



CONCERTED ACTION ENERGY PERFORMANCE OF BUILDINGS

EPBD implementation in Cyprus

Status in December 2016

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1. Introduction

As the building sector is responsible for more than 30% of the final energy consumption in Cyprus and the existing building stock is lacking in energy efficiency, the energy performance of buildings plays a vital role in implementing an energy policy that will be beneficial to almost all stakeholders. Therefore, Cyprus aims to reduce the building sector's energy demand to a very low level, for both new and existing buildings, by implementing all financially and technically feasible measures of energy efficiency.

The first initiative to promote energy efficiency in buildings was initiated in 2004 with the “*Grant Scheme for Promoting Renewable Energy Sources and the Conservation of Energy*”. The scheme included subsidies for thermal insulation, double-glazing, efficient lighting and RES. However, the decisive step was the implementation of minimum energy performance requirements in 2007 and the launch of the national scheme to certify the energy performance of new and existing buildings two years later¹.

Cyprus transposed Directive 2010/31/EU into their national legislation by amending their law that regulates the energy performance of buildings in December 2012. Based on this new legal framework, technical requirements for NZEB were defined, detailed requirements for technical building systems were issued and minimum energy performance requirements have since been twice revised, based on the calculation of cost-optimal levels. The new minimum energy performance requirements were implemented on 1 January 2017 and are considered to be the final step for leading Cyprus into a smooth transition towards NZEB. The overall responsibility of the implementation of the EPBD in Cyprus lies with the Ministry of Energy, Commerce, Industry and Tourism (MECIT). This report is an overview of the current status of the EPBD implementation in Cyprus.

2. Current Status of Implementation of the EPBD

2.1. Energy performance requirements: NEW BUILDINGS

The first minimum energy performance requirements for new buildings have been adopted on 21 December 2007, whereby maximum permissible U-values for new buildings were determined for the first time, making thermal insulation of the building envelope and the installation of double-glazed windows virtually mandatory². In 2010, energy class B for the EPC was added to the minimum requirements³. The results of calculating the cost-optimal levels of minimum energy performance requirements, which took place in 2013, have been the catalyst for further tightening these requirements.

2.1.i. Progress and current status of new buildings

The results of the calculation for setting the minimum energy performance requirements at cost-optimal levels have indicated that, while energy class B was at the optimal level, requirements regarding insulation and RES were much less efficient than the optimal levels. At the same time, the economic benefit of shading (for all buildings) and improving lighting (in office buildings) has been made apparent by the results of the calculation.

In order to set minimum requirements at cost-optimal levels by 2017, in December 2013 the maximum U-values were reduced by approximately 15%, and a maximum shading factor for windows was introduced. This factor is the product of the solar radiation reduction factor of fixed shading, external removable shading, and transmission of solar radiation through glazing. Also, according to the requirements for non-residential buildings, at least 3% of the total energy consumption should come from RES⁴.

From 1 January 2017, the U-values of the building envelope will be reduced even further, closely approaching the requirements for NZEB. Additionally, the minimum proportion of total energy consumption that should come from RES, both for residential and non-residential buildings, has significantly increased⁵.

2.1.ii. Format of national transposition and implementation of existing regulations

The methodology for calculating U-values is documented in the “*Guide of Thermal Insulation of Buildings*” issued by the MECIT, which is necessary to show compliance regarding building envelope minimum requirements and/or to use them as an input for assessing the overall energy performance of a building. The guide also provides the methodology for calculating effective thermal mass as well as general information about different insulating methods. The “*Methodology for Calculating the Energy Performance of Buildings*” issued by the MECIT documents all the algorithms and assumptions used to calculate energy consumption and to issue an EPC. It includes the calculation of heating, cooling, ventilation, domestic hot water and lighting energy use, expressed in terms of primary energy, based on which the energy class is assigned to the building. The methodology was revised in 2015, mainly in order to address issues in certifying existing buildings. Both documents are based on CEN standards, and they are both mandatory, to be used to calculate the energy performance for all types of buildings, existing and new.

The MECIT checks implementation of minimum energy performance requirements through random on-site visits of the construction sites. In the case where appointed inspectors find no compliance with minimum requirements the building owner is notified of the infringement and a deadline is given to comply. If the building owner does not comply within the deadline, then legal action is taken. In 2015 and 2016, 1,443 inspections of construction sites have been done.

