



Deployment of thermal retrofit innovations:
Energy efficiency strategy in housing and action on fuel poverty in France

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Energy Retrofit needs dialogue among three world views

- **First view : current paradigm, a trend to maximise energy performance**
 - It has been supported by engineering societies such as Negawatt members
 - this approach supports the idea that
 - ↪ all possible technical solutions should be implemented
 - ↪ building energy consumption has to and may be cut by 3/4 from now on

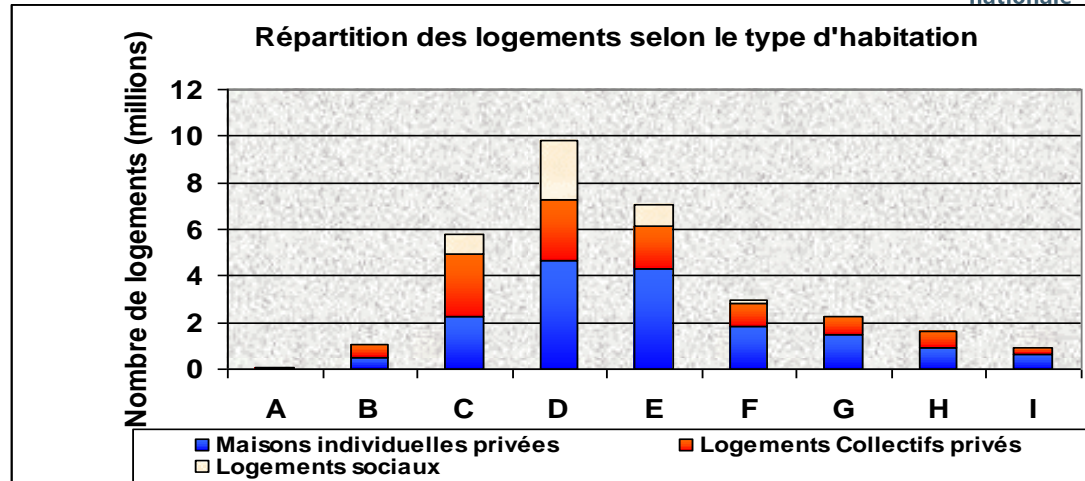
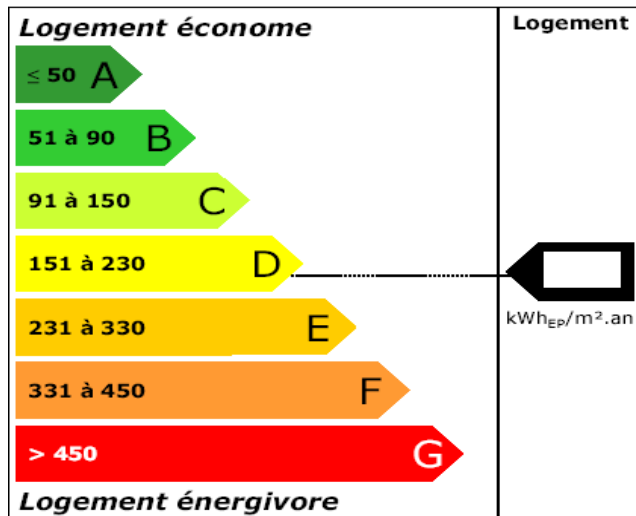
- **Second view : Industrial strategies – can they produce a suitable response ?**
 - Energy operators or utility companies try to promote corporate networking among craftsmen and contractors
 - Industry has experienced strong development with vertical integration
 - It seems to be more difficult to develop horizontal Integration

- **Third view : Does development of local economic sectors offer an effective entry ?**
 - Four territorial levels in France, Région, Département, Intercommunalités and Communes
 - Promotion of local jobs becomes a more and more important aim
 - This includes promotion of bio-based materials

What have we learned about energy efficiency demand in existing housing since 1973 ?

- Private housing (unprofessional decision-makers) constitute 90% of energy retrofit demand
 - Public housing institutions represent about 10% of the market demand
- Key factors of retrofit energy demand are not technical
 - Among household budget, energy retrofit has to face severe competition from mass market motor industry, audiovisual, leisure, health ...
 - ↪ Mass marketing enables greater sales effectiveness
 - A lot of concerns may incorporate high impacts on thermal performance : repairs, embellishment, cosiness, thermal confort, decoration
 - ↪ Energy efficiency constitute less than half of energy retrofit motivating factors
 - ↪ Home Improvment (e.g decorating) when buying house reduce the cost of wall insulation to a small amount

