



CORDIS Results Pack on **construction skills**

A thematic collection of innovative EU-funded research results

April 2023

A photograph of four construction workers on a site. They are wearing white and yellow hard hats and high-visibility yellow safety vests. One worker in the center is holding a tablet, and they all appear to be engaged in a discussion. The background shows a construction site with cranes under a clear blue sky.

Leveraging new skills
for the building sector to deliver
on the European Green Deal

Research and
Innovation

**SECOND
EDITION**

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Editorial

Leveraging new skills for the building sector to deliver on the European Green Deal

Europe's ambitious climate targets, including carbon neutrality by 2050, are the driving force behind the need to renovate and transform Europe's building stock. This CORDIS Results Pack highlights 10 EU-funded projects working within the BUILD UP Skills initiative that provides innovative training to building sector professionals to achieve these green goals.

The EU faces a skills shortage in the construction sector, highlighted by the ongoing revision of the [Energy Performance of Buildings Directive](#). Launched in 2011, the [BUILD UP Skills initiative](#) is helping to deliver the skilled and qualified professionals needed to transform Europe's building stock. This will reduce the EU's overall energy usage and contribute to reaching its climate goals, as outlined in the [European Green Deal](#).

One of the key challenges though is the renovation of existing buildings, since the current rate of renovation is only around 1.2 % of Europe's entire building stock per year. For new buildings, the nearly zero-energy building (NZEB) standards became mandatory in Europe as of December 2020, requiring robust skills from all professionals involved.

Reacquainting you with the BUILD UP Skills initiative

The European Year of Skills 2023 will help companies, in particular small and medium-sized enterprises, to address skills shortages in the EU. It will promote reskilling and upskilling, helping people to get the right skills for quality jobs.

The BUILD UP Skills initiative is perfectly placed to support this goal. It has received more than EUR 50 million in funding since its inception, targeting building professionals and companies throughout the entire value chain, public authorities, building owners and tenants. Some 32 countries have been involved in the initiative, with over 70 projects finalised.

The first step of the initiative has been to support the development of national qualification platforms and road maps focused on energy efficiency and renewable energy usage in buildings. In a second step, the road maps have been turned into action by projects developing national or transnational training and qualification schemes.

Alongside an emphasis on the main new and upcoming challenges relating to NZEBs, such as new materials and products, renewables integration, standardisation and certification processes, the integration of digital skills and in particular the use of building information modelling (BIM), BUILD UP Skills also aims to ensure that the building professionals who do make the time and effort to upscale their skills are recognised and visible on the market. Projects currently funded under the initiative are focusing on 'trigger mechanisms', such as one-stop shops, subsidies, awareness campaigns and supporting public authorities with skills-based procurement.

The Horizon 2020 factor

Through the Horizon 2020 programme, the initiative was upscaled, primarily through multi-country project consortiums addressing professionals along the entire building value chain, including designers, architects, engineers, site managers, technicians and installers.

In this update, we showcase 10 EU-funded projects under Horizon 2020 that positively contributed to the success of the BUILD UP Skills initiative and, more indirectly, the wider ambitions and targets of the European Green Deal.

Since 2021, BUILD UP Skills has continued to support innovative training and qualification projects as part of the LIFE Clean Energy Transition sub-programme.

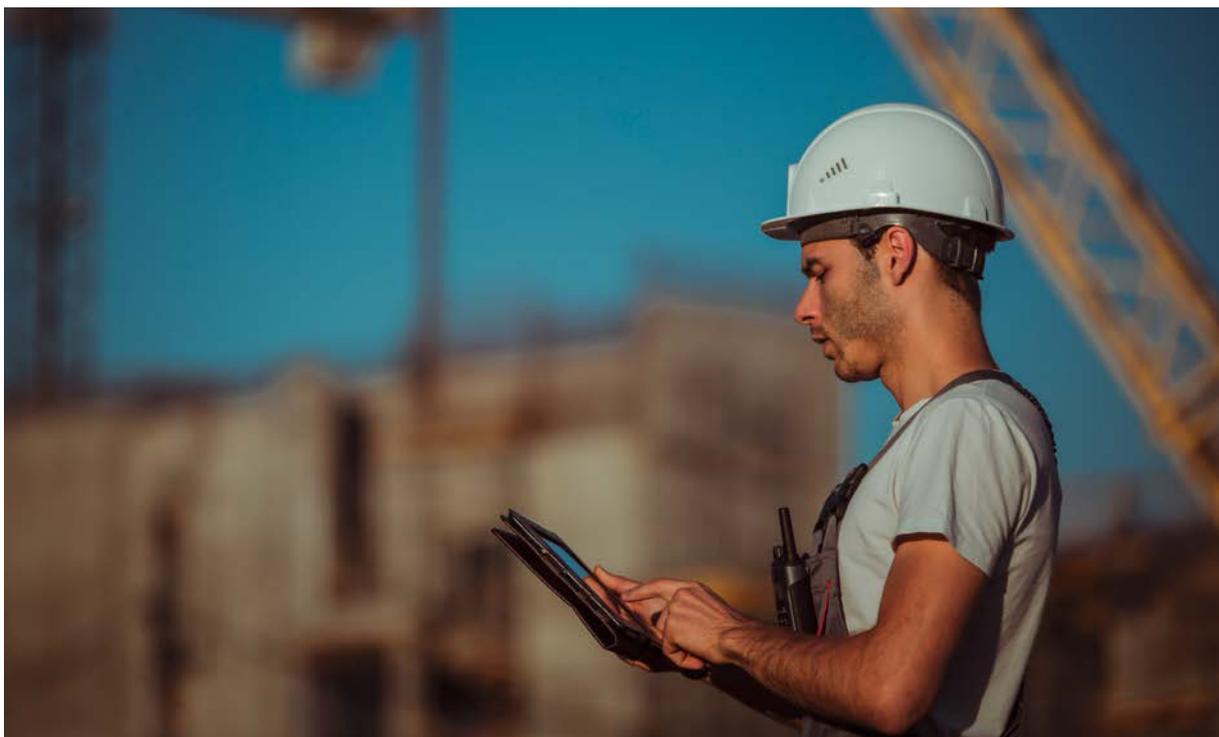
BIM-trained on-site workers deliver better nearly zero-energy buildings

Nearly zero-energy buildings tend to be more promising on paper than they are in real life. To reverse this trend, the EU-funded BIMplement project has been training on-site workers across Europe on how to use building information modelling.

The year 2021 marked a turning point for the construction and renovation sector. The Energy Performance of Buildings Directive now effectively requires any new construction project to be a nearly zero-energy building (NZEB). By 2050, renovation works will also need to comply. But although the march towards energy

efficiency has begun, as soon as you look closer, you realise it's not without hurdles.

