, as well as provisions setting out the possibility of imposing sanctions on those who breach the provisions of the Regulations and/or Decrees adopted in the implementation of the Law

2. Regarding the obligation to publish contract information and templates for energy service providers, the publication of information on best practices for concluding energy efficiency contracts and lifting the regulatory and non-regulatory barriers to the conclusion of energy

efficiency contracts, the new Regulations provide for the publication of Guidelines by the Competent Authority with regard to template energy efficiency contracts in the public sector, whereas the remaining matters set out above have been included in the relevant provisions of the harmonising draft law.

3. To ensure the handling of complaints lodged in relation to energy service contracts, these Regulations grant additional competences to the Committee of Energy Auditors, including the handling of complaints.

4. No measures have been taken so far to allow independent market intermediaries to play some role in stimulating market growth with regard to the demand for and offer of Energy Services, nor measures to ensure that energy distributors, transmission system operators and retail companies refrain from activities that could obstruct the demand and supply of energy services or prevent market growth for these specific services. However, such provisions have been included in the harmonising draft law and the adoption of the relevant measures will be decided after transposing the Directive into national law.

5. At this stage, the energy services market is not considered to be mature. However, the implementation of the regulations on the operation of Energy Service Providers and the efforts to identify and lift barriers to market growth in energy services in Cyprus are expected to make the market more mature in the years to come. In addition, in order to promote energy services in the public sector, the working party that has been established for the implementation of the obligation to improve the energy efficiency of government buildings set out in Directive 2012/27/EU (relevant reference is made in paragraph 4.1 of Annex F) evaluates the possibility of financing the implementation of energy-saving measures with the provision of energy services and the conclusion of Energy Performance Contracts (EPC). For this purpose, the Electrical and Mechanical Services Department is currently preparing template tender documents for the selection of energy service providers, which will also include template Energy Performance Contracts. These templates are also expected to be used by other bodies wishing to use energy service providers for the implementation of energy efficiency measures. A contract notice is expected to be launched in 2014 by the Electrical and Mechanical Services Department, in cooperation with the other members of the working party, for the energy upgrading of two public buildings through energy performance contracting. The success of this pilot project in the Public Sector is expected to identify issues related to the provision of energy services and propose ways to resolve them, while being an example for the private sector.

6. In the next years, a number of energy efficiency contracts are expected to be signed by public authorities in the context of Cyprus' commitment to an annual energy upgrading of 3% of the useful floor space of buildings owned by the central government, whereas, at this stage, it is impossible to make any estimations on the number of contracts.

7. When a sufficient number of companies are registered in the relevant registry Energy Service Providers and when the first Energy Efficiency Contracts are signed, we will be able to accurately identify the sectors in which energy service providers will operate, as well as the type of services provided. During this period, it will also be possible to make estimations on the overall value of energy-saving programmes and on the overall value of energy-saving programmes that may be implemented in the non-residential sector, given that under the above Regulations, Energy Providers must:

   (a) submit to the competent authority, when so requested, the Energy Performance Contracts concluded with final consumers as well as any other documents and information requested for the purpose of evaluating the energy services provided;

   (b) keep a record of all valid Energy Performance Contracts from the date of their signature up to 3 years after their expiry, including the relevant reports, measurements and calculations as well as other relevant documents and, following a request from the competent authority, energy service providers must allow the latter to access these records;

   (c) submit to the competent authority, within 30 days from the end of each calendar year, an annual list of the Energy Performance Contracts concluded in the previous year, which must include a short description of each contract.

3.1.7. Other horizontal measures to promote energy efficiency (Articles 19 and 20)

1. Regarding other horizontal measures to promote energy efficiency and the implementation of Article 19 of the Energy Efficiency Directive, as well as the effort to lift regulatory and non-regulatory barriers, in the draft law amending the 2009 and 2012 Laws on Energy Efficiency in End Use and Energy Services it is proposed that, inter alia, the Council of Ministers may adopt Regulations related to:

   (a) the split of incentives between the owner and the tenant of a building or among owners, with a view to ensuring that these parties are not deterred from making efficiency-improving investments by the fact that they will not individually obtain the full benefits or by the absence of rules for dividing the costs and benefits between them; and

(b) the procedures to be applied with a view to ensuring that individual public bodies are facilitated to make investments in improving energy efficiency and to outsource a part of the services included in long-term energy performance contracting.

2. A more detailed analysis of the barriers and measures set out in Article 19(a) and (b) is provided in Annex F to the NEEAP, 'Strategy for encouraging investments in building renovation' (paragraphs 4.2 and 4.1, respectively).

3. A national energy efficiency fund was established in 2003 with the title 'Special Fund for Renewable Energy Sources (RES) and Energy Savings (ES)', under the 2003 Law on Encouraging and Promoting the Use of Renewable Energy Sources and Energy Saving (Law 33(I)/2003). The aim of the Fund is to encourage the use of RES and promote energy-saving. According to the provisions of the applicable Grant Schemes, the following activities may be subsidised:

   - Generating or purchasing electricity from RES, as the case may be;
   - Energy-saving installations, equipment or activities;
   - Programmes for promoting RES, energy-saving, including cogeneration of heat and power, and providing the public with information.

4. The Special Fund is managed by the Special Fund Managing Committee, comprising the following members:

   - The Director-General of the Ministry of Energy, Commerce, Industry and Tourism (MECIT) or a representative thereof, as Chair of the Committee;
   - The Director-General of the Ministry of Finance or a representative thereof;
   - The Director-General of the Planning Bureau or a representative thereof;
   - The Director of Commerce and Industry, responsible for energy issues in the MECIT, or a representative thereof;
   - The General Accountant of the Republic of Cyprus or a representative thereof;
   - A representative of the Cyprus Scientific Technical Chamber.

5. Under the general supervision of the Minister for Energy, Commerce, Industry and Tourism, the Committee has the competence and duty of managing the Fund's cash flows in order to pursue and achieve the targets set by the RES and ES legislation. In particular (and without prejudice to the above), it is responsible for:

   - Financing or subsidising, under the terms and provisions of the Schemes, various activities aiming to the use of RES and the promotion of ES;

- Checking, evaluating and approving applications for receiving subsidies or financing;
- Proceeding to all necessary disbursements or expenses in relation to the Fund's purposes;
- Investing any reserves of the Fund in the way and to the extent established by the Minister for Energy, Commerce, Industry and Tourism, with the approval of the Minister for Finance;
- Developing, either on its own or in cooperation with any other legal or natural person, other activities which may contribute to achieving the fund's aims.

6. There are no important interactions between the Fund's operation and other policy measures (e.g., mechanisms requiring the adoption of energy efficiency measures, EU Cohesion Policy Funds, etc.). The Cypriot State does not foresee the fulfilment of its obligations in relation to the renovation of central government buildings [as set out in Article 5(1) EED] through an annual contribution to the National Energy Efficiency Fund (NEEF) of an amount equal to the investments required to meet the above obligations.

7. Decision No 72 911 of the Council of Ministers was adopted on 2 December 2011, approving the deposit to the Special Fund for RES and ES, of the required percentage from the income of annual emission allowances, which will be necessary for the Fund's viability.

8. In addition, Article 10(1)(e) of the Law on Promoting and Encouraging the Use of RES and Energy Saving (Law 112(I)/2013), provides for the deposit to the Special Fund of part of the income from emission allowances. However, there is no obligation to use such income exclusively for improving the energy efficiency of buildings.

9. At this stage, the Cypriot State does not make any use of the income from annual emission allowances in order to develop innovative financing mechanisms to meet the energy efficiency improvement targets for buildings, reserving this right for the future, as Article 21(3) of the Law on Greenhouse Gas Emission Allowance Trading (Law 110(I)2011) establishes this right in favour of the State.

3.1.8. Energy savings from horizontal measures

1. Note that the implementation of horizontal measures starts in 2014 and, therefore, there is no available information with regard to the energy savings achieved under all horizontal measures. Regarding energy savings from the implementation of such measures in the future, for the moment, there are only estimates for the measures included in the NEEP submitted by Cyprus for meeting the target under Article 7.

2. According to the measures set out in Chapter 3 of the NEEP submitted by Cyprus, the estimated energy savings from the measures' implementation is expected to amount to 27 500 TOE in 2016 and to 42 000 TOE in 2020. These data have also been included in the tables of chapters 2.3 and 2.4 of this Action Plan. However, given that the NEEP will be revised, these data may be modified.

3.1.9. Financing of horizontal measures

1. Data on the financing of measures implemented up to 2013 are set out in Annex D, separately for each measure. Regarding horizontal measures, the only available data, for the moment, are those related to measures included in the NEEAP of Cyprus for achieving the target under Article 7.
2. Given that it was decided to revise the NEEP, as mentioned above, these data may be modified.

3.2. Energy efficiency measures for buildings

3.2.1. Review of the requirements under the EPBD recast (2010/31/EU)

1. Calculations on cost-optimal levels of minimum energy performance are presented on the website of the Energy Department which may be accessed using the link provided in **Annex I**, whereas the national targets for nearly zero-energy buildings are set out in detail in the National Action Plan for nearly zero-energy buildings **(Annex C**).

2. The measures adopted in compliance with the requirements of Article 10(2) of the EPBD are set out in paragraph 4.2 of **Annex F** (Strategy for encouraging investments in building renovation).

3. The case of alternative measures for heating and cooling systems [Article 14(4), Article 15(4) EPBD] does not apply to Cyprus. Cyprus has established and conducts regular inspections of heating and cooling systems according to the provisions of the Law on the Energy Efficiency of Buildings and the legislation adopted in implementation thereof.

3.2.2. Building renovation strategy (Article 4)

1. The strategy to encourage investments in energy saving is attached as **Annex F** (Strategy for encouraging investments in building renovation).

3.2.3. *Complementary measures to address the issue of the energy efficiency of buildings and appliances*

1. The complementary measures to address the issue of energy efficiency in residential and non-residential buildings are analysed in other chapters of the NEEAP.

3.2.4. *Energy savings from measures addressing the issue of the energy efficiency of buildings*

1. Regarding energy savings in implementation of the EPBD and the energy efficiency of buildings in Cyprus, please refer to the following table illustrating energy savings for the years 2012, 2016 and 2020 in end use and primary use, in the residential and tertiary sector. Further information is provided in Annex D, paragraphs 1.1 and 1.2.

Table 14: Energy savings through the application of the minimum requirements for the energy performance of new buildings.

S/N	Implementation Period	End use			Primary Use		
		2012 TOE	2016 TOE	2020 TOE	2012 TOE	2016 TOE	2020 TOE
1	**2004-2013**	**85 760.4**	**95 991.6**	x	x	x	x
2	**2010-2013**	x	x	x	-[14]	x	-[14]
3	**2014-2016**	x		x	x	x	x
4	**2014-2020**	x	x	x	x	x	**15 000**

2. Energy savings from the implementation of the building renovation strategy are expected to amount to 4 488 TOE in 2016 and 10 472 TOE in 2020, respectively. Note that part of the measures related to the building renovation strategy have been included in the NEEP for meeting the target under Article 7. Please refer to measures 1.1, 1.3 and 1.4 set out in Chapter 3 of the NEEP.

3. Note that the above savings have been included in the tables of Chapter 2.2 and 2.3 of this NEEAP.

3.2.5. *Financing measures for the energy efficiency of buildings*

1. A detailed description of the financing of measures for the energy efficiency of buildings is provided in paragraphs 4.2 and 5 of **Annex F** (Strategy for encouraging investments in building renovation).

[14] The relevant calculations were not made. Information will be provided in the 4th NEEAP in 2017.

3.3. Energy efficiency of buildings used by public bodies (Articles 5 and 6)

3.3.1. Buildings of the central public administration (Article 5)

1. Relevant information on the list of heated and/or cooled central government buildings is provided in paragraph 4.1 of **Annex F** (Strategy for encouraging investments in building renovation).
2. Relevant information on the assessment of the obligation to renovate buildings owned by public bodies is provided in paragraph 4.1 of **Annex F** (Strategy for encouraging investments in building renovation).

3. In summary, Cyprus has selected to regard the building unit as a whole, including the envelope, equipment, operation and maintenance. The buildings of the central public administration with the lowest energy efficiency levels constitute a priority when it comes to adopting energy efficiency measures, whereas it has been decided not to apply the requirements for specific building categories, in line with Article 5(2).

4. When assessing the renovation obligation for 2014, Cyprus intends to take into account the surplus of the annual renovation rate of any of the three previous or three subsequent years, as well as the replacement of old buildings with new ones and the removal of buildings due to the more intensive use of existing buildings in the two previous years. Information will be provided, as the case may be, on the alternative approach for achieving equivalent savings in order to meet the renovation requirements under Article 5(6).

5. Note that the alternative approach will not be implemented.

3.3.2. Buildings of other public bodies (Article 5)

1. Relevant information is provided in paragraph 4.1 of **Annex F** (Strategy for encouraging investments in the renovation of buildings).

2. In addition, the relevant provisions of the Directive in relation to buildings of other public bodies have been transposed through the harmonising draft law.

3.3.3. Purchase by public bodies (Article 6)

1. Article 6 of the Directive titled ‘Purchase by public bodies’ establishes, inter alia, the obligation of Member States to ensure that central governments (CG) (administrative services having competence over the entire territory of Member States as set out in

Annex IV to Directive 2004/18/EC) purchase only products, services and buildings with high energy-efficiency performance insofar as that is consistent with cost-effectiveness, economical feasibility, wider sustainability, technical suitability, as well as sufficient competition, as referred to in Annex III of the Directive.

2. In addition, according to the same Article, public bodies, including at regional and local levels with due regard to their respective competences and administrative set-up, shall be encouraged to follow the exemplary role of their central public administrations to purchase only products, services and buildings with high energy-efficient performance.

3. The steps taken in order to ensure that the central public administration complies with the above requirements of Article 6 of the Directive, involve the transposition of the Article's requirements, following consultation with the Public Procurement Authority, namely the General Accounting Office of the Republic, through the relevant draft law (Law amending the 2009 and 2012 Law on energy efficiency in end use and energy services).

4. In particular, the basic act is amended through the addition of the new Article 15 on purchasing by public bodies, which stipulates the following:

(1)(a) Central governmental authorities shall purchase only products, services and buildings with high energy efficiency. If the central governmental authorities purchase products, services and buildings without high energy efficiency, they must justify their option based on cost-effectiveness and economical feasibility, general sustainability and technical suitability, as well as sufficient competition, as laid down in Annex II

(b) The requirement referred to above shall apply to the contracts for the purchase of products, services and buildings by central government authorities, insofar as the value of such contracts is equal to or exceeds the thresholds laid down in Article 19(1) of the 2006 Coordination of Public Procurement, Works and Services Contracting Procedures and Relevant Matters Law, which are occasionally revised as laid down in Article 92 of that Law.

(c) The Competent Authority for Public Contracts may issue circulars for the implementation of points (a) and (b) hereof.

(d) For the implementation of point (c) hereof, the Competent Authority for Public Contracts may ask for and obtain the opinion of other competent services of the State.

(2) The obligation referred to in paragraph 1 shall apply to the contracts of the armed forces only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces. The obligation shall not apply to contracts

for the supply of military equipment as defined by the 2011 Coordination of Procedures for the Award of Certain Works Contracts, Supply Contracts and Service Contracts by Contracting Authorities or Entities in the Fields of Defence and Security and Relevant Matters Law.

(3) The Competent Authority for Public Contracts shall encourage public bodies, including at regional and local levels, with due regard to their respective competences and administrative set-up, to follow the exemplary role of their central governmental authorities to purchase only products, services and buildings with high energy-efficient performance. The Competent Authority for Public Contracts shall encourage public bodies, when tendering service contracts with significant energy content, to assess the possibility of concluding long-term energy performance contracts that provide long-term energy savings.

(4) Without prejudice to paragraph (1), when purchasing a product package covered as a whole by a delegated act adopted under Directive 2010/30/EU, the contracting authorities may require that the aggregate energy efficiency shall take priority over the energy efficiency of individual products within that package, by purchasing the product package that complies with the criterion of belonging to the highest class of energy efficiency.

3.3.4. Savings from measures in central public administration and other public bodies

1. There are no energy savings resulting from measures in central public administration and other public bodies in implementing the provisions of the EED as these provisions have not as yet begun to be implemented. However, the energy savings calculated in relation to measures applied so far by the bodies in question relate mainly to the implementation of the GPP Action Plan, as well as to some investments made under Grant Schemes of the Special Fund for RES and ES.

2. The energy savings calculated for the year 2012 and for the 2016 end use target from the above actions amount to 777.2 TOE and 448 TOE, respectively. The contribution of these measures (which were implemented after 2010 and will be in force in 2020) to the 2020 target amounts to 178 TOE. Please also refer to measures 3.2 and 6 of Annex D. The future contribution of GPP to the 2016 and 2020 targets is expected to amount to 700 TOE and 1 000 TOE, respectively.

3.3.5. Financing of energy efficiency measures in public sector buildings

1. Relevant information is provided in paragraph 4.1 of **Annex F** (Strategy for encouraging investments in the renovation of buildings).

3.4. Energy efficiency measures in the industry

3.4.1. Key policy measures addressing the issue of energy efficiency in the industry

1. A Grant Scheme for encouraging the use of Renewable Energy Sources and Energy Saving for Natural and Legal Persons as well as for Public Sector Bodies engaged in an economic activity, was in place up until the end of 2013. The investments covered by the Grant Scheme fall into two subcategories.
    a. NA: Energy Saving (SA)
    b. NB: Renewable Energy Sources (RES)

2. According to the provisions of the 2013 plan, energy-savings investment means an investment in systems, equipment and materials whose installation achieves at least 10% energy savings in a specific application.

3. Energy-saving investments and investments in vehicles and mobile machinery were not eligible. In addition, the design and construction of machinery or means of transportation which consume fewer natural resources are not eligible activities for receiving a grant under the energy-saving category.

4. Eligible expenses also included the design costs, where necessary, under the restrictions set out in the relevant application documents for the different categories and subcategories of the Scheme.

5. Category NA1 of the grant scheme applied only to existing undertakings operating in Cyprus for at least four (4) years. Financial aid was granted to energy investments in existing holdings of the undertakings in question, under the condition that the building licence was issued by 28 December 2008.

6. There were five (5) subcategories of investments as follows:

    a. NA1.1: Purchase/installation of new equipment for the recovery of waste energy, either directly or indirectly by recovery/recycling of discarded materials, product or employed medium.

    b. NA1.2: Purchase/integration of new materials and equipment to reduce idle energy consumption and energy losses.

    c. NA1.3: Purchase of new equipment for the production, transmission, distribution and use of energy.

    d. NA1.4: Purchase/installation of a new energy management IT system and/or integration of automated direct energy regulation/switch-off devices.

e. NA1.5: Replacement of existing materials and/or equipment connected with the subcategories NA1.1 to NA1.4.

7. The total amount expected to be made available in 2013 for this specific investment category was EUR 1 230 000.

8. The grant amounts per category and subcategory for the year 2013 are presented in detail in the following table.

Table 15: Grant rates per category and subcategory for Grant Schemes under the Special Fund for RES and ES for the year 2013.

S/N	INVESTMENT	Subsidy per aid type	
		Regional aid	De minimis aid Special Subsidy
NA1	**Energy savings in existing undertakings**		
	NA 1.1 NA 1.2 NA 1.3 NA 1.4	15% or 25% or 30% of the eligible budget, according to the category of the undertaking (large, medium, small). The maximum grant amount was EUR 50 000 per facility.	30% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount was EUR 50 000 per facility.
	NA 1.5 Replacement of existing materials and equipment connected with the subcategories NA1.1, NA1.2, NA1.3 and NA1.4	-	30% of the eligible budget under the restriction of maximum eligible expenditures. The maximum grant amount was EUR 50 000 per facility.

9. It should be noted that training seminars on energy management and RES are held on an annual basis, in cooperation with the Human Resources Development Authority of Cyprus (HRDA), the Productivity Centre and the Energy Institute. Four (4) seminars were held in 2013 in Nicosia, Limassol, Larnaca and Paphos, with a duration of 60 hours each. The seminars were addressed to unemployed engineers of all specialties and focused, inter alia, on issues related to energy saving and energy efficiency improvement technologies/systems, ways of operation, selection of an appropriate system and applications in Cyprus (industry, hotels, services, etc.). In addition, examples for drawing up a technical-financial study for the installation of energy-saving systems and other examples of studies under ES Grant Schemes were presented.

10. Furthermore, information days were held in Nicosia, Limassol and Paphos addressed mainly to engineers who are members of the Cyprus Scientific and Technical Chamber (ETEK), the Cyprus Employers and Industrialists Federation (OEB), the Cyprus Chamber of Commerce and Industry (KEBE), hotel owners, entrepreneurs, credit institutions, municipalities and

communities, contractors and the general public. Information days focused on energy audits, the energy efficiency of buildings, energy labelling, energy-saving and RES technologies used for heating and cooling purposes.

11. In recent years, the Cyprus Employers and Industrialists Federation (OEB) holds an annual fair on energy saving, in cooperation with the EAC and the Energy Department. Printed information material on the different energy-saving and RES technologies is distributed at the fairs. In addition, information is provided to the general public with regard to the provisions of the grant schemes. The most efficient energy-saving investments made by natural or legal persons under the grant scheme of the Special Fund for RES and ES are rewarded at the 'Save Energy' fair.

12. Within 2013, the Energy Department has approved training institutes to carry out training programmes for candidate Category A and B energy auditors. Category A relates to all buildings regardless of their surface and air conditioning system and includes, inter alia, ports, airports and street lighting. Category B relates to industrial facilities, as well as agricultural activities and installations. The first category B energy auditors are expected to be entered in the relevant registry within 2014. The first energy auditors have been included in the registry of Category A energy auditors in 2013.

13. In addition, Cyprus' NEEP establishes, as a measure to achieve the target under Article 7, co-financing for conducting energy audits in industries and for the implementation of the energy-saving investments proposed by the energy audit. The measure will concern approximately 10 industries per year.

3.4.2. Savings from measures in the industry

1. Regarding energy savings for measures implemented in the Industrial Sector through the Grant Scheme of the Special Fund for RES and ES by 2013, please refer to the following table which illustrates energy savings for the years 2012, 2016 and 2020 in end use and primary use. Paragraph 3.4 of Annex D provides additional information on the types of investments carried out in the Industry.

Table 16: Energy savings through measures taken in the Industrial Sector

S/N	Implementation Period	End use			Primary Use		
		2012 TOE	2016 TOE	2020 TOE	2012 TOE	2016 TOE	2020 TOE
1	**2004-2013**	2 922.91	2 722	x	x	x	x
2	**2010-2013**	x	x	x	649.72	x	650

2. In addition, the estimated energy savings from the implementation of the measure under the NEEP, in relation to energy audits and the implementation of the energy-saving investments proposed by the energy audit, are expected to amount to 1 650 TOE in 2016 and to 3 850 TOE in 2020, respectively.

3.4.3. Financing of energy efficiency measures in the industry

1. With regard to the financing of investments made in the Industrial Sector in the period 2004-2013 which were subsidised by the Special Fund for RES and ES, it should be noted that the total amount of the subsidy stood at EUR 1 537 659. Regarding the implementation of the measure included in the NEEP, in relation to performing energy audits, the overall financing needs foreseen amount to EUR 10 500 000. Note that this amount may be different in the revised NEEP.

3.5. Energy efficiency measures in the transport sector

3.5.1. Key policy measures addressing the issue of energy efficiency in the transport sector

1. According to the 2013 (Amending) Law on Motor Vehicles and Road Traffic, which entered into force on 1 January 2014, the annual circulation tax for each category M1 motor vehicle and the annual circulation tax for each category N1 motor vehicle, resulting from a category M1 motor vehicle and classified under the category of light lorry (VAN type), is calculated on the basis of the carbon dioxide emissions of the vehicle's engine. In addition, as from 1 January 2014, category N2 and N3 vehicles (lorries) and M2 and M3 vehicles (buses) are registered in so far as they have been proven to comply with the 'EURO VI' requirements on the emission of pollutants.

2. The launch of the 4th Old Vehicle Scrapping and Replacement Scheme was announced on 11 October 2010, whereas the scheme was implemented in 2011. Applications were admitted for a period of 2 months with final date on 13 December 2010. The 4th Scheme related to the payment of a grant equal to EUR 1 800 and covered the scrapping of M1 category motor

vehicles, older than 15 years old, under the condition that a new car with CO2 mass emissions lower or equal to 165gr/km would be purchased.

3. The new public transportation system was put in force in the second half of 2010. The new public transportation bodies replaced part of their vehicles with new ones that have low fuel consumption and pollutant emissions, as compared to the old vehicles that were replaced. Provincial urban companies have reorganised their routes, aiming to optimise their efficiency in this sector. Their websites contain a detailed map of the routes and the timetable of buses in order to facilitate passengers.

4. The following table provides comparative data on transports over the twelve-month period from September 2010 to August 2011, as compared to 2012.

Table 17: Transport and increase analysis (not including free transport beneficiaries and transport by school bus)

	Transport		% Increase	Transport share	
	9/2010 – 8/2011	**2012**		**9/2010 – 8/2011**	**2012**
Nicosia	4 769 738	4 918 020	3.11%	38%	32%
Limassol	2 113 946	3 044 634	44.03%	17%	20%
Larnaca	373 698	613 770	64.24%	3%	4%
Paphos	2 966 655	3 830 703	29.13%	24%	25%
Famagusta	1 714 420	2 274 952	32.70%	14%	15%
Inter-urban	536 427	746 719	39.20%	4%	5%
Total	12 474 885	15 428 798	23.68%		

5. In addition, a project relating, inter alia, to the construction of the first bus lane in Cyprus for the amount of EUR 18 399 001.30 + VAT, started to be implemented on 17 October 2008 and was completed within 2011. The project is expected to contribute to the reinforcement of Public Transport and was co-financed by the EU (Structural Funds).

6. Before the end of 2011, the widening of the motorway linking the Alambra and the GSP intersections (entry to Nicosia) from four to six circulation lanes was completed. Works started on 11 January 2010 against the amount of EUR 32.4 million + VAT and were co-financed by the Trans-European Transport Networks Fund.

7. In the context of the implementation of EU Regulation (EC) No 1222/2009 on the labelling of tyres with respect to fuel efficiency and other essential parameters, delegated inspectors of the Energy Department perform market surveillance checks in order to identify cases of non-compliance with these provisions. In addition, presentations on energy savings in the transport sector and on eco-driving are made in the context of the seminars addressed to unemployed engineers of all specialisations organised by the Energy Department and the Productivity Centre, with the support of the Human Resources Development Authority of Cyprus.

8. The municipalities of Nicosia have founded the Inter-municipal Bicycle Company of Nicosia (DEPL), aiming to change the way things work on Cypriot roads via an automated 3rd generation bike rental system. The installation of this innovative system will be combined with the design of new bicycle lanes, which will be used by a large part of the population and by tourists to commute from and to the city centre. In particular, the Nicosia Municipality has installed 100 bicycles in 5 stations, the Aglantzia Municipality, 50 bicycles in 4 stations, the Strovolos Municipality, 80 bicycles in 8 stations, the Dali Municipality, 20 bicycles in 3 stations, the Aghios Dometios Municipality, 20 bicycles in 2 stations, the Latsia Municipality, 15 bicycles in 2 stations and the Engomi Municipality, 30 bicycles in 3 stations. There is one single system for all municipalities that participate in the programme, whereas each user can take a bicycle from the station of one municipality and return it to the station of another municipality. The programme aims to promote the use of bicycles among citizens as an alternative means of transport in the city.

9. Furthermore, a Grant Scheme for energy saving in the transport sector (purchase of hybrid vehicles, electric vehicles and low-pollutant vehicles), was in force in the period 2004-2009.

10. In addition, note that the proposal of the Electrical and Mechanical Services Department to use the resources of Structural Programmes to promote and develop electric vehicle infrastructures in Cyprus has been approved by the Directorate-General for EU Programmes, Coordination and Development. The establishment of a network of charging infrastructures will be promoted under this proposal. Charging points and infrastructures for electric vehicles will be installed in public buildings and in public roads, whereas installation costs in private buildings, single-family houses and undertakings will be subsidised under specific criteria and specifications.

11. Finally, it should be noted that the installation of LPG systems in vehicles is expected to start in 2014 and will reduce the emission of pollutants and fuel consumption in old vehicles.

3.5.2. Savings from measures in the transport sector

1. This section presents the savings achieved through measures in the transport sector, which have been calculated using both 'bottom-up' approaches for specific/individual actions and 'top-down' approaches for the overall transport sector in Cyprus.

2. The energy savings arising from specific/individual actions under the Vehicle scrapping plan and the Grant Scheme for Electric, Hybrid and Low-Pollutant Vehicles, with the

corresponding contribution to the years 2012, 2016 and 2020 in end and primary use are included in the following table.

Table 18: Energy savings from specific/individual actions in the transport sector.

S/N	Description of the measure	Implementation Period	End use			Primary Use		
			2012 TOE	2016 TOE	2020 TOE	2012 TOE	2016 TOE	2020 TOE
1	**Vehicle Scrapping Plan**	**2008-2010**	**2 822.8**	**2 822.8**	x	x	x	x
	Vehicle Grant scheme	**2004-2009**	**1 073.5**	**1 073.5**	x	x	x	x
2	**Vehicle Scrapping Plan**	**2008-2010**	x	x	x	**167**	x	167
	Vehicle Grant scheme	**2004-2009**	x	x	x	x	x	x

3. Note that paragraphs 7 and 8 of Annex D provide further information on the Vehicle Scrapping Plan and the Grant Scheme, respectively.

4. In addition, the expected energy savings from the implementation of additional measures in the transport sector are expected to amount to 10 000 TOE (transport and air transport) in 2016 and 50 000 TOE (transport and air transport) in 2020, respectively.

5. With regard to the calculation of energy savings for the overall transport sector, it should be noted that the energy efficiency indicators cover the energy consumed in the road transport of passengers and goods. Final energy savings were expressed as the sum of savings achieved per vehicle type.

6. In the transport sector, the energy efficiency indicators cover the overall consumption of fuels. Energy savings in road transport were calculated using the available energy indicators for Cyprus, for the period 2007-2012, drawn from the ODYSSEE database. Calculations were made on the basis of the M5 methodology (p. 48) set out in the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services'.

7. The following table presents vehicle reserves per year from 2007 to 2012.

Table 19: Number of vehicles per category in Cyprus (2007 – 2012)

Year	Fuel consumption (Mtoe)	Stock of cars	Stock of buses	Stock of light vehicles	Stock of vans
2007 (ref)	0.719	411 000	3 000	104 000	14 000
2008	0.778	444 000	3 000	107 000	15 000
2009	0.776	461 000	3 000	108 000	16 000
2010	0.785	463 000	3 000	105 000	16 000
2011	0.766	470 000	4 000	103 000	15 000
2012	0.713	475 000	4 000	103 000	15 000

8. In addition, the following table illustrates energy consumption per vehicle per annum, from 2007 to 2012, as well as energy savings per vehicle and the overall energy savings in the transport sector per annum in TOE, as compared to 2007 (reference year).

Table 20: Energy consumption and savings per vehicle (2007 – 2012)

Year	Fuel consumption per vehicle (TOE)	Fuel savings per vehicle (TOE)	Total fuel savings (TOE)
2007 (ref)	0.7748	0	0
2008	0.7963	-0.0215	-21 035.56
2009	0.7745	0.0003	334.05
2010	0.7913	-0.0165	-16 413.79
2011	0.7645	0.0103	10,334.05
2012	0.7080	0.0667	67 207.97

Figure 14: Fuel consumption per vehicle (2007–2012) in TOE

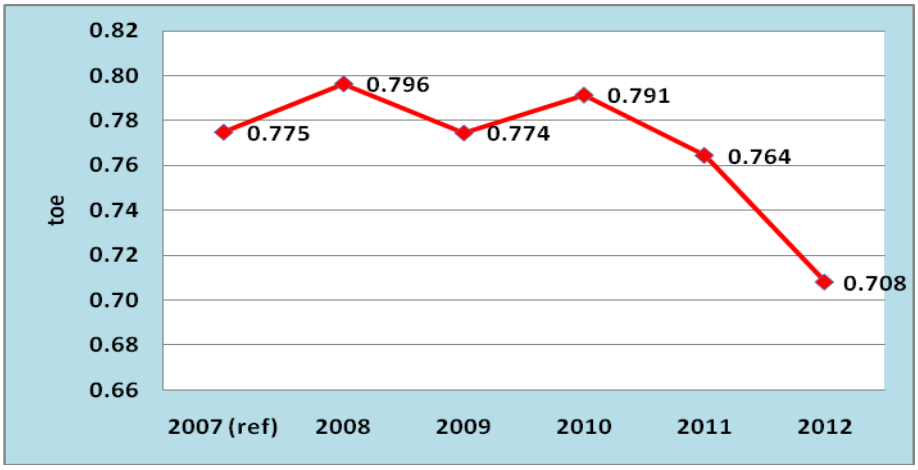


Figure 15: Fuel savings per vehicle (2007–2012) in TOE

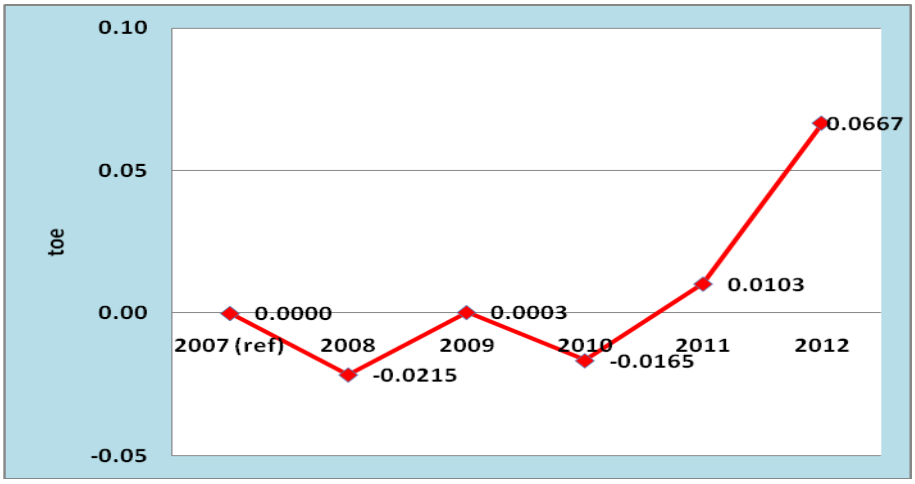
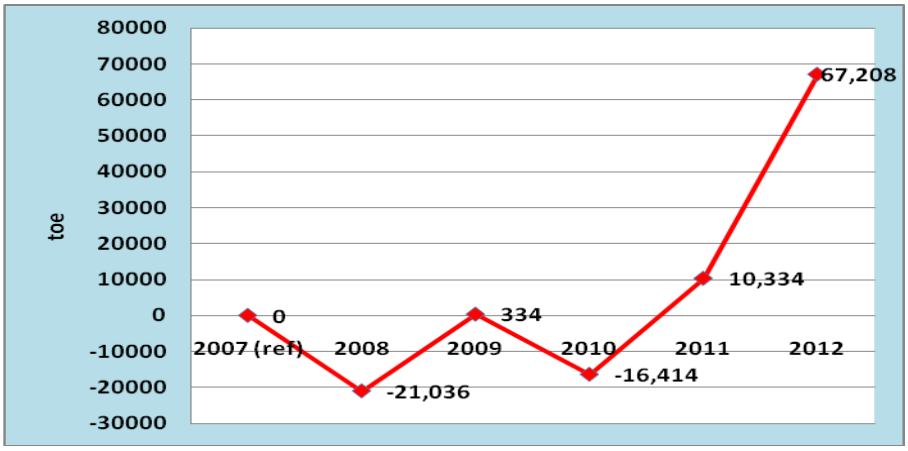


Figure 16: Total fuel savings in road transport (2007-2012) in TOE



9. It is clear from the above figures and tables that in the years 2011 and 2012 there has been a significant improvement in the energy performance of the transport sector as in 2012 energy savings in all transportation modes amounted to 67 200 TOE, as compared to 2007 (reference year). This result was expected due to the different actions implemented in recent years in Cyprus, which are set out above, whereas at the same time it is related, to a certain extent, to the economic crisis that has hit the country in recent years.

10. In order to calculate energy savings in primary consumption for the 2020 target, 2010 was used as reference year using the methodology set out above, which reveals that in 2012 overall energy savings stood at 83 870 TOE as compared to the reference year. Please refer to the following table.

Table 21: Energy consumption and savings per vehicle (20010 – 2012)

Year	Fuel consumption per vehicle (TOE)	Fuel savings per vehicle (TOE)	Total fuel savings (TOE)
2010 (ref)	0.7913	0.0000	0.00
2011	0.7645	0.0269	26 913.31
2012	0.7080	0.0833	83 869.96

11. Finally, the above results confirm Cyprus' high energy-saving potential in the transport sector and contribute to the achievement of the projections made under the energy efficiency scenario, namely energy savings in the transport sector amounting to 41 000 TOE in 2020.

3.5.3. Financing energy efficiency improvement measures in the transport sector

1. The financing of investments made in the transport sector in the period 2004-2009, which were subsidised by the Special Fund for RES and ES, amounted to a total subsidy of EUR 2 611 923. Subsidies under the Vehicle Scrapping Plan amounted to EUR 5 785 055. Furthermore, the description of the measures under paragraph 3.5.1 above also makes reference to the financing of other measures in relation to the transport sector.

3.6. Promotion of efficiency in heating and cooling (Article 14)

3.6.1. Comprehensive assessment

1. In implementation of the provisions of the EED on the promotion of efficiency in heating and cooling (Article 14), the Republic of Cyprus envisages a number of amendments to the applicable national legislation.

2. The comprehensive assessment of the potential for the application of high-efficiency cogeneration and efficient district heating and cooling has not been prepared yet. The assessment is expected to be completed by 31 December 2015. The exact methodology of the assessment has not been established at the present stage.

3. The comprehensive assessment will define the cost-benefit analysis procedures and methodology in order to meet the criteria set out in Annex IX to the EED.

4. The comprehensive assessment will reveal national potentials for high-efficiency cogeneration, efficient district heating and cooling, as well as for other efficient heating and cooling systems.

5. Two different grant schemes for the promotion of combined heat and power and/or high-efficiency cooling were in place up until 31 December 2013.

6. The first scheme concerned 'Natural persons and Organisations which are not engaged in economic activities'. The beneficiaries of this scheme were non-profit organisations, municipalities, communities, churches, monasteries, unions and State services, to the extent that they are not engaged in economic activities, for high-efficiency units of up to 1MW. The total amount of subsidy stood at 30% of the eligible budget of the investment, for a maximum amount of EUR 160 000 per unit. In addition, beneficiaries were granted a feed in tariff on the electricity generated which would be fed into the network of the EAC or of another supplier. This price is set by the CERA.

7. The 2nd Scheme concerned 'Natural and Legal persons, as well as Public Entities, which are engaged in economic activities'. Under this scheme, subsidies were only granted on the electricity generated by EAC or another supplier at a price set by the CERA. Further details on the provisions of these grant schemes are posted on the website of the Energy Institute, accessed via the link provided in **Annex I.**

3.6.2. Individual installations: cost-benefit analysis and results

1. No cost-benefit analysis has been performed to date.

3.6.3. Individual installations: exemptions and decisions introducing exemptions

1. The Republic of Cyprus has decided to adopt all the exemptions set out in Article 14(6) and (8) EED. For this purpose, the European Commission has been notified on the matter.

3.7. Energy transformation, transmission, distribution and demand response (Article 15)

1. Regarding the measures adopted by the Cyprus Transmission System Operator (CTSO) with regard to electricity, please note the following:

    i. The CTSO is obliged by law to encourage the penetration of RES in the electricity grid. Many RES systems, such as small PV systems and small wind farms are dispersed, i.e., they are connected to the Distribution System and not to the Transmission System. Therefore, they are located closer to electricity consumption centres. This results to the reduction of electricity in transmission lines from remote

conventional power plants to consumption centres, leading to a reduction of energy losses during energy transmission.

ii. The operating voltage of overhead lines and transmission substations was upgraded from 66 kV to 132 kV. This upgrading was necessary due to the gradual increase of the energy transmitted in part of the network with initially limited consumed power. Note that doubling the voltage has lead to a reduction of thermal losses during energy transmission by 75%.

iii. In the context of meeting the design and operation requirements of the transmission system n-2 and n-1, there was a restriction of the charge on transmission lines and power transformers with regard to their charge acceptance capacity, thus leading to the reduction of energy losses during energy transfer.

iv. The Transmission and Distribution Rules, drawn-up by the CTSO, set out that the connection of applicant producers/consumers to the electricity transmission or distribution system is made on the basis of the capacity of their installation in MW/MVA, aiming at restricting thermal losses from the flow of the energy produced/consumed into the electricity system. Thus, the capacity limit for connection to the medium voltage system is set at 20MW/MVA, beyond which connection to the high voltage system is mandatory.

v. In addition to the thermal losses caused by the flow of active power into the transmission/distribution system, additional thermal losses are caused by the flow of reactive power produced/consumed from the point of generation/demand thereof to power stations. Therefore, the CTSO has promoted/adopted the following measures, aiming to the reduction of the distance and/or quantity of the reactive power circulating in the system:

- Installation of devices for balancing demand for reactive power through capacitors in transmission substations in order to reduce the feed-in distance of inductive reactive power of consumers, such as water pumps, summer air conditioning devices, etc.

- Installation of reactors in transmission substations in order to balance the inherent generation of excessive capacitive power of high-voltage underground electrical cabling during low-demand periods.

2. Regarding the measures to improve energy efficiency in the production sector, the following table presents a list of the Production Units established in the period 2008-2013, as well as

the capital expenditure of each unit. The production of these plants with the use of liquid fuel currently depends on the ratio of the price of diesel to the price of fuel oil, whereas in the future it will be differentiated due to the introduction of natural gas.

Table 22: Measures in the production sector.

Production Unit	Unit Description	Year of installation	Lifetime (years)	Capital Expenditure (EUR million)	Performance in peak demand (%)[15]
NG Document 4 Vasilikos ES	Gas turbine combined cycle unit with a capacity of 220 MW using natural gas and diesel.	2009	25	165	52.4 / 48.9
Internal Combustion Plant 1 Dekelia ES	3x 17MW Internal Combustion Engines using fuel oil	2009	25	70[16]	42.0
Internal Combustion Plant 2 Dekelia ES	3x 17MW Internal Combustion Engines using fuel oil	2010	25	53	42.0
Internal Combustion Plant 5 Vasilikos ES	Gas turbine combined cycle unit with a capacity of 220 MW using natural gas and diesel	2012	25	237	52.4 / 48.9

3. With regard to the investments made in the period 2014 – 2020, the Power Generation Development Programme of the EAC is currently under study and is expected to be completed shortly.

3.7.1. Savings resulting from all energy supply measures

1. Until the completion of the 3rd NEEAP there was no available information on energy savings from energy supply measures.

3.7.2. Financing of energy supply measures

1. Until the completion of the 3rd NEEAP there was no available information on the financing of energy supply measures.

[15] Performance is calculated taking account of output units and fuel energy on the basis of low calorific yield. For Combined Cycle Gas Turbine (CCGT) plants performance is indicated for Natural Gas/Diesel.

[16] The price includes a maintenance contract amounting to EUR 5.7 million.

ANNEX A: ANNUAL REPORT UNDER THE ENERGY EFFICIENCY DIRECTIVE

A1 National 2020 energy efficiency target

1. The 2020 indicative national energy efficiency target for primary energy savings according to Article 3(1) EED (Annex XIV, Part 1, EED) has been set at 375,000 TOE for Cyprus, following the revision of the target in 2014. Additional information on the target's mode of calculation and the assumptions taken into consideration is provided in Chapter 2.1 and Annex H to this NEEAP.

A.2 Key statistics

Table 1. Estimation of key statistics related to energy consumption for the year preceding the previous year (year X - 2)

	2011	**2012**	
Estimation of key statistics related to energy consumption	**Quantity**	**Quantity**	**Unit**
Total primary energy consumption	2 703 984	2 506 871	TOE
Total final energy consumption[(1)]	1 875 976	1 737 796	TOE
Final energy consumption - Industry	223 026	186 053	TOE
Final energy consumption - Transport	1 045 372	958 386	TOE
Final energy consumption - Households	319 402	**329 311**	TOE
Final energy consumption - Services	243 987	223 096	TOE
Gross added value - Industry[(2)]	2 342.2	2 043.6[17]	EUR (million)
Gross added value - Services[(2)]	10 994.9	10 962.8[17]	EUR (millions)
Average disposable income per household	42 778	39 036[17]	EUR
Household disposable income (net)	13 034.5	12 103[17]	EUR (millions)
Total number of households	309.3	310.8	Thousand
Gross Domestic Product - (GDP)[(2)]	15 172.1	14 806.1[17]	EUR (millions)
Electricity generation from thermal power stations	4 726 884	44 431 062[17]	MWh
Electricity generation from thermal power generation plant	0.0697	0.029	TWh
Heat generation from thermally- based electricity production[(5)]	439 634	313 228	GWh
Heat generation from combined heat and power stations[(6)]	0.0753	0.00947	TWh

[17] These are preliminary data and, therefore, they may change. The final data will be included in the report to be forwarded to the European Commission in April 2015.

Fuel for thermal power stations	1 146 454[18]	*1 093 320*[19]	TOE
Fuel for combined heat and power stations[(7)]	-	*Diesel: 2 306 887 lt* *Heating oil: 38 653 lt* *Biogas: 21 680 033 m*^{3}	
Losses from energy transport and distribution (all fuels)[(8)]	-	*68 200*[20]	*Mwh*
Total passenger kilometres (pkm), if applicable	*No available data*[21]		
Total tonne kilometres (tkm), if applicable[(3)]	923.5	878.8	Million tkm
Total km (if there is no pkm and tkm)[(3)]	*No available data*[21]		
Total population	0.862	0.8659[17]	Millions
Heat generation from district heating stations[(4)]	*Cyprus has no district heating stations.*		
Fuel in district heating stations[(4)]	*Cyprus has no district heating stations.*		

[(1)] *No climate adjustment.*

[(2)] *Constant prices (in volume) in 2005.*

[(3)] *Except for transportation in oil pipelines.*

[(4)] *Useful information for a clearer image on the progress of Member States, required under the Regulation on energy statistics [Regulation (EC) No 1099/2008].*

[(5)] *Includes waste heat generated by industrial facilities.*

[(6)] *Includes waste heat recovered by industrial facilities.*

[(7)] *Useful data for monitoring improvements in the efficiency of combined production of heat and power*

[(8)] *Useful reference data especially for the measures under Article 15 EED.*

A.3 Analysis of energy consumption trends

1. The only sector showing an increase of energy consumption in 2012, as compared to 2011, is final energy consumption in households. This increase amounts to 9,909 TOE.

[18] Total quantity for 2011 is calculated by adding up the fuels of the Electricity Authority of Cyprus (1 139 996 toe) and the fuels used by autoproducers (6.458 toe).

[19] Total quantity for 2012 is calculated by adding up the fuels of the Electricity Authority of Cyprus (1 090 496 TOE) and the fuels used by autoproducers (2 824 TOE). In addition, note that the indicators of Annex IV of the Energy Efficiency Directive (EED) were used to convert heavy fuel oil and LPG into tonnes of oil equivalent.

[20] Relates exclusively to losses during electric power transmission.

[21] The Statistical Service of Cyprus reports that data on 'Passenger kilometres (pkm)' were calculated and sent to Eurostat. Calculations were made on the basis of the results of the Survey on the Transport of Passengers/Persons through distances less than 100 km performed in the years 2007, 2008 and 2009. Due to the fact that this survey is no longer carried out and given that a significant period of time has passed since the last survey, we believe that it is not appropriate to calculate these data without a reliable source of information.

2. In July 2011, Cyprus was faced with a sudden crisis in its energy market when the explosion at the Mari naval base caused extended damages to the Power Station of Vasilikos, which was covering 60% of total electricity generation in Cyprus.

3. Due to this emergency situation and under the relevant decree adopted by the competent Minister for Commerce, Industry and Trade, the CERA published a Decision authorising the EAC, as universal electricity supplier in Cyprus, to ensure the required new power generation during the energy crisis.

4. In view of this emergency situation, direct and effective measures were taken, including inter alia:

   - The temporary shut-down of desalination plants.
   - A public campaign on energy-saving resulting in the voluntary reduction of electricity consumption by users.
   - Regulation of the supply in order to strike a balance between the available production and demand (giving priority to specific consumer categories).
   - Using various ways to inform the affected consumers on the exact time of power supply failure.

5. As a result of the above measures, there was a de facto reduction in the overall electricity demand for the year 2011, as this unfortunate setback occurred during a period of high demand.

A.4 Information on important measures adopted in the previous year

1. Relevant information on financial incentives is provided in paragraph 4.2 of Annex F (Strategy for mobilising investments in the renovation of buildings).

