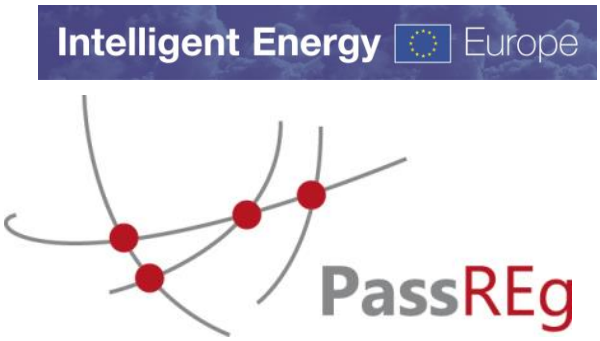


IEE PassREg

PASSIVE HOUSE REGIONS WITH RENEWABLE ENERGY

PassREg beacon projects:

Specifics, experiences and lessons learnt

Lessons learnt from experience on effectiveness of specific instruments used in the Beacon Projects

Deliverables D3.2 and D3.3

INTRODUCTION

The beacon projects in the PassREg regions were shining examples of passive house with renewable energy systems implemented within the scope of the success model they belong to.

*The guiding principle in PassREg was that implementation of **whole models, not single solutions** in the form of individual instruments and/or strategies, leads to the building of optimal NZEBs.*

The work on beacon projects aimed at facilitating the PassREg moto: **"Making frontrunners visible – Supporting future frontrunners".**

The beacon projects were either new builds or renovations, ranging from smaller or larger individual buildings to entire urban settlements. This variety was a reflection of the difference in the state of experience with the passive house standard implementation amongst the PassREg aspiring regions. Therefore, in those without much experience, beacon projects tends to be smaller type and typically residential, while in the more advanced ones, beacon projects were advanced energetic renovations, non-residential buildings (e.g. schools, offices), or even whole city quarters.

In any case, beacons were buildings, which:

- have served as **impetus to the Success Model (SM) development and introduction of the region/city they belong to**
- have been linked with **their SM** implementation
- have influenced the local **market for passive house standard buildings with renewables**, including the related market for building materials, components and technologies
- have served as **good examples (beacons)** for stakeholders in the region to follow and replicate.

Beacons were: examples of passive house and renewable energy supply principles implemented within a model (front runner or aspiring) and applying various financial, capacity building, technical, quality assurance, policies and PR approaches and solutions.

The work in WP3 "Beacon Projects" focused on undertaking various actions specific to the work with the beacon projects, namely: **study tours with international workshops, info sessions and trainings.**

The **study tours with international workshops** took place in each of the three front runner regions (Brussels, Hannover and Tirol). The beacon project representatives from the aspiring regions had an opportunity to visit best practice buildings examples in passive house standard with renewables and exchange experience with knowledge

transfer as peer to peer activities (guided visits, presentations, question and answer sessions, round table discussions).

The **info sessions** took place locally at beacon project in the aspiring regions, whereby up to five such sessions were held focussing on various relevant topics for different target groups: regional/local politicians and decision makers, architects and planners, builders, product and system suppliers, and financiers.

The **trainings** for beacon projects included development of training infrastructure, especially in the aspiring regions-beginners where such structure was not yet established and increasing the training capacity and offer in the more advanced aspiring regions, in order to strengthen the existing knowledge on the market to be able to design, build and maintain successful beacons of passive house with renewable energy as forward looking nZEBs.

The underlying moto of the PassREg beacon projects was that they provide a **'window' into the success models they fit in!** Consequently, activities on the beacon projects included investigating the 'beacons-success models' interactions, in order to gather experiences with the beacons on the local level and transfer lessons learnt as input to the implementation of their corresponding success model. To this end, a successful **thematic workshop** was held during the partners meeting in Innsbruck, October 2013 and lessons learnt were derived.

Another dimension to the work with the beacon projects to which all partners contributed by posting information, was in making their description and visualization publicly available through the PassREg website: http://www.passreg.eu/index.php?page_id=70.

Last but not least, the work included follow up throughout PassREg duration of the most important specifics from the beacon projects. These specifics were agreed with partners at start of PassREg defined as**: approaches and solutions for regulations and policies, business case and financing, knowledge and capacity building, quality assurance, public relations and marketing**.

This report presents summary of insights from the above work undertaken with the beacon projects and presents conclusions and lessons learnt derived towards supporting other aspiring cities and regions across Europe **to use passive house approach in combination with renewable energy as their solution for NZEBs.**

SPECIFICS OF BEACON PROJECTS

This section presents the summary of the findings from the work on bacon projects on their specific approaches /solutions (**five specific topics**) as implemented on:

- **local/regional regulations and policies**
- **business case, financing**
- **knowledge, capacity building**
- **quality assurance**
- **public relations, marketing.**

All beacon projects in PassREg strongly demonstrated locally to policy makers and stakeholders: **"It can be done",** as well as were valuable source for exchange of know-how in transferring approaches and solutions into real buildings and urban developments.

The selection of PassREg beacons was done with special attention to the following criteria:

- **Strong policy support** by local region/municipality
- **Visibility:** important project; showcase for others to follow
- **Timing:** projects in planning phase or early construction. Exceptionally completed buildings were selected as beacon projects where they had a convincing programme of performance/comfort monitoring
- **Type:** renovation or new build
- **Scale:** individual building or urban settlement
- **Multiplication potential:** representative for large percentage of building stock.
- **No conflict of interest:** selection was made on the basis of fair and transparent criteria and procedures, which prevented unnecessary market distortions.

  Throughout duration of PassREg project, partners provided update every several months on progress with the above five specific topics for their beacon projects. This created a pool of information that was shared amongst the project partners on the one hand, and on the other highlighted the fact that in order to have successful implementation of passive house in combination with renewables on a building project, each of the specific topics is very important to be well defined and implemented.

  For example, it became evident that a trigger and enabling factor to a kick start of a beacon project is an **ambitious local and regional policies** concerning energy performance of new buildings and renovations. These policies were often defined as more ambitious that the national/federal requirements and resulting from enthusiastic local politicians and decision makers.

  Some outstanding examples for regulation and policy are in Brussels, Bahnstadt Heidelberg, Frankfurt (Passive House Act for municipal buildings), city of Antwerp (through local policy on new city district development), Gabrovo's strong political will of the mayor.

Financing the beacon projects was enabled, in several cases with an additional financial support they were receiving based on the fact that they were the first examples of such advanced constructions (in the beginners PassREg regions for example), while in the more advanced regions often public-private partnership was a vehicle for enabling investing in these exemplary developments, as in the beacon project Nieuw Zuid in Antwerp.

Additionally, subsidies in Tirol (Wohnbauförderung) as well as the BATEX programme in Brussels have made their beacons possible. As of 1998 proKlima supports more than 98,000 m² of new residential passive house space in Hanover Region. One out of three new residential housing units in Hanover is a passive house. Another successful example is the morphological design and scrum team approach in Arnhem-Nijmegen, the Netherlands, whereby this approach is creating best cost effectiveness in their local beacon projects.

Availability of **knowledge and awareness** amongst key stakeholders, starting from decision makers, building owners, different kind of construction professionals, users, was another very important enabling factor for the success of beacon developments. In was observed that the status of awareness and knowledge in the front runner and advanced aspiring regions/cities was at higher level than in the starting PassREg regions, however, it is important to point out that beacon projects indeed served also as a vehicle for gaining more knowledge as well as direct implementation of this knowledge.

A successful example comes from the beacon project in Cesena, the Passive House Multi residence. The architect Piraccini studio used a multi-disciplinary team of professionals: project manager, architects, Passive House advisor, structural designer, designer of electrical installations, mechanical designer, thermo technical designer, acoustic specialist, geotechnical and geological specialist. Also a number of calculation software tools was been used as knowledge:

1) PHPP tool for the Energy balance and the designing of buildings in compliance with the Passive House quality protocol.
2) Autodesk Ecotect Analysis for sustainable architectural designing and for the calculation of passive solar inflows.
3) Mold frame simulator 3 pro for the dynamic simulation of heat bridges.
4) Namirial Termo 2.5 for thermo technical design.

It is this comprehensive knowledge support enabling this beacon's success.

It should be pointed out that implementing knowledge in beacon projects is not always straightforward. This is illustrated in the example from the beacon project in Wales, the Burry Port Primary School. This building aimed to be BIM Level 2 compliant (Building Integrated Modelling), utilising 3D modelling tools accessible across the whole project team. It was anticipated that such tools will streamline change processes and provide accuracy throughout design, phasing and construction with all parties working from a shared model with shared goals. The 3D nature of the model was to help the end users visualise what the building will look like and how it will work, which would aid the consultation process greatly and hopefully give users a better appreciation from the very earliest design stages of what a passive house standard building may be like for them.

However, once the tender had been awarded (status of Spring 2015), it became quickly apparent that the local supply chain was not mature enough to support BIM during the implementation of the project. This was therefore not pursued on the scheme. As such, during development, issues were experienced relating to clash detection that required details to be re-worked during the construction process. Although they are not believed to have influenced the overall integrity of the scheme, it is recognised that things could have been improved through the use of BIM and its ability to help with clash detection in particular.

An integrated view on providing knowledge in support to beacon project was provided for the Tiskadi village, Rezekne region, Latvia. The field of knowledge in the region during PassREg has been growing slowly, because specific courses (Certified Passive House and other shorter courses about energy saving methods) are mainly provided only in Riga, Latvian capital, far from the area. Nevertheless, the design and construction project team of the beacon comes from Riga, and has brought to the area the implementation of the following knowledge:

Tools and aids for planning and design: PHPP used for energy calculations, and the example of comparison for two methods – PHPP and Latvian energy assessment method is used. The energy calculations are done by certified CEPH engineer.

Technical solutions includes careful planning of building details, to exclude thermal bridges, use of high quality and durable materials, solid fastenings of heat insulation, damp-proofing of foundations and roof, and airtightness control, including Blower door test, and overall quality control thorough all the design and construction cycle.