"There is still a considerable gap between designed and actual performance, in terms of both energy efficiency and indoor



environmental quality,” says Narjisse Ben Moussa, sustainable development and Europe project officer at Alliance Villes Emploi. “This has several explanations, one of which is the lack of a qualified workforce.”

Ben Moussa and her partners under the project BIMplement (Towards a learning building sector by setting up a large-scale and flexible qualification methodology integrating technical, cross-craft and BIM related skills and competences) want the whole value chain to do better.



Our pilot projects ensured that the new tools were adapted to each partner's national or regional context before they could be deployed on real construction.

or midsize construction companies are familiar with BIM processes. Those in the know only implement it during the design phase based on 2D plans, as BIM processes are not even an afterthought in the execution phase. Such approaches can considerably undermine the energy efficiency of NZEB projects.

Reaching the right stakeholders

“We focused on construction companies and on-site workers who had so far been mostly left behind in BIM process strategies. We strongly believe that they are in fact the very stakeholders who can guarantee that implementation complies with design,” Ben Moussa explains.

The project focused specifically on ventilation and airtightness. In France for instance, the team's training on ‘hands-on and on-site airtightness’ doubled or even tripled the level of airtightness on renovation sites compared to projects with no on-site training. This is just one of the project results. The team selected several pilot labs (national or regional BIM-learning Centres or on-site construction projects) where they reinforced training tests of custom tools and learning methods adapted to on-site workers. In the Netherlands for instance, they implemented the BIM maturity scan which can be used by organisations and value chains to detect skill gaps. Once this is done, they can organise targeted upskilling interventions.

“BIMplement goes way beyond methodologies, tools and technical training: It considers social acceptance to guarantee successful implementation and appropriation by the targeted groups. Our pilot projects, on the other hand, ensured that the

new tools were adapted to each partner's national or regional context before they could be deployed on real construction,” adds Ben Moussa.

Raising awareness

Perhaps BIMplement's most critical endeavour was to raise awareness and convince stakeholders of the importance not only of using BIM, but also of conducting on-site training for manual workers. And it worked. In France, national institutions financing training companies have shown interest in upskilling building companies, most of which are still not familiar with BIM processes.

Meanwhile in Spain, the Valencian regional government is now banking on training and qualification programmes using digital technologies. The region even adopted and customised the ‘Catalogue of constructive elements’ – a tool providing a wide range of solutions compliant with current regulations that contains information on the likes of thermal, acoustic, waterproof and fire-protection performance. The new version comes as an online application where users can connect their projects from their offices or on-site.

Now complete, BIMplement continues to live through the Horizon 2020 ARISE project which builds on the lessons learned through BIMplement. Project partner ASTUS has also developed programmes for training centres, efforts which will certainly help skilled on-site workers avoid errors and improve the quality of buildings over the coming years.

PROJECT

BIMplement – Towards a learning building sector by setting up a large-scale and flexible qualification methodology integrating technical, cross-craft and BIM related skills and competences

COORDINATED BY

Alliance Villes Emploi in France

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/745510

PROJECT WEBSITE

bimplement-project.eu



Tailored energy sector upskilling trialled in six countries

BUSLeague has advanced the pan-European recognition of cross-craft energy skills in the construction sector. New and improved training programmes are helping to deliver more sustainable buildings.



As a key sector of the European economy, construction is increasingly feeling the impact of the drive for more sustainable energy use. Success in meeting these green objectives lies in the hands of a suitably skilled and experienced workforce.

Despite past efforts to harmonise sustainable energy training and qualifications across the EU, curricula and content differ between countries, leading to variable levels of competence and expertise.

“The need for standardised skills is critical. Recently, we have seen a surge in demand for more efficient energy solutions,

such as airtightness of the building envelope, heat pump and solar installations,” says Jan Cromwijk project coordinator of the EU-funded [BUSLeague](#) (Dedicated to stimulate demand for sustainable energy skills in the construction sector) project.

BUSLeague has developed an upskilling training and qualification framework to deliver the sustainable energy solutions needed for the built environment.

“This framework supports skills-based green public procurement, while integrating cross-craft skills in existing and new training and e-learning materials,” explains Cromwijk.



The project trialled upskilling solutions in six different countries, supported by the 'Evaluation 1-2-3' toolbox developed by the project, which measured their effectiveness.

Some interventions work in one country but not others. Our teams included expertise beyond the technical, to identify the relative strengths and weaknesses in each national ecosystem.

Beyond the technical

Focusing on four key areas – mutual recognition of skills, awareness raising, capacity building and legislative changes – BUSLeague implemented a range of solutions in Austria, Bulgaria, France, Ireland, the Netherlands and Spain.

"Some interventions work in one country but not others. So to tailor our approach, our teams included expertise beyond the technical, to identify the relative strengths and weaknesses in each national ecosystem," adds Cromwijk.

For example, project partner the [University of Ljubljana](#) trained national implementation team members in ethnography techniques, helping them conduct people-centred stakeholder interviews.

The [University of Twente](#) coached the national teams in [storytelling techniques](#), which became integral for each consortium meeting.

Embedding upskilling for sustainable buildings

BUSLeague contributed to sister project TRAIN4SUSTAIN's European Committee for Standardization [workshop agreement](#). TRAIN4SUSTAIN had developed the Competence Quality Standard (CQS) underpinning the workshop agreement. The CQS evaluates, scores and reports the level of competence, skills and knowledge of white and blue collars in sustainable building.

"All our implementation countries are now directly or indirectly involved in [BUILD UP Skills](#) projects under the LIFE Clean Energy transition, where the BUSLeague learning outcomes, training materials and delivery will be further used," notes Cromwijk.

The BUSLeague consortium is now applying their upskilling approach to other areas along the sustainable building value chain. Work has already started on 'circular skills' and 'digital skills' modules. 'Cultural heritage' and 'climate adaptation' are forthcoming.

"Our mission for the future is to address public sector gaps in awareness and skills, working with housing associations and municipalities, vital players for our green transition," Cromwijk adds.

Examples of interventions

In France, [Build Your Project](#) was launched in the Hauts-de-France region to attract people, especially women, to the industry. Through basic assessments and taster sessions, the project helped people identify their existing skills and aptitudes, before providing training and employment support. Over 800 people have so far gone through the system.

While in Spain, BUSLeague partnered with the DIY chain [BAUHAUS](#) (website in Spanish) promoting energy efficiency among customers and developing training for their employees and installers (mostly self-employed and SMEs). The [Valencian Building Institute](#) (IVE), another partner, developed 10 micro-training modules delivered online via the BAUHAUS and IVE Moodle platforms. These learning resources attracted over 2 200 registrations.

