

Drivers and barriers for large scale retrofitting in the Netherlands

And the role of Climate-KIC

Towards 200.000 energy neutral retrofits per year. A learning journey in the Dutch building sector learns deep retrofit will accelerate when five conditions are met: new legislation frame, start local energy plans, industrial technical innovation, chain collaboration in the sector and new financial arrangements. All in alignment with the aim to realize Energy Neutral Built Environment in 2050.

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Introduction

Climate-KIC wants to target more effectively the Energy Neutral Built Environment in 2050. Enabling and creating new business opportunities in the field of deep retrofitting is expected to contribute to that.

Climate-KIC aims to facilitate this process of acceleration in the sector. As input for further development of activities, Climate-KIC wants to define necessary principles, validated by up-to-date market information. This report reflects the findings of a learning journey investigating the deep retrofit challenge at a sector level.

Desired results

The objective of the project is to identify the main opportunities and barriers for large scale retrofitting in the Netherlands. We want to find stakeholders drive as well as the desired market conditions for acceleration towards energy neutral solutions. A set of principles as a starting point for a new Climate-KIC program will be elaborated. By doing so, this work aims to contribute to the desired market information Market Briefs of the Building Technology BTA Living Lab.

Approach

Elaborate and analyse interviews with ten persons in the sector: visionaries and key players, in order to explore their aims, opportunities and drives. Describe the current situation and possible appealing perspectives for different stakeholders and Climate-KIC in particular. A multi stakeholder workshop has been held in order to validate the findings.

Definition of the challenge



The overall target is realization of fossil free (CO2 Neutral) built environment in 2050.

This means retrofitting 200.000 dwellings per year in the Netherlands.

The question is if fast and trustable solutions will emerge from the building and installation sector, based on the present market conditions.



1 Key findings

1.1 Market situation

We did not find a broad sense of urgency to bring forth solutions, neither on the demand side nor on the supply side. Parties are waiting for the other to cross that bridge. We did not find any stakeholder taking leadership beyond its own circle of influence. As a result, there is no fundamental change, and the desired volumes of zero energy retrofitting are by far not met.

There is, however, a start with new concepts, new references and an increase of experience with energy neutral solutions in the market. This new type of experience seems to start mostly in smaller or new building contractors, some housing corporations and in local pilots where local energy plans are developed, facilitated by local governments. If conditions are set right, interviewees believe that an acceleration of energy neutral retrofit is possible.

The type of solutions we found, i.e. a variety of new concepts and already existing solutions, are all based on an integral industrial product principle. Most of the interviewees claim that this will be mainstream in the building sector in the next decades. The present market conditions will however not bring this type of innovation, all stakeholder claim, because the Dutch market on energy neutral retrofit is too small to ignite innovation. There is not enough future certainty in market developments in order to justify investments in new solutions and professional skills like industrial design. This holds for stakeholders like building contractors, building companies and suppliers, as well as housing corporations.

Zero Energy, Fossil Free, Carbon Neutral or "Nul-op-de-Meter" ("Net zero energy") are new concepts in the market. For example the "Stroomversnelling-program" gave a new impulse in specific markets with new Net Zero Energy propositions. Interviewees show that despite these new references and propositions, acceleration did not take place yet.

1.2 The situation from different stakeholders viewpoint

1. Housing corporations are in general willing to adapt to new proven solutions in the market, being "plug and play" solutions with a clear planning for maintenance, in order to avoid high risk. Keeping control over their maintenance plans is more important than experimenting, due to their statutory function providing affordable renting houses. "Buying" new types of retrofit integral solutions is not a natural thing to do.
2. Municipal governments aim at a fossil free built environment, and several of them are eager to show progress. But also, local governments are limited in tools and legal competences. This results in a general lack of continuous vision and leadership. Presently, new spatial planning laws are developed to tackle this.
3. The industrial suppliers have the capacity to innovate. Developing solutions for deep retrofitting is however strongly dependent on the belief and estimations of the directors and board, who are mostly multinational oriented. Industrial suppliers face the dilemma that new technology in the building sector is profitable only for high volumes and therefore needs market share in more than one country. Obviously, zero energy housing does not provide an interesting market volume yet.