2.1.iii. Action plan for progression to NZEB for new buildings

The national action plan for increasing the number of NZEB, which was issued in 2012 and revised in 2016, identifies a number of actions to be taken up to 2020. The first step towards NZEB is considered to be the issuance of the “Requirements and Technical Characteristics of the NZEB Ministerial Order of 2014 (Κ.Δ.Π. 366/2014)”. The order provides, in a legally binding document, both mandatory requirements by 2020 and a high energy efficiency standard that can already though voluntarily be implemented in new and renovated buildings. The requirements for NZEB specify lower U-values, maximum heating demand for residential buildings, maximum lighting power installation for office buildings, maximum primary energy consumption and a minimum contribution of RES. The requirements differ only between residential and non-residential buildings, but the same requirements apply for new and existing buildings.

In order to assist building designers in the design of NZEB, the MECIT issued “The Technical Guide for NZEB” in 2015, which documents how architectural design, building envelope, technical building systems and RES are optimally combined. Furthermore, other educational measures are taken in order to improve technical knowledge regarding NZEB. The Cyprus University of Technology has undertaken the training of a small group of instructors who in turn will train other engineers/architects on the topic. To date, there are 14 instructors which have trained 120 engineers and architects in NZEB design.

The University of Cyprus is running a similar programme which aims at increasing knowledge and skills regarding NZEB. The educational activities of the programme include a university course (graduate level), e-learning and webinars, as well as training sessions and workshops on actual case study buildings. From January 2016 until today, more than 60 professionals in the building sector have been trained in Cyprus, and more than 120 in total have updated their skills through participation in the project activities. The University of Cyprus envisages the creation of an innovative interdisciplinary educational training programme that focuses on real building situations.

2.1.iv. Requirements for systems and / or building components for new buildings

Since the implementation of the EPBD in Cyprus, emphasis was given on improving the building envelope of new buildings. Thus, maximum U-values were established for roofs, walls, windows and floors in contact with the external environment. These U-values have been gradually tightened over the last ten (10) years in an attempt to reduce energy demand for heating and cooling in new buildings. Furthermore, the introduction of a maximum shading factor for windows in 2013 was the first minimum requirement purely set to address cooling energy demand. As far as technical building systems are considered, the only current requirement is the installation of solar water heaters for domestic hot water in new residential buildings according to the “*Technical Guide for the Installation of Solar Heaters*”, which specifies the size of the system according to the size of the house. Another requirement will be in force from 1 January 2017 as maximum mean power installed for lighting is set for new office buildings.

2.II. Energy performance requirements: EXISTING BUILDINGS

As mentioned above, the rules for calculating U-values and energy performance are the same for new and for existing buildings. The requirements defined in NZEB regulation are also identical for both new builds and for that part of the existing building stock which undergoes major renovations.

2.II.i. Progress and current status of existing buildings

The minimum energy performance requirements include requirements for existing buildings. The first minimum energy performance requirements issued in 2007 mandated that buildings over 1,000 m² that undergo major renovations shall be insulated at the same level as a new building. From January 2010, the minimum category B on the EPC was added to requirements for buildings over 1,000 m² that undergo major renovations. In December 2013, maximum U-values have been reduced and also implemented for building elements of an envelope that are replaced or retrofitted. In order to reach cost-optimal levels, as of 1 January 2017 all buildings that undergo major renovations should reach at least energy class B as far as it is technically and financially feasible. Additionally, all building elements that are replaced or retrofitted have to reach the same U-value requirements as new buildings.

2.II.ii. Plans to improve the existing building stock

Most of the existing building stock has a relatively poor energy performance, as the majority (94% for the residential sector and 83% for the tertiary sector), was built before the implementation of minimum energy performance requirements. Implementing energy efficiency measures has been mobilised mainly through financial incentives, though since 2015 the trend has been for deep renovations rather than single measures.

In April 2016, by decision of the Cabinet of Ministers, the Commission for the Energy Performance of Buildings of the Central Government Authorities was established. It consists of the relevant departments of the Ministry of Transport, Communications and Public Works, which is responsible for public buildings and the MECIT. The committee, as part of its mission, seeks to upgrade the energy efficiency of buildings owned and used by the central government, in order to implement the obligations of Article 5 of Directive 2012/27/EU, as well as to propose measures for promoting NZEB for public buildings in the best economic and technical way. For the renovation of public buildings, 20 million € has been secured from the EU structural funds of the 2014 – 2020 period.

2.II.iii. Regulation of system performance, distinct from whole building performance

Requirements for building elements had originally been implemented for maximum U-values and only for buildings of more than 1,000 m² that undergo major renovations⁶. Requirements for building elements regardless of renovations were set in 2013⁷. These requirements set maximum U-values for roofs, walls and windows that were replaced or retrofitted or were part of an extension to an existing building. At the same time, requirements were set for the efficiency of boilers, AC systems with a rated output of power of less than 12 kW, solar water heaters and ventilation systems with a capacity bigger than 500 litres per second that were replaced or installed in existing buildings⁸.

