1. Introduction

This report presents an overview of the current status of the implementation of the EPBD in Portugal as well as plans for its evolution. It mainly focuses on energy performance requirements and EPCs, including quality control mechanisms, training of qualified experts and information campaigns.

The EPBD field implementation started in 2007, based on three decrees published in 2006. The legislation was revised in 2013 to transpose the tighter requirements of Directive 2010/31/EU. The revision process had contributions from nearly 100 different stakeholder institutions that resulted in the actual revision being aimed at, among other things, the improvement of methodologies and the certification process, based on extensive experience gained over the last four years. Those years have passed and after a period of adaptation, the changes are now being readily adopted by the market. The requirement to display an EPC in property advertisements was a major change that contributed to the increase in the number of EPCs issued monthly. The change was not only due to changes in legislation; ADENE (the Portuguese national energy agency) has developed a strategy in order to upgrade the National Building Energy Certification System (SCE), and these changes included the development of a new online platform to issue EPCs, a new EPC layout, a new website and the publication of support documentation and guidelines for experts. The main goal was to realign the SCE with the needs of the market.
2. Current Status of Implementation of the EPBD

In the most recent years, the implementation of the EPBD in Portugal was focused on updates and minor adjustments to what had already been implemented since 2006 and revised in 2013.

Some revisions of specific topics in the current regulations had to be made in order to fully comply with the EPBD, namely adjustments regarding requirements for building renovated elements. Until September 2014, only buildings that undergo major renovations had to comply with those requirements, while now every building element that is renovated has to comply with those requirements. From 1 January 2016, stricter requirements came into force. This tightening was foreseen in the 2013 regulation, aiming for NZEB levels for 2020, and focusing on U-values of building elements as well as minimum performance of technical building systems. This revision was also supported by cost-optimal studies that showed some margin of improvement in the regulations. These necessary adjustments allowed Portugal to have the EPBD transposed into national regulation.

A big step forward was given with connecting external and EPC databases\(^1\). This allowed for more precise and coherent information, mainly because the data is now validated by different entities and information can be used in a more purposeful way.

Another improved aspect was the importance given to the EPC as a tool for providing access to funding schemes and incentives. The EPC can be the “key” to have direct access to specific incentives for building renovations, having building taxes reduced depending on energy labels (typically A or A+), or when a building that undergoes renovations improves two (2) levels from the initial performance.

2.1. Energy performance requirements: NEW BUILDINGS

This chapter presents an outline for transposing and implementing the EPBD energy performance requirements in Portugal. It also describes the cost-optimal procedure for setting requirements, the action plan towards NZEB and plans for implementing Articles 4 and 5 from the Energy Efficiency Directive.

2.1.i. Progress and current status of new buildings

While existing buildings are believed to be relevant, the Portuguese legislation focuses heavily on new buildings, both residential and non-residential, with the primary objective of setting the pace for more efficient buildings to come, considering the substantial share of energy consumption spread across buildings throughout Europe, with Portugal being no exception.

To achieve this goal, a stepped tightening of requirements has been implemented – focusing on building envelope and technical building systems – from the establishment of the 2013 regulations. This first level of requirements was defined to be applicable until the end of 2015, after which a stricter level of requirements came to force.

In order to comply with the current regulation\(^2\) that has been significantly strengthened since the regulations of 2013, today’s buildings are designed with added concerns, among which design, a robust level of minimum requirements, and the promotion of RES.
2.I.ii. Format of national transposition and implementation of existing regulations

The current building energy performance legislation, which applies for both residential and non-residential buildings, bases the calculation methodologies on comparisons with reference buildings and includes the parameters presented in Table 1. The reference building is considered the same building as the one being evaluated, but with reference values for the building components and technical building systems, and without the contributions of RES and energy efficient solutions (heat recovery, etc.).

<table>
<thead>
<tr>
<th>Building</th>
<th>Main legislation requirements</th>
<th>Requirements included in calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential and non-residential</td>
<td>Thermal behaviour, Energy and Indoor Air Quality</td>
<td>Thermal Comfort</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Minimum requirements for U-values, including thermal bridges</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Windows solar factor and shading devices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ventilation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indoor air quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infiltration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Maximum energy needs and primary energy consumption</td>
</tr>
<tr>
<td>Non residential</td>
<td>Systems efficiency</td>
<td>Minimum efficiency for HVAC systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Renewable energy systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lighting (only for non-residential)</td>
</tr>
<tr>
<td></td>
<td>Ventilation and indoor air quality</td>
<td>Minimum outdoor air supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Indoor air quality</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infiltration</td>
</tr>
<tr>
<td></td>
<td>Installation and maintenance</td>
<td>(Not relevant for calculations)</td>
</tr>
</tbody>
</table>

Table 1: Requirements included in calculations.

