

# Mapping of frontrunners in nZEB renovation of single-family houses

- Executive Summary -

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## Introducing the COHERENO project

The Intelligent Energy Europe (IEE) funded project, **Collaboration for Housing Nearly Zero-energy Renovation (COHERENO)**, aims to achieve better collaboration between enterprises involved in innovative business schemes to realise nearly zero-energy building (nZEB) renovations of owner-occupied single-family homes. The project is intended to show how existing barriers to effective cooperation can be eliminated and better services for different customer segments can be developed. While technological solutions for nZEB renovation are available at a demonstration level, there is a lack of supply-chain collaboration models. Better communication and awareness of each other's activities is one of the central ideas in promoting better collaboration between different service providers. Therefore, during the early stages of the project, experienced market players in participating countries and their roles within the renovation chain were mapped. The five participating countries include **Austria, Belgium, Germany, Norway and the Netherlands**.

Business Collaboration Events are also organized in participating countries to counter supply-side market fragmentation and encourage collaboration. These events are paving the way for the uptake of new business models and represent the starting point for a long-term nZEB renovation network beyond COHERENO. The national networks will be dedicated to the widespread availability of integrated, collaborative services for nZEB housing renovation across Europe, increasing both quantity and quality of single-family house renovations.

This executive summary gives a short overview of the supply chain mapping methodology and key findings for each country. It supports the development and promotion of national lists of service providers and provides guidance to stakeholders in non-participating countries on how to initiate similar activities.

## The nZEB radar

During the first stage of the COHERENO project, examples of nZEB single-family house renovations in the five partner countries have been used to identify experienced actors.

A set of criteria was developed to identify the different types of nZEB renovation, including holistic renovation, renovations close to nZEB levels and deep renovation of building components (e.g., walls, windows, roofs etc.) that can lead to an entire nZEB house renovation. Criteria are based on national market conditions in each country using existing instruments, such as Energy Performance Certificates (EPC), to track relevant projects in a practical and simple way. The toolbox of instruments was defined and detailed individually through intensive dialogue between project partners and national stakeholders; these stakeholders comprise national advisory boards in each country.

The radar has a scale for nZEB renovations ranging from 1 to 4, with 1 being the best.

