

>Research activities at CSTB

ANNEX 45

September 5th 2006

General

Skills

Status

**Centre for research, consultancy,
evaluation and knowledge
dissemination**

**State-owned industrial and
commercial corporation under the
control of the Ministry of Housing**



Distribution

Marne-la-Vallée

540 people

Administrative headquarters

- Sustainable development – energy, health, environnement
- Safety, structures and fire performance
- Construction techniques
- Equipment and services

Paris

40 people

- Economic and social sciences

Grenoble

80 people

- Acoustics
- Materials

Sophia Antipolis

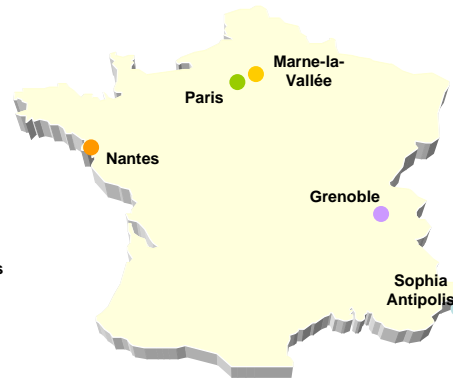
80 people

- Information and Communication Technologies
- Renewable Energies

Nantes

80 people

- Wind, climatology
- Pollution control and treatment
- Lighting



Health, Environment, Risk Prevention

Structure and comfort

Construction and Facility Technology

Quality Assessment

Information Technology Industries

Economics and Sociology

Health, Environment, Risk Prevention

Assessing and preventing the risks to health and safety from:

- air,
- water,
- wind,
- fire,
- earthquakes, etc.

Controlling energy use in order to reduce the greenhouse effect.

Controlling the environmental impact of construction materials and buildings.



Structure and Comfort

New and existing buildings: tools and methods for assessing the quality of indoor and outdoor comfort.

- thermal engineering
- ventilation
- lighting
- acoustics
- indoor comfort in transport systems



Construction and facility technology

Supporting architectural and industrial innovation by combining research, experimentation and simulation

- Structures
- Envelopes
- Facilities
- Control Engineering, Telecommunications
- Materials



Assessing quality

Assessing innovative products and systems

- Technical Assessments
- Technical Experimental Assessment
- European Technical Approval
- Euro-Agéments
- Certification (products, actors, building)



Information Technology Industries

IT services and tools adapted to the needs of construction professionals.