Similarly in Ireland, the [Technological University of the Shannon](#) and the [Irish Green Building Council](#) (IGBC), using BUSLeague's qualification framework, supported the design of new eco-centres within DIY stores, demonstrating energy efficiency measures, complemented by in-store training videos. Simultaneously, the IGBC developed and delivered a 1-hour online training for staff of builders' merchants and DIY stores, outlining key building regulation changes and considerations for delivering energy-efficient buildings, and flagging training opportunities.

PROJECT

BUSLeague – Dedicated to stimulate demand for sustainable energy skills in the construction sector

COORDINATED BY

ISSO in the Netherlands

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/892894

PROJECT WEBSITE

busleague.eu



Training experts in energy-efficient construction

If the EU is to achieve its climate goals, it must improve the energy efficiency of its buildings. But doing so requires that building professionals acquire new skills in sustainable renovation. To help, one EU-funded project has set up a training and certification programme in energy-efficient construction for heating, ventilation and air conditioning professionals.



Accounting for 40 % of the EU's total energy consumption and 36 % of all greenhouse gas emissions, Europe's building stock has a carbon problem.

"Over a third of the buildings in the EU are over 50 years old, and approximately three quarters of these are considered energy-inefficient," says Johann Zirngibl, a senior scientist who coordinates the EU-funded project CEN-CE (CEN standard Certified Experts EU-wide qualification and training scheme

based on EPBD mandated CEN standards). "If the EU is to achieve its [Green Deal](#) climate objective of reducing net greenhouse gas emissions by at least 55 % and becoming carbon-neutral by 2050, these inefficient buildings must be fully renovated."

With the goal of doubling the rate of renovations over the next decade, the EU has launched its [renovation wave initiative](#) (RWI). However, before building professionals can start renovating, they first need to know how to do so in a sustainable, energy-efficient



To make the EU's envisioned 'renovation wave' a reality, we first need a qualified workforce and a quality assessment tool.

and training schemes in energy-efficient construction," explains Zirngibl.

Certifying HVAC experts

With the decarbonisation of heating, ventilation and air conditioning (HVAC) being a key focus of the RWI, CEN-CE has developed a range of training programmes specifically for HVAC professionals. "HVAC professionals play an important role in energy efficiency, especially in renovation where heating and cooling systems are replaced or upgraded first," remarks Zirngibl.

Based on standards set by the [European Committee for Standardization](#) (CEN), the training programmes cover both individual standards and 'big picture' issues like adopting a holistic approach to assessing a building's energy performance.

"Whereas some of these standards relate to the daily work of the HVAC professional, others relate to upcoming challenges like global cost calculation and integrating renewable energy sources," explains Zirngibl. "That's why simply providing training on individual technical topics is not enough and complementary training on transversal know-how is also needed."

The training and qualification schemes target middle- and senior-level professionals and include both workshops and in-class sessions. An electronic learning system has also been launched. "We've received very positive feedback from the hundreds of experts who have already been trained," adds Zirngibl.

Following the training, participants can take a test to become a CEN-CE certified expert. Once complete, the participant will have his or her name added to the publicly available [CEN-CE list of certified professionals](#), making it easy for anyone to find a qualified HVAC professional.

way – which is where the CEN-CE project comes into play.

"CEN-CE is dedicated to setting up qualification

CEN-CE is now looking for partners for the commercial roll-out of its training scheme.

Beyond renovations

By increasing the renovation sector's technical skills and competencies, the project is helping the EU achieve its climate goals. "To make the EU's envisioned 'renovation wave' a reality, we first need a qualified workforce and a quality assessment tool," notes Zirngibl. "CEN-CE has laid the groundwork for the former, now we must build on this work in order to deliver the latter."

However, the CEN-CE training is by no means limited to renovation – it also benefits new construction projects. "The EU's [Energy Performance of Buildings Directive](#) requirement that all new construction be nearly zero-energy as of 2021 has had a positive impact on our work and training," concludes Zirngibl. "This requirement demands a more expert-level understanding of technical building systems, and the CEN-CE training is well-positioned to provide exactly that."

PROJECT

**CEN-CE – CEN standard Certified Experts
EU-wide qualification and training scheme
based on EPBD mandated CEN standards**

COORDINATED BY

Scientific and Technical Center for Building in France

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/785018

PROJECT WEBSITE

cen-ce.eu



Boosting green employment in the Spanish construction industry

Guided by the EU target of decarbonising Europe's housing stock by 2050, Construye2020_Plus developed training solutions to support a sustainable construction industry in Spain, creating attractive employment prospects and opening up the marketplace.



Reducing the construction industry's CO₂ emissions will require structural changes to the sector, including the development of new techniques, new materials and new skills. This is an employment and market opportunity as much as a challenge, which also benefits the environment.

To help embrace the opportunities in Spain, the EU-funded [Construye2020_Plus](#) (A new boost for green jobs, growth and sustainability) project has been developing formal and informal training for green construction methods.

“Our cross-cutting approach has engaged experts to share different perspectives and collaborative solutions, linking areas of construction that might not otherwise work together. This has helped raise public awareness of sustainable buildings – crucial to developing a market for them,” explains project coordinator Esther Rodriguez from the [Construction Labour Foundation](#).

The project created a qualification for energy auditors – aligned with the EU's implementation of the [Energy Efficiency Directive](#), two energy efficiency courses (as well as updating existing ones) and a proposal for a green skills recognition system.



It also completed a virtual information sharing campaign reaching hundreds of people.

Training and accreditation

Construye2020_Plus adopted the [quintuple helix innovation model](#), engaging key stakeholders from academia, business, government, civil society and environmental interest groups, to share knowledge, expertise and opportunities.

These experts identified key construction industry challenges, proposing a training road map for the implementation of 30 recommended solutions for greater energy efficiency, renewable energy sources and nearly zero-energy buildings (NZEBs).

The vocational and educational training developed by Construye2020_Plus includes two short cross-cutting courses, piloted in 2021.

The 'energy efficiency for operators' programme attracted 130 students through six online and two face-to-face courses in Bilbao and Madrid. A further 186 students attended the 'energy efficiency for middle managers' course, with six online courses and three face-to-face in Seville, Madrid and Palma de Mallorca.

On completion, participants received [basic and intermediate 'Green tag' diplomas](#). In a satisfaction survey, participants rated both courses 3.5 out of 4.

The project also updated six courses under the umbrella of the [BUILD UP Skills initiative](#) including those for laws and regulations, materials and construction solutions and the NZEB approach.