2. With regard to legislative measures, please refer to the following tables:

LEGAL FRAMEWORK ON THE ENERGY EFFICIENCY OF BUILDINGS	
PREFECTURES	**REGULATIONS AND DECREES**
The 2006 Law on the Energy Efficiency of Buildings, Law 142(I)/2006 The 2009 Law on the Energy Efficiency of Buildings (Amending) Law 30(I)/2009 The 2012 Law on the Energy Efficiency of Buildings (Amending) Law 210(I)/2012 The 2006 Law on Streets and Buildings (Amending) Law 101/2006	The 2009 Regulations on the Energy Efficiency of Buildings (Energy Certification of Buildings) RAA 164/2009 The 2014 (Amending) Regulations on the Energy Efficiency of Buildings (Energy Certification of Buildings) RAA 39/2014 'The Streets and Buildings (Energy Efficiency of Buildings) Regulations of 2006' RAA 429/2006 'The Streets and Buildings (Energy Efficiency of Buildings) (Amending) Regulations of 2006' RAA 61/2014 'The 2007 Decree on the Calculation Methodology of the Energy Efficiency of Buildings' RAA 567/2007 'The 2009 Decree on the Energy Efficiency of Buildings (Calculation Methodology of Energy Efficiency of Buildings)' RAA 414/2009 'The 2007 Decree on the Minimum Energy Efficiency Requirements for Buildings' RAA 568/2007 'The 2009 Decree on the Energy Efficiency of Buildings (Minimum Energy Efficiency Requirements for Buildings)' 'The 2013 Decree on the Energy Efficiency of Buildings (Minimum Energy Efficiency Requirements for Buildings)' RAA 432/2013

Energy Efficiency in End Use and Energy Services, Laws/Regulations:

Legislation adopted:

No	Title	Purpose
1	Law 31(I)/2009, Law 52(I)/2012: The 2009 and 2012 Laws on energy efficiency in end use and energy services	Transposition of the provisions of Directive 2006/32/EC
2	RAA 184/2012: The 2012 Regulations on energy efficiency in end use and energy services (Energy Auditors).	Regulating matters related to the training and licensing of energy auditors for buildings, industries and transportation
3	RAA 171/2012: The 2012 Decree on the methodology and other requirements for conducting energy audits	Sets out the procedures, requirements and guidelines to be followed by energy auditors when carrying out audits in buildings and industries
4	RAA 163/2012: The 2012 Decree on Energy Service Auditors	Grants authorisation to officers of the Energy Department to monitor the implementation of the Law
5	RAA 218/2012: The 2012 Decree on the remuneration of the members of the Energy Auditors' Committee	Sets out the requirements and amount of remuneration for members of the Energy Auditors' Committee
6	The 2014 Regulations on energy efficiency in end use and energy services (Energy Service Providers) (RAA 210/2014)	Regulating issues related to the licensing of energy service providers and the establishment of the minimum issues to be regulated through energy performance contracts

Legislative instruments to be adopted within 2014

No	Title	Purpose
1.	The Decree on the Methodology and Other Requirements for Conducting Energy Audits (Transport)	Sets out the procedures, requirements and guidelines to be followed by energy auditors when carrying out audits in the transport sector
2.	The (Amending) Law on energy efficiency in end use and energy services	Transposition of the provisions of Directive 2012/27/EU
3.	The Decree on the conversion factors of selected end use fuels	Transposition of the provisions of Directive 2012/27/EU
4.	The 2014 (Amending) Law on the promotion of combined heat and power	Transposition of the provisions of Directive 2012/27/EU

A.5 Buildings of the central public administration

1. Relevant information is provided in paragraph 4.1 of Annex F (Strategy for encouraging investments in the renovation of buildings).

A.6 Energy performance obligations

1. As mentioned in paragraph 3.1 of the NEEAP, as an alternative to the adoption of an energy efficiency obligation scheme, Cyprus has chosen to prepare a National Energy Efficiency Programme (NEEP) for the purpose of achieving the Cumulative Energy Savings Target referred to in Article 7 EED.

2. Given that according to Article 7(1) the obligation of Member States to meet the target set out in the same Article starts from 1 January 2014, there are no available data on the savings achieved from the implementation of Cyprus' NEEP at the time in which the 3rd NEEAP is being drafted. Note that the revised NEEP will be submitted to the European Commission before 5 June 2014.

ANNEX B: ROADMAPS ON THE RENOVATION OF BUILDINGS

1. The Strategy for encouraging investments in the renovation of buildings is presented in Annex F.

ANNEX C: NATIONAL PLAN ON NEARLY ZERO ENERGY BUILDINGS

Nearly Zero Energy Buildings Action Plan

CYPRUS

September 2012

REPUBLIC OF CYPRUS

MINISTRY OF COMMERCE, INDUSTRY AND TOURISM

Contents

1. Introduction

The national plan for increasing the number of nearly zero energy buildings in Cyprus has been composed according to Article nine of the 2012/31/EU Directive, by the Energy Service of the Ministry of Commerce, Industry and Tourism (ES), the Competent Authority for the harmonization and application of the provisions of the Directive.

2. Context

The total dwelling stock in Cyprus[22] was in 2011, 433.212 of which, 299.275 are permanent residences and 133.937 are empty or of seasonal or temporary use. Of the 433.212 residences, 172.944 are detached houses, 59.050 are semi-detached houses, 32.893 are terraced houses and 123.557 are apartments. 32.530 are conventional dwellings in partly residential buildings

The recorded year of completion of these buildings is as follows:

3.968 were completed before 1919,

9.129 were completed between 1919 and 1945,

20.343 were completed between 1946 and 1960,

24.255 were completed between 1961 and 1970,

61.247 were completed between 1971 and 1980,

85.503 were completed between 1981 and 1990,

70.094 were completed between 1991 and 2000,

54.897 were completed between 2001 and 2005,

and

74.203 were completed between 2006 and 2011.

When it comes to the size of the residential buildings in Cyprus, the mean area per dwelling there has been a decreasing trend from 184m^2 in 1998 to 153m^2 in 2005. Since 2005 the mean area per dwelling has remained approximately in the same level.

The total building stock in the tertiary sector [23] was approximately 81.000

Out of the 81.000 there is information for the following categories of buildings

1073[24] are buildings used by public authorities, mainly offices

1035[25] are schools (nursing kindergarten, primary schools, gymnasiums, lyceum and universities)

395[26] are hotels and tourist apartments.

and

60^3 are hospitals and medical centres.

[22] According to the 2011 demographical survey of the Statistical Service of Cyprus
[23] According to the Electricity Authority of Cyprus
[24] According to ES data
[25] According to the technical services of the Ministry of Education and Culture
[26] According to Cyprus Organization of Tourism

3. Starting Point

The first attempt to introduce energy conservation in buildings was the preparation of a voluntary CYS98:1999 Standard for the Insulation and Rational Use of Energy in Dwellings.
The Standard was suggesting that the thermal transmission (Uvalue) of the elements of the envelope of the building (except doors and windows) should be less than 1W/m^2 K. Furthermore the mean U value of the building surface with regards to the volume of the building should be between 1.22-1.55 W/m^2 K. The compliance with this Standard was set as a requirement when applying for a grant for insulation of existing buildings under the Grant Scheme for the Promotion of Energy Conservation and Renewable Energy Sources until 2008.The Grant Scheme for the insulation of existing buildings was in force from the middle of 2004 to September 2009 and 22.861 applications were received during that time. The estimated energy conservation by this measure is 6.746 toe per year.

For the transposition of the 2002/91 EPBD in Cyprus, the following legal documents have been approved by the House of Representatives and published in the Government Official Gazette:

- The Law for the Regulation of the Energy Performance of Buildings of 2006, N.142(I)/2006;
- The Amendment of the Law for the Regulation of Roads and Buildings of 2006, N.101(I)/2006;
- The Amendment of the Law for the Regulation of the Energy Performance of the Buildings of 2009, N.30(I)/2009;
- The Energy Performance of Buildings Notification in Accordance to Article 22 of 2007, Κ.Δ.Π. 437/2007
- The Energy Performance of Buildings Notification in Accordance to Article 22 of 2009, Κ.Δ.Π.275/2009
- The Roads and Buildings (Energy Performance of Buildings) Regulations of 2006, Κ.Δ.Π. 429/2006;
- The Energy Performance of Buildings (Inspection of Air-conditioning Systems) Regulations of 2009, Κ.Δ.Π. 163/2009;
- The Energy Performance of Buildings (Energy Certification for Buildings) Regulations of 2009, Κ.Δ.Π. 164/2009;
- The Energy Performance of Buildings (Methodology for calculating the Energy Performance of Buildings) Ministerial Order of 2009 Κ.Δ.Π. 414/2009;
- The Energy Performance of Buildings (Minimum requirements for the Energy Performance of Buildings) Ministerial Order of 2009, Κ.Δ.Π. 446/2009;
- The Energy Performance of Buildings (Authorized Inspectors) Ministerial Order of 2009, Κ.Δ.Π. 40/2009;
- The Energy Performance of Buildings (Examination material examination fees for Qualified Experts) Ministerial Order of 2009, Κ.Δ.Π. 260/2009;
- - The Amendment of the Law for the Regulation of the Energy Performance of the Buildings of 2012, N.210(I)/2012;
- - The Energy Performance of Buildings (Minimum requirements for the Energy Performance of Buildings) Ministerial Order of 2013, Κ.Δ.Π. 432/2013;

The law and regulations, determine the minimum demand of the Energy Performance Requirements of a Building, the prerequisites for the issue of a Certificate for the Energy Performance of a Building, the exceptions of the obligation of the existence of a Certificate, the maintenance procedure and the inspection of

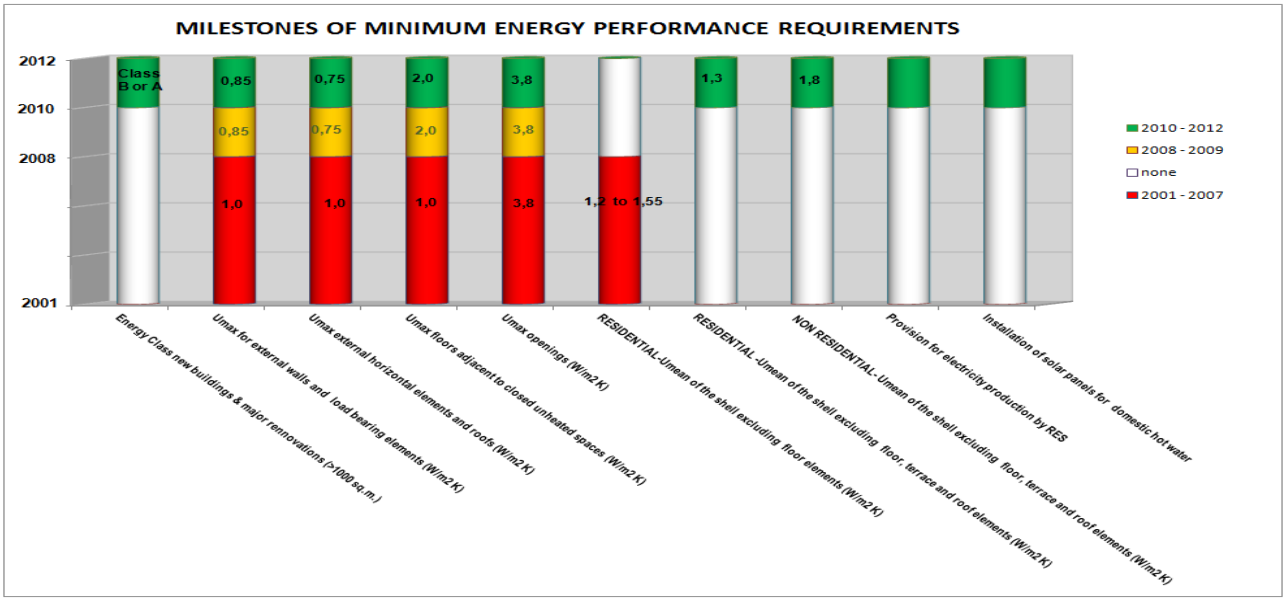
the energy consuming units of the building, the methodology for the calculation of the Energy Performance of a Building, the commendation of Advisory Committees, the authorities for inspection and auditing, the administration fines, the issuing of regulations, the offences, the lawsuit for the violation of law, the ability and the validity of the registration of Accredited Experts, the establishment and operation of the Register, the regulations and the fees.

The Law N.142(I)/2006 took effect as of 21/12/2007 by enacting the legislation concerning the minimum requirements set for the energy performance of buildings, (ΚΔΠ568/2007) which at that time were restricted to thermal insulation of the envelope for all new buildings and existing buildings exceeding 1000m2 of effective floor area undergoing major renovation. The issue of Certificates for the Energy Performance for Buildings has taken effect as of 1st of January 2010 for residential buildings where as for non residential buildings has commenced in September 2010.

From January 2010, (Κ.Δ.Π.449/2009), the minimum requirements for the energy performance of buildings, besides the restrictions on the thermal performance of the different elements of the envelope of the building (maximum U-values), include; a mean u-value for the whole envelope excluding roof and floor, compulsory use of the domestic hot water solar systems, provision for electrical infrastructure for renewable system producing electricity. The category of the Energy Performance Certificate must be at least B (approximately 200kWh/m2/yr on average, for residential buildings and 260 kWh/m2 /yr on average, for non residential) for all new buildings, and all existing buildings exceeding 1000m2 of effective floor area undergoing major renovation.

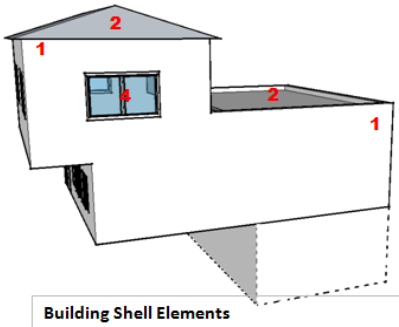
The Amendment of the Law for the Regulation of the Energy Performance of the Buildings of 2012, N.210(I)/2012 took effect in 28/12/2012 and the latest revision of the minimum requirements for the energy performance of buildings took effect in 13/12/2013.

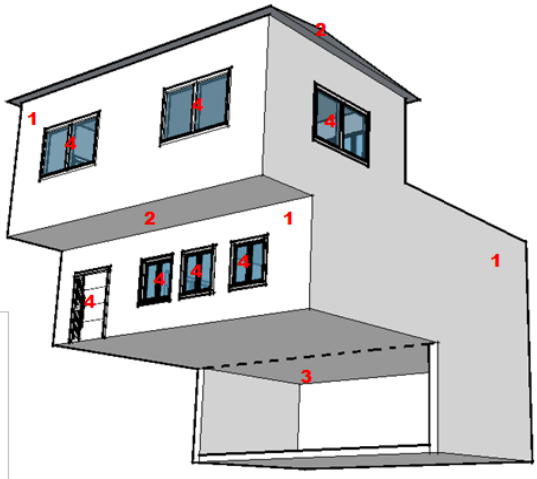
The chart below shows the milestones of the minimum requirements up until November 2013



Minimum Energy Performance Requirements according to CYS98, Κ.Δ.Π.568/2007 and Κ.Δ.Π.446/2009.

CYS 98	ΚΔΠ.568/2007	ΚΔΠ.446/2009
• 2001-2007	• 2008-2009	• since 2010





Building Shell Elements

1 : Walls and bearing construction elements

2: Horizontal shell elements and roofs in direct contact with the external enviroment

3 : Floors over closed non heated spaces

4 : Openings

Building Shell

- **1** : Umax =1,0 W/m²K
- **2** : Umax =1,0 W/m²K
- **3** : Umax =1,0 W/m²K
- **4** : Umax =3,8 W/m²K
- Umean of the building shell elements excluding floors = 1,2 to 1,55 W/m²K

Building Shell

- **1** : Umax =0,85 W/m²K
- **2** : Umax =0,75 W/m²K
- **3** : Umax =2,0 W/m²K
- **4** : Umax =3,8 W/m²K
- Umean N/A

Building Shell

- **1** : Umax =0,85 W/m²K
- **2** : Umax =0,75 W/m²K
- **3** : Umax =2,0 W/m²K
- **4** : Umax =3,8 W/m²K
- Umean of building shell elements excluding floors , terraces and roofs is 1,8 W/m²K for non residential and 1,3 W/m²K for residential buildings

Other Measures

- All new buildings are at least Energy Class B

- Installation of solar panels for covering hot water consumption

- Provision for future use of systems of electricity production

4. Definition of NZEB for Cyprus

For the purpose of setting the definition of the NZEB in Cyprus the ES had structured the in depth study of the potential of energy saving in the identified as most commonly used 3 categories of residential buildings,

i) Detached 2 storey house

ii) terraced houses

iii) apartments on building blocks,

in the 4 climatic zones[27] of the country as defined in the national methodology for the energy performance of buildings.

The parameters identified to be analysed in order to characterize the NZEB were:

a. Architectural Design: orientation, compactness and summer comfort control
b. Insulation of opaque surfaces: walls, roof, floor (in contact with the ground, the air and closed environment)
c. Shading strategies and applications (fins, overhangs, shutters, etc)
d. Windows and other transparent surfaces: Thermal characteristics, U-value, shading, Tsolar, Lsolar.
e. Air permeability of the building for detached buildings and apartment buildings (high and low rising)
f. Ventilation, natural and mechanical, in order to achieve good air quality to control air humidity and to ensure the durability of the building while reducing the energy consumptions of the heating, cooling and the use of ventilators.
g. Heat recovery systems when applicable
h. Heating systems, use of conventional hybrid or only renewable heating systems (the heating system should be analysed according to the following parameters: adaptation to the building characteristics (including its use), their energy efficiency, their environmental impact (especially of the carbon footprint) and the long term availability of the resource.
i. Optimization of the solar hot water production
j. Investigation of the gains from programming that would manage the absence of the occupants
k. Natural cooling methods
l. Cooling systems, use of conventional, or hybrid and renewable systems should be analysed according to the following parameters: adaptation to the building characteristics (including its

[27] Climatic zone 1 : Costal areas
Climatic zone 2 : Lowlands
Climatic zone 3 : Low mountainous areas (from 300m up to 600m from sea level)
Climatic zone 4 : High mountainous areas

use), their energy efficiency, their environmental impact (especially of the carbon footprint) and the long term availability of the resource.

m. Strategies for passive heating and cooling

Consulting Services

Through an open tender procedure, ES had engaged the consulting services of EXERGIA S.A. The scope of the contract was the in depth analysis of the different aspects of the design, materials and technical systems in the 4 climatic zones of Cyprus applicable to residential buildings, and in order to advice the Competent authority on the best possible applications in terms of energy efficiency, towards achieving nearly zero energy residential buildings and an indication of the primary energy in kWhr/m2/yr. The contract had a duration of approximately one year and was completed in July 2012 and the results of the contract have been presented to all the interested parties in June 2012.

Calculation of Cost Optimal Levels

At the same time the ES is calculating the minimum energy performance requirements at the cost optimal levels. The method is based on the comparative methodology framework as it is defined in the Regulation No 244/2012 and the guidelines accompanying the regulation. For the purpose of the calculation reference buildings were defined for the following types of buildings:

- Single family buildings
- Apartment buildings
- Office buildings
- Educational buildings
- Hospitals
- Hotels
- Sports facilities
- Small retail buildings
- Large retail buildings

In all cases more than one reference building corresponds to each type of building, since the main purpose of a reference building is to represent the average and typical building stock. For the establishment of reference buildings, real and virtual buildings were used. The energy performance of the reference buildings is calculated in kWh/m^2/year of delivered and primary energy using the national methodology. The national methodology defines the pattern of use and the conversion factors of primary energy. So far they have been calculated the cost optimal levels of the energy performance requirements for single family buildings and office buildings. The calculation will be completed and submitted to European Commission by March 2013.

The proposed NZEB in Cyprus definition is under public consultation and when it is concluded the design parameters of NZEB are to be finalized.

For Residential Buildings:

Primary Energy Use: ?kWh/m2/yr

The numerical indication above includes primary energy use for heating, cooling, lighting and domestic hot water.

At least 25% of the ?kWh/m2/yr of the Primary Energy must be covered by RES

The NZEB for residential buildings in climatic zones 1,2,3[6] (Coastal areas, Lowlands, Low mountainous areas) uses a reference building with the following technical characteristics:

TABLE 1: RESIDENCE IN CLIMATE ZONES 1, 2 AND 3*

S/N	DESIGN PARAMETER	PROPOSED PRICE
	Structural elements of the building's envelope	
1	Thermal transmittance of external walls	≤0.489W/m^2k
2	Thermal transmittance of roof	≤0.407W/m^2k
3	Thermal transmittance of floor in contact with the soil	≤1.6W/m^2k
4	Thermal transmittance of floor over an open pilotis	≤0.41W/m^2k
5	Thermal transmittance of framed structures	≤2.8W/m^2k
6	Internal thermal capacity of residence	Medium construction (medium or heavy weight)**
	External shading	
7	Shadowing factors of the shading system on glass pane during summer months	Gvalue ≤0.5***
8	Thermal transmittance of the shading system with shutters	≤1.1W/m^2k
	Other Parameters	
9	Air-tightness of envelope (entry of air)	≤110m^3/(hm^2) at 50Pa
10	Night cooling in the summer	Bedrooms ≥ 730 m^3/h
		Other spaces ≥ 1300 m^3/h
11	Annual consumption in primary energy (heating, cooling, lighting, domestic hot water and equipment)	? kWh/m^2 per annum (the price will be set depending on the software used for this purpose)
12	Contribution of Renewable Energy Sources to annual primary energy consumption	≥25%

The NZEB for residential buildings in climatic zone 4[6] (high mountainous area) uses a reference building with the following technical characteristics:

TABLE 2: RESIDENCE IN CLIMATE ZONE 4

S/N	DESIGN PARAMETER	PROPOSED PRICE
	Structural elements of the building's envelope	
1	Thermal transmittance of external walls	≤0.303W/m^2k
2	Thermal transmittance of roof	≤0.338W/m^2k
3	Thermal transmittance of floor in contact with the soil	≤.283W/m^2k
4	Thermal transmittance of floor over an open pilotis	≤0.34W/m^2k
5	Thermal transmittance of framed structures	≤2.8W/m^2k
6	Internal thermal capacity of residence	Medium or heavy construction (medium or heavy weight)** ≥ 132 kWh/K per m^2 of total floor surface
	External shading	
7	Shadowing factors of the shading system and glass pane during summer months	-
8	Thermal transmittance of the shading system with shutters	≤1.1W/m^2k
	Other Parameters	
9	Air-tightness of envelope (entry of air)	≤10m^3/(hm^2) at 50Pa
10	Night cooling in the summer	Bedrooms ≥ 730 m^3/h
		Other spaces ≥ 1300 m^3/h
11	Annual consumption in primary energy (heating, cooling, lighting, domestic hot water and equipment)	? kWh/m^2 per annum (the price will be set depending on the software used for this purpose)
12	Contribution of Renewable Energy Sources to annual primary energy consumption	≥25%

5. National Plan to increase the number of NZEB

In the present chapter the proposed plan of action for increasing of NZEB in Cyprus is presented.

Objective

The plan of action presents the essential measurements that will enable Cyprus to harmonise with the Directive 2010/31/EU and enforce the NZEB on new public buildings by 2018 and all new buildings by 2020.
The national plan includes short term and medium term measures as follows:

Short term measures

1. Information of the public and education of selected groups of the industry.
2. Pilot project applications and encouragement of volunteer application of the NZEB in private buildings.
3. Guidance for preparation of the industry and construction companies.
4. Gradual advancement of legal requirements (strengthening of the minimum energy performance requirements for new buildings).

Medium term measures

5. Certification of NZEB.
6. Compliance monitoring.

Identified population groups

The identified population groups affected and thus needing tailored actions are:

General Public	All the potential owners and users of NZEB
Land Developing Companies	Companies that plan ahead for future construction developments
Professionals	Professionals that design and control the construction of buildings such as Architects, Civil Engineers, Electrical Engineers, Mechanical Engineers, etc
Qualified Experts	Engineers, specially trained and registered by the ES as qualified to issue Energy Performance of Buildings Certificates according to the national methodology for the energy performance of buildings.
Industry	All the industrial and commercial enterprises that supply construction and building materials, energy saving products, solar systems, building technical systems, etc.
Public Authorities	Ministry of Commerce, Industry and Tourism, Ministry of Interior, District Authorities, and Municipalities, i.e. all the competent authorities involved in the legal framework.
Consulting Companies	Companies and organizations that will consult stakeholders about the oncoming changes in the construction industry.

Suggested Actions:

The following actions have been included in order to implement the measures of the national plan. The execution of the national plan is divided in three stages according to the progressive reviews of the legal framework in Cyprus. The three stages are the following:

1st Stage 2012-2015: Application on a volunteer basis of the NZEB.

a) Preparation of a Technical Guide

ES will prepare a Technical Guide based on the results of the in depth study of the energy saving potentials and the outcomes of the consulting services contract. The Technical Guide shall include the minimum requirements of the NZEB in Cyprus and technical and **construction guidance in order to facilitate the design and construction of the building.** The application of the Technical Guide will be on a volunteer basis and will be upgraded continually. It will remain in use even after the enforcement by law application of NZEB.

b) Pilot Project Applications of NZEB in Cyprus

Residential and non residential pilot applications of NZEB are planned to be constructed.

Since last year the ES is assisting the Cyprus Land Development Cooperation[28] into designing and setting the specifications for new developments of semi-detached, terraced and apartments in order to be NZEBs. This action is subject to land development construction demand.

Also ES is working closely with the Technical Services of the Ministry of Education and Culture in order to design and construct the first NZEB schools.

c) Supporting Research Programs for the development, improvement or advancement of construction techniques.

It is important that research programmes in the industrial field are supported in order to develop or advance further the available construction products and techniques and thus make available improved solutions in the construction industry.

d) Methodology and software for the Energy Performance Certification of the NZEB

Comparing the existing national methodology of the certification of the Energy Performance of Buildings, with the certification of NZEB, further parameters are to be accounted for in the latter, thus the existing methodology should be further developed in order to include the NZEB category. Once this is done, the software now in use for the certification of buildings will have to be improved, or replaced in order to reflect the new methodology for the certification of NZEB. It should be noted that the software in use now is developed by the ES and is free for all users. There are at the moment several private initiatives to develop software conforming to the national methodology, which will undergo evaluation and approval by ES in order to be used for Energy Performance Certification of Buildings.

e) Informing the Qualified Experts and the Engineers of the building industry

[28] Cyprus Land Development Cooperation was established in 1980 within the framework of the state's social policy to assist middle- and low-income classes in acquiring their own home. In order to promote the purpose of its establishment, the cooperation divides land into housing plots and erects dwellings which are available to eligible citizens at reasonable prices and terms of payment.

The Qualified Experts and Architects and all Engineers involved in the design and construction of building will need to be informed of the changes of the legal framework and the minimum energy performance requirements of NZEB. Qualified Experts should be also further educated in the new parameters of the methodology for the certification of the NZEB and the use of the new software.

f) Training the construction companies personnel and the on site technicians.

Under the **European initiative "Build Up Skills"** which is part of the European programme "Intelligent Energy for Europe" and is co-funded by the European Executive Agency for Competitiveness and Innovation (EACI), Cyprus has identified[29] the numbers, the specialities, the necessary knowledge, skills and way of thinking needed to be acquired by the on site personnel, in order to render both the Construction sector, as well as other related sectors, making achievable the relevant targets of "Europe 2020" strategy[30], including NZEB.

The examination of the current **Vocational Education and Training System** in technical occupations concludes that the structure of the System is sufficiently concise and flexible, in order to meet any challenges that may arise. However, the continuous review and upgrade of the existing programmes is thought to be an absolute necessity, as well as the addition of new targeted programmes in emerging critical technologies, the training of instructors in order to renew and enrich their knowledge, and the provision of incentives and measures to increase the flow of Cypriot young people in technical occupations.

The total employment needs in certain technical occupations related to the "Build Up Skills" project for the period 2010-2020 are expected to increase significantly in comparison to the respective ones for the period 2005-2010.

Through the analysis of the status quo and the comparison with national targets and actions, the needs for technological skills are identified, which will play a key role in the achievement of the targets for 2020, like the installation and maintenance of photovoltaic systems, heat pumps and shallow geothermal systems, solar protection and automation systems, electronic monitoring and control of central heating, cooling and air-conditioning systems. Additionally, the minimum annual number of people per discipline who must receive training for new skills by 2020 has been estimated.

The results of this report will lay the foundation for the preparation of a **Roadmap** with a time horizon for completion by 2020, which will include all main policies and actions that are required for the promotion of the necessary vocational education and training of the people employed in technical occupations of the Construction sector and other related sectors, so that they acquire the necessary skills for the achievement of the national targets regarding the energy in the building sector.

g) Raising the awareness of the public.

The correct user-behaviour of the occupant will enhance the design and construction of NZEB whereas the foul use will negatively affect their performance. Thus it is important that
the characteristics and advantages of the NZEB as well as of the renewable energy systems and energy conservation systems be presented through a well planned campaign to the public, with special interest in the rational and correct use of these buildings and technical systems.

29 BUILD UP Skills – Cyprus An Analysis of the National Status Quo Report

30 http://ec.europa.eu/europe2020/

Successful practices used in the past will be planned such as publication of informative flyers, articles and interviews in newspapers, participation of energy officers in television and radio shows. Furthermore the upgrading of the website of the ES with a special link to the NZEB has already been planned.

h) Design and announcement of a linear tightening of the minimum energy performance requirements leading to the 2020 NZEB.

In order to achieve a smooth transition from the today's minimum energy performance requirements to the NZEB energy performance requirements the ES will design and announce a linear tightening of the minimum energy performance requirements.

i) Relevant economic incentives and financing instruments

Proposed Support Scheme title: «εξοικονομώ – αναβαθμίζω» (I save – I upgrade), timeframe:2014-2020

- **Category A**-Financial incentive plan for energy performance upgrade of residential buildings for which the building permit was granted prior to the 21st December2007. Total budget: 5.000.000 euros.
- **Category B** Financial incentive plan for energy performance upgrade of non residential buildings owned by a business for which the building permit was granted prior to the 21st December2007. Total budget:5.000.000 euros
- **Category C** Financial incentive plan for the energy performance upgrade of public sector buildings with useful floor area over 250 sq. meters and which were built prior to 2008. Total budget:5.000.000 euros
- **Category D** Financial incentive plan for energy performance upgrade of individual building elements and for which the building permit was granted as residential. Total budget:1.000.000 euros

2nd Stage2015-2018: Gradual Application of NZEB

a) Second and third revision of the minimum energy performance requirements.

The minimum energy performance requirements, as mentioned before, have been set for the first time in 2007 and have been revised in 2009 and are included in Ministerial Orders issued by the Ministry of Commerce, Industry and Tourism. It is planned that at least 2 more revisions will take place between 2015 and 2018 named as the Second Revision and Third Revision respectively. On the second revision the minimum energy performance requirements will be tightened further, reflecting the trend leading to the NZEB and in the third revision the minimum energy performance requirements for NZEB will be issued

b) Further upgrading of the software for the Certification of the NZEB.

The software developed during the first stage will continuously be upgraded /improved according to the remarks of the users and the changes made by the ES.

c) Further upgrading the NZEB web platform

Information will be periodically updated and enriched to include: a) the Technical Guide, b) the presentation of NZEB that have been certified as such including description of construction and planning data, as well as visual presentation (photos and videos) and c) information on the construction companies, or land development organization responsible for the building.

d) Informing the Qualified Experts and the Engineers of the building industry-continued.

The education of the Qualified Experts and Engineers of the building industry will continue through the second stage in order to cover all new interested parties and to continuously update their knowledge on the different aspects of NZEB, as well as the legal requirements, i.e. the second and third revision of the minimum energy performance requirements.

e) Training the construction companies personnel and the on site technicians.

The Roadmap to be prepared on the second stage of **Build up Skills Project** will set the pace and needs of the training of the construction companies personnel and the on site technicians and will run through to the second stage.

f) Raising the awareness of the public- continued.

The information campaign that has started during the first stage will be evaluated and according to the results, adjusted to reach further and further the public. Furthermore Open Day houses visits to the NZEB constructed during the first stage, either by the pilot projects supported by ES, or by private initiative will be planned

3rd Stage2018-2020: Implementation and Application of NZEB

a) Implementation of the Third Revision of the Minimum Energy Performance Requirements.

The Ministerial Order containing the Third Revision of the Minimum Energy Performance Requirements will be enforced and it will apply to all new building occupied and owned by the public authorities- from the 31st of December 2018 and to all new buildings- from the 31st of December 2020.

b) Identified final software for the Certification of the NZEB.

The Ministerial Order prescribing the Final version of the official (free) software for the Certification of NZEB will be enforced. At the same time other software developed by the private sector will be evaluated and be approved for use for the certification of NZEB.

6. Conclusion

Existing Insulation requirements for new buildings are approaching the limits of cost efficiency. Some further improvements will be delivered due to the reduction of cost of the necessary material and technology. The bulk of the improvements towards the NZEB will be achieved by increasing RES on buildings, primarily photovoltaics. The proposed NZEB in Cyprus will be finalized after a public consultation process.

ANNEX D: DESCRIPTION OF MEASURES AND TABLES ON CALCULATIONS

MEASURES IMPLEMENTED

1. Minimum requirements for the energy performance of new buildings (Law 142/2006)

1.1. Residential Sector

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 as established by the relevant decree adopted by the Minister for Commerce, Industry and Tourism.
	Time frame	Start: 2008, Expiry: - These codes, which have been in effect since 2008, were revised in 2010 and 2013, whereas another revision thereof is expected before 2020.
	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	Buildings of the Residential Sector (houses - apartments)
	Target group	New dwellings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006)
	Regional 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 Department of the MECIT.
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	National methodology. Set out in Annex E, paragraph 1.
	Energy savings achieved in 2012.	**78 050.3 TOE**
	Energy savings expected in 2016	**112 353 TOE** (87 101 TOE by the end of 2013 and 25 252 TOE from the measures of the period 2014-2016).
	Energy savings expected in 2020 (if possible).	**25 000 TOE**
	Assumptions	In calculating energy savings, data were received from the National Statistical Service concerning the surface (in square metres) of the houses-apartments built in the period 2008-2012. The assumptions are included in the methodology description provided in Annex E, paragraph 1.

TABLES ON ENERGY EFFICIENCY CALCULATIONS FOR THE ENERGY EFFICIENCY OF NEW HOMES.

New Single-family house							
Total Primary Consumption before Buildings Code (kWh/year)	**Primary Consumption before Buildings Code in (kWh/m²/year)**	**Total Energy Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Total Energy Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)**	**Primary Energy Saving (kWh/m²/year)**	**Final Consumption before Building Codes in (kWh/m²/year)**	**Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Final Energy Saving (kWh/m²/year)**
3 882	226.60	21 431 696	121 771	104.83	123.4	66.7	56.7

Year of Construction	**Area of new single houses constructed (m²)**	**Energy Saving (kWh/m²/year)**	**Total Energy Saving per year (kWh/year)**	**Total Primary Energy Saving per year (toe/year)**	**Total Final Energy Saving per year (toe/year)**	Life time	**Contribution in the target of 2016 TOE %**		**Contribution in the target of 2020 TOE %**	
2008	550000	90.00	49500000	4257.0	2680.4	20	4257.0	2.301%	0.0	0.000%
2009	1325779	90.00	119320110	10261.5	6461.1	20	10261.5	5.547%	0.0	0.000%
2010	1167883	104.83	122430661.3	10529.0	5691.6	20	10529.0	5.691%	10529.0	2.274%
2011	970505	104.83	101739274.3	8749.6	4729.7	20	8749.6	4.730%	8749.6	1.890%
2012	824929	104.83	86478383.19	7437.1	4020.2	20	7437.1	4.020%	7437.1	1.606%
2013	577450	104.83	60534868.23	5206.0	2814.2	20	5206.0	2.814%	5206.0	1.124%
2014	519705	104.83	54481381.41	4685.4	2532.7	20	4685.4	2.533%	4685.4	1.012%
2015	519705	104.83	54481381.41	4685.4	2532.7	20	4685.4	2.533%	4685.4	1.012%
2016	571676	104.83	59929519.55	5153.9	2786.0	20	5153.9	2.786%	5153.9	1.113%
2017	628844	104.83	65922471.5	5669.3	3064.6	20	0.0	0.000%	5669.3	1.224%
2018	691728	104.83	72514718.65	6236.3	3371.1	20	0.0	0.000%	6236.3	1.347%
2019	760901	104.83	79766190.52	6859.9	3708.2	20	0.0	0.000%	6859.9	1.482%
2020	836991	104.83	87742809.57	7545.9	4079.0	20	0.0	0.000%	7545.9	1.630%
TOTAL	9396097		965341769.7	83019.4	45791.2		60965.0	30.653%	72757.9	15.714%

Note that for the period 2013-2020, a forecast is made of the total square metres of the houses to be built.

New Apartments						
Total Primary Consumption before Buildings Code (kWh/year)	**Primary Consumption before Buildings Code in (kWh/m²/year)**	**Energy Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)**	**Primary Energy Saving (kWh/m²/year)**	**Final Consumption before Building Codes in (kWh/m²/year)**	**Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Final Energy Saving (kWh/m²/year)**
23990.01	272.61	150.218106	122.40	161.96	76.36	85.60

Year of Construction	Area of new apartments constructed (m²)	Energy Saving (kWh/m²/year)	Total Energy Saving per year (kWh/year)	Total primary Energy Saving per year (toe/year)	Total Final Energy Saving per year (toe/year)	Life time	Contribution in the target of 2016 TOE %		Contribution in the target of 2020 TOE %	
2008	455 000	105.00	47 775 000	4 108.7	3 349.6	20	4 108.7	2.221%	0.0	0.000%
2009	1 212 750	105.00	127 338 750	10 951.1	8 928.1	20	10 951.1	5.920%	0.0	0.000%
2010	931,209	122.40	113 975 922.1	9 801.9	6 855.4	20	9 801.9	5.298%	9 801.9	2.117%
2011	613 886	122.40	75 136 970.25	6 461.8	4 519.3	20	6 461.8	3.493%	6 461.8	1.396%
2012	521 803	122.40	63 866 424.72	5 492.5	3 841.4	20	5 492.5	2.969%	5 492.5	1.186%
2013	365 262	122.40	44 706 497.3	3 844.8	2 689.0	20	3 844.8	2.078%	3 844.8	0.830%
2014	328 736	122.40	40 235 847.57	3 460.3	2 420.1	20	3 460.3	1.870%	3 460.3	0.747%
2015	328 736	122.40	40 235 847.57	3 460.3	2 420.1	20	3 460.3	1.870%	3 460.3	0.747%
2016	361 610	122.40	44 259 432.33	3 806.3	2 662.1	20	3 806.3	2.057%	3 806.3	0.822%
2017	397 771	122.40	48 685 375.56	4 186.9	2 928.3	20	0	0.000%	4 186.9	0.904%
2018	437 548	122.40	53 553 913.12	4 605.6	3 221.2	20	0	0.000%	4 605.6	0.995%
2019	481 302	122.40	58 909 304.43	5 066.2	3 543.3	20	0	0.000%	5 066.2	1.094%
2020	529 433	122.40	64 800 234.87	5 572.8	3 897.6	20	0	0.000%	5 572.8	1.204%
TOTAL	6 510 045		775 704 519.9	70 819.2			51 387.6	27.777%	55 759.5	12.043%

Note that a forecast for the period 2013-2020 is made of the total square metres of apartments to be built.

RESIDENTIAL SECTOR- New Single family house & New Apartments									
Year of Construction	**Area of new buildings (single houses, apartments, offices) constructed (m^2)**	**Total Energy Saving per year (kWh/year)**	**Total primary Energy Saving per year (toe/year)**	Life time	**Total Final Energy Saving per year (toe/year)**	**Contribution in the target of 2016 TOE %**		**Contribution in the target of 2020 TOE %**	
2008	1 005 000	97 275 000	8 365.65	20	6 030	8 366	4.52%	0.00	0.00%
2009	2 538 529	246 658 860	21 212.66	20	15 389	21 212.6	11.47%	0.00	0.00%
2010	2 099 092	236 406 583.4	20 330.97	20	12 547	20 330.96	10.99%	20 330.97	4.39%
2011	1 584 391	176 876 244.6	15 211.36	20	9 249	15 211.35	8.22%	15 211.36	3.29%
2012	1 346 732	150 344 807.9	12 929.65	20	7 862	12 929.65	6.99%	12 929.65	2.79%
2013	942 713	105 241 365.5	9 050.76	20	5 503	9 050.75	4.89%	9 050.76	1.95%
2014	848 441	94 717 228.98	8 145.68	20	4 953	8 145.68	4.40%	8 145.68	1.76%
2015	848 441	94 717 228.98	8 145.68	20	4 953	8 145.68	4.40%	8 145.68	1.76%
2016	933 286	104 188 951.9	8 960.25	20	5 448	8 960.24	4.84%	8 960.25	1.94%
2017	1 026 614	114 607 847.1	9 856.27	20	5 993	0	0.00%	9 856.27	2.13%
2018	1 129 275	126 068 631.8	10 841.90	20	6 592	0	0.00%	10 841.90	2.34%
2019	1 242 203	138 675 494.9	11 926.09	20	7 251	0	0.00%	11 926.09	2.58%
2020	1 366 423	152 543 044.4	13 118.70	20	7 977	0	0.00%	13 118.70	2.83%
TOTAL	15 906 141	1 838 321 290	158 095.63			112 353	60.731%	128 517.32	27.758%

1.2. 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	**Time frame**	Start: 2008, Expiry:- These codes, which have been in effect since 2008, were revised in 2010 and 2014, whereas another revision thereof is expected before 2020.
	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 **Target group**	Buildings in the tertiary sector
	Regional application	New tertiary sector buildings, except those described in the Annex to the Regulation of the Energy Efficiency of Buildings Law (Law 142(I)2006).
		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 Department of the MECIT.
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	National methodology. Set out in Annex E, paragraph 2.
	Energy savings achieved in 2012.	**7 710 TOE**
	Energy savings expected in 2016	**12 183.8 TOE**
	Energy savings expected in 2020	**5 000 TOE**
	Assumptions	In calculating energy savings, data were received from the National Statistical Service concerning the surface (in square metres) of the houses-apartments built in the period 2008-2012. The assumptions are included in the methodology description provided in Annex E, paragraph 2.

TABLES ON ENERGY EFFICIENCY CALCULATIONS FOR NEW BUILDINGS IN THE TERTIARY SECTOR.

Offices							
Total Primary Consumption before Buildings Code (kWh/year)	**Primary Consumption before Buildings Code in (kWh/m²/year)**	**Total Energy Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Total Energy Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)**	**Primary Energy Saving (kWh/m²/year)**	**Final Consumption before Building Codes in (kWh/m²/year)**	**Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Final Energy Saving (kWh/m²/year)**
645 994	256.86	31 724.352	180 252	76.60	95.13	66.76	28.37

Year of Construction	**Area of new offices constructed (m²)**	**Energy Saving (kWh/m²/year)**	**Total Energy Saving per year (kWh/year)**	**Total primary Energy Saving per year (toe/year)**	**Total Final Energy Saving per year (toe/year)**	Life time	**Contribution in the target of 2016 TOE %**		**Contribution in the target of 2020 TOE %**	
2009	322 949	76.60	24 739 351.92	2 127.6	788.0	20	2 127.6	1.150%	0.0	0.000%
2010	290 292	76.60	22 237 686.62	1 912.4	708.3	20	1 912.4	1.034%	1 912.4	0.413%
2011	301 130	76.60	23 067 866.33	1 983.8	734.8	20	1 983.8	1.072%	1 983.8	0.428%
2012	255 960	76.60	19 607 686.38	1 686.3	624.5	20	1 686.3	0.911%	1 686.3	0.364%
2013	179,172	76.60	13 725 380.46	1 180.4	437.2	20	1 180.4	0.638%	1 180.4	0.255%
2014	161 255	76.60	12 352 842.42	1 062.3	393.5	20	1 062.3	0.574%	1 062.3	0.229%
2015	161 255	76.60	12 352 842.42	1 062.3	393.5	20	1 062.3	0.574%	1 062.3	0.229%
2016	177 380	76.60	13 588 126.66	1 168.6	432.8	20	1 168.6	0.632%	1 168.6	0.252%
2017	195 118	76.60	14 946 939.33	1 285.4	476.1	20	0.0	0.000%	1 285.4	0.278%
2018	214 630	76.60	16 441 633.26	1 414.0	523.7	20	0.0	0.000%	1 414.0	0.305%
2019	236 093	76.60	18 085 796.58	1 555.4	576.1	20	0.0	0.000%	1 555.4	0.336%
2020	259 703	76.60	19 894 376.24	1 710.9	633.7	20	0.0	0.000%	1 710.9	0.370%
TOTAL	2 754 938		211 040 528.6	18 149.5	6 722.0		12 183.8	5.436%	16 021.9	3.460%

2. Grants scheme for encouraging RES use

2.1 RESIDENTIAL SECTOR.

Title of the Energy Efficiency Improvement Measure (EEI)		Grants scheme to encourage the use of RES (end use) in the residential sector.
Description	**Time frame**	Start: 2004, Expiry: 2013
	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 in purchasing and installing new equipment. It also covers the cost of studies, where these are deemed necessary. The investments must concern mature technologies and not technologies which are 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.
	Regional application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	• Autonomous photovoltaics • Domestic solar systems • Solar space heating/cooling • Central active solar water heating systems. • Solar swimming pool heating systems • Heat pump with ground heat exchanger for space heating and cooling
	Budget and source	See Annex G Special Fund for RES and ES
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Department of the MECIT.

<table>
<tr><td>Energy Savings</td><td>Method used for monitoring/calculating energy savings</td><td>In calculating energy savings for each type of investment, the Methodologies set out in Annex E, paragraph 3, were used.</td></tr>
<tr><td></td><td>Energy savings achieved in 2012.</td><td>13 443.1 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2016</td><td>13 628 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2020</td><td>1 011.1 TOE</td></tr>
<tr><td></td><td>Assumptions</td><td>
<table>
<tr><th>Investment Category</th><th>Number of Systems</th></tr>
<tr><td>Autonomous photovoltaics</td><td>379</td></tr>
<tr><td>Domestic solar systems</td><td>41 521</td></tr>
<tr><td>Solar space heating/cooling</td><td>813</td></tr>
<tr><td>Central active solar water heating systems.</td><td>48</td></tr>
<tr><td>Solar swimming pool heating systems</td><td>51</td></tr>
<tr><td>Heat pump with ground heat exchanger for space heating and cooling</td><td>110</td></tr>
<tr><td>TOTAL</td><td>42 922</td></tr>
</table>
The assumptions are included in the methodology description provided in Annex E, paragraph 3.
</td></tr>
</table>

TABLES CONTAINING DATA ON INVESTMENTS MADE UNDER THE GRANT SCHEME FOR ENCOURAGING THE USE OF RES IN THE RESIDENTIAL SECTOR

INDEPENDENT PV SYSTEMS - RESIDENTIAL SECTOR								
S/N	YEAR	STRUCTURAL INVESTMENT (YEARS)	NO OF INVESTMENTS	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2005	20	4	1.86	1.86	0.001%	0.0	0.000%
2	2006	20	28	12.56	12.56	0.007%	0.0	0.000%
3	2007	20	33	13.42	13.42	0.007%	0.0	0.000%
4	2008	20	64	26.71	26.71	0.014%	0.0	0.000%
5	2009	20	73	20.91	20.91	0.011%	0.0	0.000%
6	2010	20	46	14.28	14.28	0.008%	14.3	0.003%
7	2011	20	37	8.59	8.59	0.005%	8.6	0.002%
8	2012	20	54	21.73	21.73	0.012%	21.7	0.005%
9	2013	20	40	11.72	11.72	0.006%	11.7	0.003%
10	2014	20	0	0.00	0.0	0.000%	0.0	0.000%
TOTAL			379	131.78	131.8	0.071%	56.33	0.012%

DOMESTIC SOLAR SYSTEMS FOR HOT WATER-1														
S/N	NO OF SYSTEMS	ENERGY SAVINGS TOE/YEAR	STRUCTURAL INVESTMENTS (YEARS)	YEARS	2004	2005	2006	2007	2008	2010	2011	2016	2020	2023
1	1 879	426.98	20	2004	427	427	427	427	427	427	427	427	427	427
2	4 978	1 411.61	20	2005	0	1 412	1 412	1 412	1 412	1 412	1 412	1 412	1 412	1 412
3	6 941	1 772.33	20	2006	0	0	1 772	1 772	1 772	1 772	1 772	1 772	1 772	1 772
4	10 706	3 358.72	20	2007	0	0	0	3 359	3 359	3 359	3 359	3 359	3 359	3 359
5	15 272	4 969.27	20	2008	0	0	0	0	4 969	4 969	4 969	4 969	4 969	4 969
6	0	0.00	20	2009	0	0	0	0	0	0	0	0	0	0
7	314	106.96	20	2010	0	0	0	0	0	107	107	107	107	107
8	256	83.53	20	2011	0	0	0	0	0	0	84	84	84	84
9	658	215.62	20	2012	0	0	0	0	0	0	0	216	216	216

10	**517**	**170.61**	**20**	2013	0	0	0	0	0	**0**	**0**	**171**	**171**	**171**
TOTAL	41 521	12 515.63			**427**	**1 839**	**3 611**	**6 970**	**11 939**	**12 046**	**12 129**	**12 516**	**12 516**	**12 516**

DOMESTIC SOLAR SYSTEMS FOR HOT WATER -2								
S/N	**YEAR**	**NO OF INVESTMENTS**	**DURATION OF INVESTMENT (YEARS)**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	2004	1 879	**20**	426.98	426.98	0.23%	0.00	0.00%
2	2005	4 978	**20**	1 411.61	1 411.61	0.76%	0.00	0.00%
3	2006	6 941	**20**	1 772.33	1 772.33	0.96%	0.00	0.00%
4	2007	10 706	**20**	3 358.72	3 358.72	1.82%	0.00	0.00%
5	2008	15 272	**20**	4 969.27	4 969.27	2.69%	0.00	0.00%
6	2009	0	**20**	0.00	0.00	0.00%	0.00	0.00%
7	2010	314	**20**	106.96	106.96	0.06%	106.96	0.02%
8	2011	256	**20**	83.53	83.53	0.05%	83.53	0.02%
9	2012	658	**20**	215.62	215.62	0.12%	215.62	0.05%
10	2013	517	**20**	170.61	170.61	0.09%	170.61	0.04%
TOTAL		**41 521**		**20**	**12 515.63**	**6.77%**	**576.72**	**0.12%**

RESIDENTIAL SECTOR - HOT WATER FROM SOLAR COLLECTORS FOR HEATING AND/OR COOLING								
S/N	**YEAR**	**NO OF INVESTMENTS**	**DURATION OF INVESTMENT (YEARS)**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	**2004**	12	**20**	2.77	2.77	0.001%	0.00	0.000%
2	**2005**	10	**20**	7.11	7.1	0.004%	0.00	0.000%
3	**2006**	42	**20**	39.59	39.6	0.021%	0.00	0.000%
4	**2007**	83	**20**	73.00	73.0	0.039%	0.00	0.000%
5	**2008**	162	**20**	149.52	149.5	0.081%	0.00	0.000%
6	**2009**	124	**20**	95.89	95.9	0.052%	0.00	0.000%

7	**2010**	190	**20**	156.28	156.3	0.084%	156.28	0.034%
8	**2011**	153	**20**	100.37	100.4	0.054%	100.37	0.022%
9	**2012**	34	**20**	25.50	25.5	0.014%	25.50	0.006%
10	**2013**	3	**20**	2.57	2.6	0.001%	2.57	0.001%
TOTAL		**813**		**652.59**	**652.59**	**0.353%**	**284.71**	**0.061%**

RESIDENTIAL SECTOR - CENTRAL ACTIVE SOLAR SYSTEMS FOR DOMESTIC HOT WATER (DHW)								
S/N	**YEAR**	**NO OF INVESTMENTS**	**DURATION OF INVESTMENT (YEARS)**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	**2004**	1	**20**	1.19	1.2	0.001%	0.0	0.000%
2	**2005**	4	**20**	9.77	9.8.	0.005%	0.0	0.000%
3	**2006**	3	**20**	6.24	6.2	0.003%	0.0	0.000%
4	**2007**	1	**20**	0.63	0.6	0.000%	0.0	0.000%
5	**2008**	10	**20**	6.81	6.8	0.004%	0.0	0.000%
6	**2009**	14	**20**	11.95	11.9	0.006%	0.0	0.000%
7	**2010**	9	**20**	8.56	8.6	0.005%	8.6	0.002%
8	**2011**	6	**20**	6.96	7.0	0.004%	7.0	0.002%
9	**2012**	0	**20**	0.00	0.0	0.000%	0.0	0.000%
TOTAL		**48**		**52.10**	**52.10**	**0.028%**	**15.52**	**0.003%**

RESIDENTIAL SECTOR - HEATING WATER IN SWIMMING POOLS WITH THE USE OF SOLAR COLLECTORS								
S/N	**YEAR**	**NO OF INVESTMENTS**	**DURATION OF INVESTMENT (YEARS)**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	**2004**	2	**20**	3.57	3.6	0.002%	0.0	0.00%
2	**2005**	5	**20**	5.27	5.3	0.003%	0.0	0.00%
3	**2006**	1	**20**	1.44	1.4	0.001%	0.0	0.00%
4	**2007**	19	**20**	13.90	13.9	0.008%	0.0	0.00%
5	**2008**	24	**20**	16.40	16.4	0.009%	0.0	0.00%
TOTAL		**51**		**20**	**40.6**	**0.022%**	**0.0**	**0.00%**

RESIDENTIAL SECTOR -Heat pump with ground heat exchanger for space heating and cooling								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	**2006**	12	**20**	19.89	19.9	0.011%	0.00	0.00
2	**2007**	12	**20**	27.53	27.5	0.015%	0.00	0.00
3	**2008**	15	**20**	48.28	48.3	0.026%	0.00	0.00
4	**2009**	45	**20**	61.71	61.7	0.033%	0.00	0.00
5	**2010**	23	**20**	74.94	74.9	0.041%	74.94	0.016%
6	**2011**	3	**20**	2.93	2.9	0.002%	2.93	0.001%
TOTAL		**110**		**235.28**	**235.3**	**0.1272%**	**77.87**	**0.017%**

Note that only investments made after 31 December 2009 contribute to the 2020 target.

