MORE-CONNECT

Development and advanced prefabrication of innovative, multifunctional building envelope elements for MOdular RETrofitting and smart CONNECtions

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MORE-CONNECT:
solving barriers to come to deep (NZEB) retrofitting

• European building sector is fragmented and not able to offer holistic, integral solutions for nZEB deep renovation toward nearly Zero Energy Building (nZEB) for reasonable costs and good quality

• European building process is based on a ‘layered’ structure:
  – many labour actions on the buildings site
  – many sub disciplines involved
  – leading to extra costs and failure risks

• European building market is top down and supply driven: mismatch between the offered products and the end-user's needs and the affordability

• Due to long-lasting renovation process and failures risks customers hesitate to renovate their property

• High operating costs are still more acceptable for owners-residences than deep renovation with low exploitation/ energy costs

• Faster and quality guaranteed renovation solutions needed.
MORE-CONNECT: challenge and solution

- Deep retrofitting by using *prefabricated multifunctional* renovation elements which have the potential to:
  - reduce costs
  - reduce the renovation time and disturbance for occupants
  - enhance *quality and performances*
    - energy efficiency
    - indoor climate

- The *challenge* of MORE-CONNECT is to make a major step forwards by a combination of:
  - product innovation,
  - process innovation
  - innovative market approach
  - in a process of cost and quality optimization
  - driven by motivated and innovation-driven **SME’s**.

- **Why SME’s?**
  - Large building companies are very traditional and have no specific economic interest in this transition
  - Transformation in building practice will be initiated by motivated innovative SME’s, combined with production-line-design specific experience
The four qualitative MORE-CONNECT objectives

1. **The development of cost optimal deep renovation solutions towards nZEB concepts with the possibility of extra customize (cost-effective) features**
   - Development of optimal configurations of energy efficiency and renewable energy systems, as one of the quantitative objectives is the offering of nZEB renovation concepts.
   - Concepts will be preselected in balance between demand reduction and renewable production,
   - Most optimal mix within the range of term ‘nearly’ in Nearly Zero Energy.

2. **The development and demonstration of prefabricated multifunctional modular renovation elements in series of 1 concepts, in a mass production process**
   - Development and demonstration of a platform for prefabricated, multifunctional renovation elements for the total building envelope (facade and roof) and installation/building services.
   - These elements can be combined, selected and configured by the end-user, based on his specific needs.
   - The configuration can be made on the basis of a pre-selection of elements, based on the specific properties and measures of his home inventoried by advanced geomatics with various aesthetic and architectonic appearances.
   - As input into advanced Building Information Modelling systems it can control and steer the further production process of these elements.

3. **The development and demonstration of new fully automated production lines for multifunctional modular renovation elements**
   - Development of new designed automated production lines supporting a line production that is effective on series-1 as well as large series
   - Demonstrated that a model for one common platform for a fully automated production line can be used in different geo-clusters

4. **The offering of a one-stop-shop to the end-user to renovate their homes**
   - End-user will deal with only one party, responsible for the total renovation, starting from an inventory of the existing situation, inventory of specific end-user demands, translation into modular renovation kits, mounting and installing, financing and aftercare
   - Limiting the actual renovation time on site to a maximum of 5 days with a goal for an average of two days, including the complete or partial removal of the existing facades and roofs or other elements
The six quantitative MORE-CONNECT objectives

1. Deep renovation toward NZEB, with a basic reduction of the primary energy consumption by at least 80% compared to the original consumption.

2. New fully automated production lines with a cost/output optimization leading to >35% improvement compared to the traditional construction realization process.

3. Construction site workload reduced to less than 10% of the total workload of a retrofit compared to traditionally more than 50%.

4. Total installing time on site of with a maximum of 5 days with a final goal of 2 days.

5. Return of investment of less than 8 years for the end-user.

6. Construction failure costs reduced to less than 5% compared to the traditional 15 to 20%.
The MORE-CONNECT pillars

**Product innovation**
- Modular façade elements
- Modular roof elements
- Modular ‘engines’

**Process innovation**
- Advanced geomatics to make inventories and gauging of buildings and buildings stock.
- Web-based and/or digital decision tools will link building characteristics, building (energy) potentials, end-users demands to program requirements, technical solutions, component combinations in concepts, production automation.
- This will be processed in BIM systems for the steering of industrial processes and for enhanced quality assurance.

**Optimization** between costs, environmental aspects and quality
- Integration of components and systems
- Re-design
- Smart connectors

**Based on NZE concepts <> perception of end-user**
Perception of end-user

• End user has three basic questions:
  – *What do I get?*
  – *What does it cost?*
  – *And what does it gain to me?*

• How does MORE-CONNECT respond to this?
  – Development of a **one stop shop concept**
    • Offered as an ‘advanced energy service’
    • User can make his own renovation configuration
    • User can add extra qualities / options
    • End-user deals with only one party, responsible for total renovation, inventory, mounting, installing, financing, after care and performance guarantee

  – Development of a system of performance guarantee
    • In production process
    • In practice (‘remote diagnostics’)

  – Development of energy cost guarantee proposition to end-users
Customers are able to make their own choices and configurations!
Achterzijde

Delen op Facebook

Vorige  Volgende
MORE-CONNECT technical developments

- Modular façade elements
- Modular roof elements
- Modular ‘engines’
....which one is more expensive?

~ € 900

~ € 25,000
MORE-CONNECT solution: prefab modular ‘engine’ for retrofitting

• Combining heating, ventilation, DHW, storage, PV inverters etc. in one compact platform
• Version 1.0: combination of existing components
• Version 2.0: redesigned components, 35% more compact and lighter
....making the engine 1.0 (still ‘hand-made’)
...placing the engine on/in the (integrated PV) roof
New development and redesign engine (2.0)

CO2 controlled MVHR
Storage
Heat pump
PV

Optional:
Solar thermal
PCM storage
E-storage
(DC?)

Plug & Play
Maintenance and repair off site
Scalable up/down
Ventilation: two options for prefab retrofitting

• In the engine: Central MVHR, CO2 controlled

• In the façade elements: Decentral combined with radiator or convector
  – MVHR, CO2 controlled (standard in living room)
  – Mechanical supply (optional for bedrooms)
MORE-CONNECT approach:  
one philosophy – different solutions for several geoclusters

- **Geo-cluster 1: Northern.**  
  - NZE renovation concepts for post-war multifamily dwellings in Denmark.

- **Geo-cluster 2: Continental Northern East.**  
  - Focusing on a collaboration between Estonia and Latvia. Focus on application of prefabricated products for typical post-war Soviet multifamily buildings.

- **Geo-cluster 3: Continental Centre.**  
  - Focusing on Czech Republic on solutions for continental climates.

- **Geo-cluster 5: Mediterranean.**  
  - Focusing on solutions for mild and warmer climates, with a pilot for the Portuguese market.

- **Geo-cluster 6: Western Central.**  
  - Focuses on modular prefab concepts for mass built single houses (50’s – 70’s) for the Dutch/Belgium markets.

- Reflected in the consortium: one ‘research partner’ (university or SME with research capacities) with one or two (SME) industrial partners.
MORE-CONNECT pilots

< Denmark

Estonia > Latvia >

< The Netherlands

Czech Republic >

< Portugal
## The MORE-CONNECT consortium

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