Taking advantage of recent digitalisation advances in the construction industry, Construye2020_Plus introduced a lean construction and building information modelling (BIM) methodology into their training. "As efforts to digitalise construction workflows are not yet widespread in Spain, we only introduced these concepts," adds Rodriguez. "The objective is not to deliver full training in a specific trade, but to familiarise tradespeople with the range of sustainable construction techniques available."

Included in the National Catalogue of Specialised Training, 1 700 workers registered to take part in these courses in 2021. To develop the energy auditor qualification, the team followed the methodology established by the [Spanish National Institute of Qualifications](#) (website in Spanish), a project partner. [The legislation](#) (web page in Spanish) was officially published by the state in January 2022.

"This professional qualification satisfies one of the legal conditions for becoming an energy auditor in Spain. It now provides a framework for formal vocational training certificates, such as the 'Advanced Vocational Training Specialisation Course in Energy

We want to achieve a generational shift so that green construction jobs become more attractive to youngsters, while helping to create market demand for sustainable construction.

Auditing', which trains specialists for emerging sectors with high employability prospects," says Rodriguez.

Shifting mindsets

Project results have been promoted within European training networks such as [REFORME](#) and [CPD](#). Project partners have also participated in three [BUILD UP Skills EU Exchange](#) events, most recently in November 2022, where they shared expertise about skills certification, especially the Green tag system.

To further promote the benefits of energy efficiency in buildings, the team pivoted their proposal for a travelling awareness raising campaign to an [online 'Virtual Route'](#). By the end of 2021, they had delivered 15 webinars promoting sustainable construction principles and outlining their importance for upcoming funding opportunities. The campaign facilitated 100 public and private construction sector panel discussions, reaching over 720 attendants.

"We want to achieve a generational shift so that green construction jobs become more attractive to youngsters, while helping to create market demand for sustainable construction," notes Rodriguez.

Some Construye2020_Plus partners continue working together within the [Construye 2030](#) project, under the [LIFE Clean Energy Transition sub-programme](#), as a continuation of the BUILD UP Skills initiative. The principle objective is to update the 2012 [Status Quo and Training Roadmap](#).

PROJECT

Construye2020_Plus – A new boost for green jobs, growth and sustainability

COORDINATED BY

Construction Labour Foundation in Spain

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/785019

PROJECT WEBSITE

construye2020plus.eu/en/home

E-learning platform ensures green construction skills in Czechia and Slovakia

To meet growing demand for energy-efficient buildings, the CraftEdu project developed an e-learning platform that helps to ensure the availability of the right skills amongst on-site workers and vocational schools.



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Achieving greener building standards, such as nearly zero-energy buildings or [deep renovations](#), relies on specialist skills amongst construction professionals.

The EU-supported project [CraftEdu](#) (Setting up national qualification and training scheme for craftsmen in the Czech Republic and developing the further offer of training courses in Slovakia, Austria and Bulgaria) has developed training and

qualifications in energy efficiency and renewable energy, mainly in Czechia and Slovakia.

“COVID-19 restrictions spurred us on to increase the online component of our training,” explains project coordinator Jiří Karásek, from the SEVEN [Energy Efficiency Center](#). “Our interactive e-learning platform now includes over 50 training videos and around 20 e-learning modules, with regular online



By designing training which is engaging and modern, CraftEdu helps to attract young people who are starting out in their careers.

consultations between trainers and students. We have had good levels of engagement, with one training video for electricians already receiving over 550 views.”

CraftEdu built on the achievements of the previous [StavEdu](#) project in

Slovakia, which had stimulated a dialogue between policymakers, vocational trainers and employers, about how to deliver the construction skills needed to meet the [EU's 2020 energy targets](#).

StavEdu led to a voluntary initiative called Building Future, established in Slovakia, for the training of professionals working on energy efficiency solutions and the use of renewables. CraftEdu extended this initiative to Czechia.

Reaching educational and professional stakeholders

CraftEdu set out to provide a full qualification package for seven established professions key to energy-efficient buildings, in construction or renovation.

In Czechia, these were heating, ventilation and air conditioning installers, carpenters, low-voltage electricians, high-voltage electricians, hydro-insulators, stove and chimney builders, inspecting technicians and window installers. In Slovakia the initiative targeted carpenters, low-voltage electricians, high-voltage electricians, hydro-insulators and window installers.

Development of the training modules involved trainers and vocational schools already developing training courses, alongside Czech and Slovak ministries and construction associations, guilds and chambers of commerce, including the [Czech Technical University in Prague](#) and the [Association of Construction Entrepreneurs](#) in both countries.

“While the project initially aimed for just one e-learning programme, given our pivot to e-learning, we developed around 20, increasing the project’s impact,” says Karásek. “We had over 370 registered participants, and interest was really strong across the portfolio.”

Those who successfully completed a course in Czechia or Slovakia received the CraftEdu learning certificate. Over 280 craftspeople had completed courses by autumn 2021.

The CraftEdu courses and support can be accessed after registration in the [CraftEdu database](#) which is available in four languages (Czech, Slovak, German and Bulgarian), with most of the training available in Czech and Slovak.

Enticing young people into ‘green growth’ careers

CraftEdu’s programme contributes directly to EU efforts to create green growth jobs, by offering training and qualifications in an industry tasked with delivering energy efficiency as part of the [European Green Deal](#).

“Crucially, by designing training which is engaging and modern, CraftEdu helps to attract young people who are starting out in their careers,” adds Karásek.

The team continues to collaborate with ministries, construction companies and schools to further develop the training schemes. It is also working to integrate the platform within the curricula of vocational schools in Czechia and Slovakia.

Working with construction associations, the team has influenced policy, such as proposing an upgrade to qualification standards in Czechia, while the new Slovakia building code will be introduced with support from project partner [ZSPS](#) (website in Slovak).

The team continues its policy work within the EU-funded [DoubleDecker](#) (website in Czech, Slovak, German and Bulgarian) project in Czechia and Slovakia, alongside further BUILD UP Skills projects in [Austria](#) (Reboot BUILD UP Skills Austria) and [Bulgaria](#) (BUILD UP Skills Bulgaria 2030).

“Those projects will update analyses of the current situation, leading to renewal of national qualification platforms and development of national road maps for each country,” adds Karásek.

PROJECT

CraftEdu – Setting up national qualification and training scheme for craftsmen in the Czech Republic and developing the further offer of training courses in Slovakia, Austria and Bulgaria

COORDINATED BY

SEVEn Energy Efficiency Center in Czechia

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/785036

PROJECT WEBSITE

craftedu.eu

Promoting the skills needed to deliver heat pumps' potential

The HP4All project has developed resources that promote the skills needed to meet the fast-growing demand for heat pumps – helping the EU reach its climate and REPowerEU objectives.

