



# Implementation of the EPBD in Cyprus

## Status in November 2010

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### 1 > Introduction

Many developments took place in the implementation of EPBD in Cyprus since the last report was published in March 2008. The Law for the Regulation of the Energy Performance of Buildings 2006, L.142(I)/2006, is the legal document on which the transposition of EPBD in Cyprus is based on. The implementation of the EPBD started in 2007 with setting minimum requirements for the building envelope and has been fully implemented in 2009 with the launching of the Energy Performance Certificate and the inspection of air-conditioning systems.

This report presents an overview of the current status of implementation and of the plans for evolution of the implementation of the EPBD in Cyprus. It addresses certification and inspection systems, including quality control mechanisms, training of Qualified Experts, information campaigns, incentives and subsidies.

### 2 > Certification

#### Certification of buildings

In Cyprus, the implementation of the EPBD is the overall responsibility of the Energy Service, which is a department of the Ministry of Commerce, Industry and Tourism. The Energy Service has designed and developed a certification scheme, which is based on a central registry and database.

The implementation of the Energy Performance Certificate (EPC) in Cyprus took place in two phases. The first phase was the certification of all residential buildings, new and existing, which started in the 1<sup>st</sup> of October 2009 as optional and it became mandatory by the 1<sup>st</sup> of January 2010 by publishing the Ministerial Order for the Minimum Energy Performance Requirements of 2009. The second phase was the certification of commercial buildings, education buildings, office buildings and all other buildings that are not considered residential, new and existing, which became mandatory on the 1<sup>st</sup> of September 2010 by the same Ministerial Order.

The Energy Performance Certificate and the recommendations report can be only issued by the Qualified Experts (QEs), and their qualifications and responsibilities are regulated by The Energy Certification Regulations of 2009 (see more details in chapter 4).

National websites:

> [www.mcit.gov.cy](http://www.mcit.gov.cy)

## The energy performance certificate

The Energy Performance Certificate (EPC) was chosen to have a similar appearance to the energy labels used for domestic appliances, in order for the public to better relate and understand the information given on it.