2.2 TERTIARY SECTOR

Title of the Energy Efficiency Improvement Measure (EEI)		Grants scheme to encourage the use of RES (end use) in the tertiary sector.
Description	**Time frame**	Start: 2004, Expiry: 2013
	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 in purchasing and installing new equipment. It also covers the cost of studies, where these are deemed 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.
	Regional application	All of Cyprus

<table>
<tr><td rowspan="4">Information concerning implementation</td><td>List and description of actions for measure verification</td><td>• Autonomous photovoltaics
• Solar space heating/cooling
• Central active solar water heating systems.
• Solar swimming pool heating systems
• Heat pump with ground heat exchanger for space heating and cooling</td></tr>
<tr><td>Budget and source</td><td>See Annex G
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 Department of the MECIT.</td></tr>
<tr><td>Energy Savings</td><td>Method used for monitoring/calculating energy savings</td><td>The Scheme includes a 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 Institute of Energy, were used in determining the final energy savings stated below. Calculations were made using the methodologies set out in Annex E, paragraph 4.</td></tr>
<tr><td></td><td>Energy savings achieved in 2012.</td><td>1 177.4 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2016</td><td>1 177.4 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2020</td><td>84.7 TOE</td></tr>
<tr><td></td><td>Assumptions</td><td>A total of 160 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:
<table>
<tr><th>Investment Category</th><th>Number of Systems</th></tr>
<tr><td>Autonomous photovoltaics</td><td>11</td></tr>
<tr><td>Solar space heating/cooling</td><td>26</td></tr>
<tr><td>Central active solar water heating systems.</td><td>111</td></tr>
<tr><td>Solar swimming pool heating systems</td><td>9</td></tr>
<tr><td>Heat pump with ground heat exchanger for space heating and cooling</td><td>3</td></tr>
</table>
</td></tr>
</table>

		The remaining cases are included in the methodology description provided in Annex E, paragraph 4.

TABLES CONTAINING DATA ON INVESTMENTS MADE UNDER THE GRANT SCHEME FOR ENCOURAGING THE USE OF RES IN THE TERTIARY SECTOR

INDEPENDENT PV SYSTEMS - TERTIARY SECTOR								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
1	2005	0.00	20	0.00	0.00	0.000%	0.0	0.000%
2	2006	1.00	20	0.19	0.19	0.000%	0.0	0.000%
3	2007	1.00	20	0.21	0.21	0.000%	0.0	0.000%
4	2008	3.00	20	1.32	1.32	0.001%	0.0	0.000%
5	2009	2.00	20	3.04	3.04	0.002%	0.0	0.000%
6	2010	3.00	20	0.59	0.59	0.000%	0.59	0.0001%
7	2011	1.00	20	1.68	1.68	0.001%	1.68	0.0004%
8	2012	0.00	20	0.00	0.00	0.000%	0.00	0.0000%
9	2013	0.00	20	0.00	0.00	0.000%	0.00	0.0000%
10	2014	0.00	20	0.00	0.00	0.000%	0.00	0.0000%
TOTAL		11		7.03	7.03	0.004%	2.27	0.0005%

TERTIARY SECTOR - HOT WATER FROM SOLAR COLLECTORS FOR HEATING AND/OR COOLING								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
1	2004	1	20	1.93	1.9	0.001%	0.00	0.000%
2	2005	0	20	0.00	0.0	0.000%	0.00	0.000%
3	2006	1	20	4.56	4.6	0.002%	0.00	0.000%
4	2007	3	20	10.99	11.0	0.006%	0.00	0.000%
5	2008	6	20	23.82	23.8	0.013%	0.00	0.000%

6	**2009**	8	**20**	15.92	15.9	0.009%	0.00	0.000%
7	**2010**	1	**20**	8.49	8.5	0.005%	8.49	0.002%
8	**2011**	3	**20**	4.22	4.2	0.002%	4.22	0.001%
9	**2012**	3	**20**	6.79	6.8	0.004%	6.79	0.001%
10	**2013**	0	**20**	0.00	0.0	0.000%	0.00	0.000%
TOTAL		**26**		**76.73**	**76.73**	**0.041%**	**19.50**	**0.004%**

TERTIARY SECTOR - CENTRAL ACTIVE SOLAR SYSTEMS FOR DOMESTIC HOT WATER (DHW)								
S/N	**YEAR**	**NO OF INVESTMENTS**	**DURATION OF INVESTMENT (YEARS)**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	**2004**	17	**20**	66.56	66.6	0.036%	0.0	0.000%
2	**2005**	29	**20**	85.10	85.1	0.046%	0.0	0.000%
3	**2006**	8	**20**	12.10	12.1	0.007%	0.0	0.000%
4	**2007**	12	**20**	37.78	37.8	0.020%	0.0	0.000%
5	**2008**	13	**20**	22.07	22.1	0.012%	0.0	0.000%
6	**2009**	14	**20**	66.12	66.1	0.036%	0.0	0.000%
7	**2010**	8	**20**	20.18	20.2	0.011%	20.2	0.004%
8	**2011**	8	**20**	27.77	27.8	0.015%	27.8	0.006%
9	**2012**	2	**20**	14.93	14.9	0.008%	14.9	0.000%
TOTAL		**111**		**352.62**	**352.61**	**0.191%**	**62.9**	**0.010%**

TERTIARY SECTOR - AGGREGATED HEATING WATER IN SWIMMING POOLS WITH THE USE OF SOLAR COLLECTORS								
S/N	**YEAR**	**NO OF INVESTMENTS**	**DURATION OF INVESTMENT (YEARS)**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	**2004**	4	**20**	17.78	17.8	0.010%	0.0	0.00%
2	**2005**	2	**20**	11.74	11.7	0.006%	0.0	0.00%
3	**2007**	2	**20**	1.74	1.7	0.001%	0.0	0.00%
4	**2008**	1	**20**	1.18	1.2	0.001%	0.0	0.00%
TOTAL		**9**		**32.43**	**32.4**	**0.018%**	**0.0**	**0.00%**

TERTIARY SECTOR -Heat pump with ground heat exchanger for space heating and cooling								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2006	0	20	0.00	0.0	0.00%	0.000	0.000
2	2007	0	20	0.00	0.0	0.00%	0.000	0.000
3	2008	1	20	539.61	539.6	0.29%	0.000	0.000
4	2009	2	20	168.94	168.9	0.09%	0.000	0.000
5	2010	0	20	0.00	0.0	0.00%	0.000	0.000
6	2011	0	20	0.00	0.0	0.00%	0.000	0.000
TOTAL		3		708.55	708.5	0.3830%	0.000	0.000

Note that only investments made after 31 December 2009 contribute to the 2020 target.

2.3 INDUSTRIAL - AGRICULTURAL SECTOR

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	**Time frame**	Start: 2004, Expiry: 2013
	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 in purchasing and installing new equipment. It also covers the cost of studies, where these are deemed 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.
	Regional 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:<table><tr><th>Investment Category</th></tr><tr><td>Autonomous photovoltaics</td></tr><tr><td>Independent photovoltaic systems for lighting.</td></tr><tr><td>Solar space heating/cooling</td></tr><tr><td>Central active solar water heating systems.</td></tr></table></td></tr>
<tr><td>Budget and source</td><td>See Annex G
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 Department of the MECIT.</td></tr>
<tr><td>Energy Savings</td><td>Method used for monitoring/calculating energy savings</td><td>The Scheme includes a 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 Institute of Energy, were used in determining the final energy savings stated below. The methodologies used are set out in Annex E, paragraph 5.</td></tr>
<tr><td></td><td>Energy savings achieved in 2012.</td><td>30 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2016</td><td>30.7 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2020</td><td>6.1 TOE</td></tr>
<tr><td></td><td>Assumptions</td><td>A total of 54 investments were realised during the implementation of the measure. Following is a detailed presentation of the types of investments:<table><tr><th>Investment Category</th><th>Number of Systems</th></tr><tr><td>INDUSTRY</td><td></td></tr><tr><td>Solar space heating/cooling</td><td>1</td></tr><tr><td>Central active solar water heating systems.</td><td>6</td></tr></table></td></tr>
</table>

			AGRICULTURE	
			Autonomous photovoltaics	36
			LIGHTING	
			Autonomous photovoltaics	11
			The assumptions are included in the methodology description provided in Annex E, paragraph 5.	

TABLES CONTAINING DATA ON INVESTMENTS MADE UNDER THE GRANT SCHEME FOR ENCOURAGING THE USE OF RES IN THE INDUSTRIAL SECTOR

INDUSTRIAL SECTOR - HOT WATER FROM SOLAR COLLECTORS FOR HEATING AND/OR COOLING								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
1	2005	1	20	9.54	9.5	0.005%	0.00	0.000%
TOTAL		1		9.54	9.54	0.005%	0.00	0.000%

INDUSTRIAL SECTOR - CENTRAL ACTIVE SOLAR SYSTEMS FOR DOMESTIC HOT WATER (DHW)								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
1	2006	2	20	1.73	1.7	0.001%	0.0	0.000%
2	2007	2	20	2.63	2.6	0.001%	0.0	0.000%
3	2008	1	20	0,68	0.7	0.000%	0.0	0.000%
4	2009	1	20	0.48	0.5	0.000%	0.0	0.000%
TOTAL		6		5.52	5.52	0.003%	0.0	0.000%

INDEPENDENT PV SYSTEMS - AGRICULTURAL SECTOR								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
2	2006	2.00	20	0.42	0.42	0.000%	0.0	0.000%
3	2007	3.00	20	0.94	0.94	0.001%	0.0	0.000%
4	2008	12.00	20	4.45	4.45	0.002%	0.0	0.000%

5	**2009**	9.00	**20**	3.78	3.78	0.002%	0.0	0.000%
6	**2010**	1.00	**20**	0.21	0.21	0.000%	0.2	0.000%
7	**2011**	4.00	**20**	3.05	3.05	0.002%	3.1	0.001%
8	**2012**	2.00	**20**	0.52	0.52	0.000%	0.5	0.000%
9	**2013**	3.00	**20**	0.74	0.74	0.000%	0.7	0.000%
TOTAL		**36**		**14.11**	**14.1**	**0.008%**	**4.52**	**0.001%**

INDEPENDENT PV SYSTEMS - LIGHTING								
S/N	**YEAR**	**NO OF INVESTMENTS**	**DURATION OF INVESTMENT (YEARS)**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
7	**2011**	1.00	**20**	0.13	0.13	0.000%	0.13	0.0000%
8	**2012**	10.00	**20**	1.42	1.42	0.001%	1.42	0.0003%
TOTAL		**11**		**1.56**	**1.56**	**0.001%**	**1.56**	**0.0003%**

3. Energy Savings Plan.

3.1 Residential Sector

Title of the Energy Efficiency Improvement Measure (EEI)		Grants Scheme for energy savings in the housing sector (existing homes).
Description	**Time frame**	Start: 2004, Expiry: 2013
	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
	Regional application	All of Cyprus

<table>
<tr><td rowspan="4">Information concerning implementation</td><td>List and description of actions for measure verification</td><td>Thermal insulation (walls)
Thermal insulation (windows)
Thermal insulation (roofs)</td></tr>
<tr><td>Budget and source</td><td>EUR 33 882 837 (pertains to all the above subcategories)
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 Department of the MECIT.</td></tr>
<tr><td>Energy Savings</td><td>Method used for monitoring/calculating energy savings</td><td>The National Methodology used is set out in Annex E, paragraph 6.</td></tr>
<tr><td></td><td>Energy savings achieved in 2012.</td><td>10 523.8 TOE
Information on the energy savings ensured by each subcategory of thermal insulation is provided in the tables below.</td></tr>
<tr><td></td><td>Energy savings expected in 2016</td><td>11 089.2 TOE
Information on the energy savings ensured by each subcategory of thermal insulation is provided in the tables below.</td></tr>
<tr><td></td><td>Energy savings expected in 2020</td><td>1 137.2 TOE
Information on the energy savings ensured by each subcategory of thermal insulation is provided in the tables below.</td></tr>
<tr><td></td><td>Assumptions</td><td>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:

<table><tr><td>Investment Category</td><td>No of investments</td></tr><tr><td>Thermal insulation - Walls</td><td>2 224</td></tr><tr><td>Thermal insulation - Windows</td><td>22 074</td></tr><tr><td>Thermal insulation - Roofs</td><td>3 632</td></tr></table>
The assumptions are included in the methodology description provided in Annex E, paragraph 6.</td></tr>
</table>

TABLES CONTAINING DATA ON INVESTMENTS MADE UNDER THE GRANT SCHEME FOR ENCOURAGING THE USE OF RES IN THE TERTIARY SECTOR

RESIDENTIAL SECTOR - THERMAL INSULATION/WINDOWS								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2004	96	30	21.55	21.55	0.01%	-	-
2	2005	545	30	130.26	130.26	0.07%	-	-
3	2006	4 540	30	1 176.01	1 176.01	0.64%	-	-
4	2007	4 722	30	1 139.34	1 139.34	0.62%	-	-
5	2008	7 257	30	1 711.41	1 711.41	0.93%	-	-
6	2009	4 708	30	1 112.89	1 112.89	0.60%	-	-
7	2010	0	30	0.00	0.00	0.00%	0.00	0.00%
8	2011	112	30	26.61	26.61	0.01%	26.61	0.01%
9	2012	91	30	14.70	14.70	0.01%	14.70	0.00%
10	2013	3	30	0.46	0.46	0.00%	0.46	0.00%
TOTAL		22 074		5 333.23	5 333.23	2.88%	41.77	0.01%

RESIDENTIAL SECTOR - THERMAL INSULATION/ROOF								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2004	12	25	14.44	14.44	0.01%	-	-
2	2005	71	25	89.51	89.51	0.05%	-	-
3	2006	609	25	823.17	823.17	0.44%	-	-
4	2007	635	25	813.18	813.18	0.44%	-	-
5	2008	979	25	1 232.68	1 232.68	0.67%	-	-
6	2009	633	25	797.79	797.79	0.43%	-	-
7	2010	0	25	0.00	0.00	0.00%	0.00	0.00%
8	2011	121	25	193.87	193.87	0.10%	193.87	0.04%
9	2012	207	25	323.40	323.40	0.17%	323.40	0.07%
10	2013	366	25	564.09	564.09	0.30%	564.09	0.12%
TOTAL		3 632		4 852.12	4 852.12	2.62%	1 081.35	0.23%

RESIDENTIAL SECTOR - THERMAL INSULATION/WALLS								
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT (YEARS)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2004	8	30	2.93	2.93	0.00%	-	-
2	2005	55	30	21.69	21.69	0.01%	-	-
3	2006	452	30	198.72	198.72	0.11%	-	-
4	2007	471	30	192.07	192.07	0.10%	-	-
5	2008	721	30	287.53	287.53	0.16%	-	-
6	2009	469	30	186.87	186.87	0.10%	-	-
7	2010	0	30	0.00	0.00	0.00%	0.00	0.00%
8	2011	18	30	5.57	5.57	0.00%	5.57	0.00%
9	2012	29	30	7.66	7.66	0.00%	7.66	0.00%
10	2013	1	30	0.82	0.82	0.00%	0.82	0.00%
TOTAL		**2224**		**903.85**	**903.85**	**0.49%**	**14.05**	**0.00%**

RESIDENTIAL SECTOR - THERMAL INSULATION/TOTAL								
S/N	YEAR	NO OF INVESTMENTS	GRANT SUM	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2004	116	EUR 33 882 837	38.92	38.92	0.02%	-	-
2	2005	671		241.45	241.45	0.13%	-	-
3	2006	5 601		2 197.90	2 197.90	1.19%	-	-
4	2007	5 828		2 144.58	2 144.58	1.16%	-	-
5	2008	8 957		3 231.62	3 231.62	1.75%	-	-
6	2009	5 810		2 097.56	2 097.56	1.13%	-	-
7	2010	0		0.00	0.00	0.00%	0.00	0.00%
8	2011	251		226.05	226.05	0.12%	226.05	0.05%
9	2012	327		345.75	345.75	0.19%	345.75	0.07%
10	2013	370		565.37	565.37	0.31%	565.37	0.12%
TOTAL		**27 930**	**EUR 33 882 837**	**11 089.20**	11 089.20	5.99%	**1 137.18**	**0.25%**

3.2 Public sector and general government

Title of the Energy Efficiency Improvement Measure (EEI)		Government grants scheme for energy savings/RES for the Public sector and general government.
Description	**Time frame**	Start: 2004, Expiry: 2013
	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 studies, where these are deemed necessary. The investments must concern mature technologies and not technologies which are 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, and to contribute towards achieving RES and Energy Savings targets.
	End use category	Public sector
	Target group	Buildings in the Public and Wider Public Sector
	Regional 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	EUR 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 Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The Scheme includes a 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 Institute of Energy, were used in determining the final energy savings stated below. The methodologies used are set out in Annex E, paragraph 7.
	Energy savings achieved in 2012.	**110 TOE**

	Energy savings expected in 2016	**110 TOE**
	Energy savings expected in 2020	**0 TOE**
	Assumptions	Three (3) investments were realised during the implementation of the measure.

Investment Type	**No of investments**
LED LAMPS	1
THERMAL INSULATION IN ROOFING	1
REPLACING SINGLE GLAZING WITH DOUBLE GLAZING	1

TABLES CONTAINING DATA ON INVESTMENTS MADE UNDER THE GRANT SCHEME FOR ENERGY-SAVING INVESTMENTS IN THE PUBLIC SECTOR

TERTIARY SECTOR - ENERGY SAVINGS IN THE PUBLIC AND BROADER PUBLIC SECTOR UNDER THE ENERGY SAVINGS GRANT SCHEME							
S/N	**YEAR**	**NO OF INVESTMENTS**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	2004	1	5.08	5.08	0.00%	0.00	0.00%
2	2008	2	105.11	105.11	0.06%	0.00	0.00%
TOTAL		3	110.20	110.20	0.06%	0.00	0.00%

3.3 Tertiary sector.

Title of the Energy Efficiency Improvement Measure (EEI)		Grants scheme for energy efficiency (end use) in the tertiary sector (existing businesses).
Description	**Time frame**	Start: 2004, Expiry: 2013
	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 studies, where these are deemed necessary. The investments must concern mature technologies and not technologies which are at a research and development stage. Energy-saving 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 EUR 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.
	Regional 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 waste energy, either directly or indirectly by recovery/recycling of discarded materials, product or employed medium. 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 connected with the above subcategories
	Budget and source	EUR 4,384,647.01 Special Fund for RES and ES

	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The Scheme includes a 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 Institute of Energy, were used in determining the final energy savings stated below. The methodologies used are set out in Annex E, paragraph 8.
	Energy savings achieved in 2012.	**10 331.6 TOE**
	Energy savings expected in 2016	**10 293.45 TOE**
	Energy savings expected in 2020	**768 TOE**
	Assumptions	A total of 370 investments were realised in this category during the implementation of the measure. Some of the investments made were of the following type: ELEC-SAVER, POWER PLANNER, INVERTERS, THERMAL INSULATION OF ROOFS/BUILDINGS, Electro Flow, EMS, HEAT RECOVERY SYSTEM, Chillers, BMS, Economizers, Replacement of Glass Panes, Replacement of Lamps. Note that 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.

TABLES CONTAINING DATA ON INVESTMENTS MADE UNDER THE GRANT SCHEME FOR ENERGY- SAVING INVESTMENTS IN THE TERTIARY SECTOR

TERTIARY SECTOR - ENERGY SAVINGS IN ENTERPRISES								
S/N	YEAR	NO OF INVESTMENTS	GRANT SUM	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2004	31	EUR 145 127.81	393.914	174.96	0.09%	0	0.000%
2	2005	34	EUR 187 207.40	570.967	342.79	0.19%	0	0.000%
3	2006	45	EUR 321 181.04	296.323	245.42	0.13%	0.00	0.000%
4	2007	58	EUR 563 296.00	3 229.15	3 105.92	1.68%	0.00	0.000%
5	2008	86	EUR 1 037 216.00	3 092.726	3 058.86	1.65%	0.00	0.000%
6	2009	74	EUR 1 681 526.76	2 648.214	2 597.48	1.40%	0.00	0.000%
7	2010	0	EUR -	0.000	0.00	0.00%	0.00	0.000%
8	2011	19	EUR 322 693.00	625.008	625.01	0.00%	625.01	0.135%
9	2012	23	EUR 84 369.00	120.535	120.54	0.00%	120.54	0.026%
10	2013	1	EUR 42 030.00	22.477	22.48	0.00%	22.48	0.005%
TOTAL		371	EUR 4 384 647.01	10 999.31	10 293.45	5.15%	768.020	0.17%

3.4 Industrial Sector.

Title of the Energy Efficiency Improvement Measure (EEI)		Grants scheme for energy savings (in existing industrial enterprises).
Description	**Time frame**	Start: 2004, Expiry: 2013
	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 studies, where these are deemed necessary. The investments must concern mature technologies and not technologies which are at a research and development stage. Energy-saving 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 EUR 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.
	Regional 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 waste energy, either directly or indirectly by recovery/recycling of discarded materials, product or employed medium. 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 connected with the above subcategories
	Budget and source	EUR 1 537 659.11

		Special Fund for RES and ES
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The Scheme includes a 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 Institute of Energy, were used in determining the final energy savings stated below. The methodologies used are set out in Annex E, paragraph 9.
	Energy savings achieved in 2012.	**2 923 TOE**
	Energy savings expected in 2016	**2 722 TOE**
	Energy savings expected in 2020 (if possible).	**650 TOE**
	Assumptions	A total of 86 investments were realised in this category during the implementation of the measure. Some of the investments made were of the following type: ELEC-SAVER, POWER PLANNER, INVERTERS, Electro Flow, EMS, HEAT RECOVERY SYSTEM, Chillers, BMS, Note that 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.

TABLES CONTAINING DATA ON INVESTMENTS MADE UNDER THE GRANT SCHEME FOR ENERGY-SAVING INVESTMENTS IN THE INDUSTRIAL SECTOR

INDUSTRIAL SECTOR - ENERGY SAVINGS IN ENTERPRISES								
S/N	YEAR	NO OF INVESTMENTS	GRANT SUM	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2004	10	EUR 153 411.92	46.799	46.80	0.03%	0.00	0.000%
2	2005	20	EUR 252 922.40	758.164	101.69	0.05%	0.00	0.000%
3	2006	12	EUR 181 455.40	239.594	73.94	0.04%	0.00	0.000%
4	2007	10	EUR 246 121.39	267.394	264.08	0.14%	0.00	0.000%
5	2008	16	EUR 347 951.00	1 069.213	1 069.21	0.578%	0.00	0.000%
6	2009	13	EUR 290 691.00	516.764	516.76	0.28%	0.00	0.000%
7	2010	0	EUR -	0.000	0.00	0.00%	0.00	0.000%
8	2011	4	EUR 46 206.00	158.823	158.82	0.00%	158.82	0.034%
9	2012	1	EUR 18 900.00	490.894	490.89	0.00%	490.89	0.106%
10	2013	0	EUR -	0.000	0.00	0.00%	0.00	0.000%
TOTAL		86	EUR 1 537 659.11	3 547.65	2 722.21	1.12%	649.717	0.14%

4. Grant Scheme for installing Photovoltaics using the NET-METERING method (under grant).

Title of the Energy Efficiency Improvement Measure (EEI)		Installation of PV Systems using the method of offsetting consumed and produced electrical power measurements (Net-Metering) for domestic consumers.
Description	**Time frame**	Start: 2013, Expiry: 2015
	Purpose/short description	The measure aims to gradually install 2 000 domestic photovoltaic systems with a capacity of up to 3KW in the next 2-3 years. Sensitive and vulnerable groups of domestic consumers will be able to install photovoltaic systems on the roofs of their buildings with a capacity of up to 3KW, generating electrical power which will be subtracted from their domestic consumption every two months. Beneficiaries will receive a grant in the region of 50% of the total investment cost from the Special Fund for Renewable Energy Sources and Energy Efficiency in order to purchase and install these systems.
	End use category	Residential Sector
	Target group	Existing Dwellings
	Regional application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Installation of PV systems
	Budget and source	EUR 107 406 for 2013 Special Fund for RES and ES
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The methodologies used are set out in Annex E, paragraph 10.
	Energy savings achieved in 2012.	**0 TOE**
	Energy savings expected in 2016	**47.62 TOE**
	Energy savings expected in 2020	**47.62 TOE**
	Assumptions	The assumptions are included in the methodology description provided in Annex E, paragraph 10.

TABLES ON THE INSTALLATION OF PHOTOVOLTAICS USING THE NET-METERING METHOD (UNDER GRANT).

	YEARS	DURATION OF INVESTMENT	2013	2014	2015	2016	2017	2018	2019	2020	2021	2032	2033
ENERGY SAVINGS (TOE/YEAR)	2013	20	47.62	47.62	47.62	47.62	47.62	47.62	47.62	47.62	47.62	47.62	0
	2014	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
	2015	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
TOTAL DATA			47.62	47.62	47.62	47.62	47.62	47.62	47.62	47.62	47.62	47.62	0.00

	YEAR OF INSTALLATION	NUMBER OF SYSTEMS	TOTAL CAPACITY KW	ENERGY SAVINGS (kWh/year)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	ENERGY SAVINGS FOR THE 2020 TARGET TOE	GRANT SUM (EUR)	EXPECTED DURATION OF INVESTMENT (YEARS)
1	2013	40	119.34	190944.00	47.62	47.62	47.62	€ 107,406	20
2	2014	0	0.00	0.00	0.00	0.00	0.00	€ -	0
		40	119.34	190944	47.62	47.62	47.62	€ 107,406.00	

5. Installing Photovoltaics using the NET-METERING method without a grant.

Title of the Energy Efficiency Improvement Measure (EEI)		Installation of PV Systems using the method of offsetting consumed and produced electrical power measurements (Net-Metering) for domestic consumers.
Description	**Time frame**	Start: 2013, Expiry: 2016
	Purpose/short description	The measure aims to gradually install 45 000 household photovoltaic systems with capacity of up to 3KW in the next 3-4 years. Domestic electricity consumers will be able to install photovoltaic systems on the roofs of their buildings with a capacity of up to 3KW, producing electrical power which will be subtracted from their domestic consumption every two months.
	End use category	Residential Sector
	Target group	Existing Dwellings
	Regional application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Installation of PV systems
	Budget and source	Not applicable
	Implementing organisation	CERA and the MECIT
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The methodologies used are set out in Annex E, paragraph 11.
	Energy savings achieved in 2012.	**0 TOE**
	Energy savings expected in 2016	1 624 49 **TOE**
	Energy savings expected in 2020	1 624 49 **TOE**
	Assumptions	The assumptions are included in the methodology description provided in Annex E, paragraph 11.

TABLES ON THE INSTALLATION OF PHOTOVOLTAICS USING THE NET-METERING METHOD (UNDER GRANT).

S/N	YEAR	Number of Systems installed	TOTAL CAPACITY OF SYSTEMS KW	ENERGY SAVINGS (kWh/year)	Expected Duration of Investment	ENERGY SAVINGS (Primary) (TOE/YEAR)
1	2013	821	2 463	3 940 800	20	982.84
2	2014	536	1 608	2 572 800	20	641.66

	YEARS	DURATION OF INVESTMENT	Energy savings (TOE/YEAR)	2013	2014	2015	2016	2017	2018	2019	2020	2032	2033
ENERGY SAVINGS (TOE/YEAR)	2013	20	982.84	982.84	982.84	982.84	982.84	982.84	982.84	982.84	982.84	982.84	0
	2014	20	641.66	641.66	641.66	641.66	641.66	641.66	641.66	641.66	641.66	641.66	641.66
TOTAL DATA				1 624.49	1 624.49	1 624.49	1 624.49	1 624.49	1 624.49	1 624.49	1 624.49	1 624.49	641.66

S/N	YEAR OF INSTALLATION	NUMBER OF SYSTEMS	TOTAL CAPACITY KW	ENERGY SAVINGS (kWh/year)	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2013	821	2 463.00	982.84	982.84	982.84	0.53%	982.84	0.21%
2	2014	536	1 608.00	641.66	641.66	641.66	0.35%	641.66	0.14%
		1 357	4 071	1 624.49184	1 624.49	1 624.49	0.88%	1 624.49	0.35%

6. Green Public Procurement Plan

Title of the Energy Efficiency Improvement Measure (EEI)		National action plan for green public procurement.
Description	**Time frame**	Start: 2007, Expiry: -
	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-saving actions included in such contracts relate to the following: **Office Equipment and Supplies:** photocopiers, fax machines, computers, etc. **Electrical 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/motion sensors in building areas where no continuous light is required and installing photocells for switching on/off lights within the perimeter of roads and in large-perimeter 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).
	Regional 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 March 2007.
	Budget and source	EUR 29 068 for purchasing fluorescent lamps EUR 890 742 for purchasing new air conditioners installed where a new need has come up EUR 707 761 for purchasing new air conditioners in replacement of existing ones. EUR 8 420 399.40 for purchasing office computers EUR 1 596 776 for purchasing new monitors EUR 663 334 for purchasing VRV and Heat Pump Systems to replace existing ones EUR 84 178 for purchasing boilers to replace existing ones.

	Implementing organisation	Environment Service
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The assumptions taken into account in making calculations for the above categories are referred to in the Methodology description provided in Annex E, paragraph 12.
	Energy savings achieved in 2012.	**667 TOE**
	Energy savings expected in 2016	**338 TOE**
	Energy savings expected in 2020	**178 TOE**
	Assumptions	The assumptions are included in the methodology description provided in Annex E, paragraph 12.

TABLES CONTAINING INFORMATION ON THE GREEN PROCUREMENT ACTION PLAN

REPLACEMENT OF LAMPS WITH FLUORESCENT LAMPS IN THE PUBLIC SECTOR

	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	-
2	2008	3513	**118**	414534	110.5	6000	-
3	2009	2983	**118**	351994	93.8	6000	-
4	2010	4000	**118**	472000	125.8	6000	€ 8,910
5	2011	3000	**118**	354000	88.3	6000	€ 5,870
6	2012	6000	**118**	708000	176.6	6000	€ 13,054
7	2013	666	**118**	78588	19.6	6000	€ 1,234

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	84.8	84.8	84.8		0.00	0.00	0.00	0.00	0	0	**0**	0	0	0	0
2	2008	110.5	0	110.5	110.5	**0.0**	0.0	0.0	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	0	0	0	0	0
4	2010	125.8	0	0	0.00	**125.8**	125.8	0.0	0.0	0	0	0	0	0	0	0
5	2011	88.3	0	0	0.00	**0.00**	88.3	88.3	0.0	0	0	0	0	0	0	0
6	2012	176.6	0	0	0.00	**0.00**	0.0	176.6	176.6	0	0	0	0	0	0	0
7	2013	19.6	0	0	0.00	**0.00**	0.0	0.0	19.6	19.6	0	0	0	0	0	0
Total Energy saving per year (toe)			85	195	204	**219.68**	214	265	196	20	0	**0**	0	0	0	**0**

S/N	YEAR	QUANTITY OF LAMPS	PURCHASE COST	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	**2007**	2694	-	85	0	0 %	0	0%
2	**2008**	3 513	-	111	0	0 %	0	0%
3	**2009**	2 983	-	94	0	0 %	0	0%
4	**2010**	4 000	EUR 8 910.00	126	0	0 %	0	0%
5	**2011**	3 000	EUR 5 870.00	88	0	0 %	0	0%
6	**2012**	6 000	EUR 13 054.00	177	0	0 %	0	0%
7	**2013**	666	EUR 1 234.00	20	0	0 %	0	0%
TOTAL		22 856	EUR 29 068.00	699	0.00	0.00%	0.00	0.00%

REPLACEMENT OF AIR- CONDITIONERS IN THE PUBLIC SECTOR

REPLACEMENT OF SPLIT UNITS IN THE PUBLIC SECTOR										
Year	**Quantity**	**COOLING CAPACITY [Kw]**	**EER best_perf_on_market**	**EER average (Παραδοχή από το ISBEM)**	**nh**	**UFES [kWh/unit/year]**	**Total Saving [kWh/year]**	**Total Saving [toe/year]**	**life time**	**Budget**
2007	1	2.64	2.86	2.5	812	107.93	107.93	0.03	10	EUR 390
2007	102	3.50	2.86	2.5	812	143.09	14 595.56	3.89	10	EUR 57 141
2007	58	4.70	2.86	2.5	812	192.15	11 144.96	2.97	10	EUR 26 562
2007	10	5.80	2.84	2.5	812	225.53	2 255.30	0.60	10	EUR 5 825
2007	83	7.00	2.84	2.5	812	272.19	22 591.90	6.02	10	EUR 42 336
TOTAL 2007	254					940.90	50 695.65	13.52		EUR 132 254
2008	9	2.64	3.22	2.5	812	191.73	1 725.60	0.46	10	EUR 3 276
2008	74	3.50	3.20	2.5	812	248.68	18 401.95	4.91	10	EUR 53 669
2008	5	4.70	3.20	2.5	812	333.94	1 669.68	0.45	10	EUR 1 986
2008	29	5.27	3.21	2.5	812	378.60	10 979.38	2.93	10	EUR 12 760
2008	9	6.40	3.20	2.5	812	454.72	4 092.48	1.09	10	EUR -
2008	57	7.00	3.02	2.5	812	391.48	22 314.41	5.95	10	EUR 25 895
TOTAL 2008	174					1 999.14	59 183.49	15.78		EUR 97 586
2009	8	2.64	3.22	2.5	812	191.73	1 533.86	0.41	10	EUR 2 740
2009	53	3.50	3.20	2.5	812	248.68	13 179.78	3.51	10	EUR 37 578
2009	3	4.70	3.20	2.5	812	333.94	1 001.81	0.27	10	EUR 1 489
2009	32	5.27	3.21	2.5	812	378.60	12 115.18	3.23	10	EUR 12 920
2009	1	5.86	3.40	2.5	812	503.82	503.82	0.13	10	EUR 500
2009	39	7.00	3.02	2.5	812	391.48	15 267.75	4.07	10	EUR 16 100
TOTAL 2009	128					2 048.25	43 602.20	11.62		EUR 71 327
2010	64	2.64	3.22	2.5	812	191.73	12 270.90	3.27	10	EUR 8 200
2010	65	3.50	3.20	2.5	812	248.68	16 163.88	4.31	10	EUR 25 989
2010	38	5.27	3.21	2.5	812	378.60	14 386.78	3.84	10	EUR 21 600
2010	41	7.10	3.02	2.5	812	397.07	16 280.01	4.34	10	EUR 27 958
TOTAL 2010	208					1 216.08	59 101.57	15.76		EUR 83 747
2011	21	2.64	3.22	2.5	812	191.73	4 026.39	1.00	10	EUR 7 120
2011	42	3.5	3.20	2.5	812	248.68	10 444.35	2.60	10	EUR 17 259
2011	24	5.27	3.21	2.5	812	378.60	9 086.39	2.27	10	EUR 14 180
2011	29	7.1	3.02	2.5	812	397.07	11 515.13	2.87	10	EUR 18 996
TOTAL 2011	116					1 216.08	35 072.25	5.14		EUR 57 555
2012	15	2.64	3.22	2.5	812	191.73	2 875.99	0.72	10	EUR 5 220
2012	70	3.5	3.20	2.5	812	248.68	17 407.25	4.34	10	EUR 31 142

2012	60	5.27	3.21	2.5	812	378.60	22 715.97	5.67	10	EUR 33 375
2012	64	7.1	3.02	2.5	812	397.07	25 412.70	6.34	10	EUR 50 026
TOTAL 2012	209					1 216.08	68 411.90	17.06		EUR 119 763
2013	43	2.64	3.22	2.5	812	191.73	8 244.51	2.06	10	EUR 15 890
2013	96	3.5	3.20	2.5	812	248.68	23 872.80	5.95	10	EUR 44 740
2013	60	5.27	3.21	2.5	812	378.60	22 715.97	5.67	10	EUR 29 610
2013	65	7.1	3.02	2.5	812	397.07	25 809.77	6.44	10	EUR 55 289
TOTAL 2013	264					1 216.08	80 643.05	20.11		EUR 145 529
TOTAL 2007-2013	1 353					9 852.61	396 710.11	98.99		EUR 707 761
Note that nh = 1400hours x 0.58 = 812										

REPLACEMENT OF SPLIT UNITS **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	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
4	2010	15.8	0.00	0.00	0.00	15.76	15.76	15.76	15.76	15.76	15.76	15.76	15.76	15.76	0.00
5	2011	5.1	0.00	0.00	0.00	0.00	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5.14
6	2012	17.1	0.00	0.00	0.00	0.00	0.00	17.06	17.06	17.06	17.06	17.06	17.06	17.06	17.06
7	2013	20.1	0.00	0.00	0.00	0.00	0.00	0.00	20.11	20.11	20.11	20.11	20.11	20.11	20.11
Total Energy saving per year (toe)			13.52	29.29	40.92	**56.67**	61.81	78.87	98.99	98.99	98.99	**98.9869**	85.47	69.69	**42.31**

REPLACEMENT OF SPLIT UNITS IN PUBLIC SECTOR

S/N	YEAR	NO OF INVESTMENTS	GRANT SUM	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2007	254	EUR 132 254	13.52	13.52	0.01%	0.00	0.00%
2	2008	174	EUR 97 586	15.78	15.78	0.01%	0.00	0.00%
3	2009	128	EUR 71 327	11.62	11.62	0.01%	0.00	0.00%
4	2010	208	EUR 83 747	15.76	15.76	0.01%	0.00	0.00%

5	2011	116	EUR 57 555	5.14	5.14	0.00%	5.14	0.00%
6	2012	209	EUR 119 763	17.06	17.06	0.01%	17.06	0.00%
7	2013	264	EUR 145 529	20.11	20.11	0.01%	20.11	0.00%
TOTAL		**1 353**	**EUR 707 761**	**98.99**	**98.99**	**0.05%**	**42.31**	**0.01%**

INSTALLATION OF NEW AIR CONDITIONERS IN THE PUBLIC SECTOR

INSTALLATION OF SPLIT UNITS IN THE 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]**	**life time**	**Budget**
2007	2	2.64	2.86	2.7	812	44.42	88.83	0.02	10	EUR 780
2007	106	3.50	2.86	2.7	812	58.89	6 241.95	1.66	10	EUR 39 075
2007	56	4.70	2.86	2.7	812	79.08	4 428.25	1.18	10	EUR 28 000
2007	15	5.80	2.84	2.7	812	85.99	1 289.80	0.34	10	EUR 8 750
2007	93	7.00	2.84	2.7	812	103.78	9 651.24	2.57	10	EUR 54 200
TOTAL 2007	272					372.14	21700.06	5.79		€ 130,805
2008	37	2.64	3.22	2.7	812	128.22	4744.01	1.26	10	€ 13,128
2008	53	3.50	3.20	2.7	812	164.47	8716.78	2.32	10	€ 20,858
2008	6	4.70	3.20	2.7	812	220.86	1325.14	0.35	10	€ 3,089
2008	46	5.27	3.21	2.7	812	251.81	11583.13	3.09	10	€ 24,830
2008	0	6.40	3.20	2.7	812	300.74	0.00	0.00	10	€ -
2008	62	7.00	3.02	2.7	812	223.07	13830.09	3.69	10	€ 42,135
TOTAL 2008	204					1289.154	40199.15	10.72		€ 104,040
2009	28	2.64	3.22	2.7	812	128.22	3590.06	0.96	10	€ 9,490
2009	74	3.50	3.20	2.7	812	164.47	12170.60	3.24	10	€ 18,552
2009	11	4.70	3.20	2.7	812	220.86	2429.42	0.65	10	€ 6,489
2009	46	5.27	3.21	2.7	812	251.81	11583.13	3.09	10	€ 22,860
2009	7	5.86	3.40	2.7	812	362.83	2539.84	0.68	10	€ 5,052
2009	50	7.00	3.02	2.7	812	223.07	11153.30	2.97	10	€ 31,592
TOTAL 2009	216					1351.25	43466.35	11.59		€ 94,035
2010	52	2.64	3.22	2.7	812	128.22	6667.25	1.78	10	€ 16,560
2010	157	3.5	3.2	2.7	812	164.47	25821.41	6.88	10	€ 60,132
2010	72	5.27	3.21	2.7	812	251.81	18130.11	4.83	10	€ 35,650
2010	102	7.1	3.02	2.7	812	226.25	23077.77	6.15	10	€ 66,882
TOTAL 2010	383					770.74	73696.55	19.65		€ 179,224
2011	42	2.64	3.22	2.7	812	128.22	5385.09	1.34	10	€ 13,620
2011	109	3.5	3.2	2.7	812	164.47	17926.97	4.47	10	€ 50,074

2011	46	5.27	3.21	2.7	812	251.81	11583.13	2.89	10	€ 21,640
2011	86	7.1	3.02	2.7	812	226.25	19457.73	4.85	10	€ 57,384
2011	1	12.4	3	2.7	812	372.92	372.92	0.09	10	€ 1,930
TOTAL 2011	284					1143.66	54725.83	13.65		€ 144,648
2012	47	2.64	3.22	2.7	812	128.22	6026.17	1.50	10	€ 15,410
2012	94	3.5	3.2	2.7	812	164.47	15459.95	3.86	10	€ 34,045
2012	52	5.27	3.21	2.7	812	251.81	13093.97	3.27	10	€ 23,880
2012	85	7.1	3.02	2.7	812	226.25	19 231.47	4.80	10	EUR 47 882
2012	1	16.2	3	2.7	812	487.20	487.20	0.12	10	EUR 1 800
TOTAL 2012	279					1 257.94	54 298.7706	13.54		EUR 123 017
2013	35	2.64	3.22	2.7	812	128.22	4 487.57	1.12	10	EUR 15 100
2013	69	3.5	3.2	2.7	812	164.47	11 348.26	2.83	10	EUR 24 350
2013	43	5.27	3.21	2.7	812	251.81	10 827.71	2.70	10	EUR 29 250
2013	57	7.1	3.02	2.7	812	226.25	12 896.40	3.22	10	EUR 46 273
TOTAL 2013	204					770.74	39 559.95	9.87		EUR 114 973
TOTAL 2007-2013	**1842**					**6 955.64**	**327 646.66**	**84.79**	**0**	**EUR 890 742**

INSTALLATION OF SPLIT UNITS IN THE 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	5.8	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	5.79	0.00	0.00	0.00
2	2008	10.7	0.00	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72	10.72	0.00	0.00
3	2009	11.6	0.00	0.00	11.59	11.59	11.59	11.59	11.59	11.59	11.59	11.59	11.59	11.59	0.00
4	2010	19.6	0.00	0.00	0.00	19.65	19.65	19.65	19.65	19.65	19.65	19.65	19.65	19.65	0.00
5	2011	13.6	0.00	0.00	0.00	0.00	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65	13.65
6	2012	13.5	0.00	0.00	0.00	0.00	0.00	13.54	13.54	13.54	13.54	13.54	13.54	13.54	13.54
7	2013	9.9	0.00	0.00	0.00	0.00	0.00	0.00	9.87	9.87	9.87	9.87	9.87	9.87	9.87
Total Energy saving per year (toe)			5.79	16.50	28.09	47.74	61.39	74.93	84.79	84.79	84.79	84.79	79.01	68.29	37.06

INSTALLATION OF SPLIT UNITS IN THE PUBLIC SECTOR								
S/N	**YEAR**	**NO OF INVESTMENTS**	**GRANT SUM**	**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	2007	272	EUR 130 805	5.79	5.79	0.00%	0.00	0.00%
2	2008	204	EUR 104 040	10.72	10.72	0.01%	0.00	0.00%
3	2009	216	EUR 94 035	11.59	11.59	0.01%	0.00	0.00%

4	2010	383	EUR 179 224	19.65	19.65	0.01%	0.00	0.00%
5	2011	284	EUR 144 648	13.65	13.65	0.01%	13.65	0.00%
6	2012	279	EUR 123 017	13.54	13.54	0.01%	13.54	0.00%
7	2013	204	EUR 114 973	9.87	9.87	0.01%	9.87	0.00%
TOTAL		**1842**	**EUR 890 742**	**84.79**	**84.79**	**0.05%**	**37.06**	**0.01%**

VRV AND HEAT PUMP REPLACEMENT IN THE PUBLIC SECTOR

REPLACEMENT OF VRV AND HEAT PUMP CHILERS IN THE PUBLIC SECTOR											
Year	**Description**	**Quantity**	**COOLING CAPACITY [Kw]**	**EER best_perf_on_market**	**EER average (Παραδοχή από το ISBEM)**	**nh**	**UFES [kWh/unit/year]**	**Total Saving [kWh/year]**	**Total Saving [toe/year]**	**life time**	**Budget**
2010	VRV	2	28.00	3.77	2	812	5 337.23	10 674.46	2.85	10	-
2010	VRV	1	33.50	3.48	2	812	5 784.33	5 784.33	1.54	10	-
2010	VRV	1	40.00	3.23	2	812	6 184.27	6 184.27	1.65	10	-
2010	VRV	1	11.90	3.58	2	812	2 132.29	2 132.29	0.57	10	EUR 11 739
2010	HEAT PUMP CHILLER	4	150.00	2.87	2	812	18 460.98	73 843.90	19.69	10	EUR 150 000
2010	HEAT PUMP CHILLER	1	745.00	3.11	2	812	107 956	107 955.53	28.78	10	EUR 75 000
TOTAL 2010		10					145 854.64	206 574.79	55.07		EUR 236 739
2011	VRV	4	70	3.20	2	812	10 657.50	42 630.00	10.63	10	EUR 88 000
2011	HEAT PUMP CHILLER	1	100	2.70	2	812	10 525.93	10 525.93	2.63	10	EUR 18 000
2011	SPLIT UNIT	1	16.2	3.00	2.5	812	876.96	876.96	0.22	10	EUR 1 800
TOTAL 2011		6					22 060.39	54 032.89	13.48		EUR 107 800
2012	HEAT PUMP CHILLER	1	226	2.83	2	812	26 910.77	26 910.77	6.71	10	EUR 24 200
2012	HEAT PUMP CHILLER	1	300	2.70	2	812	31 577.78	31 577.78	7.88	10	EUR -
TOTAL 2012		2					58 488.55	58 488.55	14.59		EUR 24 200
2013	VRV	1	50.4	3.42	2	812	8 496.08	8 496.08	2.12	10	EUR 11 666
2013	VRV	1	56	3.34	2	812	9 121.63	9 121.63	2.27	10	EUR 13 000
2013	VRV	1	90	3.60	2	812	16 240.00	16 240.00	4.05	10	EUR 32 000
2013	HEAT PUMP CHILLER	1	543	2.87	2	812	66 828.73	66 828.73	16.67	10	EUR 76 579
2013	HEAT PUMP CHILLER	1	348.8	2.64	2	812	34 330.38	34 330.38	8.56	10	EUR 53 600
2013	HEAT PUMP CHILLER	1	498.4	2.87	2	812	61 339.67	61 339.67	15.30	10	EUR 72 200
2013	HEAT PUMP CHILLER	1	226	2.57	2	812	20 350.55	20 350.55	5.08	10	EUR 35 550
TOTAL 2013		7					216 707.04	216 707.04	54.05		EUR 294 595
TOTAL 2010-2013		25					443 111	535 803	137.18	0	EUR 663 334.00
Note that nh = 1400hours x 0.58 = 812											

