



Long-term national strategy for the mobilisation of investment in building renovation



Article 4 of Directive 2012/27/EU



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1. Introduction

In post-industrial society, buildings are vital in the lives of human beings: European citizens spend 90% of their time inside buildings. [1] The technical characteristics – thermal, acoustic and air quality - and the appearance of a building can influence productivity, well-being and people's behaviour. [2]

Globally, the buildings sector accounts for approximately 35% of total consumption of final energy, corresponding to a third of all CO₂ emissions (direct and indirect), related to energy use. To reduce carbon intensity in the atmosphere and energy consumption and, as a result, the use of energy resources, it is necessary to recognise that buildings play a vital role in a long-term strategy. [3]

The fact that at least half of all buildings globally will still exist in 2050 has to be taken into consideration, as well as the fact that a building may have a working life of more than 100 years. Therefore, a strategy for this sector should not be limited to stricter control in new construction but should also provide more efficient solutions for existing buildings. [3]

Europe¹ has building stock covering approximately 25 billion m² of useful floor area, of which around 25% is non-residential. Office buildings in Europe account for around 40% of energy needs – the largest of all sectors – with 27% for residential buildings and 13% for services buildings. Buildings are also responsible for 36% of CO₂ emissions. [4] This consumption is mainly due to the use of space heating and cooling as well as sanitary hot water.

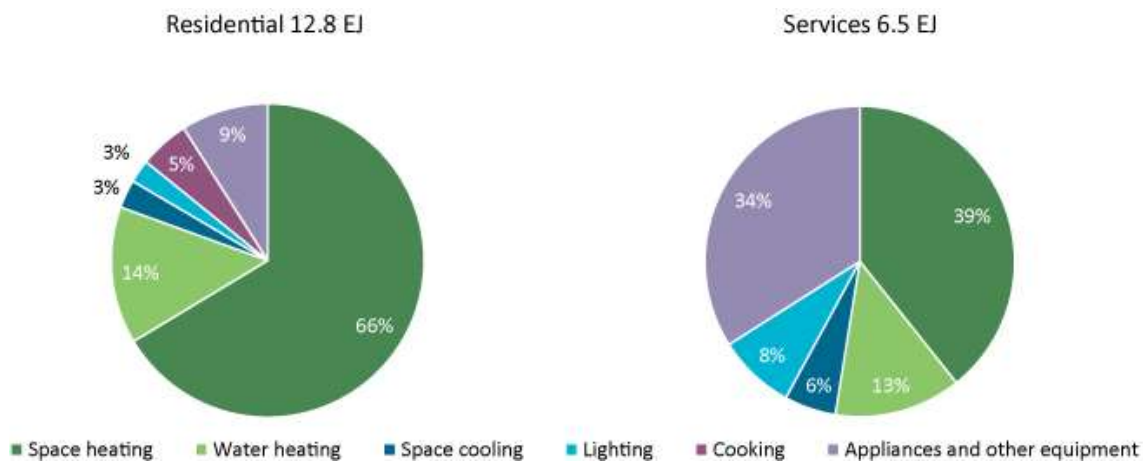


Figure 1: Final energy in 2010 [3]

In 2010, heating represented 65% of all energy use in buildings. In a breakdown per sector, 66% is for residential buildings and 40% for services. Cooling only accounted for 5% of total use.

Lighting, the kitchen, electronic devices and service equipment consume around 25% of final energy. Finally, water heating represents 15% of the demand for energy in buildings.

The demand for energy for heating and cooling of interiors is mainly caused by low levels of efficiency in European buildings – around 75% of buildings are inefficient. [5] This fact is also related to the construction period and it is estimated that 40% of residential buildings were built before 1960, a time when construction regulations were very limited [2].

¹ Includes the EU-27, Switzerland and Norway.

Such demand for energy could be minimised through passive measures such as fitting insulation in the building envelope, installing more efficient glazing and using efficient ventilation systems.

1.1. European Legislation

In 2007, the European Council set ambitious aims with regard to climate change, more specifically to limit the average land temperature increase to 2°C above pre-industrial levels. Targets were set for 2020 which included a 20% improvement in energy efficiency, a 20% reduction in greenhouse gas emissions and a figure of 20% for the use of renewable energy in total consumption [6].

In 2010, the European Union published the strategy ‘Energy 2020 – a strategy for competitive sustainable and secure energy’ and reinforced the role of energy efficiency, considering this as the most efficient means, from an economic point of view, to reduce emissions, improve security and energy competitiveness and even create jobs. From the ordinary citizen’s perspective, it is promoted as a measure capable of providing visible benefits: the average savings in energy costs of a household could be € 1 000/year. [7]

The European Commission recognised that the most significant potential savings were in the buildings sector and in industry and transport. With regard to residential buildings, a potential reduction of 27% was identified and 30% in commercial buildings [8].

With the aim of reaching this potential saving and aware that buildings account for 40% of total energy use in the European Union, Directive No 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings was published – the EPBD (Energy Performance of Buildings Directive). This new publication recast the regime set out in Directive No 2002/91/EC of the European Parliament and of the Council of 16 December 2002 and instigated more specific actions which were required to take into account climate and local conditions, the interior environment and cost-effectiveness.

In 2012, Directive No 2012/27/EU of the European Parliament and of the Council of 25 October 2012 as published, which set the establishing of a new framework as a primary goal. This would be a framework common to all Member States, reinforcing the promotion of energy efficiency in the European Union, defining actions to achieve European targets set for 2020 and which place the European Union on a path to transition to a low-carbon economy beyond the 2020 horizon.

This regulation once again stressed the importance of buildings, considering this sector as having greater potential with regard to energy savings and vital to reducing greenhouse gases. Article 4 of the Directive sets out, for the first time, the requirement for Member States to define long-term strategy to mobilise investment to renew the national stock of buildings, residential and commercial, public and private, and which included:

- a) An overview of the national building stock – based on statistical data;
- b) Identification of cost-effective approaches to renovations relevant to the building type and climate zone;
- c) Policies and measures to stimulate cost-effective, deep renovations of buildings, including staged, deep renovations;
- d) A forward-looking perspective to guide investment decisions by private citizens, the construction industry and financial institutions;
- e) An evidence-based estimate of expected energy savings and wider benefits.

A further Directive on the performance of buildings is on the promotion of the use of energy from renewable sources. This law sets out a series of rules on the use of renewable energy in the EU and defined targets for all Union countries. The main aim was to reach 20% of energy use from renewable sources by 2020. One of the aspects referred to in this document was the need to increase the share of energy from renewable sources in the construction sector, more specifically through the installation of technologies producing renewable energy in buildings.

Also of note are the Directives on energy use in products: To ensure that manufacturers place products on the market² which are more energy efficient and pollute less, the European Parliament defined a number of product design requirements through Directive No 2009/125/EC of 21 October 2009 – the ‘Ecodesign’ Directive. With the aim of informing consumers on the energy performance when acquiring products,³ a law was published on Energy Labelling through Directive No 2010/301/EU of 19 May 2010.

1.2. The national picture

Unlike the European Union, where buildings consume most energy, in Portugal it is the transport sector which use most final energy, accounting for 37%, while buildings represent around 30% [9].

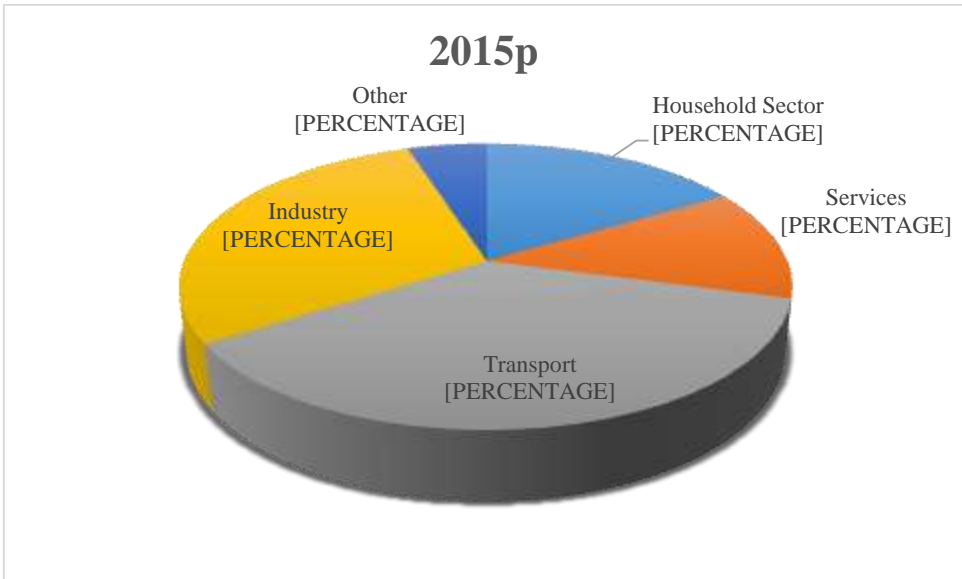


Figure 2: Final energy in 2010 [3]

The residential sector is responsible for approximately 16% of final energy use, while services represent around 13%. Industry represents 29% of consumption and the remaining sectors – Others⁴- around 5%.

In Portugal’s case, 2020 targets are more ambitious than those of the European Union: a general objective of a reduction of 25% in primary energy consumption was established and a specific

² For example, it included water heating equipment and window frames.
³ For example, it included hot water equipment, ambient air heating and cooling systems, kitchen appliances and light bulbs.
⁴ The sector ‘Others’ includes agriculture, fisheries, construction and public works.

objective of 30% in the case of government. With regard to renewable energies, the goal is that in 2020, 31% of final consumption be provided by indigenous renewable sources [10].

1.2.1. Energy dependence

In relation to energy dependence, in other words the need to import energy to satisfy requirements, in 2015 the figure stood at 78.3% (in 2014 it was 72.8%, corresponding to a good hydro year, which was not the case in 2015). Although this figure decreased 10-11 p.p. With respect to 2005, Portugal continues to be one of the European countries most dependent on foreign imports, especially the import of fossil fuels. This energy dependence leaves the country more vulnerable, especially with regard to natural gas, the fossil fuel most used in buildings and which in Portugal is imported through a single supplier [11].

According to the International Energy Agency, Portugal has the potential to reduce this dependence on fossil fuels through the use of more efficient heating technologies and by insulating buildings [12].

1.2.2. Energy Poverty

The definition of a long-term strategy to renovate buildings should also be seen as an opportunity to reduce energy poverty. [12]

In general, the concept of energy poverty relates to the inability to reach a comfortable temperature in housing by suitably heating or cooling the residence due to economic reasons. The concept does not have a consensual definition and several different definitions exist as shown in the study ‘Selecting Indicators to Measure Energy Poverty’⁵, carried out by the consortium led by the company Trinomics B. V. O INSIGHT_E which considers that the problem is caused by three main factors: Low income, low thermal efficiency in housing and high energy costs. Energy poverty has significant impact on health, including respiratory illnesses and infections, cardiovascular and circulatory diseases. It also has effects on mental health [11] and is associated with poor school performance.

Portugal appears as one of the countries with greater levels of energy poverty in several studies, despite differences in methods of calculation [13]. These studies reflect a further study conducted by Tom Fowler *et al.*,⁶ between the winters of 2002/2003 and 2010/2011 and sought to analyse the Excess Winter Death Index (EWDI) and the respective causes such as cardiovascular and respiratory problems (including seasonal respiratory infections) in a number of European countries. Portugal was second on this list with a figure of 25.9%, while the European average was 13.9%.

1.2.3. Definition of deep renovation

⁵ Trinomics - Selecting Indicators to Measure Energy Poverty, Under the Pilot Project ‘Energy Poverty – Assessment of the Impact of the Crisis and Review of Existing and Possible New Measures in the Member States, Framework Contract ENER/A4/516-2014

⁶ Excess winter deaths in Europe: a multi-country descriptive analysis

There are several different ways of defining 'deep renovation' and can be seen as a) the proportion of energy savings made; b) the energy performance, or c) the implementation of a series of energy saving measures [14].

The European Commission which follows an approach as set out in a), considers that a deep renovation is that which can typically lead to energy savings in a building of around 60% in comparison to before the renovation [14]. Although it does not limit a specified number of measures, as in c), the Commission states that by covering the roof and the façades, it is more likely that deep renovation will be achieved.

