

Initiatives to promote environmental performance of buildings: Overview of the Portuguese situation in 2023



Workshop «Governança Territorial | Alterações Climáticas, Reabilitação e Habitação»
Colégio da Trindade (evento híbrido) | November 3rd, 2023

0.a

Introduction

- ▶ Climate change and environmental degradation are an **existential** threat to Europe and the world



The European Green Deal ²⁰¹⁹

- ▶ One of the 6 European Commission priorities for 2019-24 is the **European Green Deal**
- ▶ It aims to transform the European Union **climate neutral** by 2050



New Circular Economy Action Plan 2020



- ▶ The European Commission adopted the **new circular economy action plan**
- ▶ One of the targets of this plan are **construction and buildings**
- ▶ The construction and building industry has a substantial **environmental footprint**
- ▶ In the EU, buildings account for **40%** of our energy consumption and **36%** of greenhouse gas emissions

A renovation wave for Europe ²⁰²⁰

- ▶ The European Commission launched the **Renovation Wave initiative**
- ▶ Renovating the EU building stock will improve energy efficiency and enhance quality of life
- ▶ It aims to **double annual energy renovation rates** by 2030



Environmental performance of buildings
plays an important role within **European Union** policy

What are the main initiatives implemented in Portugal
aimed at improving the **environmental performance of buildings**?

Topics

1. Guidelines set by national strategies and plans
2. Environmental provisions set in the building regulatory framework
3. Voluntary certification systems oriented to construction products and buildings
4. Incentive programs and tax benefits
5. Training, information and public awareness



Scope



► Environmental resources analysed:

- Energy
- Water
- Materials
- Waste

0.b

Sustainable building

Sustainable building,
also known as **green construction** or **sustainable construction,**
is an approach to the
design,
construction
and operation
of buildings
that aims to minimize
their **environmental** impact
(or do no significant harm to the environment)
while promoting **social** and **economic** benefits

Some examples of strategies for sustainable building

Energy

- ▶ Use energy-efficient equipment and lighting systems
- ▶ Incorporate renewable energy sources such as solar panels and wind turbines
- ▶ Implement passive design strategies, such as adequate thermal insulation, natural ventilation and daylighting

Materials

- ▶ Use sustainable building materials such as timber from sustainable forests and recycled materials
- ▶ Choose materials that have a low embodied energy, (which is the energy required to extract, manufacture, transport, and install the material)
- ▶ Prioritize materials that are non-toxic and do not pose health risks to occupants

Water

- ▶ Install low-flow fixtures and dual-flush toilets to reduce water consumption
- ▶ Use rainwater harvesting systems to collect and reuse rainwater
- ▶ Implement water-efficient landscaping practices

Waste

- ▶ Implement a waste management plan that includes reducing waste generation, recycling, and responsible disposal of construction and demolition debris
- ▶ Use prefabrication and modular construction techniques to reduce waste and improve efficiency
- ▶ Reuse materials from previous construction projects





1.

National strategies and plans

National policies on environment and energy are formalized in a set of **strategies** and **plans** for various areas

The **main changes** should arise from guidelines and actions set in these strategies and plans

National strategies and plans

- ▶ There are, at a higher level, strategies and plans about **climate change** and **sustainable development**

Examples

- ▶ Roadmap for Carbon Neutrality by 2050
- ▶ National Strategy for Climate Change Adaptation
- ▶ National Energy and Climate Plan
- ▶ Action Program for Climate Change Adaptation

National strategies and plans

Energy

- ▶ The National Action Plan for Energy Efficiency
- ▶ The Long-Term Strategy for Building Renovation

Water

- ▶ The National Water Plan
- ▶ The National Program for Efficient Water Use

Waste

- ▶ The National Waste Management Plan

- ▶ A complete set of subsidiary strategies and plans lay down goals and actions for the management of **energy, water, materials** and **waste**

Roadmap for Carbon Neutrality 2050 (RNC2050)

- ▶ A sharing economy contributes to a lower possession rate of some equipment - relocation of the demand to services (e.g., laundry, kitchen).

- ▶ The perspective of net zero energy buildings (NZEB) and Positive Energy Districts (PED) will mark the future of buildings.