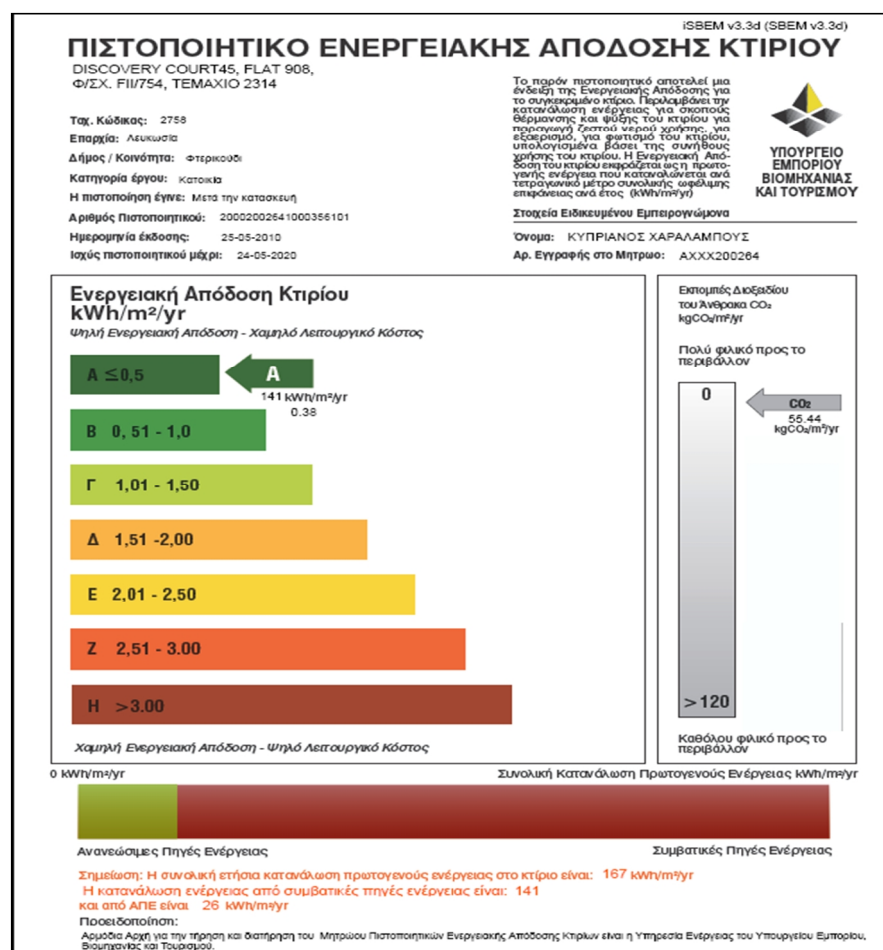


Fig. 1 - Energy Performance Certificate

The main purpose of the EPC is to give useful information considering the cumulative energy performance of the building. The buildings are rated based on calculated consumption (asset rating) of primary energy per year (kWh/m<sup>2</sup>.year) for typical use of the building and according to the building type. The energy label classifies the buildings on an efficiency scale ranging from A (high energy efficiency) to G (poor efficiency).

The EPC also provides information about the estimated CO<sub>2</sub> emissions resulting from the calculated energy consumption, and the calculated energy that comes from renewable sources.

The EPC has to be accompanied by the recommendations report, consisting of a list of suggested measures and the related costs for their implementation. The report is divided in three tables. A table of short payback period recommendations (up to three years), a table of medium payback period recommendations (three to seven years), and a table of long payback period recommendations (more than seven years). Every suggested measure has to have a short description, and be classified in one of these tables. Further than that, the impact on energy saving has to be evaluated as Low, Medium or High. The recommendations are the sole responsibility of the Qualified Expert. The software that is used for calculating the energy performance of buildings generates a list of recommendations for the building for which the calculations are performed. The QE can then choose from this list and/or can create his/her own.

The validity of the EPC and the recommendations report is 10 years for all types of buildings.

### 3. Recommendations

The following sections list recommendations selected by the accredited expert for the improvement of the energy performance of the building. The recommendations are listed under four headings: short payback, medium payback and long payback.

#### a) Recommendations with a short payback

This section lists recommendations with a payback of less than 3 years:

Recommendation	Potential impact
Install more efficient water heater.	MEDIUM
Chiller efficiency is low. Consider upgrading chiller plant.	HIGH
Some floors are poorly insulated - introduce and/or improve insulation. Add insulation to the exposed surfaces of floors adjacent to underground, unheated spaces or exterior.	HIGH

#### b) Recommendations with a medium payback

This section lists recommendations with a payback of between 3 and 7 years:

Recommendation	Potential impact
The default chiller efficiency is chosen. It is recommended that the chiller system be investigated to gain an understanding of its efficiency and possible improvements.	LOW

#### c) Recommendations with a long payback

This section lists recommendations with a payback of more than 7 years:

Recommendation	Potential impact

Figure 2 - Recommendations to improve the energy performance

As of the 1<sup>st</sup> of January 2010 for residential buildings, and as of the 1<sup>st</sup> of September 2010 for non-residential buildings, it became mandatory that every new building or building unit and every existing building above 1,000 m<sup>2</sup> that undergoes major renovation must have an EPC in order to get a building permit before construction starts. As part of the minimum requirements, the buildings that apply for a building permit have to be at least class B.

From the same dates, all existing residential and non-residential buildings need to be certified when they are sold or rented. The building owner has to present an EPC to everyone that is interested in renting or buying. In all cases, the EPC has to be accompanied by a recommendations report.

