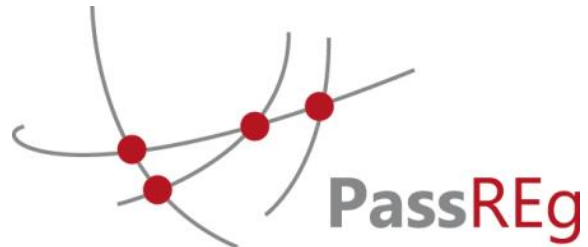




Co-funded by the Intelligent Energy Europe
Programme of the European Union



Passive House Regions with Renewable Energies (PassREg)

IEE PassREg

PASSIVE HOUSE REGIONS WITH RENEWABLE ENERGY

Final Aggregated Monitoring and Evaluation Report

Deliverable 2.5

**Based on the Success Models and Monitoring reports
from PassREg's frontrunner and aspiring regions**

Developed by EnEffect

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*The **Final Aggregated Monitoring and Evaluation Report** for PassREg's frontrunner (FRRs) and aspiring (AR) regions represents an analytical comparison of the accomplishments and achieved results on the PassREg project, based on the Success Models and Monitoring Reports prepared by the regions' representatives in the course of the project. It generally follows the structure of the Models, delivering an analysis in 6 main sections – Policy, Economy & Finance, Beacon Projects, Capacity Building, Involvement of Stakeholders and Communication. The efforts of the partners towards ensuring of sustainability of projects' activities are presented in a separate final chapter.*

*The **Final Aggregated Monitoring and Evaluation Report** complements the other PassREg publication, and namely the PassREg Success Guide, the final brochure "Defining the Nearly Zero Energy Building" and the "Beacon brochure" (all available at www.passreg.eu).*

*At this point it might be helpful to remind that the **Success Models** of the involved regions represent a description of the policies and actions that would ensure accelerated implementation of "nearly zero-energy buildings (NZEB)" based on the Passive House concept + RES throughout the regions and municipalities. It describes the successive steps to develop patterns of success (Success Model) and, where applicable, roadmaps for achieving them.*

Items included in the Success Model were described in two horizons - today (baseline) and future state. The description of future policies and instruments outlines the means by which to achieve predetermined objectives of this project and in a wider scope – the European and national climate and energy efficiency building policy: from 2019/2021, new buildings will be designed and constructed according to the "nearly zero-energy" standard. The current report describes the objectives already reached, the overcome barriers and the road ahead.

PASSREG FINAL AGGREGATED MONITORING AND EVALUATION REPORT

Local authorities take action: the Passive House Regions of Europe

As the project moves to its end, it becomes evident that the choice of regional focus is very successful. Although each of the participating countries endeavours to transpose the EPBD into national laws, it is unlikely that the Passive House (PH) standard will be immediately adopted as the basis of national NZEB definitions. However, regional and local authorities in the participating regions (and beyond) show much greater willingness and ambition to adopt the PH concept and the standard itself, thus trying to set even more ambitious targets than the national ones, taking into account the positive long-term effects these policies would bring to the local economies.

Regional political consensus

As evidenced on so many occasions, one of the most important lessons learned from the PassREg project remains that the most successful regional and local energy efficiency policies are usually based on a sustainable political consensus, leading to a long succession of policies for energy efficiency. Thus, targeting NZEB and PH in advance of the national and European goals and deadlines is a logical result of the penetration of these policies in the **strategic development programmes** of the communities. In other regions, the desire to reduce energy costs and to tackle energy poverty, fuelled by the inspiration of the frontrunners, generates interest towards the passive house. In contrast to the conservative national policies, **some regions set very high goals**, such as switching to “energy plus” buildings by 2020 (Aquitaine). Since 2013, NZEB standard becomes mandatory in Antwerp for all new public buildings and for those that will be subject to complete renovation. Interest in the PH concept penetrates into policies for sustainable urban development and aims to achieve CO₂ neutral city by 2050 (Antwerp) or sustainable districts with low-energy buildings (Zagreb). At the same time, achieving **cost optimality** remains an essential reference for all aspiring regions. An interesting approach is described in Antwerp, where cost effectiveness is planned to be secured by maximizing the energy efficiency of the buildings, thus decreasing the necessary investment in energy production by RES. The examples of buildings with minimal appreciation of the initial investment (Gabrovo - 7.2% in the pilot passive kindergarten, the first one in Bulgaria) and, in already developed markets, even of buildings with lower cost than the average for this type of construction (90% in the frontrunner Brussels) are also very encouraging.

Most of local authorities devote considerable attention to good examples and encourage their **multiplication**. Increasingly high interest receives the application of the PH concept in the renovation of existing buildings (Wales, Antwerp, Aquitaine, Latvia). Additional positive momentum is gained by the accession of some cities to the Covenant of Mayors and subsequently developed SEAPs (Antwerp, Zagreb, Cesena, Gabrovo, Burgas).

PassREg Inspirations

Looking at European frontrunners, numerous regions and municipalities have already adopted Passive House as a binding requirement for all new public building projects, also considering the fact that a significant contribution can be made to climate protection in this way with very little extra effort. One of the first such municipalities, Frankfurt (Germany), passed legislation as far back as 2007 ensuring that all new builds built by the city or for the city should be constructed to the Passive House Standard. Communities, cities, and regions that, like Frankfurt and Heidelberg, have decided to promote Passive House by setting an example with their own public buildings, are rewarded continuously by extremely low running costs. This benefit enables them to divert funds to other important endeavours.



The “Bahnstadt” in Heidelberg (Germany) is the world’s largest Passive House district. At the International Passive House Conference 2014 it received the “Passive House Award” (in the category “regions”) for its exemplary nature. Source: PHI

Other regions have not only followed this approach, they have gone even further by mandating Passive House not only for public buildings but for all buildings in general. In Belgium, for example, the Brussels Capital Region has made the standard mandatory for all new builds as well as for retrofitting with Passive House components, whether public or private, residential or non-residential, as of January 2015. A whole city district in Heidelberg – the “Bahnstadt” – is being planned and built according to the Passive House Standard.

While not necessarily having written Passive House into law, a variety of communities have recognized the advantages of the standard and officially support Passive House construction, either financially, or by recognizing the standard in their building codes, or through the provision of information and consulting. The very high density of Passive House buildings visible in Hanover (Germany) as well as in the region of Tyrol (Austria), for example, is due in no small part to the financial incentives and informational material on offer in both locales.

Dedicated Local Policies

When in September 2009 the new Government of **Brussels Capital Region** published a declaration of its policy towards mandatory implementation of the PH standard – at the beginning for its own buildings - the major stakeholders groups were, least to say, surprised – some to the extent of not believing. However, in May 2011 the Government adopted the new energy target regulation for all new construction (housing, offices and schools) from 2015.

Now, since 1st January 2015, all new buildings and "deep renovations" in Brussels comply with the Passive House standard. The success, in the words of PassREg partner PMP leader Arch. Sebastian Moreno, is that on 1st January 2015 nothing happened. No protests, meetings, revolts. Nothing has changed fundamentally since 1 January 2015. No peak in applications for planning permits in December in order to avoid the new law. In Brussels, passive house is business as usual – and that was actually the goal of the PassREg project.



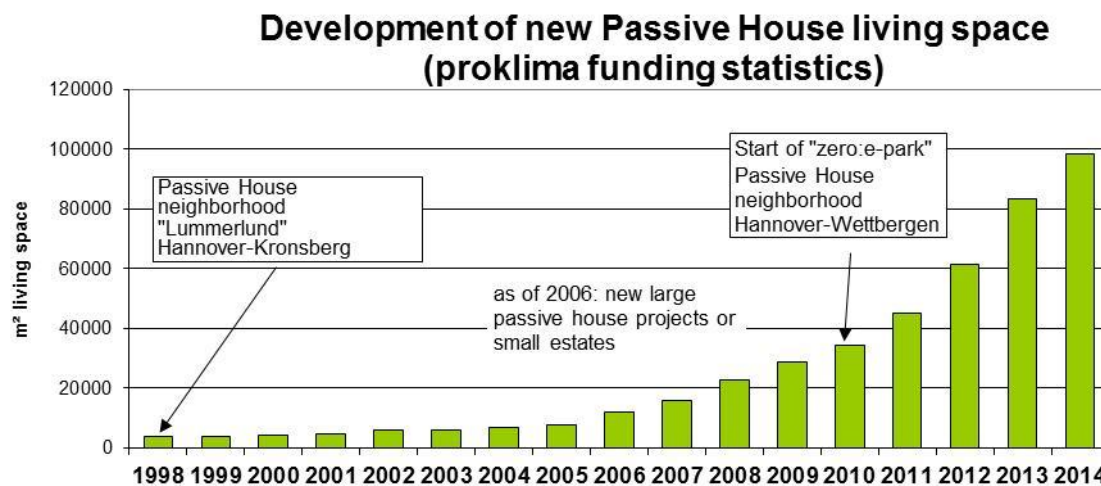
*Bryun Ouest, Social housing in Brussels
Pierre Blondel Architects. Source: EnEffect*

But this change did not happen overnight. The enormous growth of Passive House construction was not just a straightforward consequence of the governmental decision: a number of incentive schemes and capacity building programs were initiated to promote the “energy revolution”. The law itself provisioned for a period 3 years of "soft landing", allowing the gradual accumulation of best practices and experience. This allowed all sector representatives (construction federations, real estate federation, architects’ federations, engineers’ federations, national scientific and technical institute, NGOs - PMP and PHP involved, and the Minister) to become convinced in the long-term judiciousness of this policy. As a result, in 2014 there were more than 1,000,000 m² of passive buildings. The law was reaffirmed by a new minister from another party: it should therefore endure and lead to new discussions on the future ambitions or levels to be achieved for renovation of the existing buildings and use of RES.

Another energy transition story, even more impressive with its continuity: in line with federal policy and taking advantage of the relative independence of local authorities in Germany, **Hannover City Council** develops a long-term regional Energy Concept back in the 80-es of the 20th century. It includes refusal to develop nuclear energy, gives a new role for the local utility company Stadtwerke Hannover AG and creates proper regulation and tools to promote passive buildings. Several policy instruments are used: Local Agenda 21, Hanover Ten Plus, Integrated Resource Planning, Hanover CO₂ Audit. With a new regional regulatory framework three standards for all new buildings on municipal land are introduced: Low Energy House (LEH), Low Energy House Plus (LEH-plus) and Passive House (PH). In addition,

the municipality approved a set of environmental requirements, covering both buildings and urban plans (building density, orientation to the sun, technical infrastructure, etc.). In the late 90's, Hanover Municipality and Hannover Stadtwerke AG create the unique instrument **proKlima**. The fund proKlima provides annually € 5 million to support the renovation of buildings and to establish the 'passive house' standard and related construction technology. Every Euro of financial assistance provided by proKlima has helped to mobilize € 12.7 of additional investments. Today, **proKlima** declares that it will **stick to the PassREg targets** in connection with following up of local strategies as Masterplan 100% Project¹ or local Climate Alliance 2020². In the next few years proKlima is going to **focus strongly on local and urban NZEBs strategies** with Passive House solutions and renewable energies. More emphasis will be placed on NZEB refurbishments in Hanover. **proKlima will provide continuous support with subsidies and campaigns.**

A few numbers, which, as usual, are quite illustrative of the proKlima achievements in the region of Hannover: proKlima has a leading role in Hanover and region to **keep the status quo and expand the standard** with Passive House and renewable energies. With strong influence through financial incentives, proKlima influences the roadmap towards NZEB buildings in the region. 30 % of new residential housing units / buildings in the City of Hanover are Passive Houses (proKlima statistics 2014).



Additionally, influenced by the PassREg project to a significant extent, a public **debate** was initiated in Hannover about the application of the **Passive House Standard** in relation to **social housing** projects. The debate was triggered by a big residential Passive House project in the inner city of Hanover (Klagesmarkt). The construction started in 2014. proKlima therefore invited the politician and member of the city council Jürgen Mineur (SPD) and Robert Kulle (head of building stock development, Gesellschaft für Bauen und Wohnen GBH

¹ <http://www.hannover.de/Leben-in-der-Region-Hannover/Umwelt/Klimaschutz-Energie/Klimaschutzregion-Hannover/Masterplan-100-f%25C3%25BCr-den-Klimaschutz>

² www.klimaallianz-hannover.de

Hannover) to join the PassREg meeting in Innsbruck (10/2013) to share experiences and gain new ideas.



One of the most famous social housing residential complexes reaching the Passive House Standard: Lodenareal, Innsbruck, Tyrol, a project of the limited-profit housing association Neue Heimat Tirol. Source: PHI

On its turn, **Tyrol** is one of Europe's regions with the highest density of nearly zero energy buildings, largely based on the PH concept. This development was mainly driven by the federal housing subsidy office of Tyrol. The mandatory energy level of new builds as of deep renovations to maintain funds are higher than the obligatory levels of the national Austrian building codes (OIB guideline 6, "energy economy and heat retention"). If the heating demand comes down to a level of equal or less than 10 kWh/m²a, additional grants are donated.

This quite successful story could be achieved through awareness rising of important stakeholders as of the general public and capacity building within those involved in planning and construction. Architects, planners, executive companies and their employees had to be brought on this high level of knowledge and experiences, which now allows a cost efficient and reliable implementation and maintenance of nearly zero energy constructions. Cost efficiency and acceptance of passive house homes combined with ventilation and renewables is high, even in neighbourhoods where it was not expected, as these results could be evidenced by studies on the "Lodenareal" housing district. The number of subsidised passive house homes in Tyrol has nearly doubled from 18,1% in 2012 up to 41% in 2013 and is still rising due to in 2015 extended housing subsidies for NZEB's.