4. The bigger, vested building contractors want to join the challenge, but are taking calculated risks in product and process development and its upscaling. As a consequence the level of ambition to take up a leading role in deep retrofitting is still quite low. Moreover, the building sector has a strong risk averse culture. Taking full responsibility for their own activities on the long term is not in their DNA. Building companies are project oriented instead of product oriented.
5. Medium sized building contractors seem to be better equipped to speed up innovation and new client propositions, and are more willing to explore new ways of collaboration with stakeholders and chain suppliers. Also they are more innovative in taking away inefficiencies at the building site, and have a better relation with the end client. We believe that this type of companies can make a difference.
6. Newcomers are rare. Most of the startups focus on specific elements within the solution, like new façade elements, new ventilation solutions etc. We did not find a lot of newcomers with an ambitious, integral focus. Factory Zero is an example of such a startup.
7. Integral solutions reduce the necessity for the traditionally strong role of the wholesaler. Innovative companies face difficulties in the business relation with their wholesaler when they make deals directly with product suppliers.
8. Innovation budgets (national or EU level) are not easily accessible or interesting for companies in the building sector. The conditions of programs (timing, required investments, etc) and effort versus success rate demotivates companies to use these budgets. This holds for all types of innovation budgets, as several interviewees claim.

2 Analysis

2.1 In general – being stuck

The traditional way of working in the building sector is a value chain of different suppliers, wholesalers, contractors, and subcontractors, different type of clients and financiers. Each stakeholder has another interest and another role. Co-operation is mainly based on assignment of contracts to building contractors with involvement of others (suppliers, installation sector etc.) through subcontracting. Co-operation is only seldom through co-creation of integral solutions in consortia of enterprises sharing responsibilities, risks and profits in a balanced way.

The building construction sector offers capacity, priced on working hours and materials. This way of organizing does not enable innovation like new industrial solutions with the desired energy performance towards end clients. Building contractors only optimize on lowest costs in the individual deals in the value chain, being project oriented and not product oriented. This is known to be a persistent culture in which the sector takes itself hostage.

Moreover, the government does not adequately facilitate a transition towards fast and cost effective solutions with a desired energy performance. The present policy on energy performance of the existing built environment insufficiently enables roadmaps to zero energy built environment, nor



imposes parties to align their activities towards zero energy solutions. One important example is the unclear national policy on phasing out natural gas.

2.2 In general- dawn of a new narrative

On the other hand, a new narrative is emerging. We found new references and different concepts in the market, and new types of companies started their activities with a drive to bring fundamental change. Moreover, there is an increase of the political support base to develop better laws and policies. An example is a shift on hand towards regional authorities being in charge of local energy plans, and a national government planning phasing out natural gas as the main energy resource for households. We believe this will definitely change the playing field in the building and construction sector, bringing new innovative business opportunities.

2.3 Company needs: large companies, SME's and start-ups

In this paragraph we zoom in on the specific types of companies, their role and needs to perform better in the collective challenge.

Larger building contractors like project developers play an important role in developing new buildings. Retrofit on industrial scale could have a place in their portfolio if the market presents higher volume targets and larger projects. Some of these bigger companies invested in gaining experience through the Stroomversnelling program, like Balast Nedam and BAM. A change towards product oriented market strategy will be necessary.

Smaller and medium sized contractors seem to be more flexible to introduce new solutions to clients, preferably based on lean product management and better chain (or consortium) collaboration. These type of companies would be better off with an easier accessible "license to operate" (certificates and standards), and access to bridge finance. Moreover, experiments and pilots, with field partners like municipalities, will enable these companies to develop skills and find the best value proposition. We consider local pilots therefore as important.