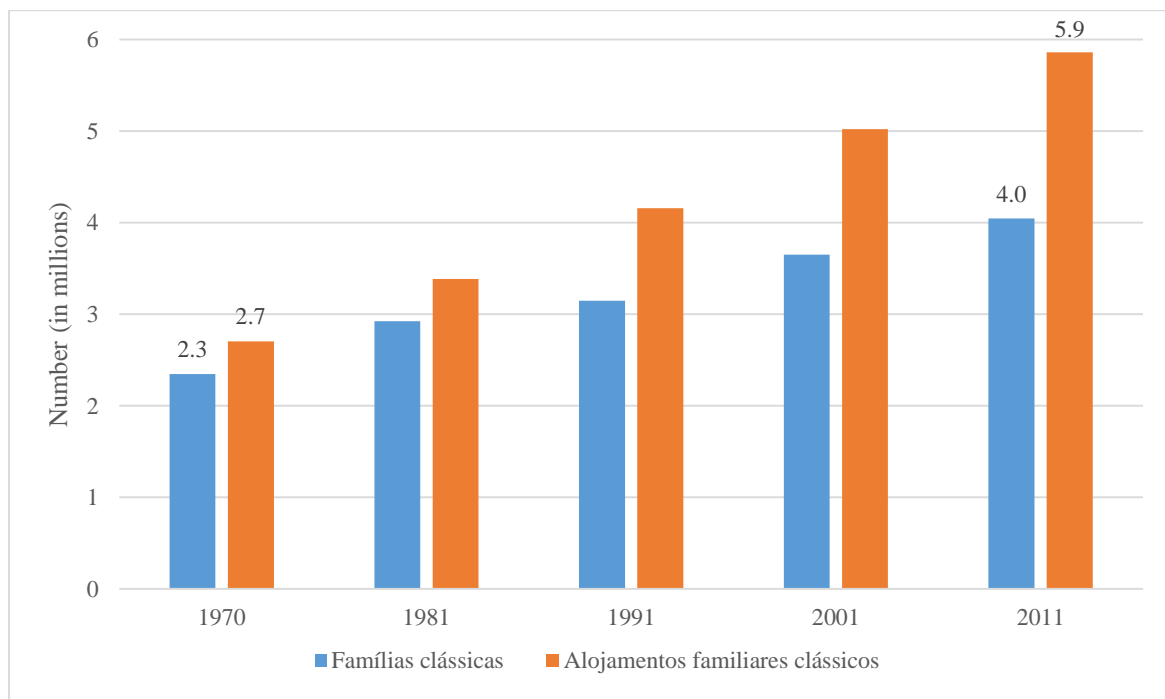
In the case of the Global Buildings Performance Network (GBPN), a deep renovation combines approaches a) and b). A deep renovation can achieve energy savings of 75% and the consumption of primary energy after renovation is less than 60 kWh/m²/year, including energy for heating, cooling, ventilation, DHW and illumination [14].

2. Building sector

It is first important to analyse some of the demographic data of our country stored on the database of the National Statistics Institute (INE).

In Figure 3, we can see the evolution of a number of private households⁷ and the number of private⁸ dwellings. In 1970, there were approximately 2.7 million private households and, at the time of the last census in 2011, there were around 5.9 million, representing growth of around 117%. The number of private households has also grown since 1970. However, for the same period this growth is only 72% and in 2011, there were 1.8 million more dwellings than families, with a ratio of 1.45 family dwellings per private household.

This trend suggests that the housing market is highly directed at the construction of new housing and that the number of empty dwellings and the number of secondary and seasonal residences has grown [15].



Key

PT	EN
Famílias clássicas	Private households
Alojamentos familiares clássicos	Private dwellings

Figure 2: Evolution of the number of households and dwellings (INE)

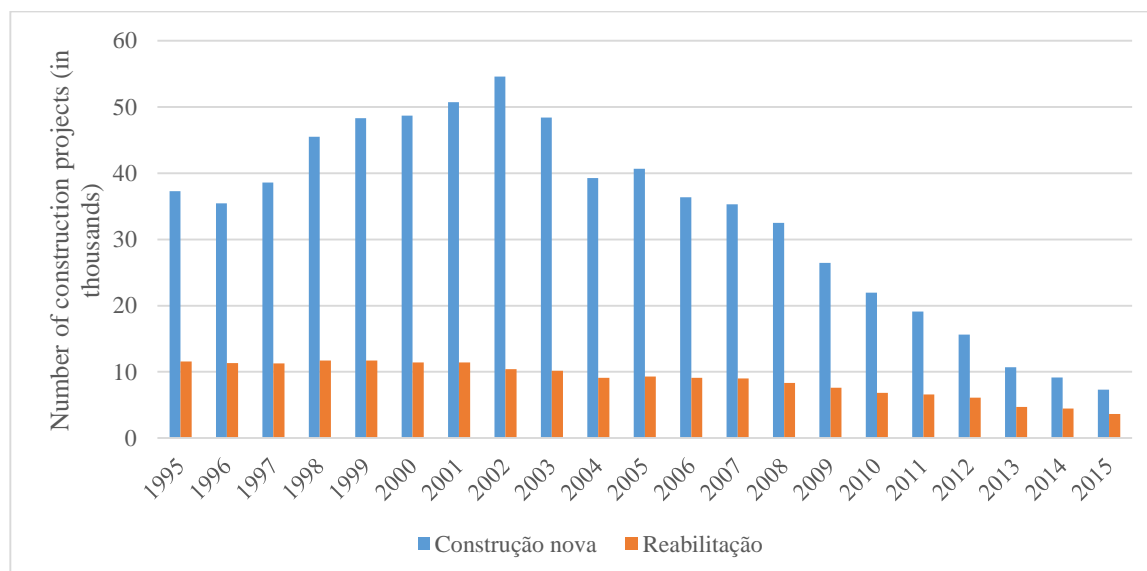
⁷ Group of people who live in the same dwelling and are related (directly or through common law partnerships) and who occupy all or part of the dwelling. A private household is also considered to be any independent person who occupies a part or all of living quarters. (Meta-information – INE)

⁸ Distinct and independent space, consisting of a room or series of rooms and respective annexes (...) normally intended for habitation by only one family/private household. (...) (meta-information - INE)

2.1. Construction dynamics

It is also important to analyse the growth dynamics in civil construction with regard to the new construction and building renovation segments in Portugal. The Legal Regime for Urban Rehabilitation (RJRU), approved by Decree-Law No 307/2009 defines the renovation of buildings as ‘the manner of intervention intended to confer suitable performance characteristics and functional, structural and construction safety to one or more buildings, to the functionally adjacent constructions incorporated into the area, as well as the dwellings which may form part of that building, or to provide new functional capabilities, determined on the basis of the urban rehabilitation options employed, with a view to allowing new uses or the same use with superior performance standards, and may include one or more urban operations’.⁹

Figure 4 shows the evolution in the number of construction projects concluded since 1995 in each of these segments, where it can be immediately seen that new construction is predominant throughout the period.



Key

PT	EN
Construção nova	New construction
Reabilitação	Rehabilitation

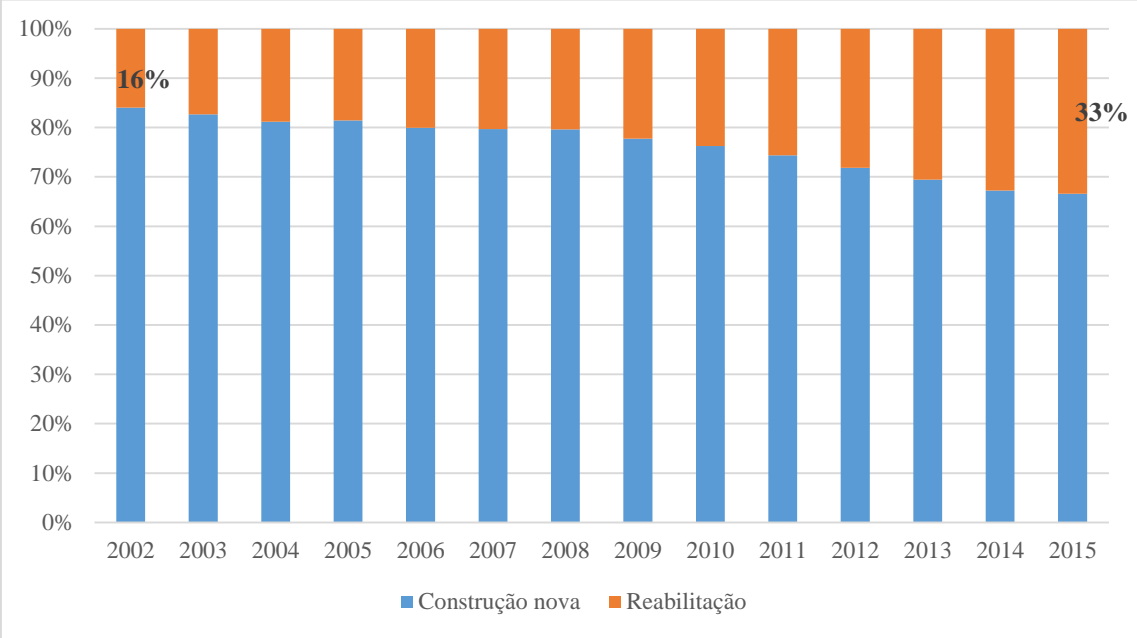
Figure 4: Evolution in the number of do construction projects concluded

The graph also shows that new construction differed in two periods: between 1995 and 2002, there was a gradual increase in the number of buildings constructed annually (the number in 2002 corresponds to around 146% of the figure for 1995). Moreover, from 2003 to 2015, an ongoing decrease can be seen in this number, which currently corresponds to 15% of the number of new constructions in 2003.

⁹ Article 2(i)

With respect to renovation work, it can be seen that up to 2003, the number of buildings renovated annually stayed above 10 000. Later, the number fell and in 2015 only 3 664 buildings were renovated (corresponding to 36% of the figure for 2002).

With the general fall in construction since 2002, and despite new construction continuing to predominate, renovation work now has greater importance: the proportion of this segment increased from 16% in 2002 to 33% in 2015 – Figure 5.

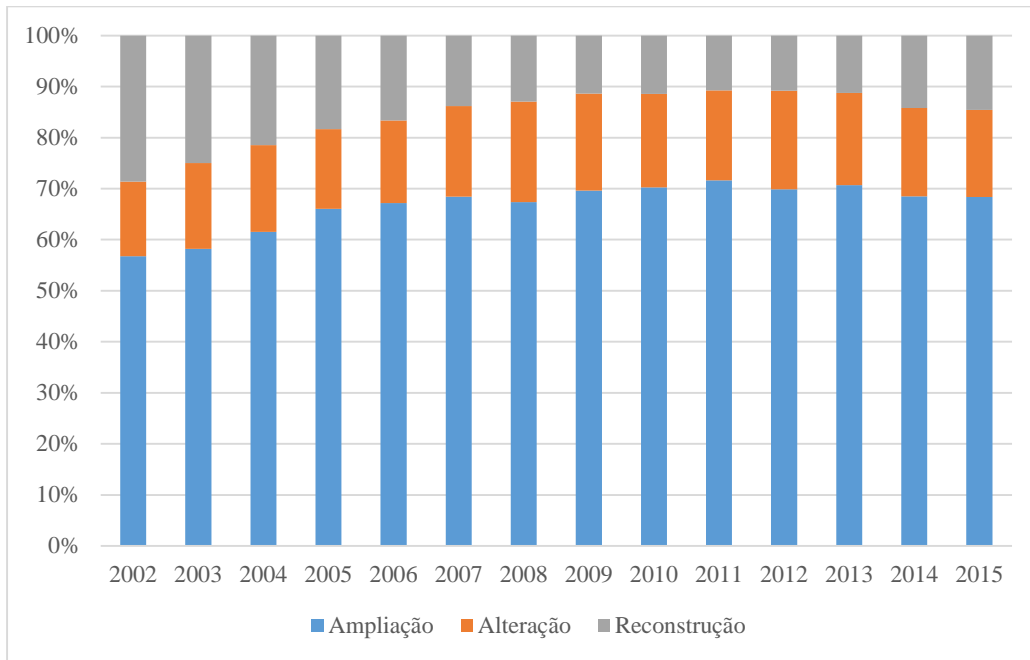


Key

PT	EN
Construção nova	New construction
Reabilitação	Rehabilitation

Figure 5: Relative weighting of construction and renovation work

Breaking down the different types of works which make up the renovation segment, it can be seen that expansion work is predominant throughout the period.



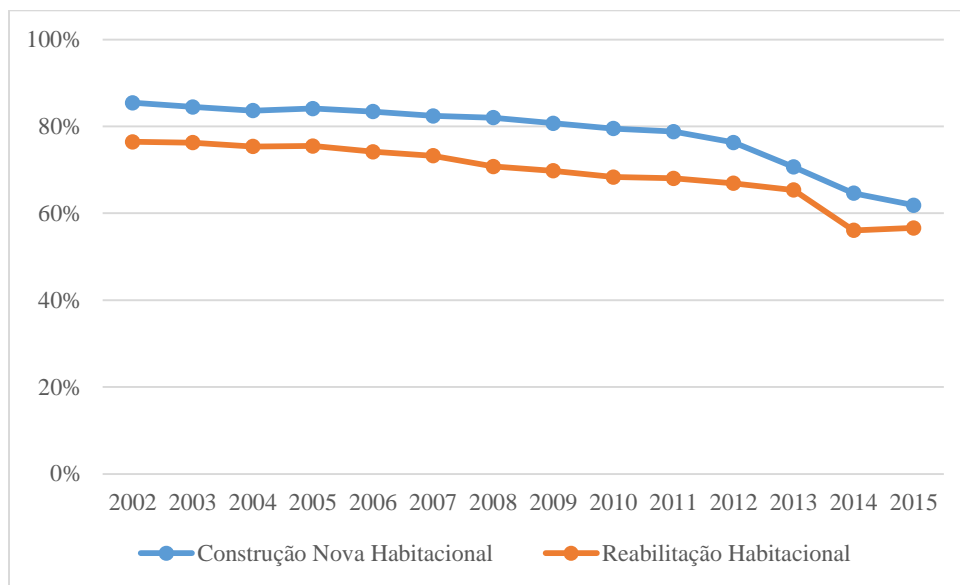
Key

PT	EN
Ampliação	Expansion
Alteração	Alteration
Reconstrução	Reconstruction

Figure 6: Breakdown of renovation work

Analysing the purpose of the concluded work, it is possible to see that both new construction as well as renovation are predominantly for housing.

Although its importance has decreased over the years, in 2015 new construction for the residential sector had a weighting of around 62% while 57% of renovation work was for this sector.



