

# Sustainable Energy Skills in the Construction

## Sector †

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**Abstract:** In this workshop we discussed the progress and results of six Horizon 2020 projects—INSTRUCT, BIMEET, The nZEB Roadshow, TRAIN4SUSTAIN, HP4All and BUSLeague about how to increase the number of skilled building professionals and/or blue-collar workers across the building design, operation and maintenance value chain (designers, architects, engineers, building managers, technicians, installers, blue collar workers including apprentices, and other building professionals), with a specific focus on the engagement of small and medium-sized enterprises (SMEs).

**Keywords:** skill; energy; construction; building professionals; small and medium-sized enterprises

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## 1. Introduction

The European Construction sector faces unprecedented challenges to achieve ambitious energy efficiency objectives, that can be met only if successful training initiatives and supporting policy instruments are put in place, acting as a springboard to stimulate the demand for energy efficiency skills.

The objective of this workshop was to discuss how to increase the number of skilled building professionals and/or blue-collar workers across the building design, operation and maintenance value chain (designers, architects, engineers, building managers, technicians, installers, blue collar workers including apprentices, and other building professionals), with a specific focus on the engagement of small and medium-sized enterprises (SMEs). Recourse to skilled professionals/workers both for renovations and new constructions of buildings and district scale solutions should be made more attractive and easier for companies and homeowners alike.

Hence, in this report, we are summarizing the contributions of six Horizon 2020 projects on sustainable energy skills and trainings in the construction value chain, including: INSTRUCT [1], BIMEET [2], The nZEB Roadshow [3], TRAIN4SUSTAIN [4], HP4All [5] and BUSLeague [6].

## 2. INSTRUCT

The INSTRUCT project aims to act at a market level by providing an operational framework and set of services serving to increase the number of skilled building professionals and construction workers along the value chain, raising awareness of stakeholders in the construction value chain including producers and retailers, home and building owners and tenants about environmental challenges and the benefits of sustainable energy skills and paving the way to legislative changes that overall will stimulate the demand for energy skills. Project key outputs include:

- quantitative and qualitative evidences that reinforce the link between energy skills and energy performance;
- set of tools and instruments facilitating the mutual recognition of energy skills and qualifications in the construction sector (including e.g. sustainable energy skills passports/registers, new partnerships and initiatives);
- real-world demonstrations (in 5 geographical European areas) of the usefulness and ease of use of the deployed instruments;
- new legislative frameworks and legislative changes' proposal, thanks to which energy skills will need to be confirmed by certificates and
- dissemination and awareness raising actions in consortium members countries, scaled up to the wider Europe.

The 30-month-long project started in June 2020 and is being implemented by the Consortium of 8 Partners which draws on the engagement of internationally leading industry best practice, research and vocational training, the educational excellence of leading institutions in Europe, the robust experience of accrediting bodies in the construction domain. It provides a Europe-wide coverage with seven participating countries, scaled up to 5 regional clusters, representing a multi-expertise ensemble of stakeholders and energy value chains deploying the INSTRUCT methodology and supporting tools in country-based pilots. It is supported by a network of stakeholders, involving the Build Up Skills chapters across Europe, already finished (BIMEET) and ongoing EU research projects and a Europe wide community of interest of 200+ members.

## 3. BIMEET

The European Construction sector is facing unprecedented challenges to achieve ambitious energy efficiency objectives (with the aim to generalize Near-Zero Energy Buildings), in an economic crisis context dominated by reduced investments, search for cost effectiveness and high productivity. Moreover the industry is experiencing its digital revolution, with Building Information Modeling (BIM) approach gaining significant interest across Europe. Member states implement very different approaches through regulations and maturity targets, which always face the traditional low-tech and informal practices of construction businesses (a fragmented sector, dominated by SMEs). BIMEET project aimed to leverage the take-up of ICT and BIM through a significant upgrade of the skills and capacities of the EU construction workforce. This Coordination and Support Action project was built around a strong consortium relying on educational and research expertise, robust experience of accrediting and labelling bodies, training supply chain and a wide engagement of industry led best practice (already committed in an EU-wide expert panel). Through its actions the project (a) paved the way to a fundamental step change in delivering systematic, measurable and effective energy efficient buildings through BIM training with a view to effectively address European energy and carbon reduction targets; (b) promoted a well-trained world leading generation of decision makers, practitioners, and blue collars in BIM for energy efficiency; (c)

established a world-leading platform for BIM for energy efficiency training nurtured by an established community of interest. Its principal outputs were 1) a skills matrix related to BIM and energy efficiency, harmonized thanks to EQF standard, and 2) a training platform contributing to widely disseminate the BIMEET EQF. These results associated with a labelling scheme guaranteed the sustainability of the project results after its lifetime.