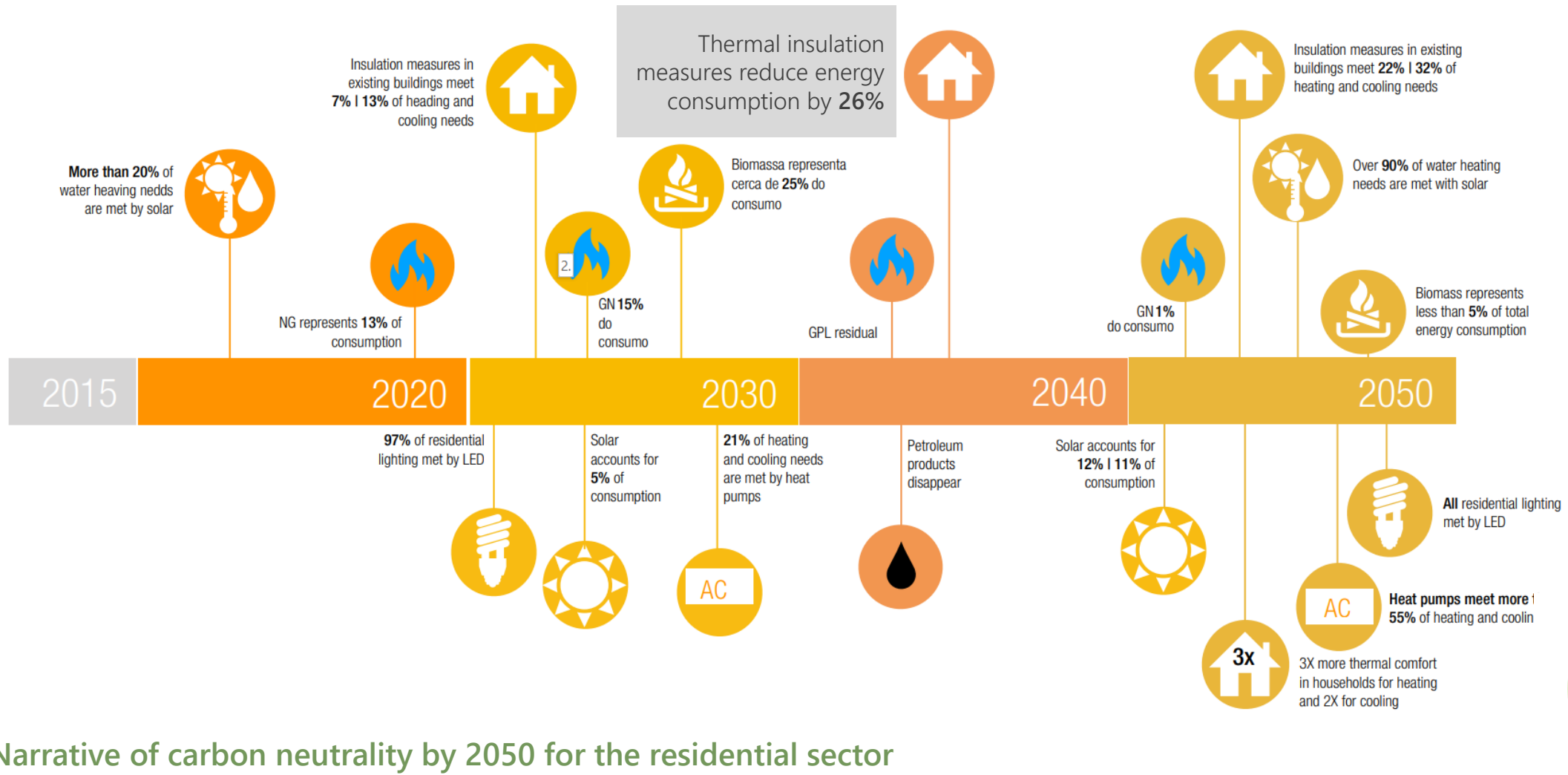
- ▶ Increased working from home involves increased use of air conditioning, lighting and other equipment, relocating the energy demand to the residence sector.

The main decarbonisation drivers in the residential and services sectors are:

- ▶ Energy efficiency
- ▶ Electrification
- ▶ Insulation and rehabilitation
- ▶ Solar thermal and heat pumps



Roadmap for Carbon Neutrality 2050 (RNC2050)



Narrative of carbon neutrality by 2050 for the residential sector



2.

