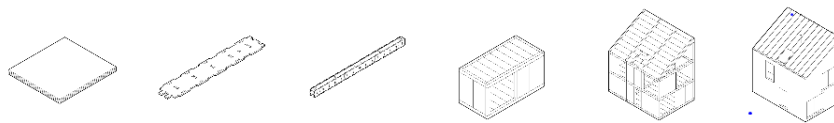


Housing 4.0 Energy Newsletter 4

The H4.0E Digital Platform

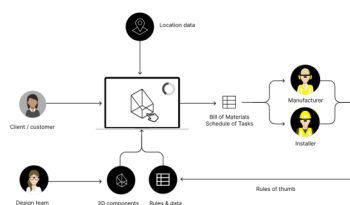
The Open Systems Lab team have been developing the digital platform, which aims to make it easier to adapt and replicate affordable, low-carbon housing based on H4.0E pilot models. The H4.0E Digital Platform will help contribute to the main project goal of **reducing home building costs by 25% and carbon emissions by 60%**. The platform allows the construction industry to optimise a building design based on key metrics for the structure, such as building cost, labour cost, mass and embodied carbon.



Platform updates and next steps

For the H4.0E platform to be able to replicate and customise house type designs it has to 'read' a variety of different building systems (from the pilots these include: closed panel timber, Insulated Concrete Formwork, post-and-beam, volumetric modules), and generate a reconfigurable 3D model based on the unique parameters of each system. To put it simply, the platform does this by creating a number of grids within the building envelope specific to the building system being used, and then automatically loads in the corresponding sub-assembly geometry from a building system

database. OSL has utilised a series of 2D grids to do the heavy lifting rather instead of individual parametric components, which require a lot more processing time. The aim is to allow this model to be used for detailed documentation, drawings, visualisations, or engineering analysis. Updates to come!



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PROJECT DETAILS

Total Budget:	€4.23 Million
ERDF Funding:	€ 2.54 Million



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HOUSING 4.0 ENERGY DURING COVID-19

In March 2020, the Covid-19 pandemic hit Europe in full force, and has continued to shape our daily lives in ways we would not have imagined this time last year. In an effort to keep the project progressing towards our goal of reducing building costs by 25% and carbon emissions by 60%, the H4.0E partnership needed to pivot. Instead of meeting face-to-face for transnational engagement, we present all project updates online during monthly telcos and virtual Steering Group Meetings. We toast pilot progress during digital yet personal virtual happy hours.



We have made a greater effort to produce digital communication content by posting vlogs demonstrating pilot updates, for example. Despite the global pandemic, and the despair and uncertainty it has brought, we have done our best to keep our transnational project alive and well—and progressing toward our goal of a low carbon future.

The H4.0E online course for the construction industry value chain

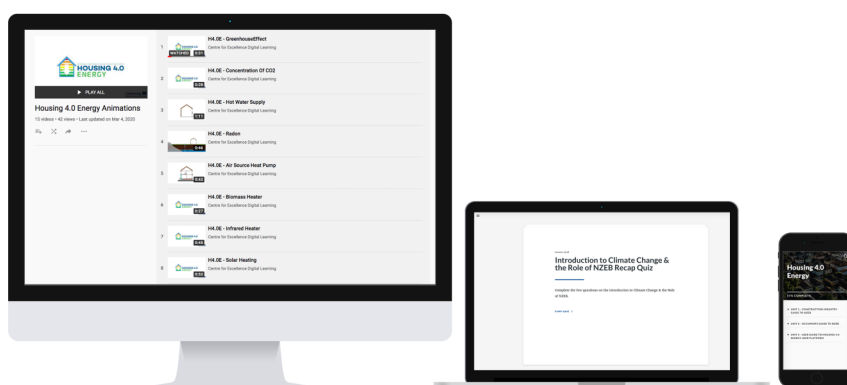
The development of the H4.0E Online Course, overseen by South West College (UK), covers both the Construction Industry and the Occupants Guides to Near-Zero Energy Homes (NZEH). The course will include:

- Unit 1: Construction Industry Guide to NZEH
- Unit 2: Occupants Guide to NZEH
- Unit 3: User Guide to Housing 4.0 Energy User Platform

Unit 3 of the course is now in development, and within the next few weeks, the partnership hopes to have it complete. Once finalised, South West College hopes to begin localising the course itself.

