



Environmental Performances of Buildings: identification of reference values through a statistical analysis

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Session: Methods for Buildings

French context :

- > Two national PCR :
 - > FDES (~800) for products and material of construction
 - > PEP Ecopassport (~1000) for electrical and electronic products and equipments
- > A national database : INIES (www.inies.fr)
- > Several building LCA tools

- > A objective for the Ministry of Ecology, Sustainable Development and Energy : a regulatory label for 2013

To a multicriteria approach

To a life cycle approach

1) To give new references, new scales of performance.

What is a good building in terms of air pollution ?

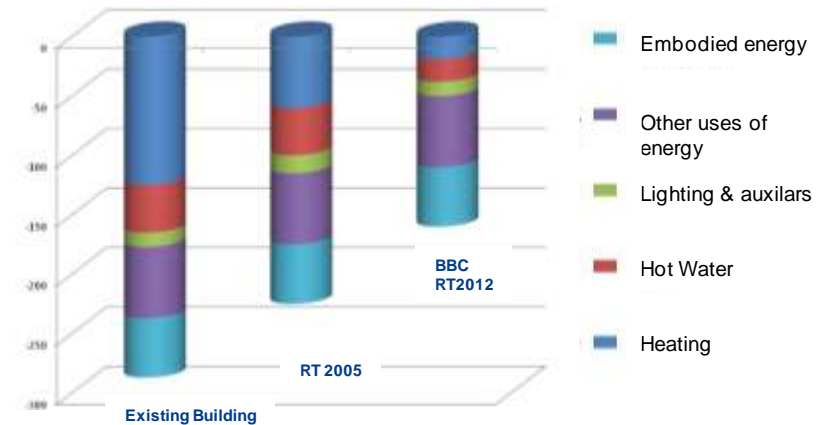
And in terms of energy consumption for its whole life cycle ?

2) To make an inventory in order to know :

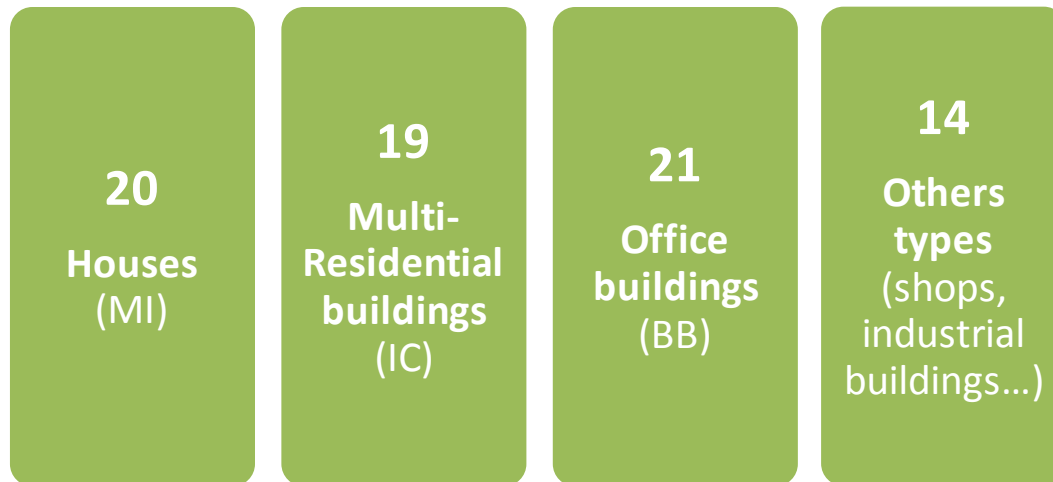
Where to act (what are the main contributors for each indicator) and

How can we easily improve building impacts ?