The local **capacity building** through train-the-trainer activity undertaken in PassREg, establishing transfer of knowledge and training supporting structures specific for example to certified passive house tradesperson and designer, was very useful for the regions where passive buildings are in their introductory phase. Learning from front runner regions on how they established and implemented as well as upgraded their capacity building structure locally, was an eye opener for many PassREg regions on how this can be successfully started and developed.

Some extraordinary examples for activities contributing to local capacity building include: the comprehensive scheme of trainings and courses for variety of construction professionals supported by the city of Brussels Environment department; the three trainings in the city of Antwerp on topics of passive buildings with renewable energy specific to non-residential buildings, renovation of individual houses and new built apartment buildings.

Quality assurance was found to be more difficult in the implementation in the beacon projects, on the one hand due to lack of such mechanisms (e.g. certification) in some regions, and on the other, due to lack of experience of those involved in their beacon developments to implement quality assurance in practice at the right time in the building process. However, awareness amongst beacon projects on the necessity of quality assurance was very high, for example, PassREg regions were effective in exchange on solutions for quality assurance (from Set of Solutions WP4), experiences shared by the Passive House Institute and study visits with presentation highlighting importance of quality assurance in the front runner regions (WP3).

Despite this, there are however successes whereby a municipality offers consultancy in the beginning of the design process, checks the PHPP calculations and gives advice for improvement. The final PHPP is part of the building permission process. In addition several site inspections take place and the updated PHPP calculation has to be submitted with the actual implementation values. All this belongs to the building permission procedure.

For example, certification scheme was implemented in the first passive house kindergarden, the Sun-Kindergarden in Gabrovo, Bulgaria. The Ergli dormitory in Latvia has met the PHI certification criteria and the energy monitoring results show that the building is performing, and as such aims to get certification should financial resources for this procedure become available. The beacon project Heidelberg-Bahnstadt, despite using a dedicated certification scheme, they use an approach whereby quality is addressed throughout each building process of this large urban site. Several other regions and beacon projects within have checks of the PHPP energy calculations as well as companies with passive house construction experiences available from web listings (e.g. Brussels, Heidelberg, Antwerp, Hannover).

The work on quality assurance on the beacon projects also included their **follow up** in terms of **energy consumption, thermal comfort conditions and user behavior, and costs**. This work was led by Passive House Institute in cooperation with PassREg partners, resulting in deliverable: “D5.4.1 "Common evaluation of the beacons implemented within PassREg" which can be downloaded from the PassREg website: http://www.passreg.eu/index.php?page_id=374 *(Quality assurance and capacity building, Monitoring report.pdf.)* The report includes a matrix overview of all beacons and relating follow up activities, description, analysis, results and conclusions in terms of energy consumption, thermal comfort and user behavior, and costs.

The PassREg beacon projects, as shining examples had also good local **visibility and communication to the public.** They were very well aware of their importance as ‘show case’ examples for their region/city. To this contributed the info sessions, trainings, beacon visits, PassREg website and the beacon brochure publication resulting from activities of PassREg.

Raising awareness highlights during PassREg project is the presentation of Ralf Bermich of the City of Heidelberg during the 2015 International Passive House Conference, in which strong message came on the importance of awareness "informed inhabitants are more content”. Similarly, Heidelberg and Hannover have comprehensive sets of information material successfully used at raising awareness of inhabitants.

Note: Further examples of the collected information relating to beacon project specifics can be found in Annex I of this document.

EXPERIENCES IN THE BEACON PROJECTS

Study tours

The study tours with seminars took place in the three front runner regions (Brussels, Hannover and Tirol). The beacon project representatives from the aspiring regions had an opportunity to visit shining passive house with renewables developments and exchange experience with knowledge transfer as peer to peer activities (guided visits, presentations and international workshops).

Study Tour and International Workshop in Brussels, October 2012

The study tour in the front runner Capital Region of Brussels consisted of an international workshop and guided visits to several most prominent passive house developments in the city.

The international workshop was attended by the PassREg partners and importantly by the invited key stakeholders of the aspiring regions. The speakers from Brussels presented the pathway of Brussels into becoming a front runner region in Europe, with explanation of their experiences, key decisions, political approach and legislations, funding mechanisms, cooperation with market stakeholders, and actions on training market actors. Participants had an opportunity to have questions answered and main conclusions of the discussions wrapped up.

Very successful in the program of the day was lessons learnt presented by the "bottom up" approach, namely, panels of those actively involved in decision making and realization of building developments (such as the real estate panel, the designers panel and constructors panel).

Study Tour International Workshop in Hannover, May 2012

The study tour in the front runner city of Hannover consisted of an international workshop and guided visits to several most prominent passive house developments in the city.

Highlight of the guided tour was the visit to the Zero:e Park, Passive house settlement supplied by a hydro energy, due to its scale as well as under development so houses at different stage of development could be seen and get explanation for.

The international workshop programme included explanation on the political decisions and its drivers for establishing the successful Pro-Klima fund, which is the vehicle to realize many ambitious building programmes as well as market capacity raising actions through trainings, campaigns, competitions, etc.

The programme was also strengthened by the specific session on deepening question and answers with discussion on specific aspects such as: regional/local building and energy policies, and roles and impacts of the key stakeholders involved. Also attention was given to economic and financial factors through supports and incentives, planning and design capacities, availability of products and technologies, trainings, information and quality assurances. The workshop ended with exchange on knowledge on public support and acceptance and strategies on communication with different stakeholders.

Study Tour International Workshop in Tirol, October 2013

The guided visits in region of Tirol focused on collective residential buildings including the Lodenareal Innsbruck as is the largest at the time passive house with renewables certified residential development. Each building visit was accompanied with explanation by its architect.

The thematic workshop "Models-Beacons-Solutions" was also part of this study tour split into two sessions, Session 1: Beacon model interaction and additional solutions led by partners PHP and DNA, and Session 2: Success models in Aspiring Regions led by partner EnEffect.

In Session 1 focus was given to investigating and exchanging on the one hand the main enabling factors for the beacons and their success model interaction, and on the other on the needed additional solutions and next steps. *(Note: further information on the beacons-success models interaction is provided further in this report in the section below called "Lessons Learnt".)*

Info Sessions

Info sessions were held at each beacon project in the aspiring regions. They were a required step for the successful application of the Success Model related to beacon projects.

The aim was to provide the key regional stakeholders with convincing information, examples, experiences and inspiration for Passive House buildings supplied by renewable energy. Info sessions served in making successfully applied solutions known and accessible to actors involved in beacon projects and in promoting capacity building and quality assurance activities for the beacon projects.

The info sessions facilitated increased awareness and capacity of key stakeholders into their work on beacon projects.

Each partner with a beacon project had at least **five different info sessions throughout the duration of PassREg project.** They were targeted at **different groups of key stakeholders**, for example:

The policy level
regional/ local politicians and decision makers and owners of buildings (especially those owning and maintaining stock of buildings, housing associations)
The technical and organizational level
planners, architects, building experts
product suppliers, local manufacturers of building components and the regional construction industry.
The financial level
potential financiers
Also it was possible to have several target groups to one info session (facilitating collaboration).

An important element in preparing info sessions was to define the target group and main objectives resulting from consultation of needs with those involved in the beacon project. This ensured that the info session is in line with local stakeholders' needs and expectations.

The following is one highlight example of an info session related to PassReg beacon project in Ergli, Vidzeme disctrict, Latvia.

More examples can be found in Annex II of this document.

Info Session	
When	6th November 2014 14:00 – 16:30
Where	Ergli, Vidzeme disctrict, Latvia
Participants	30
Background Participants	Architects, municipalities, owners of buildings, house administration companies, housing maintenance office, builders.
Objectives (resulting from consultation of needs with those involved in the beacon project)	It would be preferable to invite to participate in next info sessions representatives form Ministry of Economics, who work on new development programs for building renovations, to explain the rules for next planning period, what kind of support will be available for low energy buildings for private and public sector.
Related to PassReg beacon projects	Energy efficient reconstruction of the service hotel of Ērgļi vocational secondary school with application of elements of passive buildings.
Summary	Info session took place in the 6th of November 2014 in Ergli municipality in Vidzeme. It was organised one day before Passive House open door days as opening event. There were 2 parts of this event, first was 2 hour discussion on related topics about Passive house standards and multi apartment renovation perspectives in Latvia. The second was excursion lead by building expert in Ergli vocational secondary school service hotel. It was dedicated and related to multi apartment buildings in Latvia and regions. The renovation works, specially planned and developed support programs for multi apartment houses. Main topic was standard project renovations with passive house components in multi apartment houses. There were presented such topics during the seminar: 1. Status quo of multi-residential houses in Ergli municipality and Vidzeme region. Architect in Ergli municipality, I Ketlere.

	2. Energy efficiency measures designing renovation works in apartment houses. Company "C projekti", Chairman of the Board, I. Jirgens. 3. Project "Energy efficient reconstruction of the service hotel of Ērgļi vocational secondary school with application of elements of passive buildings" solutions and achieved results, Director of the sckool, A.Spaile. 4. The goal of Passive House Open door event, progress of the Passreg project and energy efficiency supporting initiatives in Latvia for multi-apartment buildings. Discussions were about available support from state for public buildings, to make renovations with passive house components, as well as for private owners, who live in multi-apartment houses and need to make renovations. This is very complicated situation and problem in Latvia, because of regulatory framework, which makes a lot of obstacles. One of the biggest obstacles is that Banks don't offer loans for private owners because of "non-existing" high risks, etc. The same architect, who designed renovation for beacon project in Ergli, has developed refurbishment projects with passive house components for standard or multi residential houses. The main task for next period is to implement it in renovation programs for multi apartment houses. One of the topics discussed were economic justification, payback period, what is better for Latvian situation, quality and how to reach EU directives. During the seminar there were used such materials: - Power point presentations of the seminar topics. - PassREg roll up. - PassREg leaflet - Discussions on above mentioned topics. The PassREg project organized seminar was attended by 30 participants.

