



# Energy performance of buildings

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ET DE L'AMÉNAGEMENT  
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## Public buildings

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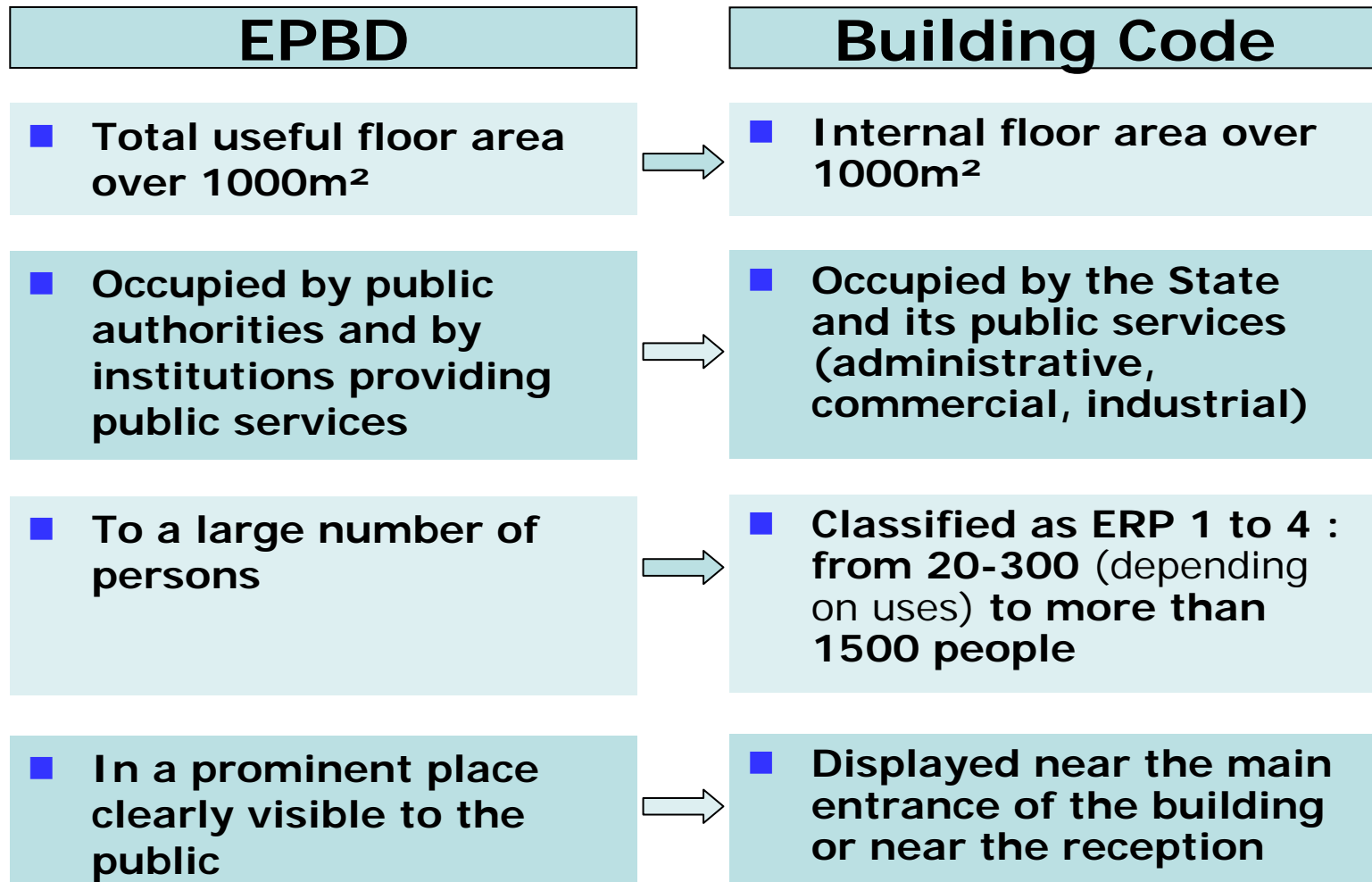
# 1 –ENERGY PERFORMANCE CERTIFICATE

- **Entry into force of certificates when buildings are sold, rent out or built**

