CONCERTED ACTION
ENERGY PERFORMANCE OF BUILDINGS

EPBD implementation in Greece

Status in December 2016

AUTHORS

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NATIONAL WEBSITES

www.ypeka.gr, www.buildingcert.gr

1. Introduction

The responsibility of the implementation of the EPBD in Greece lies with the Ministry of Environment and Energy (YPEN). The adoption of the Directive 2010/31/EU was approved by the Greek Parliament in February 2013 under Law 4122/2013. From 9 July 2015, Law 4122, among others, reduces the limit of floor area to attain an EPC in public buildings to 250 m^2 (in force since 9 July 2015) and sets control mechanisms for quality control of the issued EPCs and inspection reports.

Law 4342/2015 transposes the EED into national legislation and sets the obligation to renovate 3% of the total floor area of heated and/or cooled public buildings each year to meet at least the minimum energy performance requirements.

New qualifications and training requirements of energy auditors were included in Law 4409 (July 2016) together with the energy auditors' classification into three categories.

Management and quality control is performed by the Departments of Energy Inspection (of Northern and Southern Greece) of the Directorate of Environment, Construction, Energy and Mines Inspections, which are entities within the ministry, established for this purpose.

This report presents an overview of the progress and current status of the EPBD implementation in Greece.

2. Current Status of Implementation of the EPBD

2.I. Energy performance requirements: NEW BUILDINGS

2.I.i. Progress and current status of new buildings

New buildings or building units must meet minimum energy performance requirements set out in the "Regulation on the Energy Performance of Buildings" (*KENAK*) (class B). In combination with the obligation set in Law 4122/2013, these regulations ensure that every new building of the public sector, from 1 January 2019 should be NZEB. This obligation applies also for all new buildings constructed after 1 January 2021.

At the stage of issuing a building permit for new buildings or building units, there must be additional documentation prepared and submitted to the relevant Building Office Authority. This documentation accompanies the energy study and contains the technical, environmental and economic feasibility of the installation of at least one of the following alternative energy supply systems:

- decentralised energy supply systems based on RES;
- combined heat power (CHP);
- heating or cooling systems in the region or block;
- heat pumps that meet the minimum eco-labelling requirements[1].

For new buildings or building units, it is obligatory, since 2011, to cover part of the hot water needs from solar, thermal or other RES/CHP systems. The minimum percentage of the solar share on an annual basis is set at 60%. Non-application of the above rate requires adequate technical documentation in accordance with current legislation and the prevailing conditions.

A cost-optimal study is under preparation and will determine the minimum energy performance requirements for new buildings or building units so that the maximum energy savings are achieved with the lower cost impact. Part of the study that covers new single-family buildings and multi-family buildings (covering over 75% of the building stock) has been completed, and resulted in a proposal for more strict minimum energy requirements for new buildings. With regard to the tertiary sector, the study is expected to be finished within the first trimester of 2017.

2.I.ii. Format of national transposition and implementation of existing regulations

The study of the cost-optimal levels of minimum energy performance requirements for buildings and building elements (Directive 2010/31/EU, Article 5) is coordinated by a steering committee, formed by the *YPEN*, and consists of experts from the academic and scientific community, assisted by individual thematic working groups.

The steering committee has completed the report for the "single-family" building use and has sent it to the EC in late May 2016, whereas the report for the "multi-family" building use was sent in December 2016. The committee is currently carrying out the study for buildings of the tertiary sector (offices, hotels, educational buildings, hospitals, sports facilities and restaurants) and this last report is expected to be finalised by March 2017.

After the completion of the cost-optimal study for the single-family and multi-family buildings, the committee has proceeded to compare their results with the current minimum energy performance requirements and the *YPEN* has prepared the revision of the *KENAK*. These new requirements are expected to be issued in April 2017. After the completion of the study for the tertiary sector buildings, the committee will decide whether the regulation needs to be revised, and will set new minimum energy performance requirements for the energy use in these types of buildings.

Along with the review of the regulation, the revision of the technical guidelines of the Technical Chamber of Greece (*TOTEE*) is also under way and is related to the upcoming changes for the building components and systems. The guidelines take into account all the existing CEN standards related to the energy performance of buildings.

2.I.iii. Action plan for progression to NZEB for new buildings

The preparation of a national plan for increasing the number of NZEB (according to Directive 2010/31/EU, Article 9) is on-going and is also the responsibility of the steering committee mentioned above. The study for the definition of NZEB will:

- define the technical characteristics of buildings with almost zero-energy consumption, taking into account national, regional or local conditions, and including a numerical indicator of primary energy use in kWh/m^2 year;
- set intermediate targets for improving the energy efficiency of new buildings;
- provide information on the policies and financial or other measures taken to promote NZEB, including details of national requirements and measures concerning the use of energy from RES in new buildings and existing buildings which undergo major renovation.