More efficient than fossil fuel boilers, heat pumps reduce life-cycle energy costs. If driven by green electricity, they also reduce carbon footprints. In buildings, they can provide space heating and domestic hot water as well as space cooling in the case of reversible systems.

According to the [European Heat Pump Association](#), the EU has 16.98 million heat pumps installed, 14 % of the heating market, with 2021 heat pump sales growing by 34 %.

"We already see increased demand for skills along the value chain, from factories to installation, for both new and retrained professionals," notes Padraic O'Reilly, coordinator of the EU-funded [HP4All](#) (Heat Pumps Skills for NZEB Construction) project.

HP4All created a package of piloted measures to improve European awareness and skills regarding heat pumps. "We increased end-user awareness of high-quality heat pumps, while providing tailored training and promotion of existing options to boost the skills needed to meet growing demand," says O'Reilly.





Three regional pilots

HP4All conducted three regional pilots, each representing different degrees of market maturity. To better understand each market, the team interviewed stakeholders, including installers, system designers, manufacturers, end users and training providers.

“This helped us identify each pilot region’s specific requirements, so we could roll out tailored activities and training,” explains O’Reilly.

The Irish pilot has primarily focused on local authorities and their respective heat pump installations, with a secondary focus on large-scale heat pump installations and private domestic heat pump installations. HP4All has provided training to local authorities in a first attempt to provide the staff who will be responsible for installations with the information they need and a source of further resources if required.

The Upper Austrian pilot aimed to boost the market for mid- and large-scale heat pump applications (commercial and industrial). The project’s activities were geared towards overcoming current challenges, such as low levels of awareness among planners and users, alongside the lack of required skills.

Pilot activities in Andalusia, Spain, tapped the public sector’s potential to drive demand through public promotions and leveraging this sector as a key market influencer able to provide legislative, administrative and financial initiatives. The pilot focused primarily on heat pumps for public buildings (residential and non-residential).

Enabling resources

The HP4All project developed a Competency Framework outlining skills – grouped into technical, customer and business clusters – considered vital for heat pump sector growth.

The Framework was developed after consultation with stakeholders through workshops and surveys, interviews with heat pump expert groups and event panel discussions, such as those carried out by the European Heat Pump Association, a partner in the consortium. This was complemented by desk research, including into comparable models from other fields.

To retain and share the resources created and collated by the pilots, a [Knowledge Hub](#) was set up for each which included a heat pump benchmarking tool, a set of dedicated resources relevant for each stage of the supply chain.

“The tools help decision-making, after users learn more about operational performance, with information about seasonal factors, expected energy consumption and costs, based on building type and specific heat pumps,” explains O’Reilly.

More reskilling and upskilling investment is needed, alongside incentive schemes to attract new professionals.

Based on the lessons learned in the project, the consortium also produced policy recommendations to help public authorities at various level of governance ensure the availability of skilled professionals.

“We highlight where regulations need to be changed, and skills shortages as a significant obstacle to achieving not only heat pump initiatives, but also related ones, such as the [European Green Deal](#) and the [renovation wave](#),” says O’Reilly.

Meeting the challenge

Industry estimates that by 2030, the number of heat pump manufacturing, installation and maintenance workers must [increase by 50 %](#). In addition, at least 50 % of existing energy industry workers must be reskilled for heat pump technologies.

The EU’s strategy for sector integration foresees that in 2030 [40 % of all residential and 65 % of all commercial buildings](#) will be heated by electricity – many using heat pumps.

“More reskilling and upskilling investment is needed, alongside incentive schemes to attract new professionals. A new approach, promoting micro-credentials and digital/hybrid learning, alongside the mutual recognition of competencies, should also be pursued,” adds O’Reilly.

HP4All’s observer countries – Croatia, Portugal and Romania – now intend to become early adopters of the HP4All package, with the team planning to replicate their model in 10 more regions and Member States by 2030.

PROJECT

HP4All – Heat Pumps Skills for NZEB Construction

COORDINATED BY

Technological University of the Shannon: Midlands Midwest in Ireland

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

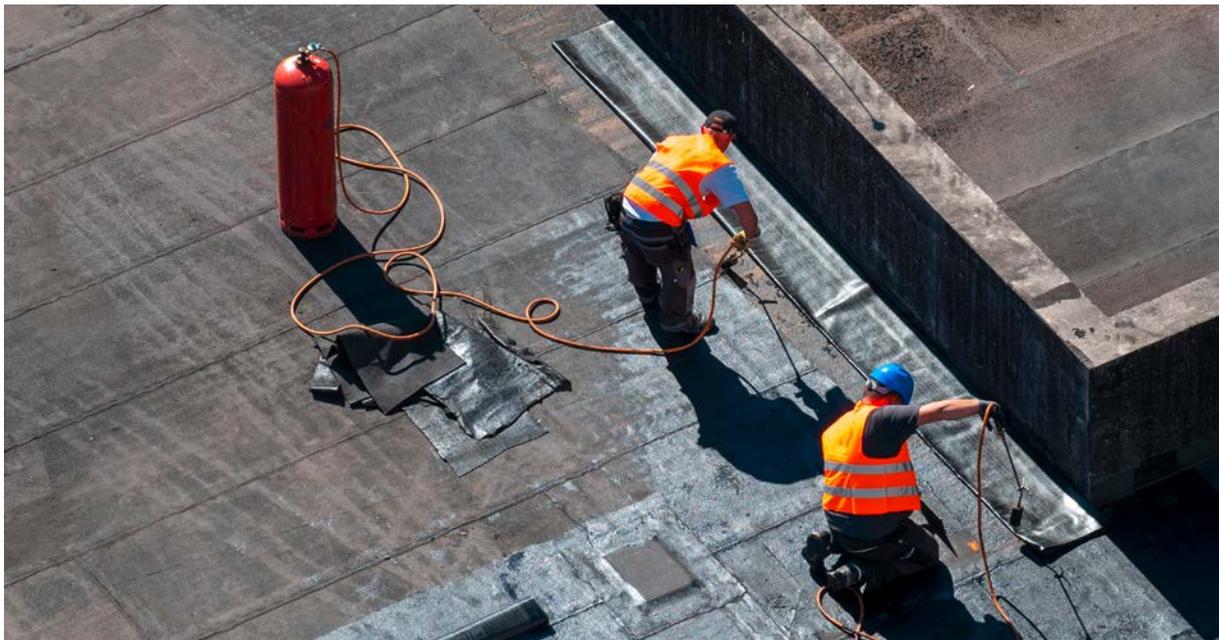
cordis.europa.eu/project/id/891775

PROJECT WEBSITE

hp4all.eu

Enhancing and standardising skills for energy-efficient buildings

The challenge with EU climate goals for more efficient energy use is transferring them from the page to bricks and mortar. NEWCOM supports nearly zero-energy buildings with new training modules for professionals, complemented by a European competences database.