3) To prepare certification schema based on environmental performance assessment

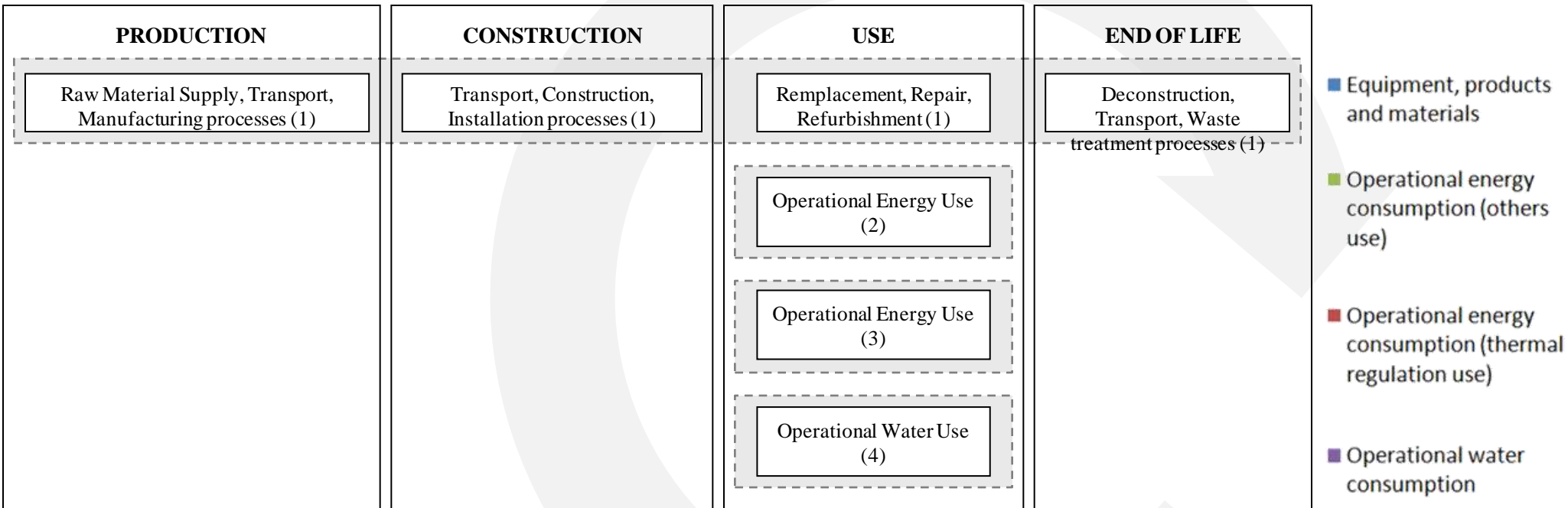


74 buildings



Buildings characteristics :

- under - construction or recently constructed
- consumed less than 50 kWh/m²/year
- various construction systems (reinforced concrete, timber frame, brick, etc.)



(1) Linked to building materials, products and equipment

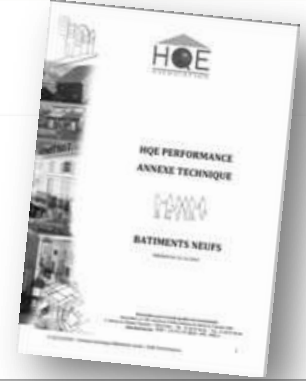
(3) Linked to the building activities end-uses

(2) Linked to thermal regulation end-uses

(4) Linked to water consumption end-uses

Reference documents (defines contributors, boundaries, etc.)

- XP P01- 020-3
- Application rules of HQE Performance



Environmental data : DataBase



Building related-data

Detailed documentation
(quantity survey, thermal calculations,
technical specifications, etc.)

Common rules :

To standardize individual assumptions about
environmental data

Common rules :