The study will provide:

- the characteristics of the national building stock;
- the evolution, through time, of the national requirements related to the energy performance of buildings;
- the energy characteristics of the buildings with nearly zero-energy consumption;
- policies and measures to encourage improvements in the energy efficiency of buildings so as to meet the requirement that, from 1 January 2021, all new buildings are to be NZEB;
- policies and measures to transform existing buildings through deep renovation to NZEB.

The study is expected to be ready during 2017 and will have an effect on the transposition of the national legislation according to the new energy requirements for new and existing buildings under energy renovation.

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

No further requirements have been issued for systems and/or building components for new buildings since December 2014. According to the final results from the cost-optimal study, new energy performance requirements are expected to be implemented for both the building components and electromechanical systems for heating, cooling and ventilation, taking also into account the Ecodesign Directive (Directive 2009/125/EC).

2.II. Energy performance requirements: EXISTING BUILDINGS

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

Regarding existing buildings, the definition of major renovation is set in Law 4122/2013, after being amended in Law 4409/2016, Article 49 (A' 136). A renovation is considered as major when the total cost relating to the building envelope or the TBS is higher than 25% of the value of the building, excluding the value of the land upon which the building is situated.

Law 4342/2015 (A' 143), which is the transposition of the EED into national legislation, sets the obligation that, from 1 January 2014, 3% of the total floor area of heated and/or cooled buildings owned and occupied by the central government must be renovated each year so as to meet at least the minimum energy performance requirements. The list of the central government buildings includes 82 buildings with a total area of 309,712 m^2. The refurbishment of these buildings is included in the national structural funds programmes. The *YPEN* has initiated an official communication with all central government organisations, in order to update that list with buildings with a floor area greater than 250 m^2, and to acquire all necessary information. This initiative is currently at the stage of collecting and processing data.

The energy requirements for existing buildings have not been altered since the end of 2014. The energy performance of an existing building that undergoes major renovation should be of an energy class B or better, unless it can be proven, through a technical report, that this is technically, functionally and economically not feasible.

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

The definition of NZEB in existing buildings has been set in Law 4122/2013 and its application will be determined in the national NZEB study, which is currently on-going (see section I.iii). The study also sets the plans to renovate the existing building stock towards NZEB.

The *YPEN* approved, in December 2015, the study[2] of the long-term strategy for mobilising investment in the renovation of the national stock of residential and commercial buildings (according to the provisions of EED, Article 4). The basic goal set out by this study for the year 2050 is that 80% of the existing building stock will be of high-energy performance. Five different scenarios have been examined. These scenarios consist of different mixtures of renovation types and renovation rates. More specifically, four different renovation types have been introduced:

- low renovation that achieves 20% savings;
- medium renovation with 40% savings;
- total renovation with 60% savings;
- NZEB renovation with 80% savings.

The “business as usual” scenario, where no additional measures are taken, shows that, by 2050, only a very small share of renovations will be of the type “total renovation”, while type “NZEB renovations” will be non-existent.

For a transformation of the existing building stock by 2050, it is necessary to foster a mixture of fiscal and economic incentives. Greece must proceed to regulatory framework developments and focus on capacity building and good practices.

Three different phases have been identified in order to reach the aforementioned goal.

The first one, called “initial phase” reaches until 2020. All regulatory aspects necessary for the required mechanisms and structures to be developed must be prepared in this period. Also, awareness on energy efficiency must be raised and economic incentives and pilot projects must be launched.

In the second phase, the so-called “acceleration phase” (period 2020-2040), a further development of technological innovation of products and techniques is foreseen, leading to a gradual cost-reduction of energy efficiency measures and a better understanding of the additional gains of a total renovation.

Finally, in the third phase, the “stability phase” (period 2040-2050), the energy market of building renovation is expected to be mature enough to include mobilisation of investments from the private sector as well (e.g., through Public Private Partnerships).

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

The *KENAK* has set minimum requirements (maximum U-values) for the building elements, as well as for energy losses and gains for the whole building envelope (max. $U_{building}$) and minimum requirements for the efficiency of heating, cooling and hot water production systems. These are set for all building uses, together with lighting requirements for the tertiary sector buildings.

2.II.iv. Encouragement of intelligent metering

Law 4342/2015 foresees that final customers for electricity, natural gas, district heating, district cooling and domestic hot water are provided with competitively priced individual metering devices that accurately reflect the final customer’s actual energy consumption, providing information on actual time of use. Such meters shall be provided whenever an existing meter is replaced or a new connection is made, unless this is technically impossible or not cost-effective in relation to the estimated potential savings in the long term.