Key

PT	EN
Construção Nova Habitacional	New construction housing
Reabilitação Habitacional	Rehabilitation housing

Figure 7: Weighting of concluded works in the housing sector

2.2. Economic growth

With regard to productivity¹⁰, the building renovation segment had the lowest weighting in the civil construction sector in 2011 with just 26% – new construction of buildings represents 40% and engineering work is 34%. This figure places Portugal as one of the Euroconstruct¹¹ countries with lowest productivity in this segment. Only the Czech Republic, Austria, Slovakia and Poland had lower productivity in 2011 – a year in which the European average was 35% (**Figure 8**). It should also be noted that in countries such as Germany, Italy and Denmark, renovation represents the vast majority of investment made in the civil construction sector.

¹⁰ Value of all expenditure involved in works.

¹¹ Euroconstruct is a European group consisting of members from different European countries, dedicated to research, analysis and economic forecasting in the Construction Sector. (<http://www.euroconstruct.org/>)

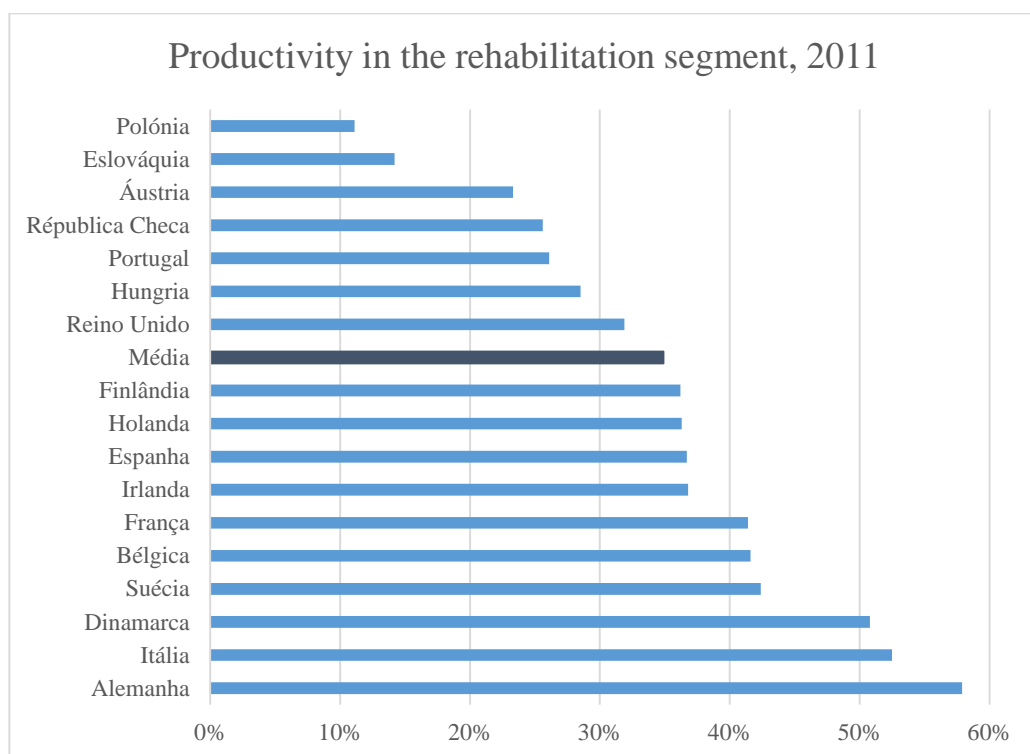


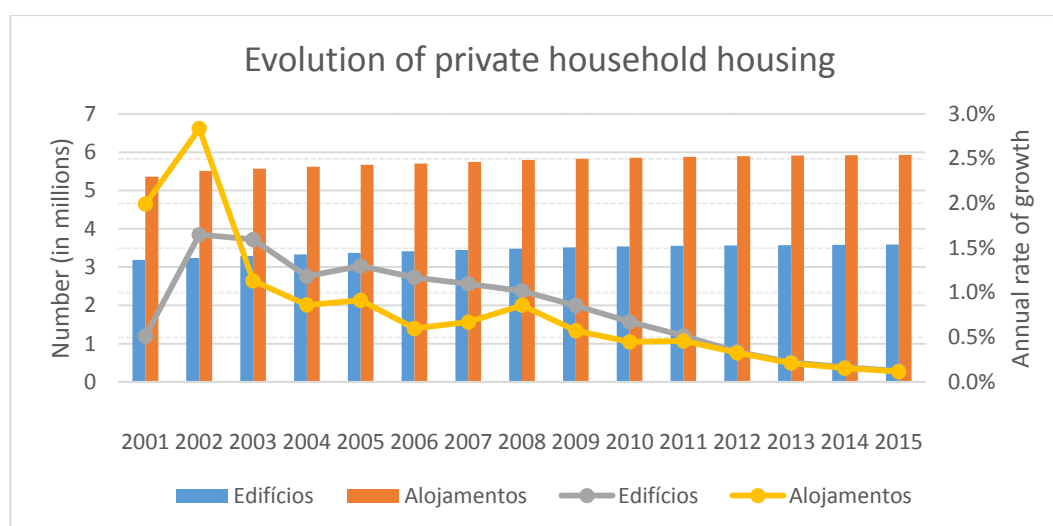
Figure 8: Productivity in the housing segment

Key

PT	EN
Polónia	Poland
Eslováquia	Slovakia
Áustria	Austria
República Checa	Czech Republic
Portugal	Portugal
Hungria	Hungary
Reino Unido	United Kingdom
Média	Average
Finlândia	Finland
Holanda	Holland
Espanha	Spain
Irlanda	Ireland
França	France
Bélgica	Belgium
Suécia	Sweden
Dinamarca	Denmark
Itália	Italy
Alemanha	Germany

3. Residential Sector

According to estimates by the INE in the annual series ‘Construction and Housing Statistics’, in 2015, the Portuguese housing stock consisted of approximately 3.6 million private household buildings and 5.9 million family dwellings. With respect to 2001, these figures represent a rate of growth of 0.85 % in the case of buildings and 0.72% in the case of dwellings. The graph below shows the evolution of housing stock in the last 14 years.



Key

PT	EN
Edifícios	Buildings
Alojamentos	Dwellings

By analysing the graph, it is possible to see that the annual evolution in the number of buildings slowed down during the period of study (except in 2002 and 2005). The rate of growth has been less than 1.50% since 2004 and in 2009, fell below 1.00%. In 2015, the figure was the lowest at around 0.12%.

With regard to evolution in dwellings, it is also possible to see a general slowdown over the study period, except in some years such as in 2008.

3.1. Characterisation

Data shown in this section are mostly provided by the *V General Housing Census*, which formed part of the *2011 Census*. These censuses are conducted by the INE and follow European Parliament standards as well as United Nations recommendations. Due to their exhaustive nature, the censuses allow different aspects of the residential building stock to be identified and characterised.

When information was not available in the 2011 Census, information from ADENE was used. This is the Portuguese entity responsible for managing the System for the Energy Certification of Buildings (SCE).

At the time of this census, there were approximately 3 544 389 buildings and 5 859 540 family dwellings.

3.2. Construction period

Four periods of construction can be seen in this analysis:

- Pre 1960;
- From 1961 to 1990;
- From 1991 to 2005;
- After 2006.

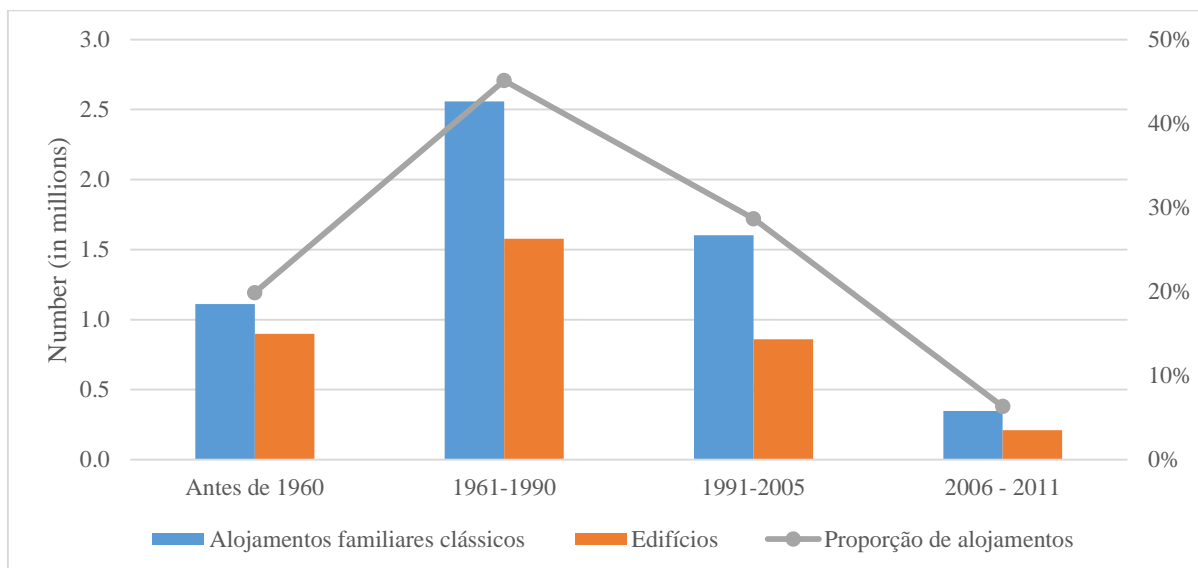
This breakdown was carried out mainly based on legislation in force at the time the buildings were constructed and the materials used in their structures.

It is considered that until 1960, buildings had a more traditional construction as they were mostly built using ‘natural’ construction materials, such as wood, stone and sand. These materials have since been replaced by reinforced concrete structures, which have been widely employed in Portugal since the end of the 1950s. It was also at this time that more demanding standards started to arise with regard to the structure of buildings. Examples include the Regulation on Construction Safety against Earthquakes (Decree No 41 658 of 31 May 1958) and the Regulation on Reinforced Concrete Structures (Decree No 47 723).

In 1991, with the entry into force of the Regulation on Characteristics of Thermal Behaviour in Buildings (RCCTE), approved by Decree-Law No 40/90 of 6 February 1990, new buildings (and buildings undergoing extensive renovation work), minimum requirements must now be met with regard to the building envelope and even in relation to the level of shading. The RCCTE marks the starting point of concerns regarding energy efficiency.

In 2006, the old RCCTE was repealed and a new law was published with exactly the same name, through Decree-Law No 80/2006 of 4 April 2006. This new law featured stricter requirements and was part of the legislative framework transposing Directive No 2002/91/EC of the European Parliament and of the Council of 16 December 1991. On the same date, the first building energy classification system, the National System for the Certification of Energy and Interior Air Quality of Buildings and the Regulations on Climate Control Systems in Buildings (RSECE) were also published. The RSECE defined requirements with respect to thermal comfort and the quality of interior air, requirements for the design, installation and maintenance of climate control systems and the maximum energy consumption limits for new buildings and large-scale renovation.

The following graph shows the breakdown of buildings and family dwellings for the construction periods considered and the proportion of such dwellings with respect to the stock set out in the census.



Key

PT	EN
Alojamentos familiares clássicos	Private dwellings
Edifícios	Buildings
Proporção de alojamentos	Proportion of dwellings

As can be seen, 45% of dwellings were built between the start of the 1960s and 1990. If we consider all dwellings built before 1990, this proportion rises to 65%.

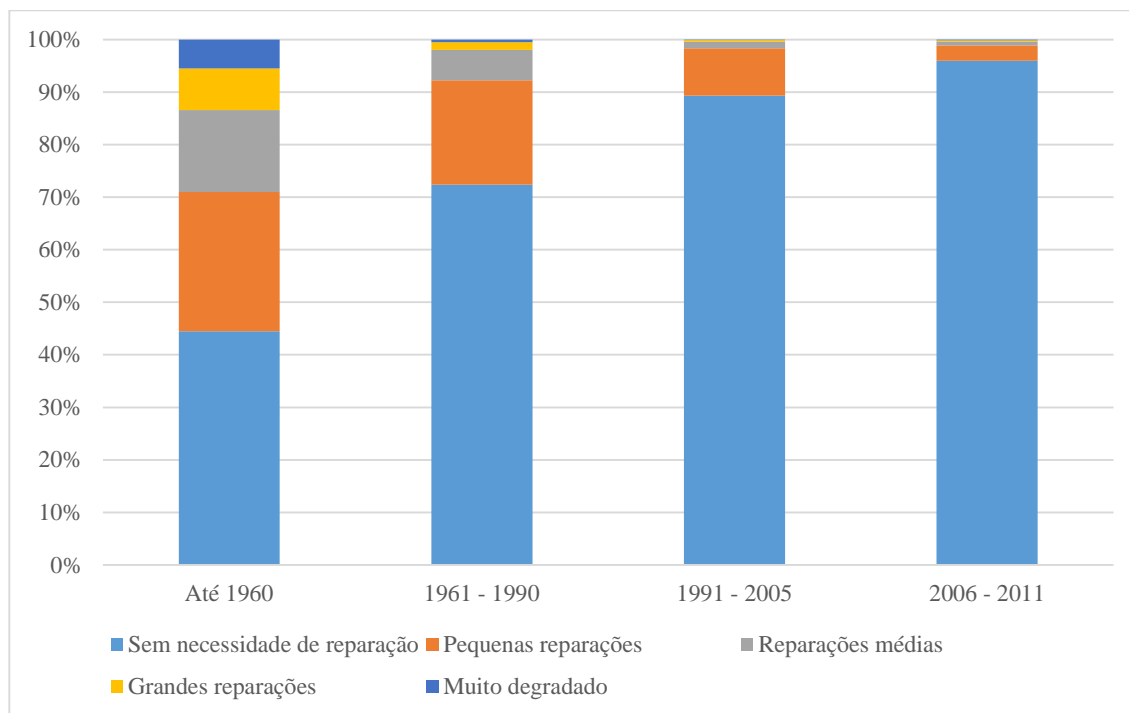
Dwellings built after the first laws on thermal behaviour represent slightly more than one third of existing buildings and of these, only 6% were built after the laws of 2006.