Looking to PassREg ARs, one of the most impressive examples for dedicated local policies is to be found in the Belgian **city of Antwerp**, Flanders region. Beyond the national targets and the Flanders Region process of defining NZEB, the Province of Antwerp announced in June 2013 its decision to apply the Passive House standard in all public new buildings and complete renovations. This decision supports the ambitious province's climate plan to reach carbon neutrality by 2020. Even earlier, on 9 January 2009, the City of Antwerp has signed the European Covenant of Mayors. By signing the Covenant the City of Antwerp pledged to



The Nieuw Zuid development in Antwerp, Belgium: an example of urban district designed entirely according to the Passive House Standard within a successful mode of publicprivate partnership. Source: Studio Associato Secchi - Viganò

reach a number of goals, with the final objective is to become a CO₂-neutral city by 2050.

In pursuit of these ambitious goals, in 2010 the local policy of the city decided that in the newly built private developments a collective heat production unit must be installed (no separate production units for each housing unit) and the buildings must allow for easy connection to a district heating network in the future. This policy is implemented in the development “Nieuw Zuid” (New South), which is also a Beacon Project in PassREg. The success of Nieuw Zuid is now followed by another large urban development – the passive city region “Cadix”. Within a sustainable approach to urbanism, PH standard and a RES share are also required for the new buildings of these large developments. Another policy initiative since the end of 2008 is that the Antwerp city council decided to build all new city schools in the Passive House standard, as the first buildings are now being realized.

In 2015, a new funding channel to stimulate local sustainable actions (typical amount 15,000 euro per action), including those who have impact on energy use by buildings, was launched by city of Antwerp. The channel is called “Project Funds Sustainable City” and it is administered by EcoHouse Antwerp. Although this new funding source is not directed to passive buildings, ideas that support energy savings based on passive house principles and facilitating deep renovations can be eligible. The city of Antwerp is also taking part in the initiative of the Flemish Minister of Energy called “Renovation Pact”, which is now undergoing to reach by June 2015 with work in several working groups, broader agreements concerning actions to significantly increase rate or refurbishment across many stakeholders in the building and energy sector.

In **Latvia**, in order to achieve the requirements set by the EU directives, the amendments in the construction laws entered into force in 2014. Especially the new LBN 002-01 “Thermotechnics of Building Envelopes” Law should be pointed out. The set parameters of Thermotechnics of Building Envelopes of this Construction standard are close to the Passive House requirements, which will certainly facilitate the implementation of the PassREg SM.

Construction elements	Latvian Building standard			Passive House
	Residential houses, homes for elderly, hospitals and kindergartens	Public buildings, except column 1	Production buildings	For all buildings
Roofs and coverings which are in contact with outdoor air	0.15 (0.2) κ	0.20 (0.25) κ	0.25 (0.35) κ	0.15
Floors on the ground	0.15 (0.25) κ	0.20 (0.35) κ	0.30 (0.5) κ	0.25
Walls	0.18 (0.2-0.3) κ	0.20 (0.35-0.4) κ	0.25 (0.45-0.5) κ	0.15
Windows, balcony doors and other glazed constructions	1.30 (1.8) κ	1.40 (2.2) κ	1.60 (2.4) κ	0.80
Outer door	1.80 (1.8) κ	2.00 (2.2) κ	2.20 (2.4) κ	0.80
Thermal bridges ψ_{RN}	0.10 (0.2) κ	0.15 (0.25) κ	0.30 (0.35) κ	$\sum\Psi < 0.01$

k - the temperature factor

In the inspired words of PassREg partners from **the Netherlands** – DNA, the project created a kind of vibe, which started to buzz in the region and DNA was able to significantly influence certain important processes in the region and even the country, such as the developing and promoting of the NZEB-tool, which is expected to be a big breakthrough in building sector. A very special highlight was the launching of the preparatory local action plan by a representative of the Stadsregio “Bridging the gap between knowledge and end user – A future success model for the Arnhem-Nijmegen City region”. The efforts of WP2-activities paid off when the lobby of the Dutch insulation industry, the national platform of municipalities and finally national policymakers started supporting the implementation and embedding into the national building regulation of the PHPP-calculation tool. In preparation of forthcoming events and political changes a representative of the national government held a presentation at the final PassREg workshop and attended the International conference in Leipzig.

In UK and **Wales** there are *no financial incentives or subsidies to specifically promote Passive house buildings*. Although barriers inevitably still exist in Wales for Passive House + RES as a future solution for NZEB, positive steps have been taken by BRE to help overcome these, particularly with the key beacon partners. In addition to the new beacon project in Carmarthenshire that was enabled through the involvement of BRE via PassREg, there is an evident legacy in the form of commitment by Local Authority members to implement Passive House + RES as their preferred option towards NZEB, with additional Passive House developments already in the early design stages.

Emilia Romagna Region, represented in PassREg by the municipality of **Cesena**, approved a resolution (Resolution no. 1577) on October 13, 2014 with amendments to the provisions relating to energy performance of buildings in force for the region, to comply with Directive 2010/31/EU, in order to strengthen policies improvement of the buildings energy performance, taking into account local conditions and external climate, as well as the requirements regarding the indoor climate and effectiveness in terms of cost-benefit. At city level, **the Cesena PSC – (Piano Strutturale Comunale - Municipal Structural Plan)** defines strategic principles that will guide urban development in the next years considering: economic, social and cultural development; quality of life improvement; use of renewable resources. The plan has 3 priorities: reduction in the use of ground; sustainable building and energy saving; and social Housing. Its key elements are high level of urban retrofitting; high level of energy efficiency and seismic performance in buildings; and increasing social housing availability. These strategic documents are supported by the **Cesena SEAP (Sustainable Energy Action Plan)** on the Covenant of Mayors, and **Protocollo d’intesa per la sperimentazione in materia di Rigenerazione urbana (Protocol for “urban regeneration”)** sponsored by CNA, involving public authorities, enterprises, banks, professionals and citizens who are committed to play their part in terms of redevelopment of public and private buildings. As key issues, public authorities (municipalities in the first place) are committed to play a leading role in defining the urban redevelopment and energy efficiency, by changing

planning instruments and regulations, but also to ensure real benefits in terms of investments and to raise the public awareness. As a consequence of the PassREg project, a PH network, connecting the local level with the national and European level, was established with local stakeholders and policy makers, in order to develop the Action Plan and the Capacity building strategy document: these two documents were completed after the consultation of this network and a discussion with actors and stakeholders involved. The two compiled documents were shared with executive and political level within the Municipality.

As reported by PassREg partner PoliMi, so far two municipalities in Italy adopted the passive house targets in the local building codes as quantitative requirements needed to reach construction taxes incentives. This is the case of Municipality of Muzzano (Biella) and Municipality of Botticino (Brescia). In Muzzano, Certified Passive Houses are eligible for a 60% reduction in construction permitting fees (primary and secondary planning fees as well as a construction cost based fee) with a maximum discount of €20,000 for each building. In Botticino, Certified Passive Houses enjoy reduction up to 55% on primary and secondary planning fees. These represent first actual examples where the Passive House requirements and complete certification scheme have been implemented in the local buildings codes.

Some references are available here:

- “Italian cities subsidies Certified Passive Houses”:
http://passreg.eu/index.php?page_id=76&y=2014
- Example from the Municipality of Muzzano (in Italian):
<http://www.comune.muzzano.bi.it/online/Home/IlComune/Regolamenticomunali/articolo31009133.html>
- Example from the Municipality of Botticino (in Italian):
<http://www.comune.botticino.bs.it/regolamento/regolamento-edilizio-ed-allegato-energetico>

We can also recognize an interesting example of a public tenders developed and put in place for a public building designed and built according the Passive House principles is the public school “Raldon” of the Municipality of San Giovanni Lupatoto (Verona). This school building, after it was designed and built according public tenders developed by the Municipality, reached the Passive House certification.

http://passreg.eu/beaconProjectDetails.php?beacon_id=58&ref=beaconlist).

During 2014, according to the relevant EU directives, plans for increasing the number of NZEB on the national level were approved and published in **Croatia** and **Bulgaria**, supported by energy renovation and RES support subsidy programmes; additionally, the national NZEB definitions were adopted in response to the EPBD. At the local level, the PassREg SM with Roadmap to 2020 was presented to the relevant committee of the City Council of the Bulgarian city of Burgas, which explicitly adopted the objectives and measures to be integrated in the second generation strategy for a sustainable energy development of Burgas. This decision was particularly important because the political will and the wide range of support provide stability of the results, even at change of leadership in local government. Additionally, the city of Gabrovo, Bulgaria (PassREg associated city) joined the Covenant of

Mayors and developed its SEAP (in addition to other long-term planning documents) with specific focus on energy efficiency and RES in buildings, as – following the success of the PassREg beacon in the city - its Mayor Mrs. Tanya Hristova explicitly declared her will to apply the PH standard in all future municipal projects.

A sustainable policy and a wise investment

The political will in the involved regions obviously find its most direct reflection in the financial incentives and economic support provided by the local and regional authorities for PH projects + RES. The design of these projects is based on the wide-spread understanding that sustainable development based on resource and energy efficiency and use of local energy sources does not contradict to economic growth, but, just on the contrary, supports it, keeping money in the local economy and providing high-quality new jobs to local specialists.

A very strong example for such policy is the already mentioned **climate protection fund proKlima**, founded in Hannover as a non-trading partnership back in 1998. It operates on the basis of a partnership contract, in which the Capital City of Hannover and the local energy supplier Stadtwerke Hannover AG play a key role together with 5 neighbouring municipalities. proKlima's staff-members are employed by Stadtwerke Hannover AG and with a special contract they are loaned to operate the fund. proKlima provides close to 5 mln. EUR annually supporting the energy renovation of buildings, introduction of the Passive House Standard, as well as the introduction of energy efficient technologies in households and renewable energy. Every Euro financial support, allocated by proKlima, helps mobilize € 12.7 in investments, which is the most convincing evidence of the high effectiveness of this instrument.

During the PassREg project, in which proKlima represented the Hanover Region and the City of Hanover as a frontrunner region, the Fund provided information on best practice examples of financing models, Passive House projects with different types of use (e.g. residential houses, urban quarter solutions, day care centres, schools, office buildings, supermarkets) and political processes. proKlima also used the context of the PassREg project to promote new types of buildings and emphasises the development of NZEBs; over the last three years, the Passive House Standard for supermarkets was developed and quality assurance and measurements were provided. During the project period three PH supermarkets were completed and put into operation. proKlima supports the development of quality assurance with subsidies, and promotes these with the available communication tools.

But even in FRRs, there is still much room for improvements. While local solutions with newly built buildings are available (e.g. zero:e-park), there is a lack of strong activities in the old building sector. For predicting the potentials of NZEBs in the old building sector (the annual new build rate is under 0.1% / yr), proKlima supported a study for a “zero-emission-

street”: based on a local project, a study was delegated to research the potentials for the refurbishment of a typical urban quarter in Hanover. The study³ showed that retrofitting with Passive House Components is a starting point for achieving NZEB in the building stock. But photovoltaics (PV) are still an essential component for financing deep renovations (payback role). In addition, a new energy economy model and solution for housing corporations in Germany is required to guarantee activities of housing corporations e.g. with warm rentals models. The results of this approach were presented at the International Passive House Conference in Leipzig 2015^{4,5} and will also be presented in regional forums.

To improve the success model, proKlima developed a new heat pump subsidy and measurement program (as of 2014). Heat pumps could play a major role to meet the NZEB targets for 2020 with new buildings. The heat pump technology is one of the major supporting technologies in newly built Passive Houses in Hannover (e.g. zero:e park). Therefore proKlima kept a special focus on the HP technology, since this technology seems to be very sensitive related to efficiency results. Quality assurance and monitoring seems to be very important.

In the FRR of **Brussels**, the financing source of the energy efficiency and RES support programmes is similar. The electricity supplier gives back 1,95 % of the consumption revenue (it is called “the energy fund”), and part of the local taxes is also used for this goal. In terms of real money, this means that from the annual “Energy invoices” of approximately 3,1 Billion Euro, approx. 1,95% (61 M Euro) is used for energy (PH) policy, including subsidies for diverse bodies, energy bonuses, surveys, monitoring and market support.

This was also the main source of funding of the extremely successful "Batex" (“Exemplary Buildings”) program, which was the main financial incentive instrument of the Brussels regional authorities to encourage demand for very high energy efficient construction. Since 2007, the region has organized five annual calls for proposals (with the exception of 2010), disbursing € 5 million per year. The term "Batex" is the abbreviation for 'Bâtiments exemplaires' or 'Exemplary buildings', and the whole idea is to leverage each project, whether large or small, whether private or public, to spread the word about eco-construction, what it involves and how it can help transform the city, building by building.

BatEx funds were available for single-family or collective housing units, collective facilities (e.g., school, hospital, or nursery), and offices, commercial or industrial facilities. All projects must be informed by passive standard guidelines (it must strive to be a zero-emission building), the project must prioritize the use of eco-friendly construction materials, and to consider natural cycles and biodiversity. Additionally, the project must demonstrate a high

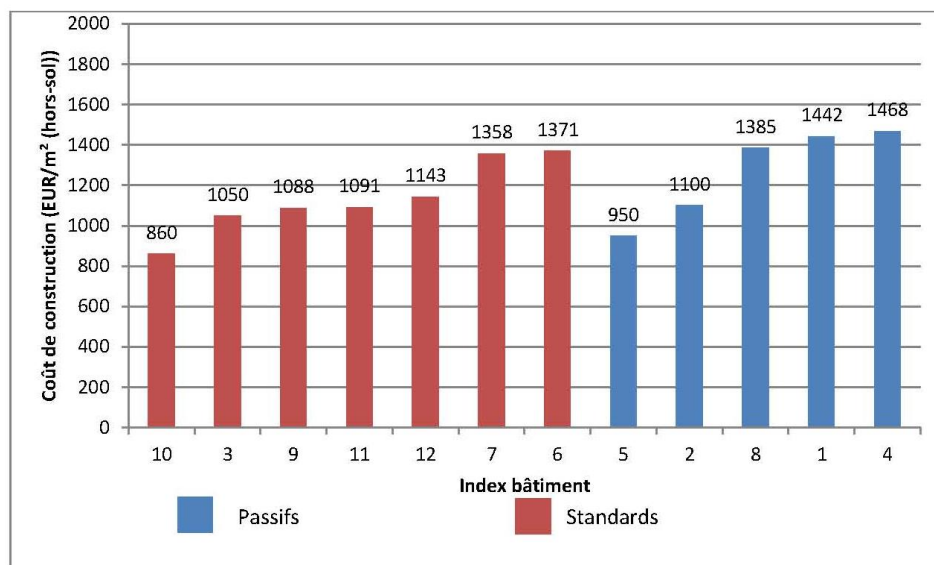
³ http://www.passivhaus-plattform.de/downloads/eu_projekt_passreg/2014_PassREg_NZEB-Studie_Quellengrund.pdf (Study in German language)

⁴ http://www.passivhaus-plattform.de/downloads/eu_projekt_passreg/2015-01-12_IPHT2015_Wohlfahrt_Harhausen_final.pdf

⁵ http://www.passivhaus-plattform.de/downloads/eu_projekt_passreg/19PHT_AG14_IPHTLeipzig_Wohlfahrt.pdf

architectural quality, good visibility, and a satisfactory level of integration into existing stock, it must be simple and feasible in technical and financial terms, with reasonable payback timelines.