In Greece, according to the provisions of Law 4001/2011, the responsible body for the electricity meters is the Hellenic Electricity Distribution Network Operator (HEDNO S.A). HEDNO S.A. has already installed

electronic meters for all medium voltage consumers and around 60,000 meters for low voltage consumers with high consumptions (large consumers). Also, HEDNO S.A has launched an open tender procedure (tender ND207), which, among other things, foresees the installation of 170,000 electronic meters in residential and small commercial buildings, with a total budget of 41 million €. The procedure of the evaluation is still on-going, and is expected to be finalised in 2017.

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

National programmes have been established to facilitate the uptake of energy efficiency measures in buildings.

- The "Energy Savings in Households" ("*Eksikonomisi kat' Oikon"*) programme, was launched by the former Ministry of the Environment, Energy and Climate Change (*YPEKA*), to promote energy retrofit of existing buildings. This programme offers a set of financial incentives for household owners to implement energy efficient technologies that focus on the building envelope, the heating and cooling systems, and DHW systems. The programme was accepting beneficiaries to participate in the relevant energy renovation measures up to the end of 2016 and afterwards closed.

- The national programme "SAVE I" ("*Eksikonomo I"*), addressed to municipalities with over 10,000 inhabitants, provides subsidies for the implementation of energy efficient technologies in buildings owned/used by municipal services. The subsidy provided was up to 70% of the cost of the energy efficiency measures. A total budget of 82 million € was allocated during the first phase of the programme (2009 - 2012). The proposed measures included building envelope measures, equipment for efficient heating, lighting, ventilation, cooling, and control systems. This first phase proved to be successful and was positively accepted by local authorities. The programme was therefore extended and is still on-going.

In order to receive financing in the above mentioned programmes, it is required to issue an EPC before the application for funding, and then a second one after the implementation of the measures are completed in order to verify the energy benefit.

2.II.vi. Information campaigns / complementary policies

Information material on the *KENAK*, the EPC and the energy efficiency of buildings has been produced by the YPEN and is found at the ministry's website http://www.ypeka.gr/Default.aspx?tabid=282&language=el-GR. Additionally, the implementation of the financing scheme "Energy Savings in Households" (see previous section) provides information related to EPCs.

2.III. Energy performance certificate requirements

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

The legal requirement in Greece that each new rental or sale transaction must be accompanied by an EPC still remains[3]. The only change, according to Law 4342/2015, Article 58, paragraph 3, is that, from 9 November 2015, all new rentals must adhere to the unique protocol number of the EPC being inserted into the electronic platform of the General Secretariat of Information Systems of the Ministry of Finance (www.gsis.gr).

Issued EPCs

Until the end of 2016, a total number of 946,700 EPCs have been issued according to the Energy Inspections Department. In 2015 alone, 282,462 EPCs were issued. The number of EPCs according to the reason of issuance is presented in Table 1. The Departments of Energy Inspection have developed a web platform, which provides statistical data of the issued EPCs (http://www.ypeka.gr/Default.aspx?tabid=907&language=el-GR) (Figure 1).

Reason of issuance	Number of EPCs	Total area (m^2)
Sale	135,282	16,522,900.20
Rent	647,999	66,405,197.51
New and renovated building	4,556	1,473,126.44
Existing residential buildings: first energy audit for “Energy Savings in Households” programme	99,374	10,703,829.78
Existing residential buildings: second energy audit for “Energy Savings in Households” programme	47,354	5,135,641.40
Public school buildings: first energy audit	155	230,009.51
Public school buildings: second energy audit	30	64,009.02
Local public buildings programme	2,242	1,608,124.71
Other reason	9,708	4,677,981.50
Total	946,700	106,820,820

Table 1. EPCs according to the reason of issuance.