Trainings

The trainings for beacon projects included development of training infrastructure, especially in the aspiring regions-beginners where such structure was not yet established and increasing the training capacity and offer in the other aspiring regions, in order to strengthen the knowledge on the market to be able to design, build and maintain successful beacons of passive house with renewable energy as forward looking nZEBs.

The following is one highlight example of trainings related to PassREg aspiring region Cesena, Italy.

More examples can be found in Annex II of this document.

Name of PassREg partner	**Municipality of Cesena**
Training session 1	**Title: Passive House Introduction**
When	7th November 2015 – 14.30
Where	Cesena, Council Hall, Piazza del Popolo 10
Target group	Architects, engineers, politicians, civil servants, students
Training focus	IPHA and the international network Passivhaus Italy and the national network of IGP
Related to beacon project	Case Finali Social Housing and Fiorita Multi Residence
Number of participants	124
Additional information	The training was organized within the framework of the Passive House Days 2014.

Training session 2	**Title: The Passive House protocol quality and contents**
When	7th November 2015 – 14.50
Where	Cesena, Council Hall, Piazza del Popolo 10
Target group	Architects, engineers, politicians, civil servants, students
Training focus	The quality of the protocol What does the Passive House protocol offer
Related to beacon project	Case Finali Social Housing and Fiorita Multi Residence
Number of participants	124
Additional information	The training was organized within the framework of the Passive House Days 2014.

Training session 3	**Title: Passive House basic principles**
When	7th November 2015 – 15.15

Where	Cesena, Council Hall, Piazza del Popolo 10
Target group	Architects, engineers, politicians, civil servants, students
Training focus	The 5 pillars (thermal insulation, windows, thermal bridges, airtightness mechanical ventilation) Climate data, PHPP Economic convenience of a Passive House
Related to beacon project	Case Finali Social Housing and Fiorita Multi Residence
Number of participants	124
Additional information	The training was organized within the framework of the Passive House Days 2014.

Training session 4	**Title: Enerphit and retrofitting**
When	7th November 2015 – 16.15
Where	Cesena, Council Hall, Piazza del Popolo 10
Target group	Architects, engineers, politicians, civil servants, students
Training focus	Enerphit and retrofitting
Related to beacon project	Case Finali Social Housing and Fiorita Multi Residence
Number of participants	124
Additional information	The training was organized within the framework of the Passive House Days 2014.

Training session 5	**Title: Building examples**
When	7th November 2015 – 16.40
Where	Cesena, Council Hall, Piazza del Popolo 10
Target group	Architects, engineers, politicians, civil servants, students
Training focus	Building examples
Related to beacon project	Case Finali Social Housing and Fiorita Multi Residence
Number of participants	124

Additional information	The training was organized within the framework of the Passive House Days 2014.

Training Frameworks

Within the training activities, aspiring region partners also prepared a "Training Framework", describing the strategy behind training activities as acknowledged as critical for raising the capacity and quality assurance in the planning and execution of beacon projects.

The following is on highlight training framework. More examples can be found in Annex II to this document.

Training Framework for the City of Gabrovo/Sun Daycare Centre beacon project

Background

This document summarizes the training framework for the city of Gabrovo/Sun Daycare Centre beacon development upon which training sessions will be implemented through the PassREg project.

The training is intended to raise the capacity in design and construction of Passive House buildings in the city and the country as a whole, targeting not only municipal buildings but also private projects. It aspires to use as much as possible and where applicable the available training material from PassREg but also to adapt it to the local conditions and to involve other related stakeholders outside the specific professional community which are however vital for the implementation of actual projects.

This framework was made by direct contacts with the representatives of the city of Gabrovo involved in the PassREg, and especially the Mayor of the city Tanya Hristova, Tatyana Stoykova, Chief Architect of Gabrovo, and Dipl. Eng. Bozhidar Lilovski, head of unit "Construction of Buildings and Facilities", responsible for the implementation of the beacon project. Mrs. Stoykova and Mr. Lilovski were directly involved in two study tours – in Tyrol and Brussels respectively, and Mrs. Hristova gradually emerged as the face of the project and of the efforts of the local authorities towards sustainable energy development in general.

Status Quo

The Sun Daycare centre is the first and only building certified to Passive House standard in Bulgaria, either public or private. There are very few private projects throughout the country which reach the PH standard criteria but they have not been certified, mostly due to unwillingness of their owners misunderstanding of the certification process. The cost of certification which in principle is quite high for Bulgaria is not perceived a barrier in these cases as they are luxury buildings and the costs for their construction are excessive. The Sun Daycare Centre, however, was designed built at a regular market price without compromising the quality, which provides for the replicability of the project and the market uptake.

This situation, however, is illustrative for the capacity building needs in the region and the country as a whole. It is widely recognized that designers and planners have not been trained in the formal educational system on issues of energy efficiency in buildings, and indeed this thematic is still not well presented in the current university courses in

Architecture. On the other hand, the awareness of the construction companies and workers in completely lacking, as some of the principles of passive houses contradict the regular practice, but most importantly, they do not coincide with the overwhelming surge for low-price construction and, consequently, are generally avoided by the companies. This not very optimistic situation is of course provoked by the lack of awareness by the investors and end users (one and the same person in many cases), the lack of demonstration projects, and the lack of public support and engagement of national and local authorities.

Based on these assumptions, the following parameters are approved as the

Main aspects of the training framework

1) Target groups

Three main target groups are identified:

- Architects and engineers within the city administration (responsible for both new buildings and renovation) and in the local professional community (WP3).
- Municipal and state decision-makers responsible for initiation, approval and implementation of building projects, as well as financial specialists representing potential funding bodies and instruments (WP3).
- Construction companies, vocational training centers and workers (WP5).

2) Identifying training needs

Since most of the people in the target groups do not have any previous knowledge in PH concept and principle, the training is targeted on PH basics, main principles, best practice examples and financial analyses. Of course, specific features are accounted for each target groups as for target group 1 (Architects and engineers) the emphasize is on PH concept, main principles and expected results in comparison to the regular design practice; for target group 2 (Public authorities and investors) on comfort, economic performance, energy savings and social and climate change implications; for target group 3 (Construction companies and workers) on specific in building materials, components and process in terms of wall, roof and foundation superinsulation, effective windows, avoiding of thermal bridges, airtightness and ventilation with heat recovery. Where appropriate, synergy effects were exploited with other IEE-supported projects as EuroPHit and BUILD UP Skills Bulgaria.

Demand for further information and knowledge through course implementation of the two target groups focusing on:

- Construction extra costs
- Cost savings in use of the building and life-cycle cost analysis
- Specific products, components and materials
- Highly efficient ventilation systems with heat recovery
- Airtightness and blower-door tests
- Quality assurance of the construction works
- Specific problems in building renovation projects

Based on this it was decided to execute with

3 training sessions with specific focus on:

- PH design basics based on external best practices and beacon project design
- Economic analysis and financing of PH projects based on the beacon project example
- Specifics in the construction works and major problems identified in the actual construction of the beacon project

Time frame

The above training sessions are implemented within the duration of the PassREg project, starting in November 2012 and running through the spring of 2015, covering the whole process of public procurement, management, design, construction, quality control and actual usage of the daycare center.

The training sessions are conducted as follows:

21.11.2012, Gabrovo: Training session for local architects and engineers

(11-12.06.2013), Sofia: Train-the-trainer course by PHI with participation of representatives of Gabrovo Technical University and Gabrovo Professional High School for Architecture and Construction

14.03.2014, Gabrovo: Training session for local authorities and financiers

Spring 2015, Gabrovo: Training session for construction companies

Use of PassREg available training material

In respect to the thematic focus of the training sessions, the following PassREg material will be used, complemented by the training experience and available materials produced by EnEffect in its regular practice:

- PH designer course
- Integrated design procedures
- PH trades person course
- Energy efficient cooling
- Integration of supply with RES

The training sessions are provided by certified PH designers, architects and construction experts participating in the design and construction of the Sun Daycare Centre, who has also participated in the PassREg "Train the Trainer" course in June 2013 in Sofia. These include Arch. Iglika Lyutzkanova and Dipl. Eng. Alexander Stankov, both certified Passive House designers participating in the design of Sun Daycare Centre and the demonstration projects on the EuroPHit projects, and Dr. Arch. Zdravko Genchev, renowned expert in the area of energy efficiency, Deputy Chair of the Steering Committee of the UN ECE Energy Efficiency 21 Project and member of the jury of the Passive House award.

LESSONS LEARNT

The underlying moto of the PassREg beacon projects is that they provide a 'window' into the success models they fit in! Consequently, activities on the beacon projects included investigating the *'beacons-success models' interactions*, in order to gather experiences with the beacons on the local level and transfer lessons learnt as input to the implementation of their corresponding success model. To this end, a successful thematic workshop on "**Major enabling factors for the beacons – Beacon model interaction"** was held during the partners meeting in Innsbruck, October 2013.

At the end of this section, the outcome of this workshop is presented.

The main lessons learnt of the PassREg beacon projects is that existence of ambitious local policies, political will and financing capacities and support are all major enabling factor for the beacons.

Incentives for investors and builders play also a very important role. This has shown to be a factor on speeding up further developments and positively affects the

construction market, whereby as the market increases and develops, the incentives support programme can be revised and adjusted.

Additionally, the importance of the construction market state and private sector initiatives can challenge the public sector into having higher ambition with buildings.

Finally, highly driven and knowledgeable individual experts can act as accelerators for convincing towards beacons where passive house standard with renewables is the basis for nZEB solution.

