



SEMINARIO INTERNACIONAL

LAS ENERGÍAS RENOVABLES HOY

PERSPECTIVAS DE COLABORACIÓN ENTRE AMÉRICA LATINA Y EUROPA

*Sede de la Secretaría General de la Comunidad Andina
Av. Andrés Aramburú cdra. 4 ,San Isidro
Lima, 1 y 2 de Marzo de 2012*

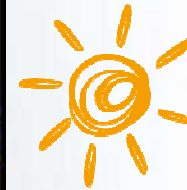
**COMUNIDAD
ANDINA**



Apoyando



Jean-Pierre JOLY
Directeur général

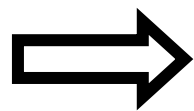
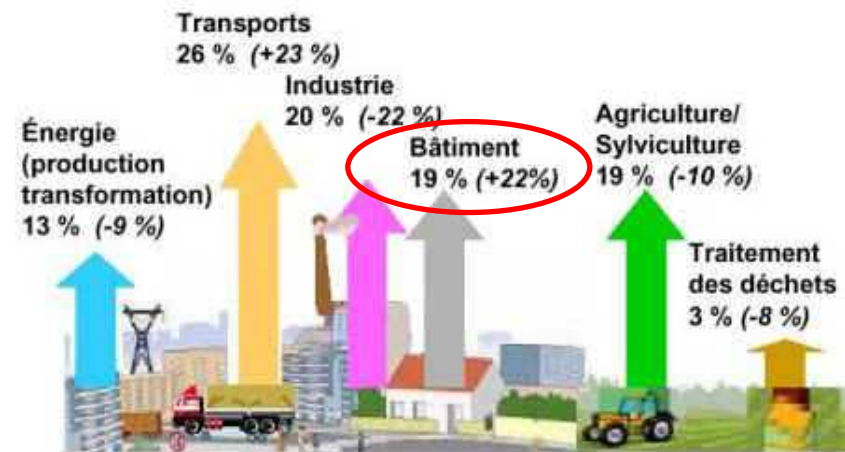
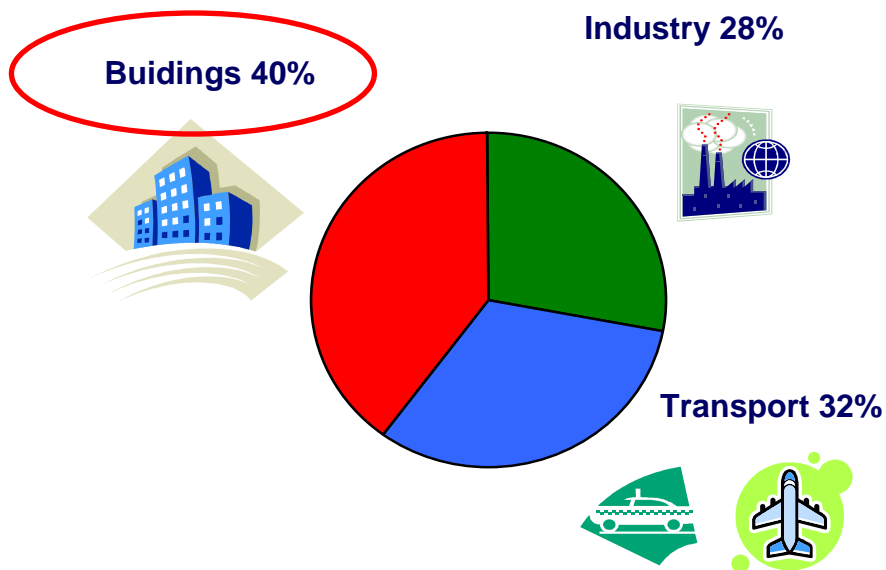


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INSTITUT NATIONAL
DE L'ENERGIE SOLAIRE

Bulding and energy efficiency



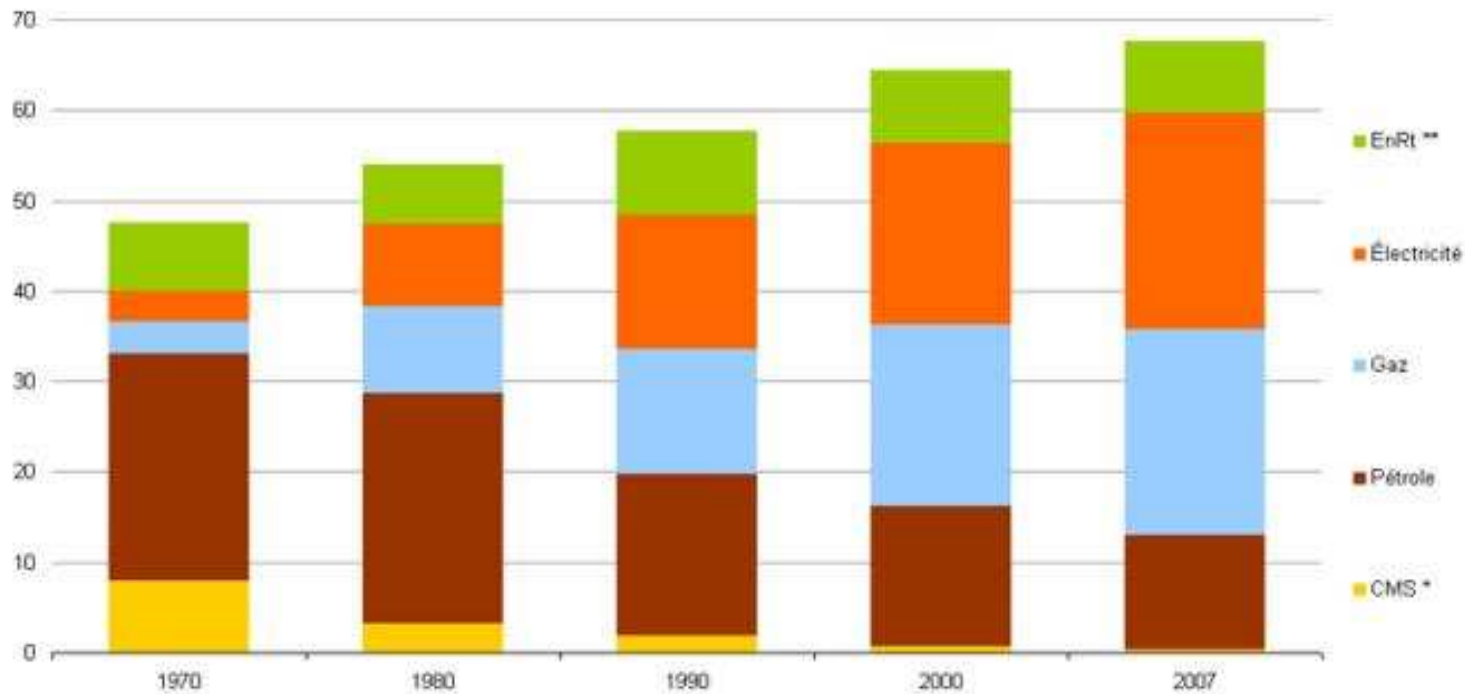
Energy consumption in Europe



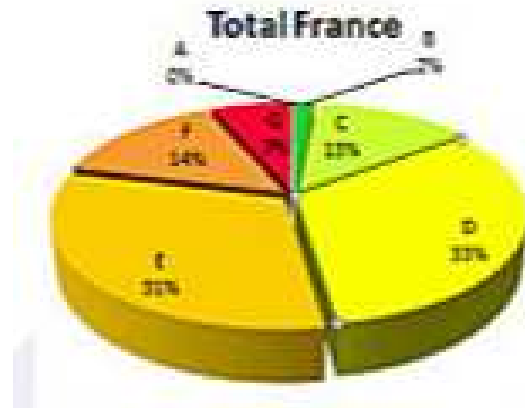
Importance of energy efficiency in buildings

