

## Large scale deep renovation with performance guarantee – the Dutch Energy Jump model

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### Lessons for SMEs:

- The use of pre-fabricated technologies in the field of energy efficient renovation is in a pilot phase in the Netherlands, but SMEs are still suggested to join the programme as soon as possible, as adaptation for future needs takes time and joining the programme reduces the future costs of education.
- Large scale industrialised solutions for streamlined renovation projects that will become increasingly more common require adaptation from SMEs. As industrialised solutions are less labour, but more technology intensive, SMEs may have a smaller role in manufacturing, but needs to have more educated workforce. On the other hand SMEs may develop new skills as intermediaries in the value chain, like franchise partners of one-stop shop selling points, energy consultants, financial advisors.

### The storyline

Energy Jump is a Dutch programme focusing on creating energy neutral buildings by means of energy efficient retrofitting of residential units, public buildings and offices. The deep renovation on the one hand intends to minimize energy need for heating and cooling, while the installation of renewable energy sources ensures energy provision (for e.g. housing appliances). Due to the interventions a very low amount of energy is needed in the winter, while the buildings provide energy to the network in the summer.

The programme was initiated by the Ministry of the Interior and Kingdom Relations, which commissioned Platform31 (a Dutch knowledge and networking organization for urban and regional development) to generate and accelerate the local projects until the end of 2016. The core of the programme is the use of pre-fabricated, industrialised technology, which allows the implementation of a complete renovation in a matter of days, without having to move out the residents.

The main financial consideration behind the programme is the assumption that about 30 years' energy bill is enough to finance the intervention, thus if the energy fee is used for loan instalments rather than for paying the energy itself, high quality energy neutral homes can be created.

The pilot phase of the programme was between 2012-2015 (from the 1<sup>st</sup> of January 2016 it was planned that everyone can "purchase the upgrade" in 7 one stop shop points) in which social rental units were renovated in dozens of locations throughout the Netherlands. There were local calls announced by the final beneficiaries, in which local manufacturers participated.

The programme provides process support throughout financing Platform31, but direct financial support for the project implementation is quite rare (although several local municipalities provided financial help for the implementation as well). Corporations like Portal, Lefier, Woonwaard, City Lander, Tiwos, Housing Limburg (and 32 more) were the final beneficiaries, and contractors like Volker Wessels, BAM, Ballast Nedam and Dura Vermeer were the implementers. 253 dwellings were renovated by the end of 2015 and 8,285 more were on the pipeline, but the goal is to renovate 100,000 more social rental homes in the coming years.

In this pilot phase even the social rental organisations were cautious, thus they tried different technical solutions on a limited number of buildings. Besides social rentals, only 5 owner occupied multi-family buildings volunteered for the project; however, Platform31 is currently in negotiation with a block consisting of 220 privately owned flats.

### The market segment:

Most of the buildings that were renovated in the project were row houses. In many cases only some parts of the building, and not the whole block, was picked for renovation.

As the product is in a pilot phase, the renovations were carried out among social housing companies. Social housing companies seemed to optimal objects for several reasons:

- They mostly have a long term vision concerning the state of their buildings, thus they are able to think decades ahead.
- They already accumulated funds for major renovations that can be used as down-payment for commercial loans. Consequently, social housing companies are more creditworthy and can obtain favourable conditions at commercial banks or at the Social Housing Guarantee Fund.
- The state of the buildings (at least in the case of social housing companies that participated in the pilot phase so far) is poor, thus major renovation would be needed at any rate, therefore the energy neutral level of renovation is “just” an addition. Investment into energy efficiency adds an element of renovation with a pay-back potential.
- Social housing companies can transfer most of the costs of investments to the tenants by increasing the rents or creating an energy performance fee. However, the energy bill after the intervention should be close to zero. (Meanwhile in some European countries the housing companies are legally prohibited to transfer the cost of renovation to the tenants, which is why they are not interested in implementing deep renovation.)
- By means of large scale renovation social housing companies can make the less attractive part of their stock attractive again, and thus increase their marketability.

Owner occupied multi-unit buildings expressed limited interest in the pilot phase, which is understandable taking into account the following factors:

- The unit costs are higher in the pilot phase than it is expected to be on the long run, and private owners are more price sensitive than big housing companies.
- Private owners rarely consider very long term outcomes (like 30 years), and prefer interventions with a shorter pay-off period. Private owners do not know how long they live in a certain flat, thus they are less likely to undertake long term obligations.
- It is quite usual to get an individual mortgage for purchasing a housing unit, but less usual to get one for renovation, mainly it is used for the common spaces like the façade or the roof. In addition to that there are few bank loan products that take into account the predicted increase in the value of the dwelling because of the intervention, thus the loan to value ratio can be a restricting factor, especially if the dwelling was already purchased with a mortgage loan.