What this approach led to was simply striking: the prices of PH construction gradually equaled those of regular market, even before the PH regulation had entered into force. The following graphic (courtesy of Arch. Sebastian Moreno, PMP) shows the construction costs of real PH buildings compared to the costs for buildings constructed according to the previous norms, showing that the market had already pulled the concept and applies it quite willingly, providing to the end users the better comfort and lower maintenance costs of passive buildings at regular prices.



Construction costs of PH buildings compared to the costs for buildings constructed according to the previous norms. Source: Arch. Sebastian Moreno, PMP

In **Tyrol**, various subsidies exist at provincial (regional) level, most being linked to housing support, especially concerning thermal insulation, use of biomass for heating and solar energy for space heating and domestic hot water preparation, but also for energy consulting and issue of EPCs. The subsidies cover roughly 60% of all new construction, as their provision is usually linked with limitations of purchase prices and rents. The subsidies for renovation of buildings are put into effect either as investment grants (usually between 10 and 25%) or loans (with 1% to 4% interest for a period of 10 to 20 years, depending on the regional system and the quality of supported measures). Almost half of the housing subsidies by the provinces are granted for new construction in the multi-apartment sector, and a certain small part is spent for the sector of detached houses. The expenditures for housing renovation are quickly increasing, as particularly attractive subsidies are provided for this goal. Compliance with certain minimum requirements for space heating is a precondition to receive subsidies; but a higher level is a grant subsidy can be obtained in order to cover increased criteria for energy consumption of the building. From 2015, even higher incentives are provided for achievement of the PH standard. It has to be acknowledged that within the

PassREg Project, the focus in planning and construction moved more and more from residential to non-residential buildings, beside the beacons, mostly residential buildings, it was possible to realise new schools, kindergartens, office buildings and even supermarkets and – very important for Tyrol’s tourism – also hotels, leisure and recreation purpose buildings in Passive House standard using also renewable energies.

Another very important form of economic support is to be found in all FRRs but is probably best visible in the AR of **Antwerp**, and this is the **public private partnerships** under which the Nieuw Zuid and Cadix urban regions were developed. In Nieuw Zuid, a wide variety of housing types in terms of size, type, budget, and location is planned to create a lively urban area for a very diverse public, with social housing is mixed throughout the quarter. The master plan for Nieuw Zuid is also ambitious in terms of energy. As agreed upon by the city and the developer, all buildings must be designed to Passive House level with a maximum heating demand of 15 kWh/m² per year. In this case, it was an explicit choice of the city and the developer to create a win-win situation: the city can realise its climate goals and gradually develop a collective heat network, and the developer can market a product with added commercial and financial value in the short and long term. In addition, as mentioned above, in 2015 new funding channel to stimulate local sustainable actions (typical amount 15,000 euro per action), including those who have impact on energy use by buildings was launched by city of Antwerp. Called “Project Funds Sustainable City” it is not directed to specifically to passive buildings, but ideas that support energy savings based on passive house principles and facilitating deep renovations can be eligible.

Although the conditions have been very stiff for bank loans to communities, in the period of 2013-2014 the **Aquitaine Region** was able to invest in energy efficient aid loans and operations. For the 2013 budget the European Investment Bank (EIB) has been committed to deliver € 800 million. A major undertaking, being one of the largest sums for the EIB within a French region, it benefits schools, training organizations, and SMEs in their projects of RE production.

500 million euro of EIB loans are signposted to finance expansion, upgrading and improving the energy efficiency of schools and training organizations. Among the selected projects: the construction of a “positive energy” school in Bergerac or the installation of photovoltaic panels on the roofs of many regional schools. In addition, the region, the EIB, alongside Crédit Agricole and Banque Populaire banks and Caisse d'Epargne, have engaged to support small and micro businesses in their projects of renewable energy production and energy renovation of buildings. Funded jointly by the EIB for € 150 million and the two banking partners who will bring an overall additional funding of € 150 million, this is a total overall budget of € 300 million which are allocated to energy efficiency projects, in the form of loans at favourable rates.

Using the available national financing programmes, the **Municipality of Cesena** has received so far €200,000 of government incentives ("Conto Termico", an incentive scheme for small interventions for increasing energy efficiency and for the production of thermal energy from renewable sources) for replacements of existing heat generators with condensing boilers in 11 school buildings and for roofing insulation in a kindergarten. Under this programme,

interventions that may be the subject of incentives concern both the efficiency of the casing of existing buildings, the replacement of existing plants with higher efficiency winter heating plants (condensing boilers) or, in some cases, the new installation of renewable sources technologies. This is a very useful opportunity for the public administration as it cannot access, for example, the tax deductions after energy retrofitting of existing buildings.

In addition to the "Conto Termico" programme, in the Legislative Decree n. 102 of 4 July 2014 (implementing Directive 2012/27 / EU) has been cited the establishment, upon the Ministry of Economic Development, of a "National Fund for Energy Efficiency". The Fund is intended to support the financing of energy efficiency measures and includes the ESCO, the use of forms of public-private partnership, the support to project companies or companies specifically constituted for a purpose, and in particular:

- a) Measures to improve energy efficiency of buildings owned by the Public Administration;
- b) Construction of district heating and cooling networks;
- c) Energy efficiency services and public infrastructure, including public lighting;
- d) Energy efficiency of entire buildings for residential use, including housing;
- e) Energy efficiency and reduction of energy consumption in industry and services.

In the "Italian Action Plan for Energy Efficiency", it is expected that the Fund favors the admission of projects and programs aimed at: creating new jobs; redeveloping energy buildings; promote new nearly zero energy buildings; introduce seismic protection measures in addition to upgrading the energy efficiency. The Emilia Romagna province has also set up a fund, which facilitates projects aimed at improving energy efficiency, the production of energy from renewable sources and the construction of technological systems that allow the reduction of energy consumption from traditional sources. Companies making investments aimed at reducing energy consumption from traditional sources, in facilities and innovative equipment for energy consumptions and for production of energy from renewable sources may benefit from the Fund.

There have been no new national or regional funding sources or financial incentives developed for **Wales** or the UK. However, some interesting studies and examples have emerged that may help future NZEB projects. BRE have carried out a recent study for the Wales Low & Zero Carbon Hub (WLZCH) investigating the correlation between EPC rating and real home energy bills. The report confirms that high EPC rated property owners will have potentially more available income compared with those in less energy efficient properties, who are effectively committed to spending this income on energy. On local governance level, the potential for departments within Local Authorities to acknowledge life cycle costing as a means of leveraging additional capital budget for projects on the understanding there will be reduced operating budget requirements was studied, also witnessed with the Carmarthenshire PassREg Beacon project. By participating in the PassREg project, Cardiff Council were inspired to include a Passive house housing development in their upcoming Housing Partnership Programme. Under this scheme, the Council will partner with a developer to build 1500 houses on land owned by Cardiff Council. Although the

Council do not have capital funding available to pay for any cost uplift for Passive House up front, they have agreed with the developer that they will accept a reduced value for the sale of the development land (compared to the 'market' value for the land) if the developer cannot sell the houses for a price to cover their costs. Overall, it is a balance of risk; if the developer is able to sell the new Passive house homes for more, both parties will share the increased profit. However, if they can't the Council are prepared to subsidise the cost uplift by reducing their land price accordingly. This reduces the risk to the developer and allows Cardiff Council to effectively raise capital to deliver the energy standard they require on a pilot scheme.

In the SM of the region of **Arnhem-Nijmegen**, special attention is paid to the marketing of the Passive House concept towards specific target groups. It involves marketing the Passive House concept towards suppliers, educating suppliers in applying Passive House principles and techniques, supporting entrepreneurs on the supply side in sustainable building to increase their entrepreneurial skills and so become more competitive in the building market, managing the process of uniting regional stakeholders towards the NZEB goal, and uniting all Dutch Passive House organizations towards the goal of raising demand for PH.

In **Latvia**, as in the most countries relying on the EU Cohesion policy (including Bulgaria and Croatia), the previous planning period of the EU funds ended in 2014, meaning that there were no new co-financing programmes for a prolonged period of time, still continuing at the end the PassREg project. For Latvia, during the next planning period 2014-2020, in the allocation of the EU funding 333.55 million Euros are intended for facilitating the energy efficiency. However, there are some relevant new initiatives.

On 8 April 2014, the State Regional Development Agency announced an open tender for a project "Sustainable development of property, renewable energy technology and innovative emission reduction technology". The objective of this tender is to introduce and demonstrate to the Republic of Latvia a low carbon dioxide (CO₂) solutions – energy efficient technologies and solutions for sustainable buildings, renewable energy technologies for power generation and other new (innovative) technologies (including technological processes) or products (including goods and services), that reduce CO₂ emissions. Submission of the project applications ended on 8 October 2014. In total 23 project applications were received and registered, but only 7 project applications were confirmed.

The association Passive House Latvia in cooperation with the Latvian Environmental Protection Fund is implementing the project "Possibilities to involve third parties in financing the projects of energy efficiency improvement of municipal buildings". Within the project an energy service (ESCO) agreement project for municipalities and Public administrative bodies has been developed to improve energy efficiency of the buildings which stipulates potential economic, technical, legal and other risks the municipality and the energy service provider may encounter during the implementation of ESCO projects in municipal buildings. The association "Passive House Latvia" has developed sample documentation/methodological

instructions for municipalities and public administrative bodies on how to perform energy service procurement of high-quality for energy efficiency implementation of buildings.

In addition, the Industrial Energy Efficiency Cluster (IEC), in cooperation with the law firm "FORT", has made a detailed agreement template of energy efficiency service according to the legislation of the Republic of Latvia, which in the near future will allow the producers in Latvia to use this popular financing model of energy efficiency projects that is already popular in Europe and United States. IEC has conducted consultations with the governing body of the Association of Commercial Banks of Latvia (ACBL) for possibilities of financing of detailed agreement projects of energy efficiency service. As a result of the consultations, both sides agreed on the key criteria for the attraction of the third party financing for energy efficiency improvement of the manufacturing plants. IEK and commercial bank consultations are currently in the progress to specify these criteria.

However, the most impressive success of Latvia has been the use of the Climate Change Financial Instrument for PHs support. Under the tender “Low energy buildings”, significant support was provided for construction of low energy consumption buildings, as well as refurbishment or simplified renovation of existing buildings. Most of the supported projects complied with the PH standard:

	Submitted (corresponding) projects		Approved projects		Implemented projects	
	No	%	No	%	No	%
	≤ 15 kWh/m2	25	36%	25	81%	14
≤ 25 kWh/m2	22	31%	6	19%	0	0%
≤ 35 kWh/m2	23	33%	0	0%	0	0%

Approved projects from the tender “Low energy buildings. Source: LEIF

Due to the low level of decentralization, there are no significant opportunities for **Bulgarian municipalities** to design and implement direct incentive schemes on their territories. Despite intensive public dispute initiated to a significant extent by PassREg partner EnEffect, the national renovation programme financed by the state budget does not integrate PH principles in its terms of execution. However, there has been a lot of success in PassREg partner regions: in the due course of execution of beacon projects, specific barriers for the public procurement procedures for passive houses were overcome and additional public co-financing was attracted. A number of financing sources were identified in the SMs of Burgas

and Gabrovo and cooperation with them is provisioned for in the strategic development plans and SEAPs of both municipalities.

Beacon projects

The Beacon Projects represent distinguished best practice examples of NZEB implemented in the European “Passive house regions” - both frontrunners and aspiring - which make exemplary use of the PassREg strategy: Passive House principles plus renewables to cover the remaining energy demand, reaching optimal profitability and significant GHG emission savings. These case studies teach us a lot about the applicability and effectiveness of solutions for both the development and the continuous optimization of PassREg success models; moreover, they provide an insight into the future of the European urban development and building practice.

The beacon projects are presented in detail in the dedicated section of the PassREg website and the special “Beacon brochure”, so the technical details will not be further described at this point. However, it has to be emphasized that the logic behind the PassREg project is that implementation of comprehensive success models is what actually leads to the building of optimal NZEB. Each regional model of success makes use of a complex set of approaches (financial, technical, political, communicative, etc.) and rely on particular infrastructure (capacity building in Passive House and renewables, legislation, financial incentives, etc), required for the successful uptake of PassREg concepts. The beacon projects provide the best possible illustration of the interplay between all factors of success; a large window into the models in which they fit so well, thus allowing for a deeper look at the approaches and infrastructure used – and sometimes in the new solutions needed. And this is what the European approach is all about. Let’s take a closer look at some of the examples:

Hannover

By building nothing but PHs in **the zero:e park** in Southwestern **Hannover**, the city faces the challenge of building a new residential area with over 300 single family homes and row houses as a zero-emissions neighborhood. The plan is based on an innovative concept whose ecological objectives are derived from the Kronsberg neighborhood, which was built more than ten years ago for Expo 2000. As a whole, the new neighborhood will not emit any carbon from heat supply and household electricity. The zero:e park is thus another milestone for Hannover’s climate protection objectives. The basic principle of the energy



A new Passive House settlement in the PassREg frontrunner Hannover: the zero:e park, the European largest zero-emissions development (<http://www.zero-e-park.de/en/home/>). Source: Matthias Wohlfahrt, proKlima

concept is to bring the houses' heat demand to a minimum thanks to energy efficient construction with passive and active use of solar energy. Taking the use of renewables into consideration, only a small amount of the energy needed should be compensated outside of the neighborhood. For heat supply, the average residual carbon emissions were calculated to be 900 kg/year per house. Compared to the neighborhood built only to the current legal standard (EnEV 2009), the consistent application of the PH Standard reduces the greenhouse gas emissions from heating by 65% to 87%. Important aspects of the zero:e park include:

- Constructing all buildings as PHs.
- Using solar thermal or PV energy to reduce the residual energy demand.
- Using household appliances that consume electricity efficiently.
- Compensating the remaining carbon emissions from heat and household electricity demand with renewable energy production facilities.