Animated videos have been designed to complement the content, which too will be available in various languages with subtitles to address accessibility. In addition to these animation videos, South West College also aims to record some demonstration videos in the new year on the new South West College Enniskillen Campus.

Finally, short quizzes are to be included after each section, so that users can do a quick recap on what they've just learnt. The course is designed to be used on PC, Tablet or Smartphone, ensuring it is user-friendly on all systems.



The building phase of the Flemish pilot is fast approaching

In Flemish-Brabant, the preparations of the pilot are starting to bear fruit as the preparations for the building of the six pilot dwellings are underway. The architects—BAST architects and engineers and OVERAL architecture—have completed the design of the pilot homes, assisted by the pilot team of Kamp C, Volta and the Province of Flemish Brabant. Currently the design is being screened to proof which adjustments can be made concerning the materials, parts and techniques in order to get achieve lower costs and an even lower CO₂ emissions.

Beginning in 2021, the first housing units will placed at the pilot location and subsequently equipped with the necessary techniques. By mid-March, the units will be completed. After giving stakeholders and the audience the opportunity to visit the housing units, the residents and tenants of the social letting agency, are expected to move into their homes in April 2021.

(Continued on p. 3)

(Continued from p. 3)



Impression of the 46m² houses at the Flemish Housing 4.0 Energy pilot location

Ensuring Covid-19 safety precautions, the Province of Flemish Brabant managed to organise an event to present a new small-scale housing project supported by the Province of Flemish Brabant. Three new small-scale and movable housing units that will be used by two social housing agencies for temporary accommodation were presented to H4.0E stakeholders.



Regional stakeholders learn more about the H4.0E pilot



WikiHouse model presented to Belgian stakeholders

The Flemish H4.0E pilot video and project animation were displayed and sketches of the pilot houses were presented — in addition to the model of the WikiHouse. The H4.0E project brochure and the pilot leaflet with more information about the pilot were distributed to the H4.0E stakeholders.

No large crowds were invited, but important actors in the Flemish housing sector were present. This gave the opportunity to present a first glimpse of the plans of the Flemish pilot of H4.0E. The project was received enthusiastically and interest in the further course of the project was ignited.

[Read more](#)

BEYOND 2020

Within the Housing 4.0 Energy project, TU Delft has conducted a study that investigates current financial, cultural, legislative and technical barriers and drivers to the implementation and uptake of small, innovative, affordable, zero-energy dwellings in small towns in Belgium (Leuven) and Ireland (Kilkenny).

Cynthia Souaid of TU Delft presented her findings on the institutional barriers report conducted within Housing 4.0 Energy at Beyond 2020, the World Sustainable Built Environment conference in November 2020. Originally to take place in Gothenburg, the conference was held online and brought together key players on various levels involved in creating a sustainable built environment in light of the UN Sustainable Development Goals. As outlined in its abstract, the paper demonstrates the “importance of context specific investigations not only in the identification of challenges to energy efficiency innovations but also in establishing more effective implementations.”

BUILDING HOLLAND

The digital Building Holland congress and National Work Conference for Circular City took place on the 27th-29th October. Ivar Diekerhof of the Municipality of Almere hosted a breakout session on WikiHouse in Almere, the location of the Dutch Housing 4.0 Energy pilot sites.



H4.0E AMBASSADORS

Two enthusiastic participants of phase 1 of the Dutch H4.0E pilot(s), Sebastiaan and Linda, are ambassadors for the project. We follow them by regularly making video's and photo's at the building site, which are shared online.



You can visit our Housing 4.0 Energy website to follow Sebastiaan and Linda's journeys as they develop their small, affordable low-carbon homes within the Housing 4.0 Energy project.