Thematic Workshop during partners meeting in Innsbruck, October 2013.
"Major enabling factors for the beacons – Beacon model interaction"
Facilitator: PHP

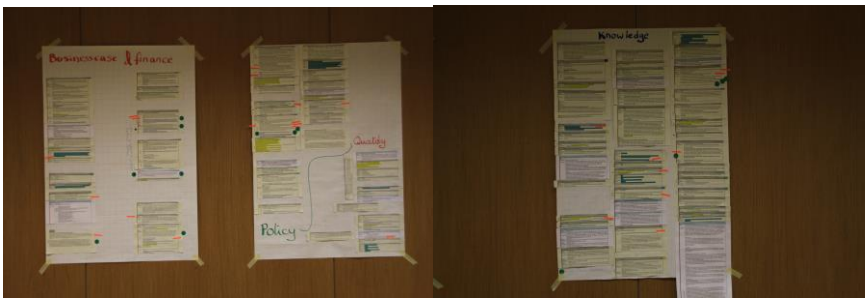
Outcome of group work
Group 1:
Tyrol Housing subsidies because of the political 10% of the budget of the federal state of Tyrol. Lot of innovative companies, good network.
Gabrovo: strong political will, EU programmes for financing, programmes produced, capacity in the university has brought stability by keeping the tradition
Cesena: need of social housing project; financing possible because of eco building regulations (tax breaks), involvement of bank institution, member of the Covenant of Mayors (SEAP), In Cesena the craftsmen are not well trained.

In Common: Political will: Covenant of Mayors, traditions, housing subsidies, Cluster in Tyrol

Political Will and financing capacities

Group 2:
Nobatek: private will for excellence, owner is a promoter, need to showcase company values. Communication factor. nZEB regulation are in force, technology know how is available, trained actors are available. Private sector can challenge the public sector.
Burgas: Political will of penetration of nZEB, Communication aspects of beacon as good examples as a driver for designers. Monitoring is a good factor.
PoliMI: Owner and designers will to build a passive House, the will to have a high quality building. Many designers with good knowledge, Visibility for environmental and business opportunities.
Knowledge is available in France and Italy, not in Burgas. Training of craftsmen is needed, also is visibility of beacons, communication is an important driver for action.
In Common:
Private sector can challenge the public sector

Group 3
Frankfurt/Hannover/Heidelberg
BRE
DNA
Political will through champions (people fight for targets) or through targets
Convincing examples
Expertise of professionals
Push the innovate (e.g. through a crisis)

	Nijmegen: champions are fighting, Wales: CO2 targets, Frankfurt: passive house act and a decision for the municipal housing association to go for passive (driver for Frankfurt were climate protection targets), Expertise are available with the champions, push the innovate: Companies want to profit, budget cut in Wales. In Common: **Individual experts can contribute to convince for passive house with renewables beacons**
	Additional solutions and next steps Facilitator: DNA  

ANNEX I: EXAMPLES OF SPECIFICS FROM THE BEACON PROJECTS

BEACON PROJECT SPECIFICS: EXAMPLE A

Name of the beacon project:	Burry Port Primary School
Location:	Llanelli, Carmarthenshire
Region:	Wales, UK
Local PassREg partner responsible for providing info of the beacon project to WP3 Leader:	BRE
Short description (ambition, context, …):	Carmarthenshire Council have an upcoming school building programme, of which Burry Port is the first. The intention is that the lessons learned from this school project will be transferred to subsequent projects. The Council have a desire for a very low energy building with low running costs for the Local Authority. They also wish to utilise local materials and supply chains as much as possible.
Project type:	New school
Size of the project:	Approx. 750m2 TFA
Stage of development:	Approaching end of construction. Due for completion September 2015

Project team:	BRE, Carmarthenshire County Council (CCC) Technical Services Dept (architects)

Focus/benefit for the proposal (importance for the region by this project "why is it an outstanding example"? innovations, multiplication potential,…):	The Council recognise that by providing buildings with very low energy demand it will reduce their ongoing running costs (i.e. they will experience the benefits of reduced bills). They also want to provide inspiring learning spaces for children where the building actually helps educate them about energy and sustainability issues. There is significant multiplication potential, as other schools are due to be built in the area, plus other building projects, such as housing developments. Additionally, the scheme will aim to use local materials, suppliers and craftsmen, thus helping develop capacity in the region for wider-scale delivery.

Description of local support:	The project will additionally be supported by the Forestry Commission for Wales, to help develop local suppliers.

Regulation & Policy

Buildings in Wales are required to comply with the Building Regulations for England & Wales. In particular, Part L of the Regulations sets standards for the thermal performance of the building fabric. Welsh Planning Policy requires that higher sustainability standards are achieved, as measured by BREEAM – the BRE Environmental Assessment Method. This is an independent assessment methodology that covers a range of environmental parameters, including energy and water use, occupant health and wellbeing, land use and ecology and construction impacts amongst other issues. A BREEAM Very Good award must be obtained for schemes in Wales with additional consideration for reduced CO_2 emissions beyond the Building Regulation minimum standard. The Passive House standard would help to drive down energy demand in new buildings and therefore reduce associated CO_2 emissions, hence it works well in parallel with BREEAM, which also covers a wider range of sustainable issues.

Planning Policy Technical Advice Note (TAN) 22 sets out the policy framework for the delivery of sustainable buildings in Wales, which encourages fabric first/ energy efficiency methods to be adopted first, then the installation of on site renewable/ low carbon energy technologies.

A level of subsidy is/will be available for renewable technologies via the Feed in Tariff (for electricity producing technologies such as PV) and the Renewable Heat Incentive (for heat producing technologies, such as biomass and heat pumps), which will offer a repayment for the amount of renewable energy generated. In general, grants are no longer available towards the upfront purchase cost of renewable energy systems in the UK.

Update: November 2013
Feedback from the Council indicates that the burden to carry out BREEAM assessments on buildings limits the potential to seek to achieve PH on other new projects as both processes will inevitably carry a cost uplift. Since BREEAM is currently a condition of Planning, this will take priority. However, Welsh Government are investigating whether to revise the TAN 22 document that sets out the requirement for BREEAM. If this were the case, it may be more viable for council projects to look to achieve Passivhaus as an alternative (although BREEAM is a wider sustainability standard compared to Passivhaus, the Council would at least welcome not having to carry out the assessment process). Unfortunately, it may be some time before a decision on the withdrawal of the BREEAM requirement for new build projects takes place.

Update: July 2014
A statement was issued by Welsh Government in March 2014 that indicated the withdrawal of TAN 22 from the end of July 2014. The effect of this will be that projects will no longer need to demonstrate compliance with the Code for Sustainable Homes or BREEAM as a Planning requirement. On one hand this may mean that projects will no longer incorporate wider sustainability features, which could be an unfortunate loss to the quality and wider sustainability of modern buildings. On the other hand it may allow clients like Carmarthenshire Council to pursue standards such as Passivhaus on other upcoming projects without the separate financial burden of also achieving BREEAM on a building. This regulatory change may therefore favour Passivhaus design by removing other regulatory burdens.

Separately, the aspiration for new construction projects in Wales to be nearly zero energy buildings (NZEB) by 2016 has been postponed to follow the EPBD time limits of 2020. The drive for new construction projects to become NZEBs in the short term will therefore be reduced. However, some clients will continue to strive for this on the basis of lifecycle costs (i.e. considering ongoing running costs). This will hopefully be the case for the Council going forward.

Update: April 2015
Although the requirements for BREEAM Certification have been removed from Planning requirements, Welsh Government are still insisting on a BREEAM Excellent rating for any projects that they fund over 1000m2. This is applicable to upcoming school projects that Carmarthenshire County Council wish to develop to Passivhaus standard. While they are confident they will meet all the necessary requirements of BREEAM anyway, they are concerned that the additional administration burden and cost of certification will prevent them from formally seeking Passivhaus Certification. They will however endeavour to push energy standards as far as possible towards Passivhaus.

Business case & Financing

At present, there are no additional funding schemes or grants in place for the delivery of very low or zero carbon buildings in the UK. Construction costs must therefore typically be comparable to 'standard' construction methods if they are to become mainstream. Where the client will retain ownership and responsibility for the building as in the case with Carmarthenshire CC and their schools, there is a greater chance that decisions may be made on lifecycle costs (i.e. increases in up-front cost compensated by longer term running cost savings). Typical costs for new school buildings in the UK are ~£1850/m2. To allow for additional costly items specific to the building achieving Passivhaus, a higher allowance is being allowed for the Burry Port Scheme. However, it is hoped that extra costs will be minimised so far as possible and that overall costs to deliver Passivhaus could be more in line with mainstream costs when the supply chain is capable of delivering key products and components and competitive prices (high performance triple glazed windows, MVHR, etc).

To ensure the Passive House Standard is met on this scheme, clauses will be included in sub contracts so that meeting the required air tightness targets will be made a condition of receiving payments, with any required remedial measures to achieve the agreed standard being at the contractors own expense. This will embed the design principles into the contracts and protect the scheme from incurring increased costs if poor workmanship is encountered, thus helping to deliver to budget targets.

Update: May 2013
Carmarthenshire Council have agreed a budget for Burry Port Primary School that should allow the Passivhaus Standard to be delivered. This was justified on the basis of reduced lifecycle/ running costs over the life of the building. The Council sought examples of costs and specifications from recently completed PH Schools in England, which helped support their case for increased budget for Burry Port. The development contract will be tendered shortly and more accurate costs will be drawn up for the scheme.

Update: August 2013
The Burry Port scheme has been out to tender over the summer period, with tenders due for submission towards the end of August. Once the winning project team is selected, more accurate costs will be identified and value engineering processes carried out to ensure the Council's original budget can be met, while still delivering Passivhaus aspirations.

Update: April 2015
While the tender for Burry Port was based on lowest cost, arguably it could encourage tenderers to underestimate their costs and leave little scope for contingency. Carmarthenshire Council recognised that this makes them prone to unforeseen extra costs in the long run. The Council have subsequently changed their tender acceptance process and for future schemes it will be based on 'average cost', i.e. the winning tender will be the one that is nearest to the average value of all tenders submitted. This should ensure that realistically priced tenders (not too high, not too low) are likely to be successful.

