



ecee 2007  
Summer Study  
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# HabitEnergy

**Success factors in the construction  
of very low-energy housing:  
the weight of stakeholder relationship  
and of household practices**  
*A survey in three European countries*

Véronique Beillan  
EDF Research &  
Development  
ICAME Development

Daniela Sanna  
Alphéeis

Emmanuelle Cayre  
EDF Research &  
Development  
ENERBAT Development



# Context and Objectives

**Very low-energy consumption buildings  
Single-family housing => decision-makers**

## **1/ Analyse the weight of:**

- **network of professional actors and relationship with final users**
- **motivation, practices and behaviour of final users...**  
**...for reaching energy efficiency targets**

## **2/ Compare issues and results:**

- **3 different Countries: France, Germany, Switzerland**



## **3/ Share knowledge and feedback:**

- **Which support and which follow-up actions for boosting actors throughout the project process (from decision to exploiting)?**



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# Actions

**18 months: September 2006 - February 2008**

**1/ Study of historical evolution of the energy efficient buildings development**

**2/ Socio-economic perspective of drivers and practices of actors in moving toward energy efficient buildings**

**3/ Comparison of energy efficiency labels for building in the 3 Countries**

**4/ Technical analysis of a pool of projects and on-site survey of key-actors of these projects**

**5/ Set-up of practical recommendations for boosting the sector**



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# The energy efficiency targets: the national labels comparison

3 Countries: 3 labels, 3 energy targets  
defined by a similar expression of energy consumptions in  $x \text{ kWh/m}^2$

- Which kWh? “Useful”, “Final” or “Primary” Energy?

If primary, which conversion factors?

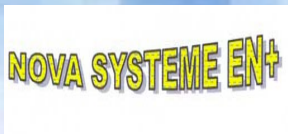
- Which floor area ?

Internal or external dimensions?

- Which energy end-use purposes are taken into account?

Heating, hot domestic water, ventilation, lighting, other domestic appliances?

- Which is the influence of the calculation method?



# The energy efficiency targets: the national labels comparison

The energy efficient targets are different...

Label	Passivhaus (Germany)	Minergie (Switzerland)	BBC (France)
Requirement	<p>Heating Useful Energy max: 15 kWh<sub>eu</sub>/m<sup>2</sup></p> <p>Consumption max: 120 kWh<sub>ep</sub>/m<sup>2</sup></p>	<p>Consumption max for heating and domestic hot water heating: 42 kWh<sub>ep</sub>/m<sup>2</sup></p>	<p>Consumption max for lighting, heating and domestic hot water heating (auxiliaries included): 50 kWh<sub>ep</sub>/m<sup>2</sup></p>
Ef/Ep Conversion factors	<p>Electricity: 2,7</p> <p>Wood: 0,2</p> <p>Fossil: 1,1</p>	<p>Electricity: 2</p> <p>Wood: 0,75</p> <p>Fossil: 1,0</p>	<p>Electricity: 2,58</p> <p>Wood: 0,6</p> <p>Fossil: 1,0</p>

**Useful energy:** energy needs of building

**Final energy:** energy supplied and used

**Primary energy:** it takes into account the energy used for the production and the transport of final energy

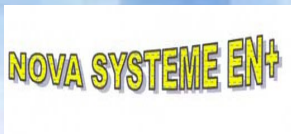


# Common potential mistakes: comparison between German and French calculation

Example for a house: 135 m<sup>2</sup> "leaving surface"

	Germany	France
<b>Reference Floor Area</b>	<b>132 m<sup>2</sup></b>	<b>149,1 m<sup>2</sup></b>
<b>Results without correction</b>	<b>24,14</b> <i>all uses</i>	<b>24,41</b> <i>(heating, domestic hot water, auxiliaries, ventilation, lighting)</i>
<b>Results with correction</b>		
<i>Reference Floor Area</i>	<b>149,1 m<sup>2</sup></b>	<b>149,1 m<sup>2</sup></b>
<i>Final Energy kWh<sub>ef</sub>/m<sup>2</sup></i>	<b>9,6</b> <i>(heating, domestic hot water, auxiliaries, ventilation, lighting)</i>	<b>24,41</b> <i>(heating, domestic hot water, auxiliaries, ventilation, lighting)</i>





# Projects pool analysis (1)

- **18 Buildings have been identified** (built between 1997 and 2007)
  - 7 Passivhaus in Germany
  - 6 Minergie in Switzerland
  - 5 energy efficient building in France





# Projects pool analysis (2)

## Some main selection criteria

- Certificated operation
- Geographical variety
- Key-actors variety
- Sources availability for on-site survey
- Thermal studies and energy receipts availability
- Envelop and HVAC systems variety
- Household variety
- ...