Global energy share in France

- Increasing
- Fossiles (oil + nat gas) stable

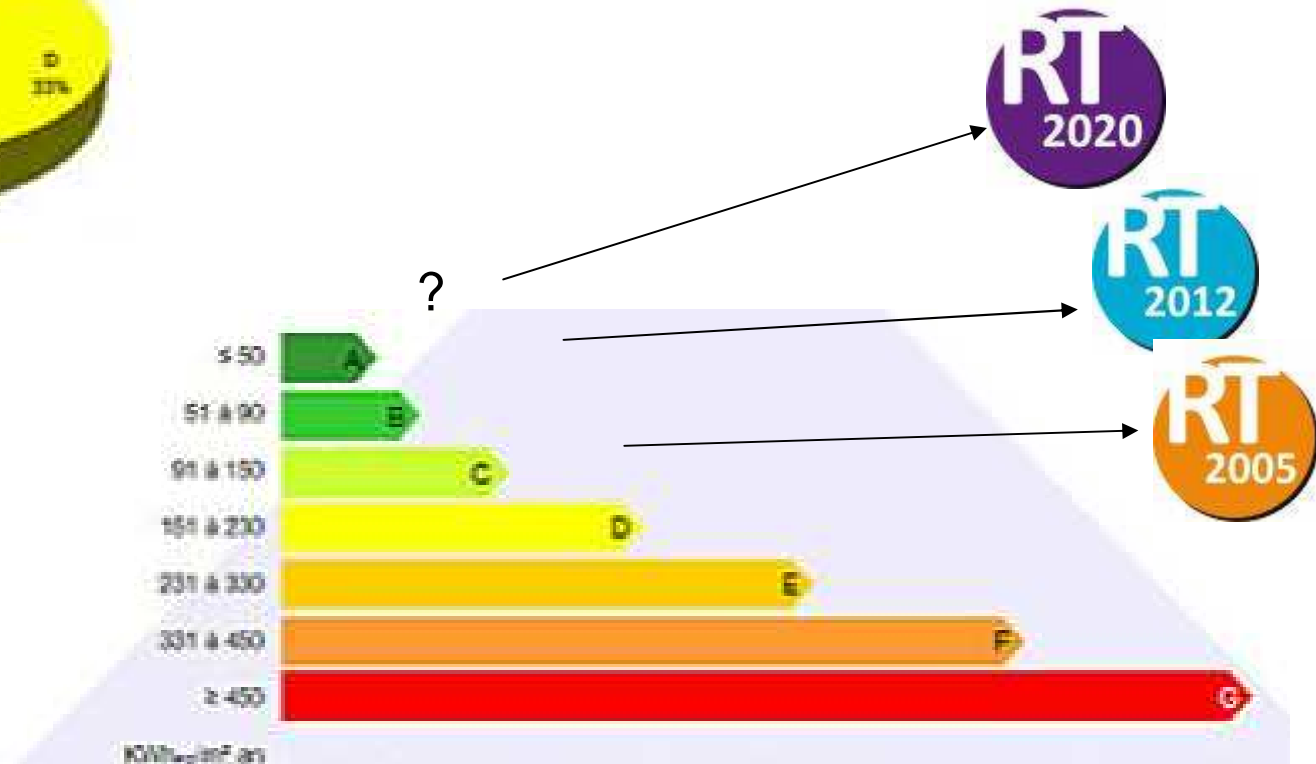


French regulation for construction



Present situation

Progressive strengthening towards less than 50kWh/m²/y



Main European labels



Swiss

MINERGIE®

42 kW.h/(m².an)

(Heating, domestic hot water, ventilation, air conditioning)
(final energy)

MINERGIE-P®

30 kW.h/(m².an)

(Heating, domestic hot water, ventilation, air conditioning)
(energy bought)

Germany

Passivhaus

15 kW.h/(m².an)

(Heating only) (final energy)

120 kW.h/(m².an)

Total consumption (primary energy)



The new French label :



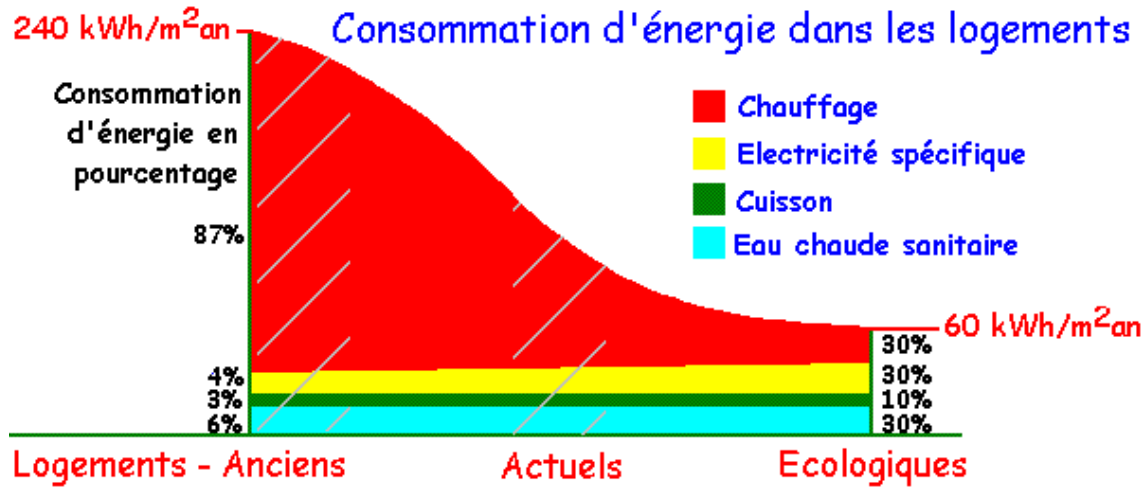
BBC

(based on thermal regulation)

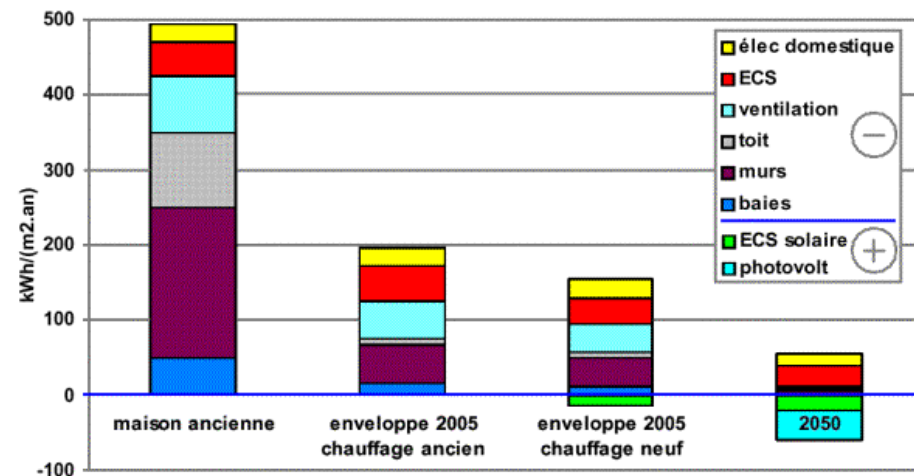
Between 40 and 75 kW.h/(m².an)
depending on the location

For heating, domestic hot water, ventilation, air conditioning system and lighting (**primary energy**)