Existing buildings which are sold	Existing buildings which are rent	New buildings	Public buildings
November 2006	July 2007	July 2007	January 2008

- **Display in public buildings**
  - **A decree was published in March 2007**
  - **Works are in progress for an application in January 2008**

# Transposition of the EPBD for public buildings (article 7)



# Content of the certificate displayed in public buildings



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- the energy consumption of the building
- the greenhouse effect gas emission of the building

They are compared to reference values through the label so that consumers can assess the energy performance of their building

- recommendations for the cost-effective improvement of the energy performance (renovations and use)



# “Method” to asset energy performance

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- **The energy performance of public buildings will be based on invoices.**
- **The energy performance includes all the consumptions (heating, cooling, computers, lighting, etc...)**

# Different scales for different buildings

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**All of the public buildings aren't offices ,**

**We intend to consider three categories:**

**The most important , for administrative buildings , and educational buildings (schools, graduate ) where uses are quite similar to private offices and that are occupied about ten hours a day**

**The second category , for buildings that are occupied 24 hours a day like hospitals and police stations**

**The third category , for buildings whose occupation is intermittent, and with specific architecture (big front halls, very often few windows ) : theatres, museums, sports hall, libraries**

**This leads to considering a scale for each type of building.**

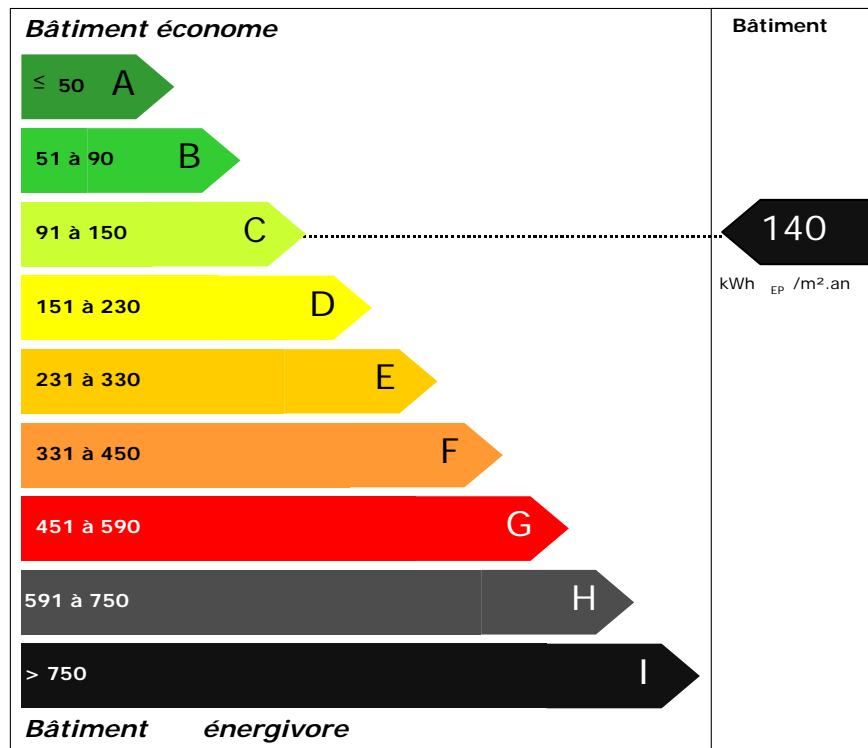
# Different scales for different buildings

**That is the reason why we choose to consider different scales according to uses of public buildings, and especially according to occupation :**

- **Administrative buildings and buildings whose occupation is similar :**
  - Educational buildings...
- **Buildings which are occupied 24 hours a Day**
  - Hospitals, police stations...
- **Buildings whose occupation is intermittent**
  - Theatre, museum, sports hall, library, ...