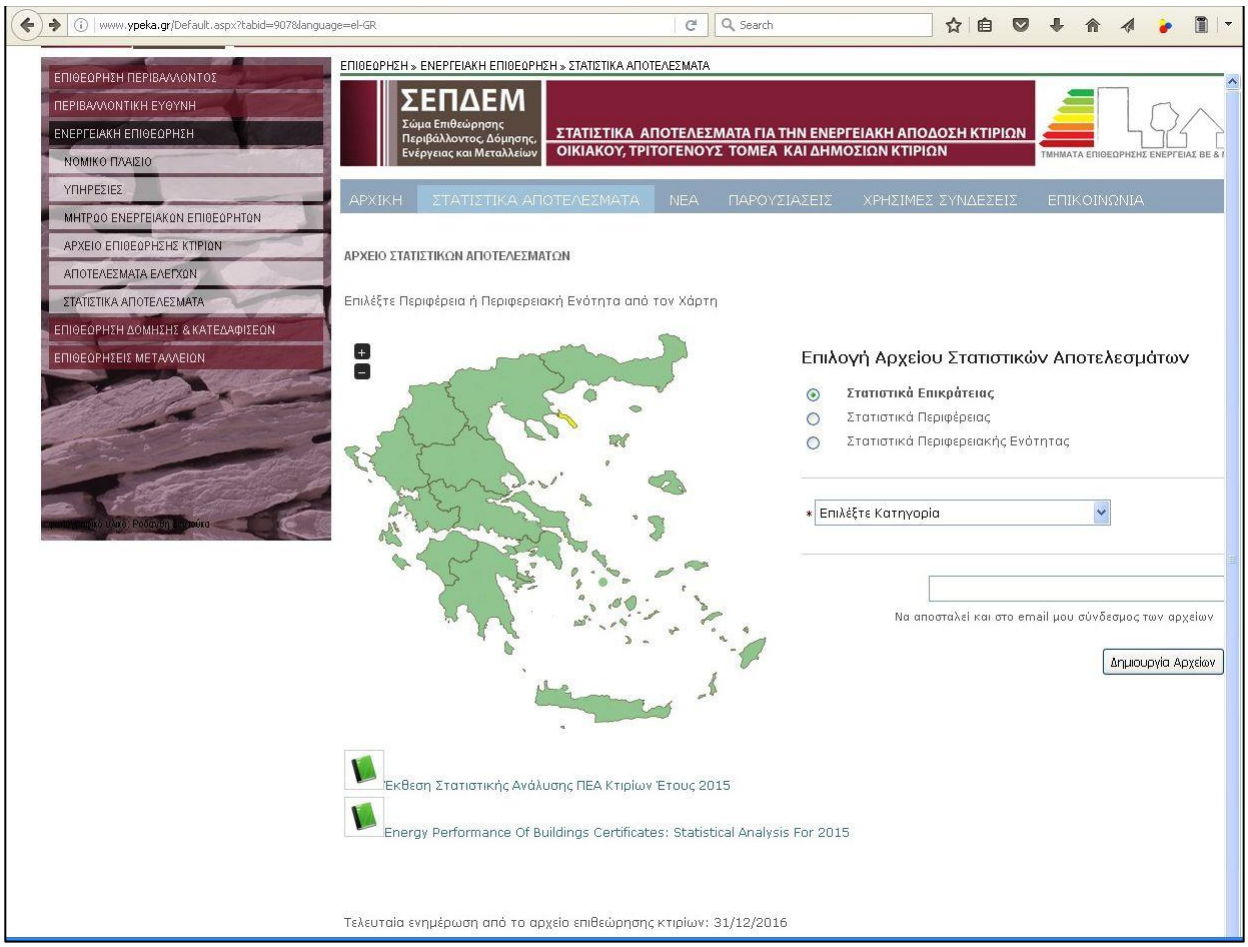

Figure 1. Statistics on EPCs (YPEN web site).

Energy auditors, inspectors' qualifications

The required qualification of energy auditors and their classification in three categories was recently set with Law 4409/2016 (part 3, Article 52), approved by parliament on 28 July 2016. According to this law, the energy auditors are classified in three categories: Class A, Class B and Class C.

Class A: energy auditors/inspectors that belong to Class A can perform audits and inspections for the following categories:

- building audits for buildings or building units with a total area lower than 250 m^2;
- heating systems inspections for heating systems with a heating capacity lower than 50 kW;
- AC system inspections for AC systems with a cooling capacity lower than 50 KW.

Eligible: all auditors/inspectors already registered in the national registry.

Class B: auditors/inspectors in Class B can perform audits and inspections for:

- buildings or building units from 250 m^2 to 1,000 m^2;
- heating systems with a heating capacity from 50 kW to 400 kW;
- AC systems with a cooling capacity from 50 kW to 400 kW.

Eligible: auditors falling under class A who have conducted at least 30 audits of Class A, 20% of which for non-residential buildings with heating systems or AC systems larger than 15 kW.

Class C: auditors in Class C can perform audits and inspections for:

- buildings or building units above 1,000 m^2;
- heating systems with a heating capacity above 400 kW;
- AC systems with a cooling capacity above 400 kW.

Eligible: auditors that have successfully passed the examination foreseen by Presidential Decree 100/2010, in Article 9 or auditors that fall under Class B who have already conducted at least 10 Class B audits.

At the end of 2016, the total number of energy auditors/inspectors registered in the National Registry for Energy Auditors was 16,858. Table 2 classifies them by type of inspections.

Category	Quantity
Building energy auditors	13,635
Inspectors for heating systems	2,589
Inspectors for AC systems	2,012

Table 2. Energy auditors/inspectors by type of inspections.

2.III.ii. Quality Assurance of EPCs

The Departments of Energy Inspection are responsible for carrying out random EPC control checks and checks on specific EPCs after complaints.

The checks include:

a. control of the data inserted in the electronic database used for the EPC calculations;

b. on-site inspection of the building in order to verify the data used for the EPC.