Building regulatory framework

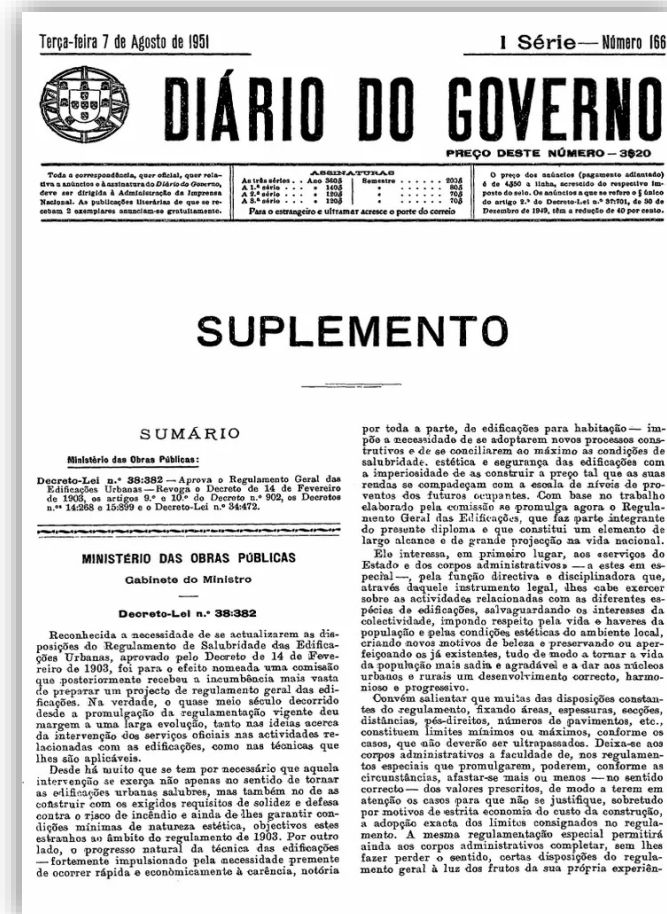
The building regulatory system encloses
the **building regulations** and the **building control system**

Building regulations set minimum requirements to ensure that buildings provide suitable conditions for their intended use, especially in terms of safety, health, comfort, functionality and accessibility, as well as to promote water and energy efficiency and sustainable construction practices

Building control aims to guarantee the application and enforcement of these minimum requirements

General Building Code

- ▶ The "General Building Code" sets the general requirements for construction in Portugal regarding **construction, health, safety** and **aesthetics**
- ▶ No requirements concerning **energy saving** or **environmental protection** are included



General Building Code

- ▶ The **Regime for the Rehabilitation of Buildings**, approved in 2019, already incorporates the principle of environmental sustainability as one of its three core principles
- ▶ This principle is in **alignment** with the most recent doctrine on sustainable building

Article 5.º Principle of environmental sustainability

- 1 – The rehabilitation activity must be aimed at minimizing its environmental impact, embracing the goal of preserving natural resources and biodiversity, with a particular focus on reducing the extraction and processing of raw materials, waste production, and harmful gas emissions.
- 2 – The rehabilitation of buildings contributes to environmental sustainability by increasing the useful life of buildings and should favor the reuse of construction components, the use of recycled materials, the reduction of waste production, the use of materials with reduced environmental impact, the reduction of greenhouse gas emissions, the improvement of energy efficiency and the reduction of energy needs, including energy incorporated into the construction itself, as well as the use of renewable energy sources.
- 3 – At the end of the useful life of components or parts of the building, once maintenance and rehabilitation solutions have been exhausted, deconstruction or dismantling actions should be favored in order to meet the objectives set out in the previous paragraph, to the detriment of demolition, even if selective.

Energy



- ▶ There are building regulations that specifically deal with **energy efficiency**
- ▶ The regulations for energy efficiency of buildings are the **4th generation** (1990, 2006, 2013, 2020)
- ▶ The **Energy Performance of Buildings Directive** (EPBD) has been a significant driver for the development of the new versions of the regulations

Requisitos para a conceção ecológica dos produtos relacionados com o consumo de energia
Decreto-Lei n.º 12/2011, de 24 de janeiro

Requisitos aplicáveis a edifícios para a melhoria do seu desempenho energético e Sistema de Certificação Energética de Edifícios
Decreto-Lei n.º 101-D/2020, de 7 de dezembro

Execução do Regulamento (UE) que define um regime de etiquetagem energética
Decreto-Lei n.º 28/2021, de 20 de abril

Water

- ▶ Building regulations **do not include** provisions for the efficient use of water
- ▶ Some requirements may even **make it difficult** to implement water efficiency measures



Materials

- ▶ Asbestos (↔)
- ▶ Lead and mercury
- ▶ Polychlorinated biphenyls and terphenyls
- ▶ Carcinogenic or mutagenic agents
- ▶ Biological agents
- ▶ Genetically modified microorganisms
- ▶ Ionizing radiation
- ▶ Explosive atmospheres
- ▶ Arsenic compounds
- ▶ Short-chain chlorinated paraffins and azoic dyes

- ▶ Several separate specific regulations set provisions on use of **dangerous substances** or their removable from buildings
- ▶ The main purpose of these regulations is to ensure a **healthy environment**



Remoção de amianto em edifícios, instalações e equipamentos de empresas

Lei n.º 63/2018, de 10 de outubro

Normas para a remoção dos materiais contendo amianto e para o acondicionamento, transporte e gestão dos respetivos resíduos de construção e demolição gerados | Portaria n.º 40/2014, de 17 de fevereiro