**Figure 1 overleaf shows the general concept of nZEB radar.**

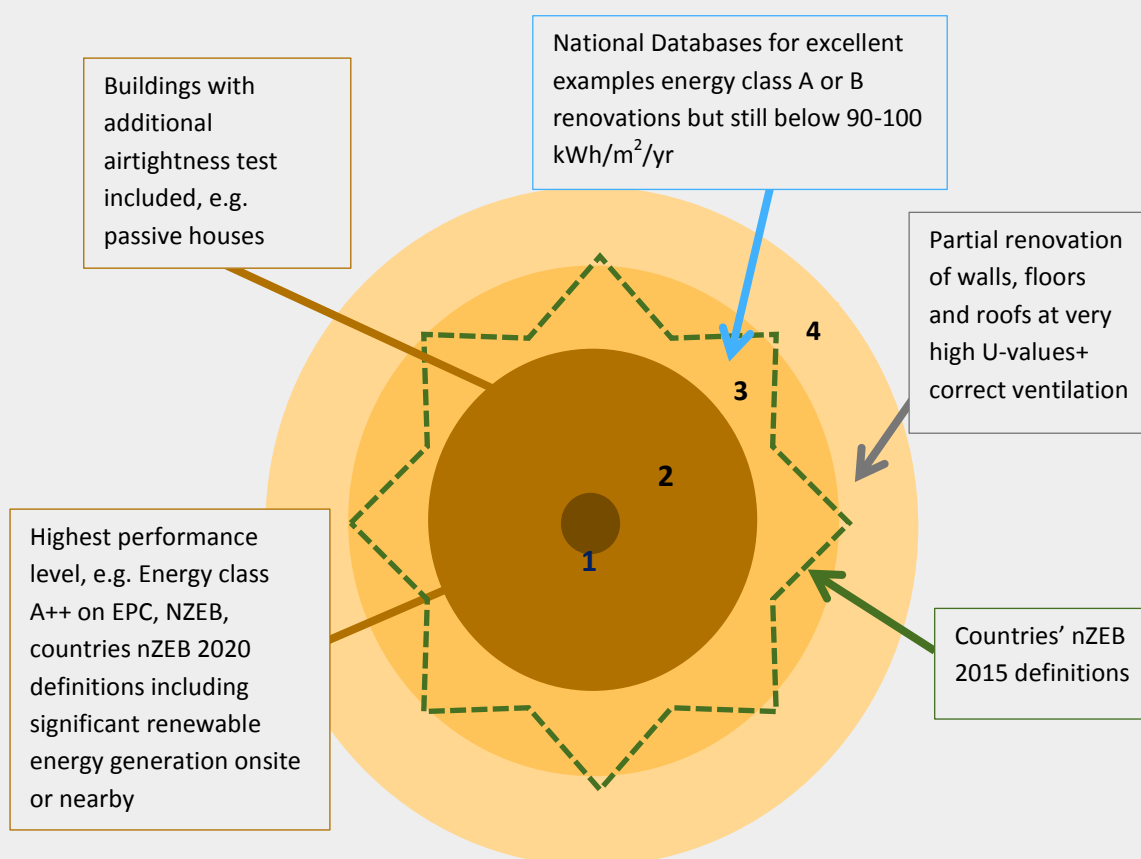


Figure 1: Example of nZEB radar, created to depict different methodologies and standards to define nZEBs.

## General method of mapping frontrunners

The nZEB radar was used to select those experts with relevant project experience, depending on the national context. This process resulted in drafting regional actors' lists, with which homeowners can identify experienced service providers. In the next step of this project, a tool for recommendations or ratings by and for homeowners should be included as part of this listing. Recommended service providers could be identified as those whose recommendations outweigh their disapproval ratings. It should be as simple and pragmatic as possible for all involved parties. All identified actors should be listed in grouped categories: contractors, consultants, quality assessment professionals and others.

## Country specific approaches and key findings

### Austria

List	Cohereno - Cooperation Profiles for nZEB-Retrofit; klimaaktiv Gebäudedatenbank
Responsible body	ÖGUT; Austrian Federal Ministry for Environment
Requirement to be listed	At least one project in line with the Austrian National Plan for Environment 2021
URL	<a href="http://www.b2match.eu/cohereno/participants?utf8=%E2%9C%93&amp;q=&amp;pts[]=1725&amp;cs[]=25532">http://www.b2match.eu/cohereno/participants?utf8=%E2%9C%93&amp;q=&amp;pts[]=1725&amp;cs[]=25532</a> <a href="http://www.klimaaktiv-gebaut.at/">http://www.klimaaktiv-gebaut.at/</a> (search: Detailsuche + Ein- / Zweifamilienhäuser + Sanierung)

The minimum requirements to map frontrunners in COHERENO are the requirements of the Austrian National Plan for major renovation, effective from 2021:

- Heating demand: 51 kWh/m<sup>2</sup>a for SFH (A/V=0,8);
- Primary Energy demand: 200 kWh/m<sup>2</sup>a;
- CO<sub>2</sub>-Emissions: 32 kg/m<sup>2</sup>a

These demands stand for the building criteria of the national climate initiative **klimaaktiv**, launched by the Austrian Federal Ministry for Environment.

To be listed as national frontrunners, actors must be involved at least in one retrofitting project meeting these requirements. In order to find projects, the Austrian Society for Environment and Technology (ÖGUT) uses the existing network of **klimaaktiv**, for which it is also responsible. Stakeholders were asked to define best practice renovation projects and excellent actors in the provinces. Stakeholders providing this information included **klimaaktiv** regional and competence partners, members of the national advisory board and leading members of the Austrian passive house platform, many of which are on the COHERENO board and are partners of **klimaaktiv**.

Up to now, no specific cooperative business model for highly ambitious nZEB renovation could be identified.