3.3. Conservation

The state of conservation considered in the 2011 Census considered the need for repairs possibly observed in the exterior components of the b (covering, structure, walls and exterior frames) which was assessed on a five-degree scale. This assessment allowed it to be seen that most buildings did not require repairs (around 71%).

The proportion of buildings requiring repairs (around 27%) is less when the degree of necessary repairs is increased (approximately 18% required small repairs, 7% medium-scale repair work and 3% large-scale repair work). Highly degraded buildings represented less than 2% of housing stock.

The following graph shows that the state of conservation is directly related to the building's time of construction as the proportion of buildings requiring repair is less the more the construction time advances.



Key

PT	EN
Sem necessidade de reparação	No repairs required
Pequenas reparações	Small repairs
Reparações médias	Medium repairs
Grandes reparações	Large repairs
Muito degradado	Highly degraded

3.4. Type of building

With respect to the type of building, it is possible to make two distinctions: single-family buildings, those which are built as a one family dwelling and multi-family buildings, designed to provide two or more family dwellings.

According to ADENE data, most buildings in Portugal are single-family, representing around 85% of all stock in 2011. The following table shows the breakdown of buildings based on period and type of construction.

	Number		Proportion	
	Single-family	Multi-family	Single-family	Multi-family
Until 1960	826 597	72 782	27.48%	13.56 %
From 1960 to 1990	1 358 651	217 883	45.17 %	40.59 %
After 1990	822 368	246 108	27.34 %	45.85 %

3.5. Tenure status

With respect to the occupancy of dwellings, it is known that at the time of the census around 68% of buildings were for normal residence and 19% were for seasonal and secondary use. Unoccupied dwellings represented around 13%.

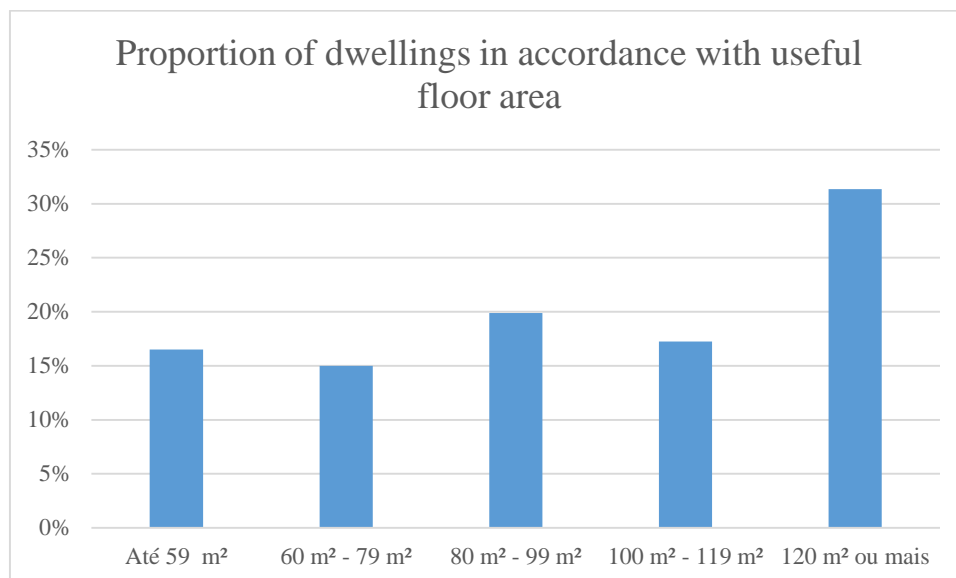
In the universe of dwellings used as normal residence, around 73% are lived in by owners (or co-owners), the proportion of let (or sub-let) dwellings was 20%, while the remaining 7% represented other situations.

The following table shows the breakdown in absolute terms of the tenure status and the proportion in comparison to the total number of dwellings.

	Number	Proportion
Habitual residence		
Owner or co-owner	2 923 271	50 %
Tenant or sub-tenant	794 465	14 %
Other situations	273 376	5 %
Seasonal use or secondary residence	1 133 300	19 %
Unoccupied living quarters	735 128	13 %

3.6. Useful floor area

The census also calculated useful floor area in normal residences and the average was 109.1 m². The following graph shows a proportional analysis.



Key

PT	EN
Até	Up to
ou mais	or more

At the time of the census, a little more than half of these dwellings had a useful floor area of between 60 m² and 119 m², and within this segment, dwellings with a useful floor area of between 80 m² and 99 m² had greater weighting (approximately 20%). Dwellings with an area of less than 60 m² represented 16.5%, while dwellings with an area greater than 119 m² had a weighting of 31.4%.

3.7. Social housing

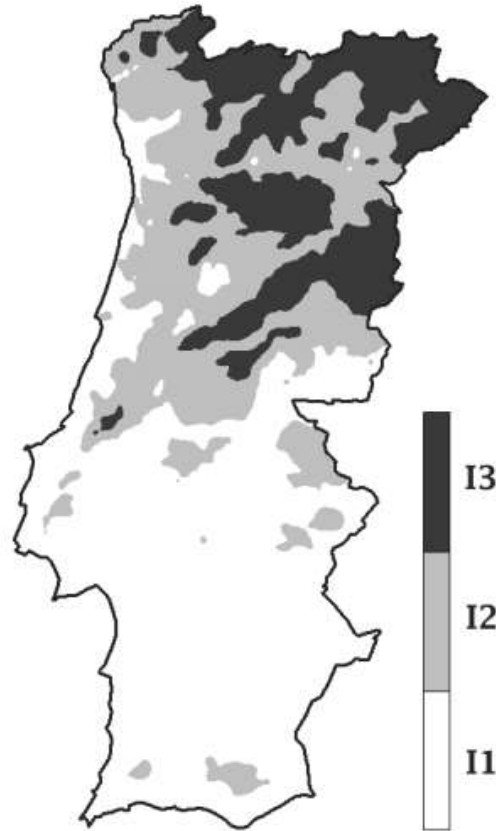
According to the Survey on the Characterisation of Social Housing conducted by INE in 2016, the social housing stock in 2015 was around 119 691 dwellings in 24 484 buildings. These buildings belong to municipalities and other owners and managers of social housing and are designed for low-income households as sale and rental values are controlled.

In proportional terms, and bearing in mind the estimates of housing stock in 2015, controlled cost housing represented around 2% of all dwellings.

3.8. Location

According to 2010 data from INE and the Directorate-General of Energy and Geology (DGEG), it was estimated that around 70% of family households were located in Predominantly Urban Areas, 17% were in Medium-Scale Urban Areas and only 14% were in Predominantly Rural Areas.

3.9. Climate Zoning



In Portugal, climate zoning was established through Official Order No 15793-F/2013 of 13 December 2013. This law sets out the difference between winter climate zones (I1, I2 and I3) summer climate zones (V1, V2 and V3).

Winter climate zones were defined based on the number of degree-days in the heating season while summer climate zones were differentiated through the average exterior temperature in the cooling season.

Given that temperatures in the cooling season do not exceed the average monthly value of 25°C and that, as a number of authors note, summer climate zoning does not interfere with single-family building energy requirement calculations, for purposes of simplification, buildings are only characterised in winter climate zones.

The following table shows the percentage breakdown of buildings by climate zone and the type and period of construction. Due to their specificity, the autonomous regions of the Azores and Madeira are also broken down.

<i>Location</i>	<i>GRAND TOTAL</i>	<i>Until 1960</i>		<i>From 1960 to 1990</i>		<i>After 1990</i>	
		<i>Single-family</i>	<i>Multi-family</i>	<i>Single-family</i>	<i>Multi-family</i>	<i>Single-family</i>	<i>Multi-family</i>
<i>I1</i>	42.66	10.71	1.28	15.34	3.17	9.01	3.16
<i>I2</i>	45.45	9.83	0.57	18.46	2.26	11.28	3.05
<i>I3</i>	6.51	1.43	0.14	2.63	0.54	1.37	0.41
<i>The Azores</i>	2.79	0.78	0.04	0.97	0.06	0.86	0.08
<i>Madeira</i>	2.59	0.57	0.03	0.93	0.12	0.69	0.25

Approximately 88% of buildings, both single-family as well as multi-family, are located in zones I1 and I2. In zone I3, characterised by more severe winter conditions, we can find less than 7% of buildings.

3.10.Characterisation of energy consumption

With respect to final energy consumption, and according to more recent data presented in the Energy Balance for 2015, the domestic sector accounts for consumption of 2 528 ktep. The following table shows the sources of this energy in proportional terms.

Power source	Proportion
Electricity	41 %
Firewood and forest waste	30 %
Oil by-products	17 %
Gas	10 %
Solar thermal	1.5 %

According to information from the Survey on Domestic Sector Energy (ICESD), which analysed the period from October 2009 to September 2010, electricity was the most common source of energy in the domestic sector, used in around 99.9% of dwellings. The second most used source at 56.1% was Butane Bottle LPG, and third was firewood used in around 40.1% of dwellings.

The ICESD also notes that the public electricity grid is connected to almost 100% of dwellings. However, only 22% of dwellings in Portugal have access to the natural gas distribution network.

With respect to the actual use of the energy, it is the kitchen¹² which accounts for most consumption. In second and third places, are water and ambient air heating, corresponding to 23% and 22%, respectively. Ambient cooling sees least consumption, standing at only 0.5%.

Energy use	Proportion
Kitchen	39 %
Water heating	23 %
Ambient heater	22 %
Electrical Equipment	11 %
Lighting	4 %
Ambient cooling	1 %

¹² The ICESD considers the use of following appliances in the kitchen Hob and oven, hob, independent oven, small stove, fireplace, microwave, ventilator/extractor fan, refrigerator (with and without freezer), fridge-freezer, freezer cabinet, dishwasher, washing and drying machine, drying machine and washing machine.

3.11. Heating and cooling equipment

Through the ICESD it is also possible to know which equipment is used in the dwelling, particularly for heating and cooling. Before starting this analysis, it should be noted that 78.3% of respondents to the survey used equipment for ambient heating while only 22.6% used ambient cooling equipment.

The following table shows the proportion of dwellings using the abovementioned equipment.

Equipment	Proportion of dwellings
Water heating	
Water heater	79 %
Storage water heaters	11 %
Boiler	12 %
Solar thermal system	2 %
Ambient heater	
Open fireplace	24 %
Fireplace with heat exchanger	11 %
Wood stove	7 %
Boiler for central heating via warm water circulation	11 %
Stand-alone electrical heater	61 %
Stand-alone LPG heater	7 %
Air conditioning which heats and cools (heat pump)	7 %
Ambient cooling	
Individual air conditioning unit	7 %
Ventilator (fan, wall ventilator)	70 %
Air conditioning which heats and cools (heat pump)	26 %

As can be seen, water heaters are most used for heating water and exist in 78.6% of dwellings. Boilers are in second place, where most use biomass as the source of heating (around 54.7%). In the study period, solar thermal use stood at 1.8%.

With regard to ambient heating, around 61.2% of dwellings used electric heaters. Fireplaces are used in more than a third of dwellings, and 11% have heat exchangers.

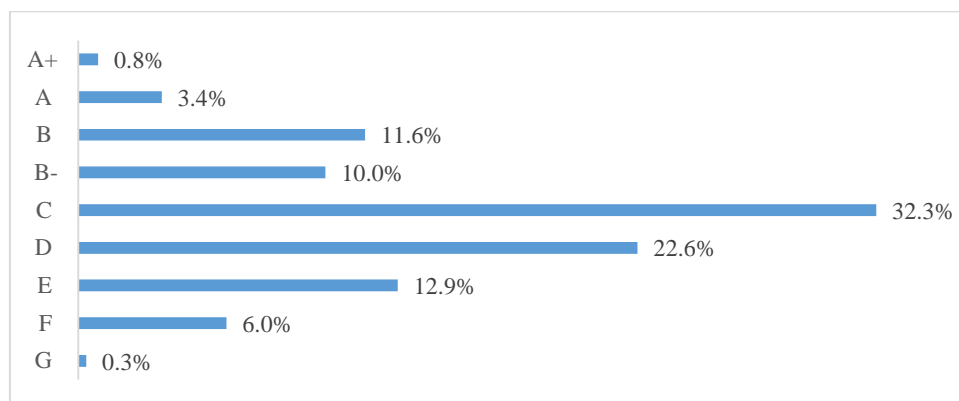
For ambient cooling, the fan was most used followed by heat pumps, with 69.5% and 26.0%, respectively.

4. Energy performance of the building stock

Data on energy classification and the thermal characteristics of housing take into consideration the certificates issued and entered into the database of the Energy Classification System (SCE), managed by ADENE. The data presented refer to the certificates issued from July 2007 to November 2016, when 1 028 486 housing certificates had been issued. The number of certificates relating to dwellings that existed before the SCE, and which have not undergone extensive renovation work, is 825 760.

4.1. Housing

The graph below shows the breakdown by class of the certificates issued relating to existing buildings or dwellings, where it can be seen that the most representative section is class C, with around 32%.



Also of note is that approximately 74% of certificates are class C or lower. In other words, below the minimum threshold used for new buildings (class B-). This shows the poor energy performance of Portuguese buildings, which as seen before, were mostly built before the first energy efficiency regulations existed.