## Technical sheet for each project

- Actors involved
- General data
- Climatic data
- Building description
- Energy consumption data
- HVAC description
- Financial issues

**PRÉSENTATION DE L'OPÉRATION**

Nom de l'opération: Passivhaus à Ulm  
 Année de construction: 2004  
 Ville: Ulm nombre habitants: 120000  
 Pays: Allemagne  
 localisation:  zone rurale  centre ville  périphérie  
 Promoteur: Casa Nova  
 propriétaire:  
 email:

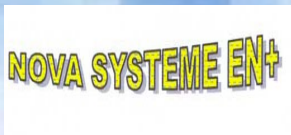


**PRÉSENTATION DE L'OPÉRATION**

Nom de l'opération: Maison Rimbaut  
 Année de construction: 2004  
 Ville: Saint-Simon nombre habitants:  
 Pays: France  
 localisation:  zone rurale  centre ville  périphérie  
 Promoteur:  
 propriétaire:  
 email:  
 téléphone:  
 Architecte: Simon Teyssou  
 BET:  
 autres intervenants/acteurs clés:  
 Existence d'une démarche (label/certification):  Passivhaus  Minergie  Autres  
 disponibilité de sources/contacts:  oui  non accord du propriétaire:  oui  non  
 disponibilité de factures énergétiques:  oui  non disponibilité d'études thermiques:  oui  non  
 type de maison:  standard  moyen  haut de gamme  
 suivi interne: contacté le 30/01/07; OK reconstruit le 14/01/07; OK pour rdv (fin mars-début avril)  
 rdv fixé le 4 avril 2007 à 11h30

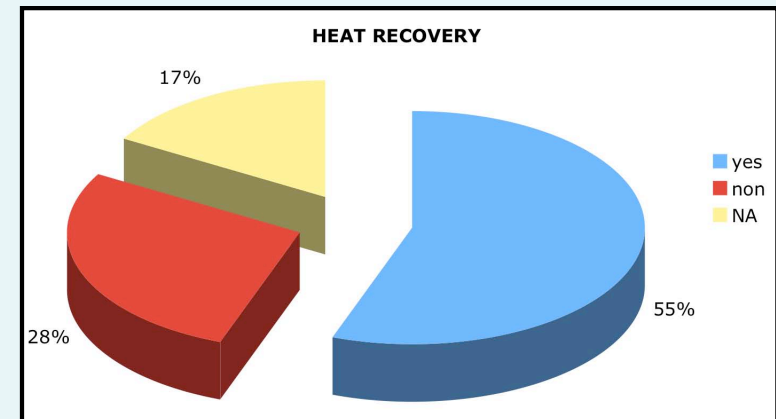
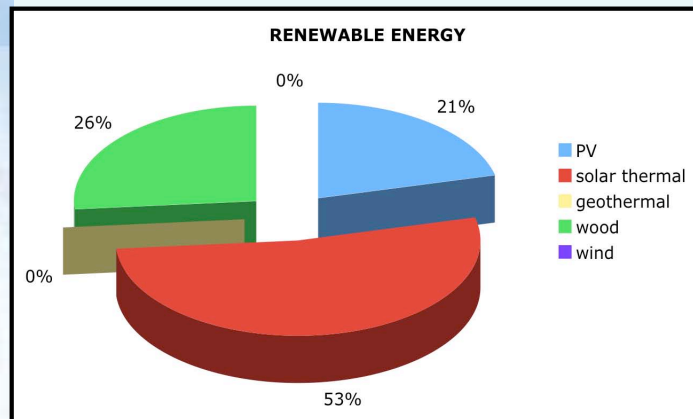
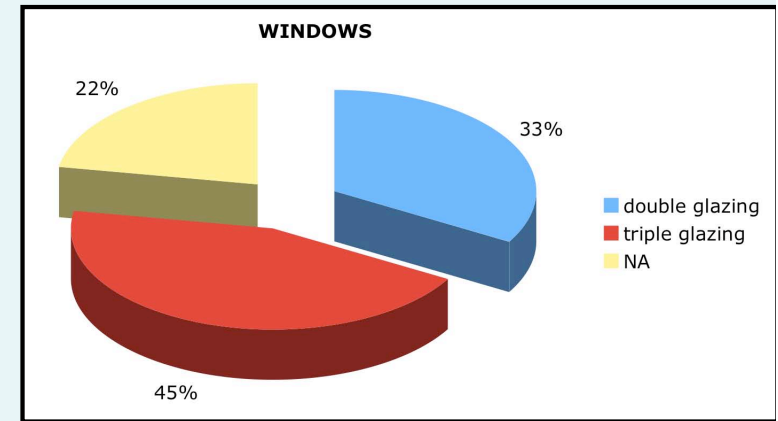
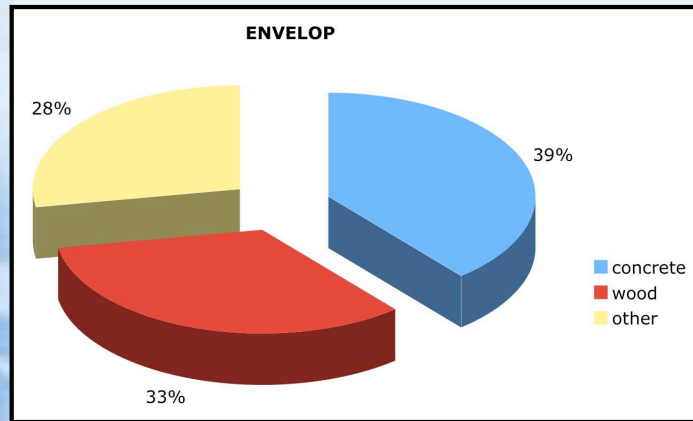