In order to encourage the involvement of private owners, new financial schemes should be introduced, similar to the ones that already exist in Central European countries. In these cases, it is not the individuals but the home owners' association that takes a renovation loan, which is financed in instalments each month from the collected common fees. By this mean not only the current owners but also the future owners can take the financial burden for an extensive investment that has long term impact. This loan scheme is under formation now and may take years to be widely used. Besides these financial schemes it is important to reduce the renovation costs in order to provide an attractive offer for private home owners. Furthermore, a new chain of intermediaries (agencies, municipalities, banks, energy cooperatives, surveying associations, retrofit shops) has to be created.

The main strategy behind the programme is to pilot the product in the social rental sector, and after it proves to be successful, it will be easier to introduce it in the private market segment.

#### **The product (value proposition):**

The product is deep renovation which results in energy neutral homes (“Zero on the Meter”).

- Technically the product contains newly installed additional envelop (façade, roofs), new ventilation, new engineering and the installation of renewable energy sources. In addition, most of the interventions contain elements that do not have energy efficiency factors, like the installation of a new bathroom or kitchen.
- Pre-fabricated technical solutions are used, which allows the completion of the whole intervention within 10 days on the site, without the residents having to move out. Only approximately 5% of the work is done on the location.
- 30 years performance warranty is attached to the product; this does not automatically mean that the pay-off period is 30 years, but the financial calculations are based on this time period.

It is estimated that the price of the interventions should be about € 60,000 (including a kitchen and a bathroom, or € 40-45,000 without that), but at the end of 2014 it was typically € 70,000 + €10,000 for removing the asbestos, which was necessary in many cases. Thus a lot of work has to be done to reduce the unit price, although it is important to note that the costs seem to be lot lower in the case of high rise buildings than for row houses. Nevertheless, the model is technically developed – and therefore better suited - for terraced houses built in 1950-1980. These are generally poorly insulated, and the

increase in their quality may affect a very large group of residents. In the future, the technical solutions should obviously be adapted for a greater variety of house types.

The costs of interventions are covered by the reserves of the social housing corporations and the loans they take either from commercial banks or from funds of social housing organisations. In the case of private buildings, the owners themselves took individual mortgages. As was mentioned before, the subsidies aim mostly to finance the coordination and technical assistance of the programme, thus most of the interventions are implemented at a market cost level.

There are several tricks to make this complicated product more attractive:

- Not only energy savings but additional comfort benefits are sold (e.g. additional kitchens, bathrooms, new outlook of the building, etc.) A purely energy based project would not work as energy savings on the long run are not attractive compared to the high upfront costs they incur.
- Residents got 3D glasses to see how the investment would look like in order to create emotional attachment to the project. During the programme the implementers learned that the original prototypes must be improved as people look for better quality (nicer outlook).
- The technical implementation was quick, and required minimal on-site work. (This is why prefabricated technology was used in most cases.)
- The high level (depth) of the intervention allows for providing a long term guarantee of energy performance, as no technical uncertainties can endanger the results. (Thus the goal is “zero on the meter”.)
- Dutch row houses have quite similar architectural characteristics (or at least they can be categorized into concrete types), which makes it relatively cost efficient to develop industrialized technologies for them. (Nonetheless, the location of windows, doors etc. can be somewhat different in each building, thus it needs to be customized.)
- Even in the pilot phase there were attempts to decide in advance which components are needed in most of the interventions, thus the manufacturers could buy them in a greater number, resulting in economies of scale (discount prices).
- There is very strong marketing, promotion and image building behind the programme. The steps are carefully documented, there are many videos and information materials on the main and sub-websites of the programme, and the media coverage is strong as well.

In spite of the technological successes of the pilot phase, the main barrier that still has to be overcome is the switch from manually oriented production to pre-fabrication. There is still little experience on how to run pre-fabricated construction. There is a lack of experienced construction companies, manufacturers, and skilled workers. Big companies may have the innovation potential, the research capacity and the needed funding to step into this market, but even for them the Dutch market does not seem to be large enough to be attractive; evidence is still insufficient as to whether it is worth doing - or rather, how can it be worth doing. In order to break this vicious circle Platform31 promotes the idea of Energy Jump in the UK and France, where the social housing stock is also significant, and can provide a high number of pilot buildings. In addition, the process should be further streamlined and standardised in order to reduce unit costs. Besides, changes are needed in the legal and financial background (e.g. government guarantees, building regulations) in order to upscale the programme.

The experts of Platform31, the agency managing the Energy Jump project, believe that prefabrication in energy efficient retrofitting is an obvious next step with the improvement of analytical (e.g. laser scanning) and technical opportunities (e.g. 3D printing of walls); the only question is when and how can the process be accelerated on the one hand, and how can the actors prepare for it on the other.

Small and medium sized companies may not have a role in producing the pre-fabricated elements (except for the small scale ones), but may still play a role in managing the process and assembling the elements on-site. However, on the long run the industrialisation requires adaptation from SMEs as well. Industrialised technologies are less labour intensive but more technology intensive. Thus SMEs need less, but more skilled work force for completing one project; however, as the volume of work can increase with the growing number of projects the overall workload can increase as well. In addition, SMEs may develop new skills and enter the value chain not as implementers but as intermediaries (e.g. energy consultancy, marketing, customer relations).

The details of the programme can be found at: <http://energiesprong.nl>