- Databases
- Electronic publishing
- Internet
- Trade software
- Training

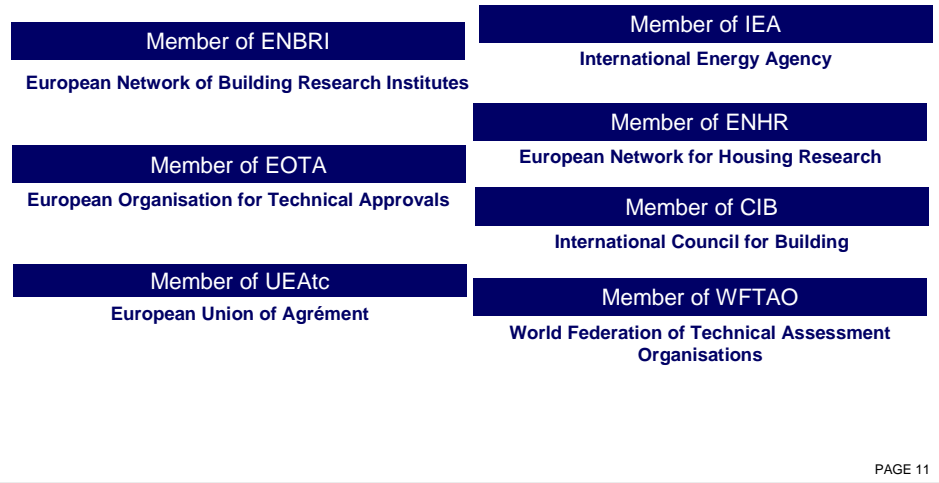


Economics and Sociology

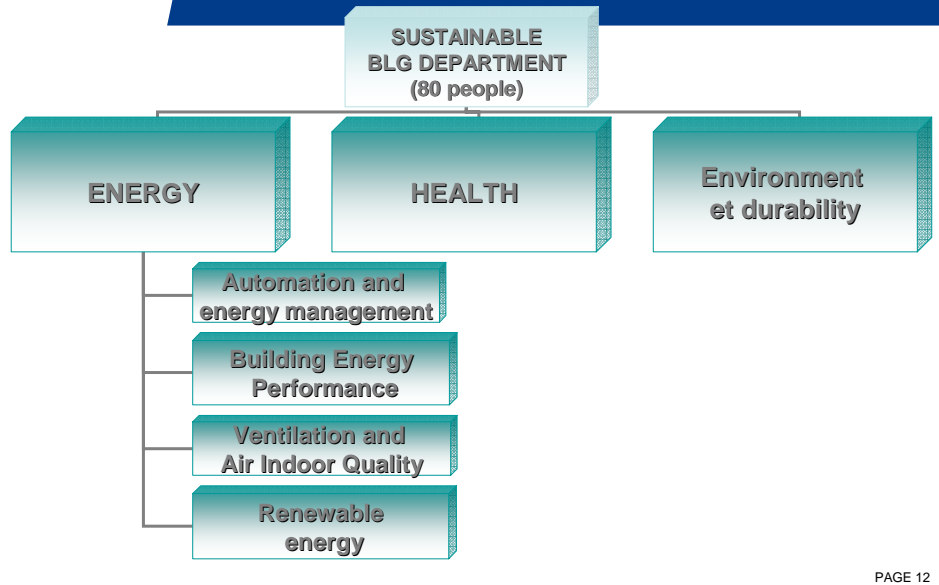
Looking at the economic and social aspects of construction and housing, districts and towns.

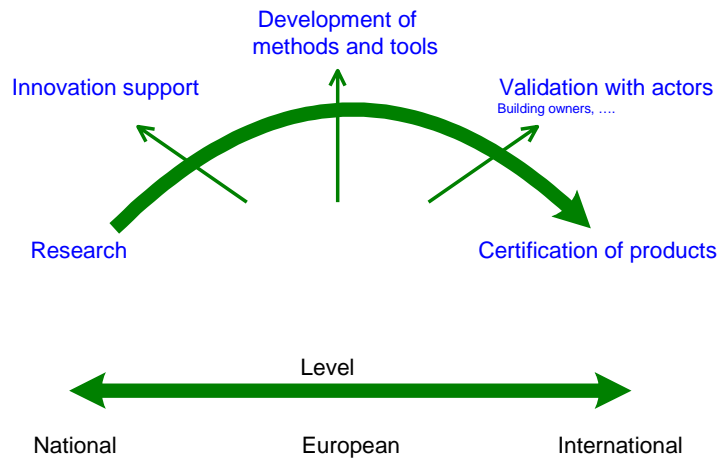
- Building economics
- Requalification of urban districts
- Using technologies and innovation





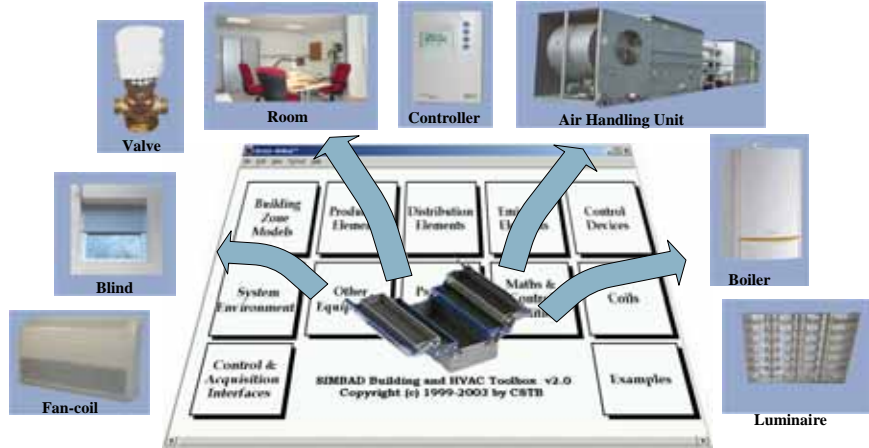
Sustainable Development Department





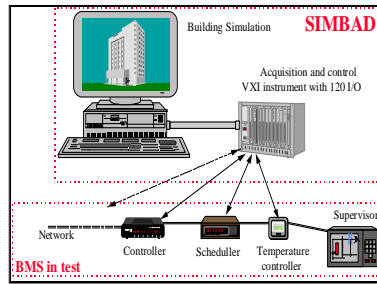
- ✓ **Energy Management and performance analysis**
 - ✓ EPBD, several European projects to facilitate implementation of the directive
 - ✓ Buildings Stock Energy analysis tools
 - ✓ Standards, regulations
 - ✓ Low energy building research program
- ✓ **Comfort analysis**
 - ✓ Thermal, indoor air quality, ...
- ✓ **Building Automation and Control Systems**
 - ✓ Development of Toolbox for Energy Performance and control assessment
 - ✓ Development of Control Strategies
 - ✓ Active building envelope and interaction with technical systems
 - ✓ Products assessment
- ✓ **Commissioning**