To standardize individual assumptions about
incomplete quantity survey

Building LCA software



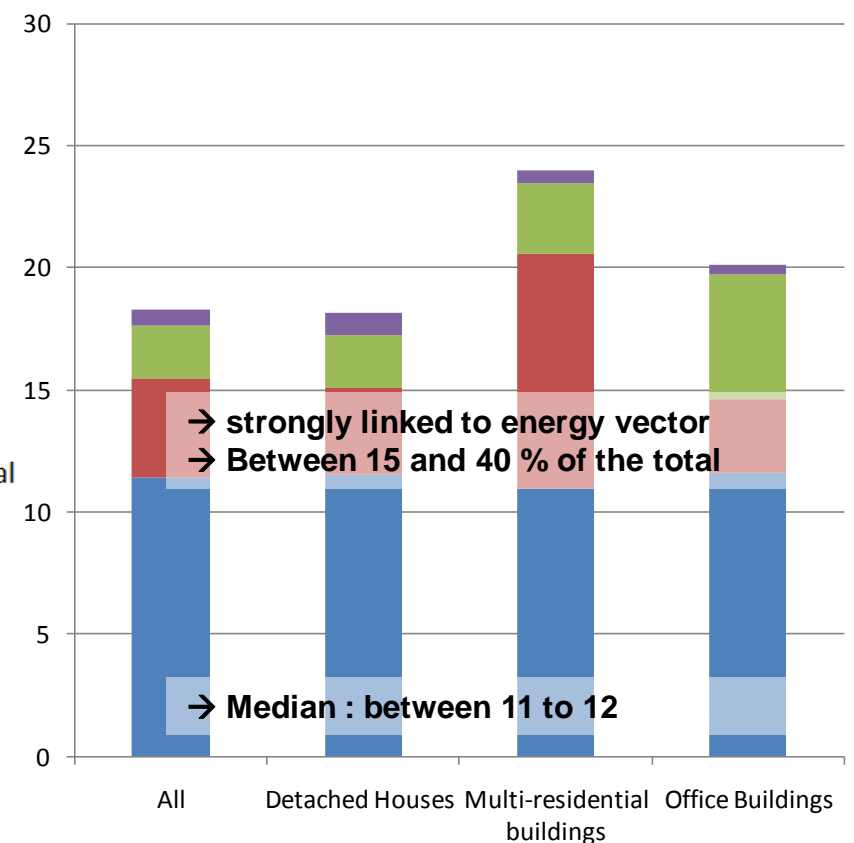
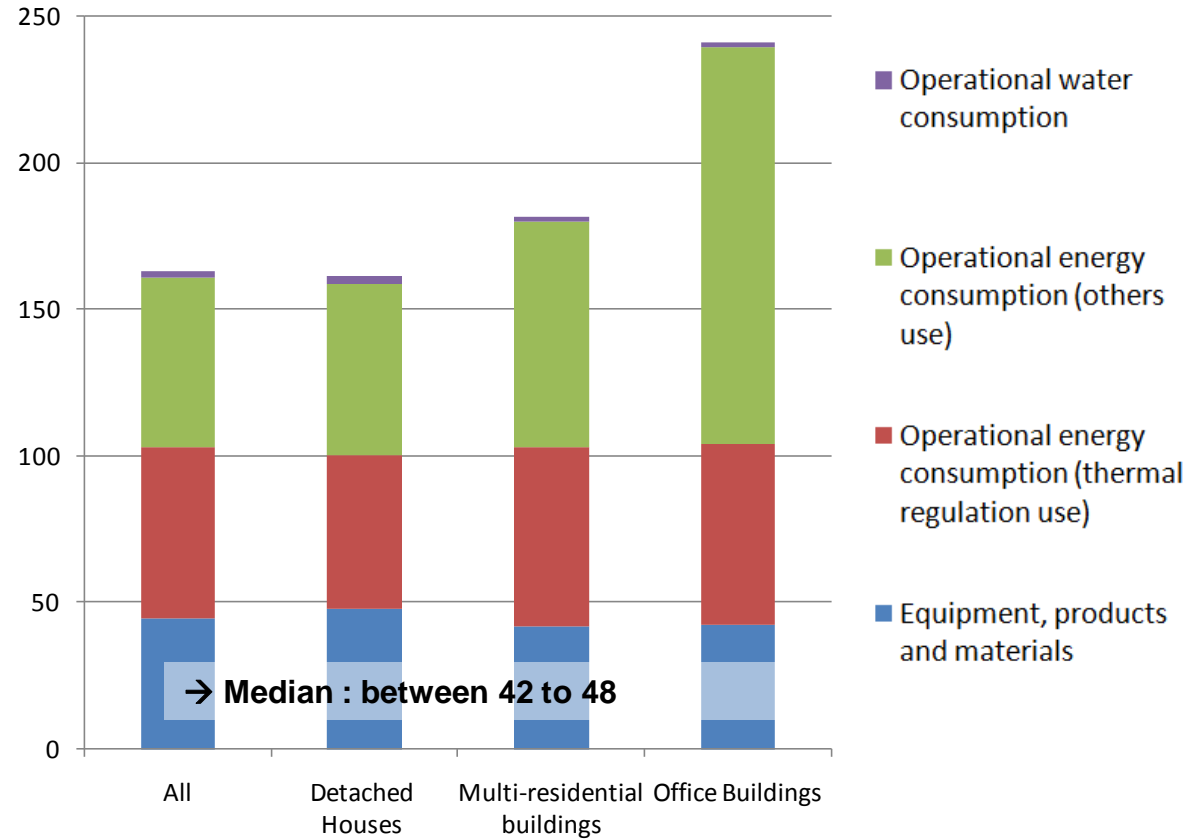
Reference study period : 50 years

Primary non renewable energy kWh/m²NFA/year

Global Warming Potential (kg eq-CO₂/m²NFA/year)