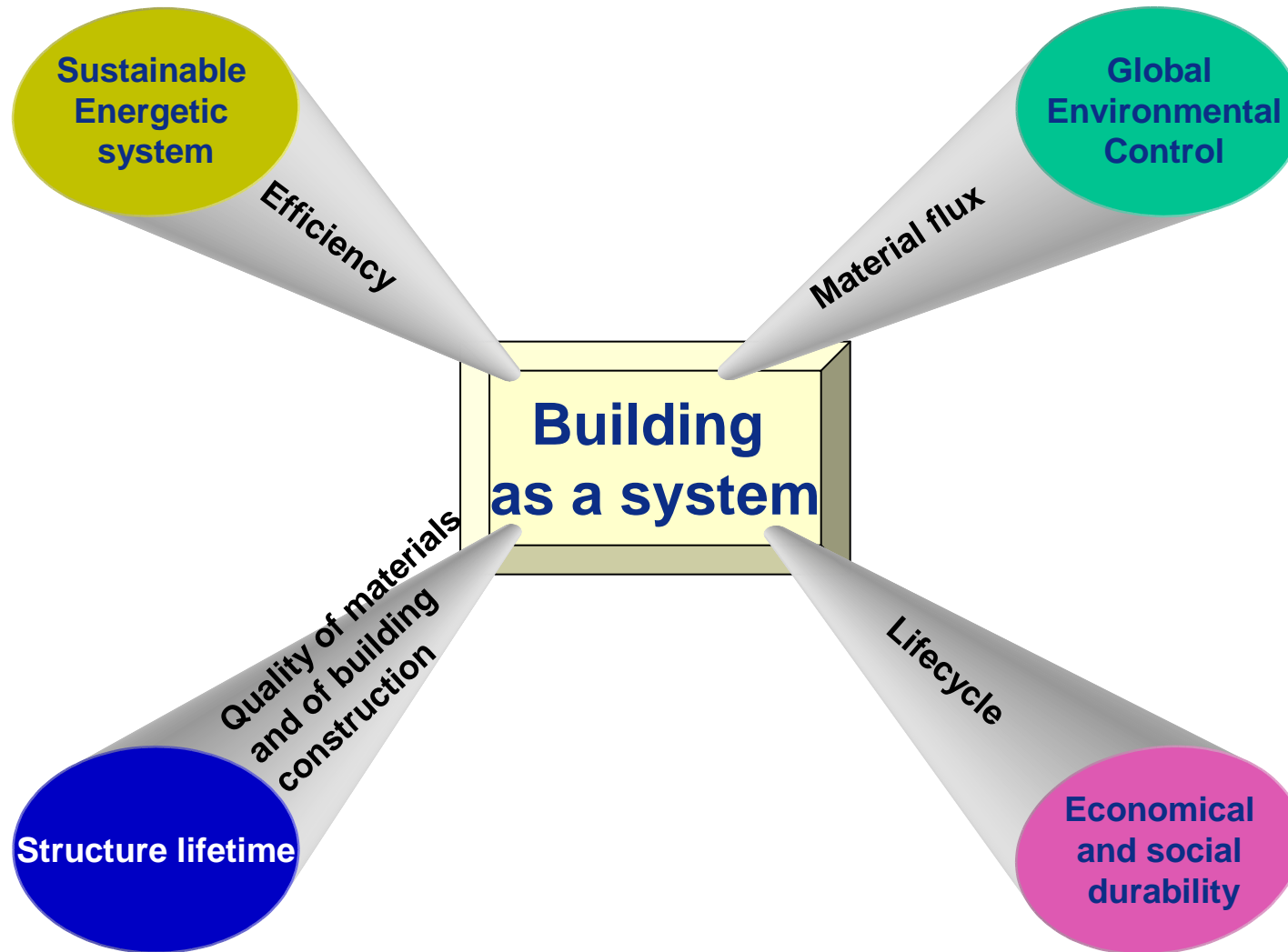
How to get the reduction?



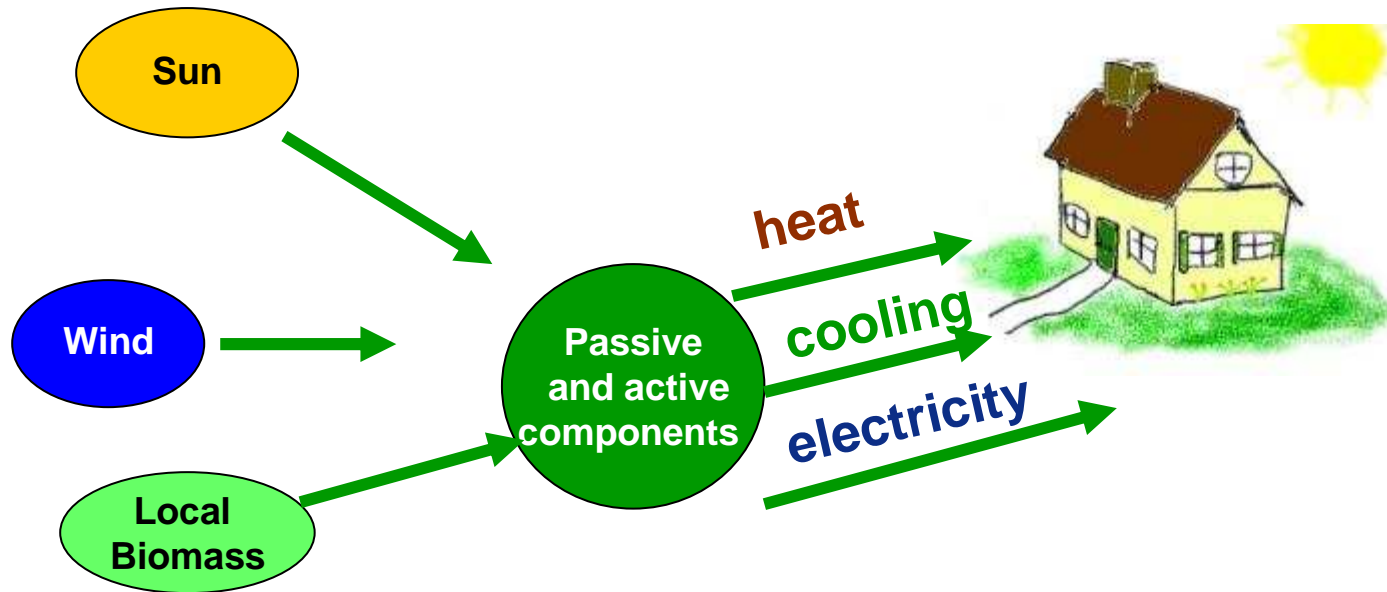
Very good insulation
and renewable
introduction



The sustainable building: A « system » view



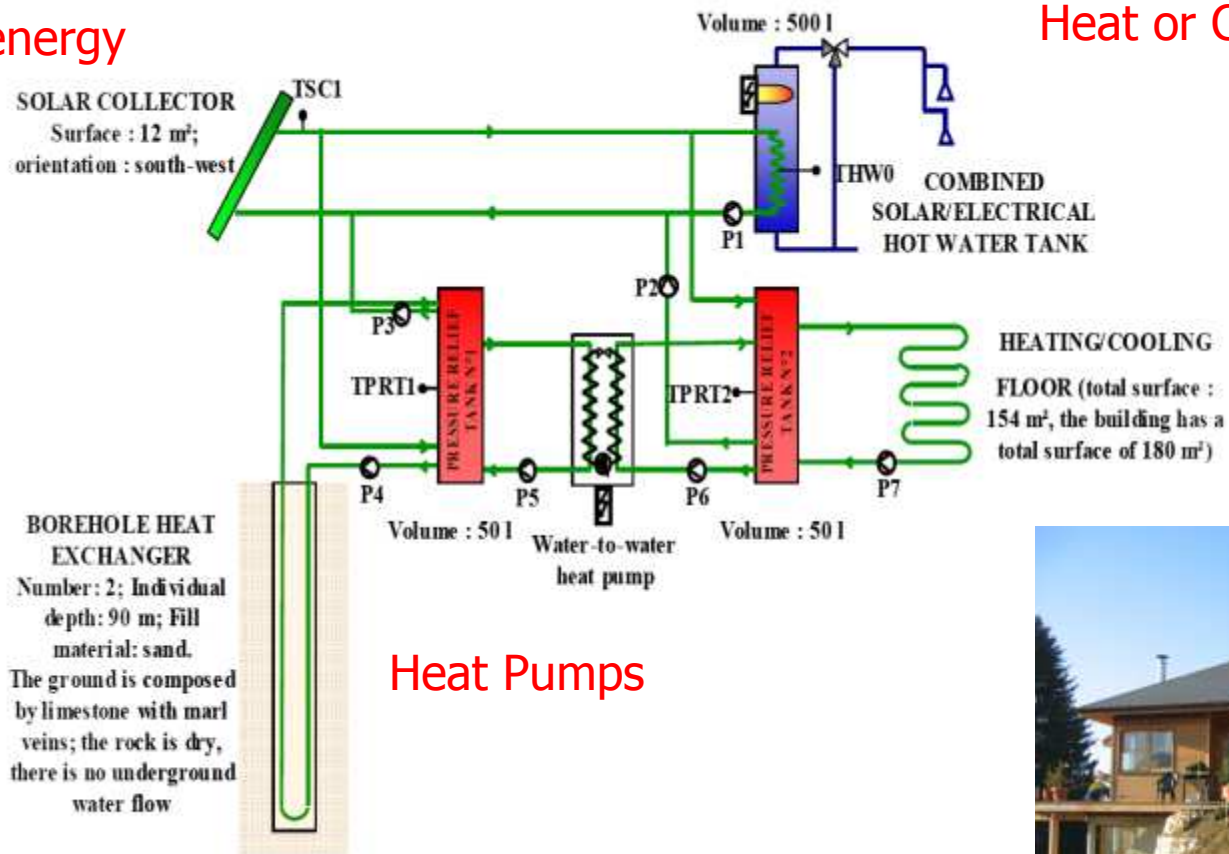
Building has to take into account the environment and take profit from it