✓ A toolbox to build simulators

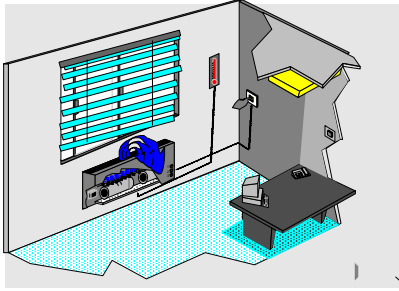


✓ Several laboratories with specific simulators for:

- ✓ Development of products
- ✓ Test of products by CSTB or manufacturers
- ✓ Normative tests
- ✓ Training



From a virtual zone to a demonstration room



Annex47

Cost-Effective Commissioning of Existing and Low Energy Buildings

Natascha Castro 

Daniel Choinière  Natural Resources Canada



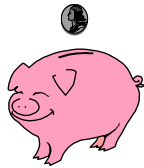
Subtasks	2005	2006	2007	2008	2009
Subtask A					
Subtask B					
Subtask C					
Meetings		●	●	●	●



Why is enhanced building operation of international interest ?



- ✓ In developed countries it is a greater challenge to operate buildings than it is to build new ones
- ✓ Users request more comfort and IAQ
- ✓ Global warming puts added pressure on reducing energy consumption



- ✓ Cost effective actions are needed
- ✓ Companies want to develop new services



- ✓ New techniques can be used to enhance operation
 - ✓ BEMS can be a key tool to help
 - ✓ Advanced computer models are becoming available from design and can be used for operation

Why Commissioning the building?

- ❖ **Bridge the gaps between design and operation**
- ❖ **Check interactions between main players**
- ❖ **Check performance**
- **Provide documentation that the building is in compliance with owners needs and energy requirements**

✓ **What is commissioning:**

- ✓ Diagnose and verify building system performance, and propose ways to improve the performance in compliance with owner's or occupants' requests
- ✓ Commissioning is performed in order to keep the system in optimal condition through the life of the building from viewpoints of environment, energy, comfort and facility usage

✓ **When**

- ✓ Apply during the entire lifecycle of the building from the design to the operation phase

✓ **Quality Process: the Commissioning plan**

- ✓ List of tasks to check the performance

✓ **Tools to check the performance at each step**

- ✓ Manual tools (check list)
- ✓ Bems assisted tools
- ✓ Models

Actors have different references and values :

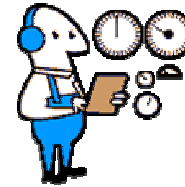
- Architect => More Artistic
- Engineer => More Technical
- Future owner => occupancy preoccupation
- Others ...



Common Target



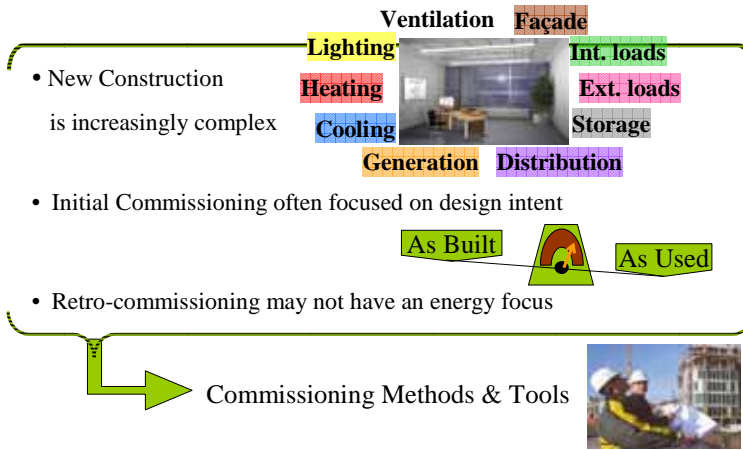
✓ Objective: To allow all the actors to share a common view of the project