The quality check procedure utilises a tolerance of 5% from the total primary energy consumption of the existing building or a variation of more than one energy class. Penalties to energy auditors are calculated according to a specially developed algorithm from the Departments of Energy Inspection of the *YPEN*, and covers all types of issued penalties (according to Law 4409/2016, Article 56).

The penalties foreseen in case of non-compliance remain the same since 2013 and include fines and temporary or permanent suspension or permanent exclusion of the auditor, depending on the severity of the violation, the consequences, the building floor area and the possibility of reoccurrence. Law 4409/2016 (Article 49, paragraph 4) introduced a new range for the fines, amounting from 200 € to 10,000 €, instead of the previously defined (by Law 4122/2013) range of 1,000 € to 10,000 €.

In the period from 2011 until the end 2015, there were 9,425 EPCs randomly checked, for 88 of which there was an on-site check performed. Additionally, 16,119 EPCs were checked using the database, either for reasons of revocation or for verification in the framework of the programme "Energy Savings in Households", thus, reaching a total number of 25,544 checked EPCs.

Until the end of 2016, penalties were given to 36 energy auditors (a combination of fines and yearly suspensions).

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

According to the provisions of Law 4122/2013, from 9 July 2015, the requirement that all buildings used by the public sector and visited by the public must ensure an EPC is issued and publicly displayed[4], accounts also for buildings with a total area of 250 m^2 or more. Since no official registry for public buildings exists in Greece, the necessary information on public buildings is difficult to access. In 2014, a list of 82 public buildings, owned by the organisations of the central government, with a total useful floor area over 500 m^2, was prepared. At the moment, the list is extended to all buildings with more than 250 m^2 floor area and the data provided are currently being processed. No controls are foreseen regarding the issuance and public display of EPCs.

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

Law 4122/2013 states the mandatory inclusion of EPC energy classes in advertisements for sales or rentals of buildings or building units that already have an EPC. However, since the EPC is only required at the moment of sale or rental and not before, in most cases, for existing buildings, there is still no EPC class reference when the building or flat is advertised. Therefore, many advertisements still do not include information on the energy rating. In the case of newly constructed buildings, where the issuing of the EPC has already been done, the advertisement includes the EPC energy class. No fines are foreseen so far for non-compliance with this requirement.

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

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

It was decided to nationally adopt the inspection scheme (model A) for heating systems. The inspectors for heating systems perform the on-site inspection and prepare a report to assess the system characteristics, operation, size and efficiency. They also provide instructions and recommendations regarding the maintenance/ replacement of the heating system or parts of it, and other alternatives. The inspection reports are submitted on-line to the same platform used for the registration of the EPCs: www.buildingcert.gr. Quality control procedures for heating systems inspection reports are the same as those for EPCs.

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

The official launch of the registry of the heating systems inspection reports was in January 2016. All provisions are covered by the *KENAK* together with the relevant technical guide issued by the Technical Chamber of Greece, which describes in great detail the procedure to inspect boilers and heating systems.

After each inspection, a report is issued, which is provided to the owner, manager or tenant of the building dependent on ownership and use. Screenshots of inspection reports for heating systems are found in Figure 2. The inspection report contains the results of the inspection performed, and includes recommendations for the cost-effective improvement of the energy performance of the system inspected or replaced.

The heating systems should be inspected:

a) at least every five (5) years for boiler systems with a total effective rated output power 20 - 100 kW;

b) at least every two (2) years, for boilers with a total effective rated output > 100 kW and, if they are heated with gas fuel, at least every four (4) years.

By the end of 2016, very few inspection reports for heating systems had been issued.

Έντυπο Ενεργειακής Επιθεώρησης Συστήματος Θέρμανσης

1. Γενικά Στοιχεία Κτιρίου	
Χρήση Κτιρίου:	
	Τμήμα Κτιρίου ☐ **Αριθμός Ιδιοκτησίας:** .....
Όνομα Ιδιοκτήτη:	
ΑΦΜ	
ΚΑΕΚ	
Α.Π. Δήλωσης & Κωδικός Ιδιοκτησίας	
Ιδιοκτησιακό καθεστώς	Δημόσιο ☐ Δημόσιο Ιδιωτικού ενδιαφέροντος ☐ Ιδιωτικό ☐ Ιδιωτικό Δημοσίου ενδιαφέροντος ☐
Ταχυδρομική Διεύθυνση:	
Στοιχεία επικοινωνίας υπευθύνου:	Ιδιοκτήτης ☐ Διαχειριστής ☐ Ενοικιαστής ☐ Τεχνικός υπεύθυνος ☐
Ονοματεπώνυμο:	
Τηλέφωνο / Fax:	
Ηλεκτρονικό Ταχυδρομείο:	
Οικοδομική άδεια: **Πολεοδομικό γραφείο:** **Έτος:** **Αριθμός:**	
Έτος ολοκλήρωσης κατασκευής:	