In order to issue an EPC and a recommendations report for an existing building, a QE has to visit the building and collect all the necessary data to perform energy performance calculations. This data must include the thermal characteristics of the building envelope, the type and efficiency of the HVAC systems, and the characteristics of the hot water and lighting system. The QE will then calculate the energy performance of the building and issue the EPC. There is no minimum requirement for an existing building, i.e., they can be labelled A through G. The Energy Service has issued the "Guide for Certifying Existing Dwellings" in order to assist QEs, as it lists the process that they must follow, as well as checklists and tables that they can fill on their visit. It also contains default values of thermal properties of constructions in case they cannot be practically assessed.

The calculation methodology is defined by the Ministerial Order for the Methodology for Calculating the Energy Performance of Buildings of 2009, and is described in two documents:

- > Guide of Thermal Insulation of Buildings (2<sup>nd</sup> Edition)
- > Methodology for Calculating the Energy Performance of Buildings

The "Guide of Thermal Insulation of Buildings" was first issued in 2007 in order to guide engineers and architects to calculate U-values and inform them on different insulation techniques. The 2<sup>nd</sup> Edition included more detailed calculation methods of U-values and calculations related to thermal mass. The "Methodology for Calculating the Energy Performance of Buildings" describes all the algorithms and assumptions used to calculate the energy consumption. It includes heating, cooling, domestic hot water and lighting needs, expressed in terms of primary energy. Both documents are based on CEN standards, and they are both mandatory to be used to calculate the energy performance of all buildings, existing and new. The "Methodology for Calculating the Energy Performance of Buildings" is simulated by the software SBEMcy, which is the only approved software by the Energy Service. The methodology and the software can be downloaded from the webpage of the Ministry of Commerce, Industry and Tourism (link at left).

[http://www.mcit.gov.cy/mcit/mcit.nsf/dmlperformance\\_gr/dmlperformance\\_gr?OpenDocument](http://www.mcit.gov.cy/mcit/mcit.nsf/dmlperformance_gr/dmlperformance_gr?OpenDocument)



The “Guide for Certifying Existing Dwellings”



The “Guide of Thermal Insulation of Buildings (2<sup>nd</sup> Edition)”

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Αριθμός ορόφων:	Αριθμός υπογειών:	Έτος κατασκευής:	Χρήση κτιρίου:
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<b>Τύπος Τοιχοποιίας</b>			
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Figure 3 - Table that the qualified expert has to fill when visiting an existing dwelling

The QEs have to submit the EPC, the recommendations report, and the calculations file via email, to the central registry of the Energy Service. Upon submission, the EPC is registered under a unique number. The same registration number appears on the recommendations report.

As from the 1<sup>st</sup> of September 2010, all public buildings in Cyprus with more than 1,000 m<sup>2</sup> that are frequently visited are required to display an energy certificate at the main entrance. The definition of public building includes every building that is used by a government body or by an organisation or company that is funded or controlled by the government. Buildings are defined as frequently visited when a service is provided to the public constantly. This definition covers a large number of buildings in Cyprus and most of them are in the process of certification at the end of 2010.

The responsibility of having a certificate is always of the building owner. The Energy Service charges the QEs with a registration fee of 200 € for the first year and 100 € for every other year. An owner, who fails to deliver the Certificate to a buyer or renter, or to display it on a public building, will incur in a fine which must not exceed 8,550 €. Until the end of 2010, there are no statistics about the cost of preparing EPCs.

Fig. 4 shows a simplified illustration of the process for certification.

Μεθοδολογία Υπολογισμού της ενεργειακής απόδοσης κτιρίου.  
Αύγουστος 2009



The “Methodology for Calculating the Energy Performance of Building”