In 2016, these requirements were revised, and as of 1 January 2017 new, more stringent U-values will be required for envelope building elements installed in existing buildings⁹. For technical building systems, new comprehensive requirements were issued in 2016 that cover almost all conventional technical building systems installed in buildings¹⁰. The requirements are described in two documents, one for residential and another for non-residential buildings, and cover requirements for not just the whole system, but also for individual parts. The requirements are also supplemented by recommendations of best practices.

2.II.iv. Encouragement of intelligent metering

In the framework of the SmartPV project, smart meters have been installed in 247 households where there is also on-site electricity production by PV systems¹¹. The aim has been to thoroughly investigate the consumption profile of these consumers – producers (prosumers) and their change in behaviour as well, based on some incentives given through the programme. The results of the SmartPV project are to be used to evaluate the installation of another 3,000 smart meters. Also, the scheme "*I save – I upgrade*", managed by the MECIT, provides subsidies for installing smart metering as part of the deep renovations of a building¹².

2.II.v. Financial instruments and incentives for existing buildings

For the last three years, the main financial incentive for renovating the existing building stock has been the scheme "*I save – I upgrade*". The scheme provides grants for renovating homes and business buildings if they reach specific energy-related criteria¹³. Eligible costs include insulation, windows, high-energy performance technical building systems, lighting, and RES for heating, cooling and domestic hot water. The percentage and maximum amount of subsidies increases with the level of energy upgrade, in order to stimulate deeper energy renovation.

Another incentive is the establishment of the 5% extra building space allowance for buildings that reach A class, with at least 25% of their primary energy consumption coming from RES, established in 2014. Most of the interest for this incentive comes from developers of large buildings. This incentive can also be used in the construction of new buildings.

2.II.vi. Information campaigns/ complementary policies

The MECIT is informing the public through leaflets and advertising flyers about EPCs, NZEB, and the inspection of central heating and AC systems. Additionally, the annual exhibition "*SAVENERGY*" is likely the most important public event in the energy efficiency of buildings. The exhibition started in 2004 and is co-organised by the MECIT and the Cyprus Employers and Industrialists Federation. It gives the public an opportunity to come in direct contact with the companies that sell and install energy saving and RES systems, mainly in the building sector.

The MECIT organises and/or participates in seminars and presentations especially directed at professionals in the building industry, such as engineers, construction companies and real estate agents. In the last two years, such events have been targeting professionals of the financial sector in order to stimulate their involvement in the energy efficiency of buildings.

2.III. Energy Performance Certificate requirements

The EPC scheme in Cyprus commenced in 2010 and underwent revisions in 2013. The changes were based on the four-year experiences of implementing it. The majority of EPCs issued so far are for new buildings and new building units. This is mainly due to the fact that the majority of existing homes are not for sale or rent, as they are owner-occupied. Another factor for the limited use of EPCs in existing buildings is believed to be the lack of information for prospective buyers or tenants. A boost in the use of EPCs in existing buildings was given by the scheme "I save – I upgrade", as it is a prerequisite for providing financing for deep renovations. Further penetration of EPCs in existing buildings is expected from 1 January 2017, as energy class B is to be the minimum requirement for all buildings that undergo major renovations.

2.III.i. Progress and current status on sale or rental of buildings and EPCs

EPCs for buildings that are for sale and rent have been mandatory since 2010. In late 2015 it became mandatory for the central government to buy and rent only high energy-efficient buildings, meaning only energy class B or better. This is expected to increase the awareness regarding EPCs and the energy efficiency of buildings, especially for office buildings.

2.III.ii. Quality Assurance of EPCs

In 2015, the MECIT has checked 9% of all EPCs issued, which is considered to be a statistically relevant sample. Samples for checking purposes are drawn from four categories: new residential buildings, existing residential buildings, new non-residential buildings and existing non-residential buildings. Ten (10) specific input parameters are checked, most notably U-values, efficiencies of heating and cooling systems, and window size. If the input parameters alter the energy class of the building, the EPC is cancelled. In that case the qualified expert has to issue a new, corrected EPC by a specific deadline. If the EPC is not issued then the building permit authority is notified in order to take measures within its jurisdiction, such as the cancellation of the building permit. Only 1% of the EPCs checked in 2015 were cancelled, though in another 8%, specific problems were spotted and the qualified experts that issued them were notified.