→ Towards a revolution of the energetic systems

Solar energy

Heat or Cold storage



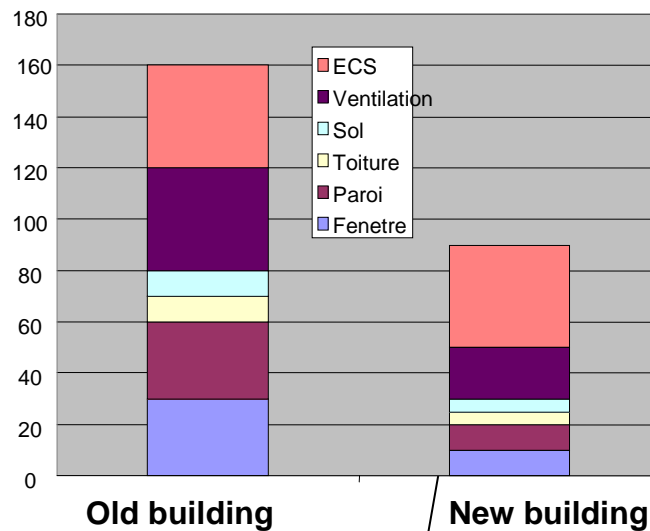
Heat Pumps

Surface geothermal



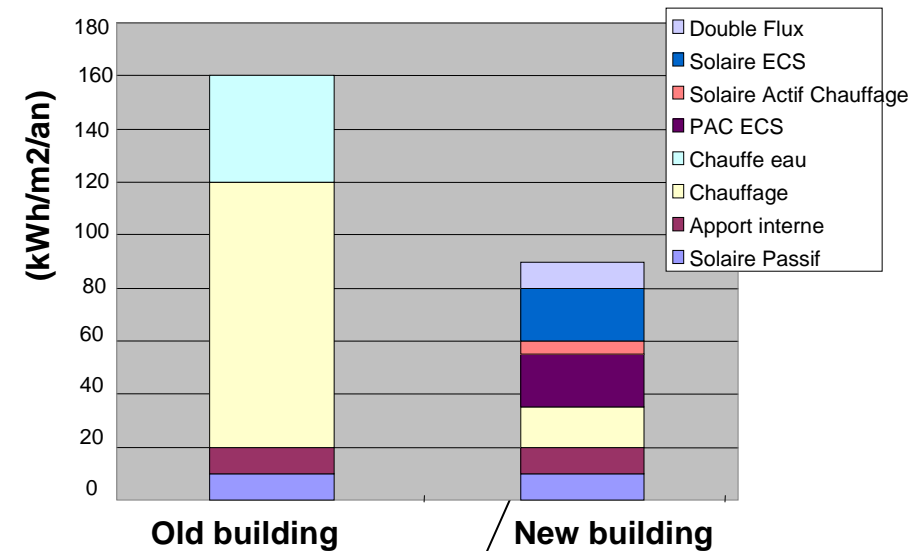
Deep modifications of consumption and production

Losses and usage (winter in France)



Strong reduction of heat dissipation through better envelope

Energy incomes (winter in France)



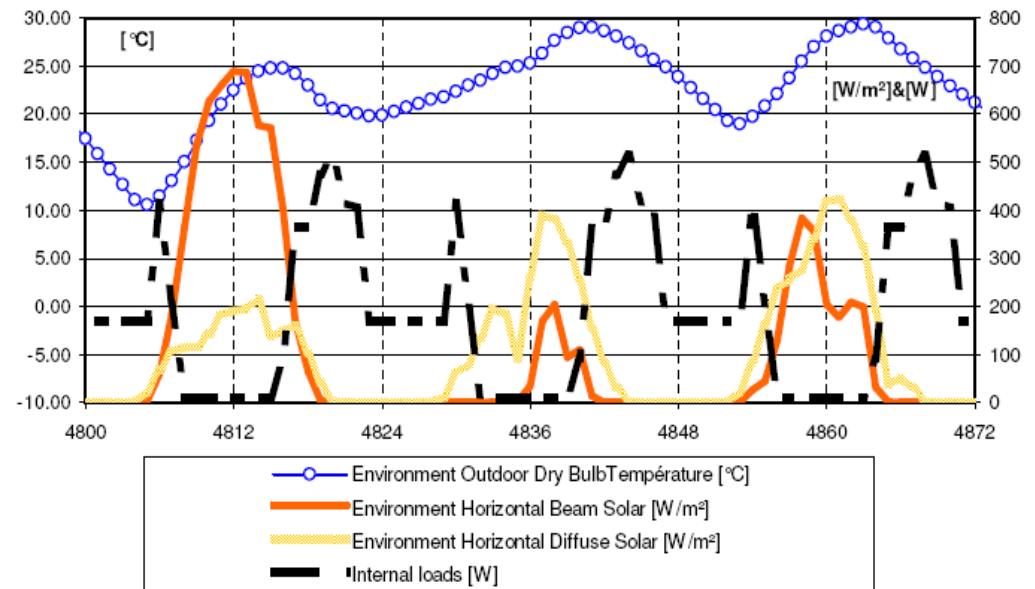
Very low power heating system and introduction of double flux ventilation and heat pumps

But a new difficulty: the control of the buiding temperature dynamics

Take into consideration:

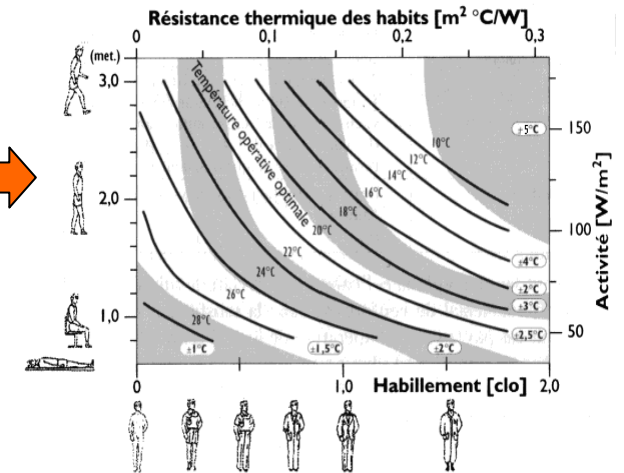
- Sun interaction
- Inertia
- Comfort (temperature and light)
- Air quality and ventilation

EnergyPlus Simulation of the impact of internal heat dissipation and solar radiation

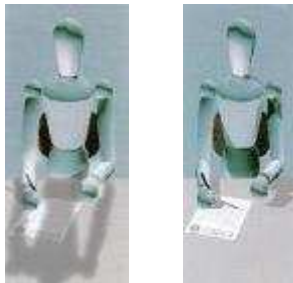


Comfortable and healthy environment

Thermal comfort :
Global Comfort : PPD-PMV Index
 Air velocity, asymetry of radiative temperature...