Startups, emerging from existing companies or from new entrepreneurs, could play an important role in developing new integral products and services in this sector. Startups in this field need, however, high investments upfront, and need a short time-to-market. Launching customers, incubators or other investors are necessary. Technical startups can generate better technology and processes but will need contractors to implement their solutions. An example is Factory Zero, who produces and delivers complete home makeovers. Another example is a new product oriented contractor like BIK Bouw ("Building in Chain Collaboration") implementing modular façade elements in collaboration with Kingspan using an alternative business model focused on a central System Integrator instead of a General Contractor .

All types of companies can create their impact and can contribute to a competitive market generating a variety of solutions, if there is a stronger market pull and a better playing field. In paragraph 3 this will be elaborated.

In the emerging future the way we are building is expected to change radically towards chain collaboration. This means the role of the wholesaler is expected to be significantly reduced and could even become obsolete.



2.4 Housing corporations: asset & risk management

Housing corporations consider maintenance and retrofit as asset management, meaning they always make decisions based on the values of their assets. Also, in renovation projects the corporation needs 70% of the consent of their renters. Adapting new integral solutions has therefore some harsh requirements:

- A controllable and explicit performance in maintenance
- The investment has to allow budget neutral cost of living for renters, as restricted by law
- Preferably it is an easy and fast solution
- The solution has to be attractive enough for renters.

It is therefore not an easy task to bring fast solutions into this market, although some corporation experiment with "industrial" deep retrofitting pilots. It needs new skills of managing maintenance and negotiating performance contracts. In general housing corporations will wait till valid, working, guaranteed solutions are available.

2.5 Local governments: ambitious but limited in reach

Role of the local governments is in practice inadequate to target innovation. Although ambitions in terms of climate neutrality are high, local governments struggle with their role and suffer from a lack of instruments. Furthermore, there is a reluctance to have close collaboration with the building sector, which can be explained from fraud scandals in the past. This makes their role not powerful enough to fire start fundamental change. It seems natural for local governments to play a more powerful role in the energy transition in the built environment. They have the climate ambition, they are the representatives of the common goods and they can play a market preparing role.

3 Towards a new playing field

Given the above mentioned findings and short analysis, we can conclude there is no silver bullet solution and no masterplan in place. A new playing field is necessary in order to allow a variety of solutions to emerge. These are the five most important elements:

3.1 Legislation and policy: precondition new mainstream

Predictability in law- and regulation and policy is a very important pre-condition in creating trust among all parties. Legislation and regulation at a national and EU level should be developed to create the prerequisites for better conditions and incentives for deep retrofitting. This includes energy and building regulation, e.g. on energy performance standards for retrofitting. The most important policy aspect will be the planning of phasing out natural gas in the Netherlands: if and when that happens, it will cause a serious mind shift and innovation impulse.



3.2 Technical innovation: next level needed

A healthy retrofitting market needs a variety of solutions for all types of real estate. There is a need for innovation in building processes and logistics, risk analysis, industrialization and integral product development, measuring, modelling and monitoring. A shift from project focused services to product solutions implies a shift to product performance guarantees and it needs industrial designer and production design skills. Moreover, this type of innovation needs prototyping and pilot environments.

A few interviewees put emphasis on the promising development of the role of “data technologies”, like monitoring software, modelling and consumer oriented communication. “Data” can therefore even act as a real game-changer of main value-driver, parallel to Tesla strategies.

3.3 Supply chain integration in the building sector

Creating a new culture of doing business and innovation is key. A shift from project oriented to product oriented requires new ways of working, new types of contracts and a change in culture including management skills. The industrial way of working implies that risk and responsibility are product oriented, like the OEM strategy. This requires elimination of the present “chain fuzz” of contractors and subcontractors and suppliers to make place for chain integration. This is easier said than done: experts in the building sector are already working on this shift for decades. The positive side is that experience and knowledge are in place and with the right market pull, this sector can bring itself in alignment with the collective challenge of 200.000 (net) energy neutral dwellings per year.

3.4 Local energy planning: promising new chance

In order to cross that innovation bridge, companies need a market pull, need pilots and need reliable partners, who also bear risks and investments. The government can create impact with a more directive role in local developments. This is already happening due to new laws on spatial planning: local governments will be in charge of local energy planning in the near future. If implemented adequately this will facilitate a process towards local energy decision making. Gaining experience will be necessary on personal and organizational level, with stakeholder involvement, new type of agreements and using energy knowledge (like techniques of local new energy sources and energy savings).