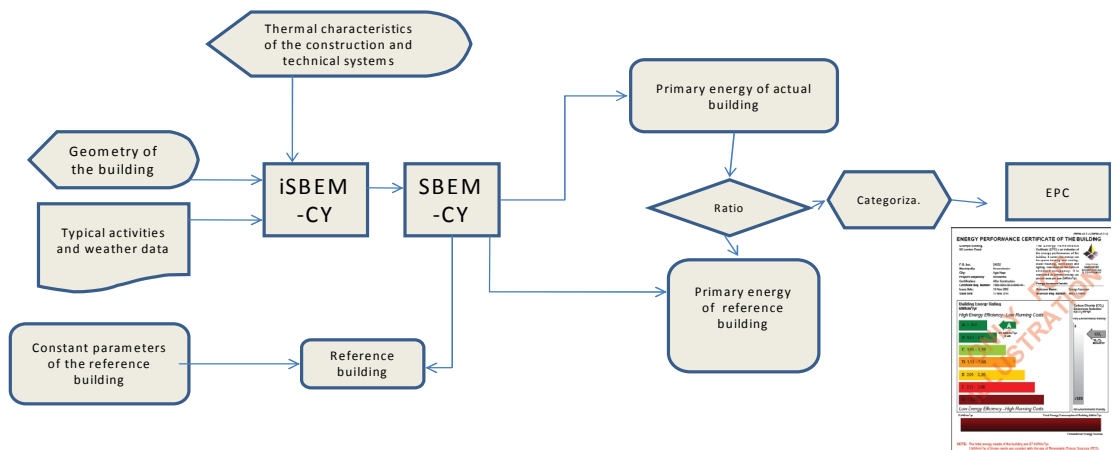


Figure 4 - Process of certification

### Quality assurance (QA)

The Energy Service has set a quality assurance scheme in order to ensure as much as possible the high quality of EPCs and the recommendations report.

The first step includes setting the vigorous qualification requirements of the QEs. These requirements include certain academic background, work experience, training and high passing grade on the exam (see chapter 4).

The second step concerns checking the way that QEs are performing calculations. The checks are on a random basis, but there are also several criteria to flag a certificate for a check, of which the most important are: issuing certificate for the first time, recorded previous failure to perform calculations, and use of RES other than solar thermal. The target is to have enough EPCs checked in order to have a reliable indicator, and to check every QE at least once in order to fix problems from the source.

As soon as the EPC is submitted, a straightforward visual verification of its form takes place, by checking if the name and the number of QE are correct, and if all the required information is filled on the EPC, e.g., address, date and so on. All EPCs are checked in this first stage. In case of problem, the EPC is send back to the QE, otherwise the EPC is issued.

Then, parameters considering the building envelope, efficiency of HVAC systems and RES are checked. In case they exceed certain criteria, e.g., very low U-values, the EPC is flagged and further clarification is asked from the QE. If the clarification is not satisfactory, then the Energy Service proceeds to a thorough check of the energy performance calculations. If more questions arise from this stage, then the QE is audited to verify the source of the data used and the correctness of any other calculation that cannot be checked by the electronic files that are submitted.

Until the end of 2010, 332 EPCs have gone through a thorough check, which accounts for 16% of all the EPCs submitted, and 103 of them were cancelled. All QEs have been checked at least once on the way they are performing calculations. The implementation of a quality assurance system has led to 53 mandates with the aim of fixing individual QE problems, and 3 mandates to all QEs addressing general problems in calculations and data collection.

## 3 > Inspections - Status of implementation

The inspection of air-conditioning systems in Cyprus started on the 1<sup>st</sup> of October 2010. The Ministerial Order for the Inspection of Air-conditioning systems makes the inspection of air-conditioning systems larger than 12kW mandatory, and the inspection of air-conditioning systems that, adding together their nominal power in the same building, exceed 50kW.



The “Guide for the Inspection of Air-conditioning systems”

The inspections can only be performed by inspectors of building services, which have to be registered in the corresponding registry of the Energy Service. To be qualified, they must have a degree in Mechanical Engineering, be members of ETEK, and have three years of related experience. Until the end of 2010, there are 44 registered inspectors. In 2010, it is planned to reassess the qualifications of the inspectors by going through training and take an exam. These qualifications will apply for the new and the existing inspectors.

The methodology of inspecting air-conditioning systems is described in the “Guide for the Inspection of Air-Conditioning Systems”, and is based on EN 15240:2007. The document describes the required data that has to be gathered, the checks that have to be performed and guidance on the recommendations.