2. Γενικά Χαρακτηριστικά Κτιρίου & Εγκατάστασης				
Αριθμός κτιρίου: _____ *(σε περίπτωση συγκροτήματος κτιρίων)*				
Έτος λειτουργίας:	.....	.....	.....	
Περίοδος λειτουργίας:	**Ημερήσιο πρόγραμμα (h/ημέρα):**		.....	
	Εβδομαδιαίο πρόγραμμα (h/εβδομάδα):		.....	
	Ετήσιο πρόγραμμα: από ..... μήνα έως ..... μήνα			
Συνολική επιφάνεια (m^2):		**Ύψος (m):**		
Συνολικός όγκος (m^3):				
Θερμαινόμενη επιφάνεια (m^2):		**Όγκος θερμαινόμενων χώρων (m^3):**		
Εξωτερικές συνθήκες σχεδιασμού **Θερμοκρασία (°C):** _____ **Σχετική Υγρασία (%):** _____				
Διάγνωση υφιστάμενης κατάστασης θερμομόνωσης των δομικών στοιχείων :		Ανεπαρκής	Μερικώς μονωμένα	Επαρκής
	Οροφή/Δώμα:	☐	☐	☐
	Εξωτερική Τοιχοποιία:	☐	☐	☐
	Φέρον οργανισμός:	☐	☐	☐
	Δάπεδο pilotis:	☐	☐	☐
	Δάπεδο επί εδάφους:	☐	☐	☐
	Δάπεδο επί μη θερμαινόμενου χώρου:	☐	☐	☐
	Κουφώματα:	☐	☐	☐
Αλλαγή χρήσης:	Μερική ☐ Ολική ☐ Περιγραφή: _____			
Αριθμός συστημάτων :				

7. Διάγνωση Υφιστάμενης Κατάστασης Λέβητα / Καυστήρα *(για κάθε μονάδα)*		
Διαθέσιμα Στοιχεία στο Ημερολόγιο Λεβητοστασίου	Οδηγίες Λειτουργίας & Συντήρησης Λέβητα & Καυστήρα	☐
	Αρχείο Φύλλων Συντήρησης – Ρύθμισης Λειτουργίας	☐
	Θεωρημένο Βιβλίο Καταγραφής Μετρήσεων	☐
	Κατασκευαστικά Σχέδια Εγκατάστασης	☐
	Τιμολόγια καυσίμου	☐
Χωροθέτηση λεβητοστάσιου - λέβητα	Θέση λεβητοστασίου σε Εσωτερικό χώρο Εξωτερικό χώρο	 ☐ ☐
	Ευκολία πρόσβασης στο λεβητοστάσιο	☐
	Ευκολία στη συντήρηση – επισκευή λέβητα	☐
Οπτική Επιθεώρηση:	Διαρροή καυσαερίων	☐
	Διαρροή καυσίμου	☐
	Διαρροή νερού / ατμού / λαδιού / αέρα	☐
	Επαρκής θερμομόνωση λέβητα	☐
	Θερμομόνωση καπναγωγού χωρίς φθορές	☐
	Θερμομόνωση καπνοδόχου χωρίς φθορές	☐
	Κατάσταση λειτουργίας καπναγωγού & καπνοδόχου	☐
	Υγροποιήσεις στην καπνοδόχο	☐
	Καπνοθυρίδα καθαρισμού σε λειτουργία	☐
	Ξεχωριστή αποχέτευση συμπυκνωμάτων (αν απαιτείται)	☐
	Επαρκής αερισμός λεβητοστασίου	☐
Διαθέσιμο δίκτυο ΦΑ		☐

8. Τεχνικά Χαρακτηριστικά Λέβητα / Καυστήρα *(για κάθε μονάδα)*		
α/α Μονάδας: _____		
Τελική Χρήση:	Θέρμανση χώρων ☐	
	Θέρμανση χώρων & Ζ.Ν.Χ. ☐	
	Ζεστό Νερό Χρήσης (Ζ.Ν.Χ.) ☐	
Τεχνικά Χαρακτηριστικά Λέβητα		
Εταιρεία Κατασκευής **Τύπος (Μοντέλο)** **Σειριακός Αριθμός**	_____ _____ _____	**Έτος Κατασκευής: _____** **Έτος Εγκατάστασης: _____**
Ονομαστική Ισχύς:	_____ (kW) _____ (kcal/h)	
Ενεργειακή απόδοση (ΠΔ 335/93):	Αριθμός αστεριών:	Δεν υπάρχει σήμανση ☐
Σήμανση CE:	☐	
Λέβητας συμπύκνωσης :	☐ Περιγραφή: _____	
Είδος λέβητα :	Χαλύβδινος ☐ Μαντεμένιος ☐ Άλλο ☐	
Επιτρεπόμενη πίεση :	Λειτουργίας: 4 bar ☐ 6 Bar ☐ Άλλο _____☐	Αντοχής: 6 bar ☐ 8 Bar ☐ Άλλο _____☐
Καύσιμο σχεδιασμού:	Πετρέλαιο ☐ Φυσικό αέριο ☐ LPG ☐ Άλλο _____☐	
Θερμικό Μέσο	Νερό ☐ Ατμός ☐ Λάδι ☐ Αέρας ☐	
Τεχνικά Χαρακτηριστικά Καυστήρα		
Εταιρεία Κατασκευής **Τύπος (Μοντέλο)** **Σειριακός Αριθμός**	_____ _____ _____	**Έτος Κατασκευής: _____** **Έτος Εγκατάστασης:_____**
Καυστήρας ενσωματωμένος στον Λέβητα: ☐		
Ισχύς:	Μέγιστη ..... (kW) Ελάχιστη ..... (kW)	
Καύσιμο λειτουργίας:	Πετρέλαιο ☐ Φυσικό αέριο ☐ LPG ☐ Άλλο ☐	