Knowledge

PHPP will be used to assess the energy use of the building from initial concept designs right through to Passive House Certification, to allow various potential design aspects to be compared and optimised. Additionally, the UK Standard Building Energy Model (SBEM) will be used to assess the energy demand of the building for compliance with Welsh Building Regulations and BREEAM requirements. (PHPP and SBEM do not make the same baseline assumptions so reported energy usage will vary between the two modelling tools.)

This building is aiming to be BIM Level 2 compliant (Building Integrated Modelling), utilising 3D modelling tools accessible across the whole project team. It is anticipated that such tools will streamline change processes and provide accuracy throughout design, phasing and construction with all parties working from a shared model with shared goals. The 3D nature of the model will help the end users visualise what the building will look like and how it will work, which will aid the consultation process greatly and hopefully give users a better appreciation from the very earliest design stages of what a Passivhaus building may be like for them.

Update: August 2013
Following the successful completion of a number of Passivhaus schools in England by the architect firm 'Archetype', Carmarthenshire Council commissioned Archetype to carry out a high level review of the Council's initial designs to assess the buildability and provide guidance based on their experiences with recent projects, prior to the contract going out to tender. It is hoped that this process will give greater confidence to tenderers in the proposed scheme designs and principles.

Update: November 2013
The architect has reviewed and revised the core school design and are confident that it can deliver Passivhaus. In addition to running the PHPP analysis, they will look to undertake daylighting and overheating modelling analysis on the revised designs.

Update: April 2015
Once the tender had been awarded it became quickly apparent that the local supply chain was not mature enough to support BIM during the implementation of the project. This was therefore not pursued on the scheme. As such, during development, issues were experienced relating to clash detection that required details to be re-worked during the construction process. Although they are not believed to have influenced the overall integrity of the scheme, it is recognised that things could have been improved through the use of BIM and its ability to help with clash detection in particular.

Capacity building

There are very few (1?) non-residential Passivhaus buildings certified in Wales, though there are more in the rest of the UK, including several recently certified Passivhaus school buildings. It is intended that this project will demonstrate the viability of Passivhaus schools (and other non-domestic buildings) within the Welsh market. Success on this scheme will certainly be passed forward into other schools that are due to be built in the area in the coming years.

As part of the project, craftsman training will be arranged to ensure that the necessary quality of construction and installation is implemented on site. The architects on the scheme will be working alongside CEPH consultants to increase their knowledge and understanding of the Passive House principles. They will also be encouraged to undertake CEPH training themselves if available via the project to increase the capacity of qualified Passive House designers and consultants in Wales.

A consideration for the project will be the use of local products and suppliers, with the intention of building capacity throughout the supply chain for delivery of low carbon buildings. In particular, the use of Welsh grown timber will be assessed in terms of its technical and cost feasibility for the development. This information will be disseminated in partnership with the Forestry Commission for Wales. It is anticipated that there are potential

local suppliers of other products, such as MVHR systems and windows, but that these may not have Passive House Certification in order for their true performance to be recognised. Hence, we will work with such suppliers towards certification with PHI in order to strengthen the availability of projects locally.

Update: May 2013
An information session was held at the end of March to set out the aspirations of the Burry Port scheme to local contractors, designers, suppliers and other Welsh Local Authority clients. The project will shortly go out to tender and it is now hoped that the Council's Framework contractors that attended the event will be in a stronger position to submit appropriate tenders since the key features of the project were explained. Positive feedback was received from all who attended the event.

The lead designer from the Council will attend a PH Designer training course in September, so they can better support the project team in delivering their PH aspirations. Once the contracting team are appointed, a PH Tradesperson course will be set up in the region to provide the necessary information and skills to help build the school. This will likely take place towards the end of 2013.

A meeting has been held with a local MVHR supplier (NuAir) to investigate their potential to supply PH accredited systems. It seems they have looked into Certification previously. They will investigate how their products compare to the required standards for potential future use.

Update: August 2013
While the Burry Port project has been out to tender, BRE have received several enquiries from the tendering companies relating to the availability of suitable Passivhaus products for use on the scheme; in particular, windows. There has been apparent difficulty in identifying products of a suitable specification (the Council indicated a preference for aluminium windows for durability, but were open to alternatives). Contractors were not familiar with how to locate manufacturers of appropriate products within the UK. While the PHI website has a searchable database of certified products, it is not necessarily easy to find a local stockist or supplier. BRE have provided contacts for known suppliers of a range of different product specifications that will hopefully assist the tendering companies in determining relevant pricing structures for the scheme. This does however emphasise the importance of manufacturers certifying their products, since the PHI website is the most obvious source of reference. If manufacturers have suitable products that are not certified, it will be very difficult for customers to become aware of these.

Update: November 2013
The PH Designer course due to be held in Wales in September sadly did not go ahead (insufficient delegates registered for the course to be deemed viable). Options to rearrange this are being explored. A meeting has been held with members of Carmarthenshire Council's Design unit to assess the extent of capacity building required to assist the Burry Port project and other future PH projects. Key target groups have been identified to receive further information/ training. These include the Local Authority Building Control department (LABC), LA Planning department, in-house design team/ management designers and various client groups within the Council. We will now look to implement a programme of training and info sessions to help with awareness raising and capacity building in the region, starting with LABC.

Update: July 2014
Training sessions have been held with LABC and the Council's Design unit to raise awareness of some of the practical issues associated with the delivery of a Passivhaus building. These issues of design and quality will be usefully transferrable when considering other projects, whether Passivhaus or not.

Update: April 2015
The PH Designer course could ultimately not be held in Wales over the course of the project. The main reason was noted to be the excessive amount of time required for professionals to attend the course was impractical, combined with a lack of mandatory regulatory requirements for the Passivhaus standard (which may otherwise have been a driver) and the cost. It is proposed that the nature of designer training needs to change, probably favouring remote learning and/ or sessions broken down to 1 or 2 days per month, and/ or short, topic based modules to supplement people's own learning to go down the 'self certification' training route of designing a PH scheme of their own. These will be explored beyond the scope of the project. Despite these difficulties, useful

training (albeit less comprehensive training) was provided to LA designers and Building Control personnel, which will be valuable as they strive to design and build future NZEB's.

Similar difficulties were experienced with Tradesperson training. Although it was intended that this would be provided for the lead contractor and their sub contracting team, this proved impossible due to the phased way that different sub contractors were brought onto the scheme. Additionally, it was noted that most contractors could not give 2 days for such training, when it was not a standard required by Regulations. As an alternative, simplified trades training was trialled with young apprentices attending the local Construction College (Coleg Sir Gar). While upskilling for existing trades professionals will inevitably be needed across the region, the principal was that it is better to inform young trainees at the start of their career and embed these ideal practices of quality construction from the onset. Training was therefore tailored for this audience (shorter) and it was well-received. The College will investigate how they can incorporate such training into their future curriculum.

Quality Assurance

It is the intention that the development will undergo Passive House Certification, which should verify the anticipated energy performance of the dwellings. Air pressure testing will be carried out at key stages throughout the construction process to ensure that the required infiltration rates are achieved, allowing opportunities for any problems to be rectified before work progresses to such an extent that it would be difficult to remedy. Clauses will be included in sub contracts to ensure that the required air infiltration rates are achieved.

Key site personnel will undergo the Passive House Craftsmen training course to ensure appropriate quality control on site, paying particular attention to detailing for air tightness and the elimination of thermal bridging. Wherever possible, products that have received certification from PHI will be utilised, though local products will be recommended to undergo such certification as a means of improving product availability in local markets.

It will be important that the building users understand how to operate the building, so user guides will be developed to explain as simply as possible how to get the most from the building. Additional training with building managers will also be carried out on completion, with key systems explained by the people that installed them. Post-occupancy surveys will investigate the users' views on the new school. In-use performance will be closely monitored by the Council (we will investigate the possibility of installing monitoring equipment to capture in-use performance) to assess whether the new school is operating as expected and to verify whether the designed energy usage is achieved. Such in-use verification will provide confidence to the Council and other future developers that Passivhaus offers a reliable low energy building solution that can be applied to future schemes.

Update: April 2015
Construction of the school beacon is not yet complete and hence is not yet Certified. However this is expected in due course. A preliminary air pressure test was carried out part way through the construction giving a result of 0.4 ac/h. This is very encouraging and suggests that good levels of quality control are being enforced on site. It is intended that closer to completion of the school, key staff members will be provided with training to ensure they are able to operate the building correctly once occupied.

PR & Marketing

Study visits and information sessions held about the building during the construction process and on completion will raise awareness about the scheme and its ambitions. In addition, it will be suggested that the scheme is assessed under the Exemplar programme, which is a joint scheme between BRE and Constructing Excellence Wales (CEW) that disseminates best practice and transfers useful learning from projects that are exemplary in nature, i.e. worthy of being copied. If successfully adopted as an Exemplar, independently produced case studies

will be published and publicised about the scheme.

A full PR and marketing strategy will be developed with Carmarthenshire Council, who will inevitably wish to roll out their own initiatives as the project progresses.

Update: April 2015
Over the course of the construction, the contractor has carried out awareness raising activities with the local school children about environmental issues in buildings using the new school as a learning reference. Various events/ information sessions have been held under the PassREg project to raise awareness of the school beacon project and the Passivhaus concept on which it is based. As the project nears completion (~September 2015) Carmarthenshire Council will look to arrange wider awareness raising activities, both within the Council and to wider audiences to publicise the development and encourage support for future projects to be built to the same high standards in future.