REPLACEMENT OF VRV AND HEAT PUMP CHILERS IN THE 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		2010	55.1	0.00	0.00	0.00	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	55.07	0.00
2		2011	13.5	0.00	0.00	0.00	0.00	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48	13.48
3		2012	14.6	0.00	0.00	0.00	0.00	0.00	14.59	14.59	14.59	14.59	14.59	14.59	14.59	14.59
4		2013	54.0	0.00	0.00	0.00	0.00	0.00	0.00	54.05	54.05	54.05	54.05	54.05	54.05	54.05
Total Energy saving per year (toe)				0.00	0.00	0.00	**55.07**	68.55	83.14	137.18	137.18	137.18	**137.182**	137.18	137.18	**82.11**

REPLACEMENT OF VRV AND HEAT PUMP CHILERS IN THE PUBLIC SECTOR								
Α/Α	**ΕΤΟΣ**	**ΑΡΙΘ. ΕΠΕΝΔ.**	**ΠΟΣΟ ΕΠΙΧΟΡΗΓΗΣΗΣ**	**ΕΞΟΙΚΟΝ. ΕΝΕΡΓΕΙΑΣ ΤΙΠ/ΕΤΟΣ**	**ΣΥΝΕΙΣΦΟΡΑ ΣΤΟΝ ΣΤΟΧΟ (2016) ΣΤΗΝ ΤΕΛΙΚΗ ΧΡΗΣΗ ΤΙΠ %**		**ΕΞΟΙΚΟΝΟΜΗΣΗ ΕΝΕΡΓΕΙΑΣ ΓΙΑ ΤΟ ΣΤΟΧΟ 2020 ΤΙΠ %**	
1	2010	10	€ 236,739	55.07	55.07	0.03%	0.00	0.00%
2	2011	6	€ 107,800	13.48	13.48	0.01%	13.48	0.003%
3	2012	2	€ 24,200	14.59	14.59	0.01%	14.59	0.003%
4	2013	7	€ 294,595	54.05	54.05	0.03%	54.05	0.01%
ΣΥΝΟΛΟ		**25**	**€ 663,334**	**137.18**	**137.18**	**0.07%**	**82.11**	**0.02%**

PURCHASING NEW COMPUTERS IN THE PUBLIC SECTOR

	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
2010	€ 2,013,910.00	5443	39	212277.00	56.59
2011	€ 1,242,647.32	4195	39	163605.00	40.80
2012	€ 1,048,932.00	2538	39	98982.00	24.69
2013	€ 126,588.00	274	39	10686.00	2.67
TOTAL	€ 8,420,399.40	19918		776802.00	202.40

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**	**2013**	**2014**	**2015**	**2016**
1	2007	9.1	9.13	9.13	9.13	0.00	0.00	0.00	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	0.00	0.00	0.00
3	2009	56.1	0.00	0.00	56.05	56.05	56.05	0.00	0.00	0.00	0.00	0.00
4	2010	56.6	0.00	0.00	0.00	56.59	56.59	56.59	0.00	0.00	0.00	0.00
5	2011	40.8	0.00	0.00	0.00	0.00	40.80	40.80	40.80	0.00	0.00	0.00
6	2012	24.7	0.00	0.00	0.00	0.00	0.00	24.69	24.69	24.69	0.00	0.00
7	2013	2.7	0.00	0.00	0.00	0.00	0.00	0.00	2.67	2.67	2.67	0.00
Total Energy saving per year (toe)			9.13	21.60	77.65	125.11	153.45	122.08	68.15	27.35	2.67	**0.00**

PURCHASING NEW SCREENS IN THE PUBLIC SECTOR

	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
2010	€ 632,385.00	5499.00	11	60489.00	16.13
2011	€ 435,096.00	4356.00	11	47916.00	12.77
2012	€ 238,680.00	2602.00	11	28622.00	7.63
2013	€ 25,389.00	279.00	11	3069.00	0.82
TOTAL	€ 1,596,776.00	20846.00		229306.00	61.13

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**	**2013**	**2014**	**2015**	**2016**
1	2007	2.80	2.80	2.80	2.80	0.00	0.00	0.00	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	0.00	0.00	0.00
3	2009	17.04	0.00	0.00	17.04	17.04	17.04	0.00	0.00	0.00	0.00	0.00
4	2010	16.13	0.00	0.00	0.00	16.13	16.13	16.13	0.00	0.00	0.00	0.00
5	2011	12.77	0.00	0.00	0.00	0.00	12.77	12.77	12.77	0.00	0.00	0.00
6	2012	7.63	0.00	0.00	0.00	0.00	0.00	7.63	7.63	7.63	0.00	0.00
7	2013	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.82	0.82	0.00
Total Energy saving per year (toe)			2.80	6.75	23.78	**37.11**	45.94	36.53	21.22	8.45	0.82	**0.00**

REPLACEMENT OF BOILERS IN PUBLIC BUILDINGS

Replacing heating systems (boilers) in public buildings										
S/N	**Building Type**	**Year of installation**	**Expected Lifetime**	**A Surface (m2)**	**SHD Specific Heat Demand (kWh/m2/year)**	**ηinit Efficiency of heating equipment (Existing Boiler)**	**ηinit Efficiency of heating equipment (New Boiler)**	**UFES Savings (kWh/YEAR)**	**UFES Savings (TOE/YEAR)**	**BUDGET**
1	Extension of the Alternative Detention Premises	2010	25	1 500	50	0.6	0.930	44 355	0.381	EUR 2 500.00
2	Larnaca General Hospital	2010	25	17 285	50	0.6	0.910	490 691	4.220	EUR 17 600.00
TOTAL 2010								535 046	4.601	EUR 20 100.00
1	Transit Building for Irregular Immigrants in Menoghia	2011	25	3,566	50	0.6	0.900	99 056	0.852	EUR 12 000.00
2	Police Academy	2011	25	2 270	73	0.6	0.905	93 078	0.800	EUR 6 000.00
TOTAL 2011								192 134	1.652	18 000.000
1	Paphos District Court	2012	25	1 260	73	0.6	0.905	51 665	0.444	EUR 11 858.00
TOTAL 2012								51 665	0.444	EUR 11 858.00
1	Police Station of Pyli, Paphos	2013	25	2 224	73	0.6	0.905	91 192	0.784	EUR 2 540.00
2	Firefighting Station No 3	2013	25	750	73	0.6	0.933	32 568	0.280	EUR 890.00
3	Nicosia District Court building 4	2013	25	1 727	73	0.6	0.905	70 813	0.609	EUR 2 540.00
4	Limassol General Hospital	2013	25	32 000	50	0.6	0.955	991 274	8.525	EUR 28 250.00
TOTAL 2013								1 185 848	10.20	EUR 34 220.00
TOTAL 2010-2013								1 964 693	17	EUR 84 178.00

Replacing heating systems (boilers) in public buildings - Energy Savings												
	YEAR OF INSTALLATION	**Energy saving (TOE/YEAR)**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2020**
1	2010	4.6	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60	4.60
2	2011	1.7	0.00	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
3	2012	0.4	0.00	0.00	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
4	2013	10.2	0.00	0.00	0.00	10.20	10.20	10.20	10.20	10.20	10.20	10.20
Total Energy saving per year (toe)		16.9	**4.60**	6,25	6.70	16.90	16.90	16.90	**16.9**	16.90	16.90	**16.9**

S/N	**YEAR**	**NO OF INVESTMENTS**	**GRANT SUM**		**ENERGY SAVINGS TOE/YEAR**	**CONTRIBUTION TO THE END USE TARGET (2016) TOE %**		**ENERGY SAVINGS FOR THE 2020 TARGET TOE %**	
1	2010	2	EUR	20 100	4.60	4.60	0.00%	4.60	0.00%
2	2011	2	EUR	18 000	**1.652**	1.65	0.00%	1.65	0.000%
3	2012	1	EUR	11 858	**0.444**	0.44	0.00%	0.44	0.000%
4	2013	4	EUR	34 220	**10.20**	10.20	0.01%	10.20	0.00%
TOTAL		9	EUR	84 178	16.90	**16.90**	**0.01%**	**16.90**	**0.00%**

7. Vehicle Scrapping Plan (Scrapping)

Title of the Energy Efficiency Improvement Measure (EEI)		Scrapping of Vehicles 2008-2010
Description	**Time frame**	Start: 2008, Expiry: 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.
	Regional application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	**Grant category C(i) (EUR 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) (EUR 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 is required.
	Budget and source	EUR 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**	The methodology is set out in Annex E, paragraph 13.
	Energy savings achieved in 2012	**2 823 TOE**
	Energy savings expected in 2016	**2 823 TOE**
	Energy savings expected in 2020	**167 TOE**
	Assumptions	The assumptions are included in the methodology description provided in Annex E, paragraph 13.

TABLES CONTAINING DATA ON VEHICLE SCRAPPING

S/N	Category of Scrapping	Year of Scrapping	Number of Vehicles	Savings per vehicle (toe)	Total savings:(toe)	Duration of Investment	Year until which the measure will be in effect	GRANT/CAR	TOTAL GRANT
1	Category C(i) - Energy savings from the operation of the Scheme for the scrapping of vehicles over 10 years old and their replacement with the purchase of new vehicles with average fuel consumption of **6l/100km**	2008	1 796	0.628	1 127.888	15 years	2023	1 283	EUR 2 304 268
2	Category C(ii) - Energy savings from the operation of the scheme for the scrapping of vehicles over 10 years old and their replacement with the purchase of new vehicles with average fuel consumption of **4.3l/100km**	2008	655	0.896	586.88	15 years	2023	1 710	EUR 1 120 050
3	Category C(i) - Energy savings from the operation of the Scheme for the scrapping of vehicles over 10 years old and their replacement with the purchase of new vehicles with average fuel consumption of **6l/100km**	2009	1 019	0.628	639.932	15 years	2024	1 283	EUR 1 307 377
4	Category C(ii) - Energy savings from the operation of the scheme for the scrapping of vehicles over 10 years old and their replacement with the purchase of new vehicles with average fuel consumption of **4.3l/100km**	2009	336	0.896	301.056	15 years	2024	1 710	EUR 574 560
5	Category C(i) - Energy savings from the operation of the Scheme for the scrapping of vehicles over 10 years old and their replacement with the purchase of new vehicles with average fuel consumption of **6l/100km**	2010	266	0.628	167.048	15 years	2025	1 800	EUR 478 800.00
	TOTAL		**4 072**		**2 822.804**				EUR 5 785 055.00

S/N	YEAR	NO OF INVESTMENTS	GRANT SUM	CONTRIBUTION TO THE END USE TARGET (2016) TOE %		ENERGY SAVINGS FOR THE 2020 TARGET TOE %	
1	2008	**2 451**	EUR 3 424 318	1 714.768	0.927%	0	0.000%
2	2009	**1 355**	EUR 1 881 937	940.988	0.509%	0	0.000%
3	2010	**266**	EUR 478 800	167.048	0.090%	167.048	0.036%
TOTAL		**4 072**	EUR 5 785 055	2 822.804	1.526%	167.048	0.036%

8. Vehicle Grant Schemes

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	**Time frame**	Start: 2004, Expiry: 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 studies, where these are deemed necessary. The investments must concern mature technologies and not technologies which are 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.
	Regional application	All of Cyprus

<table>
<tr><td rowspan="4">Information concerning implementation</td><td>List and description of actions for measure verification</td><td>The measure pertains to grants for the following types of vehicles:
Hybrid vehicles
Electric vehicles
Vehicles with carbon dioxide emissions below 120 g/km.</td></tr>
<tr><td>Budget and source</td><td>EUR 2 611 923
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 Department of the MECIT.</td></tr>
<tr><td>Energy Savings</td><td>Method used for monitoring/calculating energy savings</td><td>The methodology is set out in Annex E, paragraph 14.</td></tr>
<tr><td></td><td>Energy savings achieved in 2012.</td><td>1 073.5 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2016</td><td>1 073.5 TOE</td></tr>
<tr><td></td><td>Energy savings expected in 2020</td><td>0 TOE</td></tr>
<tr><td></td><td>Assumptions</td><td>A total of 3 118 investments were realised during the implementation of the measure. Following are the quantities per category:
<table><tr><th>Category</th><th>Quantity</th></tr><tr><td>Hybrid vehicles</td><td>831</td></tr><tr><td>Electric vehicles</td><td>32</td></tr><tr><td>Vehicles with carbon dioxide emissions below 120g/km</td><td>2,229</td></tr></table>
The assumptions are included in the methodology description provided in Annex E, paragraph 14.</td></tr>
</table>

TABLES CONTAINING INFORMATION ON GRANT SCHEMES FOR VEHICLES (ELECTRIC, HYBRID, LOW-POLLUTANT)

HYBRID VEHICLES									
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT	GRANT SUM	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
1	2006	76	15	EUR 997 338	32.26	32.26	0.02%	0.00	0.00%
2	2007	253	15		107.40	107.40	0.06%	0.00	0.00%
3	2008	338	15		143.48	143.48	0.08%	0.00	0.00%
4	2009	164	15		69.62	69.62	0.04%	0.00	0.00%
TOTAL		831		EUR 997 338	352.76	352.76	0.19%	0.00	0.00%

ELECTRIC VEHICLES									
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT	GRANT SUM	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
1	2006	7	15	EUR 22 566	4.35	4.35	0.00%	0.00	0.00%
2	2007	0	15		0.00	0.00	0.00%	0.00	0.00%
3	2008	25	15		15.55	15.55	0.01%	0.00	0.00%
4	2009	0	15		0.00	0.00	0.00%	0.00	0.00%
TOTAL		32		EUR 22 566	19.90	19.90	0.01%	0.00	0.00%

LOW-POLLUTANT VEHICLES									
S/N	YEAR	NO OF INVESTMENTS	DURATION OF INVESTMENT	GRANT SUM	ENERGY SAVINGS TOE/YEAR	CONTRIBUTION TO THE END USE TARGET (2016) TOE	%	ENERGY SAVINGS FOR THE 2020 TARGET TOE	%
1	2006	0	15	EUR 1 592 019	0.00	0.00	0.00%	0.00	0.00%
2	2007	291	15		91.49	91.49	0.05%	0.00	0.00%
3	2008	859	15		270.07	270.07	0.15%	0.00	0.00%
4	2009	1079	15		339.24	339.24	0.18%	0.00	0.00%
TOTAL		2229		EUR 1 592 019	700.80	700.80	0.38%	0.00	0.00%

9. Compact Fluorescent Lamps Campaign

Title of the Energy Efficiency Improvement Measure (EEI)		Distribution of free fluorescent lamps
Description	**Time frame**	Start: 2007, Expiry: 2012
	Purpose/short description	The measure related 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 were 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. were entitled to 10 compact fluorescent lamps. As it was impossible to distribute all lamps by the end of 2010, it was decided to extend the period of distribution to 2011 and 2012.
	End use category	Buildings in the residential and tertiary sectors (Non-profit Organisations, Churches, Schools, Welfare Associations and Charity Institutions).
	Target group	All buildings in the above sectors
	Regional 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	EUR 2 710 840 The data were provided by the Special Fund for RES and ES.
	Implementing organisation	Special Fund for RES and ES
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The bottom-up methodology was used, as referred to in page 77 of the methodologies proposed by the European Commission, under certain assumptions referred to in the methodology set out in Annex E, paragraph 15.
	Energy savings achieved in 2012.	**24 358.8 TOE**
	Energy savings expected in 2016	**15 001.9 TOE**
	Energy savings expected in 2020	**10 491.0 TOE**

TABLES CONTAINING INFORMATION ON THE COMPACT FLUORESCENT LAMPS CAMPAIGN

	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
1	2007	373374	**47**	17548578	4678	6000
2	2008	373374	**47**	17548578	4678	8000
3	2010	360000	**47**	16920000	4511	10000
4	2011	245000	**47**	11515000	2872	10000
5	2012	650000	**47**	30550000	7619	10000

		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	2872	0	0	0	**0**	2872	2872	2872	2872	2872	2872	2872	2872	2872	2872
5	2012	7619	0	0	0	**0**	0	7619	7619	7619	7619	7619	7619	7619	7619	7619
Total Energy saving per year (toe)			4678	9357	9357	**13867.8**	16740	24359	19680	19680	19680	**15001.9**	15002	15002	15002	**10491.0**

S/N	Year	Quantity	Budget	ENERGY SAVINGS at the year of installation TOE/YEAR	CONTRIBUTION TO THE TARGET (2016) FINAL CONSUMPTION TOE %		CONTRIBUTION TO THE TARGET ON PRIMARY CONSUMPTION (2020) TOE %	
1	**2007**	373 374	EUR 643 206.00	4 678	0	0.0%	0	0.00%
2	**2008**	373 374	EUR 694 666.00	4 678	0	0.0%	0	0.00%
3	**2010**	360 000	EUR 1 372 968.00	4 511	4 511	2.4%	0	0.00%
4	**2011**	245 000		2 872	2 872	1.6%	2 872	0.62%
5	**2012**	650 000		7 619	7 619	4.1%	7 619	1.65%
TOTAL		**2001748**	**EUR 2 710 840.00**	**24 359**	**15 001.88**	**8.1%**	**10 491.01**	2.27%

10. Replacement of Household Appliances (Clothes Washers, air conditioners, Refrigerators, etc.)

Title of the Energy Efficiency Improvement Measure (EEI)		Replacement of Household Appliances
Description	**Time frame**	Start: 2010, Expiry: -
	Purpose/short description	Relates to the replacement of household appliances in the residential sector.
	End use category	Residential Sector
	Target group	Residential sector appliances
	Regional application	All of Cyprus
Information concerning implementation	**List and description of actions for measure verification**	Legislation on the labelling of domestic appliances (Ecodesign).
	Budget and source	Not applicable
	Implementing organisation	-
	Competent monitoring authority	Energy Department of the MECIT.
Energy Savings	**Method used for monitoring/calculating energy savings**	The methodologies used are set out in Annex E, paragraph 16.
	Energy savings achieved in 2012.	**5 535 TOE**
	Energy savings expected in 2016	**12 369 TOE**
	Energy savings expected in 2020	**20 342 TOE**

TABLES CONTAINING INFORMATION ON THE REPLACEMENT OF DOMESTIC APPLIANCES

Aggregate data on all appliances

ENERGY SAVINGS PER YEAR - TOE													
Measures	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Household Dishwashers (Regulation 1016/2010)	111	210	298	384	474	569	671	776	901	1 051	1 227	1 227	1 116
Household Refrigerators (Regulation 1060/2009)	156	452	715	969	1 223	1 481	1 745	2 012	2 308	2 633	2 997	2 997	2 997
Household Freezers	224	386	467	550	634	718	804	904	1 019	1 152	1 300	1 300	1 300
Household Refrigerator-Freezers	339	720	1 013	1 350	1 692	2 041	2 396	2 779	3 162	3 549	3 942	3 942	3 942
air conditioners	447	879	1 292	1 632	1 940	2 248	2 591	2 935	3 277	3 598	3 929	3 929	3 929
Household Clothes Washers	240	470	686	917	1 158	1 409	1 671	1 937	2 208	2 483	2 757	2 757	2 518
Household Clothes Dryers	191	374	557	743	972	1 219	1 491	1 760	2 063	2 391	2 721	2 721	2 530
Television sets	80	144	189	233	274	235	204	188	177	172	179	145	117
Electric Ovens	109	212	318	429	548	671	795	918	1 042	1 166	1 289	1 289	1 180
Total savings kWh	**1 896**	**3 846**	**5 535**	**7 207**	**8 913**	**10 591**	**12 369**	**14 210**	**16 158**	**18 193**	**20 342**	**20 308**	**19 629**

Household Dishwashers

REPLACEMENT																		
				Sales Estimate		Replacement estimate		A+++ (quantity)	kWh/annum	A++ (quantity)	kWh/annum	A+ (quantity)	kWh/annum	A (quantity)	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
Household Dishwashers				**2010**	11 959	**2010**	5 980	0	0	0	0	0	0	4 186	1 381 380	1 381 380	151 952	41
				2011	10 903	**2011**	5 452	0	0	0	0	0	0	4 362	1 439 328	1 439 328	158 326	39
				2012	8 792	**2012**	4 396	88	20 222	440	114 296	2 418	701 162	1 451	478 724	1 314 404	159 856	40
life cycle			12	**2013**	8 500	**2013**	4 250	213	48 875	425	110 500	2 338	677 875	1 275	420 750	1 258 000	158 716	40
Imports				**2014**	8 500	**2014**	4 250	425	97 750	850	221 000	2 550	739 500	425	140 250	1 198 500	172 508	43
	EU	non-EU	**Total**	**2015**	8 500	**2015**	4 250	850	195 500	1 275	331 500	2 125	616 250			1 143 250	196 053	49
2010	9 531	2 428	11 959	**2016**	8 500	**2016**	4 250	1 275	293 250	1 700	442 000	1 275	369 750			1 105 000	221 468	55
2011	8 313	1 534	9 847	**2017**	8 500	**2017**	4 250	1 488	342 125	1 913	497 250	850	246 500			1 085 875	234 175	58
2012	7 096	640	7 736	**2018**	9 775	**2018**	4 888	1 955	449 696	2 444	635 440	489	141 752			1 226 888	283 944	71
				2019	11 200	**2019**	5 600	3 360	772 800	2 240	582 400					1 355 200	354 144	88
				2020	11 200	**2020**	6 500	4 550	1 046 500	1 950	507 000					1 553 500	420 420	105

NEWLY-INSTALLED EQUIPMENT					
Estimate of new installations		Savings per appliance/year (kWh)	Total savings/Year (kWh)	Total savings/Year (TOE)	**TOTAL SAVINGS FROM REPLACEMENT AND NEW INSTALLATION (TOE)**
2010	5 980	44	263 120	70	**111**
2011	5 452	44	239 888	60	**99**
2012	4 396	44	193 424	48	**88**
2013	4 250	44	187 000	47	**86**
2014	4 250	44	187 000	47	**90**
2015	4 250	44	187 000	47	**96**
2016	4 250	44	187 000	47	**102**
2017	4 250	44	187 000	47	**105**
2018	4 888	44	215 072	54	**124**
2019	5 600	44	246 400	61	**150**
2020	6 500	44	286 000	71	**176**

ENERGY SAVINGS PER YEAR - TOE															
Household Refrigerators		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	2010	111	111	111	111	111	111	111	111	111	111	111	111	0	0
2	2011	0	99	99	99	99	99	99	99	99	99	99	99	99	0
3	2012	0	0	88	88	88	88	88	88	88	88	88	88	88	88
4	2013	0	0	0	86	86	86	86	86	86	86	86	86	86	86
5	2014	0	0	0	0	90	90	90	90	90	90	90	90	90	90
6	2015	0	0	0	0	0	96	96	96	96	96	96	96	96	96
7	2016	0	0	0	0	0	0	102	102	102	102	102	102	102	102
8	2017	0	0	0	0	0	0	0	105	105	105	105	105	105	105
9	2018	0	0	0	0	0	0	0	0	124	124	124	124	124	124
10	2019	0	0	0	0	0	0	0	0	0	150	150	150	150	150
11	2020	0	0	0	0	0	0	0	0	0	0	176	176	176	176
TOTAL		111	210	298	384	474	569	671	776	901	1 051	1 227	1 227	1 116	1 017

Household Refrigerators

REPLACEMENT																		
				Sales Estimate		Replacement estimate		A+++	kWh/annum	A++	kWh/annum	A+	kWh/annum	A	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
Household Refrigerators				2010	12 482	2010	6 241	0	0	0	0	624	73 017	4 369	655 279	728 296	166 778	44
				2011	24 085	2011	12 042	0	0	0	0	1 806	211 341	9 634	1 445 070	1 656 411	378 861	94
				2012	21 716	2012	10 858	109	7 275	543	45 604	5 429	635 193	4 778	716 628	1 404 699	328 706	82
life cycle			15	2013	21 000	2013	10 500	525	35 175	1 050	88 200	5 775	675 675	3 150	472 500	1 271 550	315 830	79
Imports				2014	21 000	2014	10 500	1 050	70 350	2 100	176 400	6 300	737 100	1 050	157 500	1 141 350	315 399	79
	EU	non-EU	Total	2015	21 000	2015	10 500	2 100	140 700	3 150	264 600	5 250	614 250			1 019 550	330 351	82
2010	9 882	15 081	24 963	2016	21 000	2016	10 500	3 150	211 050	4 200	352 800	3 150	368 550			932 400	354 501	88
2011	12 930	10 780	23 206	2017	21 000	2017	10 500	3 675	246 225	4 725	396 900	2 100	245 700			888 825	366 576	91
2012	13 520	6 702	20 226	2018	23,000	2018	11 500	4 600	308 200	5 750	483 000	1 150	134 550			925 750	414 713	103

2019	25 000	**2019**	12 500	7 500	502 500	5 000	420 000					922 500	466 200	116
2020	28 000	**2020**	14 000	9 800	656 600	4 200	352 800					1 009 400	522 928	130

NEWLY-INSTALLED EQUIPMENT					
Estimate of new installations		Savings per appliance/year (kWh)	Total savings/Year (kWh)	Total savings/Year (TOE)	**TOTAL SAVINGS FROM REPLACEMENT AND NEW INSTALLATION (TOE)**
2010	6 241	67	418 130.25	111	**156**
2011	12 042	67	806 830.75	201	**296**
2012	10 858	67	727 486	181	**263**
2013	10 500	67	703 500	175	**254**
2014	10 500	67	703 500	175	**254**
2015	10 500	67	703 500	175	**258**
2016	10 500	67	703 500	175	**264**
2017	10 500	67	703 500	175	**267**
2018	11 500	67	770 500	192	**296**
2019	12 500	67	837 500	209	**325**
2020	14 000	67	938 000	234	**364**

ENERGY SAVINGS PER YEAR - TOE														
Household Refrigerators		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1	**2010**	156	156	156	156	156	156	156	156	156	156	156	156	156
2	**2011**	0	296	296	296	296	296	296	296	296	296	296	296	296
3	**2012**	0	0	263	263	263	263	263	263	263	263	263	263	263
4	**2013**	0	0	0	254	254	254	254	254	254	254	254	254	254
5	**2014**	0	0	0	0	254	254	254	254	254	254	254	254	254
6	**2015**	0	0	0	0	0	258	258	258	258	258	258	258	258
7	**2016**	0	0	0	0	0	0	264	264	264	264	264	264	264
8	**2017**	0	0	0	0	0	0	0	267	267	267	267	267	267
9	**2018**	0	0	0	0	0	0	0	0	296	296	296	296	296
10	**2019**	0	0	0	0	0	0	0	0	0	325	325	325	325
11	**2020**	0	0	0	0	0	0	0	0	0	0	364	364	364
TOTAL		156	452	715	969	1 223	1 481	1 745	2012	2 308	2 633	2 997	2 997	2 997

Household Freezers

REPLACEMENT																	
				Sales Estimate		Replacement estimate		A+++	kWh/annum	A++	kWh/annum	A+	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
Household Freezers				**2010**	13 448	**2010**	6 724	336	36 982	3 362	470 680	3 026	605 160	1 112 822	360 944	96
				2011	10 426	**2011**	5 213	261	28 670	2 606	364 893	2 346	469 148	862 710	279 820	70
				2012	5 252	**2012**	2 626	131	14 442	1 313	183 803	1 182	236 318	434 562	140 950	35
life cycle			15	**2013**	5 200	**2013**	2 600	520	57 200	1 300	182 000	780	156 000	395 200	146 432	37
Imports				**2014**	5 200	**2014**	2 600	780	85 800	1 300	182 000	520	104 000	371 800	151 008	38
	EU	non-EU	**Total**	**2015**	5 200	**2015**	2 600	1 040	114 400	1 300	182 000	260	52 000	348 400	155 584	39
2010	10 215	3 233	13 448	**2016**	5 200	**2016**	2 600	1 300	143 000	1 300	182 000			325 000	160 160	40
2011	4 297	3 106	7 403	**2017**	6 000	**2017**	3 000	1 800	198 000	1 200	168 000			366 000	184 800	46
2012	1 687	1 413	3 100	**2018**	7 000	**2018**	3 500	2 450	269 500	1 050	147 000			416 500	215 600	54
				2019	8 000	**2019**	4 000	3 200	352 000	800	112 000			464 000	246 400	61
				2020	9 000	**2020**	4 500	3 600	396 000	900	126 000			522 000	277 200	69

NEWLY-INSTALLED EQUIPMENT					
Estimate of new installations		Savings per appliance/year (kWh)	Total savings/Year (kWh)	Total savings/Year (TOE)	**TOTAL SAVINGS FROM REPLACEMENT AND NEW INSTALLATION (TOE)**
2010	6 724	71	477 404	127	**224**
2011	5 213	71	370 105	92	**162**
2012	2 626	71	186 428	46	**82**
2013	2 600	71	184 600	46	**83**
2014	2 600	71	184 600	46	**84**
2015	2 600	71	184 600	46	**85**

2016	2 600	71	184 600	46	**86**
2017	3 000	71	213 000	53	**99**
2018	3 500	71	248 500	62	**116**
2019	4 000	71	284,000	71	**132**
2020	4 500	71	319 500	80	**149**

ENERGY SAVINGS PER YEAR - TOE														
Household Freezers		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1	**2010**	224	224	224	224	224	224	224	224	224	224	224	224	224
2	**2011**	0	162	162	162	162	162	162	162	162	162	162	162	162
3	**2012**	0	0	82	82	82	82	82	82	82	82	82	82	82
4	**2013**	0	0	0	83	83	83	83	83	83	83	83	83	83
5	**2014**	0	0	0	0	84	84	84	84	84	84	84	84	84
6	**2015**	0	0	0	0	0	85	85	85	85	85	85	85	85
7	**2016**	0	0	0	0	0	0	86	86	86	86	86	86	86
8	**2017**	0	0	0	0	0	0	0	99	99	99	99	99	99
9	**2018**	0	0	0	0	0	0	0	0	116	116	116	116	116
10	**2019**	0	0	0	0	0	0	0	0	0	132	132	132	132
11	**2020**	0	0	0	0	0	0	0	0	0	0	149	149	149
TOTAL		838 348	1 488 274	1 815 653	2 146 685	2 482 293	2 822 477	3 167 237	3 565 037	4 029 137	4 559 537	5 156 237	5 156 237	5 156 237

Household Refrigerator-Freezers

REPLACEMENT															
		Sales Estimate		Replacement estimate		A+++	kWh/annum	A++	kWh/annum	A+	kWh/annum	A	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
Household Refrigerator-Freezers		**2010**	19 258	**2010**	9 629			481	96 290	8 666	2 383 178	481	168 508	2 647 975	605 423	161
		2011	23 196	**2011**	11 598			580	115 980	10 438	2 870 505	580	202 965	3 189 450	729 224	182
		2012	17 828	**2012**	8 914			446	89 140	8 023	2 206 215	446	155 995	2 451 350	560 468	140
life cycle	15	**2013**	20 500	2013	10 250			513	102 500	9 225	2 536 875	513	179 375	2 818 750	644 469	161

Imports																	
	EU	non-EU	**Total**	**2014**	20 500	**2014**	10 250			1,538	307 500	8 712.5	2 395 938	0	0	2 703 438	662 406	165
				2015	20 500	**2015**	10 250			2 563	512 500	7 687.5	2 114 063	0	0	2 626 563	690 594	172
2010	6 766	12 502	19 258	**2016**	20 500	**2016**	10 250			3 588	717 500	6 663	1 832 188	0	0	2 549, 688	718 781	179
2011	11 066	12 130	23 196	**2017**	20 500	**2017**	10 250	2 050	317 750	5 638	1 127 500	2 563	704 688	0	0	2 149 938	829 071	207
2012	9 352	8 476	17 828	**2018**	20 500	**2018**	10 250	2 050	317 750	5 638	1 127 500	2 563	704 688	0	0	2 149 938	829 071	207
				2019	20 500	**2019**	10 250	3 075	476 625	5 125	1 025 000	2 050	563 750	0	0	2 065 375	841 935	210
				2020	20 500	**2020**	10 250	4 100	635 500	5 125	1 025 000	1 025	281 875			1 942 375	868 893	217

NEWLY-INSTALLED EQUIPMENT					
Estimate of new installations		Savings per appliance/year (kWh)	Total savings/Year (kWh)	Total savings/Year (TOE)	**TOTAL SAVINGS FROM REPLACEMENT AND NEW INSTALLATION (TOE)**
2010	9 629	69	664 401	177	**339**
2011	11 598	69	800 262	200	**381**
2012	8 914	69	615 066	153	**293**
2013	10 250	69	707 250	176	**337**
2014	10 250	69	707 250	176	**342**
2015	10 250	69	707 250	176	**349**
2016	10 250	69	707 250	176	**356**
2017	10 250	69	707 250	176	**383**
2018	10 250	69	707 250	176	**383**
2019	10 250	69	707 250	176	**386**
2020	10 250	69	707 250	176	**393**

ENERGY SAVINGS PER YEAR - TOE														
Household Refrigerator-Freezers		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	2010	339	339	339	339	339	339	339	339	339	339	339	339	339
2	2011	0	381	381	381	381	381	381	381	381	381	381	381	381
3	2012	0	0	293	293	293	293	293	293	293	293	293	293	293
4	2013	0	0	0	337	337	337	337	337	337	337	337	337	337
5	2014	0	0	0	0	342	342	342	342	342	342	342	342	342
6	2015	0	0	0	0	0	349	349	349	349	349	349	349	349
7	2016	0	0	0	0	0	0	356	356	356	356	356	356	356
8	2017	0	0	0	0	0	0	0	383	383	383	383	383	383
9	2018	0	0	0	0	0	0	0	0	383	383	383	383	383
10	2019	0	0	0	0	0	0	0	0	0	386	386	386	386
11	2020	0	0	0	0	0	0	0	0	0	0	393	393	393
TOTAL		339	720	1 013	1 350	1 692	2 041	2 396	2 779	3 162	3 549	3 942	3 942	3 942

air conditioners

REPLACEMENT															
Sales Estimate		Replacement estimate		A+++	kWh/annum	A++	kWh/annum	A+	kWh/annum	A	kWh/annum	B	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
2010	32 331	2010	16 165				0	1 617	355 639	6 466	2 004 508	8 082.693	3 233 077	5 593 224	1 677 967	447
2011	33 322	2011	16 661				0	1 666	366 541	6 664	2 065 959	8 330.48	3 332 192	5 764 692	1 729 408	431
2012	33 484	2012	16 742			837	138 120	1 674	368 319	8 371	2 594 973	5 859.616	2 343 846	5 445 257	1 657 058	413
2013	33 591	2013	16 796			2 519	415 692	5 878	1 293 263	8 398	2 603 322			4 312 277	1 364 351	340
2014	33 699	2014	16 849			2 527.424	417 025	10 952.17	2 409 478	3 369.8	1 044 669			3 871 171	1 232 246	307

2015	33807	**2015**	16 903			2 535.504	418 358	10 987.18	2 417 180	3 380.6	1 048 008			3 883 547	1 236 185	308
2016	33 914	**2016**	16 957			8 478.613	1 398 971	8 478.613	1 865 295	1 695.7	525 674			3 789 940	1 374 807	343
2017	34 022	**2017**	17 011			8 505.547	1 403 415	8 505.547	1 871 220	1 701.1	527 343.9			3 801 979	1 379 174	344
2018	34 130	**2018**	17 065	2 559.744	358 364.2	7 679.232	1 267 073	6 825.984	1 501 716					2 768 790	1 374 497	343
2019	34 238	**2019**	17 119	4 279.707	599 158.9	9 415.355	1 553 534	3 423.765	753 228					2 905 921	1 285 667	321
2020	34 345	**2020**	17 173	7 727.712	1 081 880	9 444.981	1 558 422							2 640 302	1 327 492	331

ENERGY SAVINGS PER YEAR - TOE														
air conditioners		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1	**2010**	447	447	447	447	447	447	447	447	447	447	447	447	447
2	**2011**	0	431	431	431	431	431	431	431	431	431	431	431	431
3	**2012**	0	0	413	413	413	413	413	413	413	413	413	413	413
4	**2013**	0	0	0	340	340	340	340	340	340	340	340	340	340
5	**2014**	0	0	0	0	307	307	307	307	307	307	307	307	307
6	**2015**	0	0	0	0	0	308	308	308	308	308	308	308	308
7	**2016**	0	0	0	0	0	0	343	343	343	343	343	343	343
8	**2017**	0	0	0	0	0	0	0	344	344	344	344	344	344
9	**2018**	0	0	0	0	0	0	0	0	343	343	343	343	343
10	**2019**	0	0	0	0	0	0	0	0	0	321	321	321	321
11	**2020**	0	0	0	0	0	0	0	0	0	0	331	331	331
TOTAL		447	879	1 292	1 632	1 940	2 248	2 591	2 935	3 277	3 598	3 929	3 929	3 929

Household Clothes Washers

REPLACEMENT																							
				Sales Estimate		Replacement estimate		A+++	kWh/annum	A++	kWh/annum	A+	kWh/annum	Total consumption	Total savings kWh	Total savings TOE							
Household Clothes Washers				**2010**	36 794	**2010**	18 397	920	147 176	9 199	1 655 730	8 279	1 655 730	3 458 636	659 716	176							
				2011	37 778	**2011**	18 889	944	151 112	9 445	1 700 010	8 500	1 700 010	3 551 132	677 360	169							
				2012	35,402	**2012**	17 701	885	141 608	8 851	1 593 090	7 965	1 593 090	3 327 788	634 758	158							
life cycle			12	**2013**	35 402	**2013**	17 701	3 540.2	566 432	8 850.5	1 593 090	5 310.3	1 062 060	3 221 582	696 357	174							
Imports				**2014**	35 402	**2014**	17 701	5 310.3	849 648	8 850.5	1 593 090	3 540.2	708 040	3 150 778	737 424	184							
	EU	non-EU	**Total**	**2015**	35 402	**2015**	17 701	7 080.4	1 132 864	8 850.5	1 593 090	1 770.1	354 020	3 079 974	778 490	194							
2010	25 905	9 889	36 794	**2016**	35 402	**2016**	17 701	8 850.5	1 416 080	8 850.5	1 593 090			3 009 170	819 556	204							
2011	31 102	7 660	38 762	**2017**	35 402	**2017**	17 701	10 620.6	1 699 296	7 080.4	1 274 472			2 973 768	836 903	209							
2012	26 580	5 462	32 042	**2018**	35 402	**2018**	17 701	12 390.7	1 982 512	5 310.3	955 854			2 938 366	854 250	213							
				2019	35 402	**2019**	17 701	14 160.8	2 265 728	3 540.2	637 236			2 902 964	871 597	217							
				2020	35 402	**2020**	17 701	14 160.8	2 265 728	3 540.2	637 236			2 902 964	871 597	217							

NEWLY-INSTALLED EQUIPMENT					
Estimate of new installations		Savings per appliance/year (kWh)	Total savings/Year (kWh)	Total savings/Year (TOE)	**TOTAL SAVINGS FROM REPLACEMENT AND NEW INSTALLATION (TOE)**
2010	18 397	13	239 161	64	**240**
2011	18 889	13	245 557	61	**230**
2012	17 701	13	230 113	57	**216**
2013	17 701	13	230 113	57	**231**
2014	17 701	13	230 113	57	**241**

2015	17 701	13	230 113	57	**252**
2016	17 701	13	230 113	57	**262**
2017	17 701	13	230 113	57	**266**
2018	17 701	13	230 113	57	**270**
2019	17 701	13	230 113	57	**275**
2020	17 701	13	230 113	57	**275**

ENERGY SAVINGS PER YEAR - TOE														
Household Clothes Washers		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1	**2010**	240	240	240	240	240	240	240	240	240	240	240	240	0
2	**2011**	0	230	230	230	230	230	230	230	230	230	230	230	230
3	**2012**	0	0	216	216	216	216	216	216	216	216	216	216	216
4	**2013**	0	0	0	231	231	231	231	231	231	231	231	231	231
5	**2014**	0	0	0	0	241	241	241	241	241	241	241	241	241
6	**2015**	0	0	0	0	0	252	252	252	252	252	252	252	252
7	**2016**	0	0	0	0	0	0	262	262	262	262	262	262	262
8	**2017**	0	0	0	0	0	0	0	266	266	266	266	266	266
9	**2018**	0	0	0	0	0	0	0	0	270	270	270	270	270
10	**2019**	0	0	0	0	0	0	0	0	0	275	275	275	275
11	**2020**	0	0	0	0	0	0	0	0	0	0	275	275	275
TOTAL		240	470	686	917	1 158	1 409	1 671	1 937	2 208	2 483	2 757	2 757	2 518

Household Clothes Dryers

Replacement															
	Sales Estimate		Replacement estimate		A++	kWh/annum	A+	kWh/annum	A	kWh/annum	B	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
Household Clothes Dryers	**2010**	35 794	**2010**	17 897					8 949	2 684 550	8 949	3 131 975	5 816 525	715 880	191
	2011	36 774	**2011**	18 387					9 194	2 758 050	9 194	3 217 725	5 975 775	735 480	183

				2012	33 685	2012	16 842			1 684	336 845	8 421	2 526 338	6 737	2 357 915	5 221 098	732 638	183
life cycle			12	2013	33 000	2013	16 500			2 475	495 000	8 250	2 475 000	5 775	2 021 250	4 991 250	746 625	186
Imports				2014	33 000	2014	16 500	2 475	371 250	4 950	990 000	6 600	1 980 000	2 475	866 250	4 207 500	915 750	228
	EU	non-EU	**Total**	2015	33 000	2015	16 500	3 300	495 000	6 600	1 320 000	4 950	1 485 000	1 650	577 500	3 877 500	990 000	247
2010	25 905	9 889	35 794	2016	33 000	2016	16 500	4 125	618 750	8 250	1 650 000	4 125	1 361 250			3 630 000	1 091 063	272
2011	30 469	7 285	37 754	2017	33 000	2017	16 500	5 775	866 250	6 600	1 320 000	4 125	1 237 500			3 423 750	1 080 750	270
2012	24 154	5 465	29 615	2018	35 000	2018	17 500	7 000	1 050 000	8 750	1 750 000	1 750	525 000			3 325 000	1 216 250	303
				2019	36 000	2019	18 000	10 800	1 620 000	7 200	1 440 000					3 060 000	1 314 000	328
				2020	36 000	2020	18 000	12 600	1 890 000	5 400	1 080 000					2 970 000	1 323 000	330

ENERGY SAVINGS PER YEAR - TOE														
Household Clothes Dryers		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	**2010**	191	191	191	191	191	191	191	191	191	191	191	191	0
2	**2011**	0	183	183	183	183	183	183	183	183	183	183	183	183
3	**2012**	0	0	183	183	183	183	183	183	183	183	183	183	183
4	**2013**	0	0	0	186	186	186	186	186	186	186	186	186	186
5	**2014**	0	0	0	0	228	228	228	228	228	228	228	228	228
6	**2015**	0	0	0	0	0	247	247	247	247	247	247	247	247
7	**2016**	0	0	0	0	0	0	272	272	272	272	272	272	272
8	**2017**	0	0	0	0	0	0	0	270	270	270	270	270	270
9	**2018**	0	0	0	0	0	0	0	0	303	303	303	303	303
10	**2019**	0	0	0	0	0	0	0	0	0	328	328	328	328
11	**2020**	0	0	0	0	0	0	0	0	0	0	330	330	330
TOTAL		191	374	557	743	972	1 219	1 491	1 760	2 063	2 391	2 721	2 721	2 530

Television sets

Replacement																		
				Sales Estimate		Replacement estimate		A++	kWh/annum	A+	kWh/annum	A	kWh/annum	B	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
Television sets				**2010**	18 788	**2010**	9 394					3 758	338 184	5 636	659 459	997 643	299 293	80
				2011	16 214	**2011**	8 107					3 243	291 852	4 864	569 111	860 963	258 289	64
				2012	11 632	**2012**	5 816					2 908	261 709	2 908	340 221	601 930	180 579	45
life cycle			5	**2013**	11 500	**2013**	5 750					3 163	284 625	2 588	302 738	587 362.5	176 209	44
Imports				**2014**	11 500	**2014**	5 750			863	60 375	2 875	258 750	2013	235 463	554 587.5	162 753.8	41
	EU	non-EU	**Total**	**2015**	11 500	**2015**	5 750			863	60 375	2 875	258 750	2013	235 463	554 587.5	162 753.8	41
2010	10 961	7 827	18 788	**2016**	11 500	**2016**	5 750			2 300	161 000	2 875	258 750	575	67 275	487 025	136 447.5	34
2011	8 875	4 765	13 640	**2017**	11 500	**2017**	5 750	863	43 125	2 875	201 250	1 725	155 250			399 625	115 144	29
2012	3 828	5 795	9 623	**2018**	13 200	**2018**	6 600	990	49 500	3 300	231 000	1 980	178 200			458 700	132 165	33
				2019	15 200	**2019**	7 600	2 660	133 000	3 040	212 800	1 140	102 600			448 400	144 362	36
				2020	17 000	2020	8 500	5 100	255 000	4 250	297 500	0	0			552 500	191 250	48

ENERGY SAVINGS PER YEAR - TOE														
Television sets		**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
1	**2010**	80	80	80	80	80	0	0	0	0	0	0	0	0
2	**2011**	0	64	64	64	64	64	0	0	0	0	0	0	0
3	**2012**	0	0	45	45	45	45	45	0	0	0	0	0	0
4	**2013**	0	0	0	44	44	44	44	44	0	0	0	0	0
5	**2014**	0	0	0	0	41	41	41	41	41	0	0	0	0

6	**2015**	0	0	0	0	0	41	41	41	41	41	0	0	0
7	**2016**	0	0	0	0	0	0	34	34	34	34	34	0	0
8	**2017**	0	0	0	0	0	0	0	29	29	29	29	29	0
9	**2018**	0	0	0	0	0	0	0	0	33	33	33	33	33
10	**2019**	0	0	0	0	0	0	0	0	0	36	36	36	36
11	**2020**	0	0	0	0	0	0	0	0	0	0	48	48	48
TOTAL		80	144	189	233	274	235	204	188	177	172	179	145	117

Household Electric Ovens

Replacement																	
				Sales Estimate		Replacement estimate		A	kWh/annum	B	kWh/annum	C	kWh/annum	Total consumption	Total savings kWh	Total savings TOE
Household Electric Ovens				**2010**	15 800	**2010**	7 900	3 950	750 500	3 160	758 400	790	225 150	1 734 050	410 365.5	109
				2011	15 800	**2011**	7 900	3 950	750 500	3 160	758 400	790	225 150	1 734 050	410 365.5	102
				2012	15 800	**2012**	7 900	4 740	900 600	3 160	758 400	0	0	1 659 000	426 126	106
life cycle			12	**2013**	15 800	**2013**	7 900	5 530	1 050 700	2 370	568 800			1 619 500	443 427	111
Imports				**2014**	15 800	**2014**	7 900	7 110	1 350 900	790	189 600			1 540 500	478 029	119
	EU	non-EU	**Total**	**2015**	15 800	**2015**	7 900	7 900	1 501 000					1 501 000	495 330	124
2010				**2016**	15 800	**2016**	7 900	7 900	1 501 000					1 501 000	495 330	124
2011				**2017**	15 800	**2017**	7 900	7 900	1 501 000					1 501 000	495 330	124
2012				**2018**	15 800	**2018**	7 900	7 900	1 501 000					1 501 000	495 330	124
				2019	15 800	**2019**	7 900	7 900	1 501 000					1 501 000	495 330	124
				2020	15 800	2020	7 900	7 900	1 501 000					1 501 000	495 330	124

ENERGY SAVINGS PER YEAR - TOE														
Household Electric Ovens		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
1	**2010**	109	109	109	109	109	109	109	109	109	109	109	109	0
2	**2011**	0	102	102	102	102	102	102	102	102	102	102	102	102
3	**2012**	0	0	106	106	106	106	106	106	106	106	106	106	106
4	**2013**	0	0	0	111	111	111	111	111	111	111	111	111	111
5	**2014**	0	0	0	0	119	119	119	119	119	119	119	119	119
6	**2015**	0	0	0	0	0	124	124	124	124	124	124	124	124
7	**2016**	0	0	0	0	0	0	124	124	124	124	124	124	124
8	**2017**	0	0	0	0	0	0	0	124	124	124	124	124	124
9	**2018**	0	0	0	0	0	0	0	0	124	124	124	124	124
10	**2019**	0	0	0	0	0	0	0	0	0	124	124	124	124
11	**2020**	0	0	0	0	0	0	0	0	0	0	124	124	124
TOTAL		109	212	318	429	548	671	795	918	1 042	1 166	1 289	1 289	1 180

11.Transport (Transport Action Plan, fuel taxation)

Title of the Energy Efficiency Improvement Measure (EEI)		Action plan to strengthen public transport
Description	**Time frame**	Start: 2010, Expiry: -
	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 from 2% in 2009 to 10% in 2015.
	End use category	Transport sector
	Target group	Public Transport
	Regional 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**	The methodology applied is set out in Annex E, paragraph 17.
	Energy savings achieved in 2012.	63 311.7 TOE
	Energy savings expected in 2016 *	8 000 TOE

	Energy savings expected in 2020	41 000 TOE
	Assumptions	Described in the methodology set out in Annex E, paragraph 17.
	Overlaps	Not applicable

MEASURES SCHEDULED TO BE IMPLEMENTED IN THE FUTURE

1. Action Plans of Municipalities and Communities

Title of the Energy Efficiency Improvement Measure (EEI)		Action Plans of Municipalities and Communities, 2010-2020.
Description	**Time frame**	Start: 2010, Expiry: 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.
	Regional 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. 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 up 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 of 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 4th NEEAP to be submitted in 2017.
	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. Relevant information will be submitted with the 4th NEEAP.

	Energy savings achieved in 2012.	- TOE
	Energy savings expected in 2016	4 000 TOE
	Energy savings expected in 2020	12 000 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 many of the measures pertain to information campaigns, we feel that the energy savings to be achieved will be smaller than estimated. Detailed information will be provided with the 4th NEEAP.

ANNEX E: METHODOLOGIES USED TO CALCULATE ENERGY SAVINGS

1. METHODOLOGY USED TO CALCULATE SAVINGS FROM THE MINIMUM REQUIREMENTS FOR THE ENERGY PERFORMANCE OF NEW DWELLINGS. ANNEX D-1.1

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 an average thermal transmittance coefficient and issue of an energy efficiency certificate pertaining at least to energy class B. The assumptions used for calculations are as follows:

- Information on the number of square metres of housing built in 2009, 2010 and 2011 was provided by the Statistical Service of Cyprus.