For the entire neighborhood to achieve climate neutrality compensation for heating and household power was calculated to be on the average 1,300 MWh of electrical energy; this amount is to be covered with electricity from a hydro powerplant in Hannover.

The zero:e park has been divided in three separate section, to be developed one after another. The work on the third section was planned to finish in 2021. However, the market demand was stronger: **in the late summer of 2014, all single plots have been sold out.**

Tyrol

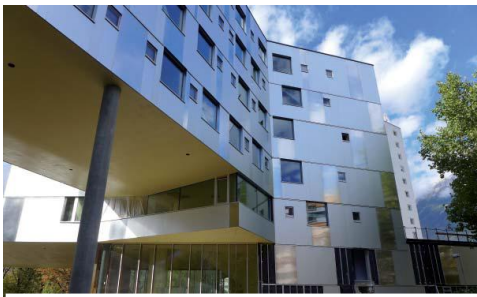


Photo: Nursing home | retreat home | Tyrol | Artec Architekten | Passive House Consultant Herz&Lang GmbH | Austria © Herz&Lang

In January 2015, additional grants for nearly zero energy buildings within housing subsidies have been extended to further 25%, a quite remarkable influence on the whole real estate market, one of the results out of the positive regional and European experiences. The number of subsidised Passive House homes in Tyrol has nearly doubled from 18.1% in 2012 up to 41% in 2013 and is still rising, this is the most important success in Tyrol, demonstrating how subsidies can be used as an incentive to raise the energetic standards for new builds as well as for deep

renovation. Within PassREg, the already established Passive House tourism to Tyrol's PassREg Beacons has increased, with international delegations visiting Innsbruck even coming from the Far East and West.

Within the PassREg Project the focus in planning and construction moved more and more from residential to non-residential buildings, so it was possible to realise new schools, kindergartens, office buildings, supermarkets, hotels, leisure and recreation purpose buildings in PH standard with renewable energies. One of the most interesting projects following the PassREg objectives was a medium sized residential estate in the west of Innsbruck, consisting of two buildings with 24 apartments and 1.930 m² effective floor area.

Constructed between 2013 und 2015, the unique feature of this project is its positive energy conception: based on passive house standard combining renewables, all needed heating energy and warm water is supplied by renewables, produces on site. The surplus electricity is used for the lighting of the underground parking.

Antwerp



One of the most convincing success story of the PassREg relates to one of the Beacon projects, namely the Nieuw Zuid development in city of Antwerp as a private market development initiative in close collaboration with the city of Antwerp, with sustainability as key element (focus on water-, energy- and waste management and implementation of a district heating system on renewable energy sources), displays the ambition to develop Nieuw Zuid as a best practice example of sustainable urbanism.

The success story in this development is in the fact that it is the first large-scale development in Antwerp following Passive House energy levels and is the first implementation of a district heating network in Antwerp, as the first step in developing a city-wide network in the long term. The implementation of this project under the direction of city of Antwerp has made it an example of model cooperation with private developers (at the building- and site level) and third parties (at the site level).

Wales

A major success for Wales is the realisation of the Carmarthenshire school beacon project. It demonstrates that Passive house can be achieved in a semi-rural location with a local supply chain. It has also prompted further Passive House projects to be initiated, both within Carmarthenshire and spreading to the Wales capital – Cardiff. It is very important to raise awareness about these beacon projects to show what is achievable in the region and what technologies and systems are available. It makes people realise that these things are possible now, not just ideas for the future. It generally encourages others to aspire to the same standards, thus helping to perpetuate good practice.



Additional highlights:

- 2 examples from Wales Beacon Regions
- Both Local Authorities wanting to trial PH standard as the solution for future NZEB requirements...
- ...but do not have extra capital budget to cover increased cost to build to Passive House standard

- Passive House School (Carmarthenshire Council)
→ Lifecycle costs to justify construction
- Passive House Housing (~30 units) (Cardiff Council)
→ Accept reduced land value to cover increased capital cost of Passive House
- By demonstrating ongoing operating budget would be much reduced by Passive House standard, able to put case for transfer of budget from operating to capital
- Overall 'lifecycle' cost less than school built to Regulations
- Enabled by Trust: examples of recent PH schools in England and reported costs helped make case
- Evidence of realistic performance key!

Burgas



The first beacon - the Art Gallery - is under construction, and Passive House Kindergarten supplied by renewable energy is in the procurement process. The awareness about Passive House + Renewables has risen from zero to a good level during the PassREg project. Undoubtedly, the local authority reports as a success story the enhancing of the administrative capacity of the municipality and the inclusion of the topic of low energy building model PH +

RES = NZEB in the agenda of municipal officials and managers.

Gabrovo

The PassREg beacon "Sun" kindergarten in the Bulgarian city of Gabrovo is the first certified Passive House in Bulgaria and the first and only public building designed and constructed to the PH standard. The project was initiated by Gabrovo municipality and EnEffect, as technical support was also received by the EcoEnergy Municipal Energy Efficiency Network. As the very first of its kind, "Sun" kindergarten is drawing the attention of many



professionals in the building sector in Bulgaria. The construction work was carried out in close contact with the designers in order to avoid major mistakes in the execution. The process was followed closely by the municipal experts related to construction, engineering, architecture and city planning. A number of regional building forums, training courses and study visits were conducted along with other capacity building events. "Sun" kindergarten was presented virtually at all major national conferences in the area. As a result, two more "passive" kindergartens are in design phase, initiated by the municipalities of PassREg partner Burgas and PassREg supporting city Varna.

Latvia



The beacon project in Vidzeme region – Ergļi has the lowest heating demand among all public buildings in Latvia and it has become a shining example in all North Europe. With help of PassREg project Latvian experts could develop national Passive House platform, which serves not only as a database, what is critical for Latvia region, but also various solutions collected from all around Europe, registered national Passive House experts and buildings, which have been built or refurbished in Latvia in accordance with EnerPHit and Passive House Standards.

Aquitaine

Within Bordeaux Euratlantique National Interest urban renewal operation, the real estate company PICHET Group will build a 4,500 m² Nearly Zero Energy Building (NZEB) or even positive energy balance office building on a timber structure. The Beacon project is within one of the largest urban planning operation in Aquitaine (office buildings, Groupe Pichet). The high performance envelope is designed to be very close to PH standards, by integration of RES and use of bio sourced insulating materials from local origin. This action is part of a comprehensive approach that aims to develop and strengthen in Aquitaine a broad engineering expertise in the field of high energy efficiency and timber frame construction, using local resources from industrial timber production such as maritime pine and bio-based insulation materials. The approach also aims to build capacity for the implementation and organization of multi-storey buildings with timber structure, thus paving the way for a strong positioning of actors on the regional housing and tertiary market.



Cesena



Cesena identified and described two beacon projects, the Fiorita Multiresidence and the Case Finali Social Housing, and organized the related 5 info sessions involving local stakeholders, designers, policy makers and market players to update them on the status and on the choices made for these 2 buildings. The Fiorita Multiresidence project involves the realization of 8 apartments under the PH certification protocol that will be certified by the local company Zephir. The building will be realized with a dry system of wooden load bearing panels. The project foresees a wide application of RES to satisfy the energy demand. A PV plant will be installed on the roof supplying 10 kW of energy. A heat pump will provide the hot water. The thermal energy need is currently estimated to be around 11 kWh/m²/year.

Italy (Politecnico di Milano)



The visibility which the beacons had thanks to the project has been a relevant opportunity to have a real impact. Showing actual examples of high quality passive houses with integrated RES from the Italian and European regions have been a great importance to support the implementation of NZEBs. In the aspiring regions in Italy PoliMi selected, described and supported valuable beacons as relevant examples of a variety of building types (public, private, school, residential, single or multi-family ones) developed according the passive house principles with RES integrated. Some of the beacons initially foreseen in the work programme had been confirmed, some other are selected as new beacons. In total PoliMi selected and supported a larger number of beacons (8) in respect to the initial work programme.

Arnhem-Nijmegen

In Arnhem-Nijmegen the PassREg project has also been used to experiment with alternative forms of cooperation and project management. Its main goals are to increase the customer satisfaction, shorten delivery times, and reduce investment costs and risks of failure in the NZEB building projects. This makes NZEB and nZE-Retrofit more competitive on the market and supports the building partners to cope with the challenges of executing high energy standards. DNA in de Bouw promotes a combination of techniques from the agile-scrum movement, systems engineering and morphological design. The so called scrum-team approach has been implemented in several (beacon) projects and is being adapted by several members of DNA in de Bouw.



As an example, the Generatie Wooncomplex Landgoed Oosterhout in Nijmegen project was developed along a performance requirements demanding life cycle costs been taken into account. The project was organized in a [Lean](#)-like cooperation. The building team consisted of the executing parties, the clients, the lean-planner, the PH advisor and the building inspector. The contracts were based on prescription of performance requirement for performance. The design team was challenged to find best and innovative solutions during the designing phase and reduce execution time, -waste, -failures and thus costs.

Brussels

It is hard to distinguish a single beacon out of more than 1,000,000 sq. m. of PH new builds and renovation in Brussels. What is more important here is to emphasize that all examples from this frontrunner city show that the PH concept and standards are applicable for all building types and are really the shortest and most feasible way to the national NZEB definitions – all proved in the heart of Europe.

Professional and administrative capacity

We previously called this broad topical area “capacity for change”, and this estimation was strongly supported by the evidence gathered from the success models of the ARs. Most of the identified barriers for the implementation of the Passive House standard at regional level are focusing on issues along this topic, and it doesn’t come as a surprise that some of the most often mentioned solutions from FRRs are in the sphere of professional and administrative capacity building.

Hanover

As early as mid-1990’s, Hannover local authorities recognize that implementation of the goals of their ecological and energy policy is unthinkable without active public support. A broad circle of stakeholders was attracted in the design of Local Agenda 21 and active *public dialogue* on climate protection issues was provoked. The implementation of Agenda 21 is based on the establishing of permanently functioning *networks* (e.g. “Environmental Communications Network), directly involving citizens in the sustainable development of the region. Other instruments include the “Environmental Hot Line”, the “City Forum” and the Planning Ombudsman institution. Specific attention is paid to the involvement of businesses and local industries through PPPs, branch initiatives and consultations. The permanent exchange of environmentally sound technologies is also a main priority, as support efforts for continuing education of professionals in the area of EE and RES are maintained. Specific measures have been taken to ensure participation of women and children in the sustainable development of the city. Hanover Municipality has also improved of its own administrative *capacity*. Its specialized unit “Energy and Climate Protection Section” encourages changes in the end energy users’ behaviour, provides consultations on local energy standards in buildings, participates in energy planning, and supports use of RES. A system of institutions has been developed and coordinated by Climate Protection Agency Hanover region (CPAH), while the programming tasks are implemented in the framework of Climate Alliance Hanover 2020. Additionally, a system of consultation centres for different stakeholder groups (households, investors, builders, etc.) was built in the municipality, and a special national network for professional orientation attracts young people to training opportunities.

In the course of PassREg, the successful organisation of two info-sessions in terms of study tours with more than 109 participants (planners, architects, politicians, staff of municipalities) showed that beacon projects are essential to convince stakeholders and collect more experience (e.g. Press Release, 30.04.2014: <http://www.proklima-hannover.de/aktuelles/2014/Passive-House-Fachexkursion-von-proKlima-gut-besucht>)

A third info-session was planned in connection with PH supermarket results and quality assurance but took place on 08.05.2015 (not possible earlier because of required measurement results). This info-session was arranged as a workshop with more than 20 participants and summarised the experience of the last three years. During the PassREg period, in corporation with the Passive House Institute proKlima successfully developed the

PH-Standard for this special type of use: 2 PH supermarkets have been certified, and a third supermarket is nearing completion. The first supermarket (PassREg) serves not only as a regional beacon but also as a PassREg-beacon.

Brussels:

The rapid growth of low-energy building in Brussels-Capital region, which followed the high-level political commitment and the resulting new strategic and legislative frameworks, also required a significant change in the institutional arrangement. *Brussels Environment* office multiplied its capacity in terms of experts and financing, which was a necessary step to test the ability of businesses and end-users to realize high-end energy efficient projects. A set of additional *institutional measures* was realized: the Sustainable Building Facilitator Network, the Employment-Environment Alliance, Brussels Enterprise Agency (BEA), Plateforme Maison Passive (PMP) and Passiefhuis Platform (PHP) are working towards smooth transition to more energy-efficient building practices, covering all relevant stakeholders in public, private and non-governmental sectors. Usually offering free consultation services, these institutions exemplify the attempts of regional authorities to support the supply side of passive building. The need to *train building professionals* via universities, vocational schools and training centres was timely realized, and in 2009 Brussels Environment decided to develop a professional development program for designers, engineers, architects, and contracting authorities. Additionally, PMP introduced training for designers in 2005 and for builders in 2007. Today, the training program involves the entire sector (developers, investors and promoters, building managers, property managers, notaries, maintenance companies, etc.), as a part of the legalization of the Passive House standard, also supported by the Professional Reference Centre for Construction.