Pilot progress in the Municipality of Almere

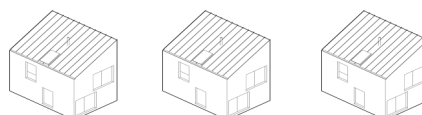
On the 20th of July 20th, phase 1 in the construction of the H4.0E WikiHouses began. The launch celebration took place with appropriate COVID-19 measures in place. A regional television channel has made a [video](#) about the festive occasion.



As the participants have already been working together for a while, they form a close-knit group. Before construction, they helped each other with, for instance, designing, measuring and joint purchasing of building materials.

The self-builder, Sebastiaan, had this to say about the H4.0E pilot: "It's great to design your own house and build it completely by yourself. Now we're helping each other with construction. It's really special to experience."

The foundation for the houses was constructed by a specialised company. Joint purchasing, also on materials such as insulation, allowed for cost-efficiency. The milling company is keen on efficient use of materials and has managed to increase the efficiency from 75% to over 85%. This has positive effects on durability and costs.



Once the WikiHouse elements are milled, they're transported to the on-site warehouse, one house at the time. Building starts with sorting out the elements in the warehouse. Next the elements are assembled into WikiHouse components, which are put together on the plot to form the structure of the house. In the building process participants are assisted by their friends, family and each other — after all, it is a joint learning process. Sharing experiences and solutions within the group, makes the construction of following houses going smoother.



As the construction of the phase 1 WikiHouses is progressing steadily, the marketing campaign for phase 2 has already begun. Due to restrictions posed by the COVID-19 pandemic, the information meeting regarding phase 2 communications was held online. A second campaign was already launched at the end of October. Almere expects to have a complete group of participants for pilot phase 2 in November 2020.

Updates from Ireland

The Irish H4.0E pilot, overseen by 3 Counties Energy Agency (3CEA), will be located in South East of Ireland (Carlow, Kilkenny and Wexford), with each region committing to the delivery of four zero energy homes (ZEHs) each — twelve in total. This pilot will utilise digitisation and 4.0 technology and integrate renewable energies. The main construction principles will be prefabricated Timber Frame and Insulating Concrete Formwork (ICF) with the aim to use renewable building materials. Innovative technologies for sourcing renewable energy will be Air to Water Heat Pumps, Mechanical Ventilation with Heat Recovery (MVHR), PV and Thermal Solar Panels. Local Authority Social Housing tenants are the intended end users, with the aim of addressing fuel poverty.



The visualised Graiguenamanagh site of the Kilkenny pilot

Wexford County Council

Like all 3CEA pilots, the Wexford pilot, with two floors and four units in an apartment block, is designed reading the Passive House principles, aiming for an A-rated nearly Zero Energy Building (nZEB) or if possible, for a Zero Energy Building (ZEB). At the moment, the County Council Wexford building department is working on procuring the design team, on drawing updates to GA and Detail design and getting a Fire- and Disability Access Certificate (DAC). They are aiming and preparing for Planning Stage 2. The Wexford Homes are aimed to be delivered by May 2022 – there is a risk that they may not be complete until August 2022, but 3CEA continues to work with Wexford to ensure delivery as early as possible.

Carlow County Council

The Carlow pilot, with one floor and four units in an apartment block, will be built in ICF as the construction type and uses in situ concrete including 70% Ground Granulated Blast Furnace Slag (GGBS), which will reduce the embodied CO₂ emissions by around 40%, compared to a standard concrete brick construction type. The Carlow project acts as well as a prototype for the ICF construction type for the online platform developed by Open Systems Lab. 3CEA was and is providing project data to OSL to develop further the platform. The Carlow pilot is within its timeline despite the covid delays. The stage of “Substantial completion on-site” will be reached in Q3 2021.