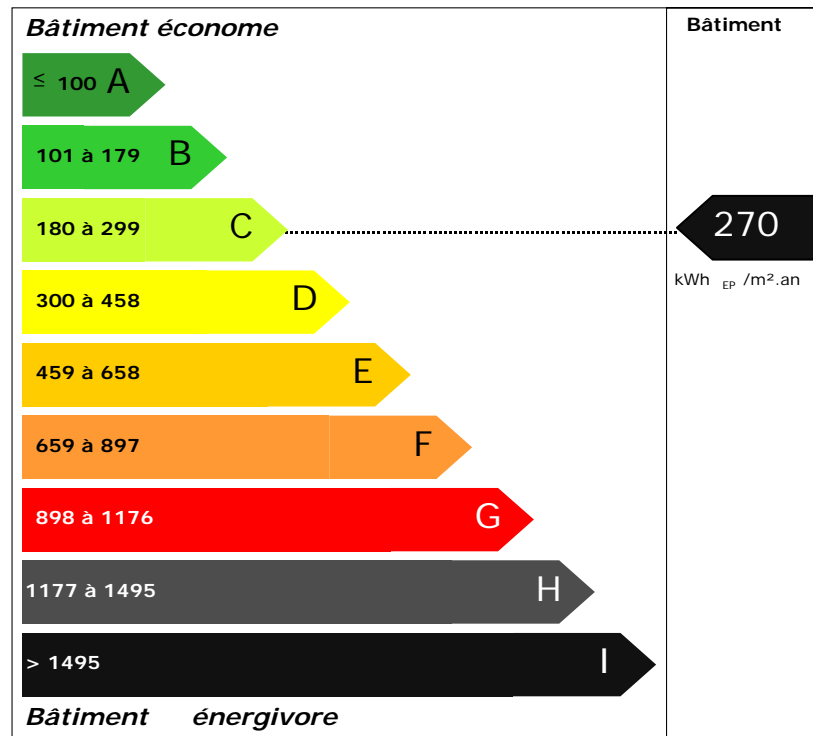
# Different scales for different buildings

## ■ Educational and administrative buildings (idem offices)



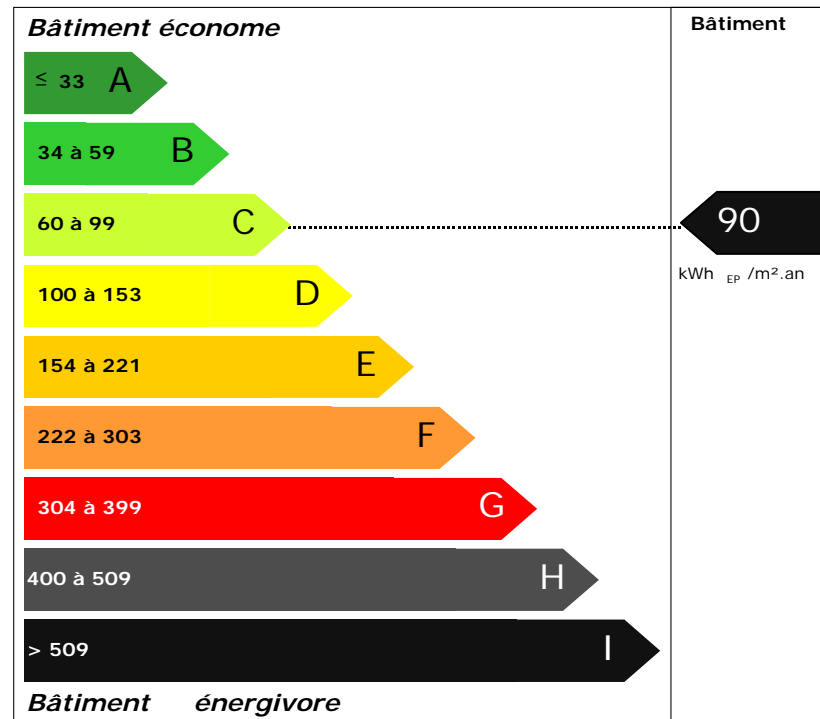
# Different scales for different buildings

- Buildings which are occupied 24 hours a Day
  - Hospitals...



# Different scales for different buildings

- Buildings whose occupation is intermittent
  - Theatre, library, museum, sports hall...