The energy performance requirements established for residential buildings are set in terms of the useful energy demand needs for heating and cooling. The total primary energy for heating, cooling and domestic hot water is also limited to a maximum value. There is a minimum RES contribution required for domestic hot water based on a minimum solar thermal panel area for each building occupant.

Non-residential buildings have a minimum energy performance requirement, which limits the maximum primary energy for heating, cooling, domestic hot water, and lighting.

The revised 2013 requirements (both for residential\(^3\) and non-residential\(^4\) buildings) were established considering the comparative methodology framework for calculating cost-optimal levels published by the European Commission. A first report\(^5\) was presented which dealt with new residential buildings; this report concluded that the legislation requirements are close to the cost-optimal levels and it is not necessary to change them. For non-residential buildings, the study focused only on office buildings, which is the most representative building typology. The report concluded that the legislation requirements are significantly outside the cost-optimal levels and that the reference building characteristics should be updated to have legislation requirements within the range of cost-optimal levels.

Most of the requirements were tightened again in 2016 following the planned update of the national legislation\(^3,4\).
2.I.iii. Action plan for progression to NZEB for new buildings

Since 2014, the national action plan for the progression to NZEB is supported by the revised legislation. The adopted preliminary definition of NZEB establishes a relationship with cost-optimal evaluations. NZEBs are defined as buildings that cumulatively offer:

i. very low energy demand with building components compatible with the upper levels (most efficient) of the cost-optimal evaluations;

ii. implementation of RES that covers a very significant fraction of the remaining building energy demand; and

iii. RES to be produced on site (whenever possible) and/or adjacent to the building. When local production is insufficient, the remaining production must be supplied as nearby as possible.

The full definition of NZEB, containing numeric indicators for primary energy demand and share of RES, is still in development. A working group of different entities was established, and it is expected that during 2018 additional information will be published allowing the market and all stakeholders to have clear guidance on the full NZEB definition.

Given that the NZEB definition is not yet completed, no information is available on how many NZEBs are built in Portugal, although relevant buildings have been designed considering NZEB principles. Built in 2006, Solar Building XXI, presented in Figure 1, is an example of a low-energy building using passive systems for both heating and cooling (ground cooling) to achieve NZEB. The main façade has a PV system with heat recovery which assists the heating in winter. In summer, a ground cooling system (earth tubes) is used to cool the building, together with night cooling strategies. The integration of RES in the Solar Building XXI design was one of the main objectives of the project. The last monitoring analysis, performed in 2011, has shown a total amount of electric energy consumption of 36 MWh, versus an amount of electricity produced by the three PV systems of almost 38 MWh.

![Solar Building XXI](image)

*Figure 1. Solar Building XXI, a low-energy building using passive systems for both heating and cooling (ground cooling) to achieve NZEB.*

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

Since 2014, new buildings must comply with stricter requirements, imposed by the roadmap defined in the national regulation. This roadmap was set with the goal of having all new buildings as NZEB by 2020; thus, a tightening of the requirements was planned via a stepped enforcement (2013, 2016).
These requirements are focused on U-values for walls, roofs, pavements, and windows, as well as the solar factor (g-value) and shading when looking at building components. When it comes to technical building systems, the requirements are focused on the minimum efficiency of equipment (water heater, heat pumps, boilers, etc.) and also on the need for having RES, and specifically solar thermal collectors. Additional requirements exist for air renovation rates and minimum indoor air quality.

A brief list of the existing requirements and their evolution can be observed in Table 2 for residential buildings, envelopes, ventilation and RES, and in Table 3 for technical building systems.