**Présentation générale**  
 Maison individuelle à Saint-Simon (1047 hab) en Auvergne (Cantal-15) implantée au sommet d'une vaste parcelle isolée à 7 Km du centre ville d'Aurillac.  
 Le système en éléments préfabriqués bois a permis de réaliser le montage de la maison en 20 jours.  
 Part d'auto-construction.  
 Les études thermiques n'ont pas été réalisées.



# Projects pool analysis (3)

## Summing up of some main issues of projects pool





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# On-site survey: the objectives

- ❑ On-site survey among final users and professional actors
- ❑ A qualitative, geographical and compared approach
  - Interviews with owners (decision-makers)...
  - ...& Interviews with professional actors involved in the building construction
- Two main objectives:
  - to understand the weight of technical, management and sociological factors in the development of low energy consumption housing
  - to work on the link between the **demand** and the offer sides

**Retracing the network of the offer and identifying the factors that may be a threat or an opportunity to link the offer and the demand sides**



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# On-site survey of the stakeholders: the Owners

## □ Interviews focus (18) on 4 main themes:

- Motivation of the households to live in this type of building
- Decision-making process of the households and implementation steps of the project
- If any, specific domestic practices associated with living in "low-energy housing"
- Satisfaction degree regarding this type of building



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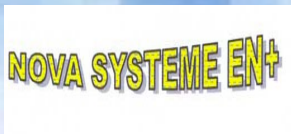


# On-site survey of the stakeholders: the key-actors

□ **The survey with the key-actors: professionals or any other actor identified in the interviews with the owners**

□ **Interviews focus on:**

- The reasons for their involvement in this kind of project
- Their opinions concerning management, regulatory and financial factors that are a threat or an opportunity for a project
- The factors allowing the improvement of the professional network and the wide dissemination of these projects
- The recommendations that they give to better exploit these buildings



# Some first results

## □ Historical review in the 3 Countries...

- Impact of major societal events
- Different speed in evolution of regulatory environment
- Different level of public and mainly of **private incentives** (subsidies, tax reductions, preferential interest rate...)
- Different implementation of **voluntary initiative of market players** (e.g. certification labels)

## □ On-site survey of owners...

### **Before...decision-making**

- Professional feedback of owner: it may play a role, but it's not very relevant
- The architect: he has a key-role in decision-making process and in implementation of the project
- Some cultural threats: many doubts about ventilation issues...

### **During...design and implementation**

- Big threat: the lack of local offer in specific energy efficient solutions

### **After...living**

- Degree of satisfaction: in general, it's high, but some more daily efforts to do in living...
- Success factor: the strong will of owners on environmental issues