Figures 2a, b, c. Heating system inspection report format.

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

Similarly to the heating systems, the official launch of the registry of the AC systems inspection reports was in January 2016. The information supplied for the heating systems inspection is also applied for the AC inspection procedure.

The AC systems should be inspected at least every five (5) years if their total capacity exceeds 12 kW.

Again, by the end of 2016, very few inspection reports for AC systems had been issued.

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

Enforcement and penalties

The control and monitoring of the process, and the quality of inspection reports on heating and AC systems, fall under the jurisdiction of the Directorate of Environment, Construction, Energy and Mines Inspections of the *YPEN*. The Directorate is also the authority responsible for controlling the performance of the functions of the energy inspectors, and the compliance and application of the related provisions.

Checks are performed automatically and are randomly sampled at a rate of at least 5%, or after complaints of an inspection report. They consist of:

- checking the validity and accuracy of input data submitted by an electronic data form file on the archive of inspection reports, including recommendations;
- on-site inspection of the building to verify the correctness of the inspection reports.

Energy inspectors, and the owners, managers or tenants of buildings must provide all necessary information, access to the building and its facilities, and any other possible assistance for carrying out the inspections, otherwise they shall receive a fine (Law 4122/2013, Article 20).

By the end of 2016, no penalties were issued regarding the inspection reports, and no statistics are available.

Quality control of inspection reports

The Departments of Energy Inspection of Northern and Southern Greece are responsible for the operation of the inspection scheme and the quality control of inspection reports. However, since the official launch of the inspection scheme (at the beginning of 2016), a very small number of inspection reports have been registered, and, as a result, no quality control checks have been carried out yet.

Impact assessment, costs and benefits

Regarding the impact assessment of the heating and AC system inspections, since very few data exist after the scheme was put into operation, no study on the impact has been performed so far. Additionally, no studies are available related to the cost and benefit of the operation of the scheme.

3. A success story in EPBD implementation

A very successful programme for energy renovation measures in the residential sector is the “Energy Savings in Households” (Figure 3). It is a national programme that offers financial support, coming from structural and national funds, for interventions in the building envelope, the heating/cooling systems, and the installation of RES for DHW production.

When first launched in 2011, the programme provided subsidies ranging from 15% to 70 %, while the remaining investment was provided in the form of zero-interest loans. The maximum eligible measures (inclusive VAT) should not exceed 15,000 €. Due to its large acceptance rate, the programme lasted until the end of 2016.

The programme includes buildings, which have a building permit and which are:

- located in areas with an average zone price lower than or equal to 2,100 €/m^2;
- are of residential use;
- their owners meet specific income-related criteria;
- are classified as low energy efficiency buildings.

The programme offers incentives for citizens to carry out the most important interventions, aimed at improving their houses’ energy efficiency, while at the same time contributing to the achievement of Greece’s energy and environmental targets; once completed, the programme will contribute energy savings up to 1 billion kWh/year.