- An assumption was made with regard to the number of square metres of housing built in 2008, as there were no available data. It was assumed that they amounted to approximately 80% of that built in 2009.

- Due to the fact that the legislation entered into force on 21 December 2007, it was assumed that only half the number of square metres of housing completed in 2008 complied with the relevant legislation.

- The document 'Calculation for Setting the Minimum Energy Performance Requirements at Cost Optimal Levels According to Article 5 of the Directive 2010/31/EE for the Energy Performance of Buildings (recast)' in relation to Cyprus, which was notified to the EC and is posted on the MECIT website (www.mcit.gov.cy) , was used to calculate average consumption per square metre in single-family houses and apartments, as follows:

Single-family houses- Assumptions to determine the mean value of primary and final consumption									
	m²	**Total Primary Consumption before Buildings Code (kWh/year)**	**Primary Consumption before Buildings Code in (kWh/m²/year)**	**Total Primary Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Primary Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)**	**Total Final Consumption before Buildings Code (kWh/year)**	**Final Consumption before Buildings Code in (kWh/m²/year)**	**Total Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)**
Single-family house	176	3 882	226.6	21 432	121.77	21 718	123.4	66.73	11 744.48

single-family houses - Assumptions to determine the mean value of primary and final consumption						
	Primary Consumption before Building Codes in (kWh/m²/year)	Primary Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Primary Energy Saving (kWh/m²/year)	Final Consumption before Building Codes in (kWh/m²/year)	Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Average Final Energy Saving (kWh/m²/year)
Single-family house	226.6	121.8	104.83	123.4	66.7	56.7

New Apartments - Assumptions to determine the mean value of primary and final consumption										
		m²	Total Primary Consumption before Buildings Code (kWh/year)	Primary Consumption before Buildings Code in (kWh/m²/year)	Total Primary Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Primary Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)	Total Final Consumption before Buildings Code (kWh/year)	Final Consumption before Buildings Code in (kWh/m²/year)	Total Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)
One-bedroom apartment (46m²)	**1St Floor (External Floor)**	46	12 111	263.3	7 741.8	168.3	4 485.4	98	2 867.3	62.333
	Middle Floor	46	10 488.69	228.0	7 483.5	162.7	3 884.7	84.5	2 771.7	60.254
	Last floor	46	14 099	306.50	6 666.3	144.9	5 221.9	113.5	2 469.0	53.7
Two-bedroom apartment (88m²)	**1St Floor (External Floor)**	88	19 738	224.3	14 227.9	161.7	13 150	149.4	8 618.5	97.938
	Middle Floor	88	21 554	245	12 853.4472	146.0619	14 801	168	4 760.5	54.1
	Last floor	88	28 192	320.4	12 271.468	139.4485	16 601	188.6	7 182.12	81.615
Three-bedroom apartment (103m²)	**1St Floor (External Floor)**	103	28 573	277.41	16 263	157.9	18 093	176	10 164.04	98.68
	Middle Floor	103	26 289	255	14 611	141.9	18873	183	5 411.414	52.538
	Last floor	103	32 784	318.3	14 687	142.6	20 044	194.6	9 392.982	91.194
TOTAL		**711**	193 828		106 805.1		115 153.457		54 290.0	

New Apartments - Assumptions to determine the mean value of primary and final consumption						
	Average Primary Consumption before Building Codes in (kWh/m²/year)	**Average Primary Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Average Primary Energy Saving (kWh/m²/year)**	**Average Final Consumption before Building Codes in (kWh/m²/year)**	**Average Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)**	**Average Final Energy Saving (kWh/m²/year)**
One-bedroom apartment (46m²)	272.6	150.2	122.4	162.0	76.4	85.6
Two-bedroom apartment (88m²)						
Three-bedroom apartment (103m²)						

The above savings per square metre per single-family house were used to perform the calculations shown in the relevant tables of Annex D, Paragraph 1.1.

2. METHODOLOGY USED TO CALCULATE SAVINGS FROM THE MINIMUM REQUIREMENTS FOR THE ENERGY PERFORMANCE OF NEW BUILDINGS IN THE TERTIARY SECTOR. ANNEX D-1.2

- Information on the number of square metres of buildings in the tertiary sector constructed in 2009, 2010 and 2011 was provided by the Statistical Service of Cyprus.

- An assumption was made with regard to the number of square metres of the buildings constructed in 2008, as there were no available data. It was assumed that they amounted to approximately 80% of that built in 2009.

- Due to the fact that the legislation entered into force on 21 December 2007, it was assumed that only half the number of square metres of the buildings completed in 2008 complied with the relevant legislation.

- The document 'Calculation for Setting the Minimum Energy Performance Requirements at Cost Optimal Levels According to Article 5 of the Directive 2010/31/EE for the Energy Performance of Buildings (recast)' in relation to Cyprus, which was notified to the EC and is posted on the MECIT website (www.mcit.gov.cy), was used to calculate the average consumption per square metre in buildings of the tertiary sector (in particular, calculations were made for offices), as shown below:

Buildings in the tertiary sector. Offices- Assumptions to determine the mean value of primary and final consumption									
	m²	Total Primary Consumption before Buildings Code (kWh/year)	Primary Consumption before Buildings Code in (kWh/m²/ year)	Total Primary Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Primary Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/year)	Total Final Consumption before Buildings Code (kWh/year)	Final Consumption before Buildings Code in (kWh/m²/year)	Total Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Consumption with Buildings Codes (Energy Efficiency Category B (kWh/m²/ year)
Building - Office	2515	645 994	256.9	453 334	180.25	239 257	95.1	167 901.4	66.76

	Primary Consumption before Building Codes in (kWh/m²/year)	Primary Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Primary Energy Saving (kWh/m²/year)	Final Consumption before Building Codes in (kWh/m²/year)	Final Consumption with Buildings Codes (Energy Efficiency Category B)(kWh/year)	Average Final Energy Saving (kWh/m²/year)
Building - Office	256.9	180.3	76.60	95.1	66.8	28.372

The above savings per square metre were used to perform the calculations shown in the relevant tables of Annex D, Paragraph 1.2.

3. SAVINGS CALCULATION METHODOLOGY UNDER THE GRANT SCHEME FOR ENCOURAGING RES USE IN THE RESIDENTIAL SECTOR. ANNEX D-2.1

3.1 INDEPENDENT PV SYSTEMS

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 an average of approximately 1600kWh 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 1600kWh.

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 the case of 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 1600kWh per kilowatt was used.

3.2 SOLAR SYSTEMS FOR DOMESTIC HOT WATER

Subsidies granted in the period 2004-2010

The methodology set out in page 73 (2.7 Solar water heating in residential and tertiary buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings, on the basis of the following assumptions:

- 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

  3 600: The result is divided by 3 600 in order to convert energy values from GJ into MWh.

- The value used for the coefficient $_{stock\_average\_heating\_system}$ 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.

Subsidies granted in the period 2011-2012

The methodology set out in page 73 (2.7 Solar water heating in residential and tertiary buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings, on the basis of the following assumptions:

- A factor of 2.9 was used for electricity.
- The value used for the coefficient $_{stock\_average\_heating\_system}$ in the proposed methodology was 1, as there were no available data.
- 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 for the period 2009-2012.
- 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.

3.3 HEATING/COOLING SYSTEMS USING SOLAR ENERGY

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 from 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

3.4 CENTRAL ACTIVE SOLAR WATER HEATING SYSTEMS.

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 either on a 12-month or on a 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 from the study submitted with the subsidy request. These studies are prepared by Mechanical Engineers registered with 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.

3.5 SOLAR SYSTEMS FOR POOL WATER HEATING

The methodology used for Household Solar Systems (3.2) 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 from the study submitted with the subsidy request. These studies are prepared by Mechanical Engineers registered with 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.

3.6 HEAT PUMP WITH GROUND HEAT EXCHANGER FOR SPACE HEATING AND COOLING.

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

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 with the Technical Chamber of Cyprus, who has prepared the study.

- The electricity consumed by the heat pump is calculated for meeting the same thermal energy demand of the building for Cooling when using a conventional system. 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 kWhth of primary energy by using the typical electricity generation performance of power plants.

2. Calculation procedure for the Heating cycle:

- 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 electricity consumed by the heat pump is calculated for meeting the same thermal energy demand of the building for Heating when using a conventional system. 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 are 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.

4. SAVINGS CALCULATION METHODOLOGY UNDER THE GRANT SCHEME FOR ENCOURAGING RES USE IN THE TERTIARY SECTOR. ANNEX D-2.2

4.1 INDEPENDENT PV SYSTEMS

The methodology used was the same as in paragraph 3.1 above.

4.2 HEATING/COOLING SYSTEMS USING SOLAR ENERGY

The methodology used was the same as in paragraph 3.3 above.

4.3 CENTRAL ACTIVE SOLAR WATER HEATING SYSTEMS.

The methodology used was the same as in paragraph 3.4 above.

4.4 SOLAR SYSTEMS FOR POOL WATER HEATING.

The methodology used was the same as in paragraph 3.5 above.

4.5 HEAT PUMP WITH GROUND HEAT EXCHANGER FOR SPACE HEATING AND COOLING.

The methodology used was the same as in paragraph 3.6 above.

5. SAVINGS CALCULATION METHODOLOGY UNDER THE GRANT SCHEME FOR ENCOURAGING RES USE IN THE INDUSTRIAL-AGRICULTURAL SECTOR. ANNEX D-2.3:

5.1 INDEPENDENT PV SYSTEMS

The methodology used was the same as in paragraph 3.1 above.

5.2 HEATING/COOLING SYSTEMS USING SOLAR ENERGY

The methodology used was the same as in paragraph 3.3 above.

5.3 CENTRAL ACTIVE SOLAR WATER HEATING SYSTEMS.

The methodology used was the same as in paragraph 3.4 above.

6. METHODOLOGY USED TO CALCULATE SAVINGS UNDER THE GRANT SCHEME FOR ENERGY SAVING IN THE RESIDENTIAL SECTOR - THERMAL INSULATION, WINDOWS, WALLS, ROOFS. ANNEX D-3.1

Subsidies granted in the period 2004-2010

The methodology set out in page 65 [2.2 Insulation refurbishment measures applied to building components (walls, roofs, windows) in existing residential and tertiary buildings] of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings, on the basis of the following assumptions:

- 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 600m) and mountainous area requests for each province (Nicosia, Larnaca, Paphos, Limassol, Famagusta).

- 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 applications was taken.

- On the basis of the sample applications 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 application submittal period, it was assumed, 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 assumptions, 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 assumptions, is referred to in the above-mentioned paragraph of Annex II.

Subsidies granted in the period 2011-2013

Regarding the period 2011-2013, the following assumptions were used:

- The methodology proposed in page 65 [2.2 Insulation refurbishment measures applied to building components (walls, roofs, windows) in existing residential and tertiary buildings] was used for each individual investment.
- The heating degree days of the climate zone in which the house where the investment was made is located, were used for each individual investment.
- Since no thermal transmittance coefficient (U-Value) was required by the Scheme before the investment during the application submittal period, it was assumed, 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 assumptions, the thermal transmittance coefficients were calculated for the above 3 categories.
- The thermal transmittance coefficient (U-Value) after the investment arises from the data accompanying each application.
- The predefined values referred to on page 65 were used for the coefficients a, b, and c required in the proposed methodology.
- 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.
- A factor of 2.9 was used for electricity.

7. METHODOLOGY USED TO CALCULATE SAVINGS UNDER THE GRANT SCHEME FOR ENERGY SAVING IN THE PUBLIC AND BROADER PUBLIC SECTOR. ANNEX D-3.2

The methodology used was the same as in paragraph 8 below.

8. METHODOLOGY USED TO CALCULATE SAVINGS UNDER THE GRANT SCHEME FOR ENERGY SAVING IN THE TERTIARY SECTOR. ANNEX D-3.3

The Grants Scheme includes a 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 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, into which the different data are entered (e.g., orientation and location of buildings, area of the different surfaces, the building's use, thermal

transmittance coefficient of the structural components, etc.) in order to calculate the heating and cooling demands in kW. The required energy in kWh is calculated in accordance with the hours of operation and the building's use.

When certain structural components are replaced and/or new ones are added to the building envelope, or when glazing is replaced, the same software is used to calculate the new heating and cooling demands 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/ELECTROFLO/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 electrical 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.

9. METHODOLOGY USED TO CALCULATE SAVINGS UNDER THE GRANT SCHEME FOR ENERGY SAVING IN THE INDUSTRIAL SECTOR. ANNEX D-3.4

The methodology used was the same as in paragraph 8 above.

10. METHODOLOGY FOR CALCULATING SAVINGS UNDER THE GRANT SCHEME FOR THE INSTALLATION OF PV SYSTEMS USING THE NET METERING METHOD (UNDER GRANT) ANNEX D-4

The methodology used was the same as in paragraph 3.1 above.

11. METHODOLOGY FOR CALCULATING SAVINGS FROM THE INSTALLATION OF PV SYSTEMS USING THE NET METERING METHOD (NO GRANT) ANNEX D-5

The methodology used was the same as in paragraph 3.1 above.

12. METHODOLOGY FOR CALCULATING SAVINGS UNDER THE GREEN PUBLIC PROCUREMENT SCHEME. ANNEX D-6

12.1 REPLACEMENT OF LAMPS WITH COMPACT FLUORESCENT LAMPS

The methodology set out in page 77 (2.9 Replacement or new installation of Lamps in residential buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings, on the basis of the following assumptions:

- 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.
- A 3.1 coefficient was used for electricity calculations up to 2010. A 2.9 coefficient was used for the period 2011-2013

12.2 REPLACEMENT OF AIR CONDITIONERS

The methodology set out in page 71 (2.6 Installation or replacement of air conditioning split system (<12kW) in residential and tertiary buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings, on the basis of the following assumptions:

- The predefined value of 2.50 was used for the $EER_{average}$ parameter, as is used in the software (ISBEM) employed 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 the application of the measure in question.
- The power for each type of air conditioner (P_{fn}) per year was provided by the Electrical and Mechanical Services Department.
- Annual operating hours (parameter n_{sh}) were set at 1 400. This value was given by the Electrical Services Department.
- The predefined value of 58%, as referred to in the methodology, was used for the f_u coefficient.

- The expected life cycle of air conditioners was set at 10 years, on the basis of the predefined value referred to in the table on page 86.

12.3 INSTALLATION OF NEW AIR CONDITIONERS

The methodology set out in page 71 (2.6 Installation or replacement of air conditioning split system (<12kW) in residential and tertiary buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings, on the basis of the following assumptions:

- Concerning the $EER_{average}$ parameter, it was held that, if the measure was not implemented, the parameter would be 2.70 for the installation of air conditioners.
- 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 the application of the measure in question.
- The power for each type of air conditioner (P_{fn}) per year was provided by the Electrical and Mechanical Services Department.
- Annual operating hours (parameter n_{sh}) were set at 1 400. This value was given by the Electrical and Mechanical Services Department.
- The predefined value of 58%, as referred to in the methodology, was used for the f_u coefficient.
- The expected life cycle of air conditioners was set at 10 years, on the basis of the predefined value referred to in the table on page 86.

12.4 REPLACEMENT OF VRV AND HEAT PUMP

As there was no other available methodology, the methodology set out in page 71 (2.6 Installation or replacement of air conditioning split system (<12kW) in residential and tertiary buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings, on the basis of the following assumptions:

- It was assumed that the $EER_{average}$ parameter is equal to 2.00.
- The data for the $EER_{best\_perf\_on\_market}$ parameter per system type were provided by the Electrical and Mechanical Services Department of Cyprus, which is responsible for the replacement of air conditioners and the application of the measure in question.
- The power for each system (P_{fn}) per year was provided by the Electrical and Mechanical Services Department.
- Annual operating hours (parameter n_{sh}) were set at 1 400. This value was given by the Electrical and Mechanical Services Department.
- The predefined value of 58%, as referred to in the methodology, was used for the f_u coefficient.

- The expected life cycle of air conditioners was set at 10 years, on the basis of the predefined value referred to in the table on page 86.

12.5 PURCHASING NEW COMPUTERS

Energy savings were calculated on the basis of the predefined values set out in table 1.2, page 84 and of the table in page 86 of the methodologies proposed in the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services'. In particular:

- The predefined value of 39kWh/year was used for the energy savings per computer.
- The predefined value of 3 years was used as the average life cycle.
- A 3.1 coefficient was used for electricity calculations up to 2010 whereas a 2.9 coefficient was used from 2011 onwards.

12.6 PURCHASING NEW MONITORS

Energy savings were calculated on the basis of the predefined values set out in table 1.2, page 84 and of the table in page 86 of the methodologies proposed in the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services'. In particular:

- The predefined value of 11kWh/year was used for the energy savings per computer.
- The predefined value of 3 years was used as the average life cycle.
- A 3.1 coefficient was used for electricity calculations up to 2010 whereas a 2.9 coefficient was used from 2011 onwards.

12.7 REPLACEMENT OF BOILERS

The methodology set out in page 68 (2.4 Replacement of heating supply equipment in residential and tertiary buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services' was used to calculate energy savings. The values for each parameter of the methodology used are set out in the relevant table of paragraph 6, Annex D.

13.METHODOLOGY FOR CALCULATING SAVINGS UNDER THE VEHICLE SCRAPPING SCHEME. ANNEX D-7

Low fuel consumption policy as in effect in the period 2008-2010

Some of the provisions included in the Scrapping Plan were:

- ✓ Category C(i): Grant (EUR 1 283) for the scrapping of a vehicle more than 10 years old 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 (EUR 1 710) for the scrapping of a vehicle more than 10 years old 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.

It was assumed 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. As regards scrapped vehicles which were replaced with new ones purchased under categories C(i) and C(ii), it was assumed that they were gasoline-fuelled vehicles with an average fuel consumption of 10l/100km.

Savings per vehicle under category C(i) were estimated to amount to 0.628 TOE/year, whereas savings under category C(ii) were estimated to amount to 0.896 TOE/year.

14.METHODOLOGY FOR CALCULATING SAVINGS UNDER THE VEHICLE GRANT SCHEME. ANNEX D-8

In calculating energy savings, the number of electric, hybrid and low CO_2 emission vehicles purchased in aggregate through participation in the Grant Scheme was taken into account.

In calculating energy savings from vehicles purchased through the Grants Scheme, it was assumed that such vehicles would replace the purchase of an average gasoline-fuelled urban vehicle. In particular, the following assumptions were made in making the calculations:

1. Each private vehicle covers a maximum distance of 20 000 km (~ 55 km/day) per annum
2. It was calculated that, to generate one kilowatt hour of electricity, 2.39×10^{-4} toe of fuel oil are required

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

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

$0.086 * 10^{-3}\,\text{toe} * \frac{1}{0.36} = 2{,}39 * 10^{-4} toe$ 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 0.86x10^{-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. As regards hybrid vehicles, it was assumed that the average fuel consumption of the hybrid vehicles purchased was 4.3l/100km
6. As regards electric vehicles, it was assumed that the average fuel consumption of the electric vehicles purchased was 0.1kWh/km
7. As regards low CO_2 emission vehicles (vehicles with carbon dioxide emissions below 120g/Km), it was assumed 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 assumed that the average fuel consumption of such a vehicle was 7l/100km.
9. Vehicles are assumed to have a life cycle of 15 years.
10. Savings per vehicle were calculated on the basis of the above assumptions:

	Consumption per vehicle/Year (hybrid, electric, low-pollutant) TOE	**Consumption of conventional vehicle TOE**	**Savings per vehicle/year**
Hybrid vehicles	0.675	1.1	0.425
Electric vehicles	0.478	1.1	0.622
Low CO2 emission vehicles	0.786	1.1	0.314

15.METHODOLOGY FOR CALCULATING SAVINGS FROM THE COMPACT FLUORESCENT LAMPS CAMPAIGN Annex D-9

Energy savings were calculated using the methodology proposed in page 77(2.9 Replacement or new installation of Lamps in residential buildings) of the document 'Recommendations on measurement and verification methods in the framework of Directive 2006/32/EC on energy end use and energy services', under the following assumptions:

- 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 1 000 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 2010-2012 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 3.1 coefficient was used for electricity calculations in the period 2007-2010, whereas a 2.9 coefficient was used for the years 2011 and 2012.
- The lamps distributed after 2009 contribute to the 2020 target if their life cycle permits it.
- It is considered that these lamps are used to immediately replace old lamps.

16.METHODOLOGY FOR CALCULATING SAVINGS FROM THE REPLACEMENT OF DOMESTIC APPLIANCES (ECODESIGN). ANNEX D-10

Household Dishwashers

1. Imported Quantities

The number of household dish washers imported to Cyprus in the years 2010, 2011 and 2012 was taken from the Statistical Service.

2. Sales Estimate

In the absence of data on annual sales made in Cyprus, calculations were based on the number of annual imports and on the assumption that half the products imported in the previous year and half the products imported in the reference year are being sold every year. For the period 2013-2017, it was considered that the number of imports will be smaller as compared to the previous years, owing to the financial crisis experienced by Cyprus. From the year 2018, when Cyprus is expected to exit the recession, sales are expected to increase, whereas it was assumed that the number of imports will be higher as compared to the period 2013-2017.

3. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

In the years 2010 and 2011 (prior to the implementation of Regulation (EC) No 1016/2010) it is estimated that imports included mainly class A products (70% in 2010 and 80% in 2011) and small quantities of lower class products.

Energy consumption calculations are made in KHz/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A+++ 230 kWh/annum, class A++ 260 kWh/annum, class A+ 290 kWh/annum, class A 330 kWh/annum and class B 363 kWh/annum

Energy savings were calculated under the assumption that class A+++ products, class A++ products and class A+ products will replace class A products, whereas class A products will replace class B products.

4. Product life

It is estimated that Household Dishwashers will have a life of 12 years according to the proposed life cycle set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

The factor **44 kWh/year** was used, as set out in p. 84 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES.

Household Refrigerators

1. Imported Quantities

The number of washing machines imported to Cyprus in the years 2010, 2011 and 2012 was taken from the Statistical Service.

2. Sales Estimate

In the absence of data on annual sales made in Cyprus, calculations were based on the number of annual imports and on the assumption that half the products imported in the previous year and half the products imported in the reference year are being sold every year. For the period 2013-2017, it was considered that the number of imports will be smaller as compared to the previous years, owing to the financial crisis experienced by Cyprus. From the year 2018, when Cyprus is expected to exit the recession, sales are expected to increase, whereas it was assumed that the number of imports will be higher as compared to the period 2013-2017.

3. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

In 2010 (when Regulation (EC) No 1060/2009 entered into effect), it is estimated that imports included mainly class A products (70% in 2010 and 80% in 2011), small quantities of A+ products (10% in 2010 and 15% in 2011), whereas the remaining quantities related to lower energy categories.

Energy consumption calculations are made in kWh/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A+++ 67 kWh/annum, class A++ 84 kWh/annum, class A+ 117 kWh/annum, class A 150 kWh/annum and class B 185 kWh/annum.

Energy savings were calculated under the assumption that class A+++ products, class A++ products and class A+ products will replace class A products, whereas class A products will replace class B products.

4. Product life

It is estimated that Household Refrigerators will have a life of 15 years according to the proposed life cycle set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

The factor used was **67 kWh/year**, as set out in p. 84 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES.

Air conditioners

1. Imported Quantities/Sales Estimate

The number of air conditioners imported to Cyprus was calculated on the basis of data from the Statistical Service, taking account of the number of households per year for the period 2010-2013 and the percentage of households (80.8%) with air conditioners. An assumption was made that each household has two air conditioners, replaced every 15 years.

2. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

Energy consumption calculations are made in kWh/annum for 12 000 BTU by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A+++ 140 kWh/annum, class A++ 165 kWh/annum, class A+ 220 kWh/annum, class A 310 kWh/annum and class B 400 kWh/annum.

Energy savings were calculated under the assumption that class A+++ products, class A++ products and class A+ products will replace class A products, whereas class A products will replace class B products.

4. Product life

It is estimated that Air Conditioners will have a life of 15 years according to the proposed life set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

No calculations were made.

Household Freezers

1. Imported Quantities

The number of washing machines imported to Cyprus in the years 2010, 2011 and 2012 was taken from the Statistical Service.

2. Sales Estimate

In the absence of data on annual sales made in Cyprus, calculations were based on the number of annual imports and on the assumption that half the products imported in the previous year and half the products imported in the reference year are being sold every year. For the period 2013-2017, it was considered that the number of imports will be smaller as compared to the previous years, owing to the financial crisis experienced by Cyprus. From the year 2018, when Cyprus is expected to exit the recession, sales are expected to increase, whereas it was assumed that the number of imports will be higher as compared to the period 2013-2017.

3. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

Energy consumption calculations are made in kWh/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A+++ 110 kWh/annum, class A++ 140 kWh/annum, class A+ 200 kWh/annum and class A 245 kWh/annum.

Energy savings were calculated under the assumption that class A+++ products, class A++ products and class A+ products will replace class A products.

4. Product life

It is estimated that Household Freezers will have a life of 15 years according to the proposed life cycle set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

The factor **71 kWh/year** was used, as set out in p. 84 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES.

Household Refrigerator-Freezers

1. Imported Quantities

The number of washing machines imported to Cyprus in the years 2010, 2011 and 2012 was taken from the Statistical Service.

2. Sales Estimate

In the absence of data on annual sales made in Cyprus, calculations were based on the number of annual imports and on the assumption that half the products imported in the previous year and half the products imported in the reference year are being sold every year. For the period 2013-2020 it was assumed that imports will be equal to the average of the previous 3 years.

3. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

Energy savings were calculated under the assumption that class A+++ products, class A++ products and class A+ products will replace class A products.

Energy consumption calculations are made in kWh/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A+++ 155 kWh/annum, class A++ 200 kWh/annum, class A+ 275 kWh/annum, class A 350 kWh/annum and class B 430 kWh/annum.

4. Product life

It is estimated that household refrigerator-freezers will have a life of 15 years according to the proposed life cycle under the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

The factor **69 kWh/year** was used, as set out in p. 84 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES.

Household Clothes Washers

1. Imported Quantities

The number of clothes washers imported to Cyprus in the years 2010, 2011 and 2012 was taken from the Statistical Service.

2. Sales Estimate

In the absence of data on annual sales made in Cyprus, calculations were based on the number of annual imports and on the assumption that half the products imported in the previous year and half the products imported in the reference year are being sold every year. For the period 2013-2020 it was assumed that exports will be equal to those of 2012.

3. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

Energy consumption calculations are made in kWh/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A+++ 160 kWh/annum, class A++ 180 kWh/annum, class A+ 200 kWh/annum and class A 230 kWh/annum.

Energy savings were calculated under the assumption that class A+++ products, class A++ products and class A+ products will replace class A products.

4. Product life

It is estimated that household laundry machines will have a life of 12 years according to the proposed life cycle set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

The factor **13 kWh/year** was used, as set out in p. 84 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES.

Household Clothes Dryers

1. Imported Quantities

The number of household clothes dryers imported to Cyprus in the years 2010, 2011 and 2012 was taken from the Statistical Service.

2. Sales Estimate

In the absence of data on annual sales made in Cyprus, calculations were based on the number of annual imports and on the assumption that half the products imported in the previous year and half the products imported in the reference year are being sold every year. For the period 2013-2017, it was considered that the number of imports will be smaller as compared to the previous years, owing to the financial crisis experienced by Cyprus. From the year 2018, when Cyprus is expected to exit the recession, sales are expected to increase, whereas it was assumed that the number of imports will be higher as compared to the period 2013-2017.

3. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

Energy consumption calculations are made in kWh/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A++ 150 kWh/annum, class A+ 200 kWh/annum, class A 300 kWh/annum, class B 350 kWh/annum and class C 385 kWh/annum

Energy savings were calculated under the assumption that class A++ products and class A+ products replace class A products, class A products replace class B products and class B products replace class C products.

4. Product life

It is estimated that Household Clothes Dryers will have a life of 12 years according to the proposed life cycle set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

No calculations were made.

Television sets

1. Imported Quantities

The number of television sets imported to Cyprus in the years 2010, 2011 and 2012 was taken from the Statistical Service.

2. Sales Estimate

In the absence of data on annual sales made in Cyprus, calculations were based on the number of annual imports and on the assumption that half the products imported in the previous year and half the products imported in the reference year are being sold every year. For the period 2013-2017, it was considered that the number of imports will be smaller as compared to the previous years, owing to the financial crisis experienced by Cyprus. From the year 2018, when Cyprus is expected to exit the recession, sales are expected to increase, whereas it was assumed that the number of imports will be higher as compared to the period 2013-2017.

3. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

Energy consumption calculations are made in kWh/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A++ 50 kWh/annum, class A+70kWh/annum, class A 90 kWh/annum, class B 117 kWh/annum and class C 152 kWh/annum.

Energy savings were calculated under the assumption that class A++ products and class A+ products replace class A products, class A products replace class B products and class B products replace class C products.

4. Product life

It is estimated that television sets will have a life of 5 years according to the proposed life cycle set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

No calculations were made.

Electric Ovens

1. Imported Quantities/Sales Estimate

The number of ovens imported to Cyprus was calculated on the basis of data from the Statistical Service, taking account of the number of households per year for the period 2010-2013 and the percentage of households (77.9%) with electric ovens. In addition, the Statistical Service took account of the fact that electric ovens are used for 3.8 hours per week. An assumption was made that each household has 1 oven, which is replaced every 10 years.

2. Estimate of systems replacing existing systems

It was assumed that half the products sold each year are intended to replace existing appliances. A market investigation was carried out in order to estimate the percentage of sales per energy class in 2013. Sales of products of a higher energy class are expected to increase on an annual basis.

Energy consumption calculations are made in kWh/annum by multiplying the number of appliances which are estimated to be sold each year by the estimated average annual consumption in kWh, depending on the energy class of each product as follows: class A 190 kWh/annum, class B 240 kWh/annum, class C 285 kWh/annum and class D 328 kWh/annum.

Energy savings were calculated under the assumption that class A and B products replace class C products and class C products replace class D products.

4. Product life

It is estimated that electric ovens will have a life of 10 years according to the proposed life cycle set out in the table in p. 85 of the document RECOMMENDATIONS ON MEASUREMENT AND VERIFICATION METHODS IN THE FRAMEWORK OF DIRECTIVE 2006/32/EC ON ENERGY END USE EFFICIENCY AND ENERGY SERVICES

5. Savings from new installations

No calculations were made.

17.METHODOLOGY FOR CALCULATING SAVINGS UNDER THE TRANSPORT ACTION PLAN. ANNEX D-11

The Methodology used is set out in Paragraph 3.5.2 (Savings from measures in the transport sector) of the NEEAP

ANNEX F: STRATEGY FOR ENCOURAGING INVESTMENTS IN BUILDING RENOVATION

ENERGY SERVICE, MINISTRY OF ENERGY, COMMERCE, INDUSTRY AND TOURISM

Strategy for encouraging investments in the renovation of buildings

Under Article 4 of Directive 2012/27/EU on energy efficiency

April 2014

ANDREAS ARAOUZOS13 – 15, P.C. 1421 NICOSIA, CYPRUS

Graphs

Tables

1. Introduction

According to Article 4 of Directive 2012/27/EU on energy efficiency, Member States shall establish a long-term strategy for mobilising investments in the renovation of their national stock of buildings [1]. This strategy shall encompass at least the following:

i. an overview of the national building stock based, as appropriate, on statistical sampling;
ii. identification of cost-effective approaches to renovations relevant to the building type and climatic zone;
iii. policies and measures to stimulate cost-effective deep renovations of buildings, including deep renovations in stages;
iv. a forward-looking perspective to guide investment decisions of individuals, the construction industry and financial institutions;
v. An evidence-based estimate of expected energy savings and wider benefits.

In Cyprus, it is estimated that houses account for 19% of final energy consumption, whereas another 13% corresponds to commerce, hotels and services, i.e., mainly office buildings [2]. The different political, economic and social conditions over the years did not allow for the implementation of energy-saving measures during the construction of buildings. The first organised attempt to implement energy-saving measures in buildings was made in 2004 through the grant schemes of the Special Fund for RES and ES, whereas the implementation of compulsory measures in new buildings and large buildings undergoing major renovation started in 2007 with the adoption of the 2007 Decree on the 'Regulation of the Energy Efficiency of Buildings (Minimum Energy Efficiency Requirements)' [3]. Therefore, there is currently an energy-intensive building stock, which has negative consequences for the economy and the environment. In addition, the lack of sufficient thermal insulation measures and the excessive exposure to sunlight observed in many buildings are harmful to the health of citizens, reduce the productivity of workers and diminish the quality of life. Major building renovations offer an opportunity to resolve many of these issues.

Using quantitative and qualitative indicators, this document underlines the problems related to the current energy conditions of the building stock, as well as the opportunities related to a greater mobilisation of investments in the sector of major investments. It also identifies the stakeholders, obstacles encountered and ways to overcome them. The increase in the frequency of renovations

and the energy-saving measures implemented during renovation is in line with the energy and environmental targets of Cyprus. **The aim is to improve the energy efficiency of the building stock in the most cost-efficient manner for the owner, while maximising economic, environmental and social benefits for Cyprus.**

The strategy for encouraging investments in the sector of building renovation has been formulated following consultation with stakeholders. Consultation was carried out through the legislated Advisory Committee for Monitoring the Implementation of the Laws Regulating the Energy Efficiency of Buildings, through a special sub-committee thereof, which was established specifically for this purpose, holding extraordinary meetings. The views of the Cyprus Scientific and Technical Chamber (ETEK), the Cyprus Chamber of Commerce and Industry (KEBE), the Cyprus Employers and Industrialists Federation (OEB), the Cyprus Energy Agency, universities, financial institutions, professional associations of engineers, architects and contractors, consumer associations and departments of the public sector involved in the building sector have been sought. The exchange of views between the Ministry of Energy and the stakeholders of the building renovation sector was an opportunity to exchange knowledge and produce new ideas.

2. Overview of the national building stock

Cyprus' building stock is relatively new, as most buildings were constructed from the 1980's onwards. Dwellings, office buildings and retail sale spaces constitute 96% of the total building stock. Dwellings are mostly owned by their residents. The overview of existing buildings categorises them into dwellings, non-residential buildings and public buildings and is based on the available statistics.

2.1 Dwellings:

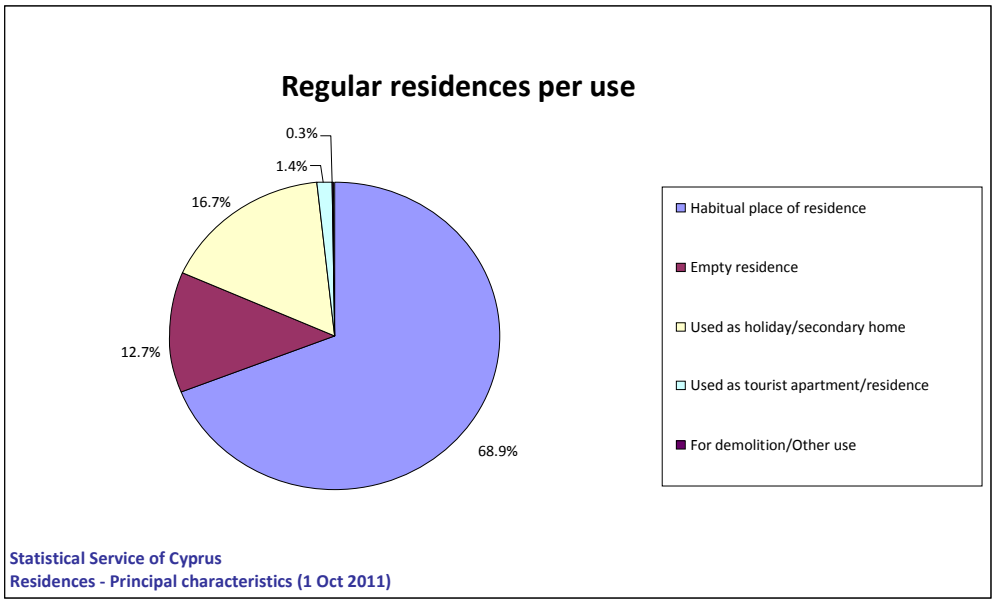
Dwellings are the majority of Cyprus' building stock, as 431 059 dwellings have been recorded (Table 1). However, 78 088 houses are used as weekend or tourist residences, which means that they are used less and, therefore, they consume less energy (Graph 1). In addition, 54 651 homes are empty [4].

Table 1 Dwellings per type and use

BUILDING TYPE IN WHICH THE RESIDENCE IS LOCATED	STATUS OF RESIDENCE					
	Total	Habitual place of residence	Empty residence	Used as holiday/secondary home	Used as tourist apartment/residence	For demolition/Other use
Total	**431 059**	**297 122**	**54 651**	**71 942**	**6 146**	**1 198**
Single-family house	172 944	129 268	12 949	28 090	1 959	678
Two-family house	59 050	48 743	4 597	5 344	247	119
Adjacent houses	32 893	18 004	4 883	8 922	859	225
Ancillary house	8 993	6 457	1 809	679	2	46
Residential Building	123 557	72 072	24 254	24 729	2 418	84
Residence in a mixed-use building	32 530	22 215	6 066	3 589	618	42
Other building type	1 092	363	93	589	43	4

Source: Statistical Service of Cyprus

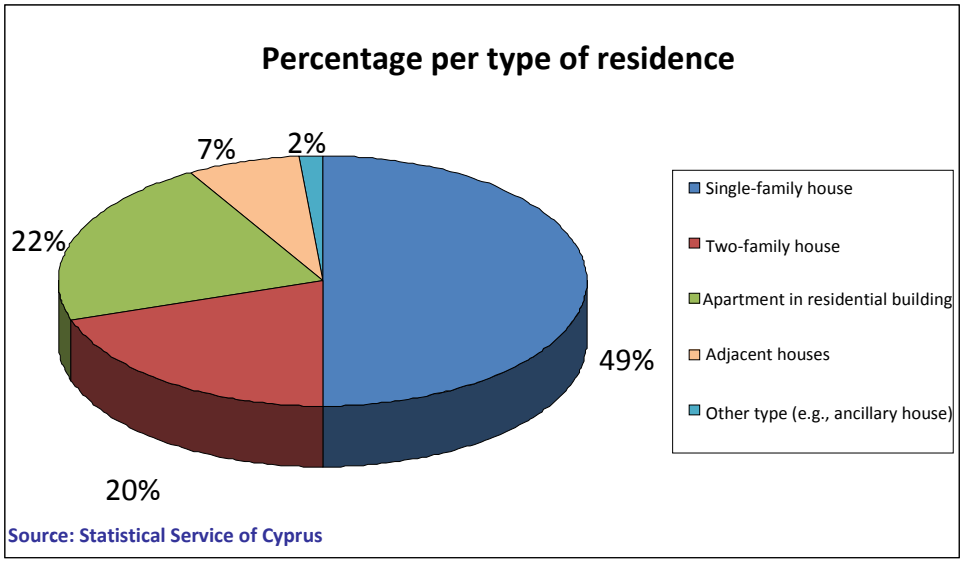
Graph 1 Percentage per use of dwelling



Almost half the dwellings are single-family houses, whereas the remaining dwellings, almost equal in number, are apartments and two-family houses (Graph 2). 61% of the dwellings are located in urban areas and the remaining dwellings are located in rural areas. However, there are great differences

with regard to the type of residence between urban and rural areas, as most single-family houses (59%) are located in rural areas, whereas most apartments (77%) and two-family houses (74%) are located in urban areas [4].

Graph 2 Percentage per type of dwelling

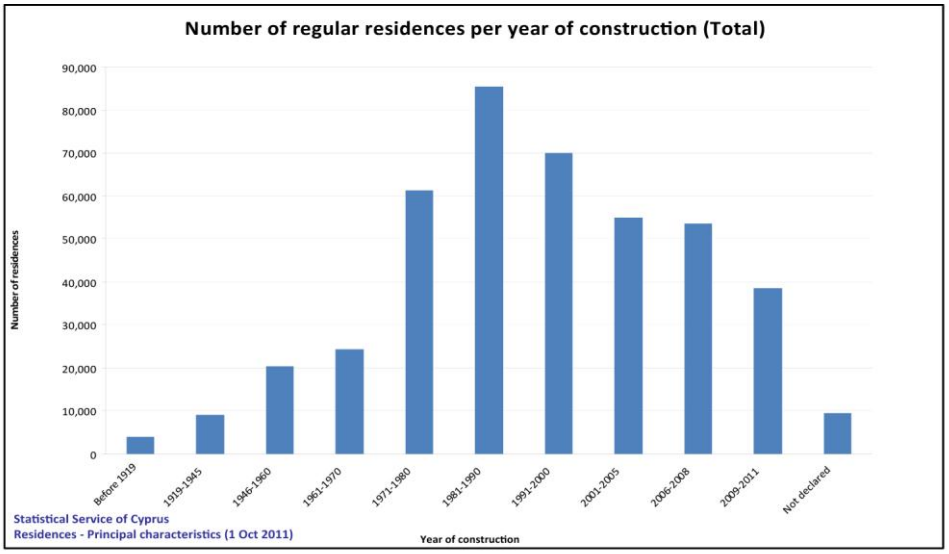


Regarding the ownership status, 78% of dwellings are owned by their residents and only 10% are rented. The remaining 12% includes dwellings the use of which has been granted free of charge by the owner to the user of the building, which means that the owner and the user may be members of the same family and, therefore, the actual number of owned/used dwellings may exceed 78% [4].

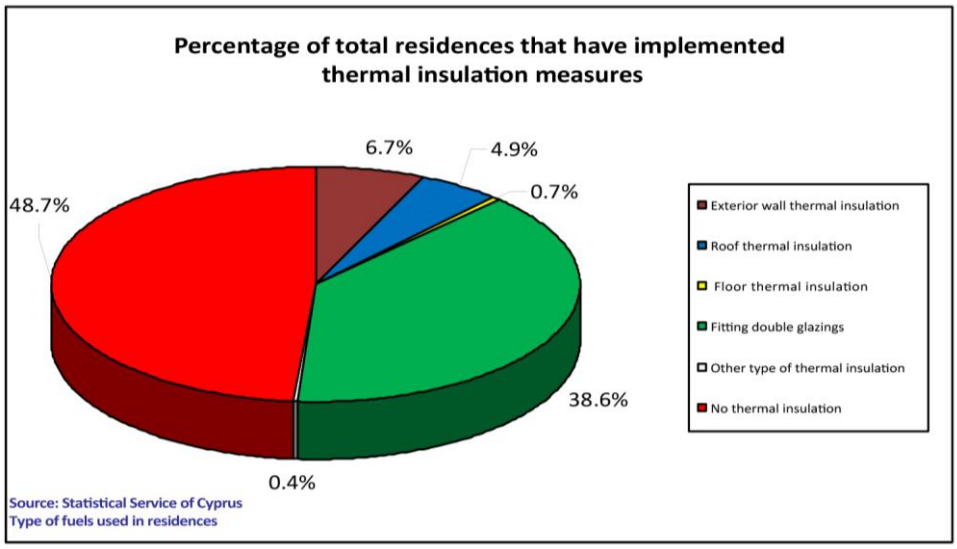
Most dwellings of Cyprus' current building stock have been constructed in the period 2001-2008, followed by the 1980's and the 1990's, which reflect the periods of increased construction activity (Graph 3) [4]. In the case of 91% of dwellings, there was no obligation to apply thermal insulation or any other energy-saving measures at the time they were built. Therefore, the energy status of most buildings may be characterised from poor to average, given that, as a rule, building owners did not take any measures during the building's construction, whereas some home owners have taken energy-saving measures at a subsequent stage, mainly under grant schemes of the Special Fund for RES and ES. According to the available statistics, 49% of dwellings have not taken any energy efficiency measures, whereas only 12% have applied some sort of thermal insulation at the building's

envelope (Graph 4). The situation is better in the case of window frames, where over 38% have double-glazing [5].

Graph 3 Dwellings by year of construction



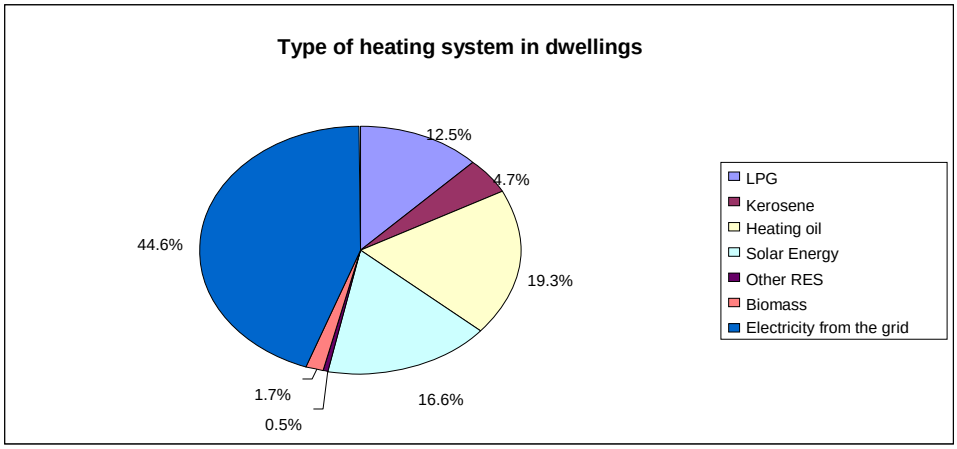
Graph 4 Percentage of dwellings that have implemented thermal insulation measures



For the year 2012, the average annual electricity consumption for all residences used was 4 555 kWh, whereas average fuel oil consumption was 951 litres [2]. The main energy product used in the residential sector is electricity coming from the grid, as it is responsible for almost half the final energy consumption, followed by fuel oil and LPG, which are the most important energy products after electricity (Graph 5). One positive point is that solar energy has penetrated the market with a

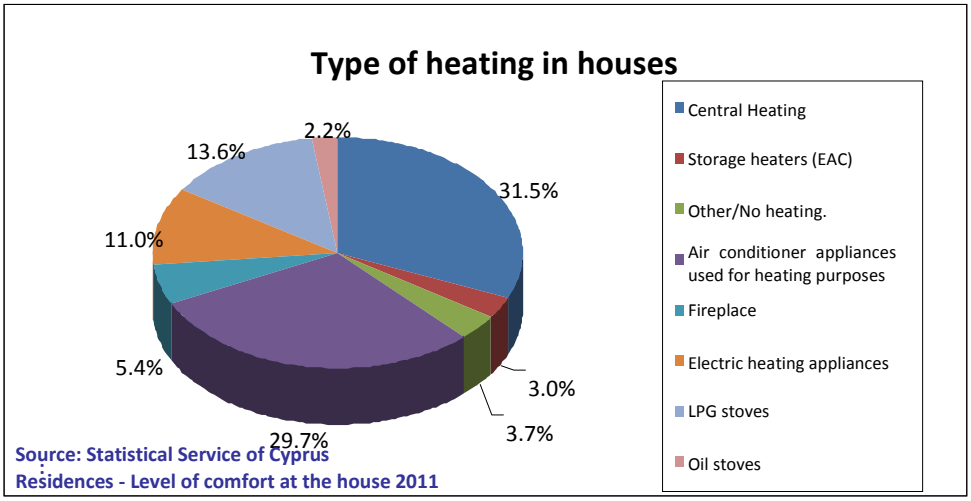
rate exceeding 16%, whereas other renewable energy sources, such as PV systems, geothermal heat pumps and biomass have a very small contribution amounting to 2% [2].

Graph 5 Percentage of energy product used in the residential sector



The highest primary energy consumption rates are due to air conditioning and heating, given that a specific level of thermal comfort must be created in dwellings [6]. However, the majority of dwellings lack central heating (Graph 6), which suggests that a large part of dwellings have to make do with average to poor thermal comfort levels during winter, whereas in some cases this also occurs during summer as 20% of dwellings do not have an air conditioning system [5].

Graph 6 Percentage per type of heating system in dwellings



Solar thermal systems for domestic hot water production have an increased penetration in the residential sector as they are installed in 91% of dwellings [5]. However, there is no information on the age of these systems and on their efficiency. In addition, central heating boilers are also used for domestic hot water production at a percentage of 29% [5].

Zones 1, 2 and 3 as set out in the 'Methodology for Calculating the Energy Efficiency of Buildings' have similar climatic data and, therefore, the same energy consumption [6] [7]. Zone 4 (areas located at altitudes exceeding 600m) is different, given that for a similar residence, heating needs are three times higher and air conditioning needs are 70% lower as compared to the other zones [8]. However, there are only 24 289 residences in zone 4, where less than 3% of Cyprus' population lives [9].

It is estimated that the energy consumption of single-family houses is higher than the average, if thermal comfort conditions are met. For a single-family house used as a habitual place of residence, with a useful surface of 195m2 and three bedrooms, electricity consumption may be even four times higher than the average, whereas fuel oil consumption can reach 2 000 litres [6]. The energy costs for heating, air conditioning and domestic hot water for a single-family house of the same size are estimated to range between EUR 3 700 and EUR 6 500 in 2012. Table 2 presents an example of annual energy consumption and the relevant costs for a typical single-family house built in the 1980's and for a typical single-family house built in the 1990's [6]. These houses were located in meteorological zone 2.

Table 2 Example of energy consumption and costs for typical single-family houses

Single-family home with a surface of 193 m2 , one level, with a flat roof (typical house of the 1980's)			
	Electricity (kWh)	Oil (litres)	Expenses (EUR)
Heating	-	1 930	2 123
air conditioning	10 576	-	3 067
Domestic hot water	-	185	203
Lighting	3 686	-	1 069
Total	14 262	2 115	6 462
single-family home with a surface of 195 m2, two levels, with inclined tile roof (typical house of the 1990's)			
	Electricity (kWh)	Oil (litres)	Expenses (EUR)

Heating	-	1 342	1 475
Air conditioning	4 192	-	1 215
Domestic hot water	-	177	195
Lighting	3 032	-	879
Total	7 224	1 519	3 764

Apartments are the second-largest dwelling category. From the 1990's onwards, there has been a significant increase in the construction of residential buildings. There are only a few residential buildings which were built before that time, comprised mainly of refugee settlements built by the State in the late 1970's and early 1980's, as well as a few residential buildings constructed by private individuals which were usually very large. In addition, from the 1980's onwards, the tendency has been to build the so-called 'family residential buildings', i.e., small residential buildings with two or three floors, with only one apartment per floor. Table 3 provides an example of the detailed energy consumption of a typical 'family residential building' and of a residential building constructed during the 1990's [6]. These residential buildings were located in meteorological zone 2.