2.III.iii. Progress and current status of EPCs on public and large buildings visited by the public

The central government owns and uses 179 buildings, and 93 of them have an EPC. The Department of Electrical and Mechanical Services has the overall responsibility for issuing EPCs for these buildings, and the issuing of an EPC for buildings that the government rents is the sole responsibility of the owner and follows the structure of EPCs used by other non-residential buildings. In order to check compliance with the display of EPCs, 19 inspections have been carried out in buildings used by the central government, the local authorities and other public bodies. In 10 cases the EPC was not displayed and the relevant public authorities were notified.

2.III.iv. Implementation of mandatory advertising requirement - status

In 2014, the ministry commenced sample checks on the implementation of this requirement. The MECIT has initially focused on building development companies and real estate agents. To date, fines have been imposed in 22 cases. The result of these actions is that the energy class now appears in advert boards, newspaper adverts and other commercials in media related to renting or selling buildings.

2.IV. Inspection requirements - heating systems, air conditioning

2.IV.i. Report on equivalence of model A and B for Heating Systems

Cyprus has chosen option A and has established regular inspections of heating systems with boilers and of AC systems.

2.IV.ii. Progress and current status on heating systems

The inspection of heating systems has to be performed according to “The Guide for the Inspection of Heating Systems with Boilers” issued by the MECIT. The document specifies the method for measuring combustion efficiency, heat losses from the chimney and how to check the boiler for over-dimensioning. It also provides guidance for possible recommendations regarding the improvement of all parts of the heating system. The frequency of the inspections varies according to the size of the boiler and the type of the fuel used.

Boiler rated output of the heating system	Frequency of inspection
More than 20 kW and less than 100 kW	Every five (5) years
More than 100 kW (gas)	Every four (4) years
More than 100 kW (liquid or solid fuel)	Every two (2) years

2.IV.iii. Progress and current status on AC systems

The inspection of AC systems is mandatory, to be performed for systems with an effective rated output above 12 kW or when the sum of all AC systems installed exceeds 50 kW of total output in the same building or building unit. The inspection is mandatory every five (5) years for systems of more than 12 kW and less than 250 kW, and for systems in which the total installed capacity in a building is more than 50 kW. For systems of more than 250 kW, inspections have to take place every three (3) years. Inspections have to be performed according to “The Guide for the Inspection of Air Conditioning System” issued by the MECIT, which describes the steps that have to be followed by the inspector as well as a checklist that has to be completed during the inspection.

2.IV.iv. Enforcement and impact assessment of inspections

Enforcement and penalties

A fine of up to 30,000 € can be implemented in the case of a central heating system not being inspected. However, no fine has been implemented so far. At this stage efforts are focused on informing the public about the benefits of inspections.

Quality control of inspection reports

At the end of each year, the MECIT requires all inspectors to submit the reports they conducted during the year. The reports are then checked to see if they have been completed appropriately and include recommendations. For 2015 checks, it has been concluded that the reports for AC systems are satisfactory, though for heating systems the recommendations in many cases dealt with only the boiler and not other parts of the system. The MECIT has issued notifications to the inspectors of heating systems in order to take corrective measures.

Impact assessment, costs and benefits

It is estimated that a heating system inspection in a house requires three (3) working hours, and the inspection of a heating or an AC system in a medium-sized commercial building a whole working day. Benefits for the owner occur when they apply the recommendations suggested by the inspector in the inspection report, which can either be of no cost, e.g., correctly setting a thermostat, or of a larger cost, e.g., replacing the boiler. The owner has the right to decide whether or not to apply the recommendations and when to do so if they choose to. It is estimated that the application of inspections may result in a total energy savings potential in buildings of around 10%.

3. A success story in EPBD implementation

A new grant scheme was put in place in 2014 in order to encourage households and Small and Medium-sized Enterprises (SMEs) to adopt energy efficiency and renewable energy measures. The scheme, titled "*I save – I upgrade*", is the follow-up of the completed "*Grant Scheme for Promoting the Renewable Energy Sources and the Conservation of Energy*" that ran for buildings in the 2004-2013 period and is based on the same financial model: the provision of grants for direct investments, partly covering the purchase and installation costs of listed energy efficiency measures and technologies. It targets renovations of existing buildings, with a total budget of 15.3 million € during the 2014-2020 period for SMEs and 16.5 million € for households. The new scheme is co-financed by EU structural funds, and the responsibility of its implementation lies with the MECIT.