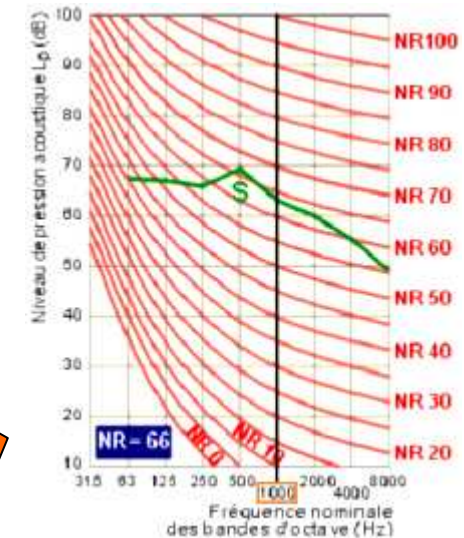
Air quality
Pollution (chem., physical, bio.),
Indicators
Ventilation control



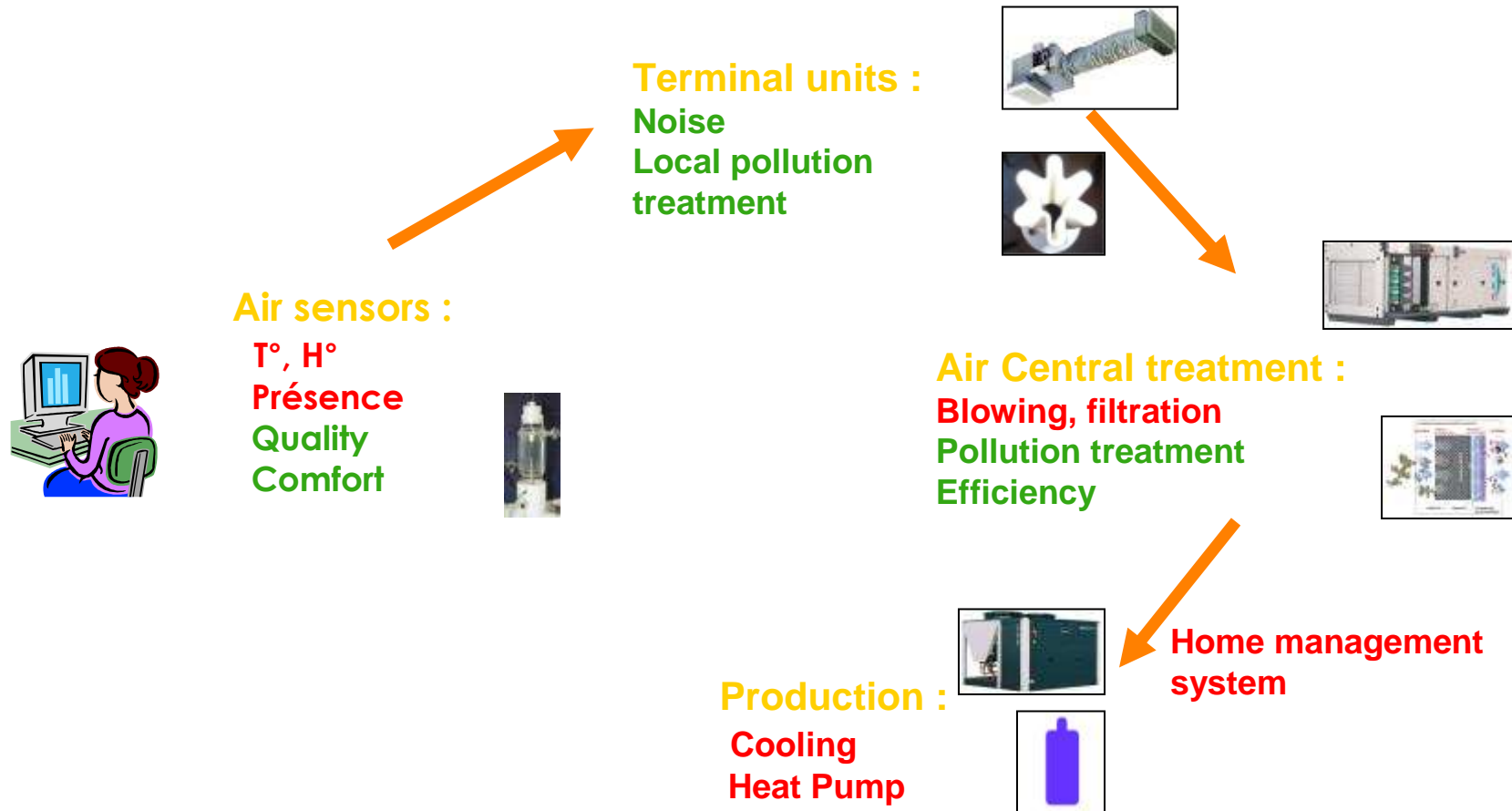
Visual comfort:
 Quality of light (intensity, uniformity, colour, ...)



Acoustical compfort:
 External (enveloppe) and internal (ventilation...)



Air vector takes the lead



New and more industrial production modes

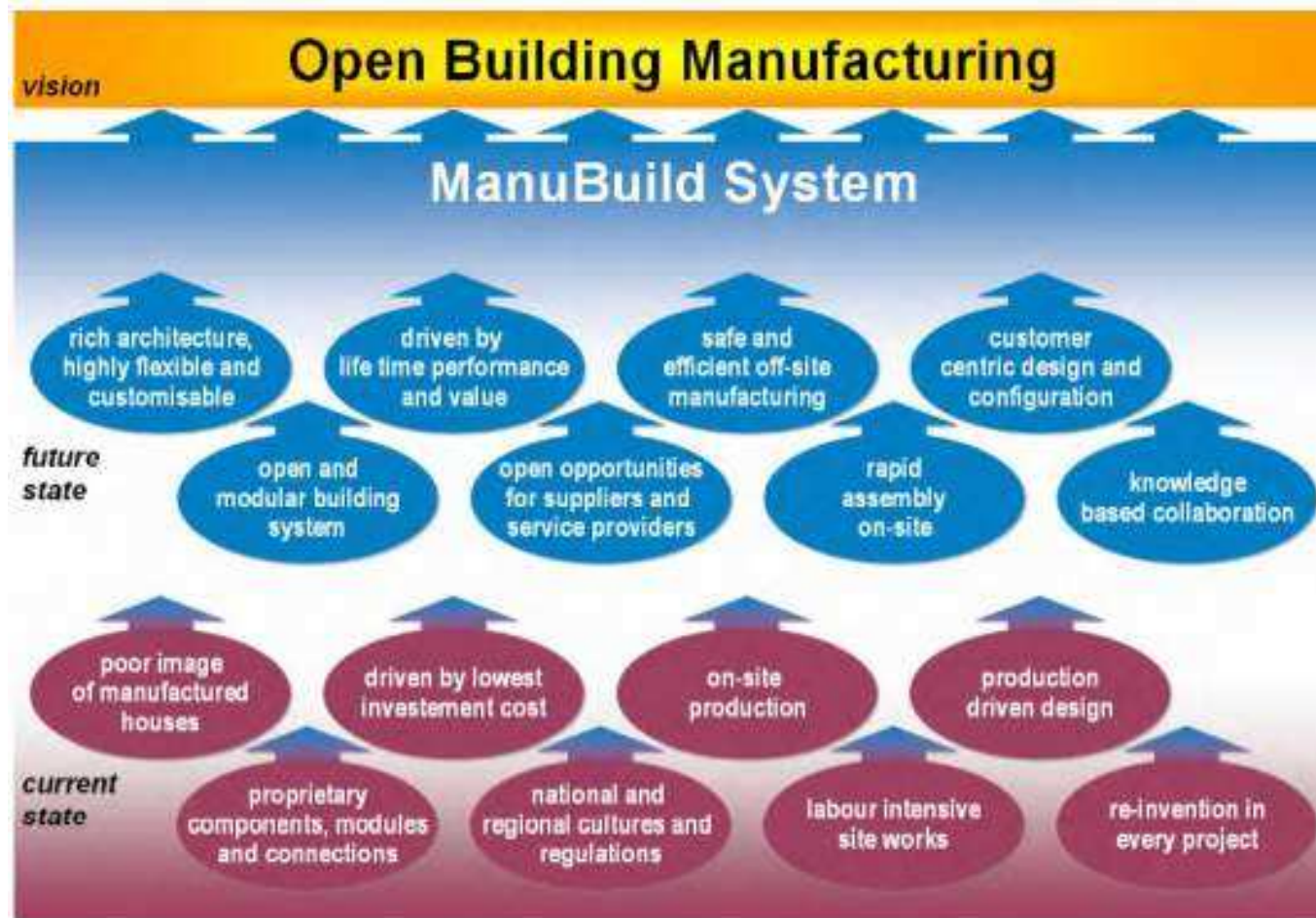


Figure 1: From Current State to Future State – Via ManuBuild System towards Vision