BEACON PROJECT SPECIFICS: EXAMPLE B

Name of the beacon project:	Nieuw Zuid
Location:	City of Antwerp
Region:	Flanders region, Belgium
Local PassREg partner responsible for providing info of the beacon project to WP3 Leader:	City of Antwerp
Short description (ambition, context, …):	Right next to the historic city centre of Antwerp, a brand new residential quarter – Nieuw Zuid or 'New South' – will be developed. There, the integration of living and working will become reality. Works for this ambitious and multifunctional project are scheduled to start in 2013. This former railway yard will be turned into a high-quality neighbourhood. The 70 ha large area, which today is vacant for the largest part, will comprise of housing, local shops, public facilities and offices. The finishing touch will consist of a park with a surface area of over 15 ha. Sustainability will be a key element in the development of Nieuw Zuid. The focus on water-, energy- and waste management displays the ambition to develop Nieuw Zuid as a best practice example of sustainable urbanism. The implementation of a district heating system on renewable energy sources, possibly in synergy with its environment, is currently being studied.
Project type:	Circa 400.000 m² of new buildings (mainly residential, also offices and public facilities)
Size of the project:	Circa 400.000 m² of new buildings
Stage of development:	Status start of PassREg project: 2012: Planning phase (making up masterplan for development of entire site) 2013-2024: phased development and construction by private developer of new living district Status: Spring 2013-04-12

	The application for the building permit of the first building is in process. Two other building are in the designstage. There is a designer (Bureau Bas Smets) appointed for the public domain and the park.

Project team:	Private market development initiative In close collaboration with the city of Antwerp and AG Stadsplanning Antwerpen

Focus/benefit for the proposal (novelty for the region by this project "why is it a shiny-example"? innovations, multiplication potential,…):	- First large-scale development in Antwerp following passive house energy levels. - Possibly first implementation of district heating network in Antwerp, as first step in developing city-wide network in the long term Status: Spring 2013-04-12 And first districtheating network of that kind in Flanders - Looking, under the direction of city of Antwerp, for a model of cooperation with private developer (on building- and site level) and third parties (on site level for implementation of district heating)

Description of local support:	City of Antwerp is directing the research and implementation of the district heating network (feasibility study, identifying possible investment parties, identifying synergies with the environment, start up tendering procedures etc.)

Regulation & Policy

The city of Antwerp has engaged itself to the Convenant of Mayors. The objective related is to go to a CO2-neutral city by 2050. As the city is confronted with a large historic building stock, to be able to reach this goal, it is important to be as ambitious as possible in new developments.
For the moment, apart from regional directives on energy performance of new buildings, little or no local policy exists on energy efficiency and quality regarding private market developments in Antwerp. In 2010 local policy decided that in newly built private developments a collective heat production unit must be installed (no separate production units for each housing unit) and space for heat tubes in the public domain must be reserved, this to allow easy connection to a district heating network in the future.
Status: Spring 2013-04-12
Since the beginning of 2013 (after the elections of 2012) there is an (almost) entire new policy in Antwerp. This means that the last months weren't that productive because we had to inform new mayor and elderly men about the project.

Business case& Financing

For Nieuw Zuid, it was recently agreed upon that
(1) the private developer engages itself to the following necessary investments to reach at building level:
° heat: maximum 15 kWh/netto m².year heat demand, and this from the start of the development
° cooling: only passive cooling in residential buildings, in offices cooling demand restricted to maximum 15 kWh/netto m².year
° renewable energy: roofs or other building parts are where possible equipped with photovoltaic panels or other technologies for the production of renewable energy
° each building and unit within is equipped with smart digital meters
° each building will be equipped by the district heat net company with a supply set with heat exchanger for connection to the district heat network. The private developer pays a connection fee to the net company worth the supply set with heat exchanger and the saved cost of natural gas net construction and connection.
(2) the city engages itself to direct the following actions at site level:
° implementation of district heat network at Nieuw Zuid, with its own heat production unit and parallel with the development phasing of the buildings. The engagement of the city comprises a feasibility study, identifying possible investment parties, identifying synergies with the environment, start up tendering procedures etc.
The investment- and business model for the implementation and maintenance of the district heat network is not clear yet, but will be studied by the city.
Status: Spring 2013-04-12
There will be a consultation of the (energy)market by the end of this month. In June will the tendering procedure be launched. We expect that the developer for the district heating will be known by November 2013
° study the possibilities of construction a wind turbine in close proximity of Nieuw Zuid
(3) the financing of the social housing.

Knowledge

See 'business case and financing' for the measures to be taken and still to be developed

Capacity building

Status: Spring 2013-04-12
By means of the project Nieuw Zuid; a process of capacity building occurs at different levels and groups:

- capacity building of the private developer of Nieuw Zuid. On the long term, a private development pilot project such as Nieuw Zuid can be exemplary for other private developers.
- capacity building within the city of Antwerp: gaining knowledge on how to surpass hindrances and implement a district heating system, and this on several aspects (technical, legal, cooperation models, financial models)
- capacity building of third parties such as investment companies, construction companies, heat production and distribution companies
- capacity building of the end users of the buildings. Possibly training sessions can be organised to instruct end consumers on the use of the technologies involved and steering their behaviour regarding energy consumption

PR &Marketing

The city of Antwerp and the private developer have already set up information and participation activities regarding the urban masterplan of Nieuw Zuid. In these activities, the ambition on sustainability has always been communicated to the public.
During the further process, as the measures that will be taken to make this ambition concrete, there will be more focus on the sustainable aspect of the Nieuw Zuid district's identity.
Also, possibly training sessions can be organised to instruct end consumers (e.g. social housing occupants) on the use of the technologies involved and steering their behaviour regarding energy consumption.
Status: Spring 2013-04-12
On the 26th of May there will be an information day for the people that already live in the neighbourhood and for they who are interested to live in Nieuw Zuid in the future. During this day the focus will be on all the aspects of sustainability of the masterplan (watermanagement, district heating, green structures, passive building, …)

BEACON PROJECT SPECIFICS: EXAMPLE C

Name of the beacon project:	Passive House Multi residence
Location:	Cesena
Region:	Emilia Romagna
Local PassREg partner responsible for providing info of the beacon project to WP3 Leader:	Municipality of Cesena
Short description (ambition, context, …):	The project foresees the demolition of an old building with a high level of energy consumption and the realization of a new Passive House building: a dry technology multi-residence, made with structural wood panels. This technology reach less walls thicknesses as well as important energetic performances and a construction time reduction of 60% compared to traditional wet technologies. In this case, the dry technology chosen was forced by project needs and scopes, over all considering some normative prescriptions as shape's respect and boundaries limitations: each increase of walls dimensions would have produced a decrease of useful surfaces. In addition to that, timing reductions produce important benefits, overall in economic terms: less bank's debt and a faster income for clients. The functional building envelope has, at last, a thickness of 40 cm and its stratigraphy could develop important energetic performances, both in term of transmittance (U=0.136 W/m2k) and of thermal lag (λ=16 hours). These performances in a traditional building (made with concrete and slabs) require thicknesses exceeded 30%. In continuity with energetic performances, the project devise the use of triple-glazed windows (UG=0,6W/m2k) as well as the integral and continuing insulation into all building overhangs, in proximity to junctions between opaque and transparent envelope, and in adherence with paddings, sills and docks. The project foresees also a strong application of renewable energy sources (**RES**) to fulfill the energy demand. A PV plant will be installed on the roof supplying 10 kw of energy. An heat pump will be installed in order to provide hot water with the PV plant energy. The thermal energy needs is currently around 11 kwh/m2/year.
Project type:	Residential
Size of the project:	1323 m3
Stage of development:	Executive planning

Project team:	Arch. Stefano Piraccini project manager, Arch. Margherita Potente project architect and Passive House certified consultant, Ing. Loris Magnani structural project, Per. Ing. Alberto Betti technological systems designer, Ing. Pietro Ducci.

Focus/benefit for the proposal	The project involves the realization of 8 residential buildings

(importance for the region by this project "why is it an outstanding example"? innovations, multiplication potential,…):	under the Passive House certification protocol that will be certified by Zephir. According to the Passive House Database it will be the first wooden multi-residence certified Passive House.

Description of local support:	No local support structures were found during the definition of the project.

Regulation & Policy

The intervention is considered as "building retrofitting with demolition and reconstruction at volumetric equality" (regional law n.15/2013) The municipal building regulation does not provide any facilitation for the construction of a Passive House building while some articles, though inadvertently, create even obstacles to this kind of projects. The municipal regulation does not provide for economic or volumetric incentives. The project thus referred to national regulations that provide generic incentives for building restructuring and for energetic efficiency's improvement, by granting the possibility of a tax relief over a 10 years period calculated as the 50% of the IRPEF amount (Regional personal income tax) with a ceiling of 96.000 euro of project cost for each existing property (law n° 201/2011 and following). Within the same ceiling, the percentage grows up to the 65% for the interventions regarding building's seismic resistance. The national law n° 147, dated 27th December 2013, grants a further tax relief which can vary from 65% (for interventions before 31/12/2015) to 50% (after 31/12/2014). These percentages can be applied on the entire building with a ceiling of 100.000 euro project cost. Since the building is owned by four individuals whose income falls under IRPEF taxation, the final tax relief over 10 years will reach about 400.000 euro.

Business case& Financing

The project is waiting for approval by the Municipality of Cesena. During its development many meetings were attended with the competent municipal staff to verify the feasibility according to the law n° 15, recently published. These meetings focused on the understanding of urban regulations, where no facilitations for Passive House certification process were found. The project is privately financed for the entire amount and the Bank of Ancona issued a loan covering the 80% of the project costs. The contract binding the building enterprise and the contractor is between two private individuals, and the enterprise guarantees for the achievement of the Passive House certification. According to the contract artisans must attend a specific training for Passive House tradesperson.

Status: February 2015

On 20/01/2015 the communication of the effectiveness of SCIA was received (request submitted on 27/01/2014).

The notice of commencement of the work was immediately sent; in the days after the yard and a selective demolition of the building identifying the recovery material was set up.

Knowledge

The Piraccini studio can count on a multi-disciplinary team of professionals: project manager, architects, Passive House advisor, structural designer, designer of electrical installations, mechanical designer, thermo technical designer, acoustic specialist, geotechnical and geological specialist. The following calculation software has been used for the Passive House multi residence's energetic project:

5) PHPP tool for the Energy balance and the designing of buildings in compliance with the

Passive House quality protocol.

6) Autodesk Ecotect Analysis for sustainable architectural designing and for the calculation of passive solar inflows.
7) Mold frame simulator 3 pro for the dynamic simulation of heat bridges.
8) Namirial Termo 2.5 for thermo technical design.