Table 1: Frequency of inspections of air-conditioning systems

Nominal power of the system	Inspection frequency	Completion of first inspection
12kW - 250 kW	Every 5 years	31 <sup>st</sup> of December 2011
≥250 kW	Every 3 years	31 <sup>st</sup> of December 2011
>50 kW	Every 5 years	31 <sup>st</sup> of December 2010

Cyprus has started an information campaign to the public for the benefits of regular inspection and maintenance of boilers. The Energy Service has issued the document “Simple ways to save energy in the central heating system” which is directed to the public and guides the home owners and users of the system to make a first assessment of it and, when it is needed, to call an inspector. The methodology for the inspection of boilers is described in the “Guide for the Inspection of Central Heating Systems with Boilers”.

A registry for boiler and air-conditioning inspectors is planned to be set up.



“Simple ways to save energy in the central heating system”

#### 4 > Qualified Experts

EPCs and recommendations reports can be only issued by QEs. The QEs are separated into two categories: QEs for residential buildings, and QEs for non-residential buildings. All QEs must have a degree in Architecture, Mechanical Engineering, Civil Engineering or Electrical Engineering and be members of ETEK (Cyprus Technical and Scientific Chamber).

- > For residential buildings, they have to have three years of experience in their field and pass a national exam.
- > For non-residential buildings, they have to have six years of experience and pass an exam, and it is a prerequisite that they already passed the exam for residential buildings.

In addition, Energy Service offers courses that the candidates may attend in order to pass the exam. The course offered for residential buildings covers the legal framework, basic heat transfer, calculation methodology, recommendations and software practice. The course offered for non-residential buildings covers case studies of big buildings with emphasis on complex technical systems and recommendations. Though the attendance to the courses by the candidates is not mandatory, the attendance is very high and for non-residential buildings is 100%.

Once the candidate has all qualifications, he/she applies to register on the qualified experts’ registry, and a professional license is issued valid for one year. The license can be suspended or cancelled if it is concluded that they cannot perform energy performance calculations or that they are changing data to alter the energy rating.

Qualified experts can act only on an individual basis. At the end of 2010, there were 200 Qualified Experts that can certify residential buildings and 32 of them can also certify non-residential buildings. The qualified experts’ registry is on the website of the Ministry of Commerce, Industry and Tourism, on which the public can view their names and contact information.

## 5 > National Information and Communication Campaigns

### The need of informing citizens on certification

The Ministry of Commerce, Industry and Tourism has recognised that informing the professionals of the building industry and the public is crucial for exploiting the full potential of the EPBD. The Energy Service, as the competent authority for implementation of the EPBD, has intensified the information campaigns during 2009 and 2010, with more emphasis on the EPC and the inspections.

The first stage information was the training of the building permit authorities, the majority of which are the Municipalities, which took place through three training sessions. Furthermore, a guide was issued, in order to assist the building authorities to effectively check if the buildings are complying with the energy performance requirements when their building permit is examined.

The second stage was the information of all the parties involved in the building industry. Energy Service organised or participated in tens of seminars and presentations to promote the EPC, minimum energy performance requirements and inspections, especially directed to professional associations, including the land development association, the property owners association, as well as the architects and civil engineers associations.

As from 2008, for every public building there is one public employee assigned as “energy saving attaché”. His duties include the promotion of energy saving culture, the implementation of national energy policies, and suggestions for reducing the overall energy consumption of the building. The “energy saving attachés” have to submit every year to the Energy Service a report that includes measured energy consumption and measures taken to improve energy efficiency. So far, there are 300 “energy saving attachés” in the corresponding public buildings who were trained by the Energy Service in related matters including the implementation of the EPBD in Cyprus and, especially, in the public buildings. Starting from 2011, this function is being expanded to public schools.