Table 3 Example of energy consumption and costs for typical residential buildings

Small 519m2 residential building with four apartments			
	Electricity (kWh)	Oil (litres)	Expenses (EUR)
Heating	-	3 939	4 333
Air conditioning	15 051	-	4 364
Domestic hot water	-	374	411
Lighting	9 550	-	2 769
Total	24 601	4 313	11 877
Large 826m2 residential building with nine apartments			
	Electricity (kWh)	Oil (litres)	Expenses (EUR)
Heating	31 636	-	9 174
Air conditioning	24 780	-	7 186
Domestic hot water	3 304	-	958
Lighting	16 437	-	4 767
Ventilation	388	-	112

Total	76 545	-	22 197

2.2 Non-residential buildings

Non-residential buildings include various types of buildings, the most important of which are offices, retail shops, restaurants, hotels and hospitals. There are no statistics on this building category. However, we know that in 2012 the EAC had 85 198 commercial customers, i.e., buildings and building units owned by enterprises and organisations [10]. Table 4 provides an analysis of EAC's commercial customers per category of use, which reflects to a great extent the relevant number of buildings and building units per type.

Table 4 Electricity consumers per category

Type of consumer	Number of consumers
Wholesale and retail sale, repair of vehicles	24 788
Accommodation premises and establishments serving food	10 097
Public administration and defence	1 671
Education	2 454
Human health and social work activities	2 143
Culture, entertainment and recreation	2 907
Other services	41 138

The vast majority of customers under category 'other services' represent buildings and building units used as offices, which rank first in terms of number followed by retail shops.

Despite the fact that there are no statistics on the age of these buildings, it may be assumed that they have a distribution over time which is similar to the one of dwellings, as commercial and other buildings had the same peak period as dwellings. Both in the case of dwellings and other buildings, there was no obligation to apply thermal insulation or any other energy-saving measures at the time they were built. Approaches to envelope construction were the same for all building categories.

The sector of non-residential buildings uses two-thirds of total final consumption of electricity from the grid (Graph 7). The use of RES is reduced as compared to households, with solar energy showing the highest penetration by 4% [2]. In some building types, such as hotels, where 50% uses solar energy for hot water production, there is an increased penetration of RES, as compared to the average penetration in buildings of the tertiary sector, [11]. One- to five-star hotels in Cyprus number 224, of which 20 are located in mountainous regions [12].

Graph 7 Percentage of energy product used in the sector of non-residential buildings

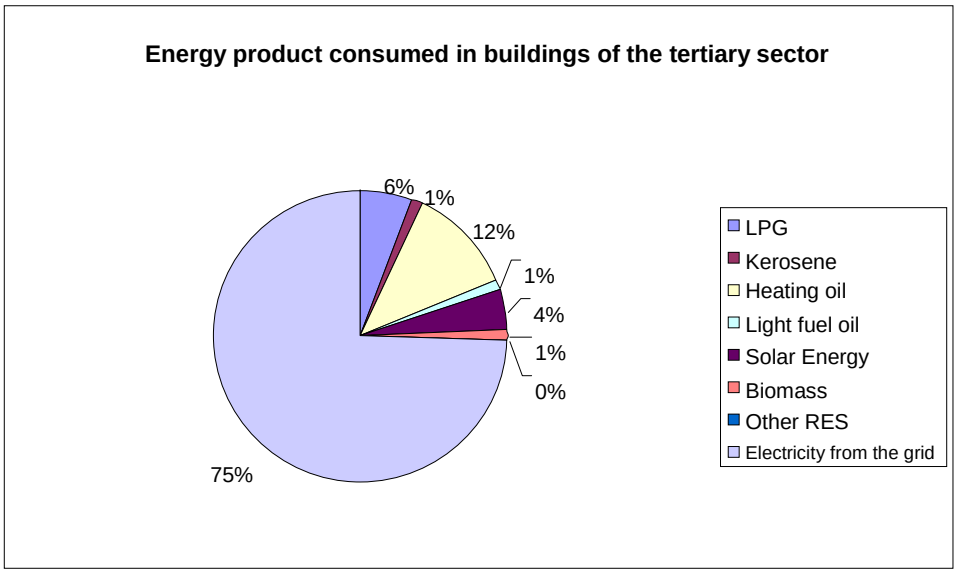


Table 5 provides an example of detailed energy consumption and the relevant costs for a typical office building constructed in the 1980's and Table 6 for a retail shop building [6]. These buildings were located in meteorological zone 2.

Table5: Example of energy consumption and costs for office buildings

1 448m2 office building		
	Electricity (kWh)	Expenses (EUR)
Heating	36 489	10 582
Air conditioning	52 852	15 327
Domestic hot water	4 199	1 218
Lighting	80 074	23 221
Ventilation	-	-
Total	173 614	50 258

Table 6: Example of energy consumption and costs for retail sales building

412m2 retail sales building			
	Electricity (kWh)	Oil (litres)	Expenses (EUR)
Heating	10 176	-	2 951
Air conditioning	21 136	-	6 129
Domestic hot water	536	-	155
Lighting	44 290	-	12 844
Ventilation	-	-	-
Total	76 096	-	22 074

2.3 Public Buildings

Public buildings means buildings used by:

i. Central government authorities such as Ministries, the Police and the General Prosecutor's Office;
ii. Local Administration, such as Municipalities and Communities
iii. Public schools, public universities and other public educational institutions;
iv. The military.

Central governmental authorities means all administrative services whose competence extends to the whole territory of the Republic of Cyprus, which are laid down in Annex IV to the 2006 Coordination of the Public Procurement, Works and Services Contracting Procedures and Relevant Matters Act. These authorities use 1 066 buildings and building units of which only 572 are property of the public sector. Central government authority buildings have low energy efficiency as, according to the issued Energy Performance Certificates, they are category C to H buildings [13]. As a rule, they use only electricity to cover their energy needs, with an average consumption of 130 kWh/m^2 per year.

In the free areas of the Republic of Cyprus, Local Administration consists of 30 Municipalities and 350 Communities. Most Municipalities and large communities have only one building, used for administrative purposes and events. However, large Municipalities own more buildings which are being used to serve the public, as well as other building types, such as libraries and sports centres. Table 7 presents some of these Municipalities and the number of buildings that they use.

Table 7 Buildings used by Municipalities [14]

Local Authority	Number of heated or cooled buildings
Municipality of Nicosia	16
Municipality of Larnaca	7
Municipality of Strovolos	4
Municipality of Paralimni	3
Municipality of Aghios Athanasios	4
Municipality of Latsia	5
Municipality of Aglantzia	7
Municipality of Dali	2
Municipality of Lakatamia	6
Municipality of Engomi	1

In Cyprus there are 833 public schools of primary and secondary education [15]. The Technical Department of the Ministry of Education and Culture is responsible for the implementation of projects related to the construction of new school units and the maintenance and extension of already existing ones. Regarding public universities, the University of Cyprus, which is the largest public university, owns most of the buildings that have been constructed in recent years within the Campus. The Technological University of Cyprus (TEPAK) uses mainly historical buildings and leased buildings in the historical centre of Limassol, whereas the Open University of Cyprus uses a building in Nicosia. Public universities have technical departments which are responsible for the maintenance and the smooth operation of their building infrastructures.

3. Cost-effective approaches to renovations

The calculation of cost-optimal levels of minimum energy performance requirements carried out in line with Article 5 of Directive 2010/31/EU on the energy performance of buildings (recast) allowed us to examine the most cost-effective approaches to building renovations, taking account of initial

capital costs and operating costs throughout the building's life [6] [16]. In order to make this calculation for existing buildings, seven reference criteria were set: two single-family houses, two residential buildings, two office buildings and one retail shop. The aim was that these buildings should represent, to the greatest possible extent, the typical average building stock. These buildings are not real. They are based on the available statistics (e.g., in the case of dwellings) and on the views of architects, engineers, contractors and other professionals of the sector as expressed during the consultations held.

Chapter 2 presents the estimated energy consumption and the relevant costs for six reference buildings. This is followed by a presentation of the characteristics of the building elements for the two single-family houses and for one office building, as set out in Chapter 2, as well as of the most cost-effective combination of energy-saving measures throughout the building's life cycle, which may be applied during major renovation. It should be noted that these examples reflect the cost of energy and materials in this particular moment, whereas energy consumption reflects average potential use. Therefore, these examples provide only a general image, as energy-saving and RES interventions to buildings must be made on a case-by-case basis. In addition, the measures set out below also contribute to other targets which are not related to energy-saving, such as aesthetic improvement of facades, replacing building elements with an expired life cycle, etc. It is estimated that if energy-saving measures are applied in the context of a scheduled large-scale renovation, the initial capital costs required exclusively for energy purposes must be assumed to be reduced by 30%.

(1) single-family home with a surface of 193 m2, one level, with a flat roof (typical house of the 1980's)

Description of construction prior to any intervention

- Roof: Concrete with no thermal insulation (U = 4,27 W/m2K)
- Columns / Beams: Concrete with no thermal insulation (U = 3,33 W/m2K)
- Walls: Conventional bricks 20cm (U = 1,38 W/m2K)
- Framed structures: Single-glazing with aluminium framing without thermal break (U = 6 W/m2K)

- Shade: Exterior moving shade
- Heating system: Central heating system using radiators and an oil-fired boiler with a performance of 80%
- air conditioning system: Independent air conditioning unit with a performance of 2.5
- Hot Water System: The same oil-fired boiler used for heating and solar paddles
- Lighting: Compact fluorescent lamps
- Energy class of the EPC: H

Energy-saving measure taken

- ✓ Placing 8cm thick thermal insulation on the roof (U = 0.34 W/m2K) EUR 6 347
- ✓ Placing 7cm thick thermal insulation on the walls, columns and beams

  (U = 0.34 W/m2K) EUR 7 604
- ✓ Replacing the boiler with a condensing boiler EUR 1 900
- ✓ Replacing air conditioners with high-efficiency air conditioners EUR 2 012
- ✓ New energy class of the EPC: B
- ✓ Total initial cost = EUR 17 863

Table 8 single-family home with a surface of 193 m2, one level, with a flat roof (typical house of the 1980's) after the implementation of energy-saving measures

	Electricity (kWh)	LPG (kg)	Expenses (EUR)
Heating	-	498	657
Air conditioning	1351	-	392
Domestic hot water	-	117	154
Lighting	3 686	-	1 069
Total	5 034	615	2 272

Total annual benefit = EUR 6 462 – EUR 2 272= EUR 4 190

(2) single-family home with a surface of 195 m2, two levels, with an inclined tile roof (typical house of the 1990's)

Description of construction prior to any intervention

- Inclined tile roof without thermal insulation (U = 1.72 W/m2K)
- Columns/Beams: Concrete with no thermal insulation (U = 3,33 W/m2K)
- Walls: Conventional bricks 20cm (U = 1,38 W/m2K)
- Framed structures: Single-glazing with aluminium framing without thermal break (U = 6 W/m2K)
- Shade: No external shade
- Heating system: Central heating system using radiators and an oil-fired boiler with a performance of 80%
- air conditioning system: Independent high-efficiency air conditioning unit
- Hot Water System: The same oil-fired boiler used for heating and solar paddles
- Lighting: Compact fluorescent lamps
- Energy class of the EPC: D

Energy-saving measure taken

- ✓ Placing 8cm thick thermal insulation on the roof (U = 0.31 W/m2K) EUR 4 091
- ✓ Placing 7cm thick thermal insulation on the walls, columns and beams

  (U = 0. 34 W/m2K) EUR 8 510
- ✓ Replacing the boiler with a condensing boiler EUR 1 900
- ✓ Installing a 2 kW PV system EUR 3 400
- ✓ New energy class of the EPC: B+
- ✓ Total initial cost = EUR 17 901

Table 9 single-family home with a surface of 195 m2, two levels, with an inclined tile roof (typical house of the 1990's) after the adoption of energy-saving measures

	Electricity (kWh)	LPG (kg)	Expenses (EUR)
Heating	-	520	686

Air conditioning	2 145	-	622
Domestic hot water	-	111	147
Lighting	3 032	-	879
Production of electricity from RES	-3 744	-	-1 086
Total	1 433	631	1 248

Total annual benefit = EUR 3 764 – EUR 1 248= EUR 2 516

(3) Office building of 1 448m2

Description of construction prior to any intervention

- Roof: Concrete with no thermal insulation (U = 1.99 W/m2K)
- Columns/Beams: Concrete with no thermal insulation (U = 1.1 W/m2K)
- Conventional brick walls 20cm (U = W/m2K)
- Framed structures: Double glazing with aluminium framing without thermal break (U = 3.8 W/m2K)
- Shade: No external shade
- air conditioning system: Independent air conditioning unit
- Hot Water System: Instant hot water without storage
- Lighting: Fluorescent lamps
- Energy class of the EPC: Z

Energy-saving measure taken

- ✓ Placing 12cm thick thermal insulation on the roof (U = 0.22 W/m2K) EUR 15 693
- ✓ Placing 12cm thick thermal insulation on the walls, columns and beams

  (U = 0.20 W/m2K) EUR 36 930
- ✓ Placing double-glazing and improved thermal efficiency frames (U = 2,25 W/m2K) EUR 62 478
- ✓ Placing fixed sun-blinds on windows facing south and east EUR 17 282
- ✓ Replacing air conditioners with high-efficiency air conditioners EUR 43 000

- ✓ Placing energy-efficient lamps EUR 2 750
- ✓ Installing a 10 kW PV system EUR 17 000
- ✓ New energy class of the EPC: B
- ✓ Total initial cost = EUR 195 133

Table 10 1 448m2 office building after the adoption of energy-saving measures

	Electricity (kWh)	Expenses (EUR)
Heating	11 873	3 443
Air conditioning	17 810	5 165
Domestic hot water	4 199	1 218
Lighting	55 748	16 167
Production of electricity from RES	-18 824	-5 459
Total	70 806	20 534

Total annual benefit = EUR 50 258 – EUR 20 534= EUR 29 724

The programme Energy Efficiency in Low Income Housing in the Mediterranean (ELI-MED) aims to identify energy-efficient approaches to the energy upgrading of buildings through pilot applications and focuses on low-income households of the Mediterranean. In the context of the project, 25 pilot interventions have been carried out in households of Cyprus, after assessing their energy status in order to implement energy-saving measures. Smart meters were installed at the buildings in order to evaluate results and compare them to the estimated energy savings [17]. The data obtained so far indicate savings ranging between 30% and 40%. The example of three residences of different type is presented below, suggesting that if certain gradual renovations are made in a targeted manner they may bring impressive results with regard to saving energy and money.

1) 150 m2 single-family house in Dali (climate zone 2)

Year of construction 1985

Energy class of the EPC: E

Energy-saving measure taken

- ✓ Placing 7cm thick thermal insulation on the roof EUR 7 530

- ✓ Replacing air conditioners with high-efficiency air conditioners EUR 1 770
- ✓ Total initial cost = EUR 9 300

New energy class of the EPC: C

Estimated energy savings 43%

2) 128m2 residence in continuous construction in Aradippou (climate zone 1)

Year of construction 1992

Energy class of the EPC: E

Energy-saving measure taken

- ✓ Placing 7cm thick thermal insulation on the roof EUR 6 669
- ✓ Replacing the solar water heater EUR 1 400
- ✓ Total initial cost = EUR 8 069

New energy class of the EPC: C

Estimated energy savings 35%

3) 94m2 apartment in Aghios Athanasios (climate zone 1)

Year of construction 2007

Energy class of the EPC: Z

Energy-saving measure taken

- ✓ Replacement of common fireplace with energy fireplaces EUR 5 000
- ✓ Replacement of light bulbs with compact fluorescent lamps EUR 100
- ✓ Total initial cost = EUR 5 100

New energy class of the EPC: E

Estimated energy savings 29%

In the sector of commercial buildings, the example of the Hellenic Bank may be regarded as a good practical example, as the Bank turned 10 of its branches into 'energy-friendly branches', as it calls them. These branches were equipped with thermal insulation on the roof, installation of heat-insulating glazing, installation of new class A air conditioners and installation of LED lighting and illuminated signs. These measures brought a reduction in energy consumption of 50% to 60% at these branches. In addition, the actions of the Bank and of its workers in the remaining buildings lead to savings of EUR 416 000 (or 18%) in 2013 as compared to 2012 [18].

The cost of the energy-upgrading works in these 10 branches, the requested State aid and the payoff time are as follows:

- Total cost of energy-upgrading works: EUR 663 404
- Other costs of energy-upgrading works in addition to usual costs EUR 270 854
- State grant requested: EUR 163 532
- Payoff time: 1.5-2.5 Years

The works and cost per branch are presented in detail below:

1. Cost of energy efficiency interventions
    - Thermal insulation on roof EUR 6 750
    - Shop windows and aluminium frames with thermal insulation EUR 10 396
    - High energy-efficient air conditioning units EUR 14 107
    - Requested State grant EUR 8 522 (pending since 2012)
2. Energy savings: 63%
3. Payoff: 1-2 Years

Companies and organisations engaged in similar activities and/or with similar buildings could reduce their energy consumption and operating costs by following similar approaches.

Examples of good practice in the sector of public buildings can be drawn from the SERPENTE programme, aimed at the energy upgrading of different building types of the public sector. The programme's coordinator in Cyprus is the Cyprus Energy Agency, whereas participants are local authorities [19]. Two examples of the programme's implementation in Cyprus are given below:

1) Municipal Library of Strovolos (climate zone 2)

The building was constructed in 1915 and it has been declared a historical building. Initially, the building was used as a school, then as a slaughterhouse and finally as the Town Hall of Strovolos until 1993, when it was abandoned. During 2011–2012, the building was renovated and the energy-saving measures implemented were: 5cm thick thermal insulation on the roof, internal thermal insulation on walls, double-glazing at the northern and eastern facade, window films on glazing facing westward, geothermal heating pump for heating and cooling and an electronic energy management system. The total cost of the measures amounted to EUR 290 000 and total payoff time is estimated to be 4 years.

2) Olympic Swimming Pool Complex of the Municipality of Geroskipou 'Tassos Papadopoulos' (climate zone 1)

The sports facility was built in 2004 and, although thermal insulation measures were taken, no efficient heating and cooling measures were taken during the building's design. The increase in energy prices has raised significantly the heating costs of the swimming pool, thus threatening the economic viability of the swimming pool complex. In 2008, solar panels and a geothermal pump were installed in order to reduce energy demand from conventional fuels. As a result, fuel oil consumption dropped by 20% (30 000 to 40 000 litres per annum). The project's cost amounted to EUR 132 000 and total payoff time is estimated to be 4 years.

4. Policies and measures to stimulate cost-effective deep renovations of buildings, including staged deep renovations.

The policies and measures that will stimulate investments in the renovation of existing buildings may be divided into: legislative measures and policies, incentives, training measures and awareness-raising measures. An analysis of the existing situation with an identification of obstacles and ways to overcome them may be found below.

4.1 Legislative measures and policies

The main legislative measures on the energy upgrading of existing buildings relate to the provisions of the 2006 to 2012 Laws on the Energy Efficiency of Buildings and the regulatory and administrative acts adopted in implementation thereof [20]. The minimum energy efficiency requirements include requirements for buildings. The first Decree, which was adopted in 2007, established the mandatory energy upgrading of buildings over 1 000m2 undergoing major renovation, which actually provided for the thermal insulation of elements of the building's envelope at the same levels as in new buildings [3]. The minimum requirements were revised in 2009 to include the issuance of an Energy Performance Certificate with a minimum energy class B for the above buildings over 1 000m2 undergoing major renovation [21]. The Decree which is currently in force was adopted in December 2013. It stipulates that thermal transmittance coefficients are reduced by 15% and it introduces a requirement for external shading, whereas existing buildings, regardless of their side, are subject to the requirements on building elements replaced or retrofitted [22].

At the same time, a Decree was adopted in November 2013, setting the requirements for the technical systems which are retrofitted or upgraded in existing buildings [23]. These requirements determine the efficiency or the size of heating, cooling, hot water and large air conditioning systems. In addition, a Decree adopted in January 2014 based on the 2013 Law on Promoting and Encouraging the Use of Renewable Energy Sources establishes the requirement for installing certified heat pump and solar thermal equipment, whereas it sets out the minimum performance requirements for biomass heaters and boilers [24]. Table 8 illustrates the applicable requirements during the major renovation of existing buildings or when replacing or retrofitting building elements and when additions are made to a building.

Table 11 Energy efficiency requirements for existing buildings

Required when: / Requirement	Building over 1 000m2 undergoing major renovation	Placed afterwards or replaced	Part of the addition to an existing building
(1) Energy efficiency category in the Building Energy Performance Certificate equal to or higher than B.	√		
(2) Maximum thermal transmittance coefficient U of walls and load-bearing structures (columns, beams and walls) which are part of the building's envelope 0.72 W/m^{2}K. Surpassing the thermal transmittance coefficient U for thermal storage walls in the case where passive solar systems are used is allowed (e.g., Trombe walls, high thermal storage walls)	√	√	√
(3) Maximum thermal transmittance coefficient U of horizontal structural elements (floors in open ground-floor area, floors in cantilever structures, terrace apartments, roofs) and ceilings, which are part of the building's envelope 0.63 W/m^{2}K.	√	√	√
(4) Maximum thermal transmittance coefficient U for floors overlying a closed, unheated space 2.0 W/m^{2}K.	√	√	√

(5) Maximum thermal transmittance coefficient U for framed structures (doors, windows), which are part of the building's envelope 3.23 W/m^2K. Shop displays are exempted.	√	√	√
(6) Maximum shadowing factor for framed structures (windows) which are part of the building's envelope 0.63. Shop displays are exempted.	√	√	√
(7) When fitting a boiler with nominal output power of 20 to 100 kW in a heating system and when installing a heating system with a boiler with nominal output power of 20 to 100 kW, the useful efficiency of the boiler at 100% of its nominal output power is not less than 92%.		√	√
(8) When installing split-type air conditioning systems without ducts of a nominal output power of 12 kW (a) the energy efficiency class during heating must be at least A [Seasonal Coefficient of Performance (SCOP) higher than 3.4]; (a) the energy efficiency class during cooling must be at least D [Seasonal Energy Efficiency Ratio (SEER) higher than 3.6]		√	√
(9) When replacing a ventilation system and when installing a ventilation system in an existing building, with a capacity of over 500 litres of air per second, a waste heat recovery system must be installed.		√	√
(10) The installation and replacement of a solar system for covering the needs in domestic hot water in existing buildings and building units must be made in line with the Technical Guide for Solar Systems and under the terms set by the competent Town Planning Authority.		√	√
(11) When a biomass boiler and heater are installed, the equipment used must achieve a conversion		√	√

efficiency of at least 85%			
(12) When a heat pump is installed, the eco-labelling requirements set out in Commission Decision No 2007/142/EC must be met		√	√
(13) Regarding solar thermal energy, certified equipment must be used based on EU standards, including eco-labelling, energy labelling and other technical labelling		√	√

Legal requirements by themselves do not promote the increase of renovations as they apply only when renovation works are carried out on the envelope or on specific elements of the building as set out above. On the contrary, in some cases they can be a deterrent as they increase costs for owners who usually do not have all the information that would allow them to make an ex ante estimation of short-term and long-term economic and other benefits. The presentation of cost-efficient approaches in Chapter 3 aims to raise awareness in that respect. However, this analysis is based on typical buildings and, therefore, a case-by-case analysis of financial and other benefits must be performed by persons who have the necessary training to do so in an independent manner.

In addition, according to the 2012 amendment to the Laws Regulating the Energy Efficiency of Buildings, for each building undergoing major renovation, the technical, environmental and economic feasibility of installing alternative energy systems (PV systems, solar systems, geothermal pumps etc.) must be studied and taken into account before starting the renovation [20]. Acknowledging that there is a connection between the installation of alternative energy systems and other energy-saving measures, the Energy Department will publish a calculation tool, which will allow for calculating economic benefits for individual energy-saving or RES measures or for a combination of measures. The user will be able to calculate the results both with regard to the building's life cycle and to the payoff time. The aim is for the tool to be used by Experts for the issuance of recommendations accompanying the Energy Performance Certificate, by researchers carrying out studies on the installation of alternative energy production systems, by building Energy Auditors and Inspectors of air conditioning and heating systems.

The Energy Performance Certificate is required by law when selling or renting buildings and building units, whereas a copy thereof must be given to the new tenant or buyer [20]. In addition, announcements on buildings for rent or for sale must indicate their energy class [20]. However, the issuance of Energy Performance Certificates for the purpose of renting or selling remains at low levels. For instance, in the period 2010 –2013, 25 652 sales documents were submitted to the Land Registry and Surveying Department (the number of land parcels, warehouses, etc., for which the issuance of an Energy Performance Certificate is not required is unknown), whereas in the same period only 1 244 Energy Efficiency Certificates were issued for existing buildings. Energy Performance Certificates for existing buildings amount to 7% of all Energy Performance Certificates issued [25]. This may be attributed to the following reasons:

i. The lack of legislation connecting the Energy Performance Certificate with the sales document and the rental agreement;
ii. Insufficient information on the Energy Performance Certificate to interested buyers or tenants of buildings;
iii. The difficulty of interested buyers or tenants of buildings, as well as of professionals in the real estate market, to 'translate' the data included in the Energy Performance Certificate into building operating costs;

The above obstacles do not allow the Energy Performance Certificate to realise its full potential as an indicator that may influence real estate prices and, therefore, promote the energy upgrading of existing buildings. To improve this situation, controls on the implementation of legal provisions and awareness-raising actions for all stakeholders will be intensified. The amendment to the 2012 Law, which allows for the imposition of administrative fines by the Ministry of Energy in cases where there is no Energy Performance Certificate during sale or rental will be another tool that will allow for better law enforcement.

The mandatory periodic inspection of air conditioning and heating systems is another measure that may assist in the energy upgrading of existing buildings. Inspection is mandatory for heating systems with boilers of a rated output power of over 20 kW and for air conditioning systems with a rated output power of over 12 kW or in cases where the cumulative rated output power in a building exceeds 50 kW [20]. Inspections are carried out by Air Conditioning System Inspectors or Heating System Inspectors, as the case may be. The aim of the inspection is to identify problems in the sizing,

maintenance and operation of the system which lead to energy wastage and to provide technical and economic recommendations for energy saving. The review of the Inspection Guide for Heating Systems and the Inspection Guide for Air Conditioning Systems, i.e., the method used during inspection, is scheduled for 2014, with emphasis on the issue of over-sizing.

Energy audits are expected to provide a more holistic approach in relation to the other three independent experts in the sector of the energy efficiency of buildings (Specialised Experts, Air Conditioning System Inspectors and Heating System Inspectors), as they must be based on updated and measurable operating data on energy consumption in the building and they must include a detailed overview of consumption characteristics. The training and licensing of energy auditors began in the second half of 2013. Periodic energy audits will become mandatory for large enterprises as they must perform an energy audit by 5 December 2015 and, thereafter, every four years [1]. Given that large enterprises are only a small part of Cypriot enterprises, the number of the energy audits performed will be determined on the basis of demand and offer in the market. For this purpose, there is need to raise awareness among building owners on the benefits of the energy audit. Audits must be promoted by the natural and legal persons that perform them, as a product that may be adjusted to the owner's profile on the basis of the latter's economic and technical needs. The Regulations on Energy Service Providers (ESPs) adopted in April 2014, are expected to increase the confidence of stakeholders in energy audits and alternative ways of financing energy-saving measures resulting from energy audits such as Energy Performance Contracts (EPCs)[26].

Graph 8 Legislation that promotes the energy upgrading of existing buildings

Article 5 of Directive 2012/27/EU on energy efficiency establishes the obligation of Member States to renovate 3% of the total floor area of buildings owned and occupied by the central government [1]. Renovations must be made to meet at least the minimum energy performance requirements. The 3% rate is calculated on the total floor area of buildings with a total useful floor area over 500 m2. That threshold will be lowered to 250 m2 as of 9 July 2015. Note that if more than 3% is renovated in a given year, the excess rate may be counted towards any of the three previous or following years. This measure is expected to be included in the national legislation within 2014, with the adoption of the draft law transposing Directive 2012/27/EU into national law, whereas as of 5 June 2013, by decision of the Council of Ministers, the Minister for Communications and Works has been authorised to submit a complete programme for the energy efficiency of government buildings [27].

A working party has been established for the implementation of this measure, comprised of the following bodies:

i. Energy Department - Ministry of Energy, Commerce, Industry and Tourism;
ii. Department of Public Works- Ministry of Communications and Works;
iii. Electrical and Mechanical Services Department - Ministry of Communications and Works;
iv. Department of Internal Audit- Ministry of Communications and Works;
v. Cyprus Scientific and Technical Chamber (ETEK).

As a first step, a list of buildings has been prepared and posted on the website of the Ministry of Energy under title 'Registry of owned government buildings' [13]. The list contains 151 buildings of which only 5 have energy class B or A in their Energy Performance Certificate. It is estimated that in the period 2014–2020, a total floor surface exceeding 120 000 m2 will have to be renovated in public buildings. The next step is to evaluate buildings from an energy-efficiency and technical aspect, after excluding buildings that have ended their life cycle. The evaluation of buildings will be carried out on the basis of the Energy Performance Certificates and the recommendations accompanying them or on the basis of the energy audit, or both, as the case may be. The Electrical and Mechanical Services Department is responsible for the coordination and issuance of Energy Performance Certificates in buildings owned or used by public authorities. This work has already begun on three buildings which will be upgraded in the context of the cross-border programme between Greece and Cyprus titled 'ENERGEIN', which is co-financed by EU and national funds. At the same time, the working party is evaluating different sources of financing. Co-financing under EU programmes and co-financing under Energy Performance Contracts are some of the sources under consideration. A call for tenders is expected to be launched by the end of 2014 by the Electrical and Mechanical Services Department for the energy-upgrading of two public buildings through energy performance contracting. The implementation of these projects faces many obstacles that need to be addressed. The most important obstacles are set out below:

i. The lack of legislation regulating the framework of public-private partnerships;
ii. The lack of sufficient and confirmed measurements of energy consumption in buildings;
iii. The practice of awarding the project to the lowest bidder, a practice commonly followed in public procurement;
iv. Long-term maintenance contracts in many public buildings.

The Regulations on ESPs, as set out above, will establish the minimum requirements of EPCs and are expected to assist both the public and private sector in overcoming the existing regulatory and administrative barriers. Regarding the issue of measurements, Energy Savings Officers are an important source of information on the energy status of government buildings, through the annual reports they prepare (more information on Energy Savings Officers is provided in paragraph 4.4). In order to obtain more accurate measurements of energy consumption, the Electrical and Mechanical Services Department has installed smart meters in buildings where EPCs will be implemented,

whereas it has scheduled the installation of smart meters in an additional one hundred public buildings. In addition, via structural programmes, the Electrical and Mechanical Services Department has scheduled the upgrading of management systems into energy management systems in 15 buildings, as well as their central connection for monitoring, regulating and controlling the operating parameters of the electromechanical equipment. Furthermore, under the latest amendment to the 2006 to 2012 Laws Regulating the Energy Efficiency of Buildings, the issuance of an Energy Performance Certificate for buildings of the public sector, which are visited by citizens, on the basis of measured energy consumption is established as an alternative, which may increase the available data on the relationship between actual consumption and user behaviour [20]. This measure has not been implemented yet as a new calculation method on the basis of measured energy consumption must be established first.

According to the 2013 Law on Promoting and Encouraging the Use of Renewable Energy Sources, all existing public buildings undergoing major renovation must serve as an example [28]. The Minister for Energy may establish, under a relevant Decree thereof, the terms and conditions under which public buildings will play this part, which may include, inter alia, turning them into nearly-zero consumption buildings and renting their roof to third parties for the installation of RES energy production systems.

To improve the penetration of RES systems in existing buildings the trust of owners in these systems must be increased. The certification of installers with specific skills and knowledge aims to reduce installation errors. A set of Regulations published in January 2014, provides for the creation of a registry of certified installers of small RES systems for the following categories:

i. Installers of biomass boilers and heating appliances;
ii. Installers of heat pumps;
iii. Installers of solar thermal systems;

The qualifications of installers differ, depending on the category. However, in all cases, they must be installers of technical systems, i.e., installers of conventional cooling or heating systems. This establishes a correlation with the 2006 to 2012 Law Regulating the Energy Efficiency of Buildings,

which stipulates that the installation of heating and cooling systems in existing buildings must be carried out by installers [20].

In addition to legislative measures, the Electrical and Mechanical Services Department, acting as competent department for mechanical and electrical installations in buildings of central government authorities and bodies of the public sector that manage a large number of buildings, implements specific policies to improve efficiency in energy use. The Electrical and Mechanical Services Department implements maintenance measures of air conditioning and heating systems aiming to reduce energy consumption, whereas it periodically issues circulars addressed to civil servants on the correct operation of these systems [29]. Under the 2014–2020 Structural Funds, the Electrical and Mechanical Services Department has submitted a proposal, following consultation with the Ministry of Energy, for the installation of ice-based electricity storage devices. The installation will be made in two buildings of the public sector aiming to explore the possibilities of peak-load shifting during summer months.

The Technical Services of the Ministry of Education and Culture, which are responsible for school buildings, have implemented the following measures:

i. Lighting automation;
ii. Installation of energy-efficient lamps;
iii. Selective use of lighting in classrooms;
iv. Installing photovoltaic systems in 114 schools with a total power of 1MW.
v. Programme for improving central heating systems

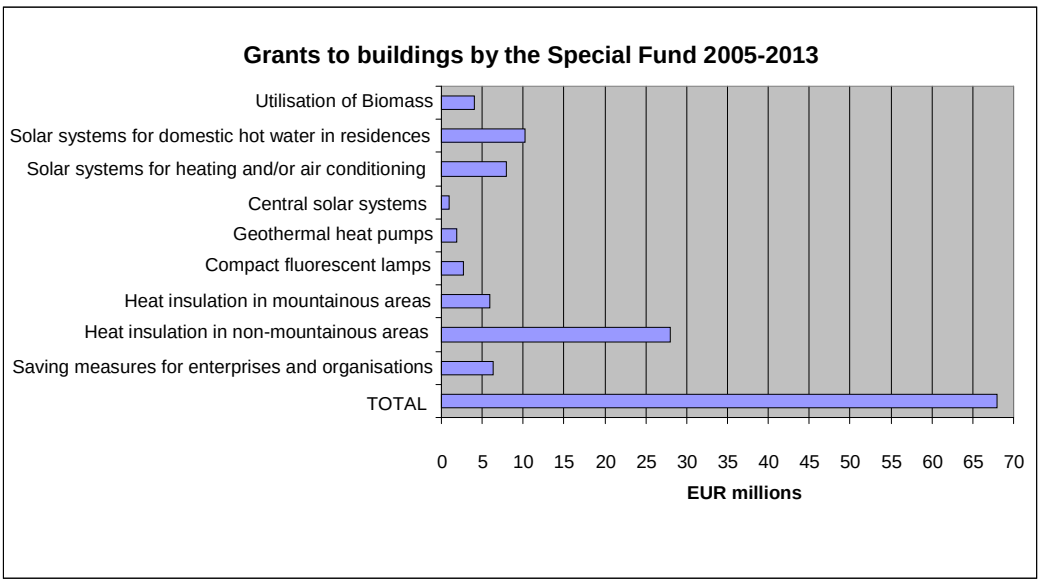
The short-term goals of the Ministry of Education and Culture include improving thermal comfort in existing schools through the thermal insulation of roofs, fitting external blinds and the installation of a central system for monitoring the electricity generated from PV systems, which will allow for the evaluation and installation of more systems. Its long-term goals involve technical and financial study for replacing existing lighting with LED lights, installing solar thermal systems where it is technically feasible and economically viable, as well as the study and design of a zero-consumption school building [15].

Within Local Administration, 15 Municipalities and 2 Communities are already implementing a Sustainable Energy Action Plan (SEAP), whereas another 4 Communities are currently at the drafting stage of such a plan. The local authorities implementing a SEAP aim at reducing CO_2 emissions by over 20% throughout their territory by 2020, through measures that increase energy efficiency and the use of RES. For the preparation and implementation of SEAPs, these local authorities receive technical support from the Cyprus Energy Agency, through their participation in EU initiatives (Covenant of Mayors, Pact of Islands, European Energy Award). According to the SEAPs, energy-saving and RES measures are programmed to be implemented in buildings of the local authorities. However, the extension of these measures to private buildings is expected to be difficult, as local authorities have limited powers with regard to adopting and supporting energy renovations. For this reason, the Municipalities and Communities that have set binding targets must offer incentives and adopt measures to encourage energy renovations within their territory, such as expediting licensing procedures and reducing fees and taxes. It should also be appropriate to consider the possibility of creating a fund to support such investments, which could draw resources from the savings arising from the implementation of the SEAP, grants or even through the imposition of a fee to citizens and enterprises operating in the Municipality. Of course such measures must be explored on the basis of the economic, human and other resources available to each local authority. In addition, the implementation of some measures and incentives may be contrary to the legal framework regulating the operation of local authorities, in which case alternatives must be sought.

4.2 Incentives

The grant schemes of the Special Fund for RES and ES are regarded as a very important measure for meeting Cyprus' targets in the sector of energy-saving and renewable energy sources. These grant schemes entered into force in February 2004 and from their first implementation until the end of 2013, a total of EUR 100 million were allocated to investments made by natural or legal persons and bodies of the public sector engaged in an economic activity [30]. It is estimated that EUR 67 million were granted as a financial incentive for the implementation of RES and ES measures in buildings, such as thermal insulation, framed structures, energy-efficient lighting, energy recovery, automations and RES systems in cooling and heating [30]. Graph 9 provides an overview of the allocation of the Fund's grants up to now (grants for the installation of PV systems are not included). The Fund is financed through the implementation of an energy fee equal to EUR 0,50 per kilowatt-hour on electricity consumption for all final consumers.

Graph 9 Grants of the Special Fund for RES and ES in the building sector



As of 2008, when the minimum energy efficiency requirements were put in place, the Fund has been financing energy-saving measures only in existing buildings and RES systems for heating and cooling in new and existing buildings. The energy savings achieved in the life cycle of buildings with the implementation of measures financed by the Special Fund are expected to amount to 1 million TOE. However, an assessment of the impact of these schemes in different aspects of the economy, such as the creation of jobs, the impact on the State's income from taxation and the competitiveness of enterprises, has not been carried out yet.

The new grant schemes prepared for the period 2014–2020 aim to promote cost-effective energy-saving solutions for building owners through transparent and reliable procedures, while improving Cyprus' macroeconomic indicators. The most important provisions introduced in the schemes are:

- ✓ Grants for cumulative energy-saving and RES measures in buildings instead of individual measures;
- ✓ Assessment of buildings by independent experts (Energy Auditors, Specialised Expert, Inspector, as the case may be), prior to the adoption of measures;
- ✓ Promotion of nearly-zero consumption buildings;
- ✓ Increased grants for vulnerable consumers;
- ✓ Inclusion of EU funds in financing.

The installation of PV systems on buildings began in 2005 with grants from the Special Fund on installation costs and the energy generated. The drop in PV prices and the increase in electricity prices has created a shift in the development model of these systems towards methods seeking to couple energy production and demand, which is expected to give a boost to the installation of smart meters and batteries. A programme for the installation of PV systems up to 3kW using the net metering method in residences and buildings occupied by local authorities was launched in 2013. Despite the fact that there is no grant, there has been great interest in the programme and, as a result, the 3 000 available licences for the first year were exhausted. For vulnerable consumers, those subject to special reduced electricity billing, systems were installed in 2 000 residences under a one-off grant amounting to EUR 900 for each kW installed. There is also a possibility to install auto-production PV systems in commercial buildings, thus allowing them to produce electricity exclusively for their own use with no control from the grid. These schemes will be continued in 2014.

The gradual and major renovation of existing buildings, as well as the increase of their energy efficiency, reduces operating costs in the forthcoming years. Buildings for sale or rent have an additional motive to adopt energy-saving measures, as this will differentiate them in the real estate market and will give them a competitive advantage. The Energy Performance Certificate is a way to demonstrate the energy upgrading of buildings. The economic crisis that affected the real estate market is yet another barrier to the issuance of the Energy Performance Certificate by consumers, in addition to those set out in paragraph 1 hereof. The large number of unused buildings and the decrease of family incomes has forced the market to focus on the reduction of sale and rent prices, rather than of operating costs. The change in the economic environment and the creation of a more competitive market in the sale and rent of real estate property will promote the role of energy efficiency.

Article 19 of Directive 2027/12/EU on energy efficiency provides for the evaluation and the adoption of measures to remove regulatory and non-regulatory barriers to energy efficiency which do not allow building owners to take energy-saving measures [1]. The main barriers to energy efficiency improvement faced by owners who rent their buildings are:

i. Long-term lease contracts;

ii. The biased effect of this investment on the real estate price of certain building types, e.g., its installation in restaurants and shops;
iii. The controlled increase in the rent of houses and shops under the provisions of the Rent Moratorium Law [30];
iv. Lack of financing.

In order to overcome these obstacles, alternative lease ways offering incentives to owners must be sought. Some examples of the practices followed in other countries to encourage investments by owners who rent their buildings are presented below:

i. Inclusion of terms for the promotion of energy upgrading in lease contracts, such as an increase in the rent after the financing and implementation of measures by the owner. Rent increase is proportional to the reduction of energy consumption achieved through the energy-saving measures, whereas the relevant details are agreed between the two parties.
ii. The energy class set out in the Energy Performance Certificate is one of the factors that determine the price index of buildings for rent. The price index is indicative. However, the method used to establish the index is binding.
iii. Energy-upgrading of large buildings and building groups owned by the same person, under the method of energy performance contracting. The owner performs an energy audit on the building and prepares a preliminary study along with a viability study, which is being presented to the tenants. If the tenants agree, the owner proceeds with the energy-upgrading of the building through an Energy Service Provider undertaking large part of the initial capital expenditure. The owner guarantees the repayment of the Energy Service Provider. However, repayment is made mainly by the tenants.

Incentives to owners who rent their buildings must be offered in Cyprus, with the participation of stakeholders, in line with the country's social and economic situation. As tenant of buildings, the Public Sector has the opportunity to serve as an example, in compliance with Article 6 of Directive 2012/27/EU on energy efficiency, as it will be obliged to rent only the buildings which meet at least the minimum energy efficiency requirements [1]. If the central government authorities rent buildings which are not energy efficient, they must justify their option based on cost-effectiveness and economic feasibility, general sustainability and technical suitability.

4.3 Training measures

The training of all professionals involved in the energy efficiency of buildings and, in particular, in the energy-upgrading of existing buildings is a fundamental measure in the promotion of investments in this sector. Priority is attached to professionals who have as their main occupation the design of buildings, the installation design of technical systems in buildings, including RES systems, and those responsible for installing building elements that affect the building's energy efficiency.

The establishment in 2009 of Specialised Experts as persons responsible for assessing the energy efficiency of buildings and for issuing Energy Performance Certificates and recommendations, has served as an opportunity for providing training to civil engineers, mechanical engineers and electrical engineers on issues pertaining to the energy efficiency of buildings. Despite the fact that the qualifications of Specialised Experts as prescribed by law do not include training, the Energy Department has organised dozens of training seminars in order to prepare the interested persons for the relevant exams. Seminars addressed to Specialised Experts for residences have a duration of 16 hours and cover issues pertaining to legislation, calculating energy efficiency and cost-effective measures in order to improve the energy efficiency of buildings. In the period 2009–2013, these seminars were attended by 1 074 individuals, whereas Specialised Experts number only 249, a fact which demonstrates that many engineers and architects have attended them purely for educational purposes. Building Energy Auditors must attend and successfully complete, by passing a final examination, a specialised programme of theoretical and practical training with a duration of 80 hours. Training is provided by establishments approved by the Energy Department. These establishments are the University of Nicosia in cooperation with the Cyprus Energy Agency, and the Frederick University, whereas 66 persons have been trained to date. The training of engineers and architects is further promoted through the various workshops, events and lectures organised from time to time by universities, the ETEK, professional associations and other organisations active in the sector of buildings and energy.

Training is essential for creating a critical mass of professionals who will promote the energy efficiency of buildings, taking account of the fact that most polytechnic schools attended by these engineers at the time did not include courses on the energy efficiency of buildings in their curriculum. Cypriot universities have made significant progress with regard to including this discipline in their academic curricula, in order to better prepare new professionals who will be employed in the

construction industry. Some examples are the inclusion of the course 'Energy resources and energy efficiency of buildings' in the curriculum of undergraduate engineering students of the Cyprus University of Technology (TEPAK) and the master's degree titled 'Energy systems and built environment' provided at the polytechnic school of the Frederick University. However, academic curricula and training seminars focusing on the sector of improving the energy efficiency of existing buildings are rarely offered. The effort of the Energy Department, through its cooperation with universities, is to provide more training opportunities on issues pertaining to the energy upgrading of existing buildings, including technical, environmental and financial parameters, both at the academic and vocational training level in the coming years.

The professional training and education of building element installers is achieved through initial and continuous education programmes. The secondary and vocational training provided in technical schools includes sectors which are directly related to the energy efficiency of buildings, e.g., engineering, electrical engineering and construction. Training on the energy efficiency of buildings has slightly increased in recent years and there is also an upward trend in the percentages of graduates active in technical professions [32]. However, the percentage of students enrolled in secondary and vocational training courses is still one of the lowest in the European Union [32]. Table 12 illustrates all specialties offered in secondary technical - vocational education in relation to the energy performance of buildings.

Table 12 Specialties offered in secondary technical - vocational education in relation to the energy performance of buildings

SPECIALTIES	Humanities	Practical Studies
General Engineering	√	√
Hydraulic, thermal and cooling systems	√	√
Electrical Engineers	√	
Electrical installations	√	√
Electric machinery, automation and control systems	√	√
Domestic appliances, cooling and air conditioning		√
Civil engineering and architecture		√
Civil engineering	√	
Architecture	√	
Building construction		√
Carpentry - Furniture manufacturing		√

Source: Build up skills Cyprus, July 2012, Analysis of the current situation

The apprenticeship scheme lasts for two years and is addressed to young people who have not completed their secondary education and who wish to be employed in technical professions. The professions available in the apprenticeship scheme are determined each year, depending on the available classrooms and teaching staff. By decision of the Council of Ministers, the New Modern Apprenticeship was launched in November 2007, aiming to address the needs of the economy by increasing skilled labour. Some of the scheduled changes involve the increase of the age limit of apprentices from 18 years to 25 years of age and ensuring mobility in education. The New Modern Apprenticeship is scheduled to be fully implemented in 2015 and it is expected to reverse the downward trend in the number of graduates of the apprenticeship scheme over recent years.

The Secondary Technical and Vocational Education Institutes (STVEIs) started operating in the school year 2012-2013 and offer one-year or two-year initial training to young people who wish to acquire, improve and upgrade their professional skills. The professional specialisations offered at the STVEIs also include specialisations related to the energy efficiency of buildings, such as technicians for domestic automation and for PV installation and maintenance. In addition, the Human Resources Development Authority of Cyprus offers intensive initial training programmes which last 21 to 25 weeks and include both theoretical and practical training by a vocational training institute, with regard to professions that are currently in demand by the labour market. In these programmes, priority is given to the long-term unemployed. These programmes also include training for construction workers, plumbers, framed structure manufacturers and building electricians.

The continuous education and training of building element installers is offered through the afternoon and night courses of technical schools. Adult professionals are given the opportunity to attend one-year training programmes leading to the acquisition of a certificate or three-year training programmes leading to the acquisition of a certificate equivalent to the technical school diploma. In addition, a series of specialised training programmes addressed to building technicians are provided by public and private training establishments. These programmes are approved and financed by the Human Resources Development Authority of Cyprus and participants are given a certificate of attendance.

An assessment of qualitative and quantitative needs in skilled technicians in the construction sector, required for meeting the relevant 2020 national targets on energy and buildings, has been carried out in the context of the programme 'Build up skills – Cyprus'. The following skills have been identified [33]:

i. Installing and maintaining biomass systems;

ii. Installing and maintaining heat pumps and shallow geothermal systems;

iii. Installing and maintaining photovoltaic systems;

iv. Installing and maintaining solar-thermal systems for domestic hot water;

v. Installing and maintaining solar-thermal systems for heating and air conditioning;

vi. Installing conventional heat insulation/thermal plaster;

vii. Installing an external thermal insulation system;

viii. Fitting framed structures;

ix. Fitting solar protection systems;

x. Installing and maintaining central or other heating systems;

xi. Installing and maintaining cooling and air conditioning devices;

xii. Installing and maintaining mechanical ventilation systems;

xiii. Installing and maintaining automations and electronic systems for monitoring and controlling central heating systems as well as cooling and air conditioning devices, including BMS.

The programme's results identify the obstacles in the qualitative and quantitative improvement of installers and propose ways to address them [33]. The most important problems and the ways to address them are set out below:

i. **Lack of regulation in technical professions:** The only technical professions related to the energy efficiency of buildings which are currently regulated are electricians and refrigeration technicians. The implementation of the legislative measures set out in paragraph 4.1 is expected to resolve the issue of insufficient regulation. Note that according to Article 16 of Directive 2012/27/EU on energy efficiency, where a Member

State considers that the national level of technical competence, objectivity and reliability of installers of energy-related building elements is insufficient, it may establish certification and/or accreditation schemes for installers of structural elements which affect the energy performance of the building [1]. The draft law for harmonisation with EU law, which was submitted by the Ministry of Energy, paves the way for the certification and/or accreditation of professions which are not covered by the Laws on the energy efficiency of buildings and RES, such as thermal insulation and fitting framed structures. The Professional Qualification Standards (PQS) for the construction industry established by the Human Resources Development Authority of Cyprus will contribute to this goal. The Professional Qualification Standards set out the knowledge that installers should have. Those who wish to do so, will be able to attend an examination for the certification of their professional qualifications.

ii. **Financing:** Companies of the construction industry have been severely affected by the ongoing economic crisis. Therefore, they are unable to allocate financial resources to training. A high number of layoffs has been recorded in the sector in recent years, which creates a climate of precarious employment thus rendering any effort to improve and/or acquire knowledge and skills untimely. In addition, many installers are self-employed and do not contribute to the Human Resources Development Fund. As a result, they are not entitled to financing for attending professional seminars approved by the Human Resources Development Authority of Cyprus. In order to address this situation, the Ministry of Labour and Social Insurance, in cooperation with the Human Resources Development Authority of Cyprus, has implemented in recent years a series of programmes which are co-financed by EU and national funds. The aim of these programmes is to provide training to unemployed persons through intensive training programmes or through their temporary employment by employers who participate in the programme, in sectors of the economy where there appears to be a need for specialised workers.

iii. **Technical vocational education and training infrastructures and educators:** Educators and training spaces must be in line with the technical developments in the sector of the energy efficiency of buildings and must take into account market demand. Educators

must constantly enrich their knowledge on new technologies, whereas the number of educators and the degree of their specialised knowledge in building renovation are currently unknown. In some cases the laboratory infrastructure of educational establishments of the public and private sector is obsolete and, therefore, it must be assessed and upgraded, where necessary.