As regards higher education courses, at the Department of Architecture of the Université Libre de Bruxelles, PMP has integrated passive house training, as designers and builders apply the learned concepts into practice, collaborating on real 'passive' projects. PMP continues to hold high level training courses for the entire sector (designers and builders) but also information sessions for the general public, monitoring, economic studies, etc. It also created and disseminated PH training materials (also for craftsmen), translated in French and adopted to the regional context.

Tyrol

The institutional arrangement in Austria and in the region of Tyrol did not fall behind strategic and regulatory development. Consultancy services and trainings are offered by Energie Tirol and its 'Energy Academy', focusing on professional development of planners and construction-related industries. Professional networking is exemplified by Ecoplus Cluster, Green Building Cluster of Lower Austria, and Low-Energy-Building Cluster Tirol, with the understanding that innovative and economically sound projects between business and research community are becoming increasingly important for the building sector. Training

opportunities are also offered by IG Passive House Austria and IG Passive House Tirol, in close cooperation with PHI and University of Innsbruck.

Compared to other Austrian regions the educational level of planners as builders/craftsmen in implementing high energetic levels is evaluated as quite high, which brings down additional costs in constructing to high energetic levels. Cost efficiency and acceptance of passive house homes combined with ventilation and renewables is also very high, as this quite successful story could be achieved only through awareness rising of important stakeholders and capacity building within those involved in planning and construction. Architects, planners, executive companies and their employees had to be brought on this high level of knowledge and experiences, which now allows a cost efficient and reliable implementation and maintenance of nearly zero energy constructions.

Wales/BRE

Training provided to key Local Authority personnel (designers and Building Control officers) and Trades Apprentices helps embed the Passive House + RES principles into future projects, which will be a long-lasting legacy of the PassREg project. Introductory information provided to a wide range of stakeholders via info sessions, regional and national events, has shown positive support for Passive House with RES as a solution for future NZEB in Wales and widened awareness of its viability. A particular success was the positive response from stakeholders voiced in the presence of key Welsh Government officers responsible for the future Building Regulations in Wales at the Regional Building Forums. It is therefore hoped that this apparent industry support will influence future Regulatory decisions.

Designers are fundamental to the PH approach but the extensive Certified Designers training course is generally too long for many to attend. A long term plan to create a 'bite size' course to be completed in stages would inevitably be valuable. In order to create interest in the PH concept generally, a short introductory training session for architects/ designers (2 intensive hours) covering the core principles of Passive House was developed and trailed. Training has been given also to the Building Control officers at Carmarthenshire Council so they are aware of the construction features relevant to the Passive house School (beacon project) being developed in their region. The training also emphasised how the key features of PH construction would likely be implemented in future low energy/ NZEB projects, so they will understand the changes they are likely to see across construction sites over the next 5 years.

Part of the PassREg project (under WP5) involved the creation of new training materials to supplement the well-established Certified PH Designer training course. One of the key areas identified was the integration of RES into Passive House developments, which is obviously an important factor in the overall delivery of the future EU NZEB targets. BRE developed a new training module exploring the renewable options available and specific considerations relating to PH, including advantages and disadvantages of different technologies and 'future

proofing' current building designs to make consideration for the future fuel mix across Europe.

Burgas

In order to achieve sustainable and good results Burgas Municipality established a working group (core team), which includes municipal experts and managers with various expertise (e.g. architectural, urban planning, legal, financial, etc.). To ensure sound flow and exchange of information the working group organized regular internal informational and working sessions. The first step of the core team was to analyse the baseline situation and to collect the output information which resulted in a document "Overview of the Starting Point of the Aspiring Regions", which further on resulted in the city's SM.

As AR the development of the beacon project was very important part of the PassREg project for Burgas Municipality. It gave a very good example not only for the municipal administration but also to professional community. The proven benefits and good practices of low energy construction contributed to reconsider the local policies in urban planning and construction. The beacon project contributed to upgrading the capacity not only of designers but also to municipal administration whose aim is to establish a long term practice of investment in NZEB's.

Gabrovo

With the support of EnEffect, a significant number of training courses and info sessions were conducted in relation to the PassREg beacon – the „Sun“kindergarten. The capacity building efforts started as early as the design phase, and the construction works were performed in close contact with the designers in order to avoid major mistakes in the execution. The process was followed closely by the municipal experts related to construction, engineering, architecture and city planning. Trainers from Technical University – Gabrovo and the local Vocational High School of Architecture and Construction took part in the train the trainer course conducted by Passive House Institute in the framework of PassREg project. A number of regional building forums, trainings and study visits were conducted along with other capacity building events related to energy efficiency in buildings. "Sun" kindergarten is also presented at virtually all major national conferences and events with the participation of EnEffect and the Municipal Energy Efficiency Network EcoEnergy.

Zagreb

One of the main lessons learned through PassREg is connected to the effect from capacity building activities on the local authorities and their impact in driving changes. It was very important that they were directly introduced to the PH concept via the Study Tours in FRRs, and the impact of the good local example (beacon project) on the process of developing passive houses for the trained individuals was also of high significance. The most important element however is to increase the number of educated architects, construction managers and tradespeople not only about Passive House principles, but also on the use of renewable energy and building specifics as the first step to rise the number of PH. The main difficulty

was the effective inclusion of politicians in the project; politicians are supporting the energy strategy and NZEB as the passive houses, but the evaluation of the local authority is that at the moment there are no indicators or proper channels to reach and measure impact to the politicians in an effective way.

Cesena

Cesena identified and supported two beacon projects and organized 5 info sessions involving local stakeholders, designers, policy makers and market players. These events have been organized in connection with other European projects events, or other municipal events or other events linked to Passive Houses, such as Passive House Days, Regional Building Forum, etc. One of them is currently under construction phase and the Municipal role of supporter and facilitator is being carried on even beyond PassREg end. Cesena also organized the Train the Trainer course with more than 20 participants coming all over Europe (and even farther).

Together with Zephir, Cesena translated the PH certified Tradesperson course. This material was used in the organization of the certified PH Tradesperson course held in November 2014, where 14 people have been trained, including civil servants, craftsmen, building entrepreneurs, architects, etc. Within the PassREg project, the course to become a "Certificate Passive House Tradesperson", organized by Zephir, which was attended by technicians from municipality, external designers and craftsmen, was held in Cesena from 19 to 21 November 2014. Additionally, the course to become a "Certificate PH Tradesperson" organized by Zephir was attended by technicians from municipality, external designers and craftsmen (19- 21 November 2014). Other courses on NZEB are regularly organized by Chambers of architects, engineers and surveyors and by private companies.

In order to have an active and exemplary role in citizenship's formation, the Municipality, in cooperation with Energie per la Città, has undertaken a training course for secondary schools of Cesena and for all citizens, which aimed to promote, in a fun and curious way, energy conservation and renewable energy. This project started in November 2013 in the secondary schools and continued in the 12 districts of the city with the objective of developing a deep personal and collective consciousness with the importance of the choices in the energy field, which affects many aspects of life daily. Starting from the very positive response received by the students of the involved classes and their parents, a new training project in schools on issues of environmental sustainability and energy conservation was organized, starting from December 2014. This course will go on within the school year 2014-2015. The main objective of the training project is to promote between schools and students the awareness on the rational use of energy, starting from their daily consumption and involvement and reaching even families on the theme of energy efficiency and development of renewable sources.

The activities in Cesena were strongly complemented by the efforts of **Politecnico di Milano**, covering a large national base. PoliMI participated in the 'Train the Trainers' course organized in Cesena together with 4 experts related to beacons. Following this course, PoliMi organized the Initial training course, which was placed near Milano: the course

showed a very good participation, with 38 persons as designers, construction companies and construction sites managers). Additionally, PoliMi developed a training module on Energy Efficient Cooling for passive houses in warm climates, with contribution by NOBATEK and PHI. It also contributed to a Training module on Integrated Supply with Renewable Energy Systems, under the management of BRE. It also contributed to the identification of suitable building services concepts and supported and communicated them with regional manufacturers of different kind of components suitable for passive houses and NZEBs.

In relation to the beacon projects, intense communication activities and technical meetings often organized on field at the construction site or in the completed building. PoliMi delivered support to energetic design and energy balance calculation by the PHPP software with in-house staff with support of PHI. This allowed for a more coherent and comprehensive process in the quality assurance and beacons support considering expertise and outcomes developed in the whole project. This produced also an easier, more intense and effective communication process between us, as Italian partners, and beacon designers and owners.

The training course in the field of Passive Houses and NZEBs organized by eERG - end-use Efficiency Research Group of Politecnico di Milano in the framework of PassREg project - during April 2015 are seeing high interest and quite large participation. The course target-group is represented by designers, technical expert, managers of construction companies, with the aim to give actual knowledge to build a passive house buildings integrated with renewable energies.

Other training seminars and technical communication initiatives have been organized mainly in northern regions of Italy and in Sicily. In Sicily regions and Catania district the course “Master BED - Master on Building Eco Design Passive House Zero Energy buildings” could be proposed also in the next years: Catania district, in Sicily, shows important developments are moving from a bright exemplary project where zero energy target is reached by adopting Passive House standard and integrated renewable energy systems. This residential building made to raise attention of many people in building sector and among policy makers. They can see an affordable solution to realize a zero energy building with pleasant architectural aspect. Many people are taking part to events and open-door visits presenting it. Starting from this, training activities are starting particularly for new passive house designers with a dedicated post-degree master under developing in Catania, to give high level knowledge in ecologic and zero energy building within a holistic approach.

Latvia

During PassREg project many main stakeholders were informed about the passive house standard. At the beginning this term was something new and unexplored, but now it is one of the synonyms during round table discussions about nearly zero energy buildings with representatives of ministries. The Latvian Success model was developed and presented in both regional Building forums. 3 Passive House Day events were organised with more

participants and houses each year. Huge contribution was provided by leading experts in Latvia from Passive House Latvija association, which actually are the passive house tradesperson course providers in Latvia region and organised it 4 times in less than 2 years. Around 60 local experts were trained and 32 received the certificate. Passive House tradesperson training course is available in national language and demand from experts for this course is growing constantly. Regular training seminars are also necessary for educating Passive House end-users — house managers and inhabitants.

Certified Passive House Tradesperson

In October/November 2014 the second *Certified Passive House Tradesperson* courses in the Latvian language were held; also the next group for February was completed. Interest and activity of the members are quite high, so courses are planned to take place on a regular basis (according to the set exam dates of the Passive House Institute).

Certified Passive House Designer

On November 2014, first *Certified Passive House Designer* courses in the Latvian language were held which were organized with the support of Passive House Latvia, CEPH AT: LV, EST and Leonardo da Vinci Lifelong Learning Programme. This course was designed primarily for teachers to help spread the valuable ideas and knowledge of the Passive House standards among the young generation in vocational schools, vocational high schools and also in the Riga Technical University Faculty of Architecture. The course was also attended by architects, energy auditors, engineers and developers, forming a group that with great interest participated in the discussions and shared the knowledge of their industry.

Educational program "Green Building Professional"

For the second time Latvian Sustainable Building Council is organizing courses offering an opportunity to obtain a certificate of a Sustainable Building Specialist or Green Building Professional (GBP). Education program "Green Building Professional" is a course of 10 modules, developed by the World Green Building Council (WGBC).

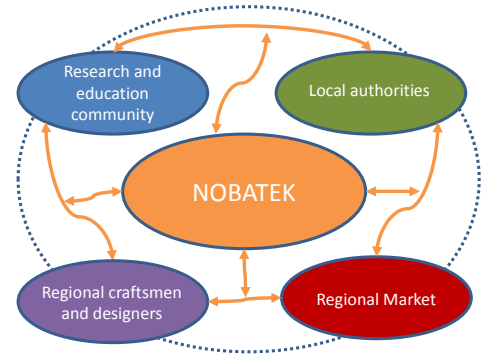
New Construction Management Programme "Construction manager" at Latvia University of Agriculture

In order to improve the construction quality in Latvia, the building specialist education in Latvia now should be at least Level 1 or Level 2 professional higher education in the construction study programme unlike it was before when construction managers were able to work well with the acquired technical education. Due to the changes in the Construction Law (see section 1.1. Construction Law), Faculty of Rural Engineering of Latvia University of Agriculture has created a new 1st level professional study program "Construction". Part-time studies takes 3.5 years during which it is possible to acquire 4th level qualification of "Construction Manager", according to the European Qualification Framework level 5, which will serve as a prerequisite for student to obtain the building trade certificate.

Aquitaine

In the development of regional training capacity, new trainers were trained at Nobatek and beyond thanks to the project. Construction of a training team, based on Nobatek resources and local partners already skilled in Passive House design, was initiated and the first trainings were carried out. Other highlights included:

- Organization of one Regional Building Forum in Talence Aquitaine. Passive house designers, engineers and architects invited to present examples of projects. Open debates and forum between the public and the speakers. Presentation of the PassREg project.
- Passive House days: participation during 2 events. Organization of one workshop/debate. Communication about one partner event.
- Position Nobatek on the NZEB related market, and communicate on it. From the start of PassREg project, Nobatek has been involved in various projects concerning NZEB concepts applied for the design of buildings (even outside the Aquitaine region). Nobatek as the main technological centre related to construction and urban planning in Aquitaine, and now as the only “National Institute for Energy Transition” for construction (*ITE INEF4*), is in capacity of having an influence on a large number of regional stakeholders. By displaying this position as regards NZEB, Nobatek expects to shift the lines and pave the way for NZEB development.
- Develop training capacity. During a large part of the project Nobatek has been acquiring more knowledge about ways to design and implement NZEB. Now a new training group has been formed and has started training activities. Beyond PassREg, Nobatek will be able to go on training more and more stakeholders in Aquitaine.



Antwerp

As WP3 leader PHP successfully coordinated the work on selection of wide range of beacons in the front runner and aspiring PassREg regions that were presented on the PassREg website. PHP also actively participated in organization and preparation of the study tours and international workshops, to which also hosting partners, PHI, and other WP Leaders contributed bringing these events to success.