## Belgium

<b>List</b>	<b>Ervaringsdeskundigen BEN woningrenovatie</b>
<b>Responsible body</b>	Passiefhuisplatform (PHP) in collaboration with Bond Beter Leefmilieu Vlaanderen (BBLV)
<b>Requirement to be listed</b>	Registration of nZEB single-family house renovation project
<b>URL</b>	<a href="http://www.b2match.eu/cohereno">www.b2match.eu/cohereno</a> ; <a href="http://www.ecobouwers.be">www.ecobouwers.be</a>

A Working Document to strengthen collaboration between enterprises was established to identify the experienced Belgian frontrunners. This document includes a regional mapping methodology to identify professionals involved in exemplary renovations of single-family houses. This method is performed in two steps:

1. Supply-side professionals attend a networking event. To attend, they must register on [www.b2match.eu/cohereno](http://www.b2match.eu/cohereno), where they create a profile identifying their experience related to nZEB renovation of single-family houses (e.g., projects, education, client recommendations)
2. The content of these profiles is then evaluated by the Belgian Passive House Platform (PHP). If accepted, the company is registered on a publicly available list as an 'experienced actor for nZEB renovation' in one or more of these categories: contractor, installer, architect or consultant.

The nZEB radars for the Brussels Capital Region and the Flemish Region have been used to determine the ambition of renovation projects listed by professionals in the networking platform. On the basis of these criteria, 50 exemplary Belgian renovation projects have already been determined by PHP. All professionals involved in these projects will be invited to create their profile in the networking platform.

Companies can offer in their profiles to provide nZEB single-family house renovation services, as well as requests for collaboration, without attending networking events. However, only those professionals who specify nZEB renovation projects in their profile, for which they were contracted by a homeowner, are included in the public list distributed to homeowners. Professionals who include a reference to open house days – where future clients can contact homeowners who already renovated - will have an increased visibility on the [Ecobouwers website](http://www.ecobouwers.be). Professionals are mapped according to post code and category.

During the first year, the profiles are controlled by PHP. After this period, the national advisory board will evaluate how to maintain the public list and networking platform.

## Germany

List	Efficient House database	Efficient House experts database
<b>Responsible body</b>	German Energy Agency (dena)	German Energy Agency (dena)
<b>Requirement to be listed</b>	Buildings with Efficiency House Standard: - Refurbishment: Efficiency House 100 or better - New construction: Efficiency House 70 or better	Either further training and qualification as an energy consultant according to the German Federal Office of Economics and Exports Control (BAFA) or possessing a dena approved additional qualification in the field of energy-efficient construction and renovation
<b>URL</b>	<a href="https://effizienzhaus.zukunft-haus.info">https://effizienzhaus.zukunft-haus.info</a>	<a href="http://www.zukunft-haus.info/energieberatung-planung/experten-finden/effizienzhaus-experten.html">http://www.zukunft-haus.info/energieberatung-planung/experten-finden/effizienzhaus-experten.html</a>

An official nZEB definition for refurbishments in Germany was not previously published. As a consequence, a non-binding definition was developed for COHERENO, based on the methodology used by the KfW Bank<sup>1</sup> for funding programmes: Efficiency House 55 or better, which indicates a reduction of 45 percent of primary energy compared to the requirement for new construction<sup>2</sup>. Houses refurbished before 2009 are considered nZEB if their primary energy demand is below 40kWh/(m<sup>2</sup>a) and transmission heat loss is below 0,28W/m<sup>2</sup>K. Based on these criteria, the German nZEB radar contains only houses within the very ambitious circle 1 (darker orange).

Two main sources were used by dena to identify market actors and highly energy-efficient refurbished buildings: 1) the dena *Best-Practice Database of Energy Efficient Homes*; and 2) the *Database of Energy Efficiency Experts for funding programs* of the Federal Government.

The dena best practice database contains more than 1.000 projects, described in details, including implemented measures, performances before and after renovation, involved market actors, etc. The project list is linked to a list of experts by region, that all interested parties can use to identify who has been involved in which / how many projects. Many experts take the opportunity to present themselves via this platform and to showcase the quality of their successfully completed projects. As of August 2014, about 40 houses and 50 experts are identified and listed in the frontrunners and building lists, though only a small portion of these projects was used in COHERENO.