The scheme provides 50% of investment costs to upgrade a building to energy class B or to reduce energy consumption by at least 40%, and 75% of investment costs for renovating to NZEB level. The maximum grant is 25,000 € for households and 200,000 € for enterprises. In all cases, an EPC has to be issued before and after the implementation of energy efficiency measures, in order for savings to be verified. For buildings above 1,000 m², an energy audit has to be performed before renovations in order to better assess the available technical and financial options. In some exceptions, households of vulnerable consumers can get subsidies for thermal insulation, windows and solar water heaters without requiring the building to reach a certain level of energy performance. To date, 654 homes have been approved to participate in the scheme, which will result to an annual savings of 31.5 GWh. In total, the first call of "*I save – I upgrade*",

which recently closed, is expected to result in around 1,000 residences and 150 tertiary buildings being upgraded.

The scheme has been successful in linking financial support and EPCs. The minimum class to be achieved on the EPC scale, or the energy savings which will be verified through the EPC, together with mandatory pre- and post- upgrade submissions of EPC documentation, provide a boost to the EPC market, raising awareness among the public about its benefits and harnessing its market potential as a driver for energy efficiency upgrades. It has also been successful in raising awareness about NZEB, as more than 45 buildings will be renovated to NZEB level as a result of this first call.

However, delays in disbursing money due to bureaucracy issues, as well as “free-riders”¹⁴, are considered to be major drawbacks. In order to optimise incentives for existing buildings, which can be achieved by simplifying existing processes and further leveraging private funds, discussions are underway between the MECIT, the banking sector, and other stakeholders. The aim is to revise the “I save – I upgrade” scheme in order to address existing hurdles, but also to design specialised financial products that could operate together or independently of “I save – I upgrade”.

4. Conclusions, future plans

The implementation of the EPBD in Cyprus has been successful in reducing energy consumption in new buildings by an estimated 50% compared to the pre-EPBD period. NZEB are expected to reduce consumption by more than 75%. However, all estimates are based on calculation models that do not consider the quality of works or any flaws that occur during operation. The establishment of a registry for energy auditors in 2013 has partially closed this gap, while more efforts are focused on training installers. Since 2015, a certification for small-scale RES installers has already been put in place and, concurrent to that, the MECIT has prepared draft legislation for setting up a certification system for technical building system installers. The new legislation is expected to be discussed in the Cypriot Parliament in 2017.

Upgrading existing buildings still remains the biggest challenge for Cyprus in order to fulfil its goals for 2020. The recent financial scheme “I save – I upgrade” has shown that there is great interest among households, but also for other groups to implement energy efficiency measures, and the industry is keen to seize on this opportunity. Thus, it is recognised that more commercial financing has to be streamlined within the sector. The MECIT’s efforts are focused on developing new financial products for the energy efficiency of buildings and the development of the ESCOs market that will mobilise private funds.

Endnotes

1. The law that regulates the energy performance of buildings (N(I) 142/2006, first issued in 2006), is the fundamental legislation by which minimum requirements, the energy performance certification scheme and other provisions of the EPBD have been implemented through regulations and ministerial orders. The law was revised in 2009 and 2012.
2. “Minimum Energy Performance Requirements Ministerial Order of 2007 (Κ.Δ.Π. 568/2007)”.
3. “Minimum Energy Performance Requirements Ministerial Order of 2009 (Κ.Δ.Π. 446/2009)”.

4. *“Minimum Energy Performance Requirements Ministerial Order of 2013 (Κ.Α.Π. 432/2013)”*.
5. *“Minimum Energy Performance Requirements Ministerial Order of 2016 (Κ.Α.Π. 119/2016)”*.
6. *“Minimum Energy Performance Requirements Ministerial Order of 2007 (Κ.Α.Π. 568/2007)”*.
7. *“Minimum Energy Performance Requirements Ministerial Order of 2013 (Κ.Α.Π. 432/2013)”*.
8. *“Requirements for TBS Installed in Existing Buildings or Building Units and for TBS that are Replaced or Upgraded Ministerial Order of 2013 (Κ.Α.Π. 386/2013)”*.
9. *“Minimum Energy Performance Requirements Ministerial Order of 2016 (Κ.Α.Π. 119/2016)”*.
10. *“Requirements for TBS Installed in Existing Buildings or Building Units and for TBS that are Replaced or Upgraded Ministerial Order of 2016 (Κ.Α.Π. 231/2016)”*.
11. www.smartpvproject.eu
12. www.mcit.gov.cy
13. A 50% subsidy is provided for buildings that are renovated in order to achieve at least 40% savings or energy class B, and a 75% subsidy is provided for buildings that are renovated to NZEB.
14. People who would perform upgrades regardless of subsidies.



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