Have both industrial fabrication and open design

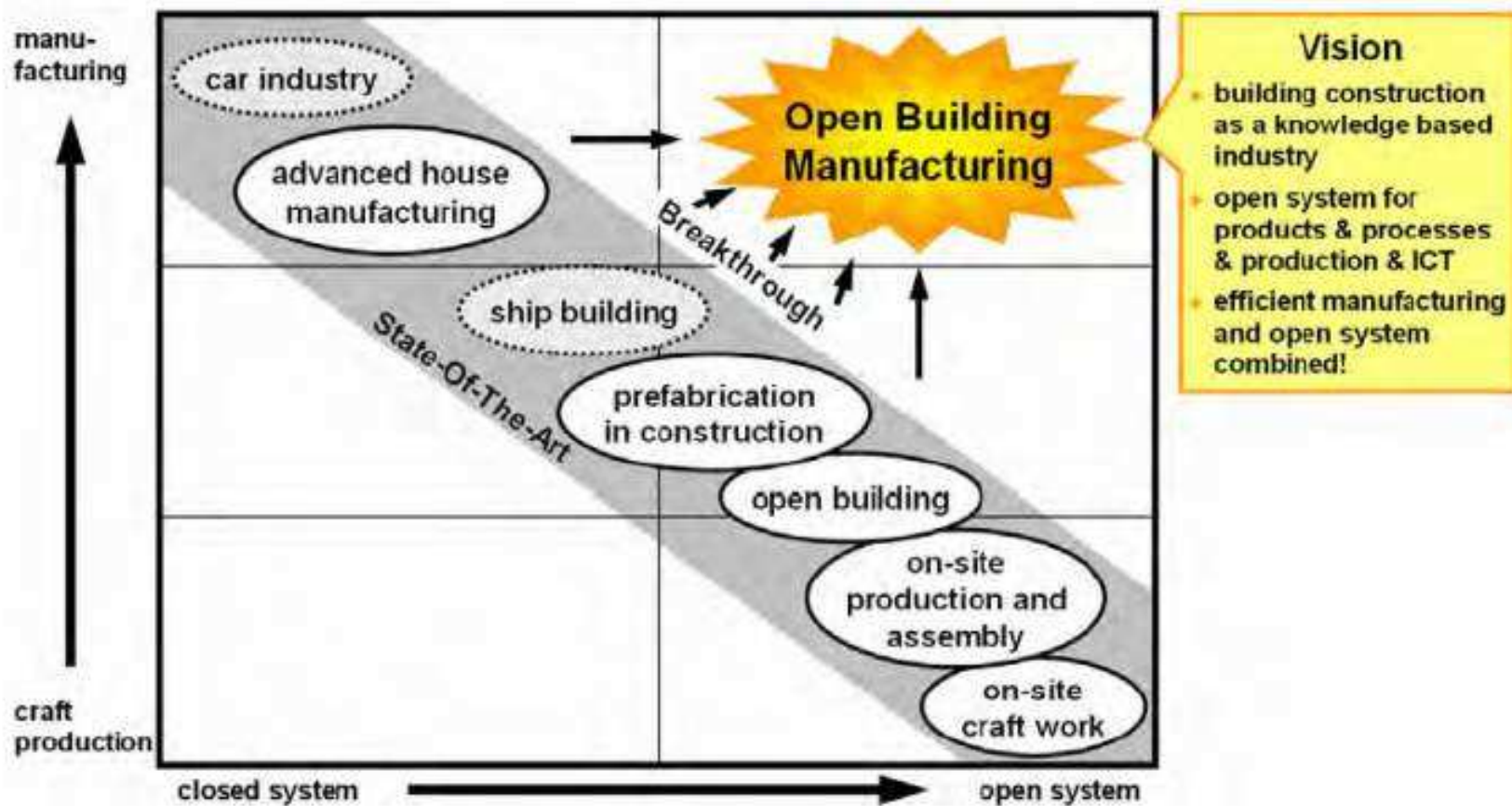
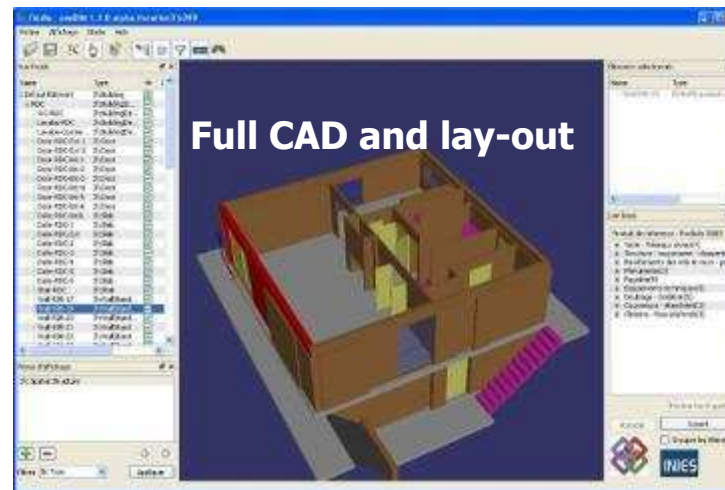
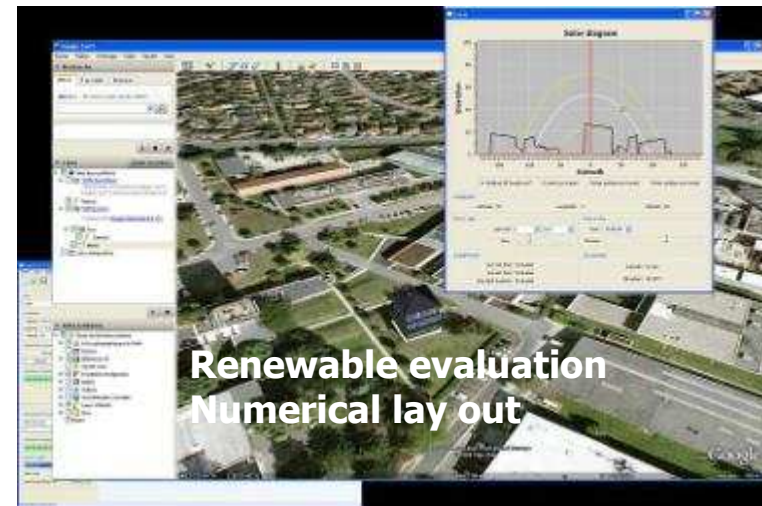
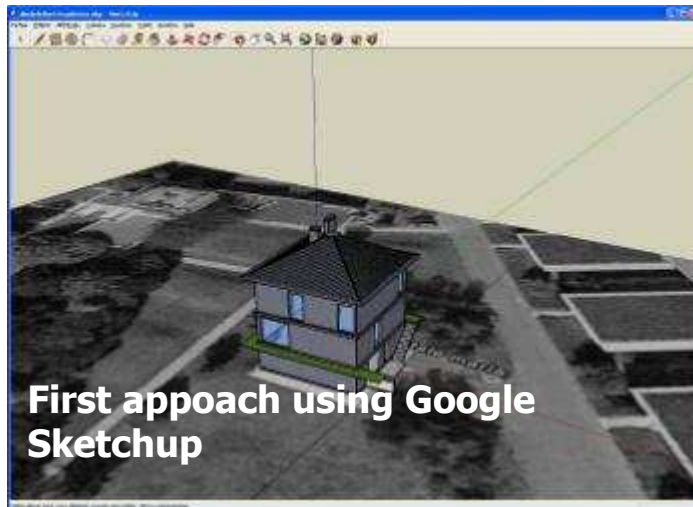