#### **4. The nZEB Roadshow**

The nZEB Roadshow project will organize national-scale marketing and communication campaigns in 5 European countries, focused around nZEB days organized in 3 to 5 selected cities in each of Bulgaria, Croatia, Greece, Italy and Romania. The nZEB weeks will consist of a multitude of events: construction products and real estate fairs, practical demonstrations and real-time nZEB construction, training courses for designers and construction workers (with inclusion of BIM-enabled VR and AR solutions), information sessions and free consultations for citizens active on the real estate market, on-site training at public building renovation sites, and career orientation centers and construction job fairs with focus on the local construction sector SMEs.

As a focal point of the events, the BKHs will get on wheels – through the design and construction of prefabricated modular mobile buildings that will serve as information and demonstration centers for raising awareness of the benefits and specificities of nZEB and will create the necessary prerequisites for effective communication between stakeholders. With very careful attention to exterior and interior design, the centers will offer real-life experience of quality nZEB and will be equipped with all necessary technologies to provide full information of the processes with relevance to the building's performance in terms of comfort, internal air quality parameters, and energy consumption.

In addition, the nZEB Roadshow will add to the current efforts to promote nZEB –related two very important but unfortunately still largely missing components: professional marketing and sales services and strong media partnerships.

#### **5. TRAIN4SUSTAIN**

TRAIN4SUSTAIN (T4S) project was constituted for stimulating the demand for skilled construction sector professionals (architects, contractors, SMEs and workers) through raising acceptance of regional and national qualifications and skills on the EU construction market. We believe, comparability of national qualifications and sustainable energy skills is key for increased transparency and penetration power in the market. T4S is tackling the issue of mutual recognition of qualification and skills so that training accredited in one country could be recognized easier in another country.

The project is set to analyze already available transnational energy skill qualification frameworks for building professions, like the Prof/Trac project's scheme or the ones produced by the BIM community. A very important methodological approach will be throughout the project implementation and to create the qualification standard is the recently developed EU framework for the assessment of energy and resource efficient buildings, aka the Level(s) initiative. T4S project has the focus on acting at market level collaborating with relevant training providers, building assessment providers and scheme operators.

The project consortium will build on its activities on continuous consultation with stakeholders as well as ultimate end-users. T4S project aim at fostering a common understanding of sustainable energy skills across Europe by promoting a competence quality standard, a European Skills Registry and a Skills Passport for facilitating transnational recognition of learning outcomes and skill levels of existing qualifications and vocational trainings.

#### **6. HP4All**

HP4All brings together leading experts across Europe to enable capacity and skills development within the Heat Pump sector and to ensure that the energy efficiency gains afforded by heat pumps are realized. HP4All, following a holistic, systemic point of view, will work both with the supply side (manufacturers, SMEs, installers etc.) and demand side (building owners, public sector etc.). This way, the project will enhance, develop and promote the skills required for high quality, optimized Heat Pump (HP) installations within residential/non-residential buildings bringing Europe to the forefront of the climatization sector.

Over 1.1m heat pumps were installed in 2017 across Europe, with the sector seeing a 100% growth since 2006. As the transition to electrification of heat speeds up this growth rate is set to increase further. HP4All will develop the HP4All package, a set of innovative tools and resources to be used by the different related stakeholders. The package includes

- a HP Competency Framework to facilitate Mutual Recognition of HP Skills across Europe and the construction sector,
- from an end user perspective, a digital HP Knowledge Hub will be created to provide guidance, support and tools e.g., technical information, case studies, procurement guidance to increase the demand for HP skills and knowledge.
- A HP Benchmarking Tool enabling end users to consider options and performance of HP technologies within different building types

The HP4All Package will be validated through 3 regional plans being implemented (AT, ES and IE) with the ambition of driving market change, influencing end user decisions and planning for new innovations. The implementation plans will be informed by extensive stakeholder engagement to map current and future barriers to HP market exploitation and skills development.

- 400 people will receive Capacity Building and guidance interventions at regional/national level to build skills/knowledge on new innovations and HP solutions e.g. smart grid integration, hybrid technologies etc. Large promotional campaigns for end users will be held,
- >20 Case Studies/Best Practices showcasing impact of skills on HP performance created,
- >10 workshops with policy makers, manufacturers and supply chains held,
- Campaigns held in 10 DIY Stores and recommendations regarding policy and procurement development.

Moreover, critical to the success of HP4All is the focus on new innovations and emerging solutions in the HP market, and the skills associated with their application. ~20 Leading experts in the HP and Energy sector will support the regional actors to prepare the market for new innovations related to HP technology, procurement and contracting services.

The impact of the project will be maximized through the role of the Observers (HR, PT, RO) as they will follow closely the development and validation of the HP4All package, becoming early adopters even before the project ends. Moreover, a replication plan will be developed, including train-the-trainer actions, roadmap for HP4All package use and an outreach awareness campaign that includes the organization of a pan-European event targeting public bodies. Thus, HP4All will ultimately address HP Skills in All Countries, for All HP Building Types and also All HP Types and Innovations.

