COMPETE

Um evento para o Cluster Habitat Sustentável

"Avaliação do Ciclo de Vida na Construção"

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Plataforma para a Construção Sustentável

coordenação

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Apoio

iSBE

A Reabilitação Energética como Veículo para a Sustentabilidade do Parque Edificado

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Energy and GHG Optimised Building Renovation
Background

- **It is no longer possible to ignore the relationship between Climate Change and GHG emissions.**
- **GHG emissions – deeply related to energy production and use**
- **Different measures are being taken worldwide to reduce energy consumption, to promote energy efficiency and expand the use of renewable energy sources**

EU – 20-20-20 targets and 50-50-50 targets
USA – reduction of GHG emissions 17% by 2020 from 2005 levels
Canada - reduction of GHG emissions 17% by 2020 from 2005 levels
Japan - reduction of GHG emissions 25% by 2020 from 1990 levels
China - reduction of GHG emissions 4-5% annually

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Energy and GHG Optimised Building Renovation
Background

EU vision

New concept emerged – Nearly- Zero Energy Buildings (NZEB)

- Mandatory for all new buildings by 2020
- Mandatory for public buildings by 2018

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The Nearly-Zero Energy Buildings concept

The Nearly-Zero Energy Buildings concept is not yet fully clarified and it must be defined by each Member State taking into account its local conditions

Currently several EU Member States have definitions for low energy buildings that should be further adapted to the NZEB concept.

For example:

Austria	Annual heating energy consumption below 15 kWh/m² (Passive building); 40-60 KWh/m² (Low energy building)
Belgium	Very low Energy class: 60% lower than standards (residential)
Finland	Low energy standard: 40% better than standard buildings
UK	Graduated requirements over time: 2010 - 25% better than current regulations; 2016 - zero carbon for all uses and appliances

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EU Policy Instruments

20-20-20 Strategy (2007):

- **20% reduction of GHG emissions**
- **20% increase in Energy Efficiency**
- **20% energy from renewables**

The New EPBD (Directive 2010/31/EU):

By 2020 every new building in the EU must be a Nearly-Zero Energy Building

This means:

Buildings with very low envelope loads

Remaining needs supplied by renewables as far as possible

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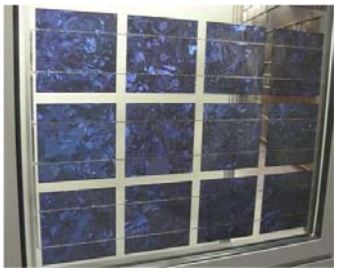
The Nearly- Zero Energy Buildings concept implies:

- **A strong investment on the envelope**
- **Application of efficient systems for heating, cooling, lighting and DHW**
- **Integration of renewable energy (use and production)**



Supported by strict regulations

In EU these Regulations are mainly targeted to New Buildings (NB) and Major Renovations (MR)

- **Only NB - Belgium, Finland, France, Slovakia and UK;**
- **NB + MR – Austria, Czech Republic, Denmark, Germany, Luxemburg, Portugal;**

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- Existing buildings - neglected – which is not a good strategy since the existing buildings are the least efficient, the largest consumers and represent the largest share of the building stock.
- In order to meet the EU targets, the existing buildings will have to face similar requirements in the near future.

Source: IEA ECBCS - Annex 50

- Existing standards do not respond effectively to the numerous constraints of this kind of buildings. Many times, the requirements result in very expensive measures and complex procedures, hardly accepted by users, owners or promoters.

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Energy and GHG Optimised Building Renovation

- However it is URGENT to act on existing buildings
- Acting only on new buildings, or even in major renovations, it will take too long to achieve the energy objectives
- It is urgent to find ways of rehabilitating them in an efficient and cost-effective way, towards this nearly-zero energy objective

Source: IEA ECBCS - Annex 50

Every cost-effective energy saving opportunity must be implemented

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Energy and GHG Optimised Building Renovation

How to achieve?

How can we do it in a systematic, massive and cost-effective way?

How can something still extraordinary be transformed into something ordinary?

The practical implementation of this concept in existing buildings implies deep changes of current practices and also in mentalities

Users, owners, promoters, designers, technicians, policy makers

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Energy and GHG Optimised Building Renovation

How to achieve?

Member States must make Rehabilitation Plans for existing buildings towards nearly-zero energy by 2015.

This means:

- High investments and financial schemes for building owners
- New and effective rehabilitation techniques where INNOVATION and Technical Progress is still needed

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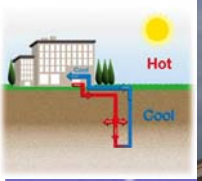
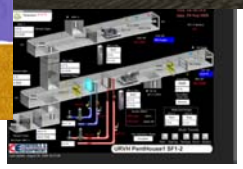
How to achieve?

INNOVATION and Technical progress is still needed

- New products and new solutions
  - New envelope solutions
  - Pre-fabrication
  - Vacuum insulation, PCM's …
- Integration of renewables at building and probably at community level
- Innovative systems
  - Renewable cooling systems
  - Heat pumps
  - Fuel cells
- Buildings Energy and Indoor Environment management and control systems (BEMS)
- etc..





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How to achieve?

- Take advantage of good examples and good practices already implemented and working well (learn from the past experience);
- Identify emerging technologies with potential to be successfully applied;


Source: IEA ECBCS - Annex 50


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How to achieve?