### Table 2: Minimum requirements evolution for residential buildings, envelope, ventilation and RES.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>U-value [W/(m2.K)]</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External walls</td>
<td>1.40</td>
<td>0.95</td>
<td>0.70</td>
<td>0.50</td>
</tr>
<tr>
<td>External roof / floor</td>
<td>1.10</td>
<td>0.75</td>
<td>0.50</td>
<td>0.40</td>
</tr>
<tr>
<td>External window</td>
<td>4.20</td>
<td>4.20</td>
<td>4.20</td>
<td>3.30</td>
</tr>
<tr>
<td>Flat thermal bridges</td>
<td>none</td>
<td></td>
<td></td>
<td>2 x U-value (closest element)</td>
</tr>
<tr>
<td><strong>Maximum window solar gain factor g-value</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light inertia</td>
<td>0.15</td>
<td>0.1</td>
<td>0.15</td>
<td>0.1</td>
</tr>
<tr>
<td>Medium and heavy inertia</td>
<td></td>
<td>0.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ventilation (air changes per hour)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>none</td>
<td></td>
<td>≥ 0.6</td>
<td></td>
<td>≥ 0.4</td>
</tr>
<tr>
<td><strong>Renewable energy systems</strong></td>
<td>none</td>
<td>Minimum solar energy contribution for domestic hot water (reference value 0.65m2 /occupant)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3: Minimum requirements for technical systems.

<table>
<thead>
<tr>
<th>Building type</th>
<th>Technical system</th>
<th>Requirement evolution</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residential and non-residential buildings</strong></td>
<td>Heat pumps</td>
<td>cooling</td>
<td>Eurovent Label C (Example: Chiller COP ≥ 2.8; EER ≥ 2.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>heating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Domestic hot water</td>
<td></td>
<td>COP ≥ 2.3</td>
</tr>
<tr>
<td></td>
<td>Boilers</td>
<td>none</td>
<td>Minimum nominal efficiency 86%</td>
</tr>
<tr>
<td></td>
<td>DHW Gas heater</td>
<td>Power ≤ 10kW</td>
<td>Efficiency ≥ 82 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Power &gt; 10kW</td>
<td></td>
</tr>
<tr>
<td><strong>Residential</strong></td>
<td>Domestic Electric Storage Water Heaters</td>
<td></td>
<td>Maximum stand-by heat loss</td>
</tr>
<tr>
<td></td>
<td>Air handling unit</td>
<td></td>
<td>Eurovent Label D Efficiency ≥ 47% Velocity ≤ 2.5 m/s Δp ≥ 125 Pa</td>
</tr>
<tr>
<td><strong>Non-residential</strong></td>
<td>Pumps</td>
<td>Minimum EFF2 label</td>
<td>Minimum IE2 or IE3 class</td>
</tr>
<tr>
<td></td>
<td>FANs</td>
<td>Minimum EFF2 label</td>
<td>Minimum IE2 or IE3 class</td>
</tr>
<tr>
<td></td>
<td>Lighting</td>
<td>None</td>
<td>Maximum power (W/m²)/100lux Example: Offices 2.5 (W/m²)/100lux for 500lux</td>
</tr>
<tr>
<td></td>
<td>Lifts</td>
<td>Minimum C</td>
<td>Minimum B</td>
</tr>
<tr>
<td></td>
<td>Central building management system</td>
<td>Mandatory if HVAC thermal power &gt; 250 kW</td>
<td></td>
</tr>
</tbody>
</table>

#### 2.11. Energy performance requirements: EXISTING BUILDINGS

Existing buildings in Portugal account for, unsurprisingly, the largest number in the current building stock, and their energy performance is rated in the bottom half of the energy scale. Given this fact, initiatives have been taken to improve their performance. Most of the action taken in this area was related to improvements in the legislation\(^7\), like detailing specific requirements for existing buildings or introducing requirements to building elements (only requirements pertaining to major renovations existed), raising awareness among building owners and making financial incentives available.
2.II.i. Progress and current status of existing buildings

Existing buildings are the main driver for improving energy performance of the building stock. They comprise the vast majority of buildings with the poorest performance, and for that reason they are the ones with the largest potential to improve.

For many decades, Portugal was lacking in terms of energy performance regulations. It was not until 1990 that the first energy efficiency regulation was introduced, with limited impact on building performance. At that time, preventing building pathologies such as mould growth was one of the most relevant aspects. Nevertheless, requirements relating to insulation and double-glazing were also introduced.

With the transposition of the EPBD, a clearer focus was given, not only for technical building systems and RES, but also in the reinforcement of the building envelope. When comparing the heating and cooling energy needs of existing residential buildings over the last 100 years, it is possible to discern a clearer evolution, especially in regard to heating needs (Figure 2).