## 7. BUSLeague

The overall aim of BUSLeague is to address and overcome the challenges of the stimulation of demand for energy skilled workforce (demand side), along with hands-on capacity building to increase the number of skilled workforces across the building design, operation and maintenance value chain (supply side). BUSLeague will achieve this objective by developing and implementing a cross European recognition of energy skills, together with upscaling successful training methods and

techniques which have already been developed in previous EU and National initiatives such as BUILD UP Skills, Construction Skills. BUSLeague focusses on a blend of four elements: mutual recognition of energy skills, awareness raising, capacity building and legislative changes.

Implementation will be done at country specific and regional levels; based on a blend of measures to stimulate demand complimented with hands-on and practical upskilling of involved local and regional workforce. In this way engagement of SMEs will be ensured. BUSLeague is formed by a coalition of former BUILD UP Skills and Construction Skills projects. The partners believe that by working together the national implementation plans and developed means will improve and become more attractive and effective. BUSLeague is strengthened by experienced anthropology researchers and educational technology researchers in order to prove impact and to optimize the blends for stimulating demand and optimizing learning transfer of applied learning means and materials.

## 8. Conclusion

The importance of identifying the potential synergies between the above projects in order to reinforce and boost the skills and energy efficiency in the construction sector was addressed. This identification supports the projects in achieving the objectives planned by the European Union within the established policy framework and directives in place. Among all revised EPBD 2018/844/EU and article 2a: long-term renovation strategies to encompass an overview of national initiatives to promote skills and education in the construction and EE sectors, precisely highlighted the importance of trainings and skillful professionals in the building sector.

These energy efficiency and renewable energy directives emphasize the significance of measures to support the increase of renewable heating, cooling and qualified installers in the building sector. In addition, launch of the renovation strategy published by the European Commission during October 2020 strengthened the importance of these measures.

According to the Renovation Wave: doubling the renovation rate to cut emissions, boost recovery and reduce energy poverty, the 6 general leading actions are:

1. Set stronger regulations, standards and information regarding the energy performance to improve incentives for public and private owners to undertake renovations;
2. Ensuring adequate, accessible and well-targeted financing, which the process of combining different funding, and multiple incentives for private funding;
3. Increase the capacity of developers to develop renovation projects and training and skills development for workers;
4. Expand the market for sustainable building products and services, including the incorporation of sustainable materials, and revised legislation;
5. Create a New European Bauhaus, with support of an advisory board consisting of external experts including scientists, architects, designers, planners, artists and civil society.
6. Developing neighborhood-based approaches for local communities to corporate renewable solutions towards the path of zero-energy districts.

Moreover, this new renovation wave strategy underlines that? the transformation towards a climate neutral construction will only be achievable if existing jobs include circular skills and the new green jobs also emerge in this context. Job profiles such as professionals in deep building renovation, installers for advanced renewable technological solutions or building information modeling specialists. Furthermore, boosting know-hows, the workers' skills in the renovation sector and the support provided by the BUILD-UP skills initiative? is underlined by this renovation wave.

In summary, identifying the potential synergies between the above projects is based on:

- Projects building on the results of previous projects from the BUILDUP skills program and also from other EU and national programs.
- Producing practical and innovative tools addressing specific gaps within a project.
- Collaborating with the industries and directly involving them to develop tools evolved within the projects.
- Boosting the supply and the demand for skilled workers both white and blue collars.
- Renewed focus on supporting public authorities followed by expected changes in the legislations and enabling public procurement procedures.

**Supplementary Materials:** The recording of the workshop is available online at <https://www.sustainableplaces.eu/home/sp20-workshops-events/sp20-sustainable-energy-skills-in-the-construction-sector/>

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## References

1. INSTRUCT's website: <http://www.instructproject.eu> (accessed on 18/11/2020).
2. BIMEET's page on Community Research and development Information Service (CORDIS): <http://cordis.europa.eu/project/id/753994> accessed on 18/11/2020).
3. The nZEB Roadshow's website: <http://www.nzebroadshow.eu/#> (accessed on 18/11/2020)
4. TRAIN4SUSTAIN's website: <http://train4sustain.eu> (accessed on 18/11/2020)
5. HP4All's website: <http://hp4all.eu> (accessed on 18/11/2020)
6. BUSLeague's page on Community Research and development Information Service (CORDIS): <http://cordis.europa.eu/project/id/892894> (accessed on 18/11/2020)
7. Renovation Wave: doubling the renovation rate to cut emissions, boost recovery and reduce energy poverty 14 October 2020 press release page on the European Commission website: [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_20\\_1835](https://ec.europa.eu/commission/presscorner/detail/en/IP_20_1835) (accessed on 19/11/2020)



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