Energy performances of 2008 Housing Stock in France



Source Anah Julien Marchal 2008

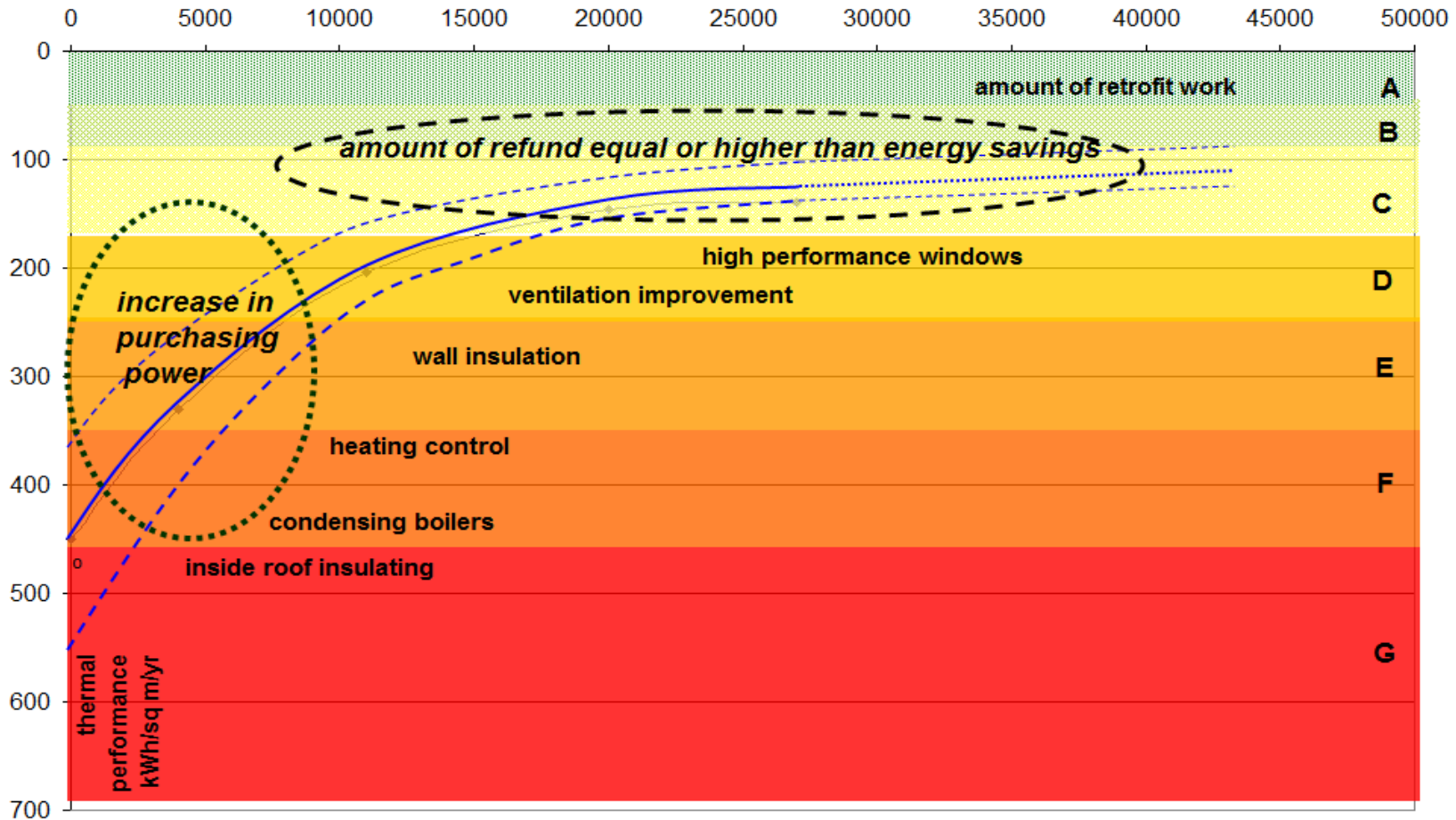
Methodology of Diagnosis of Energy Performance-DEP-(Home Energy Certificate in France) allows our approach of energy performance

- ~ DEP are mandatory since July 2007 over real estate transactions
- ~ The DEP scale (from A to G) might usefully be completed by H > 600 et I > 800