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The EU's [Energy Performance of Buildings Directive \(EPBD\)](#) promotes policies that will achieve a highly energy-efficient and decarbonised building stock by 2050 – for both renovations and new builds.

Yet, construction of high-quality sustainable buildings, especially residential, suffers from inadequate quality assurance during construction/renovation, a shortage of relevant and up-to-date skillsets as well as low demand from owners and developers.

To support the construction industry, [NEWCOM](#) (New competence for building professionals and blue-collar workers – certified qualification schemes to upgrade the qualification for building nZEBs) developed nearly zero-energy building (NZEB) training

schemes. The training is modular with units either stand-alone or complementary to pre-existing courses.

In addition, a competence database was created to help standardise mutual recognition of skills across Europe. The database links course-accredited competences with individual professionals using an app-mediated skills card, viewable by potential clients.

“By inputting further training or course modules, this system can be expanded to other professional fields,” says project coordinator Georg Trnka from the [Austrian Energy Agency](#) (website in German).



Building owners benefit from higher workmanship and energy efficiency, while pan-European standardisation benefits professionals seeking mobility of employment

Enhancing and standardising construction skills

For the construction sector to ensure the highest energy efficiency for buildings, even minor construction or renovation errors need to be avoided. An airtight [building envelope](#) has to be established along with professionally installed heating, ventilation and air conditioning (HVAC) systems. Yet there are gaps in the skills required to achieve this.

“Further education about energy efficiency is surprisingly scarce in many European countries, and existing courses often don’t cover topics like cross-craft understanding, life-cycle service or continuous energy control and monitoring,” adds Trnka. “As there is also declining demand for personal certification in building services and skills under [ISO 17024](#), unless it relates to safety, it makes sense to tie energy efficiency training to established courses.”

Based on the priority needs of the project partners, NEWCOM’s training modules focused on three topics.

Firstly, Flat Roofs and Roof Waterproofing, taking a lifelong service approach, including planning and installation of green roofs and energy efficiency measures. Secondly, Ventilation Installations, including heat recovery, noise protection, controlled airflow and smart demand systems. Thirdly, Quality Assurance in the planning, construction and operation phase of NZEBs, including aspects of indoor air quality, quality of the thermal building envelope and the energy system, such as cost-efficiency measures.

The project’s partners, who helped develop the NEWCOM training modules, were organisations tasked with national energy efficiency implementation and/or having experience in upskilling professionals, such as institutions and vocational schools responsible for NZEB skills. Train-the-trainer sessions were conducted and involved 149 trainers from different professional backgrounds.

The competence database was based on a methodology developed in cooperation with the [BIMplement](#) project.

After completing a training module, professionals can be tested in accordance with Units of Learning Outcomes, which certify the individual’s skills. The competence database is linked to the [BUILD UP Skills Advisor app](#) which can display a professional competency card, viewable by clients or companies.

Building benefits

NEWCOM supports the EPBD, the EU’s legislative instrument for improving the energy performance of European buildings.

“Building owners benefit from higher workmanship and energy efficiency, while pan-European standardisation benefits professionals seeking mobility of employment,” explains Trnka.

Most of NEWCOM’s training modules have been adopted by the project’s partners, for example in Austria by the Working Group for Energy Consultant Training. In Hungary, the modules were offered in cooperation with the TRAINBUD Sustainable Construction Skills Alliance. While Slovakia offers the training in cooperation with other projects such as [StavEdu](#) and [ingREeS](#).

The team have gone on to develop further training (running September 2020 until February 2023) for quality, energy efficiency and renewable energy in building construction. Included in the BUILD UP Skills app, the training aligns with the competence database, supporting the mutual recognition of skills.

In Austria specifically, an energy skills needs assessment was undertaken, supported by the national climate protection network, [klimaaktiv](#), and included a review of national supplier network training. This resulted in three short online training modules, focusing on residential building renovations, ecological construction material management and quality checks on energy efficiency.

“These were targeted at national energy advisors, a key group linking consumers with the construction sector, who have the right background knowledge and are often willing to partake in this kind of ‘cross-trade’ training,” says Trnka.

Over 100 participants took part between December 2021 and December 2022, with over 80 % evaluating the training as excellent.

PROJECT

NEWCOM – New competence for building professionals and blue-collar workers – certified qualification schemes to upgrade the qualification for building nZEBs

COORDINATED BY

Austrian Energy Agency in Austria

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/754148

PROJECT WEBSITE

newcomtraining.com



On the road with energy-efficient buildings

Raising awareness about the many benefits of green and sustainable buildings through informative, interactive and fun events and training opportunities.

Responsible for 40 % of the EU's total energy consumption, Europe's building stock is the Continent's single largest energy user. It's also a major roadblock to Europe being able to achieve its ambitious climate goals.

"The path to climate neutrality starts with energy-efficient buildings," says Dragomir Tzanev, executive director at [EnEffect](#), a Bulgarian think tank on the efficient use of energy resources.

Addressing this challenge are policy initiatives such as the [Energy Performance of Buildings Directive](#), which mandates that, as of 2021, all new buildings be nearly zero-energy buildings (NZEBs), and the [renovation wave strategy](#), which aims to double the annual energy renovation rates of existing buildings over the course of the next decade.