A three page leaflet informing the public about the EPC has been issued and made available in places where frequent services are offered to the public, like the Office of Servicing the Citizen, the Electricity Authority of Cyprus and banks. Additionally, three advertisement flyers have been published: one for the EPC when a building is for sale or for rent, one for the inspection of air-conditioning systems and one for the inspection of heating systems.



Advertisement for the EPC



Advertisement for air-conditioning inspections



Figure 5 - Three page leaflet about the EPC for the public

Ads of these three issues were published in newspapers, and additionally officers of the Energy Service have participated in radio and television shows to promote EPBD issues.

## 6 > National Incentives and Subsidies

In 2004 the Government of Cyprus has launched the “Grant scheme for the promotion of renewable and energy conservation” This Scheme is intended to provide financial incentives in the form of government subsidies for investments to be made to generate electricity using wind and solar energy, biomass and landfill biogas and for investments made to improve energy efficiency in the sector of buildings, industry and services.

Considering the building sector the Scheme covers thermal insulation for existing buildings, and installation of ground source heat pumps, solar thermal systems, photovoltaic and small wind turbines for new and existing buildings. For the thermal insulation and the installation of ground source heat pumps and solar thermal systems the building owner receives a fund according to the size of the investment. Since the beginning of 2010 an EPC has to be issued and included in the application forms in the case of solar thermal systems for space heating and ground source heat pumps. In the case of photovoltaic and small wind turbine the building owner receives an operational aid with a subsidy per KWh generated. The subsidy (the difference between the overall sale price per KWh and the Electricity Authority of Cyprus purchase price) shall be paid by the Special Fund which has been set up, and which is financed by imposing a charge on electricity consumption of 0.0044 €/KWh.

## 7 > Impact of the EPBD at national level

### Evolution of Minimum Energy Performance Requirements in building regulations

The implementation of the EPBD in Cyprus was the first attempt ever made to regulate the energy consumption in buildings. The 2007 regulations for the first time required thermal insulation of the building envelope in Cyprus.

*Table 2: Minimum energy performance requirements for new building and all buildings above 1,000 m<sup>2</sup> that undergo a major renovation (2007 regulations)*

Description	U-value (W/m <sup>2</sup> K)	Comments
Horizontal structural elements of the shell	≤0.75	
Wall and structural elements of the shell	≤0.85	Not applied to passive systems
Windows and external doors	≤3.8	Not applied to shop windows
Floor in contact with unheated spaces	≤2.0	

In 2009, a new Ministerial Order for the Minimum Energy Performance Requirements was issued. It keeps the same maximum U-values for the building envelope, but it makes the requirements more stringent as it regulates the building as one entity. These new requirements are:

- > The average U-value of the building envelope
- > The EPC with a B category

The calculation of the average U-value (or U-mean) takes into account the U-value of each element of the building envelope and its corresponding surface area and averaged over the whole area of the building envelope. The roof and the floor are not included in this calculation. Compliance with this requirement results in lower U-values in case that extensive use of glazing is chosen. The maximum average U-value differentiates between residential and non-residential building.

The B energy category as a minimum requirement is achieved only if the building needs the same or less primary energy than the reference building. The reference building has predetermined values of the thermal characteristics of external walls, floors and windows which are slightly lower than those set as minimum requirement for every individual element. Additionally, it has predetermined values for the efficiency of heating, air-conditioning, hot water and lighting systems. For non-residential buildings, these parameters are stricter.

*Table 3: Predetermined U-values for the reference building*

U-values in the Reference building		
Exposed element	U-value (W/m <sup>2</sup> K) (residential)	U-value (W/m <sup>2</sup> K) (non-Residential)
Roofs <sup>1</sup> (irrespective of pitch)	0.6375	0.6375
Walls	0.7225	0.7225
Floors (except for ground floors, below)	0.6375	0.6375
Ground floors	1.6	1.6
Windows, roof windows, roof lights, and pedestrian doors	3.23	3.23
Vehicle access and similar large doors	Same as real building	Same as real building
<sup>1</sup> Any part of a roof having a pitch greater or equal to 70° is considered as a wall		