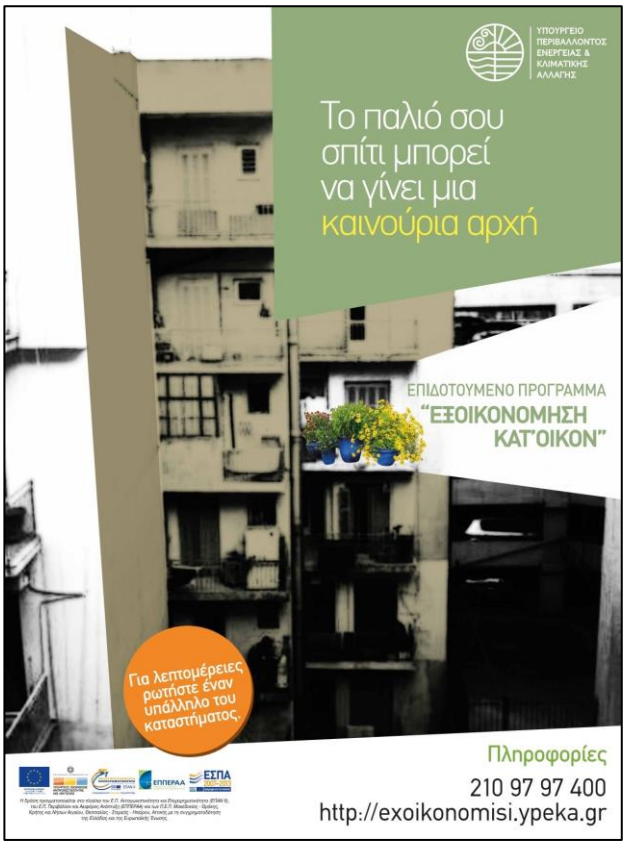

Figure 3. "Energy Savings in Households" programme brochure.

The main supported actions/measures include:

- building envelope (including thermal insulation, windows & glazing, exterior wall, doors, ceiling, etc.);
- equipment (including efficient heating, efficient lighting systems, ventilation, cooling, control systems, etc.);
- energy audits, consultancy costs, labour costs, education and training activities, etc.

Eligible for participation in the programme are only natural persons who have the right of (full or bare) ownership, or usufruct to an eligible residence and meet the income-related criteria set.

The programme's goal is to result in:

- energy savings (approximately 1 billion kWh/year);
- public awareness concerning the rational use of energy and environmental protection;
- improving the living conditions in buildings, cities and the urban environment;
- mobilising market forces towards developing sustainable communities.

The initial budget of the programme outlined by the state was 396 million € coming from structural and national funds, where 241 million € were revolving funds. The programme was based on a collaboration between major banks and the former YPEKA ministry. At the end of 2015 the actual budget of the programme was 385 million € and the banks provided another 130 million €, leading to a total actual budget of about 0.52 billion €.

Until December 2015**,** over 200,000 applications have been submitted to the banks and about 50% of them have received an initial approval for a loan. Out of them, 50,041 applications received the final programme approval and 35,185 applications were pending. Finally, 45,403 applications out of the 50,041 approved applications proceeded to the implementation phase (the owners of the remaining applications decided not to proceed for various reasons).

During 2016, the *YPEN*, in cooperation with all stakeholders, has taken the necessary steps to ensure national resources from unused allowances of greenhouse gas emissions, and proceeded in financing about 8,500 applications of the 35,185 pending applications, with a total budget of 85 million €.

Regarding the interventions, the most preferable measures were the replacement of windows (83%), followed by the upgrade of the heating system and domestic hot water production (71%), and the position of thermal insulation on the building envelope (54%). The achieved energy savings (based on the completed 45,403 projects) amount 753.91 GWh per year of primary energy according to the calculations performed from the issued EPCs before and after the intervention.

4. Conclusions, future plans

A national registry system for issuing EPCs and heating and AC systems inspection reports is fully operational. The system is centrally operated by the *YPEN*. Quality control of EPCs and inspection reports is performed in two stages: in the first stage through calculation of the EPC and checks on the inspection reports data provided from the national database, and in the second stage through on-site visits and new collection/check of data/inputs.

All energy auditors and inspectors are qualified engineers who, according to their ability and experience, are classified in three categories. Generally, the level of knowledge of the auditors/inspectors is high.

The use of EPCs has been fully implemented in the building market and its existence in building transactions is obligatory. The uptake of EPC recommendations is a challenge, which is currently being addressed on a state level through financial incentives, information campaigns, and with national and European programmes.

The full implementation of the energy inspections of heating and AC systems started in January 2016. However, until the end of 2016, very few inspection reports have been issued, which, in turn, caused delays in the implementation and control of energy efficiency measures for these systems.

The transposition law related to Directive 2010/31/EU (Law 4122/2013) has been modified with issues regarding the energy auditors' qualifications, fines, and the operation of the control authorities, while the EED was officially adopted in November 2015 by Law 4342/2015.

The outcome of the cost-optimal study for new and existing buildings in Greece is in the last stage of development and its results are expected to lead to new minimum requirements for the new buildings. The full study is expected to be ready in the first trimester of 2017. Additionally, the revision of the current building energy regulation is almost finalised and should be officially published by April 2017. Finally, the study for the definition of NZEB, their technical characteristics and the policies adopted to increase their number is currently on-going and should be available in 2017.

Endnotes

1. Established by decision 2007/742/EC of the European Commission of November 9, 2007, as amended.
2. www.ypeka.gr/LinkClick.aspx?fileticket=XLqxHeSJDdA%3d&tabid=282&language=el-GR
3. Since 2013, Law 4122, Article 12.
4. The EPC needs to be issued by an approved energy auditor.

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