Figure 2: Current State in Relation to Open Building Manufacturing

Source: Open Building Manufacturing: Core concepts and Industrial Requirements

Importance of new CAD tools

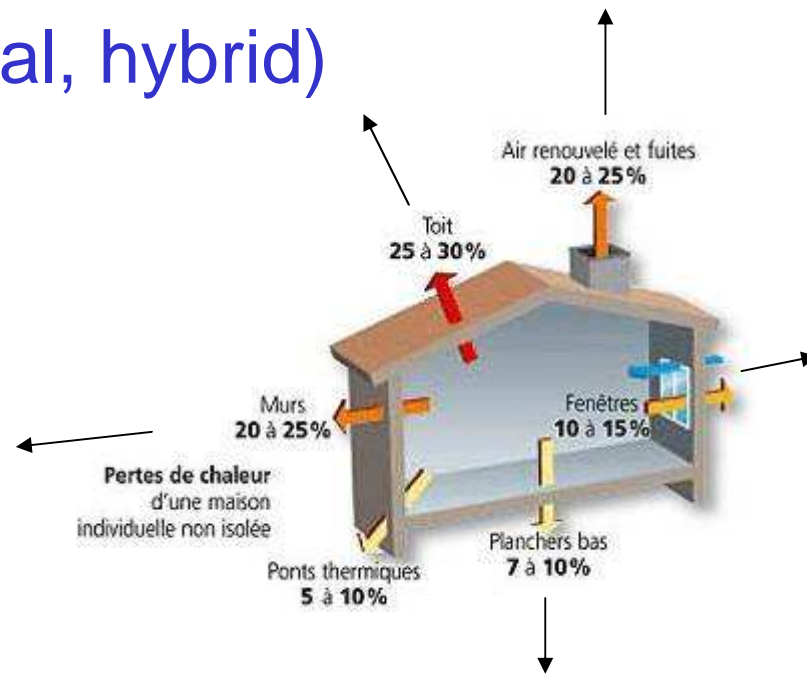


INES specific work

Solar integration
(PV, thermal, hybrid)

Ventilation
Enveloppe leak tightness

Insulation and
permeation



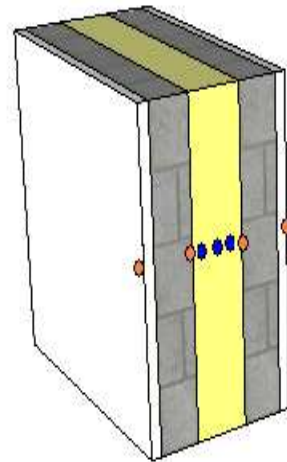
Management of sun
energy flow through
windows

Structure and Inertia

4 Experimental houses: field tests & numerical tests

- **Monitoring:**

*Structure
embedded
sensors*



- Thermohygromètre
- Thermocouple



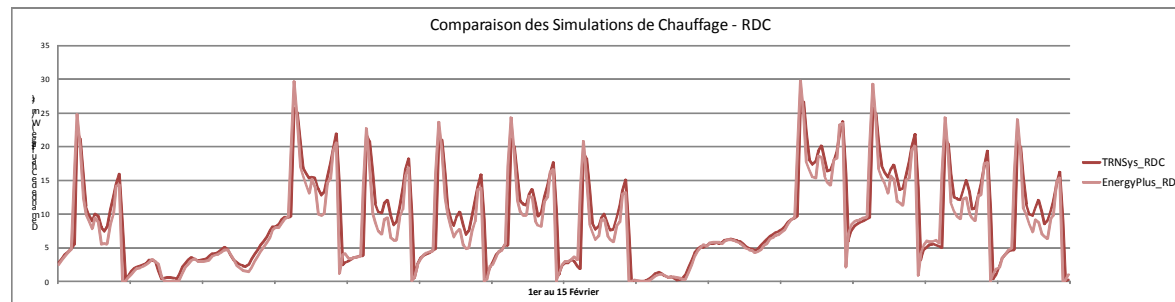
Optic fiber temperature continuous sensor



*Thermal comfort and Air
quality assessment sensors*

Comparison & validation of code for Low Energy Buildings

- Dynamic Thermal Simulation with 2 BPS tools
 - ◁ EnergyPlus ▷
 - ◁ TRNSys ▷
- Fine measures of building dynamic behavior
 - 200 sensors/house
 - Steptime acquisition = 1 min
 - Control of the dynamic input data

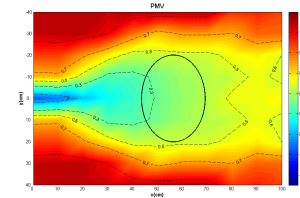
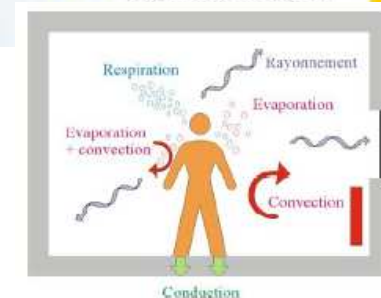


Indoor Environment Quality



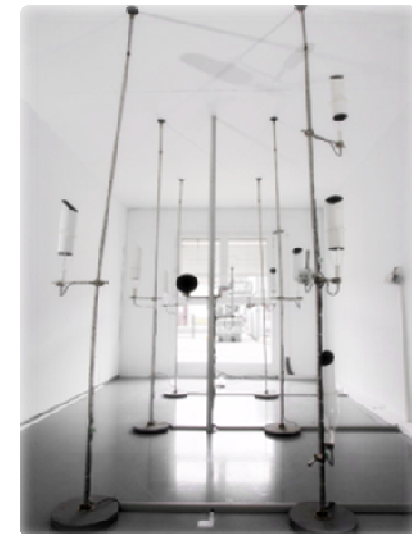
■ Themes :

- Thermal comfort
- Indoor air quality
- Visual comfort
- Acoustic care



■ Activities

- spatial mapping of comfort index (PMV, Teq...)
- "Inter-comforts" correlation studies
- Development of Mean Radiant Temperature models
- Air quality campaign campaign in occupied buildings,
- Personalized thermal comfort control
- Blinds control