Kilkenny County Council

Kilkenny County Council (KCC) is providing units on two sites. Because of the building types, they have a shorter planning process than Wexford. The building at the site in Graiguenamanagh will be a ICF construction type and the building at the site in Mullinavat will be in closed Panel Timber Frame—this is because KCC is aiming to develop the cost-effective version whilst not interfering with their own set timeline. There will also be significant embodied CO₂ emission savings at these sites, and the Kilkenny pilot is as well within its timeline despite the COVID-19 delays. The stage of “Substantial completion on-site” of both sites will be reached in Q1 2022.

Issues Addressed

The EU 2050 Framework for climate and energy sets targets for a carbon neutral economy, which can be reached by increasing the share of renewable energy to greater than 27% and providing at least 27% energy savings across Europe by 2030. The North-West Europe (NWE) region is the most industrialised region—as well as the most prolific CO₂-emitting region—in Europe. Within this region, the private housing sector alone accounts for nearly one-third of all CO₂ emissions, as there is currently no great push within this industry to achieve EU targets. Meanwhile, decreasing household size, changing patterns of regional population density and other social factors have led to a significant decline in demand for large, expensive and energy-inefficient homes; and in turn, this has led to the increased desire for smaller, more affordable energy-efficient high quality living spaces.



Project Goals

The main goal of the Interreg North-West Europe **Housing 4.0 Energy** project is to offer small (1-2 person) households in North-West Europe access to new affordable near-zero energy/low carbon homes (NZEH) and zero energy/low carbon homes (ZEH), ultimately **reducing home building costs by 25% and carbon emissions by 60%**. Housing 4.0 Energy (H4.OE) will develop an affordable ZEH market by adapting and applying new technologies, thus creating both consumer and supplier interest. Digitisation (4.0) techniques and the development of a H4.OE digital platform ignite fundamental changes in design, manufacturing and construction within the housing industry to meet both EU climate targets and the needs of residents in North-West Europe.

PROJECT DETAILS

Total Budget: €4.23 Million

ERDF Funding: € 2.54 Million



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H4.OE SUPPLY CHAIN WEBINAR

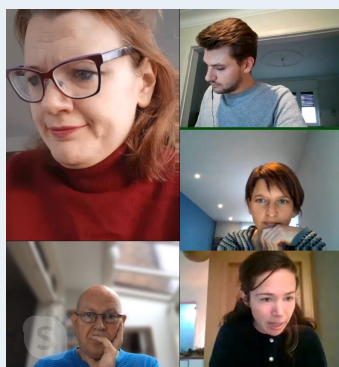
In July 2020, 3CEA hosted a [H4.OE Supply Chain workshop](#) tailored for suppliers, manufacturers, architects, construction and engineering companies, designers and other industry experts. The virtual workshop encouraged participants to come together to share their knowledge and explore the aspects of sustainable energy solutions, building techniques, low carbon construction materials, sustainable manufacturing and supply chain.



The aim of this workshop was to introduce the H4.OE Irish pilot and the Digital Platform industry experts. A group discussion was held on how the project can be enhanced to achieve long-term sustainability and engagement within the industry. The intention was to create knowledge sharing networks between industry experts and allow better understanding of the project goals and explain how the H4.OE Digital Platform can work for *you*—and what improvements can be made to improve the system and supply chain.

ONLINE H4.0E PARTNER STEERING COMMITTEE MEETING

Due to Covid-19, the H4.0E consortium will convene online for their next international Steering Committee Meeting and exchange event on 7-8 December 2020.



Housing 4.0 Energy Animation

The Housing 4.0 Energy partnership has finalised the project-wide animation, which visually demonstrates the short-term and long-term objectives and goals of the project. A task overseen by Elfi-Tech, the [animation video](#) is now available in three languages: English, German and Dutch.



Project Partners

The Housing 4.0 Energy partnership includes eight organisations from five different countries in North-West Europe. The H4.0E partners are:

- Province of Flemish Brabant (Belgium)
- European Institute for Innovation-Technology (Germany)
- Gemeente Almere (Netherlands)
- TU Delft (Netherlands)
- 3 Counties Energy Agency (Ireland)
- South West College (United Kingdom)
- Open Systems Lab (United Kingdom)
- Kamp C (Belgium)



Gemeente Almere



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