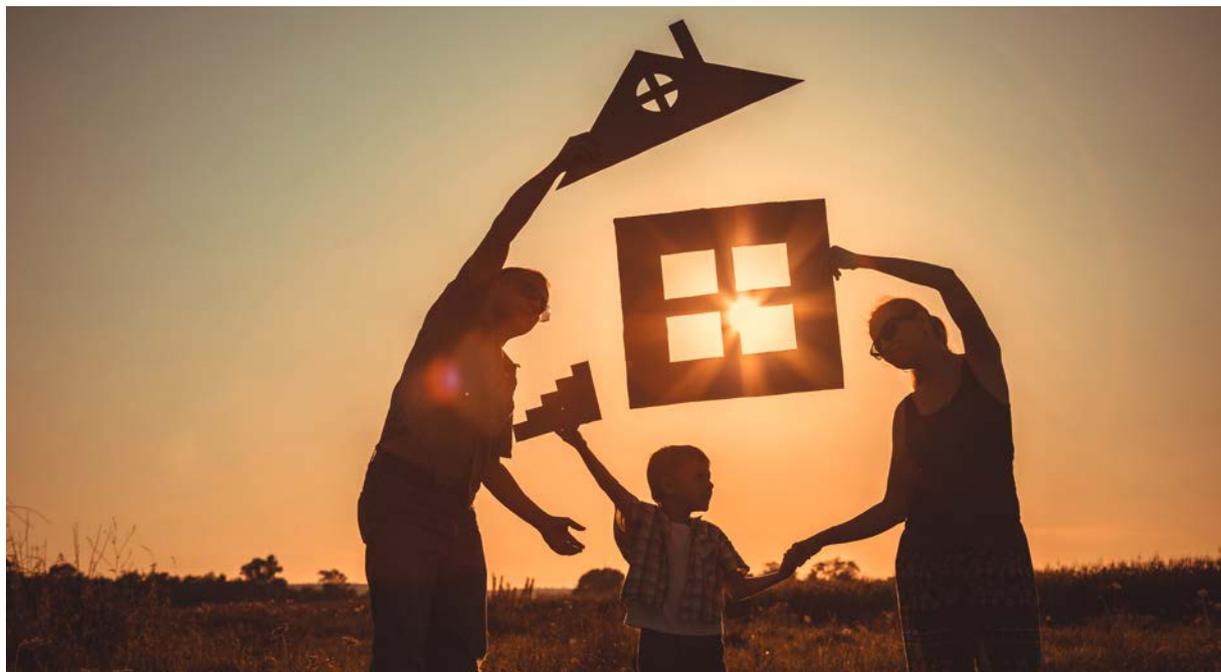
While these policy initiatives would put a substantial dent in the building stock's total energy footprint, their success is heavily

dependent on there being demand for such energy-efficient buildings and renovations, as well as for trained and qualified professionals to carry out these projects.

For [The nZEB Roadshow](#), an EU-funded project, the best way to stimulate such demand is to go straight to the end users: the homeowners. So, they packed up their relevant training materials, tools, equipment and demonstrators and hit the road.

Raising awareness about energy-efficient buildings

With the goal of showcasing the benefits of green and sustainable buildings, the project took its message across Bulgaria, Croatia, Greece, Italy and Romania.



"We built mobile training and demo units designed to raise awareness about the benefits of NZEBs and to get homeowners, building professionals and other stakeholders interested and talking about energy-efficient buildings," explains Tzanev, who served as the project coordinator.

The project organised a wide range of events, including conferences, product exhibitions, training for professionals and information sessions for homeowners. There were also press conferences, events with policymakers, events for kids and school visits.

"We did all kinds of crazy and fun activities, all of which aimed to educate and raise awareness about the importance of energy efficiency and how it saves both money and the environment," adds Tzanev.

Fun for the entire family

The project even held energy efficiency festivals for the entire family. For example, in Croatia, the 'MUZA' demo truck has already visited 14 different cities, where it set up shop at popular locations. Families could go from tent to tent and participate in different hands-on activities, including games and contests, and learn about the benefits of energy efficiency – all while having fun.

"What really made this event unique is that, while the entire exhibition was dedicated to NZEB, there was something for everyone – professionals, politicians, suppliers, homeowners and, most importantly, young people," notes Tzanev.

The Croatia roadshow was such a success, it received the National Geographic Award for best educational initiative. MUZA is now permanently hosted at the Nikola Tesla Technical Museum in Zagreb.

Connecting homeowners with building professionals

In total, the project organised over 30 public events, which attracted tens of thousands of visitors. It also successfully

trained more than 4 000 building professionals in energy-efficient construction and renovation.

"We helped connect homeowners who were excited about energy efficiency following one of our events with these newly trained professionals – showing how education and awareness raising can go a long way in terms of stimulating demand," concludes Tzanev.



We did all kinds of crazy and fun activities, all of which aimed to educate and raise awareness about the importance of energy efficiency and how it saves both money and the environment.

The project is currently working with cities and authorities from across Europe – and beyond – to help them implement similar energy efficiency roadshows in their own countries and regions.

PROJECT

The nZEB Roadshow

COORDINATED BY

Center for Energy Efficiency EnEffect in Bulgaria

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/892378

PROJECT WEBSITE

nzebroadshow.eu



Upskilling energy-efficient construction in North Macedonia

Buildings represent 40 % of European energy consumption. To increase energy efficiency in North Macedonia's buildings, TRAINEE developed training, a knowledge centre and a skills register, while boosting market recognition of green buildings.



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The [national qualification road map](#) of North Macedonia was developed under the BUILD UP Skills initiative to increase energy efficiency (EE) and renewable energy sources (RES) building skills in the country. The roadmap identifies the skills required, indicates where there are skills shortages and calls for updated training where needed.

To help overcome barriers such as a lack of trainers/training providers and low market demand for EE and RES skills, the

EU-supported TRAINEE (TowaRd market-based skills for sustAINable Energy Efficient construction) project developed training for priority skills listed in the road map. The project also established a knowledge centre, which as well as providing training access also offers an [online tool](#) for homeowners to evaluate the energy performance of their buildings – a regional first.

"Awareness raising was critical. For example, despite building information modelling (BIM) being a crucial construction innovation worldwide, it was little known in North Macedonia.



We found short training sessions with small groups of 6-10, with less theory and organised as on-the-job training, to be most effective.

So, we developed training and a policy proposal for its introduction nationally," says project coordinator Jadranka Arizankovska from the [Economic Chamber of North Macedonia](#).

Qualifications along the whole value chain

To upskill the workforce towards EE and RES, voluntary qualification schemes from previous BUILD UP Skills projects were first updated and a process developed for the recognition of prior learning (RPL) for several professional groups: on-site workers; technicians/engineers; architects and designers; as well as installers of solar-thermal energy and photovoltaic systems. TRAINEE then developed nine new training topics for these groups.

The new BIM course – for practitioners, decision makers, builders and manufacturers – used [ACCA](#) software. As this is an interoperable [open BIM tool](#), certified and approved by the industry body [buildingSMART](#), it ensures quality and sustainability.

The RPL route to certification was piloted for 11 occupations with 429 trainees, of whom 369 were certified, while all nine new training schemes were piloted with 234 trainees, of whom 183 achieved certification.

"We found short training sessions with small groups of 6-10, with less theory and organised as on-the-job training, to be most effective," remarks Arizankovska.

To promote EE, the project also developed an online tool for its knowledge centre which allows users (homeowners or occupants) to evaluate their building's energy performance, along with suggestions for improvement.