→ From 162 to 241 kWh/m²/year

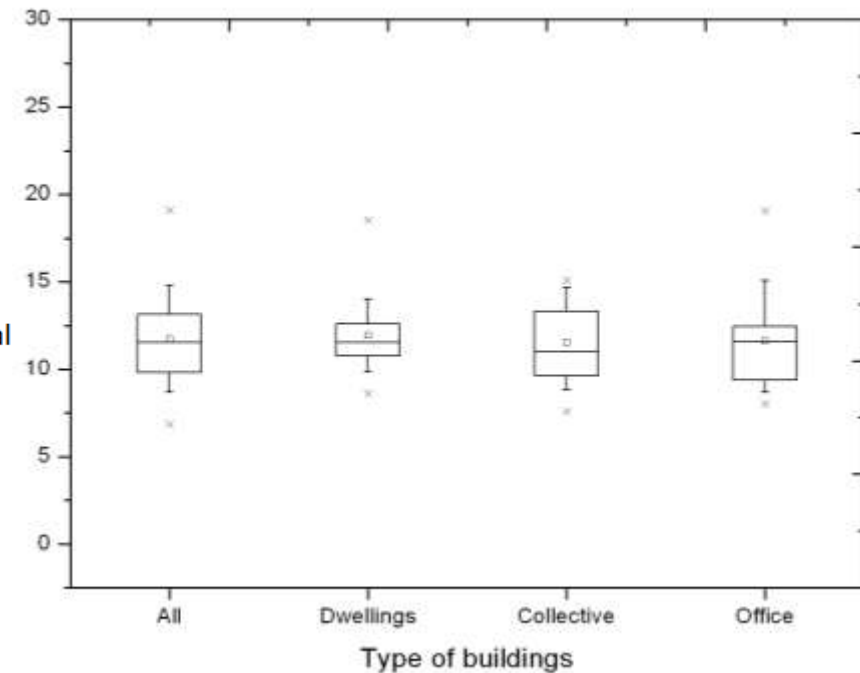
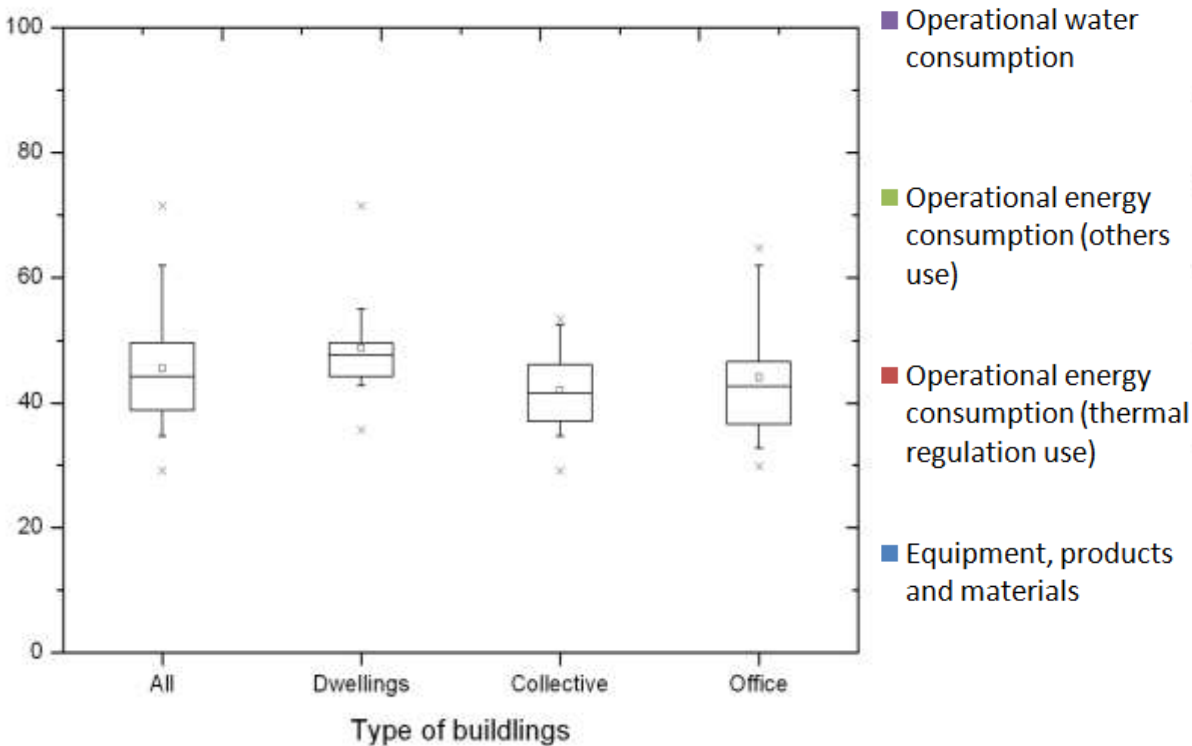
→ From 18.2 to 24 kg eq CO₂/m²/year