![Energy needs by construction date - Residential [kWh/m².year]](image)

*Figure 2: Energy needs by construction period - Residential [kWh/m².year]*

At this moment, when a specific building component (building envelope or technical building system) is renovated, minimum requirements apply. In these cases, the energy efficiency is improved “part-by-part”, knowing that each new component of the building performs as well as it would in a new building. If a building is to undergo major renovations, then an overall assessment has to be made, and a minimum performance has to be achieved; in these cases, it might be necessary to replace or improve certain elements in order to reach that minimum threshold.

Independently of being renovated, existing non-residential buildings that have an energy consumption of over 2.5 GWh or less than energy label C are obliged to present and put in practice an Energy Rationalisation Plan (PRE). This plan refers to a set of measures to be implemented in the building, in order
to make it more efficient (label C or better). This means to reduce 2.5% of its final energy consumption for those buildings consuming more than 2.5 GWh, or 5% for those consuming more than 5 GWh. The measures and reduction in final energy consumption are to be completed during the time set for implementing the PRE, which is six (6) years. Further information about the PRE can be found in the relevant legislation.

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

Building renovation has been a government priority since the transposition of the EPBD, which came into force in 2013. In order to promote it, the new legislation gave some flexibility to the requirements that are applied to building renovations so that different cost-optimal solutions can be considered in accordance with the building characteristics. On top of that, a strategy has already been submitted which plans to boost the rate of retrofitting and stimulate the economy. This strategy is based on different topics that range from simplifying mechanisms and facilitating necessary changes in the existing building sector to possibly using national and European sources for financing.

Regarding public buildings, an Energy Efficiency Programme for Public Administration (ECO.AP) was launched. This programme aims to achieve a 30% improvement in energy efficiency in public services and the various bodies of public administration by 2020. Eco.AP is an evolving programme that endeavours to establish energy efficiency measures to be implemented into services, agencies and public equipment and to change behaviours and promote the rational management of energy services, notably by hiring Energy Services Companies (ESCO).

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

An improvement seen is the stepped requirements (2013 level, 2016 level) that are applicable to building components. Technical buildings systems are, without exception, covered by these improvements, and the minimum efficiency of equipment is now higher than it was in 2013.

Existing residential buildings are only obliged to comply with these stricter requirements when they undergo renovations. The building component to be renovated must adhere to the minimum performance levels defined in the regulation.

2.II.iv. Encouragement of intelligent metering

Since 2014, it is mandatory for non-residential buildings to have energy consumption monitoring of heating ventilation and AC systems equipment with an electric power above 25 kW. The same happens for boilers with a thermal power above 100 kW.

Buildings with a thermal power above 25 kW must have an installation and maintenance technician (TIM) that guarantees proper system installation and maintenance. This technician must also supervise these specific activities and manage all relevant technical information. One of their tasks is to promote the installation of energy metering systems in the buildings.
The requirements are to encourage intelligent metering regarding the need to install building management systems in non-residential buildings with more than 250 kW of heating ventilation and AC systems power output.

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

The Energy Efficiency Fund (FEE)\(^\text{10}\) is a financial tool that helps implement the National Energy Efficiency Action Plan (NEEAP), and among other forms of assistance, allows for building owners to apply for funding in order to improve the energy performance and efficiency of the building (or building unit). The most recent requests for funds centred on the improvement of building components as well as the installation of solar thermal collectors.

The following building components have been targeted as eligible for funding in recent years:

- In 2015, a residential building built before 1990 for insulation, at a cost of 1M €;
- In 2015, residential buildings for solar thermal, at a cost of 500,000 €;
- In 2016, residential and commercial buildings, for domestic hot water (solar thermal water heater), windows, wall and roof insulation, and lightning, at a cost of 1.1 M €.

Another type of incentive that currently exists focuses specifically on tax reduction, namely concerning municipality taxation of real estate and building renovations. Some municipalities have tax reductions for better labelled buildings, typically A and A+, or buildings whose renovation improves the energy performance by two (2) labels.

It is expected that, under the agreement established between Portugal and the European Commission (Portugal 2020\(^\text{11}\)), new dedicated lines of financing, like the IFRRU\(^\text{12}\), will be available to leverage investments in the building sector and contribute to a low carbon economy. Around 700 million € are planned to be made available in November 2017, which will be leveraged by another 700 million € from the banking sector for a total of 1.4 million €.