In light of current energy regulations, the Regulations on the Energy Performance of Housing (REH), which after renovation work allows a lower threshold of class C, it can be seen that there is at least potential for energy renovation in close to 42% of certified housing. This corresponds to certificates for which the class is D or lower. In a long-term strategy, this potential should be increased as the goal is to make buildings even more energy efficient.

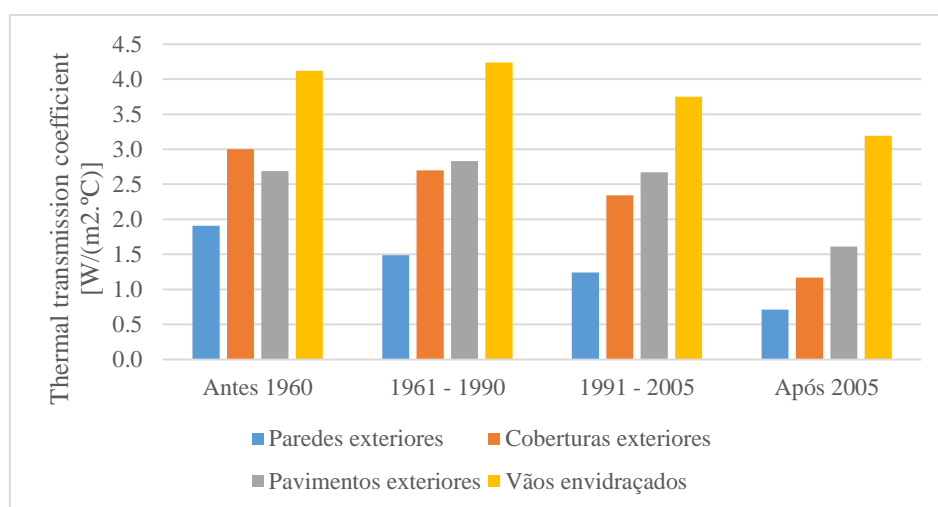
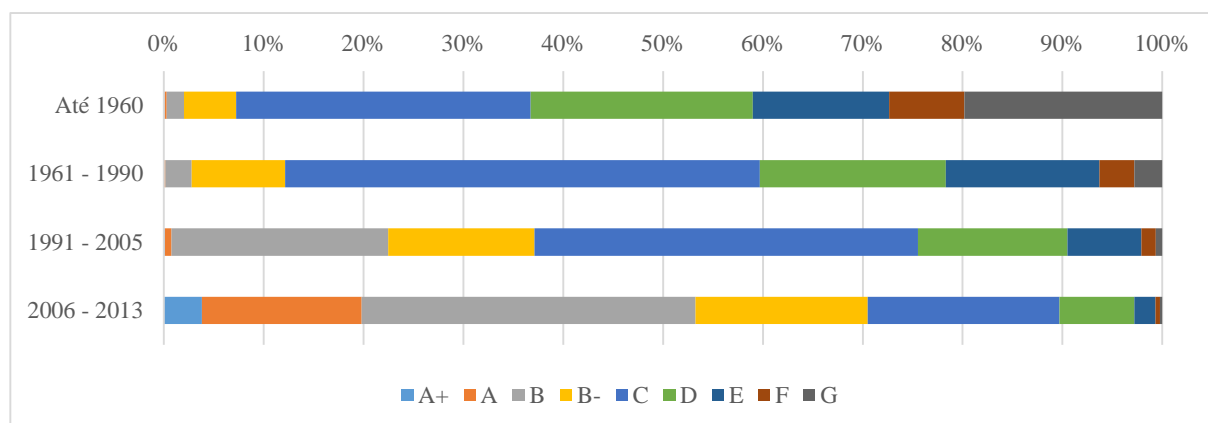
In a breakdown of certificates according to construction periods, it can be seen that pre-1990 construction has low levels of efficiency, mostly characterised by classes C and D. In pre-1960 construction, class G accounts for 20% of certificates.

These low levels of energy quality are related to the thermal behaviour of buildings, more specifically that of their envelope (includes exterior walls, exterior covering, exterior paving and glazing), where heat is exchanged between the interior and exterior of the building. The thermal quality of the envelope can be assessed through the thermal transmission coefficient (U), expressed as $W/m^2 K$. This is defined physically by the flow of heat per unit of area of a given structure, when stationary, for a unit temperature difference. This figure is therefore directly proportional to the flow of heat. As such, the lower the value of this coefficient, the lower the heat losses through the building's envelope will

be. The graph shows the average value of U for each type of envelope in the construction periods considered, according to SCE 1 certificates¹³.

As already mentioned, the first thermal regulations on buildings only came about in 1990. Until that point, buildings were constructed without thermal insulation and their U coefficients are higher, leading to greater heat losses and gains through the envelope.

The evolution in average U figures over the different periods also reinforces the importance of technology and legislative power in making buildings ever more energy efficient.



Key

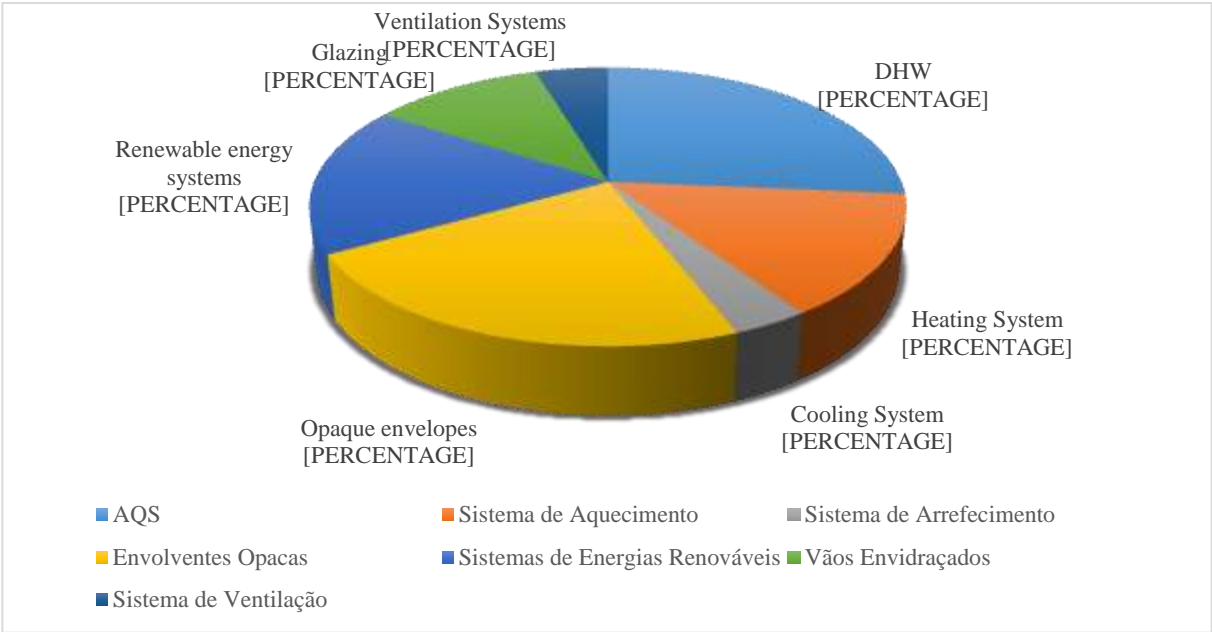
PT	EN
Paredes exteriores	Exterior walls
Coberturas exteriores	Exterior coverings
Pavimentos exteriores	Exterior paving
Vãos envidraçados	Glazing

¹³ The SCE 1 refers to the Energy Certification System in force from July 2007 to November 2013 and includes 560 011 housing certificates.

The SCE also provides a vision of the rehabilitation requirements of certified building stock, more specifically the improvement measures which would lead to more efficient buildings. These measures mostly to work on building envelopes, including opaque and glazed sections, the production of DHW and the installation of renewable energy systems¹⁴.

The following graph shows the incidence of every measure in the certificates. It should be noted that these data refer only to the first SCE, in other words, certificates issued up to December 2013.

Moreover, ADENE also estimates that one million buildings require repair, a figure which means 180 million m² of walls, 42 million m² of windows and 125 million m² of covering. [http://www.adene.pt/10solucoes-eficiencia-energetica]



Key

PT	EN
AQS	DHW
Envolventes opacas	Opaque envelopes
Sistema de ventilação	Ventilation system
Sistema de aquecimento	Heating system
Sistemas de energia renováveis	Renewable energy systems
Sistema de arrefecimento	Cooling system
Vãos envidraçados	Glazing

¹⁴ Renewable energy systems include mainly solar panels (95.6%), photovoltaic systems connected to the grid (1.0%), biomass boilers (0.2%) and other (3.2%).

4.2. Shops and services sector

The approach taken in the characterisation of services and commerce buildings

According to General Education Indicators in the database of the Directorate-General of Education and Science Statistics, in the academic year of 2014/2015, there were around 14 105 teaching establishments in the pre-school, 1st cycle, 2nd and 3rd cycles and secondary education. Most are state teaching establishments accounting for around 73%, with the remaining 27% being private teaching institutions. With respect to the study cycle, pre-school establishments are greater in number. This figure falls as the level of teaching increases and secondary schools are least in number.

There were a total of 294 higher education institutions in the academic year of 2015/2016, mostly public: around 179.

	Pre-school	1 st cycle	2 nd and 3 rd cycles	Secondary	Higher
Public	3 760	3 832	2 083	584	179
Private	2 348	522	598	378	115
Total	6 108	4 354	2 681	962	294

According to the most recent data from Health Statistics 2015, there are 225 hospitals in Portugal, 110 of which are public, 111 are private and four are public-private partnerships. It should also be pointed out that with regard to public hospitals, six have restricted access, usually for the armed forces and, as such, fall outside the requirement to implement energy efficiency measures.

The most recent data on Health Centres are from 2012 and show that there are a total of 387 such centres, and around 17 of these have in-patient facilities.

In this section, there is a short description of the stock of buildings licensed for commerce, services or similar activities. Information on the number of such buildings is mainly from INE, I. P.

According to Tourism Statistics for 2015, updated by INE, I. P. in July 2015, 1 591 hotels were in operation, including hotel-apartments, pousadas, farmhouses in Madeira, apartments and tourist villages.

According to the INE database, there were 82 403 restaurants and similar in 2015. This number includes the following types of establishments: restaurants, take-away meals, cafés, bars, patisserie and establishments serving drinks with a dance floor.

To obtain a more detailed breakdown of these buildings, including construction period and useful area, exhaustive research was carried out which proved to be unsuccessful. It was decided to estimate these indicators based on data for buildings certified under SCE 2¹⁵ up to 28 February 2017, using statistical processing of the useful floor area, the construction period and the energy class of these buildings.

¹⁵ SCE 2 was considered as being the Building Energy Certification System in force since December 2013.

In this estimate, it was considered that one certificate refers to one establishment, and as such, includes all the buildings in that group. It should also be noted that the representation of certified buildings in relation to existing establishments varies in the different sub-sectors. This is shown in the following table along with a summary of the number of establishments being studied.

Sector	No of establishments	No of certificates issued	Representation of certificates
Education from pre-school to secondary	8 898	339	4 %
Higher Education	294	50	17 %
Hospitals	225	94	43 %
Health Centres	387	66	17 %
Hotels	1 591	1 258	80 %
Restaurants and similar	82 403	6 980	9 %

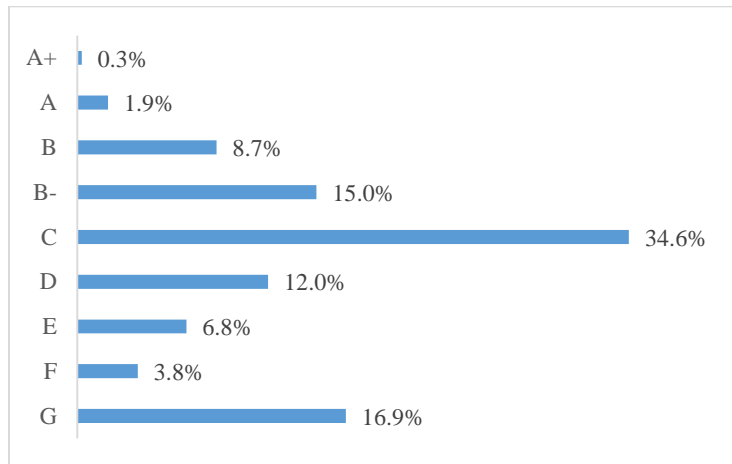
4.2.1. Useful floor area

Sector	Estimated area (m ²)
Education from pre-school to secondary	20 063 263
Higher Education	2 508 991
Hospitals	3 310 544
Health Centres	147 275
Hotels	8 427 889
Restaurants and similar	11 786 052

4.2.2. Construction period

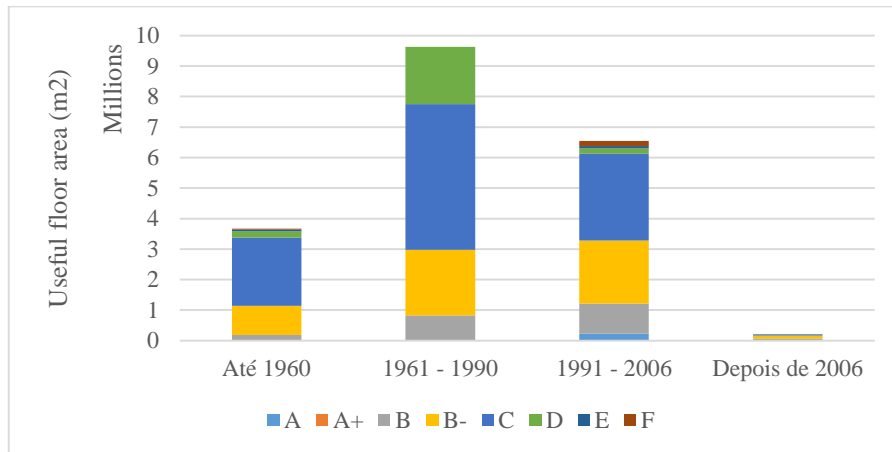
Sector	Construction period			
	Until 1960	1961 - 1990	1991 - 2005	After 2006
Education from pre-school to secondary	3 672 955	9 625 426	6 547 644	217 239
Higher Education	1 153 495	672 736	679 870	2 891
Hospitals	867 496	979 372	1 008 822	454 854
Health Centres	22 842	35 350	82 194	6 889
Hotels	978 415	2 793 022	3 012 272	1 644 180
Restaurants and similar	1 994 983	4 763 728	4 898 619	128 723

With regard to the energy classification of commerce and services buildings, once again class C stands out with approximately 35% of buildings. Certified buildings of class D or lower stood at 39%.