Relating to work on info sessions, PHP organized five sessions for the aspiring region city of Antwerp, cooperating locally with those involved in the beacon project ‘Nieuw Zuid’, EcoHuis Antwerp and the department of the city planning. Each info session program was prepared with great care to correspond to interest of the specific target group, and local stakeholders were invited to share know how in an interactive way.

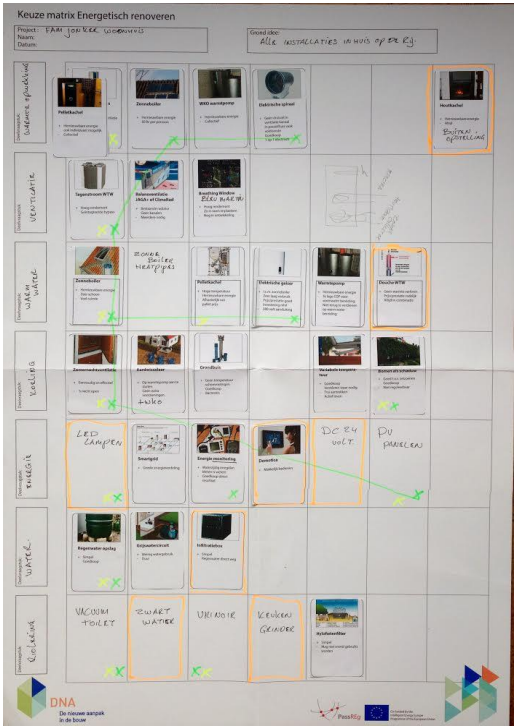
Relating to undertaking capacity building for trainings, 5 members of PHP staff took part in the PassREg train the trainer sessions delivered by the PHI, then organized three rounds of trainings specifically for capacity building of the city of Antwerp staff directly working on building developments in the city. The training program was 'custom made' to the needs of the administration staff specifically on residential, non residential and renovations, including information on integrating renewable systems.

With the support of PassREg and in efforts to provide sustainability of the actions, PHP is continuously improving its courses, recently the offer has been strengthened concerning modules on renovation, renewable systems, as well as our possibilities to do custom made in company knowledge transfer. It offers also assistance to SMEs on stimulating innovations in passive house technologies.

Arnhem-Nijmegen

Within the PassREg project, DNA has elaborated a building strategy aiming a fast nationwide implementation of PassREg knowledge that led to the establishment of the independent and complementary training institution KERN (solution further elaborated in WP4). The KERN Foundation has given its first official course for craftsmen in PH building, in the first quarter of 2015. Interest was limited, but growth is expected as marketing efforts of KERN increase.

Additionally, it is increasingly likely that there will be an NZEB-tool, based on PHPP, available for the Dutch market in the very near future; it was targeted for June 1st, 2015. This will possibly boost again the interest for (the application of) passive house principles.



As a major highlight of DNA's activities on PassREg, the organization helps overcoming of the suppliers organizational challenge for serving mainstream markets through identification of possible solutions for the supply side to develop competencies to serve the mainstream markets. The successful introduction of Scrumteams and Morphological Analysis shows that social Innovation is going hand-in-hand with the technical innovation, which definitely helps building the PH market and one of the main goals of the PH project.

Stakeholders' Involvement

A largely horizontal issue and a major focus of PassREg Success Models, the effective involvement of stakeholders is a crucial factor for the success of the political and financial

measures in support of sustainable urban development. It is also a very important issues for all projects supported by Intelligent Energy Europe programme, so let's see what some of the project partners report on this issue (texts from final reports are used without any editorial intervention in order to avoid any misinterpretation):

PHI:

The Passive House Institute traditionally addresses the target group of architects, engineers and manufacturers, the public, the press and also crafts as well. PassREg has approached this group through various activities and has included the political decision makers and their supporters e.g. in district development towards zero-emission quarters. It has organised specific sessions for political decision makers, e.g. in the recent Passive House Conference. During the PassReg project it has worked very closely together with the City of Heidelberg to provide the information from Bahnstadt Heidelberg to the consortium and beyond.

BRE:

Local Authority members, particularly those responsible for instigating construction projects and setting the required standards for development, have been key to the implementation of Passive House in Wales under PassREg. LA Development Managers and Property Services Team leaders have been extremely influential in this regard. LA Building Control officers (enforcing construction quality in practice) and LA in-house Designers (building the principles into all future LA projects) can support the key individuals in implementing the aspirations. The PassREg project has also helped involve and raise awareness with a wider range of stakeholders, including architects, contractors, developers, housing associations, product suppliers/ manufacturers, services engineers, etc.

Burgas:

By organising info sessions and through good contacts, Burgas Municipality managed to ensure partnerships and provide support for the project through stakeholders and key players. These include a professional school of construction and architecture, training center for professional qualifications, municipal councilors, leading construction companies, representatives of the design community and others. So the network of stakeholders is covering all sectors that are key to the project roadmap and the Municipality.

Zagreb:

City of Zagreb gathered experts through the Regional Expert Group who disseminate knowledge of Passive House principles. The PassREg network was expanded to the Chamber of Architects and the University of Zagreb, especially to the Faculty of Architecture. Also other faculties have been influenced, which were joined into a Membrain project of a self-sustainable house presented during the Paris Solar Decathlon competition 2014. City of Zagreb supported and subsidised the Membrain project towards which was also presented PH. Fulfilling the obligations of the project, the City of Zagreb reached different target groups via info sessions and regional events such as politicians, representatives of ministries,

representatives of the regional cities as well as students, investors and other major stakeholders.

Cesena:

The project allowed the city of Cesena to establish a stakeholder network coordinated by the European project Office department and supported by the in-house society Energie per la città, energy manager of all public buildings. The network was created by beacon projects architects, civil servants dealing with energy issues and building constructions. PH certifiers and associations have been involved as well as private citizens, schools and teachers. Politicians and councilors have been part of each event and activity and became promoters of the network.

EnEffect

EnEffect spread out the PassREg message virtually to all Bulgarian municipalities, helped by EcoEnergy Municipal Network. The PassREg calendar and articles in the EcoEnergy newsletter were sent to all municipalities, and hundreds of municipal decision makers and experts representing more than 50 cities took part in PassREg events. The project attracted designers, building experts and trainers, as hundreds of specialists took part in the local training courses and info sessions. A special highlight is the cooperation with the Bulgarian Construction Chamber, resulting in collaboration in several other projects. Other important cooperations are with the Chamber of Architects, the Energy Efficiency and Renewable Energy Fund, Habitat for Humanity, professional schools and universities, responsible ministries and state agencies.

LEIF

With activities undertaken within the framework of the PassREg project, it was possible to reach a very wide range of target groups – politicians, ministers, representatives of ministries and planning regions through regional building forums, and local building experts and craftsmen through Passive House Tradesperson courses. Each of the 10 info sessions were targeted to a specific target group such as – universities and students, facilities managers and housing maintenance bureaus, state real estate companies, national authorities, politicians and main stakeholders. Very important support and contribution was provided by the Passive House Latvija experts.

PHP

In the Aspiring Region, the city of Antwerp, the target group of local authorities was represented through involvement of the department of the city planning and the organisation EcoHuis, that is the most important and well established advice and info center for the general public. The target group of market players were represented through the architects, engineers, contractors, developers and facility managers, as well as related professional organisations, and they took part in the info sessions, forums, workshops and training courses and in the implementation of the solutions. Both target groups were

involved in various dissemination activities and received information through PassREg communication channels (website, newsletter, etc.).

PMP

With the coming into effect of the law in 2011, all the actors were convened and involved in preparing the sector for the Passive House Standard in 2015. Architects' associations, contractors, developers, but also the Centre Scientifique et Technique de la Construction (CSTC) [Scientific and Technical Centre for Construction] and pmp have, in their respective ways, marshalled their members, through training, publications, examples and visits, seminars, etc.

proKlima

proklima concentrated the project activities particularly on the target groups of planners, architects and politicians and those people who support and develop political decisions, e.g. 2 info sessions (study tours, 2013, 2014) have been organised by proKlima. They were more than successful with over 100 participants in the study tours with very fruitful discussions.

eERG PoliMI

Through communication, technical disseminations and training activities of all WPs, different groups of stakeholders (such as building users, designers, manufacturers, representatives of companies from the construction sector, policy makers, students) were reached and actively involved via workshops, conferences, info sessions and direct communications. Valuable information and examples directly reached a number of interested people: the results of the communication phase can be considered a crucial step for developing a successful process in the actual implementation of Passive Houses plus renewables systems principles, towards NZEBs.

DNA in de bouw

The regional key stakeholders such as designers and builders, local and national authorities, (potential) market players for NZEB and clients (private and commercial) were the main target for all activities of DNA in de bouw during the PassREg period. The involvement of these stakeholders has been intensified through enthusiastic network activities, many events (expert meetings, scrum team meetings, regional forums, excursions, and trainings), publications and increased active participation of the stakeholders in the process of transition of the regional building sector. Understanding the relevance of the PassREg activities, the co-financing local authorities became ambassadors for PassREg. Through the PassREg project the DNA activities even became effective on the national level. KERN, the initiated executing organisation of DNA targeted national educational organisations and clients for training activities and the acceleration of the spreading of NZEB knowledge.

Awareness raising activities

One of the most underestimated issues in the efforts for implementation of the NZEB concept at all levels, the raising of policy makers, building professionals and end-users awareness and increasing of their interest towards the opportunities offered by energy efficient solutions is the key factor for sustainable market uptake of the proposed concepts. In many of the less advanced regions, there are tangible shortages in citizens' culture in respect to energy savings in everyday life, in information about the effects of the use of specific new materials, systems, technologies and solutions in terms of energy savings and comfort of habitation, and in understanding of the environmental, economic and social impact of the targeted energy efficiency and RES policies, especially at the local level.

Of course, there is no general recipe for success of a communication campaign: it should be tailored towards its goals, target groups and external environment. However, lessons learned from PassREg show that the political acts at all levels of governments could (and should) serve as serious incentives for the start – or reinforcement – of the communication efforts targeted to increased market demand. This conclusion should be seriously taken into account as the respective resources should be allocated up front in order to set the space for actual success of the policies: it is a well-known that if the civil society attitude is not favourable towards a policy action, it starts working against itself – and its initiators.

One of the most convincing efforts in terms of intensive communication activities comes from Belgium and deserves particular attention:

Communications (r)evolution in Belgium: the stories of Brussels-Capital Region and the City of Antwerp

The active promotion of the benefits of energy-efficient construction is a priority for the Brussels regional authorities. One way of doing so is by raising the profile of the "Exemplary Buildings" program. Brussels Environment features the Exemplary Building winners in articles, project files, seminars, the "Green Brussels, Inspiring Architecture" book, and other publications. Visits are organized for the public during or after the execution of the project.

Furthermore, Brussels Environment has developed AlterClim, which is a software that helps determine whether premises of certain characteristics can avoid air conditioning (partially or fully). Available through the Brussels Environment website, AlterClim contains the results of 50,000 dynamic simulations, as well as substantial technical and educational documentation in the form of sheets that can be read online or printed. Other concrete initiatives of the Brussels-Capital Region to stimulate and increase the low-energy construction visibility are described below.

Ecodynamic Company Label

Created in 1999, the Ecodynamic Company label is an initiative of Brussels Environment. Its goal is to encourage companies and organizations to actively commit to improving their

environmental performance (especially the energy consumption, waste management, and efficient use of raw materials). The target groups are all enterprises and organizations (large and small, private and public, regardless of their area of expertise).

The “Ice Challenge” Special Event

The Ice Challenge event is organized by PHP in Brussels and Antwerp. It aims to raise public awareness and illustrate firsthand the benefits of the good building insulation. The event consists of placing two 1,3 tone blocks of ice in two separate makeshift constructions – one very well insulated and the other one – not insulated. The two constructions are placed side by side on a main downtown street for everyone to see. The goal is to illustrate in this way how more rapidly the ice in the non-insulated construction melts during the summer months. Observers have to guess how much ice would be left in each shack after 40 days. For example, during the 2007 Ice Challenge, more than 450,000 kilograms of ice still remained in the well-insulated cabin, whereas the ice in the non-insulated one had completely melted for 11 days only. But the main objective of the event is promotional: by the guessing competition, the participants obtain useful tips for energy saving and house insulation.

PMP/PHP Events

PHP and PMP jointly organize an annual Passive House Fair: a building technology forum that showcases the latest developments in energy-efficient construction. The Fair targets construction professionals and the general public alike. Among the activities of the happening are open houses, free readings, information and planning advice, and meetings with the professional members of PMP/PHP. In 2012, the fair took place during the second weekend of September. 120 companies from the building sector participated.

In addition, PHP and PMP also organize an annual Passive House Symposium. A more specialized event than the Passive House Fair, the symposium is targeted specifically to construction professionals. More than 30 prominent Belgian and international speakers give lectures on a variety of aspects concerning passive construction and share their experiences with the audience. Participation in the Passive House Symposium is mandatory for all professionals who wish to stay abreast of the latest developments in passive construction.

Ecobouwers

Ecobouwers is an annual conference with loads of technical information and practical experiences on sustainable building. Visitors come into contact with the most engaged and environmentally conscious builders and professionals. Ecobouwers has only one goal: more sustainable and energy efficient homes in Flanders. Because they are urgently needed!

The initiative also supports a large network, as its members can find construction advice over 10,000 threads at the forum and share their experiences with many other professionals in the area. On Ecobouwers.be, more than 800 construction professionals, who have proven their expertise and can provide independent advice, can be contacted. The photo-blogs, showing construction of energy-efficient homes, are one of the most visited sections of the website,

which is also the most visited independent construction site of Flanders with more than 1.2 million visitors per year.