Both databases will be continuously updated during the project's duration.

## Norway

<b>Name of list</b>	Rådgiverregisteret
<b>Responsible body</b>	Norwegian Energy Agency (ENOVA)
<b>Requirement to be listed</b>	Exam from passive house course (ENOVA/NTNU)
<b>URL</b>	<a href="http://www.enova.no/radgivning/naring/kundenare-radgivere/radgiverregisteret/radgiverregisteret/77/96/?certified=on&amp;passivhustext=&amp;type=&amp;search">http://www.enova.no/radgivning/naring/kundenare-radgivere/radgiverregisteret/radgiverregisteret/77/96/?certified=on&amp;passivhustext=&amp;type=&amp;search</a>

Based on the criteria defined by the Norwegian nZEB radar, there are 13 confirmed single family homes (SFH) in Norway built between 1950-1990 that either received an energy performance certificate (EPC) grade of A or B, a low-energy house certificate or a passive house certificate. None of the identified houses met the criteria of circle

<sup>1</sup> KfW is the German government-owned development bank.

<sup>2</sup> The exact energy standard is laid out in the German Energy Saving Ordinance (EnEV) 2009.

one from the nZEB radar (zero or plus energy houses). Three houses met the criteria of the second circle (passive house certificate or EPC grade A). Nine met the criteria of circle three (Listed in national databases, EPC grade B). An house met the criteria of circle four (3 measures from the list).

Several sources were used to identify the most ambitiously renovated SFH. Most SFH were found in the Norwegian EPC database administered by the Norwegian Water Resources and Energy Directorate (NVE). Others were found through the Norwegian State Housing Bank (Husbanken) and Enova, which provides low interest loans and funding schemes to encourage energy efficiency in SFH. A few SFHs were identified through other SINTEF research projects and through frontrunner actors within the architect and energy consultant professions. For Norway, using the mapping of the most ambitiously renovated SFH to find front running actors (contractors, consultants, architects etc.) was not useful. Instead, the already established list of approved energy consultants (contractors, architects, consultants, etc.) administered by the state agency Enova was used.

There are two sets of criteria actors should meet to be listed either as a passive house advisor for the professional market (1) or as a passive house advisor for the private market (2) of SFH.

#### Criteria group 1, actors serving registered companies, public entities and housing cooperatives

- Hold a degree in architecture or civil engineering (e.g. Master's degree)
- Planned a passive house that was built and meets the NS3700/37001 requirements

#### Criteria group 2, actors serving private individuals, SFH market

- Must be employed in a registered company with central or local authorisation
- Passed exam in the post graduate course "passive house design" at NTNU *or* planned a passive house that was built and meets the NS3700/37001 requirements *or* passed the course for energy advisors organized by Enova /Lavenergiprogrammet

Supply side actors can register themselves by filling in a form available on the Enova website and providing the required documentation listed in the registration criteria above. Alternatively, Enova can list an actor as long as the required information has been made available. Enova verifies that the information registered is correct prior to placing a supply side actor on the list.

## The Netherlands

<b>Name of list</b>	<b>Ervaren actoren BENG-renovatie particuliere woningen</b>
<b>Responsible body</b>	National advisory board
<b>Requirement to be listed</b>	Specification of nZEB renovation
<b>URL</b>	<a href="http://www.b2match.eu/cohereno">www.b2match.eu/cohereno</a>

In the framework of COHERENO, a Dutch Working Document was established to identify Dutch frontrunners. A national identification method for regional mapping was discussed to identify 'experienced' professionals involved in quality approved renovations.

The suggested working method involves two steps:

1. Two networking events are held in The Netherlands. To attend a networking event, professionals have to register on the networking platform: [www.b2match.eu/cohereno](http://www.b2match.eu/cohereno). Here the professionals have to identify their offers and experience related to nZEB renovation of SFH.