# Data

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- Data and measurements are hardly available in France to create a representative and useful scale for each type of building
- France doesn't have any benchmarks yet
- As consumption heating isn't the main one in public buildings of the second and third type, European data will be used (from EP-label or Display)
- A data base is under progress

## 2 – TECHNICAL AND ECONOMIC FEASIBILITY

- The French Government published in March 2007 a decree which requires to carry out a technical and economic feasibility study

- Entry into force :

Major renovations of existing buildings > 1000m <sup>2</sup>	New Buildings > 1000m <sup>2</sup>
April 2008	January 2008

- Done before construction or renovation starts

# Technical and economic feasibility

- **This study consists in analysing feasibility of alternative systems and renewable energies such as:**
  - Thermal or photovoltaic solar system,
  - Wood boiler,
  - Combined heat and power generator,
  - District or block heating or cooling, if available,
  - Condensing boilers and heat pumps, under certain conditions.
  
- **For each alternative, the study presents :**
  - Investment costs,
  - Energy, greenhouse effect gas and energy cost savings during a year,
  - Time of return on investment,
  - Global cost

## 3 –EXISTING BUILDING REGULATION

- **The French Government published in March 2007 a decree which introduces:**
  
- **For major renovations**
  - Global requirements for major retrofits of buildings over 1000 m<sup>2</sup>;
    - Calculation of energy consumption for heating, cooling, hot water, ventilation, lighting
    - Or technical solutions
  
- **For other renovations**
  - Requirements for new components and systems
    - Minimal requirements for each item (decree published in may 2007)

# Major renovations of public buildings

**Buildings > 1000 m<sup>2</sup> + cost of works > 25%**

- Introduction of a maximum consumption, based on regulation on new buildings ?
- Maximum consumption in new buildings:
  - depending on climate and energy



Type of heating	Climatic zone	Maximum consumption
Boilers fired by fossil energy	H1	<b>130 kWh<sub>ep</sub>/m<sup>2</sup></b>
	H2	<b>110 kWh<sub>ep</sub>/m<sup>2</sup></b>
	H3	<b>80 kWh<sub>ep</sub>/m<sup>2</sup></b>
Electric heating (including heat pumps)	H1	<b>250 kWh<sub>ep</sub>/m<sup>2</sup></b>
	H2	<b>190 kWh<sub>ep</sub>/m<sup>2</sup></b>
	H3	<b>130 kWh<sub>ep</sub>/m<sup>2</sup></b>

# Major renovations of public buildings

**Buildings > 1000 m<sup>2</sup> + cost of works > 25%**

- **Consumption lower than a threshold fixed by a decree**
  - Calculation of the energy consumption of the building :
    - Before renovation C initial
    - After renovation C projet
    - Of a reference building C réf
  - Requirement 1:  $C_{\text{projet}} < C_{\text{réf}}$
  - Requirement 2 :  $C_{\text{projet}} < C_{\text{initial}}$



# Major renovations of public buildings

**Buildings > 1000 m<sup>2</sup> + cost of works > 25%**

## ■ Works in progress:

- Precise description of the building and its components : thermal bridges, materials, existing boilers, ...
- Adaptation of the calculation methodology for new buildings to existing buildings in order to take into account characteristics of existing buildings
- Adaptation of existing technical solutions to different types of buildings



## Other cases

### Minimal requirements by item for small public buildings (under 1000 m<sup>2</sup>)

- **Application : when a building component is replaced or installed**
  
- **Elements taken into account**
  - Boilers fired by non-renewable liquid or solid fuel
  - Electric heating systems
  - Air-conditioning systems
  - Hot water production systems
  - Windows and glazed walls (with or without closing)
  - Equipments of energy production using renewable energy sources
  - Insulation materials of opaque walls
  - Ventilation systems
  - Lighting systems

# Entry into force of the regulation

**Still under discussion**

**Will come into force from the end of 2007**

- **Major renovations & technical and economic feasibility :**
  - **1<sup>st</sup> of April 2008**
  
- **Other renovations (minimal requirements) :**
  - **1<sup>st</sup> of November 2007**

# Grenelle de l'Environnement : « A collective thought »

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## Under discussion, defining major and clear objectives for 2012 and 2020 :

- For new buildings, rising positive energy buildings as soon as possible,
- For existing buildings, massive and performant renovations to improve all the stock,
- For public buildings, additional objectives for exemplarity.

→ **The level of the objectives and the way to reach it are in discussion**



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**Thank you for your attention**

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