Higher-quality buildings, energy savings and more employment

The [knowledge centre](#), based in Skopje at the Engineering Institution of Macedonia, currently holds the catalogues that can be used for scheduled training. To date, 20 memorandums have been agreed with construction companies interested in having their employees take part in the training.

To further increase EE visibility and demand, the centre also houses the project's online searchable register of certified workers and trainers. "It has been of interest to the authorities as a basis for a national register of licensed renewable energy sources installers, in alignment with the [Renewable Energy Directive](#)," adds Arizankovska. The centre is now working to secure official verification of the training by national institutions for adult education.

The project's results also contribute to European efforts to standardise qualifications, such as achieving [ISO 17024](#) for professional profiles, with TRAINEE developing and piloting in Croatia, Greece and Slovenia its [methodology for mutual recognition of skills between countries](#).

"In the meantime, more work needs to be done to promote opportunities, especially of the benefits of RPL to on-site workers who do not yet seem to fully value this approach as a means to certification," says Arizankovska.

The TRAINEE team has ensured the continuation of its work through the ongoing Horizon 2020 project [SEetheSkills](#) aiming to stimulate demand for energy-efficient construction skills through a novel '3V' approach which increases their visibility, validation and value.

PROJECT

TRAINEE – TowaRd market-based skills for sustAINable Energy Efficient construction

COORDINATED BY

Economic Chamber of Commerce in North Macedonia

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/785005

PROJECT WEBSITE

trainee-mk.eu/en



A passport to take energy efficiency building skills across borders

Researchers work to make it easier for a building professional to have their energy efficiency skills, certifications and accreditation accepted across all EU Member States.



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Buildings and homes are Europe's single largest consumer of energy. This shouldn't come as a surprise, considering that most of these buildings were built during the post-war construction boom.

"Europe's buildings aren't only old, they're grossly inefficient," says Peter Gyuris, senior project manager at [Geonardo](#).

The good news is that these energy-inefficient homes can be made efficient through renovation. In fact, according to some estimates, doing so could save 45 % of the final energy consumption currently used to heat residential buildings. It's because of figures like these that the EU launched its [renovation wave initiative](#), which looks to renovate 35 million buildings by 2030.

Unfortunately, doing so is easier said than done. “Energy-efficient and good quality home renovations require an advanced skillset from building professionals,” adds Gyuris. “While these skills are already in short supply, accessing those professionals who are properly trained is even more difficult.”

As Gyuris explains it, one problem can be that if a building professional gets trained and certified in one country, that certification is often not recognised in another. “Before one can implement adequately performed energy-efficient renovations across the border, they would need to go through that country’s qualification and/or training scheme(s) – at the end of which they get the level of qualification they might already have,” he says.

Cutting through this red tape is the EU-funded project [TRAIN4SUSTAIN](#) (Establishing Future-Oriented Training and Qualification Quality Standards for Fostering a Broad Uptake of Sustainable Energy Skills in the European Construction Sector). “Our goal was to establish a system of mutual recognition, one that would make it easier to have one’s accreditation accepted across all EU Member States,” notes Gyuris.

Proving equivalence with the Skills Passport

To do this, the consortium, led by Geonardo, analysed all available national qualification and training schemes. This process also included market-based and for-profit options.

The outcome of this effort is the [Skills Passport](#). “The Skills Passport is a tool designed to foster easy and practical comparison of skill levels among different professions on a transnational level,” remarks Gyuris. “It can be used to prove equivalence of qualification schemes within the EU or even with neighbouring states.”

The European Skills Registry and a new Competence Quality Standard

To make the Skills Passport possible, TRAIN4SUSTAIN has improved the Competence Quality Standard (CQS), a catalogue of skills covering most competences relevant to energy performance in buildings, originally developed by the [PROF-TRAC](#) project. Any building professional can find his or her competences there, and select the level of competence possessed. In order

to facilitate further uptake and standardisation, TRAIN4SUSTAIN validated the CQS through a CEN Workshop Agreement, a pre-standardisation step.

This universal reference makes not only Skills Passports possible, but also the publication of a building professional’s certified competences in a single database: the [European Skills Registry](#).



*The more skilled professionals we have,
the more buildings and homes we can
renovate and the more energy we can save.*

“This is an easy-to-use, web-based platform for comparing and verifying professional qualifications,” says Gyuris. “It also serves a matchmaking function in that it can help connect qualified experts to energy-efficient building projects.”

The European Skills Registry allows individual passports to be grouped in teams and companies, which is instrumental in proving competence in the context of larger projects. TRAIN4SUSTAIN has even tested the European Skills Registry in a public procurement procedure in Spain.

“All of these outcomes make energy sustainability much more attractive to building professionals,” concludes Gyuris. “The more skilled professionals we have, the more buildings and homes we can renovate and the more energy we can save.”

PROJECT

TRAIN4SUSTAIN – Establishing Future-Oriented Training and Qualification Quality Standards for Fostering a Broad Uptake of Sustainable Energy Skills in the European Construction Sector

COORDINATED BY

Geonardo Environmental Technologies in Hungary

FUNDED UNDER

Horizon 2020-ENERGY

CORDIS FACTSHEET

cordis.europa.eu/project/id/894514

PROJECT WEBSITE

train4sustain.eu



CORDIS Results Pack

Available online in six language versions: cordis.europa.eu/article/id/430447



Published

on behalf of the European Commission by CORDIS at the Publications Office of the European Union
2, rue Mercier
L-2985 Luxembourg
LUXEMBOURG

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This Results Pack is a collaboration between CORDIS and the European Climate, Infrastructure and Environment Executive Agency.



Print	ISBN 978-92-78-43429-8	ISSN 2599-8285	doi:10.2830/657793	ZZ-AK-23-002-EN-C
HTML	ISBN 978-92-78-43446-5	ISSN 2599-8293	doi:10.2830/918538	ZZ-AK-23-002-EN-Q
PDF	ISBN 978-92-78-43431-1	ISSN 2599-8293	doi:10.2830/059333	ZZ-AK-23-002-EN-N

Luxembourg: Publications Office of the European Union, 2023

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RESULTS PACK ON REDUCING ENERGY BILLS

The rising cost of fuel and electricity has led to an increase in energy bills for households.

This Results Pack on Reducing Energy Bills highlights EU-funded projects that help citizens lower their energy consumption and their bills by shifting to more efficient and sustainable choices. These include replacing old and inefficient appliances with more efficient ones, getting involved in collective purchase schemes and community energy actions, and supporting vulnerable households challenged by energy poverty.



Check out the Pack at:
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