The new Ministerial Order of 2009 introduced for the first time the integration of RES in new buildings. It made the installation of a solar thermal system for the production of hot water mandatory in all new residential buildings. The installation of these systems was already common practice in Cyprus for houses. However, for the first time, their technical parameters are regulated, including size and efficiency, since they now have to be designed and installed according to the “Technical Guide for the Installation of Solar Thermal Systems”. Additionally, and for all new buildings, it is required to pre-install the necessary infrastructure in case the future owner decides to install RES to produce electricity.

*Table 4: New Minimum energy performance requirements for new buildings and all buildings above 1,000 m<sup>2</sup> that undergo a major renovation (2009 regulations)*

Description	U-value (W/m <sup>2</sup> K)	Comments
Average U-value not including floors and roofs	≤1.3 residential ≤1.8 non-residential	
Energy class on the EPC B or better		
Installation of solar thermal systems in all new residential buildings according to the “Technical Guide for the Installation of Solar Thermal Systems”		It is subject to restrictions and requirements set by the Department of Spatial Planning and Housing
Installation of the needed infrastructure for the future installation of RES electricity production systems		

### Other impacts

The implementation of the EPBD in Cyprus leaves complete freedom to building designers in the choice of technologies and, to a great extent, freedom in architectural design. This freedom enables the architects and engineers to meet the minimum requirements by using different construction materials and technologies.

The demand from the designers to find construction materials to meet the minimum requirements had an impact on the quality of information on the building products, and even on the competition between producers and vendors in supplying materials of improved thermal properties.

The requirement of a minimum B class on the certificate has integrated for the first time the importance of efficient technical systems in the energy performance of buildings. As a result, more designers have shown interest in heat pumps and condensing boilers. The calculation of the overall energy performance of the building has also underlined the importance of integrated solar strategies and external shading for the designers. Furthermore, the Qualified Expert, most of the

times an established professional in the building sector, in many cases operates as a consultant that oversees all matters related to the energy performance of buildings, making the implementation of minimum requirements more effective and even leading to designs better than the minimum requirements.

## **8 > Conclusions and future planning**

According to the National Action Plan, it is estimated that the targets of Cyprus in energy saving can be achieved to a great extent by applying the EPBD requirements for new buildings and major renovations. This is due to two major factors: the long absence of legislative measures regarding the thermal insulation of buildings, and the relatively large number of new constructions.

The real challenge in energy saving is the existing building stock. It consists of 380,000 homes, and it is estimated that less than 15% have thermal insulation in any elements of the building envelope. Since these buildings were not built under any regulation, they were insulated either under individual initiative, or under the “Grant scheme for the promotion of renewable and energy conservation” that started in 2004.

In 2010, this Grant scheme was revised and it started to include subsidies for the installation of ground source heat pumps, solar thermal for space heating, replacement of solar thermal systems for producing domestic hot water older than 10 years with new more efficient units, as well as installation of photovoltaic and small wind generators.

The Energy Service is preparing proposals to further revise the Grant scheme targeting improvements of the energy performance of the existing building stock. The certification and inspections schemes, already created by the implementation of EPBD, are significant tools to be used in any new financial incentive introduced in the future.

The adequate information of the public and key persons in business and corporations is another challenge that had to be faced in order to promote energy efficiency measures in the existing building stock. A more intensive information campaign is planned, with advertisements and pilot projects that will serve as show cases.

The experience from implementing the EPBD so far, as well as the new obligations from the recast of the EPBD, has set forward the planning of more actions. The most important of them are:

- > Technical solutions for achieving nearly zero energy building in Cyprus;
- > Redefinition of the reference building, and the minimum requirements, in order to better reflect the climatic variety of Cyprus and the resulting cost-benefit relationship;
- > Provide additional training to building designers in energy efficiency and integration of RES;
- > Provide additional training for installers of insulation materials and HVAC systems.

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