Reference study period : 50 years

Primary non renewable energy kWh/m²NFA/year

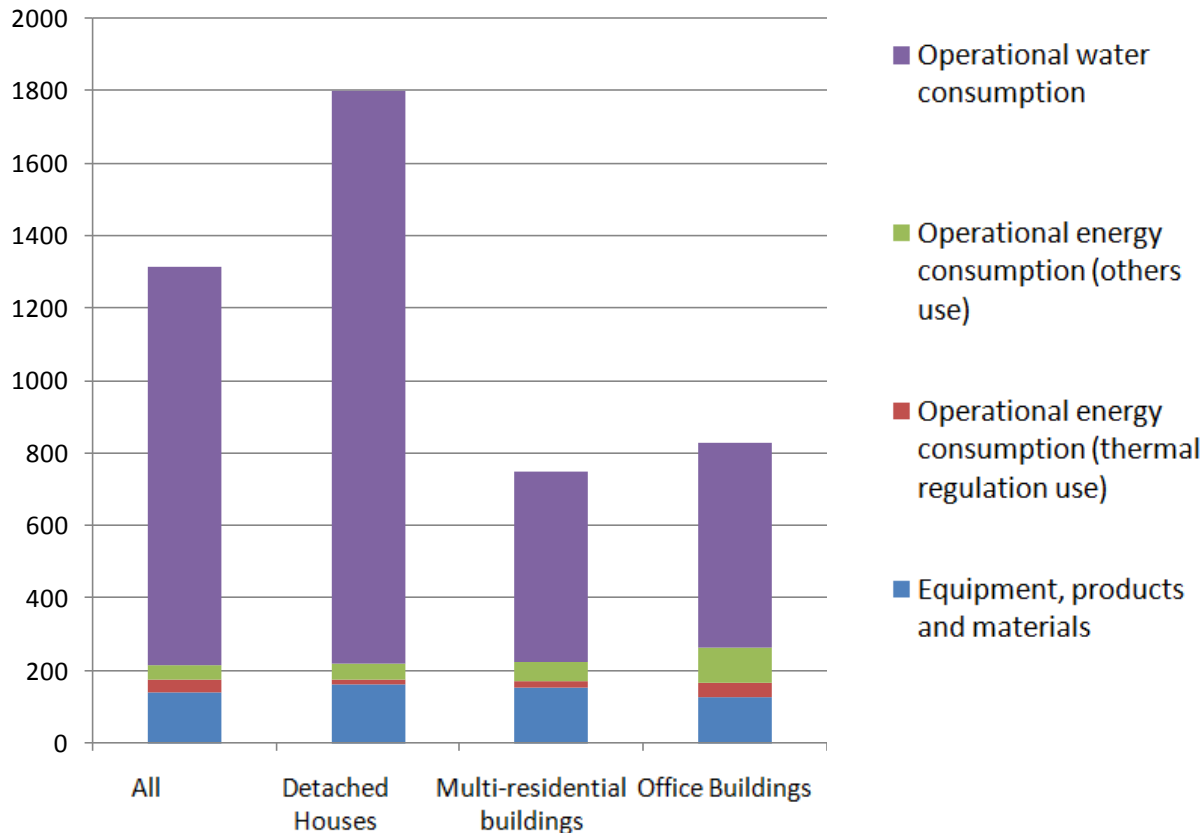
Global Warming Potential (kg eq-CO₂/m²NFA/year)



Reference study period : 50 years

Water consumption (L/m²NFA/year)

→ From 750 to 1800 L/m²/year



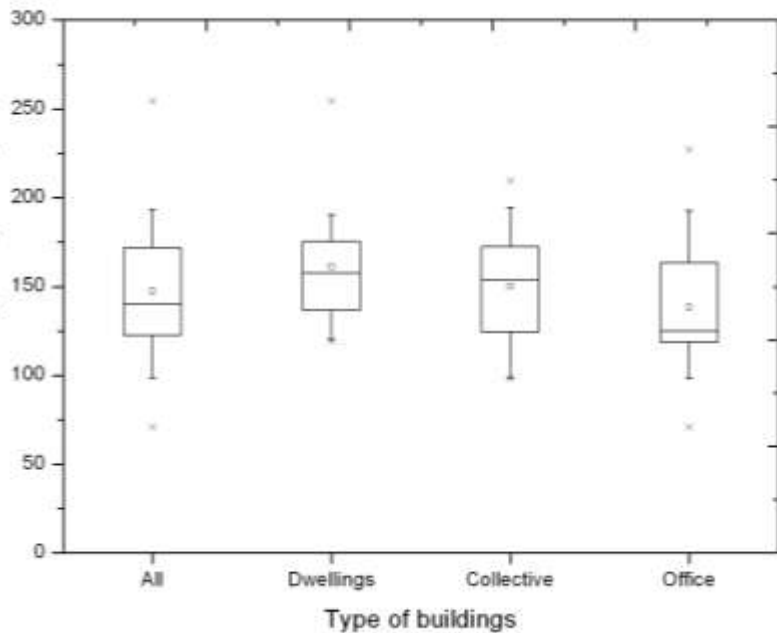
Inert waste (kg/m²NFA/year)