2.II.vi. Information campaigns / complementary policies

In 2016, a marketing campaign was drafted and put into practice which specifically focused on EPC recommendations. After analysing all issued EPCs, and particularly the almost 2 million proposed recommendations, the top ten measures were identified, five related to building envelope – wall insulation, roof insulation, windows, solar shading and ventilation, and five related to technical building systems – solar thermal collectors, wood stoves, boilers, heat pumps and PV, and a set of small brochures were designed (around ten pages each\(^\text{13}\)).

These brochures had a clear message in mind – to provide a better understanding to the building owner of the building features that can be improved when considering the potential energy reduction or achieving costs savings. Each brochure follows the same structure and has a coherent design which allows homeowners to understand the impact of that specific recommendation as well as any possible constraints or difficulties in implementing it. Figures 3 and 4 present the brochure covers for roof insulation and solar thermal collectors, respectively.
Figure 3: Cover of brochure for roof insulation.

Figures 4: Cover of brochure for solar thermal collectors.
2.III. Energy performance certificate requirements

Since 2009, when the EPC became mandatory to exist in rental or sales contracts, it has become widely available to the public. It is currently not only a way to differentiate buildings before making a decision, but also as an important source of information, in great part thanks to a refreshed layout in 2013, which made the EPC a friendlier and more user-oriented document (Figure 5).

![Energy Performance Certificate](image)

**Figure 5: Energy Performance Certificate in two different sizes - First page and smaller display versions**

Apart from the information, EPCs are now an important tool to enable access to funding schemes or tax benefits.
2.III.i. Progress and current status on sale or rental of buildings and EPCs

In the last couple of years, it was possible to see a small boost in the real estate sector, and of course, the numbers of issued EPCs follow this trend. The EPC database is increasing each year, and a better definition and representation of the building stock can now be made. At the beginning of 2017, there were a total of 1.2 million EPCs; with 90% of them existing in the residential sector and 10% for non-residential buildings.

As mentioned, a very important aspect closely related with this increase is the obligatory advertisement of the EPC label before the building is rented or sold and when offered to the market; this is a responsibility for both the building owner and the real estate agent. Cases of non-compliance are now being addressed on a more regular basis, mostly because notaries, as stated in the regulation, are obliged to report whenever a transaction occurs without the existence of an EPC. In these cases, building owners or real estate agents were asked to minimise the fault by issuing the EPC and providing it, free of charge, to the new owner. As a result, the real estate market has almost fully adopted the EPC as a mandatory document and advertisements in general include the necessary information on the energy performance of the building.

Some studies are being developed, in particular by the National Institute of Statistics (INE), to ascertain if better-labelled buildings are sold faster, or if a premium exists in the sale price. These studies will be important, as they can establish additional relevance for the EPC. The positive “discrimination” for energy performance in buildings already exists, mainly when it comes to tax benefits for which reduced municipal real estate taxes are just an example. Private studies done for the city centre of Lisbon also showed a clear relationship between energy classes and the transaction price.

2.III.ii. Quality Assessment of EPCs

In 2015, specific regulation regarding quality assessment came into force. This regulation clearly states the criteria, rules and tolerances for errors, as well as the criteria behind the need to reissue the EPC.

Two types of quality assessment can occur with the EPC: a short assessment, and a detailed assessment. A short quality assessment involves all the documents and information being uploaded by the qualified expert to the database, whilst the detailed one is a complete duplication of the necessary calculations that support the EPC, and it even includes a second site visit. The detailed assessment can be triggered at random or whenever needed to better support the assessment.

Tolerances and out-of-range values are defined in the regulation and are used to quantify the number and severity of errors or mistakes that can exist in an EPC. As a consequence of these analyses, and if the EPC is to be considered invalid based on deviations from a set of parameters, a reissue by the expert is necessary. Additional penalties might be applicable to the expert if no action is taken that would minimise the impact of the errors that he or she made.

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

In 2014, the Portuguese definition of a public building includes every non-residential building as well as private buildings owned by government bodies. Non-residential buildings larger than 500 or 1,000 m² (depending on type) are required to display an EPC at the main entrance. Currently there are more than
2,500 certified public buildings and many more in the process of being certified. The low figure of issued EPCs shows that this has been the building typology with the most difficulties in terms of implementing the EPBD requirements in Portugal, but a clearer increase in the number of certified buildings can now be observed.