Shown below is the energy classification of the different types of buildings per sub-sector. The breakdown shows year of construction and floor area and is once again estimated based on buildings certified under SCE 2.

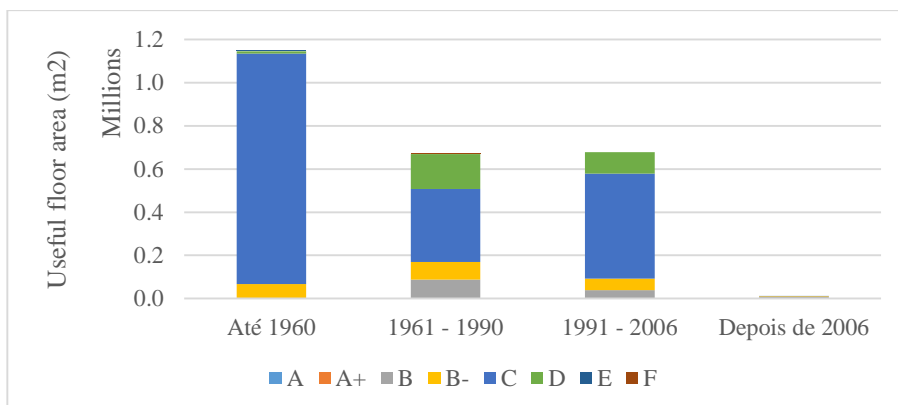
Education from pre-school to secondary:



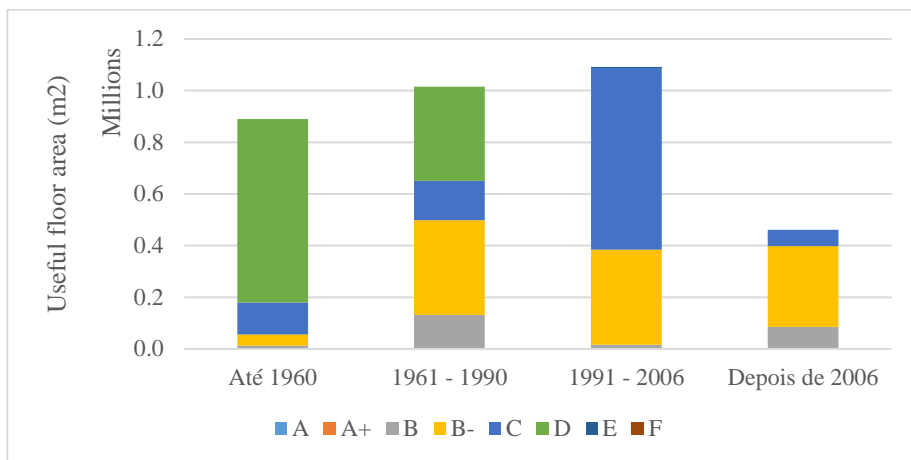
Key

PT	EN
Até 1960	Up to 1960
Depois de 2006	After 2006

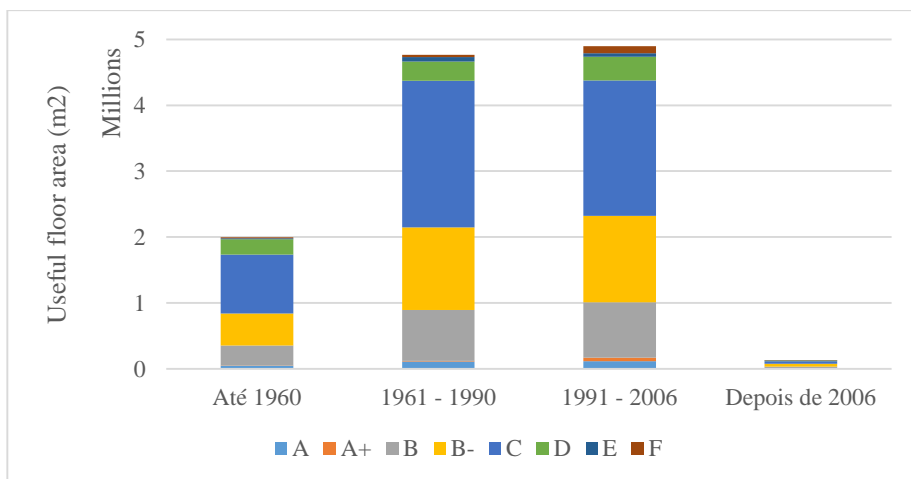
Higher education institutions:



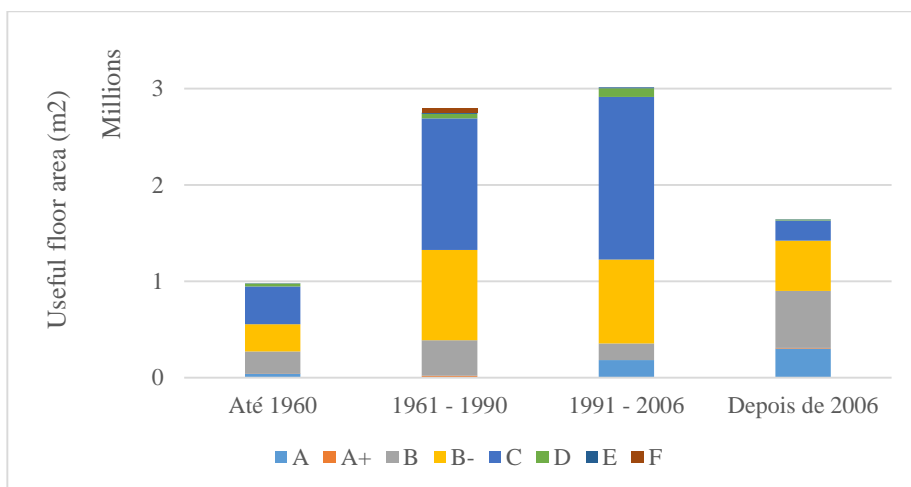
Health Centres and hospitals:



Restaurants and similar:



Hotels:



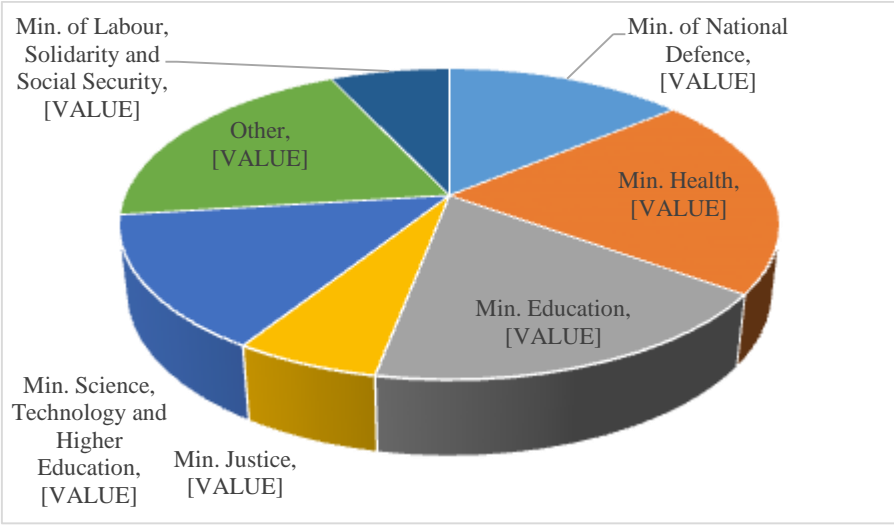
4.2.3. Energy consumption in the services and commerce sector

Final energy consumption in the area of services in 2015 was 1.948 ktep¹⁶, mostly electricity – around 1 467 ktep [10].

Energy source	Proportion
Electricity	75.3 %
Gas	11.5 %
Oil by-products	7.9 %
Solar thermal	2.2 %
Firewood and forest waste	1.6 %
Heat	1.4 %
Other renewables	0.1 %

State buildings also use mainly electricity, and in 2015 accounted for consumption of 212 ktep.

Based on buildings with consumption greater than 100 MWh, the demand for electricity by the state is concentrated in six ministries. The most relevant in this respect are the Ministry of Health and the Ministry of Education, with consumption of 21% and 18%, respectively. Next are the Ministry of Science, Technology and Higher Education (MCTES) and the Ministry of National Defence with 14% each, and finally, the Ministry of Labour, Solidarity and Social Security (MTSSS) with 7% and the Ministry of Justice with 6%. The remaining State entities consume around 20%.



4.2.4. Ownership

To study the ownership of services buildings, the report on the State Property Information System (SIIE) for the 4th quarter of 2016 was used. The SIIE is an electronic platform for collecting and compiling information on buildings and land used by government. It is provided by the Directorate-General of the Treasury and Finance and the entry of data is the responsibility of the entities using the properties.

¹⁶ Excluded from this analysis if the consumption of jet fuel.

This report refers to 17 904 buildings which occupy a total gross area of 703 730 401 m², and it is known that of these, around 77% are the property of the State, 11% belong to private entities and 2% are mixed ownership. There is also a considerable number of buildings without any defined ownership – 10%.

With regard to the ministries consuming most electrical power, the buildings registered in the SIIE are mostly owned by the State, mainly through permission which has been granted for free use.

	Min. of Education	M.C.T.E.S.	Min. of Health	Min. of Justice	M.T.S.S.S
Rentals to state	1 %	3 %	2 %	9 %	8 %
Free use	99 %	96 %	81 %	83 %	74 %
Rental to private citizens	0 %	1 %	16 %	8 %	18 %

5. Improvement measures: Regulatory measures

The regulatory measures on energy efficiency currently in force are those set out in Decree-Law No 18/2013 of 20 August 2013 and republished since then in Decree No 28/2016 of 23 June 2016. This law transposes Directive 2010/31/EC of the European Parliament and of the Council of 16 December 2010 on the energy performance of buildings

The law also enabled a review of the legislation in force in Portugal, which up to that point consisted of three different Decree-Laws: Decree-Law No 78/2006 of 4 April 2006 approving the National System for Energy Certification and Interior Air Quality of Buildings; Decree-Law No 79/2006 of 4 April 2006, Regulations on Energy and Climate Control Systems in Buildings and Decree-Law No 80/2006 of 4 April 2006, Regulations on the Thermal Behaviour Characteristics of Buildings.

The new Decree-Law maintains the aims of the three previous laws, more specifically with regard to controlling energy consumption. However, it recognises the most relevant technical specificities for characterising and improving the energy performance of each type of building – a) buildings for housing and b) buildings for commerce and services, introducing for this purpose the Regulations on the Energy Performance of Buildings for Housing (REH) and the Regulations on the Energy Performance of Buildings for Commerce and Services (RECS) – meaning that the regulations were now specific to each type of building, unlike previous legislation. These regulations are also an integral part of the new Energy Certification System for Buildings (SCE), also approved in Decree-Law No 118/2013.

5.1. Regulations on the Energy Performance of Housing

The aim of these Regulations is to promote the improvement of thermal behaviour, the efficiency of technical systems and improvements to the envelopes of buildings for housing. Also created was a methodology for calculating different factors and minimum requirements are established for new construction and for buildings undergoing deep renovation work¹⁷, classified as:

- Thermal and energy quality in building envelopes: thermal transmission coefficient values of the opaque envelope and the solar factor values of the glazing are defined for each climate zone;
- Renewal of air: A maximum value is given for the rate of air renewal per hour;
- Values of requirements for nominal primary energy and useful energy for heating and cooling and respective limits;
- Requirements relating to the quality, efficiency and operation of technical systems;
- Compulsory installation of a thermal solar system (SST), whenever there is suitable exposure to the sun (alternatively, a different renewable resource system may be used which seeks to ensure, on an annual basis, a energy value at least equivalent to that which would be obtained with an SST);
- Promotion of systems which are able to improve the building's energy performance.

5.2. Regulations on the Energy Performance of Buildings for Commerce and Services

¹⁷ 'Deep Renovation', renovation to a building where: (i) the cost of the work on the envelope and/or on technical systems is greater than 25% of the total value of the building, and when individual dwellings exist within the building, understood to be the total of these dwellings, excluding the value of the land on which it is built; and/or (ii) when extension work is involved, when the cost of the extended part is more than 25% of the value of all the existing building (useful floor area, in the case of buildings for commerce and services) (...)

These regulations establish rules on the design, construction, change and maintenance of buildings for commerce and services and on the respective technical systems, promoting energy performance and the quality of the interior air. They govern the design and construction of new buildings and existing buildings undergoing deep renovation.