→ From 40 to 47 kg/m²/year



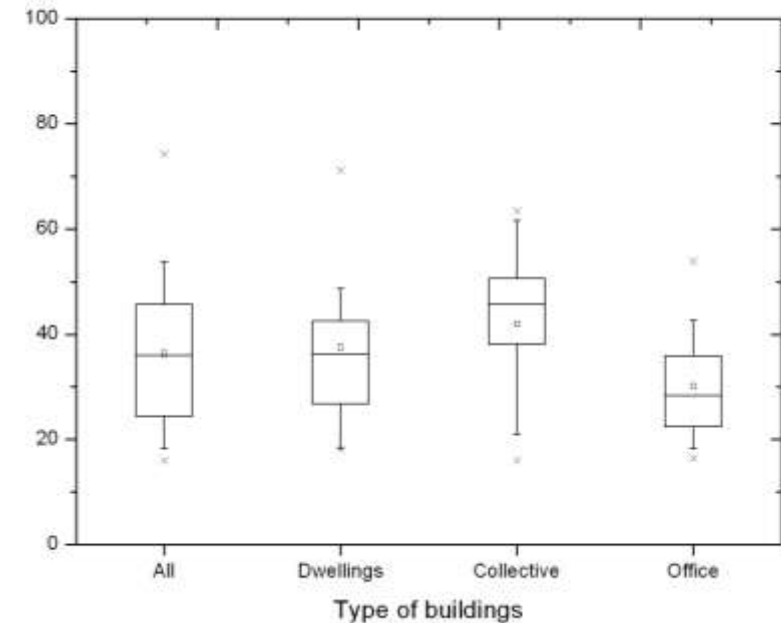
Reference study period : 50 years

Water consumption (L/m²NFA/year)



Inert waste (kg/m²NFA/year)

- Operational water consumption
- Operational energy consumption (others use)
- Operational energy consumption (thermal regulation use)
- Equipment, products and materials



First LCA reference values of different types of low-energy buildings for the French context:

- the product and material contributor : important for NRE, CO2, ...**
- Pointed out that the non regulatory energy uses are significant for low energy buildings**

Uncertainty sources :

Reference documents (defines contributors, boundaries, etc.) ←

- XP P01- 020-3
- Application rules of HQE Performance

Environmental data : →



Building related-data ←

Common rules : →

Common rules ←

Building LCA software

Statistical Analysis ←

Sample size

We have a first set of reference values

We need :

- > Performance values
 - > comprehensive LCA toolbox
 - > More environmental data

What next ?

- > From new application rules of HQE Performance, a new large experiment have just been started.



« **Test your new buildings** » was initiated as a call for expressions in December 2010.

Measure the performance towards :

- *Environmental indicators (LCA ones, biodiversity, land use)*
- *Economical indicators (LCC)*
- *Comfort indicators (IAQ)*