Understand what are the real constraints for effective and massive rehabilitations;

We have to find answers to some questions:

- **Why is retrofitting so difficult to implement?**
- **Why the already numerous good rehabilitations examples are not being massively replicated?**
- **Why are good demonstrations cases unable to influence neighboring rehabilitations?**
- **What are the main difficulties?**
- **Are they technical, social, legal, economical?**

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How to achieve?

- **We must actively involve all the stakeholders interested in the process, helping them to be aware of the most appropriate solutions for their needs, and including them in this global commitment.**
- **It is of major importance to involve citizens in the process**
- **It is of major importance to introduce the "added value" concept in the rehabilitation process**
- **Citizens must be convinced to invest …**
- **Develop or adapt efficient Retrofit Tools to support decision makers in their rehabilitation strategies**

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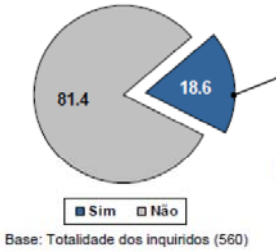
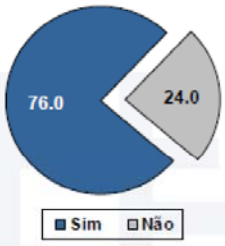
Survey – Portugal - May 2011

Have you done any improvement or rehabilitation work in the last 2 years?



Base: Totalidade dos inquiridos (560)

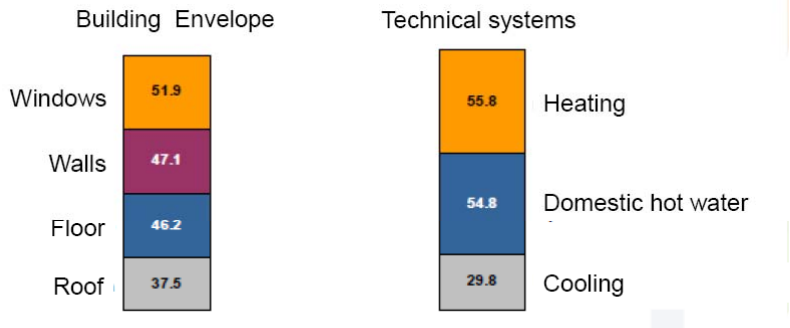
Have you considered the recommendations in the EPC ?



Source: ADENE

Survey – Portugal - May 2011

What have you refurbished / improved in the house (%)?



Source: ADENE

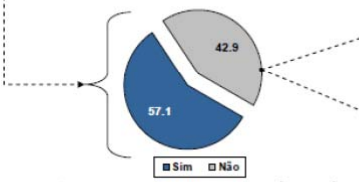
Survey – Portugal - May 2011

When refurbushing the ENVELOPE of the house…

Mantenance or repair works?

Have you taken the chance to improve the energy performance of your house?

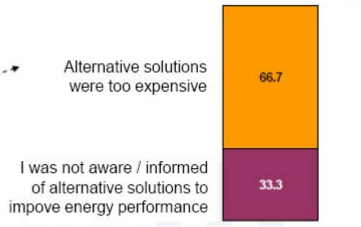
%



Base: Inquiridos que fizeram obras manutenção/reparação na envolvente da habitação (7)

Why haven't you took the chance to improve the energy performance of your house?

%



Base: Inquiridos que não aproveitaram oportunidade para melhorar desempenho energético (3)
resposta múltipla

Source: ADENE

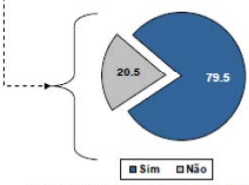
Survey – Portugal - May 2011

When refurbushing the ENVELOPE of the house…

Improvement /eabilitation works?

Have you notice any improvement in the energy performance of your house?

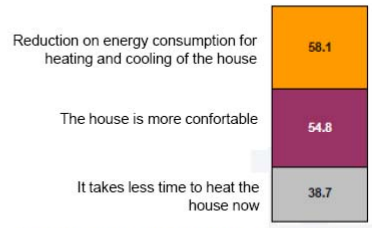
%



Base: Inquiridos que fizeram obras melhoria/reabilitação na envolvente da habitação (39)

Why do you think there as been an improvement in the energy performance of your house?

%

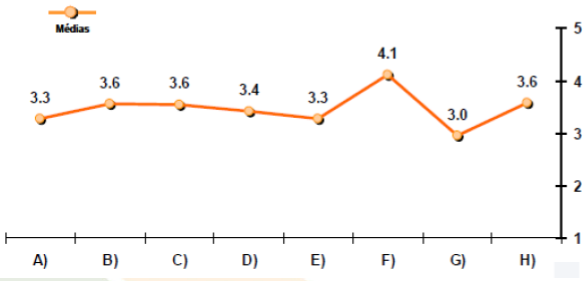


Base: Inquiridos que fizeram obras melhoria/reabilitação na envolvente e consideram que houve melhoria no desempenho energético da habitação (31)
resposta múltipla

Source: ADENE

Survey – Portugal - May 2011

What is more relevant in your decision to refurbish your house?
(1 – not important at all → 5 - very important)



A) Energy label
B) Duration of the works
C) Price
D) Env. friendly materials
E) Aesthetics
F) Improve quality of life
G) Increase of floor area
H) Retun on investment

Source: ADENE

These are just some of the questions which we are trying to find answers in IEA ECBCS Annex 56 project:

Energy and GHG Optimised Building Renovation

International Energy Agency

Energy Conservation in Buildings and Community Systems Programme

END

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