Main lessons about energy performance

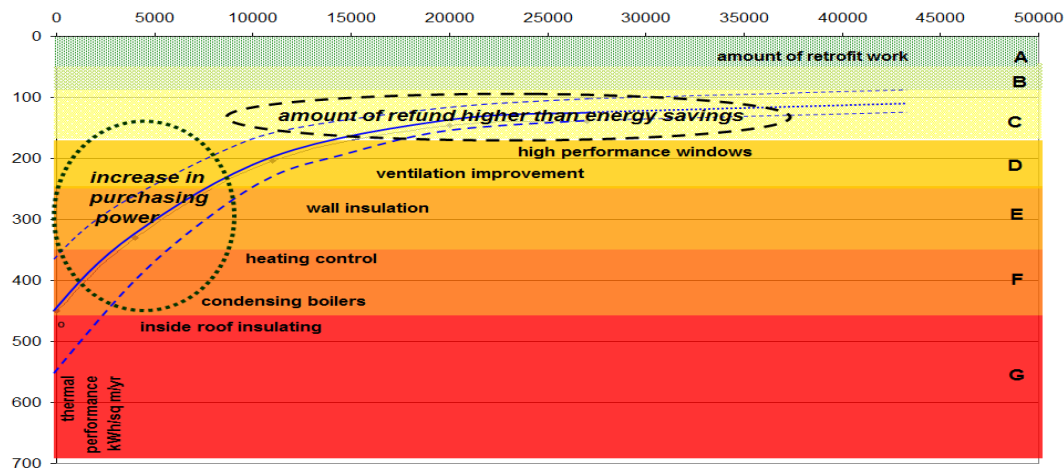
- Energy performance is very uneven (from 50 to 800 kWh/sq m/y ~1 to 16)
- Single family houses are the worst performing
- Class F or G dwellings should be renovated first
 - ~ Benefit four times greater for F or G dwellings
 - 500 kWh/sq m/year → 150 kWh/sq m/year = 350 kWh/sq m/year benefit
 - 240 kWh/sq m/year → 150 kWh/sq m/year = 90 kWh/sq m/year benefit

Incremental costs of retrofit and energy performances for a typical single-family house



A ground floor single family house built in 1970 near Orléans heated by natural gas. No improvement since 1970.

Diminishing returns



- Amount of retrofit work between 0 and 10 000 euros/house → Household's purchasing power increases significantly, even with the current energy prices
- Amount of retrofit work more than 15 000 euros/house → incremental amount of refund may be equal or higher than energy savings
- Energy prices will have to grow at a much higher level to make profitable energy consumption cut by 3/4
- But reduced incremental costs and higher returns :
 - When people buy an old or unsafe house, wall inside repairs may be needed and incremental cost of wall insulation are very low
 - When old windows or boilers have to be replaced

Strengths and weaknesses of industry and trade :

- **Increase in insulating materials and heating systems technical performances**
 - market surveys show performances increases (Ademe 2006, 2008, 2010, 2011, 2013)
- **Retrofit market increase slower than GDP increase in France (source CAH)**
 - plentiful sales forces (several ten thousands self employed craftsmen) have to be used by materials and systems industries
 - the relationship with the final customer remains poorly controlled
- **Vertical integration strategies**
 - They may improve the relationships between industry and craftsmen and between craftsmen and final customers
 - ↪ Best known are –Lapeyre, K par K – windows, Engie Home services- Heating
 - They maintain disconnection between business areas such as insulation and heating systems
- **Horizontal integration strategies**
 - Seems to be more efficient from a civil engineering technical point of view
 - Few companies have been experiencing these strategies and their growth seems to be slow

Operating results achievements and limitations

■ Global retrofit growth is not established

- 100 000 global retrofits per year (one shot)
- Plus 200 000 global retrofits per year undertaken over several years
- Average amount of retrofit remains lower than expected

■ Partial retrofits (heating only, insulation only)

- they are very common : 2 000 000 dwellings per year

■ Inside walls retrofit activity remains very low

- Difficult except when buying an old house
- Good situation of real estate may help energy retrofit activity

■ External thermal insulation as an emerging sector

- But not in old districts

■ Several sectors might remain sidelined

- Dwellings where poor people are living
- Dwellings which remain out of the market (unsafe, with older persons living, ..)
- Collective private building because energy retrofits would require collective decisions

Habiter Mieux Anah Program

- Anah seeks partnership with local authorities in order to
 - Identify households subject to fuel poverty
 - Provide technical and social advice towards operations with tangible results
 - ↪ Performance improvement must be 25% minimum and average is 40% improvement

- Learning curve between 5 and 10 years
 - We have experimented our knowledge since 2008
 - Difficult starting phase in 2011 – 2012 has been slow (with 20% to 40% of the objectives achieved)
 - The program was boosted in 2013, with greater support and expanding of the target population
 - We have achieved the 50 000 target since 2014
 - 2016 target increased to 70 000, 2017 target should be increased to 100 000
 - ↪ We are now learning how to improve energy efficiency in private collective buildings

- HM program helps to achieve more efficient commercial relationships
 - Craftsmen have to speak with social and technical advisers
 - Heating and Insulation Craftsmen have to work together

Developping synergies requires dialogue, among industry and trade, craftsmen, architects, local authorities and private persons

- It seems difficult to avoid long training periods
 - Public programs for residential renovation may take several years before being efficient
 - ↪ five years (national policy)
 - ↪ two years (local policy)
 - Vertical integration learning period could be around fifteen to twenty years
 - Horizontal integration seems to be very difficult to reach
- There is little chance of damaging competition between diverse strategies
 - Because potential markets are very important
- Technical and social support by local authorities and Anah
 - May help to stimulate and boost market participants
- There is a large potential for cross fertilization
 - This requires to learn how to work together
 - In order to offer a better answer to final customers