First results in July 2011

Final report in November 2011

Who ? Non LCA expert

Buildings owner assistant

Architects

Engineering office

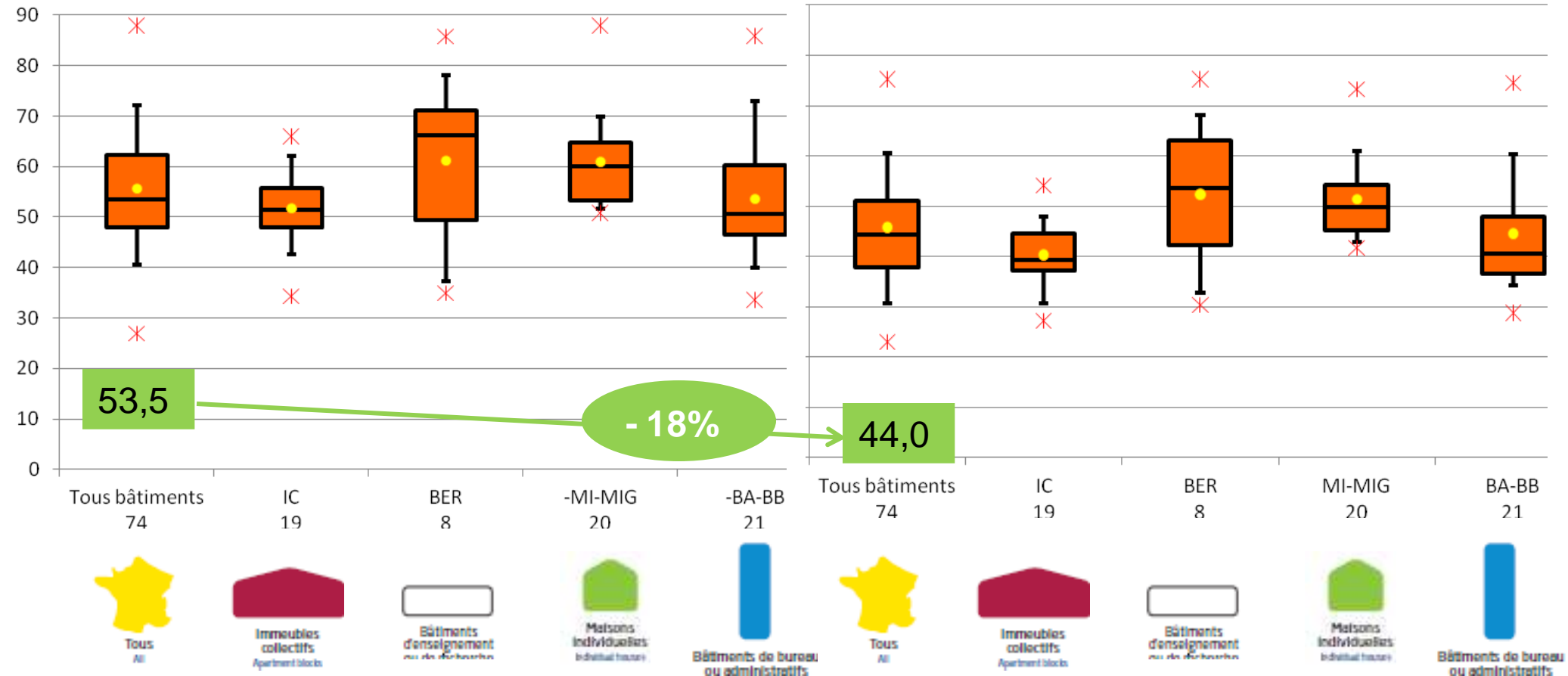
Designers

Buildings owners

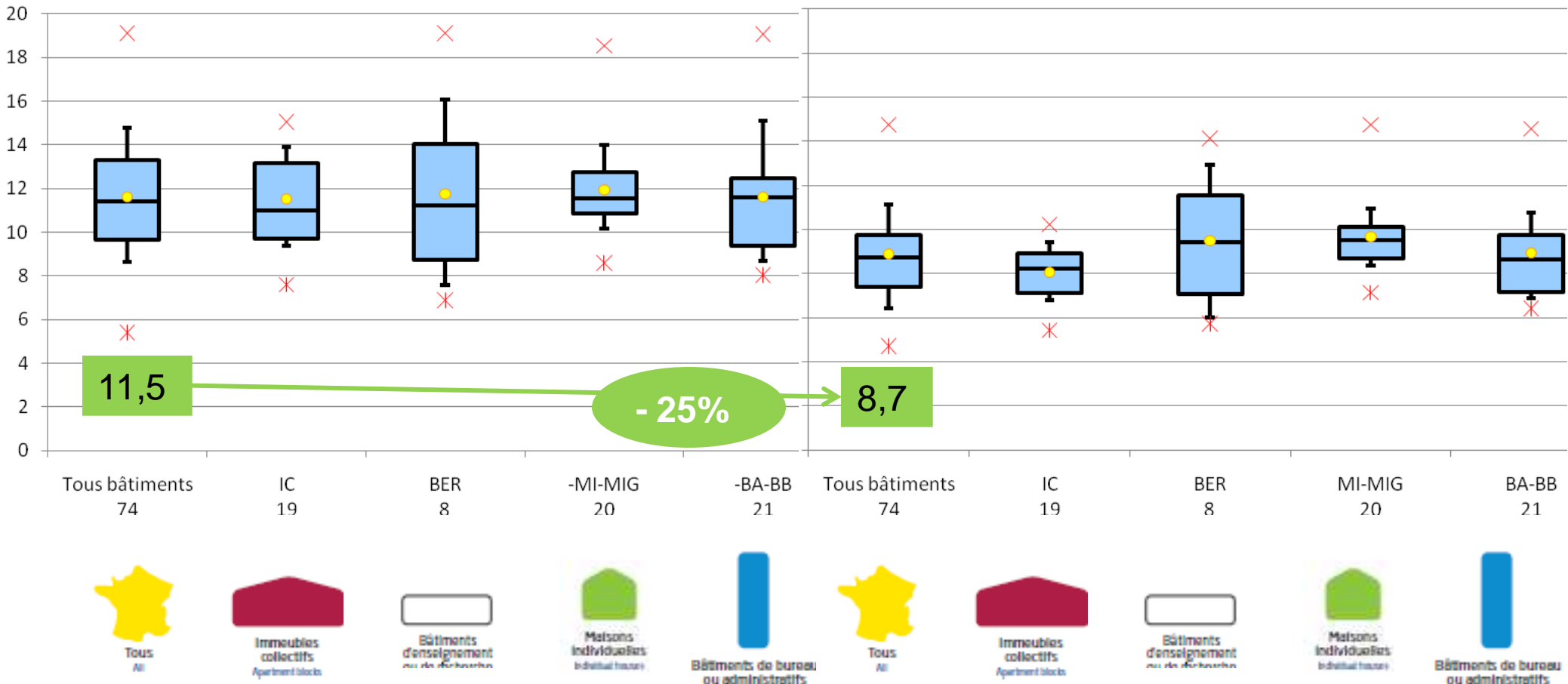
National Scientific network

Total Primary Energy kWh/m²SHON/an
50 year

Total Primary Energy kWh/m²SHON/an
100 year

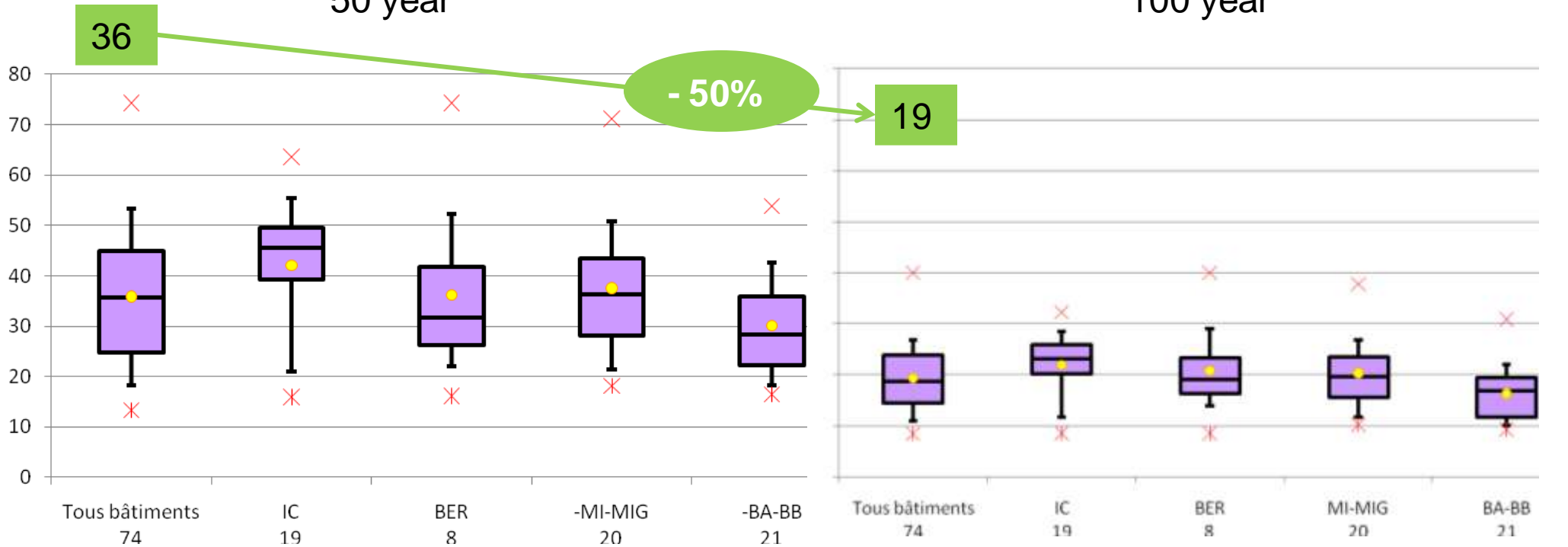


Global Warming Potential - kg CO₂/m²SHON/an 50 year Global Warming Potential - kg CO₂/m²SHON/an 100 year



Inert Waste kg/m²SHON/an
50 year

Inert Waste kg/m²SHON/an
100 year



Tous All



Immeubles collectifs
Apartment blocks



Bâtiments d'enseignement
non des établissements



Maisons individuelles
Individual houses



Bâtiments de bureau
ou administratifs



Tous All



Immeubles collectifs
Apartment blocks



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