2. Registration in the networking platform is evaluated by Delft University of Technology (DUT) and a Dutch national advisory board. This will lead to an indicative list of ‘experienced actors for nZEB renovation’ in three main categories: contractors and installers; project managers and architects; and energy performance consultants (EPA-advisors). Members of the national advisory board will further determine a strategy to promote this list.

On the basis of the Dutch nZEB radar, various exemplary projects were found. All professionals involved in these projects will be invited to register their profile in the networking platform. Professionals in the building sector will also be invited to register for the networking platform by DUT and supporting partners.

Supporting partners were chosen to serve regions in The Netherlands with a relatively high demand for renovation of owner-occupied SFH. In the western part of the country, supporting partners include the City of The Hague, the ‘Marktplaats Duurzaam Bouwen’ (‘Market Place Sustainable Construction’) and the Innovation Centre for Sustainable Construction (ICDuBo). In the eastern part of the country, collaboration was established with the city-region Arnhem-Nijmegen, the non-profit organisation DNA in de Bouw, the HAN University of Applied Sciences and the non-profit organisation Achterhoek Duurzaam Verbouwen (ADV).

Even without attending collaboration events, companies can specify their offer and request collaboration for the sector of nZEB SFH renovation in the COHERENO networking platform. However, only those who specify nZEB renovation projects in their profile, for which they were contracted by a homeowner, will be included in the public list destined for distribution to homeowners. Furthermore, quality assurance requirements for these actors will be established.

The national advisory board will organise a consultation on how to continue the development of a public list based on the COHERENO results and how to ensure the quality of listed actors. Several Dutch initiatives have recently started in parallel with COHERENO. For instance, the Dutch government initiative ‘Meer met Minder’ (‘More with Less’) is developing a public list of acknowledged ‘Meer met Minder’ companies. The government-supported programme ‘Energiesprong’ (‘Energy Leap’) is developing a public-private covenant to address large numbers of renovations of SFH. These initiatives will determine the quality standard to be achieved beyond COHERENO.

## Conclusion and outlook

There is a great deal of interest on information, networking and the development of business structures and routines for nZEB renovation in participating countries. The main reason that no stronger collaboration was developed until now is because the market for truly nZEB renovations is still a niche. This fact makes it even more important to have reliable networking structures and pragmatic tools for the identification of experienced actors.

Experience shows that country-specific actors’ lists can provide suitable tools to increase collaboration of market actors for deep renovation. Lists enable people to identify relevant and experienced actors and simplify the initiative. COHERENO highly recommends establishing similar lists and mapping frontrunners in countries not involved in the project. The methodology to identify frontrunners can be used in an analogous manner in all countries due to its high flexibility. It is especially suitable if no other tools exist. The experience of actors is proven automatically when contacts are identified via completed projects.

Nevertheless, the experience of COHERENO showed that existing approaches can be included in the development of high quality listings. For cases where comprehensive lists of market actors already exist, making use of them is a better choice. Existing lists can be improved and adjusted for the specific needs of nZEB market actors. Another approach would be to extract relevant contacts and create additional lists where qualification for nZEB renovation would additionally be checked.



Based on the COHERENO experience the following 9 criteria should be considered when setting up an experts list by stakeholders in non-participating countries:

1. Check if an nZEB actors list can be generated from and/or included in an already existing infrastructure to avoid overlap.
2. Involve national associations and federations of contractors, consultants and representative homeowners to ensure their support.
3. Set up transparent criteria regarding who is accepted on the list.
4. Ensure that all listed actors meet the required criteria.
5. Highlight and promote the benefits of actors being on the list.
6. Ensure regular updates and maintenance of the list.
7. Include a tool for comments and recommendations by and for homeowners.
8. Make the list easy to access and understandable for each target group.
9. Provide all necessary information while ensuring data protection.

For more information on national specifications and legislative background, please see the report “**Criteria to track nZEB activities for housing renovation**” available on the COHERENO website.

[www.cohereno.eu](http://www.cohereno.eu)

## Project Partners



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