The building's structure is made of wooden load-bearing partition walls called xlam, the external casing is insulated with stone wool and fiberglass and covered by a ventilated wall in laminam (a big size ceramic material 3mm thick) and by ventilated wooden walls. The heat bridge of balconies was calculated using a specific software and inserting insulating fibreboards on the structural protruding elements' intrados and extrados.

Status: February 2015
In January 2015 the executive architectural, structural and plant engineering project was defined. Furthermore, the compilation of the PHPP, calculation and verification of thermal bridges and the tender were realized.

Capacity building

Architect Margherita Potente of the the Piraccini studio attended the CEPH training for Passive House Designer course organized by ZEPHIR s.r.l. in Milan. Nowadays the studio has entered into an advisory agreement with ZEPHIR for the monitoring of the certification protocol's steps.

Status: February 2015
On 12/02/2015 will start the operations of the temporary works for containment of the land, necessary before proceed with the excavation work. In parallel they will proceed with the complete demolition of the existing building.

Quality Assurance

Architect Margherita Potente of the Piraccini studio attended the CEPH training for Passive House Designer course, and with the advice of Dr. Phys Francesco Nesi she will follow the certification protocol's phases. Before works begin artisans involved in the building's construction will attend a training for Passive House certified tradesperson in Cesena.

Status: February 2015
In January 2015 the executive architectural, structural and plant engineering project was defined. Furthermore, the compilation of the PHPP, calculation and verification of thermal bridges and the tender were realized.

PR &Marketing

The intervention has been selected as the first case study of a Protocol of agreement promoted by the National Confederation of Artisans (CNA) of Forli'-Cesena. The protocol binds together Municipalities, Local Authorities, Financial institutions, Professional Orders, and aims to facilitate policies for the recovering of the construction industry. Interventions for urban regeneration and energetic improvement will be incentivized by applying a shared and codified system of instruments and actions to promote local constructions' quality. The Protocol of Agreement, activated in December 2013, has been entered into by more than 20 Municipalities out of the 30 on the Province's territory. More generally the aim of the Protocol is to accelerate the achievement of Kyoto agreement by 31/12/2020, also fostering the access to the European funds provided for by the "Covenant of Mayors". As a

guarantee for the translation of objectives into real actions a technical board has been established, where referents of all parts will work for the development of specific activities (the definition of building regulations for urban regeneration, the identification of facilitated forms of financing, the deduction of Municipal Property Tax and of urbanization contributions, the wording of a contract with a completion guarantee to make enterprises responsible for the objectives' achievement). On July 18 2014 a public conference was held in Cesena to illustrate the passive multi-residence project, with the participation of local Mayors and at the presence of representatives from the Department of Architecture of Bologna and from the Architects' Chamber of Forlì- Cesena.

Status: February 2015

- **7 November 2014: Passive House Days – 3rd edition**

In Passive House Days organized with the participation of Municipality of Cesena, architects, designers, craftsmen, contractors and administrators took part in the day's work, which has seen alternating, at the Council Chamber of the Town Hall, 7 speakers. The interventions covered various issues related to the theme of energy conservation in buildings, with the presentation by the designers of solutions already in place. After an overview on European projects related to energy conservation participated by the city of Cesena (Silvia of Angels, Municipality of Cesena) and the diffusion model of NZEB (Ing. Ilaria Prati, Energie per la Città), the work continued with the presentation of enlargement and renovation of the school of St. Victor (Ing. Giovanni Battistini, Energie per la Città), a project of Social Housing (Arch.Gabriele Borghetti) and Multiresidenza (Arch. Stefano Piraccini), with a focus also on the protocol of urban regeneration (Dott.Gabriele di Bonaventura, CNA).
In the afternoon Francesco Nesi, director of Zephir, provided an introduction to the Passivhaus, illustrating the
foundations, the protocol and affordability. A second part was devoted to the issue of restructuring and presentation of some design examples. Work ended with speeches and questions form participants, who have shown wide interest on the covered topics.
The response from designers and citizenship has been very positive: 120 people attended.

- **19-20-21 November 2014: Certified Passivhaus Tradesperson"**

Within the European project PassREg, was proposed in Cesena 19 to 21 November 2014, at the hall of the wooden Malatestian Library, the course to become "Craftsman Certificate Passivhaus" organized by Zephir, a course on European level that provides all the information necessary to pass the exam ACPH.
The course is divided into three training days 8 hours.

BEACON PROJECT SPECIFICS: EXAMPLE D

Name of the beacon project:	Low energy refurbishment of two buildings: school and dormitories
Location:	Tiskadi village
Region:	Rezekne region
Local PassREg partner responsible for providing info of the beacon project to WP3 Leader:	Latvian Environmental Investment Fund
Short description (ambition, context, …):	The purpose of this project is to practically illustrate the example of low energy refurbishment as well as environmentally friendly solutions of improving living environment. Project will put a great impact on developing

	Rezekne Region by improving the infrastructure of the education, and will be the example of low energy design and construction process in the region. Moreover, special attention must be paid for this project because the school and dormitory houses the children with special needs regarding both health and education. 1 – School. Low energy refurbishment with Passive house elements, planned specific space heat demand 15 kwh/m^2 in a year. 0.36 kg CO_2/Ls per year, ~90% heat energy saving per year. 2 –Dormitory. Low energy refurbishment with Passive house elements, planned specific space heat demand 15 kwh/m^2 in a year. 0.27 kg CO_2/Ls per year, ~90% heat energy saving per year.
Project type:	Low energy refurbishment of public buildings
Size of the project:	1 – School, Treated Floor area 2075 m^2, 900 000 EUR 2– Dormitory, Treated Floor area 2181,7 m^2, 820 000 EUR
Stage of development:	Construction stage has started, though because of some technical difficulties the deadline has been prolonged. Therefore no updates are actual. For now construction works are finished for 80%, because of long winter.

Project team:	Zanis Feldmanis, Director of the School Terezija Kruste, Project manager from Rezekne municipality Devijs Siraks, Project Architect Sigita Djubina, General Contractor

Focus/benefit for the proposal (importance for the region by this project "why is it an outstanding example"? innovations, multiplication potential,…):	The objective of the project is the performance of refurbishment as a pilot project in compliance to the goals defined by the European Union for construction of buildings with energy consumption close to zero as from year 2020. Multiplication factor is included in the fact that both buildings are typical products of Soviet era, and there are numerous similar schools in the area. The insulation works are done before that in some buildings, but Beacon projects will show the complex Low energy approach for the first time in the local area.

Description of local support:	The project is financed partly by Climate Change Financial Instrument (85%) and partly by State budget (15% from Ministry of Education and Science).

Regulation & Policy

Energy efficiency is not directly determined as priority in The Development Programme for Rezekne Municipality. However, The Ministry of Environmental Protection and Regional Development of Latvia has nominated Latgale region which includes also Rezekne as the prior region at state level where different development activities will be implemented during next three years. It includes also investments in energy efficiency.
The beacon project as many other energy efficiency projects in Latvia is mainly financed by CCFI that is Green Investment scheme financed by the Proceeds from the Assigned Amount Units Purchase Agreements which are made within the international emissions trading under the Kyoto Protocol.

The municipality is aimed to use on-site renewable sources as much as possible for heating energy supply. The main on-site source is wood. However, as the decisions of energy procurement are done decentralized by local governments the common policy is not been implemented and the main decision motive is the lowest price.
Rezekne municipality has submitted the letter of support for support PassREg. The Cooperation Agreement is signed between Rezekne municipality and Latvian Environmental investment Fund for collaboration in PassREg.

Business case & Financing

The cost-effectiveness is one of the main decision making arguments which determines the distribution of investments in the region. Investment decisions are based mainly on economic objectives, the only case of application of green procurement is the tender of projects financed by CCFI as it was one of the financing provisions. The municipality is looking for well based argumentation why green procurement is advisable.
The involvement level of local manufacturers, source suppliers and other private companies is low.
The beacon professional project team is formed from experts and companies from other Latvia region – Riga. The process of beacon project implementation is divided in separate stages - finance confirmation stage, project design making stage, construction stage and maintenance stage.
The energy performance of buildings is not monitored; the only approximate indicator is the use of heating sources.

Knowledge

The field of knowledge in the region is growing slowly, because specific courses (CEPH, and shorter courses about energy saving methods) are mainly provided only in Riga, Latvian capital, far from the area. Nevertheless, the design and construction project team comes from Riga, and could bring to the area the implementation of the following knowledge:

- Tools and aids for planning and design: PHPP is used for energy calculations, and the example of comparison for two methods – PHPP and Latvian energy assessment method is used. Energy calculations are done by certified CEPH engineer and provide good insight for the proper use of insulation for building envelope, PH quality windows and high efficiency recuperation ventilation.
- Technical solutions include careful planning of building details, to exclude thermal bridges; use of high quality and durable materials, solid fastenings of heat insulation, damp-proofing of foundations and roof, and airtightness control, including Blower door test, and overall quality control thorough all the design and construction cycle.
- As both buildings are connected to centralized heating and electricity networks, as state property (education buildings), the reasonable option is air-to-air heat pump for heating, already installed.

Capacity building

In the design process project team had frequent exchange of information, integrated team work, including consultations with construction professionals. Project went through serious expertise, done by certified CEPH architect, and expert of Energy and building physics in Latvia. All the risks found at this stage of quality control, were eliminated. As in Latvia PH certification is not introduced in the market yet, this procedure is not included. Anyway, if the project reaches the target, 15 kwh/m2, airtightness and other PH parameters, such an option could be considered after first year of monitoring.
The workers of construction company are trained in the previous projects, and in the particular one, it

is planned that they will get additional training before works, especially regarding quality of insulation works and airtightness. Industrialization of building process will be provided by bringing pre-fabricated materials to the building site, in order to save time and finance; and avoid to let moisture inside building materials at the building site. It is especially important for insulation structure, and wooden I-beams. The quality of building components will be checked four times: first, on delivery specification, next – at the factory, then – at delivery point, and finally as the quality of installations.