“Be Passive”

Since November 2009, Plateforme Maison Passive (PMP) and Passiefhuis Platform (PHP) have been issuing **“Be Passive”**, a quarterly magazine dedicated entirely to low-energy buildings, and the passive standard in particular. The target audience is: architects, public authorities, building societies, regional development agencies, engineers, construction manufacturers, real estate actors and all others involved in construction. The magazine aims to serve as a “one-stop shopping” centre for everything that relates to the energy-efficient building. The goal is to present the information in a clear, concise, and jargon-free way so as to be comprehensible to individuals without technical training. The website (free details and free issues) has more than 20,000 downloads. The magazine is distributed without exception to all target audiences (approximately 15,000).

Specifically, the magazine offers detailed accounts of the prominent low-energy construction projects, as well as interviews with important individuals (public authorities, architects, construction sector leaders, building owners and residents). The “Exemplary Building” winners receive extensive coverage. In addition, the editors include updates on the current Belgian legislation related to the low-energy building. “Be Passive” is an initiative financed by PMP/PHP and a group of private stakeholders. Four issues have been supported by the Belgian SPF environment. More information: be.passive magazine

“Populist” Actions

Since the start of the project and the standardization of the compulsory passive standard, it was time to communicate these advances widely to the public. One of the first public advertising initiatives is the “Are you normal?” campaign (www.areyounormal.be). The campaign was carried out during the 2012 Passive House fair. It included a flashmob, moving advertising (in rollers) along the main pedestrian popular zone in Brussels (where more than 30,000 people pass by every day), T-shirts, and a quiz on the event website, among others. The goal of the campaign was to show that nowadays, a PH is mainstream - the only thing special about it is the inhabitant.

I visited a Passive House

After raising the initial interest, informing and provoking the public a comic video produced by PMP became the next step of the communication strategy. With more than 200,000 hits on YouTube, it proved to be a huge success and the reason is quite simple: we can only make jokes with what we know, accept and appreciate. Already well known in the PH community you could check it in English at <https://www.youtube.com/watch?v=ms9piTYk2Os>.



The understanding that **communication with the key stakeholders and end users** is crucial for the market uptake of the NZEB and PH concepts and the standards is also clearly visible in the other PassREg FRRs and ARs. In **Tyrol**, awareness rising and educational trainings within member network as well as for the general public include regular network meetings (WP6), regular visits of building sites (WP3), tours of plants and product presentations, courses and trainings also open to the public (PHPP, detailing...) (WP5), courses for property experts (WP5), construction fair presentations (Zeba 2013, 2014, 2015, Innsbruck) (WP6), annual passive house journals (WP6), weekly newsletters within the network (WP6). Some of the additional public/stakeholder information events include participation of International Passivhouse Days in 2012, 2013, 2014 (WP6), International workshop and studytour, Innsbruck, 9/10.10.2013 (WP3), presentation of front runner region Innsbruck at Zagreb Energy Week, 13.5.2014, international studytour, information event Innsbruck (WP6), international studytour, information event Innsbruck, 5.11.2014 (WP6), Studytour in Heidelberg (WP6), networking with stakeholders within the Tyrol region (WP2).

In Hannover, the successful organisation of **two info-sessions** in terms of study tours with more than 109 participants (planners, architects, politicians, staff of municipalities) showed that beacon projects are essential to convince stakeholders and collect more experience (find more in the Press Release from 30.04.2014: [http://www.proklima-hannover.de/aktuelles/2014/Passive House-Fachexkursion-von-proKlima-gut-besucht](http://www.proklima-hannover.de/aktuelles/2014/Passive-House-Fachexkursion-von-proKlima-gut-besucht))

A third info-session was planned in connection with PH supermarket results and quality assurance but took place on 08.05.2015 (not possible earlier because of required measurement results). This info-session was arranged as a workshop with more than 20 participants and summarised the experience of the last three years. Special regional support was given with more than 10 presentations and publications by proKlima experts and local representatives and participation in a number of regional and international conferences and events.

In **Wales**, BRE have tried hard to push dissemination to the uninitiated to encourage new interest in Passive house + RES as a future solution for NZEB. Various events and presentations have been carried out over the course of the PassREg project. These range from local 'meet the buyer' information sessions to prepare developers for the requirements of upcoming Passive house projects, to awareness sessions about the core principles of Passive house with RES and how they deliver the backbone of the future NZEB requirements. These took place at International events (EcoBuild construction trade event, London, UK) as well as regionally and nationally at Local Authority Building Control (LABC) general assembly events (Birmingham, Llandrindod Wells, Wales) and to general stakeholder audiences within the beacon regions of Cardiff and Carmarthenshire.

In particular, Building Forum events were held in both North and South Wales to consider the options for Wales' delivery of the NZEB requirements and gain feedback on the feasibility of Passive house with RES as a basis. The events were well received and attended

by key stakeholders including Local Authority members, construction companies, architects, energy consultants, members of the Building Regulations Advisory Committee and, importantly, Welsh Government delegates responsible for setting future Building Regulations in Wales. Support was strong for the Passive house “fabric first” approach as a way of reducing the scale (and cost) of on or off-site renewable energy sources. However, it was acknowledged that there would inevitably be a considerable learning curve to achieve the necessary quality of delivery on site. This positive stakeholder feedback for the Passive house approach will hopefully influence the future policy direction and Regulations.

In Bulgaria, PassREg partner EnEffect has undertaken a very strong and comprehensive communication campaign as it is well understood that awareness raising is the main driver for increased market demand for Passive House solutions both at the local and national levels. EnEffect followed its communication strategy developed in the beginning of the project, also reflecting the new development and changes in the environment (which are quite usual on the political front in the country). Regional dissemination events are held on dozens of occasions, either on behalf of PassREg project itself or in cooperation with other events. Press releases are sent out according to the plan and publications are monitored, reflecting a significant interest from the professional media. Project pamphlets were translated, adapted and printed, presentations were adapted and new items were introduced on the numerous occasions that the project promoted, exhibition material (project poster and competition poster exhibition) are also prepared, printed and displayed. Required contribution to PassREg newsletters is elaborated and the newsletter is translated and disseminated, also through communication channels of EnEffect partners. The project brochure is translated, adapted and printed in its 7 versions. Project website is supported and promoted through all possible channels. Passipedia articles were prepared and submitted to IPHA for review and publishing. The Gabrovo beacon is included in the Passive House project database. EnEffect also provided a high-profile member of jury for International PH Award competition, as Dr. Arch. Zdravko Genchev is a distinguished member of some of the most respectable international bodies in the area of sustainable energy.

As already mentioned above, EnEffect provided the composition, design and publishing of the PassREg Success Guide. It also translated, printed and disseminated the PassREg brochure in Bulgarian language, and, with permission of the project officer, produced 2 additional publications: (a) the brochure “Active for more comfort: the Passive House” and (b) a 2015 calendar with PassREg beacons distributed to all Bulgarian municipalities and available for replication by all project partners.

An addition, in the **Bulgarian city of Burgas**, ensuring visibility and public support is also perceived as an important action to overcome the informational gap about NZEB. The local authority identified the information needs within the analysis of the current situation and developed communicational strategy, which point out the main actors and stakeholders and defines the specific approach to reach them. Targeting those aspects resulted in total of 13

events organized and carried out within the project including 5 info sessions, 2 regional forums, events organized within day of the passive house in 2012, 2013 and 2014, 2 press conferences with wide media coverage. Furthermore a significant number of interviews and reportages were presented by local radio and TV.

In Zagreb, Croatia, during the last three years spent within PassREg project, the main activities of the City of Zagreb were based on the organisation and execution of the Passive House Days and Zagreb Energy Week via Info Sessions and regional building forums. The continuous dissemination of the project activities via www.eko.zagreb.hr and PassREg brochures, promoted additionally with Success Model, promotion of the Beacon project, translation of the training materials as the establishment of Passive House Consortium Croatia. It could improve the acceleration and implementation of the knowledge connected with design and construction of passive houses and NZEB. City of Zagreb has adapted different types of materials during the PassREg project, which helped institutions and users to get more involved into process of making and using passive houses. The most effected method is to provide materials for investors on the market, which have to be informed properly about quality and cost efficiency provided by passive housing.

In the dissemination obligations and activities according to communication process, the goal was to target different types of stakeholders (architects, civil engineers, contractors, investors) and start with dissemination of the Passive House Principles through organized Info Sessions, Regional Group Forums, Zagreb Energy Week, Passive House Days as the monitoring and identifying beacon project. During the PassREg project, several beacons pass through but the final beacon has shown as great example for further dissemination and presentation of PH principles. City of Zagreb has noted a large increase of investors' interest which is also connected with subvention of renewable energy sources provided by Zagreb.

In **Cesena**, all the communication activities such as translation of the newsletters, press releases, publication of contents on institutional and project websites, realization of the initial and final brochures, production of the posters, organization of dissemination and communication events such as Passive House Days, have been developed in accordance to the project activities. But that was just a part of the communication efforts: the regional building forums have been a major success, attended by technicians from the municipal private and public building sectors and urban planning. These meetings have allowed designers, architects, craftsmen, administrators, to get to know the experiences already made in the context of passive buildings and aspects of design and construction of passive buildings. During the "Passive House Days" and info session organized in Cesena, the two beacon projects were presented in detail. Thanks to the events held, such as regional building forums, the active participation of the beacon projects' architects, the protocol of urban regeneration and disclosure of issues related to buildings and passive NZEB, it has been possible to create a shared knowledge of network between professionals, builders, public administration and citizens.

These activities were also supported by **Polimi** in other Italian regions, as it performed and completed all planned communication and technical events and developed the required dissemination materials. A special focus point were the visits and technical presentations of the actual beacon projects in the Italian regions, as the opportunity to visit actual successful examples and the presentation of the monitoring data represent valuable evidence of the quality and performances of these passive house project.

Many dissemination events and info-sessions were organized. The last one, which represent the final regional building forum linking all associated aspiring region in Italy, could be singled out thanks to the national relevance of the events. The event was organized on the 21st of March 2015 in the most important fair-exposition in the field of construction and buildings. More information can be found at http://buildsmart.madeexpo.it/ew/ew_bsmart_eventi/PassiveHouse%20in%20Italia_programma%202.pdf

One of greatest benefits from PassREg in **Latvia** is perceived to be the new Latvian Passive House Platform (www.pasivmaja.lv), which was planned for years, but finally in cooperation with PassREg it is developed and a lot of international experience and solutions are available in national language. On 15 December 2014, Passive House Platform started its operation where all information about current events in Passive House field in Latvia and all over the world is being regularly updated. The main goal of the Platform is to promote zero-energy building construction throughout Latvia on the basis of the Passive House principles, by using renewable energy as a power supply as much as possible.

Passive House Days

For the third year in early November, SIA "Environmental Investment Fund" within the framework of the International open Passive days organized the Passive House open doors days throughout Latvia. Within the framework of the Passive House Days, informative discussion seminars were held, as well as site visits to Ērgļi Vocational Secondary School which is a very good example of successful reconstruction using components of Passive House in Latvia. In total, in two days time it was possible to visit 6 Passive Hoses in different regions of Latvia.

PassREg project activities

Together with the association Passive House Latvia, LEIF organized and participated in the exhibition "Environment and Energy 2014", Riga, Latvia, with the stand on the construction of Passive Houses. Numerous representatives and experts participated in this information stand, and there was also displayed an exhibition of Passive House designs and information stands including a demonstrative heat recovery unit, different types of glazing, efficiency of which visitors could check by touching it. Also there was a Passive House wall construction and other expositions. PassREg project stand offered a chance to receive the information not only about the Passive House project standards in Latvia but also information on further educational courses that will be organized for Passive House designers and tradespersons.

Continuing work on the PassREg, in the beginning of the February 2015 an informative discussion seminar was organized in one of the project's pilot regions and Passive House projects — Tiskādi Secondary School. The discussion in Tiskādi Secondary School was organized in order to educate and inform the users of the building, the staff of the secondary school on how exactly the attitude and habits of the users of the building may affect its energy efficiency levels. Representatives of this industry, users of such buildings, representatives of the municipality and other people interested in this matter who want to share their experience and acquire new information were invited to join the discussion.

Aquitaine

The awareness raising activities are perceived as extremely important to give more visibility and demystify stereotypes about NZEB and PH in Aquitaine. Often seen as expensive and not comfortable in summer, NZEB had to be characterized in comparison with the business as usual and extended “national regulation standard”. However the comparison is not easy as the targets and principles are not defined exactly the same way. That is the reason why Nobatek started series of studies concerning the comparison of Passive House with National Regulation standard. The results of the studies are crucial in order to convince decision makers of the added value of NZEB.

In addition PassREg gave the opportunity to know better what is done in others regions in order to get inspired by the mechanisms deployed there – mainly through the shining examples (beacon projects). For example, a region as the region of Brussels could be inspiring on many aspects. Now Nobatek has access to the adequate communication material to convince local politicians about the opportunities related to the implementation NZEB standards. In the framework of the project, the following communication activities were undertaken:

- 5 information sessions to beacon projects stakeholders, and to a larger public around the beacon projects.
- Dissemination through PassREg communication tools. Participation to the realization of a brochure about PassREg beacons.
- Passive House days: participation during 2 events. Organization of one workshop/debate. Communication about one partner event.
- Contribution to the production of PassREg communication material (Newsletters, Press Releases, translations)
- Dissemination of the communication material through the available media: brochures, Noatak’s website, Noatak’s social and professional network account (e.g. Twitter), Noatak’s mailing lists.
- Production and dissemination of a local brochure about NZEB in Aquitaine.

In **Antwerp**, in addition to the more or less national-level communication activities described above PHP was also quite active in communicating about PassREg, using own

communication channels to do dissemination, such as website, newsletter to members, linked in, professional day and construction fair, NZEB symposium, and also the annual passive house open days.

