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Cover photo: Nieuw Zuid development in Antwerpen | Belgium © Studio Associato Secchi-Viganò

Opportunities and benefits

As key influential members of the design team, building designers and engineers will be responsible for ensuring that ever-stricter environmental targets are met in their developments in order to comply with European directives. Passive House offers a proven mechanism for delivering nearly zero energy buildings. PassREg provides designers with case studies of successful projects across Europe, presented on www.passreg.eu as well as the Passive House Database (www.passivehouse-database.org). The project gets training opportunities off the ground throughout the EU for those wishing to upskill in order to become proficient in these design methods. This will be particularly helpful in areas where there is currently limited knowledge and experience of methods to deliver very low energy design, but an aspiration to do so in line with national targets.

By pooling the experiences of partners from across Europe, the project compares and contrasts a range of approaches and design strategies in order to establish the most appropriate concepts for different applications and climates.

The lu·teco office building in Ludwigshaven, Germany is among the world's largest office complexes built to the Passive House Standard. Making use of various state-of-the-art technologies including subsoil heat exchangers, a heat pump, concrete core activation and a photovoltaic system, the building barely uses any energy from conventional sources and stands as an example of non-residential buildings in line with the PassREg concept.

Taking advantage

Designers and engineers can become engaged with the project and its findings directly both online as well as through events such as the International Passive House Conference, the International Passive House Days and a wide variety of events held locally throughout the participating regions. Study tours are also being conducted within the project framework to disseminate the lessons learned from PassREg and other Passive House schemes supplied by renewables.

The Passive House approach is flexible enough to accommodate the entire range of construction methodologies and designs, whilst delivering 'cutting edge' environmental performance across buildings of various uses and scale. A future proof construction solution that makes the use of renewable energies feasible, Passive House is compatible and complementary with many existing national standards and can be adopted to help contribute to the delivery of Nearly Zero Energy Buildings.

An early development in 2000 of 32 Passive House dwellings in Hanover had an average primary energy demand of 75 kWh/m²a, of which the space heating demand was 12 kWh/m²a. Each house was sold with a share in a local wind energy plan that effectively covered the necessary energy demand of the dwelling.

PassREg

Building for the energy revolution

Passive House Regions with Renewable Energies

An informational pamphlet for:
architects and engineers

Passive House regions

Meeting our energy needs sustainably into the future requires nothing short of an energy revolution. In terms of our built environment, perhaps the greatest opportunity lies in the promotion of an “energy efficiency first” approach to building, supplemented by renewable energies. Several front runner regions across the EU already successfully support this approach on the basis of the Passive House Standard. Many more aspire to get on board.

By investigating what makes front runner regions so successful as well as by making their successes more accessible, the PassREg project helps aspiring regions become front runners themselves. In the examination of both regional mechanisms and individual construction case studies, a wealth of knowledge will be gleaned to support actors in optimising existing models promoting energy conscious construction and inspiring new ones.

Participating regions

Austria	The Region of Tyrol
Belgium	The Brussels Capital Region The City of Antwerp
Bulgaria	The City of Burgas along with the Cities of Gabrovo, Sofia and Varna
Croatia	The City of Zagreb
France	The Region of Aquitaine
Germany	The Cities of Frankfurt am Main, Hanover and Heidelberg
Italy	The City of Cesena and the City of Aglientu, The Regions of Catania, Foggia, Marche, and Pesaro and Urbino The Government of Sicily
Latvia	The Regions of Rezekne and Vidzeme The City of Strenci
Netherlands	The Regions of Arnhem-Nijmegen and Gelderland The Cities of Arnhem and Nijmegen
United Kingdom	The Region of Wales

Toward EU energy goals

The EU has set ambitious goals for energy performance in buildings. To meet these goals by the 2020 deadline, many are looking to the Passive House Standard for energy performance in buildings.

Passive House is the basis

An internationally recognised building energy standard, Passive House combines maximal comfort with minimal energy use and life cycle costs. Through a focus on careful planning paired with quality building components, Passive House buildings use an average of 90% less energy than typical building stock – in terms of heating, they require less than 1.5 cubic metres of gas or 1.5 litres of oil per square meter annually. Vast energy savings have also been demonstrated in warm climates where conventional buildings typically require active cooling.

Making renewables feasible

The high levels of energy efficiency reached by Passive House buildings mean that the tiny energy demand that remains can be covered, economically, by a wide variety of renewable energy sources. Such efficient buildings can also do more with the renewables placed on small surface areas – a critical aspect in urban areas where buildings often have restricted roof and facade areas.

Many Passive House buildings make use of renewable energies, e.g. through photovoltaic systems, to cover their remaining energy demand.

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Quality assurance

Buildings, whether new build or retrofit, must perform as expected if we are to ensure sustainable energy supply into the future and improve our standard of living in so doing. Proper performance, in turn, can only be ensured if quality in design, construction and the materials chosen is taken seriously.

PassREg builds upon existing Passive House design tools as well as quality assurance procedures and certification criteria for both buildings and components. Through PassREg, these criteria are being optimised for application throughout the EU, guided in part by the monitoring results of select case studies. In addition, PassREg strengthens the appropriate quality assurance infrastructure in partner countries while driving increased availability of qualified materials and products on regional markets.

The energy balance and Passive House design tool known as the PHPP or Passive House Planning Package is perhaps the most accurate energy balance program on the market. It stands as the first step in quality planning for low energy buildings.

The Passive House Institute certifies building components in order to provide quality assurance for high performance, Passive House suitable products and make such products visible on the market. This is an example of the seal awarded to transparent components meeting Passive House criteria.

Buildings meeting Passive House energy efficiency criteria can be certified according to international Passive House criteria. For energy retrofits in which the Passive House requirements cannot be met, EnerPHit certification may be awarded. These certifications stand for quality in high performance construction.

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Training and qualification

Qualified architects, engineers and craftspeople are essential in the successful construction of high performance buildings. Such professionals form the basis of the successes seen in front runner regions having successfully implemented Passive House solutions supplemented with renewables on large scales. Indeed, one of the greatest challenges faced in this regard lies not in technical details but in the training of qualified professionals.

Through PassREg, aspiring regions are being supported in the development of long term training strategies based on the successes of front runners. Courses making use of and building on readily available material for designers and tradespeople are being translated and adapted as needed to fit regional requirements. These offerings, supplemented by a range of informational sessions and forums, will serve as the basis for the general uptake of Passive House training by educational systems as well as by the building sector throughout the EU.

Architects and craftspeople in a Brussels Passive House course are working with a 3D model to get familiar with typical features of Passive House buildings such as suitable connections between a solid wall, concrete floor slab and foundation wall. These participants are learning how to apply PU panels to the exterior wall and how to achieve a continuous, uninterrupted insulation layer between the floor (inside) and the wall (outside).

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