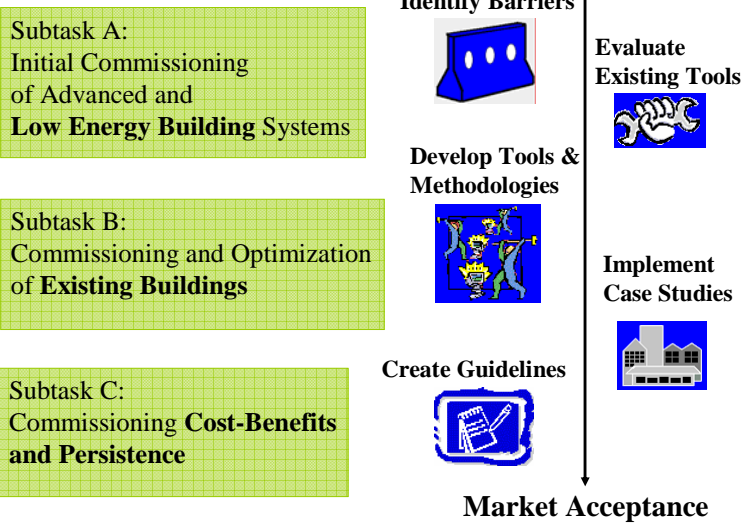
Country	Methods for Low Energy Buildings	Tools for Existing Buildings	Cost-Benefit and Persistence
Belgium	2	1	-
Canada	1	1	1
Czech Republic	1	1	2
Finland	1	1	3
France	1	1	3
Germany	1	1	3
HongKong/China	1	1	3
Hungary	2	1	2
Japan	3	1	2
Netherlands	2	1	2
Norway	2	1	2
South Korea	-	2	-
Sweden	1	2	?
USA	1	1	1

The Challenge Of Annex47

To ensure that components and systems in buildings reach their technical potential and operate energy-efficiently

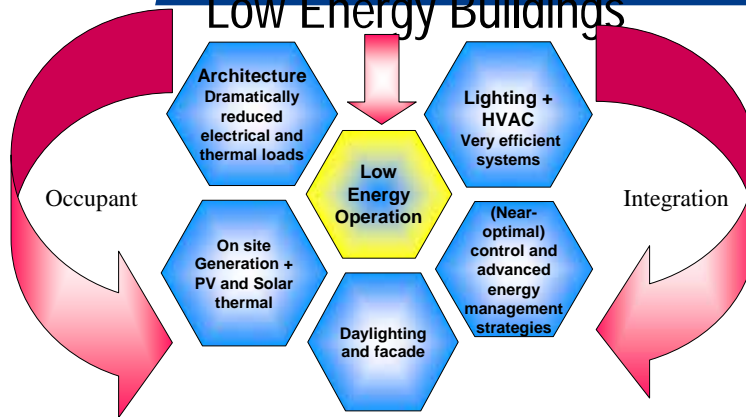


The Annex Structure



Subtask A: Initial Commissioning of Advanced and Low Energy Building Systems

Low Energy Buildings



- Develop a general commissioning methodology adapted for low energy buildings
- Develop control strategies and functional performance tests for advanced systems
- Implement control strategies and apply functional performance tests to case studies

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Subtask B, Commissioning and Optimization of Existing Buildings

What could be done for existing buildings to enable the cost effective commissioning?

- ✓ **Develop, Improve and Test Tools (Automatic or Manual)**
- ✓ **Monitors building control data**
- ✓ **Generates detailed commissioning reports**
- ✓ **Implemented in stand-alone tools and/or embedded in BEMS**

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Subtask C, Commissioning Cost-Benefits and Persistence

- ✓ How to quantify the benefits of Commissioning?
- ✓ How to enhance the persistence of benefits?
- ✓ How to remove barriers to market acceptance?



Where to find further information

- ✓ Results of Annex40

www.commissioning-hvac.org

- ✓ Website of Annex47

http://cetc-varenes.nrcan.gc.ca/en/b_b/bi_ib/annex47

- **Develop a Cx plan adapted to lighting and lighting control system**
 - Define tasks to check the performance of advance system at each phase of the process
 - Define task adapted to the project and the request of actors
- **Develop Cx tools ??**
 - To verify the performance of advance lighting system
 - To verify the performance of integrated control functions

Thank you for your attention