As with REH, the rules refer to thermal behaviour, ventilation and the efficiency of technical systems:

- Thermal transmission coefficient values of the opaque envelope and the solar factor values of the glazing are defined;
- These regulations promote systems which are able to improve the building's energy performance.
- Renewal of air: A maximum value is given for the rate of air renewal per hour;
- Requirements which set out the quality level, efficiency and operation of technical systems, including climate control components, preparation of DHW, lighting, energy management systems, renewable energies and also lifts and escalators;
- An energy efficiency indicator is provided, expressed on an annual basis in primary energy per useful floor area (kWh/m².year). This indicator has maximum limits for new buildings, buildings undergoing deep renovation and existing buildings;
- The operation of the building's technical systems must be monitored by a technician who shall ensure proper maintenance, supervise activities and manage and update relevant technical information;
- It is also compulsory to carry out periodic energy assessment with a view to identifying the need and opportunity to reduce energy consumption.

5.3. National Energy Certification System for Buildings (SCE)

The SCE is the certification system which is currently in force for buildings and operates through the issue of certificates (or pre-certificates, when at the design stage) which give an energy class to a building (or dwelling), on the basis of the respective energy performance. Possible measures are also presented which could reduce energy consumption and improve levels of energy efficiency.

5.3.1. Energy class

There are eight different levels of energy class, from A+ (most efficient) to F. In the case of REH, the class is determined through the primary energy requirements of the building calculated on an annual basis. In the RECS, it is determined through the Energy Efficiency Indicator, also calculated on an annual basis. In both cases, the calculation compares the building's real performance with the performance of a reference building.

Energy class	
A+	25% less than the reference consumption
A	Between 26% and 50%
B	Between 51 % and 75 %
B-	Between 76 % and 100 %
C	Between 101 % and 150 %
D	Between 151 % and 200 %
E	Between 201 % and 250 %
F	251% more than the reference consumption

With the entry into force of Decree-Law No 118/2013, all new buildings have an energy class equal to or higher than B-, while deep renovation should provide a building with at least a class C.

5.3.2. Requirement and penalties

SCE certificates shall be issued in the following situations:

- For new buildings or dwellings or buildings undergoing deep renovation;
- For existing buildings or individual units for commerce or services: If they have useful floor area equal to or greater than 1 000 m² or, in the case of shopping centres, supermarkets and covered swimming pools equal to or greater than 500 m²;
- Public property buildings with an interior useful floor area greater than 250 m²;
- All existing buildings or dwellings when sold, gifted or rented. The energy class shall also be stated in advertisements for sale or rental.

Non-compliance with these requirements shall constitute an administrative offence punishable with a fine.

5.4. Exceptional Regulations on Urban Rehabilitation

In 2014, an Exception Regime for Urban Rehabilitation (RERU) was published through Decree-Law No 53/2014 of 8 April 2014, amended by Decree-Law No 194/2015. This law applies to buildings or dwellings which were built a minimum of 30 years ago or are located in areas of urban rehabilitation and are for residential use.

The law provides temporary exception – seven years after entry into force (up to April 2021) – and seeks to provide a response to the economic and social environment currently being experienced by the rehabilitation sector. It arose from the need to drive rehabilitation work, bypassing a number of technical obstacles by dispensing with some legal requirements essentially intended for new construction (e.g. with regard to accessibility, acoustic requirements, etc.). However, the current version of the law, does not dispense compliance with the minimum energy efficiency requirements and thermal quality set out in the REH (Decree-Law No 53/2004). It is therefore, a vital regulatory measure to facilitate the implementation of energy efficiency measures in old buildings which would have difficulty in satisfying other technical requirements

5.5. Legal Regime for Urbanisation and Construction (RJUE)

The RJUE, approved by Decree-Law No 555/99 of 19 December 1999 lays down the legal regime for urbanisation and construction, in other words, it governs the prior control of construction, ensuring the conformity of the design and execution of work, guaranteeing respect for urban and environmental interests.

One of the advantages of this regime with respect to energy efficiency measures, is the fact that prior control is not required on work to replace materials covering the exterior and roofing with others which provide finishing which are identical to the original, and which reduce energy needs.

With respect to the production of clean energy, also exempt from prior control are installations in main buildings of a) photovoltaic solar panels, b) wind generators and c) solar thermal collectors. However, a) and c) must not exceed the area of the building's covering or the respective height by one metre and b) equipment must not exceed the building's height by four metres and must not have a radius greater than 1.5 metres.

6. Improvement measures: Tax measures

6.1. Tax relief

In Portugal, tax relief is laid down in the law through the Tax Relief Statute (EBF), published through Decree-Law No 215/89 of 1 July 1989, which has been amended several times. Tax relief provides exceptional benefits in the form of exemption, reductions in levies or tax concessions.

This sub-chapter sets out the tax measures currently in force provided for in law which refer to buildings.

6.1.1. Tax relief directly related to the energy class

i. Urban buildings subject to rehabilitation

Urban buildings undergoing rehabilitation which are given an energy class equal to or greater than **A**, or which are given a classification which is two levels higher than the previous certification, are exempt from the payment of Municipal Property Tax (IMI) for three years.

Buildings acquired for urban rehabilitation and which comply with the abovementioned energy requirements are exempt from the payment of Municipal Tax on Real Estate Transfer (IMT). This provision was amended by Law No 82-D/2014 of 31 December 2014.

ii. Existing buildings

In a number of municipalities, buildings with an energy class equal to or higher than **A** may benefit from a reduction of up to 25% in IMI. The same discount may be attributed to buildings undergoing work to raise their energy class by at least two levels. In both cases, this discount remains in force for five years. Added in Law No 42/2016 of 28 December 2016.

6.1.2. Other tax measures

Owners which carry out property rehabilitation in urban rehabilitation areas¹⁸, may include around 30% of the respective expenditure for deduction purposes in personal income tax. This deduction has a maximum ceiling of € 500.

Urban buildings subject to rehabilitation¹⁹ may obtain exemption from IMI for five years. This exemption may also be renewed for a further period of five years (provision added in Law No 64-A/2008 of 31 December 2008)

¹⁸ *'Territorially defined area, including urban areas characterised by poor, degraded or obsolete buildings, urban infrastructures, social equipment, open areas and parks. It may include historical areas and centres, areas of protection for buildings which are classified or about to be classified, in accordance with the Cultural Heritage Base Law, degraded urban areas or consolidated urban zones'* in accordance with Law No 7-A/2016 of 30 March 2016.

¹⁹ *'Work intended to provide suitable performance characteristics and functional, structural and construction safety (...) or to provide new functional capabilities (...) with higher standards of performance, resulting in a building conservation level of the at least two classes above the pre-renovation class'* in accordance with Law No 7-A/2016 of 30 March 2016.

6.1.3. Value Added Tax (VAT)

VAT is a general tax on consumption applied in Portugal on the transmission of goods and services.

This tax is provided for in a specific law, the Value Added Tax Code (CIVA), and has three different rates: reduced, intermediate and normal rates. In mainland Portugal, the reduced rate is 6% and the normal rate 23%.

The CIVA law (Decree Law No 349-B/84 of 26 December 1984) includes a list of goods taxed at the reduced rate, which includes some rehabilitation work:

- Urban rehabilitation work on buildings in urban rehabilitation areas;
- Rehabilitation work on buildings when contracted or funded by the Institute for Urban Housing and Rehabilitation, regardless of location;
- Rehabilitation work on buildings under special financing or tax schemes or other programmes, regardless of location;
- Conservation, repair and improvement work on urban housing buildings which are owned by housing and construction cooperatives granted to the respective members under a collective property regime;
- Improvement, remodelling, renovation, restoration, repair or conservation work on housing. In this situation, the reduced rate does not apply to materials used when the respective cost exceeds 20% of the total value of the services provided.

7. Funding programmes

Several funding programmes are planned for the coming years which will support energy rehabilitation and the revitalisation of degraded areas. These programmes provide funding for the private and social housing sectors, state owned and central and regional government buildings and also the corporate sector.

Aid granted by these programmes can be in the form of reimbursable or non-reimbursable subsidies and granted through financial instruments.

The financial instruments provide a means of access to reimbursable capital (see Decree-Law No 159/2014). This means of financing provides a multiplication effect as the instruments can be applied during different aid cycles, preferably with private co-investment, allowing public funds to be leveraged.

7.1. 'Renovate to Rent' Programme

The Institute of Urban Housing and Rehabilitation (IHRU, I. P.), is a public institute and forms part of the State's indirect administration. It has administrative and financial autonomy and its own property.²⁰

The Institute's mission is to ensure that policies are achieved in the areas of urban housing and rehabilitation, in coordination with city and social policies and policies for safeguarding and improving property, ensuring that buildings remain in the public memory and evolve. The competences of IHRU, I. P. include the design of funding and loans to finance the construction and rehabilitation of property, urban rehabilitation and respective monitoring during execution; Establishing collaboration agreements and programme-contracts in urban housing and rehabilitation as well as the respective monitoring during execution of projects, the legal certification of projects and social interest housing.²¹

Currently, there are two programmes being funded through IHRU, I.P. in the area of urban rehabilitation, the 'Rehabilitation for Rental' programme and the 'Rehabilitation for Rental – Accessible Housing' programme.

IHRU, I. P. programmes refer to work under the Legal Regime for Urban Rehabilitation (RJRU), published through Decree-Law No 307/2009 of 23 October 2009, and amended by Law No 32/2012 of 14 October 2012.

In accordance with this law, urban rehabilitation is required to:

- Ensure the rehabilitation of buildings which are degraded or functionally unsuitable;
- Rehabilitate urban spaces which are degraded or in the process of degrading;
- Modernise urban infrastructures;
- Promote the environmental, cultural, social and environmental sustainability of urban spaces;
- Promote the implementation of energy efficiency criteria in public and private buildings.

²⁰ Decree-Law 175/2012 of 2 August 2012

²¹ Decree-Law 175/2012 of 2 August 2012

The Rehabilitation for Rental programme refers to funding, through long-term loans, of renovation work in Urban Rehabilitation Areas, or to buildings falling under the RJRU²², published by Decree-Law No 37/2009 of 23 October 2009.

This work refers to:

- a) Rehabilitation or reconstruction of buildings which are mainly used for housing and in which dwellings are intended for rental under rental support or control schemes;
- b) Construction of buildings which are mainly used for housing and in which dwellings are intended for rental under rental support or control schemes, provided that the renovation work is relevant to the completion of the former urban space;
- c) Rehabilitation or creation of municipal spaces for public use, provided that this takes place under a systematic urban rehabilitation operation in accordance with the RJRU;²³
- d) Rehabilitation or reconstruction of buildings which are intended for public use equipment, including student residences.

The programme has initial funding of 50 million euros from a loan granted by the European Investment Bank (EIB), and each project receives fund of approximately 50% of total investment costs. Total investment is therefore expected of € 100 M

Funded work must be concluded by 30 September 2018²⁴. The planned number of buildings for rehabilitation is 400.

7.2. Portugal 2020

Under Portugal 2020, a partnership agreement between Portugal and the European Commission, the programming principles of the European Strategy 2020 have been implemented with regard to the economic, social and territorial development to be promoted from 2014 to 2020.

The Partnership Agreement combines European Structural and Investment Funds (ESIF) and covers several different areas: Competitiveness and Internationalisation; Social Inclusion and Employment; Human Capital; Sustainability and Efficiency in the Use of Resources. These aims are to be achieved through sixteen operational programmes including the Operational Programme for Sustainability and Efficiency in the Use of Resources (PO SEUR) and seven regional programmes (five on the mainland and one in each autonomous region).

Under the Operational Programme for Sustainability and Efficiency in the Use of Resources Programme, three aims have been defined:

- Support the transition to a low carbon emission economy in all sectors (Thematic Aim 4);
- Promote adaptation to climate change and risk prevention and management (Thematic Aim 5);
- Protect the environment and promote efficiency in the use of resources (Thematic Aim 6).

²² Buildings falling under these regulations are a minimum of 30 years old and have a level of shortcomings and degradation that work is justified which can provide suitable performance and safety characteristics.

²³ *'Systematic urban rehabilitation operation consists of integrated urban rehabilitation work in an area, intended for the rehabilitation of buildings and the qualification of the infrastructure, collective use urban equipment and parks, with a view to requalifying and revitalising urban spaces, associated with a public investment programme, in accordance with Decree-Law No 307/2009 of 23 October 2009.*

²⁴ <http://www.portaldahabitacao.pt/pt/portal/reabilitacao/reabilitarparaarrendar/reabilitarparaarrendar.html>

The measures of interest in the area of the energy consumption of buildings are set out in a number of investment priorities in thematic aim 4, which is also intended to comply with European '20-20-20' targets and the targets established in National Action Plans for Energy Efficiency (PNAEE) and in Eco.AP.

7.2.1. OP SEUR

This operational programme can support building work in any part of the country and has the following specific aims:

- a) Increase the energy efficiency of State central government infrastructures;
- b) Increase energy efficiency in the housing sector

The main aims of funding are energy efficiency in public buildings and private housing and to reduce energy bills. The final beneficiaries of these actions are central government bodies and (a)), owners of autonomous dwellings, buildings or private housing (b)).

The programme seeks to support already existing buildings, preferably those with worse exist performance. Renovation work on buildings must result in significant improvements and achieve an increase of a minimum of two levels in energy performance certification. The minimum requirements are those laid down in the Regulations of **Decree-Law No 118/2013** and Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources.

