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

## Opportunities and benefits

As households become more aware of environmental impacts and there is growing concern about how energy costs may rise in future, developers will face increasing pressure from clients to implement environmentally sound designs in their buildings and show that they are fit for the future.

Application of the Passive House Standard, supplied by renewable energies, will help such organisations differentiate themselves within the housing market by offering high quality homes with high thermal comfort levels and very low running costs for their occupants. The reduced energy bills also make Passive House buildings attractive as rental properties.

The incorporation of renewable technologies for energy provision will further future proof such dwellings against increasing energy costs. High levels of quality, synonymous with the Passive House Standard, make for long lived structures and low risk investments.

An early development in 2000 of 32 Passive House dwellings in Hanover had an average primary energy demand of 75 kWh/m<sup>2</sup>a, of which the space heating demand was 12 kWh/m<sup>2</sup>a. Each house was sold with a share in a local wind energy plan that effectively covered the necessary energy demand of the dwelling.



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## Taking advantage

Housing Associations are typically key construction clients with a considerable number of new build projects and also a responsibility to ensure existing housing is maintained to more modern standards. They also have social responsibilities to protect vulnerable tenants from the risk of fuel poverty, occurring when occupants are forced to spend more than 10% of their income on energy bills. The radically reduced running costs of a Passive House dwelling compared to more typical homes can help provide better financial security to households, particularly in the longer term as energy costs inevitably rise.

In order to demonstrate Passive House as a cost-effective means of delivering low energy new and refurbished housing, the PassREG project works to disseminate potential financing mechanisms for private developers and social landlords. The project presents solutions that can be utilised and adapted for regional conditions and circumstances, while being complementary to many existing national standards.

As of 2012, the Lodenareal Passive House housing estate in Innsbruck, Austria stood as the largest of its kind in Europe. The entire complex, completed in 2009, comprises 354 rental and 128 owner-occupied apartments. With a heating demand of 14.5 kWh/m<sup>2</sup>a, base heating needs for the complex can be met with a mere 300KW pellet boiler. A solar heating system helps meet DHW needs.



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PassREG

# Building for the energy revolution

## Passive House Regions with Renewable Energies



An informational pamphlet for:  
developers and housing associations

## 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

<b>Austria</b>	The Region of Tyrol
<b>Belgium</b>	The Brussels Capital Region and the City of Antwerp
<b>Bulgaria</b>	The Municipalities of Burgas and of Gabrovo
<b>Croatia</b>	The City of Zagreb
<b>France</b>	The Region of Aquitaine
<b>Germany</b>	The Cities of Frankfurt am Main, of Hanover, and of Heidelberg
<b>Italy</b>	The City of Cesena; the Provinces of Foggia, and of Pesaro and Urbino; the Government of Sicily and the Province of Catania; the Municipality of Lonato and the Province of Lombardia; the Municipality of Aglientu (Sardinia) and of San Giovanni Lupatoto (Verona)
<b>Latvia</b>	The Regions of Latgale and of Vidzeme
<b>Netherlands</b>	The Region of Arnhem-Nijmegen
<b>United Kingdom</b>	The City of Carmarthenshire (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.



## 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).