4.4 Awareness-raising measures

The energy status of buildings affects all citizens of Cyprus, as we all use buildings either as a place of residence or workplace or to receive certain services. The knowledge of the general public on building energy efficiency appears to have been improved over the past 10 years, through the different synergies implemented, such as grant schemes and legislative measures, whereas the increase in energy prices has contributed significantly in this regard. However, many citizens are not aware of the energy consumption of their building and the related costs. Even in cases where this information is known, it is difficult to assess and, even more, to identify the causes of energy wastage in order to offer the best possible solutions.

The Energy Performance Certificate aims to inform the interested parties on the energy status of a building. However, it is required only during the construction, sale or rental of buildings thus excluding the largest part of the building stock especially in sectors like residences, where the majority of buildings are owned by the residents. In addition, although the presentation of an Energy Performance Certificate is mandatory during sale and rental, many potential buyers and tenants ignore its existence and, as a result, they receive it after agreeing on the sale or rental, or not at all. The Ministry of Energy is carrying out various awareness-raising campaigns on the Energy Performance Certificate. However, it is acknowledged that this effort must be continuous and more intensive as the general public needs time in order to realise that the submission of the Energy Performance Certificate during sale or rental is necessary and beneficial. Awareness raising on the Energy Performance Certificate must involve all stakeholders, namely building owners, tenants, potential buyers, real estate agents and property surveyors. The experience of previous years has shown that awareness-raising efforts must focus more on potential buyers and tenants as they are the only stakeholders that assume the energy costs, for whom the Energy Performance Certificate is a reliable source of information.

The installation of smart meters is a measure which is expected to improve awareness among all building users (tenants and owners) with regard to energy consumption. According to Article 9 of Directive 2012/27/EU on energy efficiency Member States shall ensure that final energy users are provided with individual meters that accurately reflect the final customer's actual energy consumption and that provide information on actual time of use [1]. According to the experience of other countries throughout the world, innovative systems that combine advanced telemetering and communication technologies [the so-called Advanced Metering Infrastructure (AMI)] can significantly improve the cost-effectiveness and productivity of electricity transmission and supply. For this reason, the EAC is currently at the first stage of implementing an AMI project involving 3 000 meters in order to explore the technical and economic parameters of the full implementation of such a system and to prepare a cost-benefit analysis.

In addition, according to Article 10 of the same Directive, retail energy sales companies must provide information to consumers upon billing, such as a comparison of current consumption with consumption during the same period of the previous year, as well as energy-saving advice [1]. Historical consumption may be provided to consumers upon request. The EAC, which is the only electricity supplier in Cyprus, already provides a large part of the information set out in Article 10, although information upon billing is expected to be further improved with the full transposition of the Directive in 2014. The transposing legislation will cover the remaining aspects of energy sales to final consumers, i.e., oil companies, which currently provide very limited information on consumption and savings when billing.

Information on energy consumption and the relevant costs is certainly the first step for encouraging building owners to adopt energy-saving measures. The second step is to identify the most cost-effective technical solutions. Some examples are provided in Chapter 3. However, each building has its own particularities and must be examined individually. Due to the lack of adequate information, building owners often seek solutions by resorting to suppliers of energy saving materials and technologies or RES systems, who often lack objectivity due to their capacity. The problem is even greater in the case of existing buildings applying individual measures, given that contracting the services of a consultant/design engineer is usually avoided. The purpose of Energy Auditors is to compensate for this shortage of independent and well-documented recommendations for owners. The same purpose is served by the Specialised Experts through the issuance of Energy Performance

Certificates and recommendations on existing buildings, without requiring the same level of analysis, which perhaps allows for easier adoption in cases where financial resources are limited, whereas, specifically for cooling and heating systems, relevant advice can be offered by Inspectors, serving as independent experts. Local Administration can play an important part in this sector. A salient example is the Municipality of Nicosia, where the Municipality subsidises 50% of the 'energy wastage control' costs, as it calls it, for Controls are performed by the Cyprus Energy Agency, usually do not last more than an hour and consist mainly of a discussion on the habits of owners with regard to energy use. At the end, owners are able to identify the areas where there is wastage of energy and ways to address it.

In cases where buildings are used as professional premises, it is necessary to provide information to workers. Energy Savings Officers have been appointed in buildings of the public sector since 2009. Energy Savings Officers are persons working in these buildings. Every year they prepare an energy consumption report, they compare energy consumption with previous years and they record the energy saving efforts made in the period under consideration. The Ministry of Energy informs and guides these officers and provides them with information material that they then distribute to their colleagues. Until 2012, the Ministry used to organise an annual event on public buildings attended by all energy savings officers for their information and the exchange of views. Due to the increase in the number of officers, since 2013 the event has been replaced by meetings, organised per district and per ministry, with up to 30 participants. This offers them better assistance in their tasks and provides them with opportunities to cooperate. Similar actions are undertaken in local authorities implementing SEAPs. The Environmental Officers of the Hellenic Bank are a similar measure adopted in the private sector. One worker in each branch is appointed as Environmental Officer. These workers are being informed on energy issues and then provide information to their colleagues. Aiming to a greater involvement of workers, the bank launched the 'energy saving championship' in 2014, where branches compete with each other for the greatest reduction in energy consumption within the year [18]. Information measures at the workplace have a multiplier effect, as the knowledge gained by workers is transferred to their homes, whereas they become a source of information for their relatives and friends.

5. Perspectives of the investment decisions of individuals, the construction industry and financial institutions.

The rate of renovations and the amount of energy savings achieved with each renovation will depend on the amount of investments made in this sector in the next years. Investments in the renovation of buildings leading to the reduction of energy consumption are often hindered by focusing on initial capital expenditure without taking account of the benefits and high payback time. Timely and well-documented information will allow investors to make decisions on the implementation of cost-efficient renovations. Issues related cost-efficient approaches to renovations, awareness-raising and the wider benefits arising therefrom are analysed in other parts of this document. However, even if these obstacles are addressed, in most cases, the lack of financing remains the most important impediment. The current and potential investors in the sector of building renovation are set out below, along with the challenges and perspectives they face:

i. **Natural persons:** Natural persons who use buildings and are charged with energy bills have a direct interest in reducing energy consumption. There is great interest for energy savings in residences, whereas, in most cases, the residents are also the owners. However, the reduction of incomes and the lack of access to credit prevent households from investing in energy saving measures. The financing difficulties faced by natural persons are mitigated, to a certain extent, through the grant schemes of the Special Fund, whereas the new form of the scheme will facilitate significantly the financing of major renovations. Owners of small units can gradually improve the energy efficiency of their buildings with small targeted interventions that will reduce the initial capital expenditure and achieve short payback times. For instance, when the life cycle of a technical system ends and it is replaced by a system having a much higher energy efficiency, then the additional costs arise only from the cost difference between the highly efficient system and the conventional system. However, even in gradual energy improvements a minimum economic and technical planning is required, so that even small capital resources may achieve the greatest possible return. For this reason, owners must be advised by independent experts. In the cases where natural persons are not charged with energy costs, e.g. if they rent their building, the investment must be translated into an increase in the real estate's value. Investments in the energy improvement of buildings may bring economic benefits to owners, if they are adequately promoted when the building is for rent. This may be highly effective in the case of real estate property located in

areas with increased competition. In addition, it should be noted that energy efficient buildings reduce the energy costs borne by tenants, thus allowing them to be able to pay the rent even in difficult economic periods. When households and SMEs are in economic distress, they opt for paying the electricity bill instead of the rent given that electricity supply to persons who do not pay their bills is immediately cut-off, whereas the eviction of a tenant is much more complicated.

ii. **Companies - building owners:** Buildings like offices, hotels and private hospitals are an important asset for every company that owns them. The investments made by a company in energy saving measures may significantly reduce its operating costs and increase its profitability. In many cases, these investments are not made, as companies opt for allocating resources under their budget to other investment proposals which may bring more profits. For the successful implementation of energy saving investments the enterprise's financial management must be presented with sufficient and well-documented information. The procedure starts with collecting consumption data, for instance through the organisation's technical department and/or by appointing staff-members as competent persons on energy issues, following the example of Energy Savings Officers in the public sector. This must be followed by an assessment of the energy status and the identification of areas where interventions can be made to reduce energy consumption. This may be done either by using the methods available in the market, e.g. through energy audits and the issuance of an Energy Performance Certificate, or within the organisation itself if possible. This process must result to the preparation of a list of proposed investments along with their expected return so that the company's management may be able to make choices and create a plan for energy interventions and savings. Investments in the energy upgrading of buildings may have an additional value for enterprises if they are incorporated in the social corporate responsibility policy of the organisation. Due to their limited financial resources, companies are required to make choices with regard to the sectors in which they are going to invest, as is the case for all their activities. Investments in the energy performance of a company's building, accompanied by a high energy class indication in the Energy Performance Certificate or any other type of energy and environmental labelling, such as Eco-Label, will improve the company's image towards the environment and the society, while increasing the economic viability of the company itself. Corporate responsibility actions that add value to the company last longer and are more likely to succeed, as they are usually applied more zealously and decisively by the organisation's executives.

iii. **Companies active in the building and energy sectors:** Construction companies are those that will carry out major building renovations. However, they must cooperate with many other types of businesses, such as traders of construction materials and structural elements, manufacturers of construction materials and companies replacing technical systems and RES systems. These companies could finance themselves the capital expenditure, which will be repaid gradually, provided that they have own capitals or easier access to financing. In this way, these companies will be able to easily attract customers as they will address the latter's difficulty to access financing and establish a climate of mutual trust. Given that access to capital is often determined by a company's size, the establishment of consortia in the sector will contribute to this effect, promoting at the same time the development of synergies and the exchange of know-how. The promoted legislative arrangements for Energy Service Providers and Energy Performance Contracts aim at creating a favourable business environment for the creation of consortia by different company types involved in building renovation. Energy Service Providers are unable to resolve the problem of financing but may contribute to its resolution, as there are different models of Energy Service Providers, for some of whom financing is a major burden and for others, it is simply non-existent. Cypriot enterprises may learn from Energy Service Providers which have been operating for years in the EU and even explore potential cooperation with them.

iv. **Financial institutions:** Financial institutions have been severely affected by the economic crisis. As a result, they have reduced lending, to the detriment of the construction sector. On the other hand, the reduction in new construction gradually increases interest in renovations. At the same time, the new economic environment obliges banks to give loans only to persons and companies able to repay them. Building renovations, which lead to a significant reduction of operating costs by reducing energy consumption, may be regarded as reliable investments by financial institutions. The results of the energy audit and the Energy Performance Certificate may be used as favourable elements for obtaining loans in the case of major renovations, in addition to the common practices followed by banks in providing financing for an investment. There are financial institutions that grant loans under favourable terms to individual energy-saving and RES measures on buildings, when they are approved for subsidy under the grant schemes of the Special Fund. These products could be further developed through cooperation with Energy Service Providers, energy auditors and other independent experts in order to grant loans to cost-efficient major renovations.

v. **Private investment funds:** The use of investment funds in building renovation has much to offer. At the end of 2012, 129 Cypriot investment service providers operated in Cyprus [34]. Despite the ongoing financial crisis, the interest in creating such companies remains high. In addition, Cyprus has managed to establish a reputation in attracting foreign investment capital, thus gaining significant experience in different professional sectors, e.g., the financial sector, legal consultants and auditors, helping create infrastructures for attracting foreign investments, such as the CIPA. Professional groups, enterprises and organisations, which have as their main task the exploitation of private investment capital, have started to focus on the sector of hydrocarbons and RES in recent years [35]. The sector of building renovation and energy upgrading has remained almost unexplored by large investment funds, whereas the potential of such investments must be examined, especially in relation to large buildings and groups of buildings.

vi. **Public funds:** In recent years, special efforts are being made to reduce public expenditure. As a result, there are no available funds which could be allocated to the energy upgrading of buildings. So far, the implementation of energy-saving measures has been financed by the Special Fund for RES and ES. Financing is expected to be increased by adding certain resources from the 2014-2020 Structural Funds. However, their contribution is expected to fall short of the needs of an ambitious scheme for the energy upgrading and major renovation of the existing building stock. The financing of such projects through large-scale subsidies under public funds would require an increase in taxation (including the contribution to the Special Fund) and/or the imposition of new taxes, something which is certainly not desirable in the current economic context. In the years to come, public financing is expected to be restricted to fulfilling its exemplary role by carrying out the 3% of public building renovations and using public-private partnerships.

6. Estimate of energy savings and wider benefits

The renovation of the existing building stock will definitely lead to savings in energy and money for investors, in so far as it is carried out under the best technical and economic terms. However, it is important to appreciate the benefit of renovations for society as a whole, for instance by increasing the competitiveness of Cyprus' economy, creating employment, enhancing social cohesion and protecting the environment. The potential benefits are related to the number and quality of the

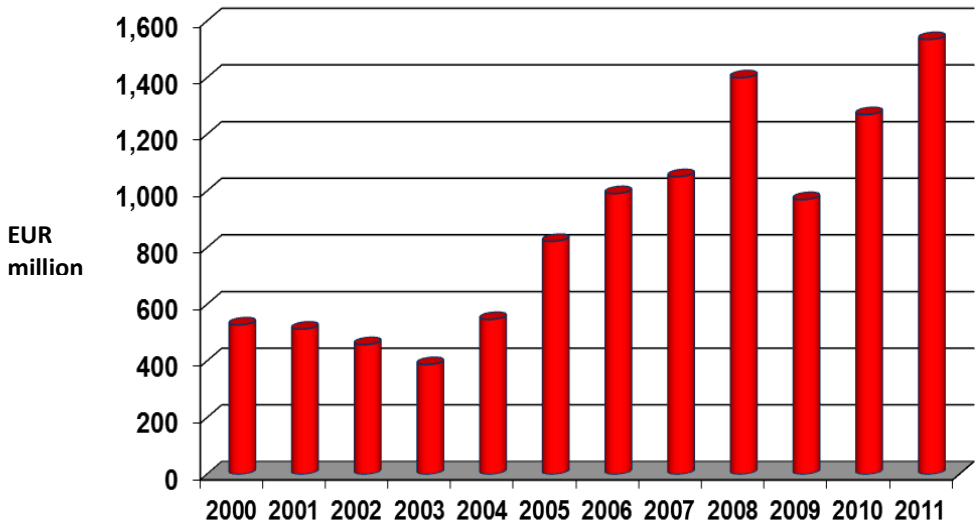
renovations that will be carried out in the next years. These benefits, along with some estimations, are presented below.

6.1 Financial benefits

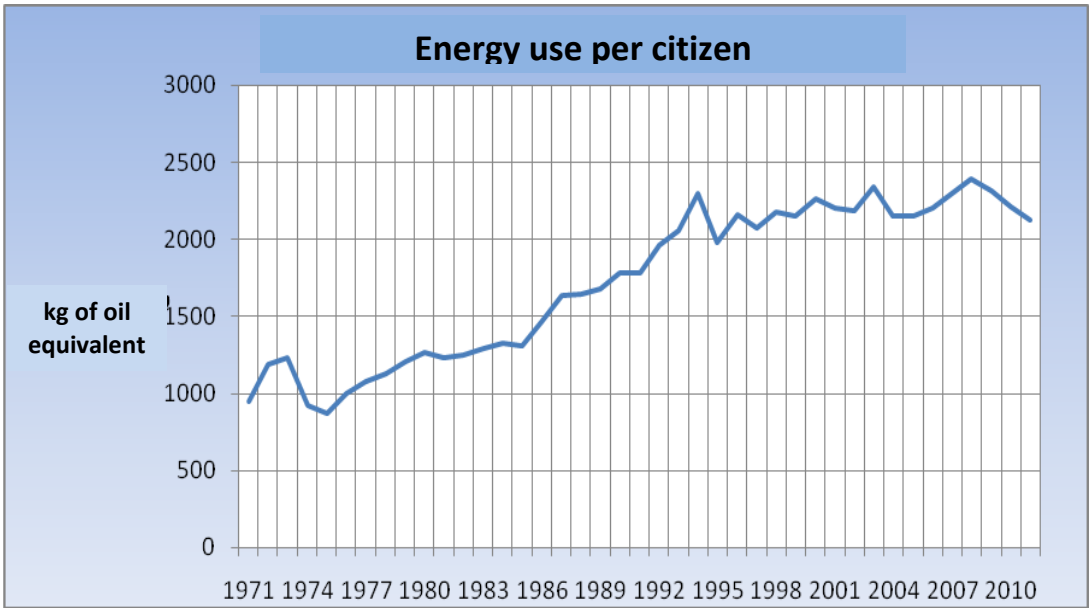
In its estimation of the impact of the implementation of Directive 2012/27/EU on energy efficiency, the European Commission provides that the pursuit of the energy-saving objectives will lead to a further increase of GDP by 2.7% in 2020 as compared to the baseline scenario [36]. The impact of the energy upgrading of the existing building stock on the development of Cyprus' economy has not been assessed yet. However, estimates may be made with regard to its positive impact on individual sectors of the economy.

The cost of fuel imports in 2012 was EUR 1.7 million which corresponds to 30% of Cyprus' total imports [37]. Fuel imports in 2012 alone exceed the total exports of Cyprus which amounted, in the same year, to EUR 1.5 million. As shown in Graph 10, the cost of the energy imported has increased over time, which is partly due to the global increase of oil prices and, mainly, to the fact that the economic growth and improvement of living standards over the past 40 years has been based on the increase of energy intensity. Graph 11 shows the upward trend of energy consumption per capita in the last 40 years [38].

Graph 10 Cost of imported fuels 2000-2011



Graph 11 Energy use per citizen

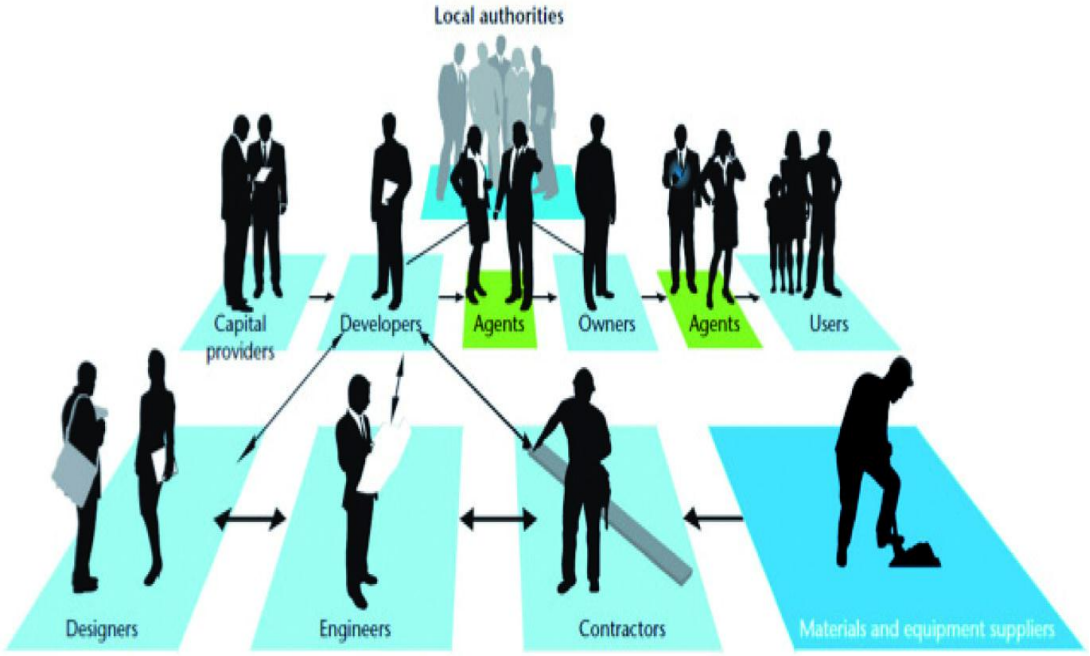


The political will of the European Commission to reduce greenhouse gas emissions by 85 – 90% in 2050 as compared to the emissions of 1990, provides a framework for developing a very ambitious renovations scenario [39]. The economic benefits arising from the renovation of the entire building stock in order to meet the minimum energy efficiency requirements, could bring savings in fuel imports amounting to EUR 300 million per year in current prices, whereas if the building stock is converted to a nearly-zero consumption status, these savings could amount to EUR 450 million per year. Therefore, the number of building renovations, either gradual or major, may play an important part in reducing energy costs for Cyprus and improving the trade balance.

At the level of households, average energy costs for the operation of a building amount to EUR 1 388 per annum, whereas the average family income is EUR 43 080, i.e., in many cases annual energy costs are equal to almost one monthly wage [40]. In addition, the expenses of households for energy products, expressed as a percentage of their income, are expected to increase [41]. Improving the energy efficiency of buildings will allow households to allocate part of their income to the purchase of other services and products, thus bringing multiple benefits to the general economy. Furthermore, the drop in energy consumption will significantly improve the viability of enterprises, especially in those where the energy costs of their building installations make up a large part of their operating costs, e.g., in the hotel and retail sale sector. Benefits from reduced consumption are expected to be proportionally higher for SMEs as compared to large enterprises.

In order to achieve the energy upgrading of buildings, investments must be made by the public and, even more so, by the private sector. Renovating 3% per annum of the total surface of buildings owned or occupied by the central public administration, is estimated to require a budget of EUR 18 million for the period 2014–2020. However, the energy upgrading of private buildings remains the greatest challenge. For instance, note that the energy upgrading of 300 000 permanent residences will require investments amounting to EUR 4.1 billion, whereas the energy upgrading of all buildings in the tertiary sector will require investments amounting to EUR 9.2 billion by 2050. Given that 19 jobs are created for every EUR 1 million, these investments will create thousands of jobs throughout the production chain of the construction industry, covering a wide range of professions [41]. Graph 12 provides a schematic illustration of the main professional groups involved in the renovation of buildings, for which demand will increase depending on the size of investments in the sector [36].

Graph 12 The production chain of building renovation



Source: BPIE, February 2013, A Guide to Developing Strategies for Building Energy Renovation

6.2 Social Benefits

Energy poverty is already an important problem that needs to be addressed through specific actions. One out of seven households in the EU are at risk of poverty, whereas in Cyprus 59 369 consumers

are characterised as vulnerable, 13 981 of which are charged under a special billing regime by the EAC [43]. Incentives to vulnerable consumers are already being implemented (Chapter 4). However, the mobilisation of investments in renovations in the residential sector, which will lead to their significant energy upgrading, will solve this problem for many decades.

The poor thermal comfort conditions of the existing building stock have a negative effect on the quality of life and, in some cases, on the health of their users. According to the World Health Organisation, in some EU countries, the number of deaths due to the insufficient design and construction of buildings is higher than the number of deaths due to traffic accidents [44]. In the EU, deaths in winter are higher by 500 million as compared to the average. According to the World Health Organisation, the increase in the number of deaths depends on the severity of winter conditions in each region. However, this correlation varies as it is also affected by the levels of thermal insulation of the building and its ability to maintain high temperatures in its interior. For instance, the relevant increase in deaths during winter is higher in the United Kingdom as compared to Scandinavian countries, where outdoor temperatures are lower during the winter [45]. In addition, a residence is a symbol of the social position of its residents. Inadequate and poor living conditions increase social exclusion, while often causing concerns related to safety and health. Such concerns affect mental health in the long run. Legislation on energy efficiency does not cover the issue of health and safety in buildings. However, the energy upgrading of existing buildings will increase the quality of interior spaces, living standards and the quality of life.

6.3 Environmental Benefits

Greenhouse gas emissions in Cyprus are almost exclusively due to energy consumption [46]. With the exception of the transport sector, these emissions have increased by 61% in 2011 as compared to 1990 [47]. The building sector consumes one third of final energy consumption and, therefore, it has a significant contribution to the increase of greenhouse gas emissions. Heating and air conditioning alone account for 6.9% of all emissions [48]. The energy upgrading of buildings will reduce significantly the greenhouse gas emissions of buildings. For instance, a 195m_2 residence accounts for 9.7 tonnes of CO_2 per annum, whereas a 1448m2 office building accounts for 135 tonnes of CO2. With the implementation of measures to reduce energy consumption by 56%, CO_2 emissions may be reduced to 5.9 and 70 tonnes, respectively.

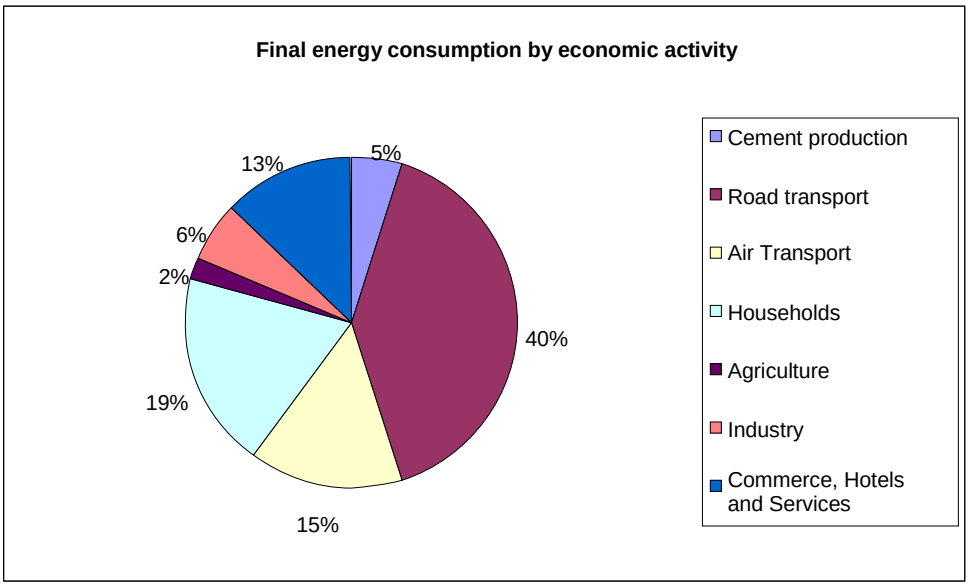
Apart from its contribution in combating climate change, the drop in energy consumption in the building sector will also reduce emissions of other pollutants such as SO_2 , NO_x and other particles which are generated by power plants and heating systems. These emissions have negative effects for the environment and for public health.

6.4 Benefits for Cyprus' energy system

Cyprus' indicative 2020 target involves improving energy efficiency by 14.3%, whereas according to Article 7 of Directive 2012/27/EU on energy efficiency, it is estimated that in the period 2014–2020, savings amounting to 240 000 TOE must be achieved, in addition to the savings resulting from the implementation of the Directives on energy saving [1]. Furthermore, Cyprus must have a RES share in final energy consumption of at least 13% by 2020 [48]. Directive 2009/28/EC on the promotion of the use of energy from renewable sources sets out that 'it will be incumbent upon Member States to make significant improvements in energy efficiency in all sectors in order more easily to achieve their targets for energy from renewable sources' [48]. Therefore, improving the energy efficiency of the existing building stock must be regarded as crucial in achieving the above targets.

The European Commission acknowledges that the increase in the renovation rate of buildings, which will also increase their energy efficiency, is very important for achieving the energy efficiency target [49]. The increase in the energy efficiency of buildings will play an important part in increasing the security of energy supply in Cyprus, as 32% of final consumption is attributed to buildings (Graph 13). The heavy dependence of Cyprus on imported fuels increases the country's dependence on external financial and political factors beyond its control.

Graph 13 Final energy consumption by economic activity for 2012



In addition, the reduction of energy consumption in buildings will reduce the need for new power plants and for the maintenance of large stocks of petroleum products. It is estimated that the pursuit of EU's target for reducing energy consumption by 20% by 2020 will forestall the construction of 1,000 new conventional power plants and will lead to the installation of 500,000 wind turbines [36]. Over the last decade, electricity consumption in Cyprus has increased by an average annual rate of 6.6%, creating the need for new infrastructures for electricity generation and distribution. In addition, according to the Laws on Maintaining Petroleum Product Stocks, minimum stocks of crude oil and/or petroleum products must be maintained in Cyprus and/or other Member States [50]. In 2012, the value of the stocks of the Cyprus Organisation for Storage and Management of Oil Stocks (COSMOS) amounted to EUR 110 million and their storage costs amounted to EUR 12 million [51]. Building infrastructures for electricity generation and the storage of oil stocks requires high capital expenses, whereas the nature of these infrastructures is often contrary to other economic activities, such as tourism, as the land areas available for their development are limited.

7. Conclusions

The renovation and energy efficiency upgrading of the existing building stock is one of the most important tools for meeting Cyprus' obligations in the energy sector and for reducing greenhouse gas emissions. The need to increase the number of renovations becomes even more imperative,

considering the benefits they can bring to building owners, enterprises, public finances and the labour market.

In recent years, energy interventions in buildings have increased, but this number does not correspond to the sector's potential. Further increase in the number of renovations and the improvement of the energy efficiency of buildings after renovation is facing obstacles, mainly relating to financing and information. The adoption of legal measures and incentives and the revision of existing measures is a way to remove these barriers, which, however, is not sufficient by itself. Of the utmost importance is the reaction of stakeholders in the private sector and their ability to take advantage of the challenges that will arise in the years to come.

The drafting process of this document provided an opportunity to discuss and analyse, as far as possible, the problems faced by each professional sector involved in the field of the energy upgrading of buildings. However, the 'Strategy for encouraging investments in the sector of building renovation' should not be regarded as a mere account of the problems and opportunities related to renovations but as the first step, a springboard for bringing together building owners, investors and professionals of the sector, in an effort to maximise the financial and other benefits for all stakeholders. This document will be revised at regular intervals in order to be adjusted to new economic and technical developments.

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ANNEX G: ENERGY SAVINGS PER SECTOR IN FINAL AND PRIMARY CONSUMPTION

Residential Sector

S/N	DESCRIPTION OF MEASURE	IMPLEMENTATION PERIOD	NO OF INVESTMENTS/QUANTITY	GRANT/PURCHASE AMOUNT	END USE ENERGY SAVINGS IN 2012	ENERGY SAVINGS IN 2012 PRIMARY CONSUMPTION	CONTRIBUTION TO THE END USE INDICATIVE TARGET (2016, 185 000 TOE)		CONTRIBUTION TO THE INDICATIVE TARGET FOR PRIMARY CONSUMPTION IN 2020, 375 000 TOE	
					TOE	TOE	TOE	%	TOE	%
1	**Minimum requirements for the energy performance of new dwellings (Law 142/2006)**	2008-2013	0	0	**78 050.3**	**0.0**	**87 101.0**	**47.08%**	**0.0**	**0.00%**
2	**Grant Scheme for energy savings in (existing) dwellings**	2004-2013	27 930	EUR 33 882 837	**10 523.8**	**571.8**	**11 089.2**	**5.99%**	**1 137.2**	**0.303%**
2.1	*Thermal insulation - Walls*	2004-2013	2 224	EUR 33 882 837	**903.0**	**13.2**	**903.9**	**0.49%**	**14.1**	**0.004%**
2.2	*Thermal insulation - Windows*	2004-2013	22 074		**5 332.8**	**41.3**	**5 333.2**	**2.88%**	**41.8**	**0.011%**
2.3	*Thermal insulation - Roofs*	2004-2013	3 632		**4 288.0**	**517.3**	**4 852.1**	**2.62%**	**1 081.4**	**0.288%**
3	**Distribution of free fluorescent lamps**	2007-2010	2 001 748	EUR 2 710 840	**24 358.8**	**15 001.9**	**15 001.9**	**8.11%**	**10 491.0**	**2.798%**
4	**Grants scheme for RES (end use) in the residential sector**	2004-2013	42 922.00	EUR 20 694 929	**13 443.1**	**826.3**	**13 628.0**	**7.366%**	**1 011.1**	**0.27%**
4.1	Autonomous photovoltaics	2004-2013	379	EUR 1 530 037	120.1	44.6	131.8	0.07%	56.3	**0.015%**
4.2	Domestic solar systems	2004-2013	41 521	EUR 10 191 538	12 345.0	406.1	12 515.6	6.77%	576.7	**0.154%**
4.3	Solar space heating/cooling	2004-2013	813	EUR 7 320 710	650.0	282.1	652.6	0.35%	284.7	**0.076%**
4.4	Central active solar water heating systems.	2004-2013	48	EUR 182 203	52.1	15.5	52.1	0.03%	15.5	**0.004%**
4.5.	Solar swimming pool heating systems	2004-2008	51	EUR 166 981	40.6	0.0	40.6	0.02%	0.0	**0.000%**
4.6	Heat pump with ground heat exchanger for space heating and cooling	2004-2011	110	EUR 1 303 460	235.3	77.9	235.3	0.13%	77.9	**0.021%**
5	**Grant Scheme for Net-Metering PV Systems**	2013	40	EUR 107 406	0.0	0.0	47.6	0.03%	47.6	**0.013%**
6	**Net-Metering PV Systems (no grant)**	2013	1 357	EUR -	0.0	0.0	1 624.5	0.88%	1 624.5	**0.433%**
TOTAL				**EUR 57 396 012**	**126 376.0**	**16 399.9**	**128 492.2**	**69.5%**	**14 311.4**	**3.82%**

Tertiary sector

S/N	DESCRIPTION OF MEASURE	IMPLEMENTATION PERIOD	NO OF INVESTMENTS	GRANT/PURCHASE AMOUNT	END USE ENERGY SAVINGS IN 2012	ENERGY SAVINGS IN 2012 PRIMARY CONSUMPTION	CONTRIBUTION TO THE END USE INDICATIVE TARGET (2016, 185 000 TOE)		CONTRIBUTION TO THE INDICATIVE TARGET FOR PRIMARY CONSUMPTION IN 2020, 375 000 TOE	
					TOE	TOE	TOE	%	TOE	%
1	**Green Procurement Action Plan - Public and Broader Public Sector**	**2007-2013**	**66 849**	**EUR 12 392 258**	**667.1**	**598.1**	**337.9**	**0.18%**	**178.4**	**0.048%**
1.1	Fluorescent lights in the public sector	2007-2013	22 856	EUR 29 068	264.9	264.9	0.0	0.00%	0.0	0.000%
1.2	Installing air conditioners in the public sector	2007-2013	1 842	EUR 890 742	74.9	46.8	84.8	0.05%	37.1	0.010%
1.3	Replacing air conditioners in the public sector	2007-2013	1 353	EUR 707 761	78.9	38.0	99.0	0.05%	42.3	0.011%
1.4	Installation/Replacement of VRV HEAT PUMP CHILLERS in the Public Sector	2010-2013	25	EUR 663 334	83.1	83.1	137.2	0.07%	82.1	0.022%
1.5	Replacing computers in the public sector	2007-2013	19 918	EUR 8 420 399	122.1	122.1	0.0	0.00%	0.0	0.000%
1.6	Replacing computer monitors in the public sector	2007-2013	20 846	EUR 1 596 776	36.5	36.5	0.0	0.00%	0.0	0.000%
1.7	Replacing boilers in the public sector	2010-2013	9	EUR 84 178	6.7	6.7	16.9	0.01%	16.9	0.005%
2	**Grants schemes for energy savings and RES for the public sector and general government**	**2004-2013**	**3**	**EUR 37 908**	**110.2**	**0.0**	**110.2**	**0.06%**	**0.0**	**0.00%**
2.1	*Grants schemes for energy savings for the public sector and general government*	2004-2013	3	EUR 37 908	110.2	0.0	110.2	0.06%	0.0	**0.000%**
3	**Minimum requirements for the energy performance of new buildings in the tertiary sector (Law 142/2006)**	2008-2013	0	EUR -	**7 710.1**	**0.0**	**8 890.5**	**4.81%**	**0.0**	**0.000%**
4	**Grants Scheme for (end-use) energy savings in the tertiary sector (existing buildings)**	**2004-2013**	**371**	**EUR 4 384 647**	**10 331.6**	**745.5**	**10 293.5**	**5.56%**	**768.0**	**0.205%**
5	**Grants scheme for RES (end-use) in the tertiary sector/Enterprises.**	**2004-2013**	**160**	**EUR 2 347 289**	**1 177.4**	**84.7**	**1 177.4**	**0.64%**	**84.7**	**0.023%**
5.1	Autonomous photovoltaics	2004-2013	11	EUR 56 704	7.0	2.3	7.0	0.00%	2.3	**0.001%**
5.2	Solar space heating/cooling	2004-2013	26	EUR 507 460	76.7	19.5	76.7	0.04%	19.5	**0.005%**
5.3	Central active solar water heating systems.	2004-2013	111	EUR 811 604	352.6	62.9	352.6	0.19%	62.9	**0.017%**
5.4	*Solar swimming pool heating systems*	2004-2008	9	EUR 56 049	32.4	0.0	32.4	0.02%	0.0	**0.000%**
5.5	*Heat pump with ground heat exchanger for space heating and cooling*	2004-2011	3	EUR 915 472	708.5	0.0	708.5	0.38%	0.0	**0.000%**
TOTAL			67 383.00	EUR 19 162 102	19 996.36	1 428.30	20 809.4	11.2%	1 031.1	0.3%

Industrial sector

S/N	DESCRIPTION OF MEASURE	IMPLEMENTATION PERIOD	NO OF INVESTMENTS	GRANT/PURCHASE AMOUNT	END USE ENERGY SAVINGS IN 2012	ENERGY SAVINGS IN 2012 PRIMARY CONSUMPTION	CONTRIBUTION TO THE END USE INDICATIVE TARGET (2016, 185 000 TOE)		END USE ENERGY SAVINGS IN 2012	
					TOE	TOE	TOE	%	TOE	%
1	**Grants scheme for energy savings (existing undertakings)**	**2004-2013**	**86**	**EUR 1 537 659**	**2 922.9**	**649.7**	**2 722.2**	**1.47%**	**649.7**	**0.173%**
2	**Grants scheme to encourage the use of RES (end-use) in the industrial sector and agriculture 2004-2013.**	**2004-2013**	**54**	**EUR 230 243**	**30.0**	**5.3**	**30.7**	**0.017%**	**6.1**	**0.00**
2.1	Solar space heating/cooling	2004-2013	1	EUR 49 280	9.5	0.0	9.5	0.005%	0.0	0.000%
2.2	Central active solar water heating systems.	2004-2013	6	EUR 13 779	5.5	0.0	5.5	0.003%	0.0	0.000%
2.3	Independent photovoltaic systems - Lighting	2004-2013	11	EUR 11 472	1.6	1.6	1.6	0.001%	1.6	0.000%
2.4	Independent photovoltaic systems (agriculture)	2004-2013	36	EUR 155 712	13.4	3.8	14.1	0.01%	4.5.	0.001%
TOTAL			140.00	EUR 1 767 902	2 952.9	655.1	2 752.9	1.49%	655.79	0.17%

Transport sector

S/N	DESCRIPTION OF MEASURE	IMPLEMENTATION PERIOD	NO OF INVESTMENTS	GRANT/PURCHASE AMOUNT	END USE ENERGY SAVINGS IN 2012	ENERGY SAVINGS IN 2012 PRIMARY CONSUMPTION	CONTRIBUTION TO THE END USE INDICATIVE TARGET (2016, 185 000 TOE)		END USE ENERGY SAVINGS IN 2012	
					TOE	TOE	TOE	%	TOE	%
1	**Grants Scheme for energy saving in transport (purchase of hybrid vehicles, electric vehicles and low-emissions vehicles), 2004-2009.**	2006-2009	3 092.00	EUR 2 611 923	1 073.5	0.0	1 073.5	0.580%	0.00	**0.000%**
1.1	Hybrid vehicles	2006-2009	831	EUR 997 338	352.8	0.0	352.8	0.191%	0.00	**0.000%**
1.2	Electric vehicles	2006-2009	32	EUR 22 566	19.9	0.0	19.9	0.011%	0.00	**0.000%**
1.3	Vehicles with carbon dioxide emissions below 120g/km	2006-2009	2 229	EUR 1 592 019	700.8	0.0	700.8	0.379%	0.00	**0.000%**
2	**Vehicle scrapping plan.**	2008-2011	4 072	EUR 5 785 055	2 822.8	167.0	2 822.8	1.526%	167.05	**0.045%**
3	**TRANSPORT ACTION PLAN**	2007-2012	-	-	63 311.7	83 703.0	-	-	-	-
TOTAL			7 164	EUR 8 396 978	67 208.0	83 870.0	3 896.3	2.11%	167.05	0.04%

OTHER MEASURES

S/N	DESCRIPTION OF MEASURE	IMPLEMENTATION PERIOD	NO OF INVESTMENTS	GRANT/PURCHASE AMOUNT	END USE ENERGY SAVINGS IN 2012	ENERGY SAVINGS IN 2012 PRIMARY CONSUMPTION	CONTRIBUTION TO THE END USE INDICATIVE TARGET (2016, 185 000 TOE)		END USE ENERGY SAVINGS IN 2012	
					TOE	TOE	TOE	%	TOE	%
1	REPLACEMENT OF APPLIANCES (WASHING MACHINES, AIR CONDITIONERS, REFRIGERATORS, ETC) - ECODESIGN DIRECTIVE	2020-2013	0.00	0.00	5 535.0	5 535.0	7 207.0	3.896%	5 000.00	**1.92%**
TOTAL					5 535.0	5 535.0	7 207.0	0.04	7 207.0	1.92%

TOTAL - ALL SECTORS

S/N	DESCRIPTION OF MEASURE	IMPLEMENTATION PERIOD	NO OF INVESTMENTS	GRANT/PURCHASE AMOUNT	END USE ENERGY SAVINGS IN 2012	ENERGY SAVINGS IN 2012 PRIMARY CONSUMPTION	CONTRIBUTION TO THE END USE INDICATIVE TARGET (2016, 185 000 TOE)		END USE ENERGY SAVINGS IN 2012	
					TOE	TOE	TOE	%	TOE	%
TOTAL - ALL SECTORS				EUR 86 722 995	222 068.2	107 888.3	163 157.8	88.2%	23 372.3	6.233%

ANNEX H: UPDATE OF NATIONAL ENERGY FORECASTS FOR THE REPUBLIC OF CYPRUS

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1. Introduction

This report presents an update of the national energy forecasts for the Republic of Cyprus that were carried out with the latest version of the 3EP/CUT energy forecast model. These forecasts are intended to be used by national authorities in the submission of the updated National Energy Efficiency Action Plan and the updated National Renewable Energy Action Plan to the European Commission.

Since the last submission of these Action Plans in year 2011, both the macroeconomic environment of Cyprus and the EU-wide regulatory environment in energy issues have changed considerably. In the macroeconomic front, after the dramatic events of March 2013 and the requirements for fiscal adjustment as well as downsizing and restructuring of the domestic banking sector in order to attain sustainable levels of public debt in the medium term, an economic and financial adjustment programme for Cyprus was agreed between the national authorities and the Troika (European Commission, European Central Bank and International Monetary Fund); this led to the signature of a Memorandum of Understanding on 2 April 2013. This adjustment programme assumed a strong contraction of the national economy in years 2013-2014 – mainly due to significant decreases in private and public consumption as well as fixed investment – and a slow rebound of economic growth from 2015 onwards. After a re-examination of this programme in November 2013 and February 2014, some further revisions of the troika's macroeconomic projections have been made.

As far as the regulatory environment is concerned, an important change has been brought about by the EU's "Energy Efficiency Directive" (2012/27/EU). This Directive, pursuing the overall objective of saving 20% of the EU's primary energy consumption by 2020, calls (among other measures) for energy-efficiency-oriented renovations in the existing building stock – with specific obligations for governmental buildings in all EU Member States – and for specific energy savings to be attained by energy distributors or retail energy sales companies or by taking other policy measures to achieve energy savings to final energy users.

The national energy forecast model calculates future annual energy consumption in each major economic sector of Cyprus (agriculture, cement industry, other industry, households, services, road passenger transport, road freight transport and air transport) as a function of future macroeconomic variables and future energy prices. Simultaneously it calculates fuel shares in each sector, depending on technology costs (investment, operation, maintenance and fuel 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.

2. Macroeconomic and oil price assumptions

Table 1 presents the basic macroeconomic assumptions up to the year 2020 that have been used in this study. Aggregate indicators, i.e. GDP and private consumption, are in line with the European Commission's winter macroeconomic forecast that was published in February 2014[31]. Economic output has declined substantially in 2013 and is projected to fall considerably in 2014 as well. According to this outlook, after some rebound in subsequent years, real GDP may only reach in 2020 the level that was recorded in year 2007. Although the adjustment programme is generally expected to affect services more strongly than other sectors of the economy, there are still vague indications about a potential change in the structure of GDP; in fact, some subsectors of the tertiary sector have turned out to be less vulnerable to the adjustment than initially expected. As the published macroeconomic forecasts do not include projections for the evolution of sectoral GDP shares, we assumed modest changes in sectoral contributions to GDP until 2020.

As regards the evolution of crude oil prices, which also affect the energy outlook of Cyprus, this study has adopted the latest oil price forecasts published by the International Energy Agency in November 2013[32]. According to the IEA's medium forecast ('New Policies Scenario'), crude oil price is expected to increase slightly and reach $113 per barrel in 2020 (at constant prices of year 2012) with a further increasing trend in later years.

3. Energy efficiency scenarios

To simulate the effect of energy efficiency measures on national energy consumption, the two available scenarios from earlier national Action Plans ('reference' and 'additional energy efficiency' scenario respectively) have been updated. The two scenarios contain different assumptions with regard to the implementation of energy efficiency measures in the various sectors of the Cypriot economy. Such measures include:

- 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), the Directive on energy performance of buildings (2010/31/EC), and the recent Energy Efficiency Directive (2012/27/EU); and

[31] European Commission, *European Economic Forecasts – Winter 2014*. Report 'European Economy' No. 2/2014, KC-AR-14-002-EN-N, Brussels, 2014. http://ec.europa.eu/economy_finance/eu/forecasts/2014_winter_forecast_en.htm

[32] International Energy Agency, *World Energy Outlook 2013*. Paris, France, ISBN: 978-92-64-20130-9.

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

More specifically:

- The 'reference' scenario 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. It has to be noted that this scenario is not identical with the corresponding 'reference scenario' that was used in the NEEAP of Cyprus of 2011 because this scenario incorporates the latest macroeconomic and energy price developments as described in Section 2 of this report.

- The 'additional energy efficiency' scenario assumes 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' and the 'Energy Efficiency Directive' at EU level, and some modest adoption of further legislation on near-zero energy buildings later in this decade.

As regards the fuel shares in each end-use sector, for both scenarios described above, the energy model calculates with dynamic recursive equations – for each future year – the allocation of final energy demand among different fuels. For this purpose, the uptake of different technologies/fuels by sector is simulated, based on each technology's costs as well as on the technically exploitable potential of each technological option. For this purpose, detailed technical information was obtained from the Cyprus Energy Service and the Cyprus Institute of Energy on the basis of earlier specialised sectoral studies and data collected in the frame of national grant schemes for investments in energy efficient and renewable energy technologies. In principle it was assumed that no drastic changes in the fuel mix of final energy consumption will take place until 2020, apart from some shifts towards renewable energy forms (including biomass and biofuels) to ensure compliance with related EU legislation.

4. Power Generation

The electricity sector is not modelled explicitly by our energy model in its current form; however, the model's projections for final electricity demand by sector and scenario are combined with official forecasts of the power generation sector, and fuel inputs for power generation are then calculated on the basis of appropriate assumptions.

For the purpose of this energy scenario update, the governmental power generation forecast (developed by the Transmission System Operator in April 2013 and adopted by the Energy Regulatory Authority in June 2013) was not used as such. Without explicitly modelling electricity demand as a function of economic and technology variables, that forecast has implicitly assumed that electricity use will strongly decline in the coming years, perhaps as a result of energy efficiency improvements or changes in consumer behaviour. Such strong assumptions, however,

would be inconsistent with the evolution of demand for other fuels as projected by our model. Hence we opted to use the electricity demand forecasts of our model, therefore the power generation forecasts of year 2020 shown for the two scenarios of this report are higher than the official forecast: by 26% in the 'reference scenario' and by 15% in the 'additional energy efficiency scenario'.

As regards fuel inputs in power generation, in line with the definition of the two scenarios that was used in the NEEAP of Cyprus of 2011, the 'reference scenario' assumes that natural gas will not penetrate in power generation of the country until 2020, whereas the 'energy efficiency scenario' was calculated by assuming that natural gas will enter the market in 2016, as foreseen by national authorities in November 2013.

In both scenarios it was assumed that renewable electricity generation will reach the levels foreseen by the official Renewable Energy Action Plan of 2010, i.e. 101 ktoe in the year 2020.

Thermal efficiency of power generation in the case with natural gas was calculated on the basis of earlier official forecasts of the Cyprus Energy Regulatory Authority. Overall thermal efficiency of non-renewable power plants is forecast to increase considerably thanks to the introduction of natural gas form 2016 onwards, up to 49.2% in 2020. 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 case of no natural gas penetration (i.e. in the 'reference scenario'), it was assumed that the thermal efficiency of non-renewable power plants will improve slightly over the years. 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.

5. Detailed Results

Tables 2 and 3 present the energy demand forecasts by fuel up to the year 2020, for the economic sectors falling under the 'heating and cooling' category (households, cement industry, rest of industry, services and agriculture) for the 'reference scenario' and the 'additional energy efficiency scenario' respectively. Tables 4-5 display the corresponding results for the transport sectors (road passenger, road freight and air transport). Table 6 presents the total national energy consumption forecasts for the two scenarios, while Table 7 shows the resulting energy savings that can be used in the updated National Energy Efficiency Action Plan of Cyprus.