Remoção de amianto em edifícios, instalações e equipamentos públicos

Lei n.º 2/2011, de 9 de fevereiro

Disposições relativas à proteção sanitária dos trabalhadores contra os riscos de exposição ao amianto durante o trabalho | Decreto-Lei n.º 266/2007, de 24 de julho

Waste



- ▶ There is a building regulation for the management of waste resulting from **construction** or **demolition** of buildings
- ▶ It includes **prevention** and **reuse**, as well as collecting, transporting, storing, sorting, treatment, recovery and disposal operations

Building Control

- ▶ In 2010, the installation of photovoltaic solar panels, wind generators and solar heating panels for domestic hot water was **exempt** from building permit procedures



Building Control



- ▶ The energy certification is **mandatory** for all buildings that are sold, rented or subject to major renovation
- ▶ The certification aims to **provide information** on the energy performance of buildings and to **promote the adoption** of energy-efficient measures
- ▶ In 2022, more than **220 000** certificates were issued

3.

Voluntary certification systems

Consumers can play an active role in the protection of the environment by **choosing** more environmental friendly products

Eco-labels help consumers to choose products and buildings that have been **recognized** to have better environmental performance

Environmental Certification of buildings

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- ▶ International systems of green building assessment and certification can also be used in Portugal
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- ▶ Level(s) is an emerging voluntary framework for measuring environmental performance, which holds the potential for broader application



Environmental Certification of systems and products



- ▶ There are systems that certify the environmental performance of certain types of installations or components
- ▶ Several products and construction materials sold in Portugal have labels awarded by certification systems

<https://www.adene.pt/edificios/>

https://environment.ec.europa.eu/topics/circular-economy/eu-ecolabel-home_en

<https://www.anqip.pt/>

<https://www.pefc.pt/>

<https://pt.fsc.org/>

<https://csustentavel.com/certificacao/>

4.

Incentive programs and tax benefits

In order to improve environmental performance it is necessary to **change the characteristics** of new and existing buildings

These changes require a **financial investment** that it is important to encourage.

Incentive programs and **tax benefits** can serve this purpose

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- ▶ Funding from State Programs for the construction and renovation of buildings requires complying with **high environmental performance standards**, which can sometimes be even more demanding than those defined in building regulations



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- ▶ Funding from State Programs for the construction and renovation of buildings requires complying with **high environmental performance standards**, which can sometimes be even more demanding than those defined in building regulations
- ▶ Tax rate that applies to buildings with improved energy or water efficiency can be **reduced**



5.

Training, information and public awareness

To improve the environmental performance of buildings, it is not only necessary to adopt effective policies in terms of regulations and investment, but also to:

- ▶ Promote a change in consumers behavior
- ▶ Increase the technical capacity of professionals
- ▶ Support the development of scientific knowledge

Training, information and public awareness

► There are many initiatives about sustainable construction in order to:

1. Ensure the training of professionals (master's degrees, postgraduate and professional courses)



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Training, information and public awareness

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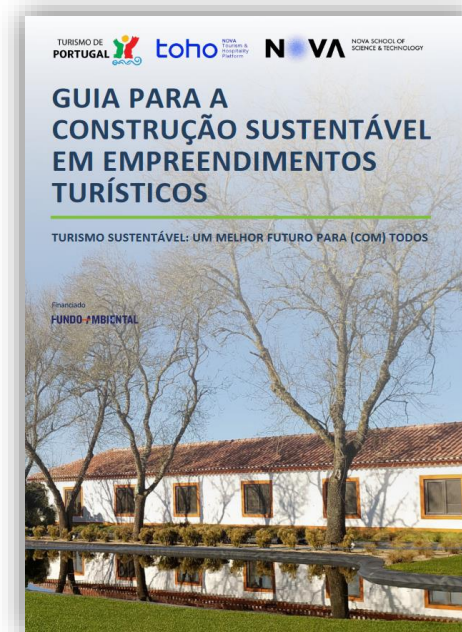
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 4. Recognize best practices (awards)
 5. Lead change by example (public leadership programs)





Conclusions

There are **numerous initiatives**
aimed at promoting sustainable building
making it challenging to provide
a complete and precise review

Conclusions

- ▶ Many of the initiatives aimed at improving environmental performance of buildings are outlined in **plans** and **strategies**
 - ▶ While some initiatives enforce **obligatory** regulations, other target **voluntary** improvements
 - ▶ **Energy** remains the predominant focus of initiatives, but efforts are also directed towards **water**, **materials** and **waste**
 - ▶ Building regulations on water conservation and sustainable building materials **have remained unchanged**
 - ▶ Several changes in the building regulations were due to the **transposition of European directives** into Portuguese legislation

Over the past 10 years,
sustainable building has evolved
from an emerging trend
into a widely recognized challenge
that consistently permeates discussions
within the construction industry,
catalysing a shift in practices

Thank you for your attention



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