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

Since December 2013, when the EPBD 2010 was transposed to the national regulation, any advertisement of buildings or apartments needs to present the energy label in addition to building characteristics. ADENE (the EPC management entity) also provides guidelines for advertisements that are followed by the vast majority of real estate agents, as well as specific web services for real estate agents to collect specific data from the EPC database to use for their advertising. An example of models to be used in advertisements can be observed in Figures 6 and 7.

![Figure 6: Example of advertisement including the energy label.](image1)

![Figure 7: Model to be used in advertisements for the energy efficiency label.](image2)

The real estate sector was informed of these two mechanisms back in 2013. After a slow start, a steady pace has been set, and it is almost impossible nowadays to see real estate advertisements without a clear reference to the energy performance of the building, in particular the energy label. It has become commonplace for real estate websites to have a specific filter for the energy label and it is often possible to sort the properties according to their energy performance.
2.IV. Inspection requirements - heating systems, air conditioning

In 2006, Portugal officially adopted option a) on Article 8 of the EPBD, establishing a regular inspection of boilers. The inspection of boilers as well as AC systems was, however, a challenging issue due to the specific climate characteristics of the country. In Portugal, boilers and AC only operate for relatively short periods during the year, the real energy consumption is very low, and this makes regular cost-effective inspections a difficult strategy. Considering these difficulties, the transposition of the EPBD for Portugal did not impose regular inspections, and provisions should be changed so that advice should be given instead of those inspections.

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

Portugal is still working on the equivalent of Models A and B, given that it was not yet possible to evaluate the impact of the campaigns.

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

A first step regarding the advice given to building users was introduced in the new EPC layout in December of 2013. A specific section focuses on the importance of maintenance over heating, cooling and domestic hot water systems. It also recommends regular inspections of this equipment. Furthermore, it addresses properly selecting and sizing the correct equipment. As an additional measure, buildings with thermal power above 25 kW are required to have systems installed and maintained by a TIM to guarantee the proper installation and maintenance. This technician supervises the above activities and manages all relevant technical information. Additional tasks include the design of a maintenance plan, which is mandatory for systems above 250 kW and done according to a layout provided by law.

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

The information provided for heating systems should also be considered for AC systems given that there is currently no distinction to the approach.

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

Enforcement and penalties
No specific action has occurred regarding this topic.

Quality control of inspection reports
No specific action has occurred regarding this topic.

Impact assessment. Costs and benefits
No specific action has occurred regarding this topic.
3. A success story in EPBD implementation

Portugal has managed to create a link between funding schemes/incentives and the EPC.

Funding schemes that are now in operation were designed using information that was made available by the national EPC database. This database holds information on roughly 1.2 million buildings/building units. The data contributes to a better understanding of the building stock, and it is increasing at a steady pace of approximately 160,000 EPCs per year.

In Portugal, the EPC is a tool that provides access to funding schemes and is also used as a validation mechanism (by the qualified expert) regarding the effectiveness of the implemented recommendations supported by those incentives. In order for the validation to occur, the EPC is issued at the beginning of the process in order to assess the current status (baseline) of the building. It clearly identifies which building component has to be replaced or renovated, in order to evaluate the future performance of the building and the resulting associated savings, in terms of either energy consumption or monetary value. Because of this, the EPC is a mandatory document for the application process. After the construction/renovation phase, a final EPC is issued which will be used as a validation and conformity check of the works that were carried out, and also to evaluate new energy indicators and improvements.

Since all information is stored in a central database, it makes it easier to establish connections with other databases to better operate the funding schemes. Having a single EPC ID number that not only identifies the EPC (with around 150 variables per certificate) but also the building in question, allows for several public and private bodies that are not necessarily familiar with technical data to gain easy access to the relevant information.