When comparing these projections with the forecast of NEEAP 2011, four points stand out. First, it is evident from Table 7 that Cyprus can attain in relative terms essentially the same energy savings (14.5%) as those foreseen in the NEEAP 2011. This is possible thanks to the current implementation level of EU regulatory initiatives, and despite strongly declining energy consumption up to 2015 as a result of the serious economic recession of years 2012-2015, which brings the reference energy consumption in 2020 to 2575 ktoe – 20% down from 3219 ktoe of the reference scenario of NEEAP 2011.

Second, according to Table 7 when compared with the corresponding results of NEEAP 2011, the buildings sector contributes more to energy savings in the current Action Plan, while the potential energy savings in transport have been revised downwards, in line with information provided by national transport authorities. This means that if more stringent or aggressive measures were taken in the transport sector (mainly as regards promotion of public transport and early adoption of more fuel-efficient and low-CO_2 cars and trucks), the relative energy savings could be clearly higher than in NEEAP 2011. In the absence of such measures, however, and assuming that transport-related measures will only involve the adoption of EU Directives and Regulations, the result of Table 7 seems to be a plausible evolution until 2020.

Third, the absolute figure of energy savings to be attained in the 'energy efficiency scenario' is markedly lower than in the earlier NEEAP – 375 toe as opposed to 463 toe in the 2011 Action Plan. This should not be surprising since the projected national energy consumption, as illustrated in Figure 1, is considerably lower. When total demand for energy declines, as a result of lower incomes and reduced economic activity, the savings that can be obtained with the aid of energy efficiency measures will inevitably be lower as well. Energy intensity drops considerably in the current 'energy efficiency scenario', albeit less fast than foreseen in the corresponding scenario of NEEAP 2011: the economic recession, reinforced by limited capital investment expenditure and lack of adequate public funds, leads to delays in the expansion of new activities utilizing modern energy technologies and slower adoption of energy efficient technologies in both the existing and new stock of buildings and equipment. Thanks to the increasingly stringent energy efficiency regulations as foreseen in EU legislation, particularly in the buildings sector, the economic crisis is not expected to cause a serious setback in the progress towards a more energy efficient economy.

Finally, in contrast to the 'energy efficiency scenario' of the NEEAP of 2011, where most of the savings came from the introduction of natural gas in the energy system, in the current scenario almost half of the total savings (182 ktoe) can come from energy saving measures in end-use sectors and the other half (192 ktoe) from additional savings in primary energy consumption due to the use of natural gas in power generation. Again, this has to be attributed to the stronger efficiency improvements in the buildings sector, while the reduced needs for electricity in the current scenarios constitute the improvements thanks to natural gas somewhat less important than in NEEAP 2011.

Table 1: Macroeconomic assumptions for Cyprus as of March 2014.

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Real GDP (mio Euros at 2005 prices)	15106	15172	14806	13932	13264	13383	13633	13953	14259	14527	14790
Annual growth rate of GDP:	*1.3%*	*0.4%*	*-2.4%*	*-6.0%*	*-4.8%*	*0.9%*	*1.9%*	*2.3%*	*2.2%*	*1.9%*	*1.8%*
Real private consumption (mio Euros at 2005 prices)	10135	10271	10012	9108	8534	8594	8850	9151	9453	9699	9928
Annual growth rate of private consumption:	*1.5%*	*1.3%*	*-2.5%*	*-7.5%*	*-6.3%*	*0.7%*	*3.0%*	*3.4%*	*3.3%*	*2.6%*	*2.4%*
Sectoral shares of GDP:											
Agriculture	2.1%	2.1%	2.1%	2.1%	2.1%	2.0%	2.0%	2.0%	1.9%	1.9%	1.9%
Industry	9.9%	9.5%	9.4%	9.4%	9.4%	9.3%	9.3%	9.3%	9.2%	9.2%	9.2%
Construction	8.8%	7.8%	7.9%	7.9%	7.9%	8.0%	8.0%	8.0%	8.1%	8.1%	8.1%
Services	79.3%	80.5%	80.6%	80.6%	80.6%	80.7%	80.7%	80.7%	80.8%	80.8%	80.8%

Source: For years 2010-2012, official national accounts, Statistical Service of the Republic of Cyprus (October 2013).

For years 2013-2020, assumptions regarding GDP and private consumption from European Commission's winter macroeconomic forecast (see footnote 1); sectoral GDP shares are authors' own estimates.

Table 2: Forecast of final energy demand for heating and cooling in Cyprus in the Reference Scenario (ktoe).

Reference Scenario Final Energy Demand in Heating and Cooling	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	10	9	8	6	5	4	4	4	4	4	4
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	135	153	154	142	133	130	129	132	135	139	143
Light Fuel Oil	31	28	32	27	25	27	28	30	32	33	35
Heavy Fuel Oil	16	12	10	9	8	7	7	7	8	9	9
LPG	58	64	64	60	56	56	56	59	62	65	68
Electricity	207	198	203	187	178	176	178	187	199	212	224
Other solid fuels	102	77	60	55	52	50	51	53	55	58	60
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	10	13	15	15	15	16	18	20	24	27	30
Geothermal	1	1	1	1	1	1	1	1	1	1	1
Solar Thermal	61	63	61	57	54	54	56	61	67	74	81
Total	**632**	**619**	**608**	**559**	**527**	**522**	**528**	**553**	**587**	**622**	**656**
Total non-electricity	**424**	**421**	**405**	**371**	**349**	**345**	**350**	**366**	**387**	**410**	**432**
Total renewables	**72**	**77**	**77**	**72**	**70**	**71**	**74**	**82**	**92**	**102**	**112**
											17.1%

Final Energy Demand in Households	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	80	82	79	73	70	67	68	70	71	73	76
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	38	42	40	38	36	35	35	36	37	38	40
Electricity	75	74	77	74	72	71	74	80	86	93	99
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	2	4	4	4	4	4	4	4	5	5	6
Geothermal	1	1	1	1	1	1	1	1	1	1	1
Solar Thermal	52	54	52	48	46	45	47	51	56	61	66
Total	**247**	**257**	**253**	**237**	**228**	**223**	**228**	**241**	**256**	**272**	**288**
Total non-electricity	**172**	**183**	**176**	**164**	**156**	**152**	**154**	**162**	**170**	**179**	**188**
Total renewables	**54**	**59**	**57**	**53**	**50**	**50**	**52**	**56**	**62**	**67**	**73**
											25.3%

Table 2 (continued).

Final Energy Demand in Cement Industry											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	12	4	3	3	3	4	4	5	5	6	7
LPG	0	1	1	1	1	1	1	1	0	0	0
Electricity	5	5	4	4	3	3	3	3	2	2	2
Other solid fuels	102	77	60	55	52	50	51	53	55	58	60
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	7	7	5	5	5	5	6	6	7	8	8
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**127**	**94**	**74**	**68**	**64**	**63**	**63**	**67**	**70**	**75**	**78**
Total non-electricity	**122**	**89**	**70**	**65**	**61**	**60**	**61**	**64**	**68**	**72**	**76**
Total renewables	**7**	**7**	**5**	**5**	**5**	**5**	**6**	**6**	**7**	**8**	**8**
											10.8%

Final Energy Demand in Other Industry											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	10	9	8	6	5	4	4	4	4	4	4
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	14	10	11	9	8	8	9	9	10	10	11
Light Fuel Oil	19	17	21	18	16	18	19	21	22	24	25
Heavy Fuel Oil	4	8	7	5	4	3	3	3	3	2	2
LPG	6	7	6	5	4	4	4	5	5	5	6
Electricity	31	29	28	22	18	17	17	17	17	18	19
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	1	0	0	0	0	0	0	0	0	0	1
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**86**	**81**	**82**	**65**	**56**	**56**	**56**	**58**	**61**	**65**	**68**
Total non-electricity	**54**	**51**	**54**	**44**	**38**	**39**	**39**	**41**	**44**	**47**	**49**
Total renewables	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**
											1.2%

Table 2 (continued).

Final Energy Demand in Service Sectors											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	16	37	36	33	31	31	30	31	31	33	34
Light Fuel Oil	11	11	11	10	9	9	9	9	9	9	10
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	13	14	16	15	15	15	16	17	18	20	21
Electricity	89	83	87	82	78	79	80	83	88	94	99
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	1	2	5	5	6	7	8	10	12	14	16
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	9	9	9	9	8	9	9	10	11	13	14
Total	**140**	**157**	**163**	**154**	**147**	**150**	**152**	**159**	**170**	**182**	**194**
Total non-electricity	**50**	**74**	**77**	**72**	**69**	**71**	**72**	**76**	**82**	**89**	**95**
Total renewables	**10**	**12**	**14**	**14**	**14**	**16**	**17**	**19**	**23**	**27**	**30**
											15.5%

Final Energy Demand in Agriculture											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	24	24	28	26	24	23	22	22	22	23	23
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	2	1	1	1	1	1	1	1	1	1	1
Electricity	7	6	7	6	6	6	5	5	5	5	5
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**33**	**31**	**36**	**34**	**31**	**30**	**29**	**28**	**28**	**29**	**29**
Total non-electricity	**26**	**25**	**29**	**27**	**25**	**24**	**23**	**23**	**23**	**24**	**24**
Total renewables	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
											0.5%

Table 3: Forecast of final energy demand for heating and cooling in Cyprus in the Additional Energy Efficiency Scenario (ktoe).

Energy Efficiency Scenario Final Energy Demand in Heating and Cooling	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	10	9	8	6	5	4	4	4	4	4	4
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	135	153	154	142	131	128	128	129	130	131	132
Light Fuel Oil	31	28	32	27	25	27	28	29	31	32	33
Heavy Fuel Oil	16	12	10	9	8	7	7	7	8	8	9
LPG	58	64	64	60	55	55	55	57	58	59	60
Electricity	415	397	392	362	337	336	345	364	387	406	427
Other solid fuels	102	77	60	55	52	51	51	54	56	59	61
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	10	13	15	15	14	15	16	19	21	24	26
Geothermal	1	1	1	1	1	1	1	1	1	1	1
Solar Thermal	61	63	61	57	53	52	53	56	60	63	66
Total	**839**	**818**	**798**	**734**	**682**	**676**	**688**	**719**	**755**	**787**	**818**
Total non-electricity	**424**	**421**	**405**	**371**	**345**	**340**	**343**	**355**	**368**	**381**	**391**
Total renewables	**72**	**77**	**77**	**72**	**68**	**68**	**70**	**75**	**82**	**88**	**93**
											11.3%

Final Energy Demand in Households	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	80	82	79	73	69	66	67	68	68	68	69
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	38	42	40	38	35	34	35	35	35	35	36
Electricity	150	148	149	143	137	136	140	150	162	171	180
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	2	4	4	4	4	4	4	4	4	5	5
Geothermal	1	1	1	1	1	1	1	1	1	1	1
Solar Thermal	52	54	52	48	45	44	44	47	50	52	54
Total	**322**	**331**	**325**	**306**	**290**	**285**	**290**	**305**	**320**	**332**	**344**
Total non-electricity	**172**	**183**	**176**	**164**	**153**	**149**	**151**	**155**	**158**	**161**	**164**
Total renewables	**54**	**59**	**57**	**53**	**49**	**48**	**49**	**51**	**55**	**57**	**60**
											17.4%

Table 3 (continued).

Final Energy Demand in Cement Industry											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	12	4	3	3	3	3	4	5	5	6	7
LPG	0	1	1	1	1	1	1	1	1	0	0
Electricity	10	10	8	7	6	6	6	6	5	5	5
Other solid fuels	102	77	60	55	52	51	51	54	56	59	61
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	7	7	5	5	5	5	5	6	7	8	8
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**132**	**99**	**78**	**71**	**67**	**66**	**67**	**71**	**75**	**78**	**82**
Total non-electricity	**122**	**89**	**70**	**65**	**61**	**60**	**61**	**65**	**69**	**73**	**77**
Total renewables	**7**	**7**	**5**	**5**	**5**	**5**	**5**	**6**	**7**	**8**	**8**
											10.2%

Final Energy Demand in Other Industry											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	10	9	8	6	5	4	4	4	4	4	4
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	14	10	11	9	8	8	8	9	9	10	10
Light Fuel Oil	19	17	21	18	16	18	19	20	22	23	24
Heavy Fuel Oil	4	8	7	5	4	3	3	3	3	2	2
LPG	6	7	6	5	4	4	4	4	5	5	5
Electricity	63	59	54	43	35	34	33	34	36	38	40
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	1	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**117**	**110**	**108**	**86**	**73**	**72**	**72**	**75**	**79**	**83**	**86**
Total non-electricity	**54**	**51**	**54**	**44**	**38**	**38**	**39**	**40**	**43**	**45**	**46**
Total renewables	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**
											0.9%

Table 3 (continued).

Final Energy Demand in Service Sectors											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	16	37	36	33	31	30	30	30	30	30	30
Light Fuel Oil	11	11	11	10	9	9	9	9	9	9	9
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	13	14	16	15	14	15	15	16	17	17	18
Electricity	178	167	168	158	146	149	155	162	171	180	189
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	1	2	5	5	5	6	7	8	10	11	12
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	9	9	9	9	8	8	9	9	10	11	12
Total	**229**	**240**	**245**	**230**	**214**	**218**	**224**	**234**	**246**	**258**	**269**
Total non-electricity	**50**	**74**	**77**	**72**	**68**	**68**	**69**	**72**	**75**	**78**	**80**
Total renewables	**10**	**12**	**14**	**14**	**14**	**15**	**15**	**17**	**20**	**22**	**24**
											8.8%

Final Energy Demand in Agriculture											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	24	24	28	26	24	23	22	22	22	23	23
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	2	1	1	1	1	1	1	1	1	1	1
Electricity	14	13	13	12	12	11	11	12	12	12	13
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	0	0	0	0	0	0
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**40**	**37**	**42**	**40**	**37**	**36**	**35**	**35**	**35**	**36**	**37**
Total non-electricity	**26**	**25**	**29**	**27**	**25**	**24**	**23**	**23**	**23**	**24**	**24**
Total renewables	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
											0.4%

Table 4: Forecast of final energy demand for transport in Cyprus in the Reference Scenario (ktoe).

Reference Scenario Final Energy Demand in Transport	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	410	404	384	348	318	310	312	319	329	339	345
Diesel	359	345	314	290	267	267	273	286	304	321	335
Aviation fuel	285	311	278	250	230	225	227	237	255	268	277
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	1	2	2	3
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	16	17	16	15	13	16	19	25	34	44	55
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**1070**	**1077**	**992**	**902**	**828**	**819**	**832**	**869**	**924**	**975**	**1015**
Total renewables (excl. electricity)	**16**	**17**	**16**	**15**	**13**	**16**	**19**	**25**	**34**	**44**	**55**
											5.4%

Final Energy Demand in Road Transport	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	410	404	384	348	318	310	312	319	329	339	345
Diesel	359	345	314	290	267	267	273	286	304	321	335
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	1	2	2	3
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	16	17	16	15	13	14	16	19	25	33	41
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**785**	**766**	**714**	**653**	**598**	**592**	**602**	**626**	**660**	**695**	**724**
Total renewables (excl. electricity)	**16**	**17**	**16**	**15**	**13**	**14**	**16**	**19**	**25**	**33**	**41**
											5.7%

Table 4 (continued).

Final Energy Demand in Road Passenger Transport											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	390	384	367	333	304	297	299	306	316	325	332
Diesel	18	17	23	24	24	27	30	35	42	48	52
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	1	1	2	3
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	16	17	14	12	11	10	11	12	15	19	26
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**423**	**418**	**404**	**369**	**338**	**334**	**340**	**354**	**375**	**394**	**412**
Total renewables (excl. electricity)	**16**	**17**	**14**	**12**	**11**	**10**	**11**	**12**	**15**	**19**	**26**
											6.2%

Final Energy Demand in Road Freight Transport											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	21	20	17	15	14	13	13	13	13	13	13
Diesel	341	328	291	266	244	241	243	251	262	273	283
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	1	1
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	1	2	3	4	5	7	10	13	16
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**361**	**348**	**310**	**284**	**260**	**258**	**261**	**271**	**286**	**300**	**313**
Total renewables (excl. electricity)	**0**	**0**	**1**	**2**	**3**	**4**	**5**	**7**	**10**	**13**	**16**
											5.0%

Table 4 (continued).

Final Energy Demand in Air Transport											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	285	311	278	250	230	225	227	237	255	268	277
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	0	0
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	2	3	6	9	12	14
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**285**	**311**	**278**	**250**	**230**	**226**	**230**	**243**	**264**	**280**	**291**
Total renewables (excl. electricity)	**0**	**0**	**0**	**0**	**0**	**2**	**3**	**6**	**9**	**12**	**14**
											4.7%

Table 5: Forecast of final energy demand for transport in Cyprus in the Additional Energy Efficiency Scenario (ktoe).

Energy Efficiency Scenario Final Energy Demand in Transport	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	410	404	384	348	316	306	306	310	317	320	322
Diesel	359	345	314	290	266	264	268	280	295	309	320
Aviation fuel	285	311	278	250	228	223	224	233	248	260	268
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	1	2	2	3
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	16	17	16	15	13	16	18	24	33	42	51
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**1070**	**1077**	**992**	**902**	**824**	**809**	**817**	**847**	**894**	**933**	**964**
Total renewables (excl. electricity)	**16**	**17**	**16**	**15**	**13**	**16**	**18**	**24**	**33**	**42**	**51**
											5.3%

Final Energy Demand in Road Transport	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	410	404	384	348	316	306	306	310	317	320	322
Diesel	359	345	314	290	266	264	268	280	295	309	320
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	1	2	2	3
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	16	17	16	15	13	14	15	18	24	30	38
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**785**	**766**	**714**	**653**	**596**	**585**	**590**	**609**	**638**	**662**	**683**
Total renewables (excl. electricity)	**16**	**17**	**16**	**15**	**13**	**14**	**15**	**18**	**24**	**30**	**38**
											5.5%

Table 5 (continued).

Final Energy Demand in Road Passenger Transport											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	390	384	367	333	302	293	293	297	304	307	309
Diesel	18	17	23	24	23	26	29	33	39	44	47
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	1	1	2	2
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	16	17	14	12	11	10	10	11	14	18	23
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**423**	**418**	**404**	**369**	**337**	**329**	**332**	**342**	**359**	**370**	**381**
Total renewables (excl. electricity)	**16**	**17**	**14**	**12**	**11**	**10**	**10**	**11**	**14**	**18**	**23**
											6.0%

Final Energy Demand in Road Freight Transport											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	21	20	17	15	14	13	13	13	13	13	13
Diesel	341	328	291	266	243	239	240	246	256	266	274
Aviation fuel	0	0	0	0	0	0	0	0	0	0	0
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	1	1
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	1	2	2	4	5	7	10	13	15
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**361**	**348**	**310**	**284**	**259**	**256**	**258**	**266**	**279**	**292**	**302**
Total renewables (excl. electricity)	**0**	**0**	**1**	**2**	**2**	**4**	**5**	**7**	**10**	**13**	**15**
											4.9%

Table 5 (continued).

Final Energy Demand in Air Transport											
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gasoline	0	0	0	0	0	0	0	0	0	0	0
Diesel	0	0	0	0	0	0	0	0	0	0	0
Aviation fuel	285	311	278	250	228	223	224	233	248	260	268
Heating fuel	0	0	0	0	0	0	0	0	0	0	0
Light Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
Heavy Fuel Oil	0	0	0	0	0	0	0	0	0	0	0
LPG	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	0	0
Other solid fuels	0	0	0	0	0	0	0	0	0	0	0
Biofuels	0	0	0	0	0	2	3	5	9	11	13
Biomass	0	0	0	0	0	0	0	0	0	0	0
Geothermal	0	0	0	0	0	0	0	0	0	0	0
Solar Thermal	0	0	0	0	0	0	0	0	0	0	0
Total	**285**	**311**	**278**	**250**	**228**	**224**	**227**	**239**	**257**	**271**	**281**
Total renewables (excl. electricity)	**0**	**0**	**0**	**0**	**0**	**2**	**3**	**5**	**9**	**11**	**13**
											4.6%

Table 6: Forecast of national energy consumption in Cyprus according to the scenarios considered (ktoe).

Reference scenario without NG in 2016	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Primary energy input for power generation	1194	1146	1097	1011	940	936	950	989	1041	1091	1132
Fuel inputs for power generation	*1174*	*1125*	*1075*	*980*	*901*	*890*	*897*	*926*	*967*	*1004*	*1030*
Renewables input for power generation	*20*	*21*	*22*	*31*	*39*	*46*	*53*	*63*	*74*	*87*	*101*
Final non-electricity consumption	1494	1498	1397	1274	1177	1164	1181	1234	1310	1382	1444
Industry	*176*	*140*	*124*	*108*	*99*	*98*	*100*	*105*	*112*	*119*	*125*
Services	*50*	*74*	*77*	*72*	*69*	*71*	*72*	*76*	*82*	*89*	*95*
Households	*172*	*183*	*176*	*164*	*156*	*152*	*154*	*162*	*170*	*179*	*188*
Road Transport	*785*	*766*	*714*	*653*	*598*	*592*	*601*	*625*	*659*	*692*	*721*
Air Transport	*285*	*311*	*278*	*250*	*230*	*226*	*230*	*243*	*264*	*280*	*291*
Agriculture	*26*	*25*	*29*	*27*	*25*	*24*	*23*	*23*	*23*	*24*	*24*
Final electricity consumption	415	397	392	362	346	352	364	387	416	444	471
National energy consumption	2688	2643	2494	2284	2118	2100	2131	2223	2351	2473	2575

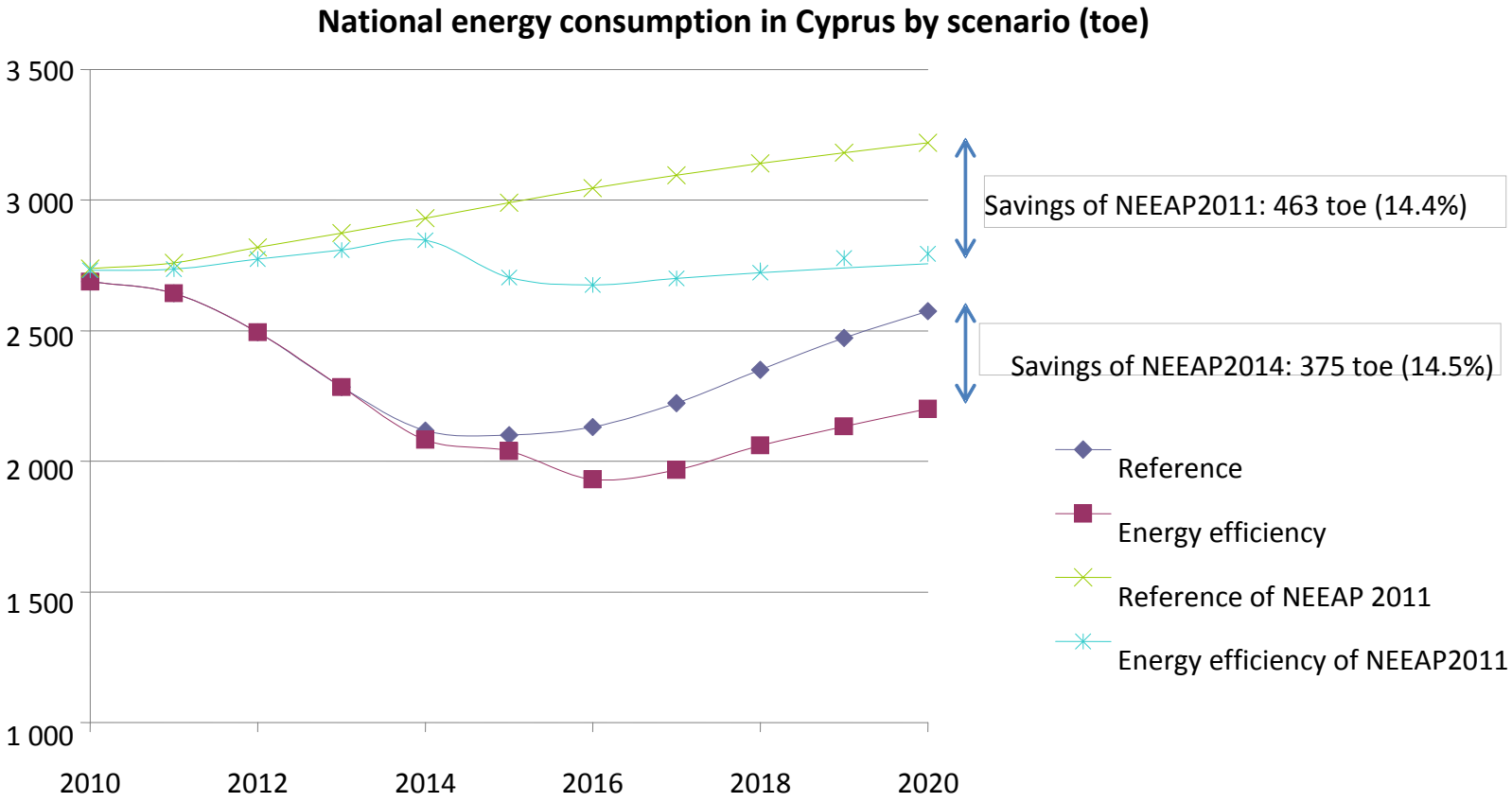
Energy efficiency scenario with NG in 2016	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Primary energy input for power generation	1194	1146	1097	1011	913	891	772	766	800	823	848
Fuel inputs for power generation	*1174*	*1125*	*1075*	*980*	*874*	*845*	*719*	*703*	*726*	*736*	*747*
Renewables input for power generation	*20*	*21*	*22*	*31*	*39*	*46*	*53*	*63*	*74*	*87*	*101*
Final non-electricity consumption	1494	1498	1397	1274	1169	1149	1159	1202	1261	1311	1352
Industry	*176*	*140*	*124*	*108*	*99*	*98*	*100*	*105*	*112*	*118*	*123*
Services	*50*	*74*	*77*	*72*	*68*	*68*	*69*	*72*	*75*	*78*	*80*
Households	*172*	*183*	*176*	*164*	*153*	*149*	*151*	*155*	*158*	*161*	*164*
Road Transport	*785*	*766*	*714*	*653*	*595*	*585*	*589*	*608*	*636*	*660*	*680*
Air Transport	*285*	*311*	*278*	*250*	*228*	*224*	*227*	*239*	*257*	*271*	*281*
Agriculture	*26*	*25*	*29*	*27*	*25*	*24*	*23*	*23*	*23*	*24*	*24*
Final electricity consumption	415	397	392	362	337	336	345	364	388	408	430
National energy consumption	2688	2643	2494	2284	2082	2040	1931	1968	2061	2134	2201

Table 7: Assessment of energy savings in Cyprus up to the year 2020.

Savings, efficiency - (reference without NG)

(ktoe)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Savings in final non-electricity consumption											
Industry					0	0	0	0	0	1	2
Services					2	2	3	4	7	11	15
Households					3	3	4	7	12	18	24
Road Transport					3	7	12	17	23	33	41
Air Transport					1	2	3	4	7	9	9
Total Transport					4	10	15	22	30	42	50
Agriculture					0	0	0	0	0	0	0
Savings in final electricity consumption					9	16	19	23	27	36	41
Savings in primary electricity production because of savings in final electricity					27	45	46	53	61	81	91
Savings in primary electricity due to introduction of natural gas					0	0	132	171	179	187	192
Total savings in primary electricity					27	45	178	223	240	268	283
Savings in national energy consumption					**36**	**61**	**200**	**255**	**290**	**339**	**375**
					1.7%	**2.9%**	**9.4%**	**11.5%**	**12.3%**	**13.7%**	**14.5%**

Figure 1: Comparison of the projected evolution of national energy consumption in Cyprus according to the NEEAP of 2011 and the current update of NEEAP.


National energy consumption in Cyprus by scenario (toe)
3 500
3 000
2 500
2 000
1 500
1 000
2010
2012
2014
2016
2018
2020
Savings of NEEAP2011: 463 toe (14.4%)
Savings of NEEAP2014: 375 toe (14.5%)
Reference
Energy efficiency
Reference of NEEAP 2011
Energy efficiency of NEEAP2011

ANNEX I: CROSS-REFERENCE TABLES BETWEEN CYPRIOT LEGISLATION AND DIRECTIVE 2012/27/EU

Directive 2012/27/EU	**The 2014 (Amending) Law on Energy Efficiency in End Use and Energy Services**
Article 1(1)	Article 3 of the amending law (amendment of Article 3 of the basic act)
Article 1(2)	Not transposed into national legislation
Article 2(1), (2), (3), (6), (8), (9), (10), (11), (12, (13), (17), (18), (19),(23), (26)	Article 2 of the amending law (amendment of Article 2 of the basic act)
Article 2(4), (5), (7) (20), (21), (22), (24), (25), (27)	Included in the provisions of Article 2 of the basic act and the relevant amendments thereto
Article 2 (14), (15),(16)	Not transposed into national legislation
Article 2(29) to (44)	**Transposed into national legislation by amending the Law on promoting the cogeneration of heat and electricity**
Article 2(28) and (45)	Included in the 2003-2012 Law on the Regulation of the Electricity Market
Article 3	The obligation has been met through the 2nd National Energy Efficiency Action Plan and through the report submitted to the Commission in April 2013.
Article 4	Article 4 of the amending law (amendment of Article 4 of the basic act)
Article 5(1)	Article 10 of the amending law [addition of new Article 14(1), (2), (8) to the basic act]
Article 5(2)	Article 10 of the amending law [addition of new Article 14(6) to the basic act]
Article 5(3)	Article 10 of the amending law [addition of new Article 14(3) to the basic act]
Article 5(4)	Article 10 of the amending law [addition of new Article 14(4) to the basic act]
Article 5(5)	Article 10 of the amending law [addition of new Article 14(5) to the basic act]
Article 5(6)	It will not be implemented and, therefore, it is not transposed into national legislation
Article 5(7)	Article 10 of the amending law [addition of new Article 14(7) to the basic act]
Article 6(1) and Annex III	Article 11 of the amending law [addition of new Article 15(1) and Annex II to the basic act]
Article 6(2)	Article 11 of the amending law [addition of new Article 15(2) to the basic act]
Article 6(3)	Article 11 of the amending law [addition of new Article 15(3) to the basic act]
Article 6(4)	Article 11 of the amending law [addition of new Article 15(4) to the basic act]
Article 7(1)	Article 11 of the amending law [addition of new Article 19(1)(a) to the basic act]
Article 7(2)(a), (b), (c)	They will not be implemented and, therefore, they are not transposed into national legislation
Article 7(2)(d) and Article 7(3)	Article 15 of the amending law [addition of new Article 19(2) to the basic act]

Article 7(4), 7(5)	They will not be implemented and, therefore, they are not transposed into national legislation
Article 7(6), Annex V	Article 15 of the amending law [addition of new Article 19(4), and Annex III to the basic act]
Article 7(7)	It will not be implemented and it is not transposed into national legislation
Article 7(8)	Included in the provisions of Article 6(1), (2) of the basic act
Article 7(9)	Article 15 of the amending law [addition of new Article 19(1)(a), (b) to the basic act]. The notification to the European Commission of the measures to be taken has been made. Implementation details are set out in the 3rd National Energy Efficiency Action Plan approved by the Council of Ministers
Article 7(10)	Addition of new Annex IV to the basic act. Implementation details are set out in the 3rd National Energy Efficiency Action Plan approved by the Council of Ministers
Article 7(11)	Not transposed into national legislation. Implementation details are set out in the 3rd National Energy Efficiency Action Plan approved by the Council of Ministers
Article 7(12)	Article 15 of the amending law [addition of new Article 19(5) to the basic act]
Article 8(1)	Included in the provisions of Articles 5,7,10,11 of the basic act and the provisions of Regulations Nos 4, 5, 6, 7, 8, 9, 19, 20 of the RAA 184/2012. For the last paragraph: Article 5 of the amending law [addition of new Article 5(5) to the basic act]
Annex VI	Included in the provisions of RAA 184/2012 (Regulation 19) and RAA 171/2012. For paragraph (c): Article 5 of the amending law [addition of new Article 5(7) to the basic act]
Article 8(2)	Article 5 of the amending law [addition of new Article 5(8)(a), (b), (c) to the basic act].
Article 8(3)	Included in the provisions of RAA 184/2012 (Regulation 4) For the first paragraph: Article 5 of the amending law [addition of new Article 5(8)(d) to the basic act]
Article 8(4)	Article 5 of the amending law [addition of new Article 5(6)(a) to the basic act]
Article 8(5)	Included in the provisions of RAA 184/2012 (Regulations No 2 and 6)
Article 8(6)	Article 5 of the amending law [addition of new Article 5(6)(b) to the basic act]
Article 8(7)	Article 5 of the amending law [addition of new Article 5(6)(c) to the

	basic act]
Article 9(1)	Article 12 of the amending law [addition of new Article 16(1) to the basic act] **With regard to electricity and natural gas issues, the harmonisation of legislation will be made by the CERA by 5 June 2014**
Article 9(2)	**The harmonisation of legislation will be made by the CERA by 5 June 2014**
Article 9(3)	Article 12 of the amending law [addition of new Article 16(2) to the basic act]
Article 10(1), (2), (3) and Annex VII	**The harmonisation of legislation will be made by the CERA by 5 June 2014**
Article 11	Covered by Article 93(1)(i) of the 2003-2012 Laws on the Regulation of the Electricity Market Also Article 13 of the amending law (addition of new Article 17 to the basic act) and Article 6 of the amending law [addition of new Article 8(d) to the basic act].
Article 12(1), (2)	Article 18 of the amending law [addition of new Article 18(1) to the basic act]
Article 13	Article 8 of the amending law (amendment of Article 11 of the basic act) and Article 6 (amendment to Article 11 of the basic act) under the amendments of the law to ensure compliance with the Regulations on energy services
Article 14	**Transposed into national legislation by amending the Law on promoting the cogeneration of heat and electricity**
Article 15(1)	This provision is covered by Article 24(1)(s) + (x), 24(5) and 89(1)(d), 24(1)(u) + (x) and 93(2), Articles 52(1) and 61(1)(a) of the 2003-2012 Law Regulating the Electricity Market, as well as by Articles 6(1)(q) + (s), 10(e), 16(2)(a), 22(1), 39(1)(c) and 39(6), 22(1) of the 2004-2012 Law Regulating the Natural Gas Market.
Annex XI	**The harmonisation of legislation will be made by the CERA by 5 June 2014**
Article 15(2)	**This obligation will be met by the CERA. Not transposed into national legislation**
Article 15(3)	This provision is covered by Articles 89(1)(b) and 94 of the 2003-2012 Law Regulating the Electricity Market and by Article 40 (1)(b)+(2)(d), (8)+(9), 40(2)(d), 40(8) and 40(9) of the 2004-2012 Law Regulating the Natural Gas Market.
Article 15(4)	This provision is covered by Article 25(7)(2)(c), 52(2), 52(8), 89(1)(d)(iv), 25 (2)(a)(i),(ii) of the 2003-2012 Law Regulating the Electricity Market, and
Article 15(5)	**Transposed into national legislation by amending the Law on promoting the cogeneration of heat and electricity**
Article 15(6)	These provisions may also be covered by Article 25(2)(a)(iii), as well as by Articles 52(7) and 62(1)(d), 25(2)(d) and 86 of the 2003-2012 Law on Regulating the Electricity Market.

Article 15(7)	**Transposed into national legislation by amending the Law on promoting the cogeneration of heat and electricity**
Article 15(8)	It is covered by Articles 25(1)(k) and 25(5) 38(2), 48, 52(6)+(7) and 62(1)(f) 25(2)(a),(d)(e), 25(6)+(7), as well as Articles 52(2),(5),(7),+(9) , 53 and 62(1)(f) and 25(2)(d) of the 2003-2012 Law Regulating the Electricity Market. Natural gas issues are covered by the transparency and impartiality obligations imposed by the provisions of the 2004-2012 Law Regulating the Natural Gas Market. In particular, the relevant Articles of the Law Regulating the Natural Gas Market are: 6(1)(k), 7(1)(l),(o)(v), 7(2)(a)(ii), (h), 16(3)+(4), 19(1)(a)+(b), 22(2),(5)+(6), 23(4), 30(1), 31(2), 35(2), 39(5) and 55(2), 19(1)(b), 19(1)(c), 55(1)and 55(2). Regarding the Natural Gas Market Regulations, there is no need to transpose the relevant provisions/measures at the present stage, inasmuch as no relevant Regulations apply due to the lack of natural gas infrastructures. When infrastructures for the transmission and distribution of natural gas are created in Cyprus and when the transmission and distribution system operators are defined, it will be technically possible to make the relevant arrangements.
Article 15(9)	The relevant report set out in Article 9(2) of Directive 2010/75/EU will be submitted jointly by the Minister for Agriculture, the Environment and Natural Resources and the Minister for Labour and Social Insurance. The national energy efficiency plan submitted under Directive 2012/27/EU will include the information of this report
Article 16(1), (2)	Transposition has been achieved through RAA 184/2012 on energy auditors, the regulations on energy service providers [Regulations Nos 3, 4, 5, 7, 8 of the Regulations on Energy Efficiency in end use and energy services (Energy Service Providers)] Moreover, through Article 7 of the amending law (amendment to Article 9 of the basic act) on installers of elements that form part of the building envelope
Article 16(3)	Article 18 of the amending law [addition of new Article 18(2) to the basic act]
Article 17(1)	Article 18 of the amending law [addition of new Article 18(3), (4) to the basic act]
Article 17(2)	Article 18 of the amending law [addition of new Article 18(5) to the basic act]
Article 17(3)(4)	Not transposed into national legislation
Article 17(5)	Article 18 of the amending law [addition of new Article 18(6) to the basic act]
Article 18(1)(a),(b)	Regulation No 9 of the Regulations on energy efficiency in end use and energy services (Energy Service Providers) And Article 5 of the amending law [amendment of Article 5(9)(a),(b) of the basic act]

Article 18(1)(c)	Regulation No 3, 4(2) of the Regulations on energy efficiency in end use and energy services (Energy Service Providers) And Article 5 of the amending law [amendment of Article 5(9)(c) of the basic act]
Article 18(1)(d)(i) -	Regulation No 9 of the Regulations on Energy Efficiency in end use and energy services (Energy Service Providers) And Article 5 of the amending law [amendment of Article 5(9)(d)(i) of the basic act]
Article 18(1)(d)(ii)	Regulations Nos 9(1), 9(4), 10 of the Regulations on Energy Efficiency in end use and energy services (Energy Service Providers) And Article 5 of the amending law [amendment of Article 5(9)(d)(ii) of the basic act]
Annex XIII	Regulation No 9 of the Regulations on Energy Efficiency in end use and energy services (Energy Service Providers)
Article 18(1)(e)	Article 5 of the amending law [amendment of Article 5(9)(e) of the basic act]
Article 18(2)	Article 5 of the amending law [amendment of Article 5(10) of the basic act]
Article 18(3)	Article 7 of the amending law (amendment of Article 9 of the basic act)
Article 19	Article 5 of the amending law (amendment of Article 5 of the basic act)
Article 20(1)	These provisions are covered by Article 3(1) of the 2003-2012 Laws on Promoting and Encouraging the Use of RES and Energy Saving, as well as by Article 9(2) of the Law on Promoting and Encouraging the Use of RES and Energy Saving [L112(I)/2013]
Article 20(2), (3)	The EU obligations are not transposed into national legislation.
Article 20(4)	These provisions are covered by Article 3(1) of the 2003-2012 Laws on Promoting and Encouraging the Use of RES and Energy Saving, as well as by Article 9(2) of the Law on Promoting and Encouraging the Use of RES and Energy Saving [L112(I)/2013]
Article 20(5), (6)	This option will not be implemented and, therefore, it is not transposed into national legislation
Article 20(7)	Decision No 72 911 of the Council of Ministers was adopted on 2 December 2011, approving the deposit to the Special Fund for RES and ES, of the required percentage from the income of annual emission allowances, which will be necessary for the Fund's viability. In addition, Article 10(1)(e) of the Law on Promoting and Encouraging the Use of RES and Energy Saving (Law 112(I)/2013), provides for the deposit to the Special Fund of part of the income from emission allowances.
Article 21	Article 6 of the amending law (amendment of Article 8 of the basic act); and

	Adoption of the Decree on Determining the Conversion Factors of Selected Fuels for End Use
Article 24	Article 9 of the amending law (amendment of Article 13 of the basic act)
Article 24(6)	**Transposed into national legislation by amending the Law on promoting the cogeneration of heat and electricity**
Articles 22, 23, 25 , 26, 27, 28, 29, 30	Not transposed into national legislation
Annexes I, II, VIII, IX, X	**Transposed into national legislation by amending the Law on promoting the cogeneration of heat and electricity**

Directive 2012/27/EU	**The 2014 (Amending) Law on the promotion of combined heat and power**
Article 2, definitions (29) to (44)	Article 2
Article 14(1)	Article 17(1) and Annex VI
Article 14(2)	Article 7(5)
Article 14(3)	Article 17(2) and Annex IV
Article 14(4)	Article 17(3) Article 17(4)
Article 14(5)	Article 15 and Annex V
Article 14(6)	Article 16
Article 14(7)	Article 18
Article 14(8)	Article 19
Article 14(9)	Article 20
Article 14(10)	Article 5 (RAA 155/2012) (RAA 185/2012) Articles 10-14
Article 14(11)	Article 7
ANNEX I GENERAL PRINCIPLES FOR CALCULATING ELECTRICITY FROM COGENERATION Part I	ANNEX II AND RAA 457/2011
ANNEX I GENERAL PRINCIPLES FOR CALCULATING ELECTRICITY FROM COGENERATION Part II	ANNEX I
ANNEX II METHODOLOGY FOR DETERMINING PERFORMANCE IN COGENERATION	ANNEX III AND RAA 457/2011
ANNEX VIII Potential for efficiency in heating and cooling	ANNEX VI
ANNEX IX	ANNEX IV

COST-BENEFIT ANALYSIS Part 1	
ANNEX IX COST-BENEFIT ANALYSIS Part 2	ANNEX V
Article 15(5)	Article 8(2)(b), Article 9(b), Article 8(6-9), Article 9(c)
Article 15(7)	Article 8(9)(d)
Article 24(6)	Article 21

ANNEX I: WEBSITES

S/N	Description of Legislation/Document /Plan	Reference to the text of the 3rd NEEAP	Website
1	Sustainable Energy Action Plans of the Municipalities and Communities of Cyprus	Chapter 1, Paragraph 18	http://www.cea.org.cy/LocalEnergy.html
2	Green Public Procurement Action Plan.	Chapter 1, paragraph 20	http://www.moa.gov.cy/moa/environment/environment.nsf/3D37FFD63B3D335CC2257953004368E1/$file/GPP2012-2014.pdf
3	National Energy Efficiency Program of Cyprus.	Chapter 2.1.1, paragraph 2	(http://ec.europa.eu/energy/efficiency/eed/article7_en.htm)
4	Regulations on Energy Auditors (RAA 184/2012).	Chapter 3.1.2, Paragraph 3	http://www.mcit.gov.cy/mcit/mcit.nsf/All/5D6DEF111AE3CF55C22575C5002BFED5?OpenDocument
5	The Decree on the Methodology and Other Requirements for Conducting Energy Audits (RAA 171/2012).	Chapter 3.1.2, Paragraph 2	http://www.mcit.gov.cy/mcit/mcit.nsf/All/5D6DEF111AE3CF55C22575C5002BFED5?OpenDocument
6	Registry of Energy Auditors.	Chapter 3.1.2, Paragraph 3	http://www.mcit.gov.cy/mcit/mcit.nsf/All/5D6DEF111AE3CF55C22575C5002BFED5?OpenDocument
7	Calculation on cost-optimal levels of minimum energy performance.	Chapter 3.2.1, paragraph 1	http://www.mcit.gov.cy/mcit/mcit.nsf/All/E074577C58AD9EFCC22575B60047BEA8?OpenDocument

ANNEX K: LIST OF BODIES THAT HAVE CONTRIBUTED TO THE DRAFTING OF THE 3RD NEEAP.

S/N	BODY
1	Institute of Energy
2	Special Fund for RES and ES
3	Statistical Service of Cyprus
4	Electrical and Mechanical Services Department
5	Road Transport Department
6	Competent Public Procurement Authority of the Treasury of the Republic of Cyprus
7	Electricity Authority of Cyprus
8	Cyprus Energy Regulatory Authority
9	Transmission System Operator
10	Ministry of Education and Culture
11	Ministry of Justice and Public Order
12	Cyprus Energy Agency
13	IT Services Department
14	Town Planning and Housing Department
15	Department of Public Procurement and Purchasing
16	State Records
17	Cyprus Fire Department Headquarters
18	Union of Cyprus Municipalities
19	Union of Cyprus Communities
20	Technological University of Cyprus
21	European University Cyprus
22	Open University of Cyprus
23	Hellenic Bank Group
24	Municipality of Sotiras
25	Municipality of Engomi
26	Municipality of Aghia Napa
27	Municipality of Lakatamia
28	Municipality of Aradippou
29	Municipality of Dali
30	Municipality of Strovolos
31	Municipality of Livadia
32	Municipality of Larnaca
33	Municipality of Aghios Athanasios
34	Community of Psimolofos

ANNEX L ENERGY POLICY OF THE HELLENIC BANK GROUP

The Energy Policy of the Hellenic Bank Group aims to increase energy savings and, by extension, to reduce the relevant electricity costs.

The three pillars of the policy of the Hellenic Bank Group (Organisation, Technological Upgrading, Raising Awareness among Workers) may be analysed as follows:

I. Organisation

1. Actions taken

- **Know thyself:** An electronic database of EAC's bills from 2009 onwards was created. From then onwards, all bills were entered into this database for the purpose of comparison, drawing conclusions, identifying the consumption of small and large buildings and taking targeted measures.
- Guidelines to staff-members and a checklist on energy issues have been drawn up (attached hereto).
- Building managers have been appointed and goals have been set.
- Meetings were held with all bodies active in the energy sector (the Energy Department, the Environment Commissioner, the CERA, the Cyprus Employers and Industrialists Federation, The Association of Energy Saving Companies, the Energy Agency), taking into account their ideas and recommendations.

2. Next Steps

The possibility to use ISO 50001 certification is being explored.

II. Technological Upgrading

1. Actions taken

- Energy upgrading in 10 buildings (energy-technological upgrading includes roof thermal insulation, the installation of thermal insulation glass panes, the installation of new class A air conditioners and the installation of LED lighting and signs).
- Where there are central air conditioning management systems, these are managed correctly.
- Improvement of the main computer rooms (by removing old equipment, changing their position in the room, creating hot/cool paths etc).
- The new energy-saving equipment and consumption monitoring systems are under pilot installation.

2. Next Steps

The mass replacement of lighting and illuminated signs with LED lights, along with the energy upgrading of buildings are being explored, whereas an approval for the installation of PV units in 4 buildings owned by the group is pending.

III. Awareness-raising among staff-members

Actions taken

- Communication (Policy, Guidelines).
- Visits to buildings.
- District Presentations on energy issues (with the participation of 150 staff-members).
- One of the main goals of the certification of buildings (Greek Key & Green Offices) was to raise awareness among workers.

Implementation results of the energy policy to the Hellenic Bank Group

The following table contains a detailed list of EAC bills, showing electricity savings for the year 2013 as compared to 2012 in relation to the average of the years 2009, 2010 and 2011.

DESCRIPTION	kWh
AVERAGE CONSUMPTION FOR THE YEARS 2009-2010-2011 (before Mari)	10 197 686
CONSUMPTION FOR 2012	8 126 724
CONSUMPTION FOR 2013	7 199 748
ENERGY SAVINGS IN 2013 COMPARED TO THE PREVIOUS YEAR 2012	11.41% (926 976)
SAVINGS IN THE YEAR 2013 AS COMPARED TO THE BASIS OF COMPARISON (YEARS 2000-2010-2011)	29.4% (2 997 938)

In addition, estimates are made with regard to energy savings resulting from energy-efficient buildings and branches in 2013 as compared to 2012 and to the average of the years 2009, 2010 and 2011.

DESCRIPTION *	kWh
SAVINGS DUE TO ENERGY-EFFICIENT BUILDINGS AND BRANCHES IN 2013 AS COMPARED TO THE PREVIOUS YEAR 2012	50 170
SAVINGS DUE TO ENERGY-EFFICIENT BUILDINGS AND BRANCHES IN 2013 AS COMPARED TO THE BASIS FOR COMPARISON (YEARS 2009-2010-2011)	152 589

* The estimated drop in consumption in the building of Amphipolis (approximately 400 000 kWh) where the Group's services were installed in 2013 is not included in the data (comparison is made using consumption measurements of the previous owner).

ENERGY POLICY - CHECKLIST AND INSTRUCTIONS

DESCRIPTION	ADJUSTMENT/ACTION
REGULATING THE TEMPERATURE OF AIR CONDITIONING DEVICES IN SUMMER	25-27°C
REGULATING THE TEMPERATURE OF AIR CONDITIONING DEVICES IN WINTER	22-23°C
REGULATING THE TEMPERATURE OF AIR CONDITIONERS IN INTERIM PERIODS OF THE YEAR	IN LINE WITH OUTDOOR TEMPERATURES, BETWEEN 22-27°C OR TURNED OFF
POSITION OF WINDOWS WHEN AIR CONDITIONERS ARE IN OPERATION	SHUT
REGULATING THE TEMPERATURE IN COMPUTER ROOMS	25°C, DOORS AND LIGHTS ALWAYS TURNED OFF
LIGHTING IN WORKSPACES	UNNECESSARY LIGHTING CIRCUITS MUST BE PUT OUT OF SERVICE
LIGHTING OF NON-WORKING SPACES (E.G., MEZZANINE AT BRANCHES), KITCHENS, TOILETS, STORAGE ROOMS	PUT OUT OF SERVICE AFTER USE
PCs, SCREENS, PHOTOCOPY MACHINES AND PRINTERS	TURNED OFF AFTER USE
VARIOUS ELECTRIC APPLIANCES (Instantaneous water heaters, microwave ovens, coffee machines, kettles, fans, etc.)	TURNED OFF AFTER USE
CONTROL OF ILLUMINATED SIGNS	CHECKED BY TECHNICAL SERVICES