Furthermore, this new experience in local pilots is valuable and can be made accessible to other pilots and projects. We consider it necessary to harvest this knowledge and experience based evidence more collectively.

3.5 Financial arrangements: high risk initial investments

New product development, new processes, new contracts and agreements, running pilots and developing new knowledge: it all needs finance and a valid business case.

- Innovation programs like TKI Urban Energy and Climate-KIC can contribute to innovation if the arrangements fit to market needs.



- Government could participate financially in pilots on local level, for instance in order to enable solutions in specific neighbourhoods. In this way enough scale and cost reduction can be achieved.
- Moreover, local governments could play a so called “market preparation” role with energy solutions like local heat exchange.

4 Climate-KIC and deep retrofit

Given the beckoning perspective of a desired market pull, Climate-KIC could contribute to innovation in deep retrofitting with the following principles and suggestions.

Incorporate deep retrofitting in a Climate-KIC program, targeted on facilitating the creation of integral chain solutions and system innovations, like industrial designs, engineering of solutions and development of services like performance monitoring tools.

This means that not only new business ideas can be facilitated, but also existing elements may be integrated as well as existing business concepts may be supported with scaling up. Innovation in scaling up could include client oriented communication systems, logistics and manufacturing in order to realize a higher impact.

Consider to partner up with lobby parties in order to increase lobby force on legislation on energy neutral built environment and accompanying policies.

Evoke and support experiments and pilots on a neighbourhood or regional level, and support the establishment of learning environments for professionals, in order to pinpoint and aggregate knowledge to sector level.

In addition, Climate-KIC could develop a deep retrofit roadmap with Dutch stakeholders. This focusses and justifies further calls to action.

In the sector there is a strong wish for a continuous stimulation program, i.e. without the structure of “calls”. There is a wish to follow the pace of the dynamics of business innovation activities. This means the possibility to apply for funding when a company needs it. Furthermore, Climate-KIC could help its network with the application process through scouts, workshops, showcases and stakeholder meetings.

Be aware that breeding personal skills is an important element: Climate-KIC could consider to give in-kind contribution like business coaches.

Furthermore, a learning environment for professionals could provide peer-to-peer contact as well as a good relation between Climate-KIC and national stakeholders, like TKI Urban Energy and Stroomversnelling but also builders, suppliers and corporations.



Attachment List of interviewees

1. Tom Jongen, BAM (building company),
2. Jan Willem van de Groep, Factory Zero, co-founder
3. Pauline Slaa, Gemeente 's-Hertogenbosch, policy advisor
4. Petra Hofman, Diep, independent consultant, transition facilitator
5. Jop van Buchem, Mitros (housing corporation), developer
6. Mathieu Wijnands, BASF
7. Folkert Linnemans, Bouwgroep Dijkstra Draaisma,
8. Teun Bokhoven, voorzitter NVDE
9. Jasper Sluimers, BIK Bouw,
10. Rob de Jonge, STO

Findings and Analysis have been presented and talked about/discussed in a workshop with participants from local and regional authorities, social housing corporations, building sector and science. and Climate-KIC affiliates.

About the authors

[Amelie Veenstra](#) has vocation to promote circular and fossil free economy with a deep knowledge of energy in built environment, sustainability and social innovation. She helps to create better market conditions and impact for Small and Medium Enterprises as well as governmental services locally and (inter)nationally. She is an avid researcher with a degree in physics and over 20 years of professional experience in developing and leading projects and programs promoting social and sustainable change.

[Patrick Kaashoek](#) works as a consultant, change-maker and facilitator of systemic issues. He was one of the facilitator-founders of the concept of Zero-Energy retrofits and Stroomversnelling. Since then he has been working on multi-stakeholder, multi-issue, multi-perspective contexts to create and facilitating the energy transition and system change.

Kees van Deelen, TNO, project lead

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