Current funding schemes are based on two types: “green taxes” and an energy efficiency fund. The former consists of a series of tax benefits or exemptions when a building’s energy performance rating (as stated in its energy label) is improved by at least two (2) ratings. The latter is a fund specifically designed to aid the renovation of certain building elements. In recent years, the requests targeted specific building components, i.e., windows, wall and roof insulation, or solar thermal collectors, and were based on the EPC as a tool to better facilitate it. When EPCs are issued during a period in which funding has been made available in this way, an icon representing financing is displayed next to the specific measure in the EPC. This highlights the fact that financial support was made available, and it also includes a link to obtain further information, as shown in Figure 8.
Implementing the Energy Performance of Buildings Directive

Other types of benefits currently available are those related to municipal taxes indexed on EPC labels. For example, buildings with the highest ratings (typically A and A+) and buildings undergoing renovations that improve their EPC rating by at least two (2) ratings benefit from reduced taxes.

4. Conclusions, future plans

In 2017, the Portuguese National Building Energy Certification System (SCE) celebrated ten years of existence. The system is now well established and further steps are being considered for the upcoming years.

One of the most relevant aspects of the change in the SCE was the shift made regarding the way EPCs are registered in the national database. Instead of having EPCs registered without any external reference, they are now cross-referenced with other databases. These interconnections between databases allow for a more precise and clearer identification of each building. As an example, the EPC database is currently linked with the National Institute of Statistics (INE) as well as the electricity provider, Energias de Portugal (EDP). Additionally, tax administration and notary information is also collected, albeit manually, and plans are being drawn in order to collect this information in real time. Besides the previous information, the EPC database also stores the INSPIRE ID\(^16\), ensuring that Portuguese EPCs will be compatible with other systems across the EU. This will allow the EPC database to serve as a central hub to connect with external entities, and as an additional advantage, improve the quality of stored information. Future connections with local and central government agencies might be implemented in the future\(^17\).
The geographical location data is now present in the EPC database, enabling buildings to be located precisely on a map, and this is a very important step towards having a better understanding of the building stock. This knowledge is essential when policies that promote building renovations are to be implemented, giving the EPC a key role in effectively putting the strategy into practice. Figure 9 is a prime example of how easy it has become to view energy performance information for the entire certified building stock.

Figure 9: Energy performance information for the entire certified building stock.
As a final remark, it is important to highlight the relevance of the consumer and the role he or she plays in the building and energy sector. Based on all the information stored in the SCE database, ADENE will launch, in 2018, the Portal casA+. This portal is a hub for consumers to have all relevant information stored in a platform only accessible by them; it relates to their own homes and deals with energy performance. Additionally, the portal gathers together various stakeholders across the construction sector and serves as a one-stop-shop for requesting proposals to implement improvement measures. It effectively contributes to closing the gap between the supply chain and the consumer.

Besides portal casA+, ADENE is also focused on contributing to the enhancement of energy literacy throughout civil society, via an information centre called CINERGIA - Energy Information Centre, available starting at the end of 2018. This is an initiative generated by ADENE, in the context of the Portuguese Energy measure under the SIMPLEX +2017 programme, a programme that aims to give all citizens and energy producers an overview of the energy sector. Aimed at the general public (families, students, teachers, urban youth, etc.) and institutions (public and private institutions in the energy as well as other sectors, universities and research centres), CINERGIA provides a didactic narrative covering the forms, sources and production of energy, its transport, distribution, storage and marketing, and its use by various industrial sectors and by end consumers. Issues such as the history of energy in the country, its use in homes and in mobility are at the centre, as is the country’s energy dependency, the state of renewable energy and the connection between energy and water efficiency. Consumers will have the opportunity to learn more about energy efficiency in their region by browsing all information available on buildings with energy certificates.

Endnotes

1. The EPC database currently connects the National Institute of Statistics (INE) and the Electric Utility (EDP Distribuição) databases. The INE database provides geographical information about the residential building stock and, most importantly, references the INSPIRE ID for future European connections. Information from the EDP details the infrastructure of a building in terms of electric meters.

2. https://dre.pt/application/conteudo/74774858 (Portuguese version only)

3. https://dre.pt/application/conteudo/70789581 (Portuguese version only)

4. https://dre.pt/application/conteudo/73441202 (Portuguese version only)


7. https://dre.pt/application/conteudo/74774858 (Portuguese version only)

8. https://dre.pt/application/conteudo/74468516 (Portuguese version only)


10. More information available at www.pnaee.pt/fee (Portuguese version only)


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Status in December 2016

13. Brochures available for download at www.adene.pt/10solucoes-eficiencia-energetica (Portuguese version only)


15. https://dre.pt/application/file/a/70196785 (Portuguese version only)


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