Funded projects must generate savings greater than the project's implementation costs (includes investment costs, operation and maintenance costs and replacement reinvestment). Actions supported may take the following forms:

- Application of thermal insulation in walls, floors, coverings and blind frames;
- Replacement of glazing and inefficient shading devices in terms of energy performance;
- Work on or replacement of technical systems installed with a view to increasing their energy efficiency, more specifically, integration of hot water from solar sources, incorporating microgeneration, heating, ventilation and air conditioning (HVAC);
- Replacement of existing systems with high efficiency systems, or through work on existing systems seek to increase their energy efficiency, interior lighting (and exterior, in the case of central government buildings);
- Installation of systems and equipment allowing the management of energy consumption so as to meter and manage energy use, thus creating savings and allowing the transfer of loads between tariff periods;
- Installation of solar thermal panels to produce DHW;
- Installation of energy production systems for own consumption using renewable energy sources;
- Energy audits, studies, diagnoses and analyses required for investment, and subsequent performance assessments.

OP SEUR also seeks to cover awareness campaigns and promote the efficient use of energy aimed at both sectors of buildings. The beneficiary will be the Energy Agency (ADENE), the body responsible for promoting and implementing activities of public interest in the area of energy and its interfaces with other sector policies, in liaison with other entities with competences in such fields.

The planned allocation is approximately 200 M€, both for public infrastructure as well as for the housing sector, giving an approximate total of 400 M€. The fund supporting these aims is the Cohesion Fund (CF) and the aid to be granted is through reimbursable and non-reimbursable subsidies and financial instruments, and different in each area of intervention²⁵.

Work on central government buildings can be promoted by central government itself or by an energy services company (ESE). In the former situation, aid granted corresponds to a maximum of 95% of all eligible expenditure and is reimbursable. At least 70% of net energy savings are to be returned.

When an ESE promotes a project, it will be financed through a Financial Instrument for Energy under Portugal 2020 (IFE2020), the financial instrument created under SEUR, established by Council of Ministers Resolution No 57/2015. It is expected that this instrument will function in collaboration with the European Investment Bank. This instrument is particularly advantageous for ESEs as it eliminates the risk of granting credit to third party entities.

With regard to work on private housing, the IFE2020 provides better access conditions to funding and bank financing mobilisation guarantees.

When subsidies are non-reimbursable, funding is not returned by the aid beneficiary²⁶. Included under this type of subsidy are audits, studies and other project evaluations as well as awareness campaigns conducted by ADENE.

7.2.2. Regional OP

The Regional Operational Programmes in Portugal 2020 refer to the seven NUTS II 2013 regions, which are also distinguishable through their degree of development:

- less developed regions (GDP per capita less than 75% of the EU-27 average);
- Regions in transition (GDP per capita between 75% and 90% of the EU-27 average);
- more developed regions (GDP per capita above 90% of the EU-27 average).

The North, Centre, Alentejo and the Azores are classified as less developed regions. The Lisbon and Madeira regions are part of the more developed regions. The Algarve is the only region in transition (see figure below)²⁷. ()

Aid to be granted is from the European Regional Development Fund (ERDF), which seeks to help reduce the disparities between the levels of development in the different regions and, as such, has a different allocation depending on the degree of development²⁸.

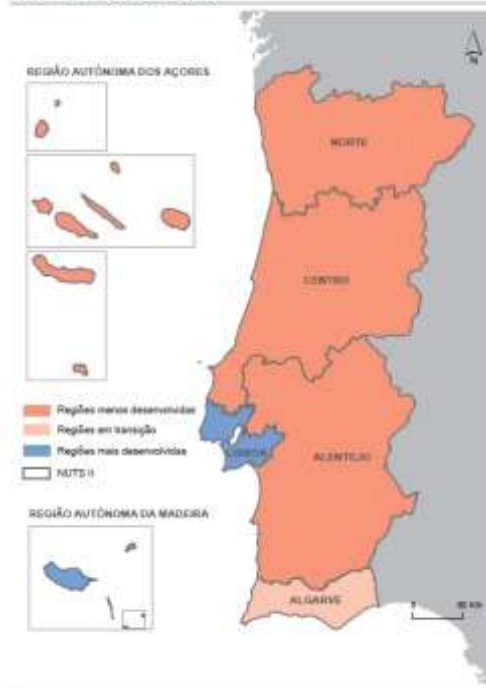
²⁵ SEUR specific regulations approved by Ministerial Implementing Order No 57 B/2015 of 27 February 2015 and amended by Ministerial Implementing Order No 238/2016 of 31 August 2016

²⁶ However, it may be required to return the net savings obtained, in accordance with conditions defined by the OP SEUR Administration Bodies.

²⁷ NUTS 2013: New Territorial Units for Statistical Purposes, INE, I.P., 2015

²⁸ PORTUGAL 2020 - PARTNERSHIP AGREEMENT 2014-2020

Portugal 2020 / Quadro Estratégico
Comum – 2014-2020



Key

PT	EN
Quadro Estratégico Comum	Strategic Common Framework
Região Autónoma dos Açores	Autonomous Regions of the Azores
Regiões menos desenvolvidas	Less developed regions
Regiões em transição	Regions in transition
Regiões mais desenvolvidas	More developed regions
Região Autónoma da Madeira	Autonomous Region of Madeira

Figure: NUTS 2013: New Territorial Units for Statistical Purposes Portuguese National Statistics Institute (INE)

The specific aims of the regional programmes address those already mentioned and the measures to be supported are intended to:

- a) Increase energy efficiency at companies, supporting the implementation of energy efficiency measures and rationalisation of consumption;
- b) Increase energy efficiency at local government infrastructures, supporting the implementation of energy efficiency measures and rationalisation of consumption;
- c) Increase energy efficiency in the housing sector, supporting the implementation of energy efficiency measures and the production of renewable energy in social housing;

As is the case with OP SEUR, the buildings to be renovated already exist. Preference will be given to buildings and infrastructure with worse energy performance and which can increase their energy classification by two levels. Actions supported in b) and c) also take the same form as those in the

thematic operational programme, and support will also be available for public lighting. Aid is non-reimbursable, and in b) may also be granted through IFE2020.

In the case of a) different criteria exist in each region with regard to the type of beneficiaries. In general, they will be companies and private social solidarity institutions. It is possible to include buildings, the fleet and the company's production process. In the case of the Algarve, companies will be preferably large-scale consumers and those in the tourism sector, while in Lisbon and the Azores priority will be given to industrial companies.

Aid to companies is reimbursable and granted through IFE2020.

In all measures, energy audits and diagnostic studies will be funded through non-reimbursable subsidies.

The table below shows planned allocations for each investment priority in the different regional programmes.

Region	Investment Priority			
	Energy efficiency renovation of public infrastructure, demonstration projects and support measures (M €)	Energy efficiency renovation of existing social housing stock, demonstration projects and support measures (M €)	Energy efficiency and demonstration projects in SMEs and support measures (M €)	Energy efficiency at large companies (M €)
North	74.9	32.1	15.4	8.3
Centre	45.0	10.0	20.0	20.0
Lisbon	12.0	25.0	6.0	6.0
The Alentejo	38.8	43.8	2.6	2.6
The Algarve	9.0	(1)	1.5	1.5
The Azores	6.0	2.0	2.0	2.0
Madeira	1.3	3.0	1.5	1.5

(1) The Algarve 2020 OP does not support social housing projects.

7.2.3. Financial Instrument for Urban Rehabilitation and Revitalisation 2020

The Financial Instrument for Urban Rehabilitation and Revitalisation 2020 (IFRRU 2020) is another of the financial instruments created under Portugal 2020. With the aim of maximising and optimising financial resources for urban rehabilitation and revitalisation, this fund brings together different sources of financing from European funds, the European Investment Bank (EIB) and the Council of Europe Development Bank (CEB). Management of the instrument is the responsibility of a professional management structure, the Management Structure of the IFRRU 2020 Administrative Commission and an Investment Committee whose members, in addition to the investors (Regional OPs, EIB, CEB), include the Directorate-General of Energy and Geology (DGEG), the Directorate-

General of the Treasury and Finance (DGTf) and the National Association of Portuguese Municipalities (ANMP), assisted by a technical team²⁹

The financial products provided through instrument have more advantageous conditions over those available on the market and are specifically designed to support urban rehabilitation and revitalisation and, as a complement, energy efficiency in housing.

Investment priorities under IFRRU 2020 are set out in the investment priorities 6.5 and 9.8, the ‘implementation of measures to improve the urban environment, revitalise cities, recover and decontaminate abandoned industrial zones, including conversion zones, reduce air pollution and promote measures to reduce noise’ and ‘the granting of aid for the physical, economic and social regeneration of disadvantaged communities in urban and rural areas’, respectively, and are presented in each Regional OP.

These investment priorities include rehabilitation actions in public and private buildings with both residential as well as commerce and services components. These buildings must be a minimum of 30 years old and located in areas addressed by the Urban Rehabilitation Action Plan (PARU) and the Integrated Action Plan for Disadvantaged Communities (PAICD), for each municipality.

Therefore, based on a logic of sustainable urban use, IFRRU 2020 seeks to promote the settling of people, creation of wealth and employment and reduce the annual consumption of primary energy in such disadvantaged areas.

Council of Ministers Resolution No 84-O/2016 establishes the initial allocations of IFRRU 2020, which are approximately

- 102 M € from the ESIF, already included in the Regional OPs and in OP SEUR;
- 500 M € mobilised by the EIB;
- 80 M € from the CEB;
- 20 M € in national funding³⁰.

These initial allocations, which stand at approximately 702 M€, must at a later date, be equalled by the fund management entity in each operation, in order to leverage financial resources. Furthermore, a component is required to exist which will be supported in every intervention project by final beneficiaries, estimated to be around 20% of the investment.

Based on these assumptions, it is estimated that the total sum in IFRRU 2020 will be 1.755 B €.

With regard to implementation indicators, it is estimated that it will be possible to support the rehabilitation, up to 2023, of approximately 1 800 buildings³¹.

7.2.4. National Fund for Building Rehabilitation

In its National Reform Plan (PNR), the Government announced the National Fund for Building Rehabilitation (FNRE), with the aim of managing and rehabilitating degraded property, improving earthquake resistance and energy efficiency and creating conditions for better access to buildings. Renovated building Rehabilitations would then be placed on the rental market at accessible prices.

²⁹ Council of Ministers Resolution No 52-A/2015

³⁰ Council of Ministers Resolution No 84-O/2016

³¹ National Reform Plan

One of the institutions which is available to invest in the FNRE is the Social Security Financial Stabilisation Fund (FEFSS), which had reserved for 2017 an investment of 50 million euros in this fund.

The general targets for the coming ten years include an investment amount which could reach 1.4 billion euros to rehabilitate more than one million square metres (800 000 square metres for housing and 200 000 for commerce).

Fundiestamo is to be the managing entity which has been identifying buildings with potential to be integrated into sub-funds, in collaboration with public entities, municipal authorities and Private Social Solidarity Institutions. Public State entities, municipalities, services sector entities and private entities (including natural persons) can submit applications to this fund.

FNRE allows investors to have a low-risk investment, with interesting profitability objectives, without increasing debt, which also help achieve public policies related to building renovations³² while also supporting the recovery of the construction sector and job creation in that sector.

The FNRE has an initial planned allocation of 500 M€ and an indicator to improve 2 702 dwellings before 2020. It is expected that by 2026, 7 500 dwellings will be reached through assets of €1.4 billion.

7.2.5. Efficient House Programme

The Efficient House Programme is to support owners in work to improve the energy efficiency of dwellings or services units. The programme will operate from 2017 to 2020 and has a target of 10 000 dwellings.

The programme will have an allocation of 100 M€ from the European Investment Bank (EIB) through the Juncker Plan. The Portuguese Construction and Property Confederation, which will promote the programme, is responsible for finding other financial intermediaries, so as to equal the leverage of the EIB, meaning that the programme will start up with 200 M€.

The implementation indicators for each of these programmes and financing funds are those set out in the table. These indicators include a total of 47 156 dwellings, 70% of which is private housing.

All these funds have a total allocation of approximately 2.5 billion euros, and are mostly intended for work renovation in private housing – around 952%.

Dwellings to be renovated							
No	OP SEUR (TO 4)	Regional OPs (total)	IFRRU 2020	Rehabilitation for Rental* + 30 years old	FNRE	Efficient House	Instruments for urban areas
Social housing		11 761					
Private housing	16 000		1 800	400	2 702	10 000	2 057

³² Council of Ministers Resolution No 48/2016

[Revitalise cities] Housing		2 436					
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Planned investment							
Allocations (EUR million)	OP SEUR - order 4	Regional OPs	IFRRU 2020	Rehabilitation for Rental* + 30 years old	FNRE	Efficient House	Instruments for urban areas
[Social Housing] Family households with improved energy consumption		116					
Private housing	200		890	100	500	100	563
[Revitalise cities] Housing		79.7					

8. Other measures

8.1. National Strategy for Public Ecological Purchases 2020 (ENCPE 2020)

Established through Council of Ministers Resolution No 38/2016, ENCPE 2020 applies to the acquisition of goods and services by bodies under the direct and indirect administration of the State and its corporate sector.

The main aim of this strategy includes environmental criteria in public contracts, in combination with economic and social aspects. These criteria aim to promote a reduction in pollution and the use of natural resources, increase the efficiency of systems while also establishing good practices, stimulating technological and product innovation by suppliers and service providers.

Office buildings are included on List A of this strategy, which refers to priority goods and services. This group includes building related equipment: cooling, heating, ventilation and electricity supply systems as well as surrounding envelopes such as windows, thermal insulation, flooring and coverings.

List A also involves heating systems with water circulation, which includes water heaters used to attain and maintain a desired interior temperature level for closed spaces, the maximum output power of which is 400 kW.

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