INES team



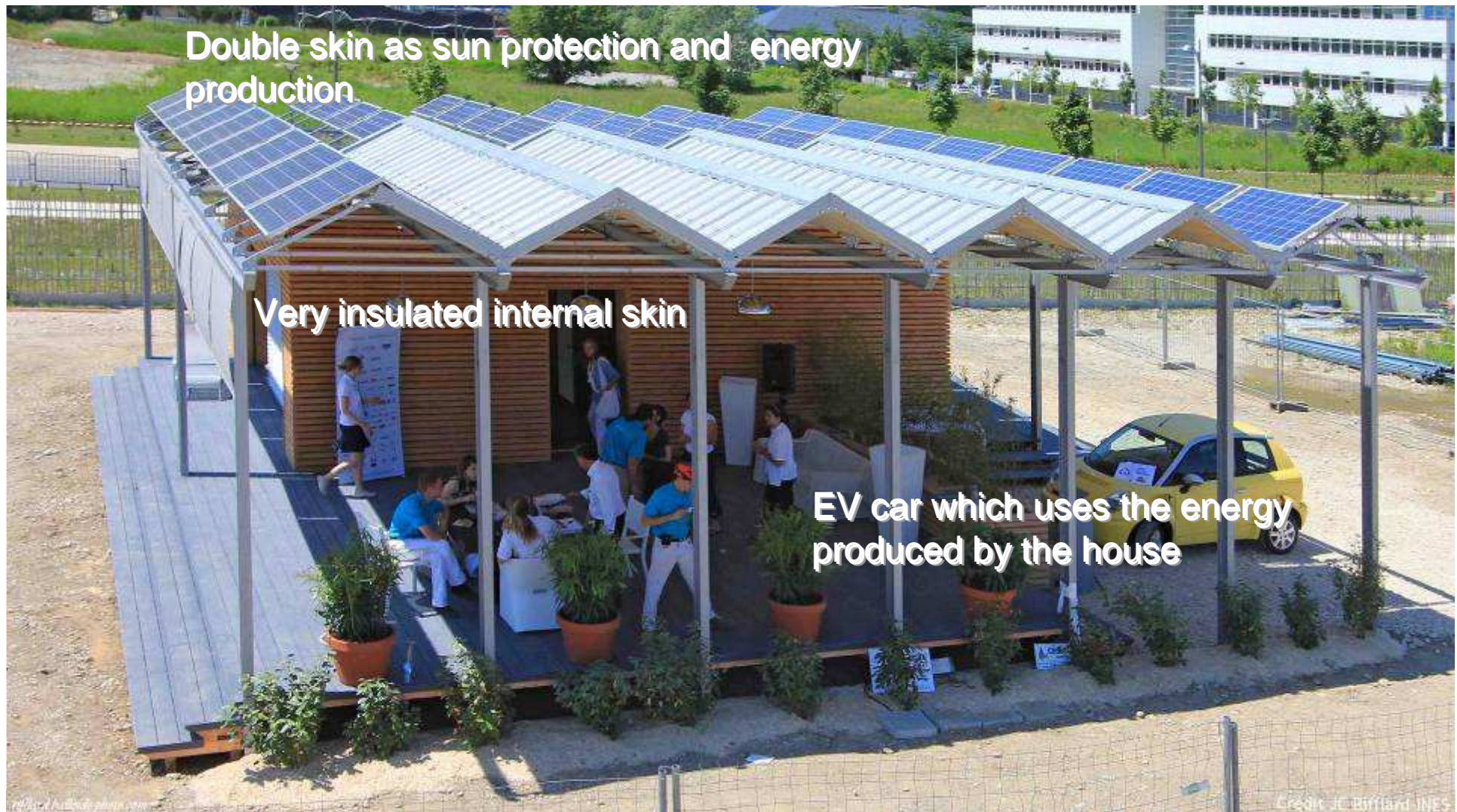
Conclusions and perspectives

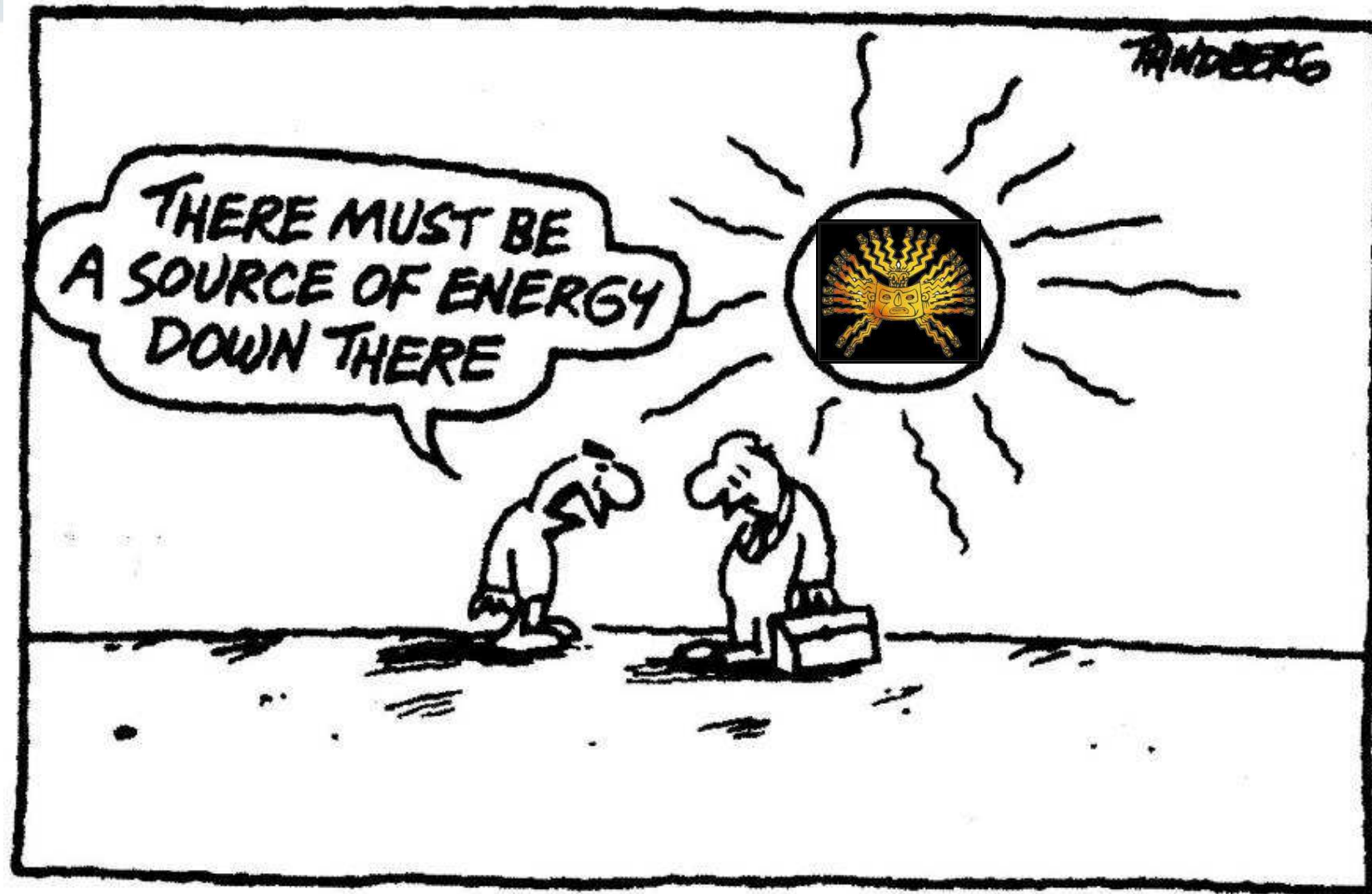


- A deep change in the building sector
- New technologies and new design (Enveloppes, Renewable, Heat pumps, inertia and storage)
- Towards new industrialisation schemes

Building and Sun: a winning team

The Armadillo Box: n° 4 at Solar Decathlon 2010





Jean-Pierre JOLY

- El señor Jean-Pierre Joly es diplomado del Instituto Nacional Politécnico de Grenoble en Francia (PHELMA) y doctorado en ingeniería de la Universidad Joseph Fourier de la misma ciudad. Es presidente del Instituto Nacional de Energía Solar de Francia (INES) desde 2009 y director de investigación en la Comisión para la Energía Atómica y las Energías Alternativas (CEA). Se dedicó en investigar en el campo de las energías solares en varios laboratorios e instituciones francesas (CEA, INES, LITEN, CEA LETI). Se destacó, en particular, por sus trabajos sobre materiales semiconductores y sus usos en las técnicas fotovoltaicas.
- Contacto : jean-pierre.joly@cea.fr
- El INES ha sido fundido en el 2006 con destino de hacerse el centro francés y europeo de referencia en el campo de la energía solar. Abarca hoy más de 350 investigadores, y seguirá creciendo durante los próximos años.
- Se ubica en el polo *Savoie Technolac* en Chambéry, Francia.
- Mayor Información en <http://www.ines-solaire.org/>



La Corporación Andina de Fomento y la Cooperación Regional para los Países Andinos dan las gracias a los expositores por haber compartido su peritaje, al público por su presencia y a todas las personas que trabajaron para que este acontecimiento tuviera el éxito que conoció.

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