- Stadslab 2050 is active in communication about its 'labo' activities to boost Antwerp as a sustainable city. The Passiefhuis Platform is organizing "Architects Café" with targeted communication for architects as well as thema days (2 x per year). There is also communication activity concerning any new passive house standard school (within the Flemish project on PH Schools), whenever it is launched, and this includes schools located in Antwerp.
- The City of Antwerp has its own city magazine that is spread to all citizens. It regularly includes information about activities in the city, e.g. those organized by EHA.
- Each year Bond Beter Leefmilieu organizes – together with PHP and VIBE - open house days, where homeowners of PHs and deep renovations open their doors for other homeowners. In each edition homeowners from Antwerp participate. As such they exchange information peer-to-peer, which proves to be a valuable communication strategy to promote PHs, use of renewables, use of ecological materials and deep renovation.
- There is also the communication that ecohuis does in the context of its activities, for examples workshops, info sessions and other.
- The Passiefhuis-Platform has a database of projects accessible from its website. Activities such as Passive House Days and Ecobouwers as well as "my house, my architect" in which realized buildings to PH standard or somewhat less ambitious, however with efficiency, architectural, environmental qualities, are being open for the public for visit is already going on for years.
- There is also a demonstration programme in Flanders which has new built schools in its centre. PHP communicates on these projects through communication channels of website and newsletters spread to various construction professionals and building owners across city of Antwerp.

In **Arnhem-Nijmegen**, DNA in de Bouw has taken upon itself the strategic action to intentionally connect with other regional networks concerning sustainability. DNA expects synergy from the mutual interests, additional knowledge and the networking opportunities. It is agreed among public sector and private sector stakeholders that the communication activities in the region are not sufficient, as concerning public celebration of successes and other communication about energy neutral building. In response to this, DNA organizes several events to get more information to the public about passive houses with RES.

1. Once per year an "open house route" with passive houses opening their doors for people that are interested either privately or professionally, so they can experience passive houses and talk to the owners about their experiences.

2. Once or twice per year a fully organized excursion for professionals and government officials, where experts share in-depth knowledge about the passive buildings that are visited.
3. Free advice on sustainable renovations/building for private home owners, given by a multidisciplinary team of usually architect, contractor and installer. This has been organised for the first time in 2014. Many home-owners made use of this offer and it generated a few serious leads for the participating building parties. DNA is planning to make this a returning service throughout the year, thereby enhancing public consciousness and at the same time generating leads for its members.
4. A regional conference on sustainable building and renovation, with specific attention for the passive house concept is being organised once a year. It has grown to 200 visitors in October 2014, a mix of private home owners and professionals in the building sector, varying from entrepreneurs to housing corporations to government officials. The event has a plenary programme, a business market and some high quality workshops on a range of subjects related to sustainable building.
5. In 2014 a 10-point manifest was developed by DNA in de Bouw on why energy neutral building is necessary NOW. It was officially presented at the conference and handed out to one of the important stimulating government officials in the region. It created another “official moment” to spread DNA’s mission and vision towards the public and professionals. The manifest is something that can be used for PR activities more often and is intended to communicate social engagement as well as professionalism.
6. DNA has published the so called “Ontwerppakket Energetisch Renoveren” (Design package energy renovation”) and sells this to building parties. It contains a complete set of materials for 5 sessions of morphological design in sustainable building or renovation. All materials are very nicely designed and produced in high quality. It is a tool that helps to make the integrated design process more efficient and it also helps the customer in decision making. Because of the professional look and feel it is also a little extra step in convincing the customer of the thoroughness of this approach.

A very important part of the communications plan of DNA is the use of social media. DNA in de Bouw has a growing list of subscribers to their weekly newsletter, members and non-members. In this newsletter important news and events are published and subscribers are encouraged to join in. Also there are regular, good quality press releases for the local press. It keeps DNA on top of mind with them and events usually get good coverage in newspapers and/or magazines, varying from announcements of events, to background articles on projects or reports from events..

The road ahead: sustainability of the action

As all project base activities, at the end of the term, many questions are raised on the sustainability of the action. The PassREg community is totally convinced that its efforts will bring numerous positive externalities to the involved communities and stakeholders for many years to come. However, in the final pages of this report, we will take a glance on how the regions and their representatives consider these issues, bringing into the focus to the local-level appreciation of the achieved results and the vision for the road ahead..

Brussels – Capital region is now “passive” for new constructions by a law adopted in advance and reaffirmed by a new minister from another party. It should therefore endure and lead to further discussions on the future ambitions or levels to be achieved for renovation. PassREg publications were designed to remain topical for a long time, whilst training courses are now self-sufficient. In **Hannover, proKlima** declares to follow up on the **PassREg targets** in connection with following up of local strategies as Masterplan 100% Project⁶ or local Climate Alliance 2020⁷. In the next few years proKlima is going to focus strongly on local and urban NZEBs strategies with Passive House solutions and renewable energies. More emphasis will be placed on NZEB refurbishments in Hanover. proKlima will provide continuous support with subsidies and campaigns. PassREg in **Tyrol** had become a kind of ancestor of other, later European Projects on energy efficiency and helped to open doors and to get in contact with important stakeholders in local policy and economy. One out of several examples is “Sinfonia” within EU 7th framework of research, where the town of Innsbruck and local partners and companies are focusing not only on energy efficient solutions for buildings but for whole districts, the PassREg objectives will be implemented within the Sinfonia Project. Within PassREg awareness rising and capacity building were deepened, and results achieved within PassREg from all front runners and aspiring regions are now accessible and visible to all politicians, decision makers and stakeholders, helpful in convincing those still not sure of their path. As an external outcome, a French governmental delegation has already shown interest for a fact finding mission on NZEB’s Buildings in Tyrol in late autumn 2015; between a delegation of the City of Zagreb and the vice mayor of Innsbruck an exchange of experiences was initiated, leading to a visit to Zagreb’s Energy Week.

In **Wales**, local partner BRE will continue to offer support to Local Authorities to help instigate new Passive House + RES projects. Numerous individuals within Carmarthenshire County Council and Cardiff City Council (beacon partners with which BRE have worked during PassREg) are already committed to the Passive House concept and are motivated to bring the standard to future construction projects that they influence. There are already new projects planned that will embrace the PassREg principles and more beacon projects will

⁶ <http://www.hannover.de/Leben-in-der-Region-Hannover/Umwelt/Klimaschutz-Energie/Klimaschutzregion-Hannover/Masterplan-100-f%25C3%25BCr-den-Klimaschutz>

⁷ www.klimaallianz-hannover.de

inevitably arise. These projects will help develop experience within the supply chain, helping to reduce costs over time. Dissemination activities related to the beacon projects will be very important in helping to spread the learning about Passive House construction in the region. The project brochure and regional brochure showing the many good PassREg examples will be a good legacy to help continue promotion and awareness raising beyond the project.

Having trained a number of Local Authority personnel (in-house designers, Building Control officers) in the core principles of Passive House + RES, these concepts will be embedded into future projects in which the Local Authority are involved. Trialing introductory Tradesperson training for Trades Apprentices will similarly ensure that quality Passive House construction principles are embedded into the working practices of the next generation of construction professionals in the beacon region.

In the view of **EnEffect**, the efforts to ensure sustainability of the project results in **Bulgaria** have two major dimensions. In terms of political and market impact on regional level, the SMs of the participating Bulgarian cities will provide serious input to the local policy-making process and will stimulate the engagement of the local actors, which is already evidenced by the replication of the Gabrovo beacon in two other Bulgarian cities (Burgas and Varna). Additionally, the principles in the Success Models and the lessons from the other European regions will serve as an input to other local long-term planning documents – SEAPs (Sustainable Energy Action Plans) of CoM (Covenant of Mayors) signatories but also development plans substantiating the use of EU Funds and national EE and RES plans. Through the numerous events organized and conducted by EnEffect, and by the publications in national, local and professional media (in addition to EnEffect’s own publications), it is believed that other Bulgarian regions and cities will take over the example and will introduce the PH standard with RES not only in their “model” buildings but also in their development models, which is perceived as the ultimate goal of the projects.

In terms of organizational capacity, the establishing of EnEffect as reference point ‘Passive House supported by RES’, adding to its long-term reputation of leading energy efficiency competence centre, is a key point of providing sustainability of project’s activities. The internal capacity built was exemplified by two certified PH designers, many conducted training courses throughout the country (some of them by direct request of city mayors), and lots of request for consultations on actual building projects. Following the experience gathered through PassREg, EnEffect took active part in the national discussions on the implementation of EPBD and definition of NZEB, as well as on the new national energy efficiency programme for support of renovation of multifamily residential buildings. With the support of the European Commission, EnEffect participates in **3 other international projects** together with PHI and other respectable European organizations in the area of sustainable energy: EuroPHit (dedicated to building renovations), BUILD UP Skills EnerPro (training programmes for construction workers) and Train-to-NZEB: The Building Knowledge Hubs (establishing of training and consultation centers), which will support the implementation of

the SMs and the sustainable use of the knowledge gained through PassREg. For example, under the BUILD UP Skills EnerPro project, a **Center of Excellence for Energy Efficiency and RES in Buildings** is already established, gathering key institutions like the Bulgarian Construction Chamber and the National Agency for Vocational Education and Training (together with the leading construction and RES training providers) with the goal to constantly update and provide world-class NZEB trainings for the national construction industry.

In **Burgas**, it is explicitly stated by the Local Authority that the best way to achieve sustainability is by creating the necessary conditions and stimuli. The PassREg SM is deemed to be a main tool to do this. The model was presented to the committee of the City Council, which explicitly adopted the objectives and measures to be integrated in the second generation strategy for a sustainable energy development of Burgas. This decision was particularly important because the political will and the wide range of support provide stability of the results, even at change of leadership in local government.

Along with the exemplary projects, publicity is perceived as one of our most important tasks after the project ends. With the goal to keep the public and media interest in low-energy buildings, it was decided that the celebration of the International Passive House Days will become a tradition for our city. Also, general advertising and presentation of our successful projects in different media and forums is key to maintaining a positive public attitude and attract new followers. Other planned activities after the project ends include annual event focused on passive buildings during the European days of sustainable energy; a new PH local award; free consultations with municipal expert on low-energy buildings once a week; work with school clubs in sustainable energy; public monitoring of energy consumed by the beacon project, compared to a conventional building.

Various models of RES investment and subsidy schemes, different approaches to sustainable building models, PHPP model are just some examples of activities that are crucial for **City of Zagreb** strategy and were already implemented in other partnering cities. One of the main reasons why the City of Zagreb extremely supported the establishment of the Passive House Consortium Croatia was sustainability of the action after the end of the project. Passive House Consortium Croatia strategy plan is to unite all the associations and make the progress in linking the experts who will ensure competitive and professional institution, products and satisfied users of the passive houses. Additionally, knowledge shared in the PassREg consortium resulted in rising the awareness through all included in dissemination process. Office staff assigned to energy issues learned much through the duration of PassREg project, knowledge, awareness and capacity was increased. City of Zagreb will work on dissemination of the Passive House Principles through the upcoming projects and events.

In **Cesena**, the PassREg project has been the trigger to a series of activities and actions that are continuing even after the project's end. The Cesena PassREg network is really active and dynamic and is continuing in proposing activities, being in contact, sharing good practices,

experiences and information. The construction of one of the 2 Cesena beacon projects has been started and the Municipality relevant departments are in contact with the beacon architects to monitor and support the realisation of the project. Furthermore the training of Municipal staff and SMEs will have a return in terms of quality of design and construction of the future building stock both private and public. The interest raised by all the events, Info sessions, Building Forums, PHDays and visits to PH will increase the rate of NZEB with RES.

The continuous communication process, which **PoliMi** started during the project with several stakeholders, is now kept on. Some policy makers, institutions and experts will be updated with further details and information on the PassREg outcomes in order to support policy and knowledge processes in place actually or in the future. New persons are contacting the University now also after the end of the project to ask information about results and outcomes from the project. Probably in the next months, PoliMi will have the opportunity to further present the PassREg results in other official dissemination events and on international scientific and technical publications. The activities of trainings in Italy and during the info sessions will continue to produce their positive impact in the construction field. The selected and described beacons projects in Italy and whole Europe remain as relevant examples to inspire further developments.

In **Latvia**, the intensifying of activities by the local governments for joining the Covenant of Mayors' is perceived as a major step to sustainability. By incorporating implementation of NZEB/ Passive House projects in SEAPs of local governments, the economic justification of Passive Houses would be supported by regional case studies.

The closest objective is establishment of regional competence centres with exposition of Passive House examples and construction materials by support of local education establishments and constructors. The work with awareness-raising in the society should be ongoing; there is a lot of skepticism in connection with energy efficient buildings among the building sector professionals as well as the people in society.

Education and training for employees of planning and development departments at local governments about the Passive House principles and their practical application is equally important to improve qualification of local governments', architects and building authority staff. To ensure implementation of the Passive House Standard in education system and daily work of construction experts, Passive House Tradesperson and Passive House Designer courses in Latvian will be organised. In this way, requirements of the Passive House Standard will become a self-evident part of training.

The action related to the development of NZEB and renewables in **Aquitaine**, as declared by local partner Nobatek, will naturally go on beyond the PassREg project, based on the following activities:

- Nobatek still participates to several projects in relation with NZEB principles (part of design teams, design of the energy efficient solutions). It corresponds to the usual activity of the entity;
- Nobatek will still communicate on a technical and scientific level, concerning the characterization of NZEB in local contexts. It will allow the various stakeholders to have more references available in order to get more confidence in NZEB.
- Nobatek will still organize and participate to Passive House trainings. Now that a training group has been formed and recognized by the Passive House Institute, more trainings will come.
- Nobatek has new opportunities to work with the people already involved in NZEB, locally and also at European scale. The project was the opportunity to better know each other, in the prospect of new collaborations. As an example, Nobatek already works with the Passive House Institute in a new H2020 funded project.

In **Antwerp** PassREg continues after the end of the project due to the fact that PHP is maintaining strong cooperation with the city of Antwerp and EcoHuis, providing advice to construction professionals and building owners, especially on deep renovation, offers a wide range of training modules where passive house and renewable energy are prevailing, organize peer to peer event through specific theme/experts days, professional day with construction fair, contributes to knowledge development locally through small research projects in city of Antwerp. The wide European network built throughout PassREg continues to be active, and future cooperation opportunities are sought after.