Quality Assurance

Passive house is very demanding quality standard for planning and construction. Technical specifications shall be formulated:

- to national standards transposing European standards, European technical approvals, common technical specifications, international standards, other technical reference systems established by the European standardization bodies or – when these do not exist - to national standards, national technical approvals or national technical specifications relating to the design, calculation and execution of the works and use of the products. Each reference shall be accompanied by the words "or equivalent";
- or in terms of performance or functional requirements; the latter may include environmental characteristics. However, such parameters must be sufficiently precise to allow renderers' to determine the subject-matter of the contract and to allow contracting authorities to award the contract.

Technical specifications for design services:

- define the goal of building use for long term, 30-50 years, requirements to assess all the
- advantages and disadvantages;
- define energy use for heating, cooling, lighting, water consumption, requirements for dynamic simulations;
- define functional comfort criteria for the building, especially air exchange volume and quality;
- define most preferable heating and hot domestic water production Technologies (thermal solar, PV, biomass burning, heat pumps, geothermal etc.);
- criteria for use of sustainable and environmental friendly building and finishing materials;
- define most preferable building and facade technologies (wooden or reinforced concrete construction, insulation materials etc.);
- requirement to assess in the design process several technical and economical alternatives during life cycle of the house, regarding construction, finishing and reducing future energy consumption;
- meet either:
  - the requirements of Passive House technology (annual heat consumption not more than 15 kWh/m2, measures of passive cooling, windows with heat transmission coefficient Uw <0.8 W/ m2K, air leakage n< 0,6 h-1 etc.)
  - or other requirements of energy efficient building according to customers goals;
- requirement to assess in the design process energy demand of the house.

Methods for quality assurance in different building phases:

- comprehensive planning
- simulations from the beginning;
- involvement of external experts for Passive House simulations,
- very exact task (terms of references) for design services contract,
- drawing technical specifications for the construction works procurement procedure on detailed work design level,
- training of design and construction team;
- repeating blower-door tests during construction, use of special airtightness cuffs and tapes;

Sample contracts and procurement documentation is available in Latvian at www.passivehouse.lv, and professional advising is provided at LEIF as well.

Monitoring for the building will be provided for the next 5 years after commissioning, as well the

guarantees of the building company must cover the risks in the case project results are worse than expected.

PR & Marketing

Well focused communication strategy has not been developed yet. It also refers to regions green management activities and goals. The main information tool is web page of Rezekne municipality and info monthly, that is distributed free of charge to all local inhabitants and companies. Information about actual projects is presented also in local regional radio and Tv broadcasts.

Communication between other regions and municipalities is effective through Latgale planning region as common information platform and emails.

BEACON PROJECT SPECIFICS: EXAMPLE E

Name of the beacon project:	Pichet Group Timber frame office Building
Location:	Bordeaux, Gironde
Region:	Aquitaine
Local PassREg partner responsible for providing info of the beacon project to WP3 Leader:	NOBATEK
Short description (ambition, context, …):	Within Bordeaux Euratlantique National Interest urban renewal operation, the real estate company PICHET Group will build a 5.000 m2 NZEB or even positive energy balance office building on a timber structure, featuring high performance envelope aiming at the PH standards, integration of RES and use of bio sourced insulating materials from local origin.
Project type:	New tertiary buildings
Size of the project:	6 storeys, 5.000 m2
Stage of development:	Architectural design Seeking Planning Permission : May 2013

Project team:	PICHET Group Technical Assistance : FCBA (timber) + NOBATEK (Energy efficiency & sustainable construction) + BEHI (environmental certification) Engineering : Ecotect, Advento, Pouget Consultants, Terrell, EM'acoustique

Focus/benefit for the proposal (novelty for the region by this	This action is part of a comprehensive approach that aims to develop and strengthen in Aquitaine, a broad engineering

project “why is it a shiny-example”? innovations, multiplication potential,…):	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 and capacity for implementation and organization of multi-storey buildings in timber structure, thus paving the way for a strong positioning of actors on the regional housing and tertiary market. These are forecasted to feature in the coming years, an annual rate of 25 000 dwellings and 159 000 m2 of office floor. This projects is part of major operations and in particular the National Interest urban renewal operation Bordeaux Euratlantique (2,500,000 m² building), or the Bordeaux Metropolitan area (CUB) housing activity featuring more than 9,500 units / year. Systems and construction processes that will be implemented will help to ensure reproducibility as well as adaptability to use timber structures in other types of buildings and in particular collective housing. This program must confirm the adaptability of local species, namely maritime pine, to modern constructive principles and high Energy Efficiency standards, and offer the timber locally and nationally, a work of reference and a unique building in France. If a PH standard is met, this can be an excellent showcase for the broad dissemination of its principles in France.

Description of local support:	http://www.bordeaux-euratlantique.fr/promesse-de-vente-signee-entre-le-groupe-pichet-et-bordeaux-euratlantique/

Regulation & Policy

In France the thermal regulations implemented in 2012 (RT2012) aim, as the previous thermal regulations, at limiting the energy consumption of new buildings whether for residential use or for any other use (such as tertiary activities).

The objective of the Thermal Regulation is defined by the Law on the implementation of the *Grenelle de l'Environment*. This goal refers to the energy performance level defined up to now by the label *BBC Effinergie*.

The thermal regulations in force will therefore be strengthened so that all new buildings, on average, offer a primary energy consumption of less than 50 kWh / m² / year against 150 kWh / m² / year with RT2005. This amount of energy concerns 5 types of use: heating, cooling, lighting, domestic hot water, auxiliary systems for heating/ventilation.

In RT2012 there are two types of requirements to be met: global performance requirements (energy consumption and summer comfort) and a minimum level of means to undertake (effort obligation).

Business case & Financing

The business and financing models are quite conventional in the context of a private developer in France. As a consequence there was no public tendering nor public-private partnership contract.
The construction project office has selected :

- Internal partners for what concerns the architectural and the main technical engineering skills.
- partners well known for their track record of innovation and performance for the other consultants

The systems and methods carried out for the project will be developed so as to be reproducible for similar types of projects and adaptable to other types of buildings (especially for collective multi-storey residential buildings).

Knowledge

Upstream defined strategy: **Passive House standard** + renewable energy production to reach BEPOS level (Positive Energy Building, which produces more energy than it consumes). Using dynamic thermal simulation tools and PHPP.

Apart from the innovative approach of a 6 storeys office building in timber frame structure in France, PITCHET group has settled for a showcase demonstration operation that must be emblematic and exemplary in all aspects, including energy efficiency and the use of materials from local sources. The building owner has these ambitions materialized by three major decisions:

• Aim the Passive energy level focusing on the performance of the envelope and good orientation (free solar thermal) energy rather than compensation of the consumption by over dimensioned renewable energy equipment. This choice is the concrete translation of the principle "the cheapest energy is the one not consumed" (Négawatt scenario).
• Produce at least as much energy as consumed by the building, and thus make this project a positive energy building “BEPOS”.
• Make maximum use of local wood resource for building envelope elements and structure while ensuring adequate thermal comfort for future users.

On the overall level of BEPOS performance, there is currently no legal definition in France for a BEPOS building. Several definitions are possible:
1. Compensation by renewable energy consumption of the regulatory consumption items (heating, ventilation, cooling, lighting, DHW and auxiliary)
2. Compensation by renewable energy in overall energy consumption of the building (heating, ventilation, cooling, lighting, DHW, heating, auxiliary and specific electricity)
3. Compensation by renewable energy in overall energy consumption of the building operation (heating, ventilation, cooling, lighting, DHW heating and auxiliary electricity specific) and his other life cycle phases (construction and demolition).

Capacity building

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 and capacity for implementation and organization of multi-storey buildings in timber structure, thus paving the way for a strong positioning of actors on the regional housing and tertiary market.

This program must confirm:
- The adaptability of local species as maritime pine, to modern construction principles
- Obtaining levels of recognitions and certifications necessary to provide the timber construction sector, a reference site and a unique building in France

- The possibility of building a high energy efficient building within the same budget as in traditional construction.

Quality Assurance

Nobatek and FCBA will ensure that building innovative structure will be able to meet all the standards: fire, seismic stability, mechanical ... even if that means passing technical and specific tests.

The quality-complain certifications chosen will be implemented during the construction phase: HQE audit, energy performance, airtightness ...

PITCHET has engaged three sectorial consultancy services:

- Timber frame: FCBA
- Energy Efficiency / comfort: Nobatek
- HQE (French environmental certification): BEHI

The Group's strategy for environmental and Energy performance certification has not yet completely defined. At least, the building will aim at French energy certification (such as Effinergie or BEPOS) and HQE. **Passive House**, Breeam and Leed are being considered ...

A commissioning of the equipment is scheduled for reception and a performance monitoring follow-up.

PR & Marketing

Bordeaux Euratlantique is the largest urban development operation currently underway in France. It mobilizes some 780 hectares, bordering the Garonne river, shared between the cities of Bordeaux, Begles and Floirac. Motivated by the upcoming of high-speed railway line (TGV) from Paris to Bordeaux in 2017 and Bordeaux-Toulouse-Spain around 2020, this operation provides an ambitious program: 2.5 million square meters of buildings, whose construction will last twenty years. 1.5 million square meters will be dedicated to housing and approximately 500,000 square meters reserved for offices. Featuring 10% of the annual market of housing in the Urban Community of Bordeaux and 20 to 30% of the office real estate market.

With the help of XYLOFUTUR cluster, a Call for Expression of Interest (AMI) was launched with industry players in June 2012. This has enabled to meet innovative industry players and propose them to support PITCHET in the pursuit of this innovative project.
A cluster of companies has already been chosen, that will be associated with the project team to finalize the constructive technology choices.
This project will create value in term of knowledge and competitive advantage, paving the way for a strong positioning of actors on the regional housing and tertiary market. These are forecasted to feature in the coming years, an annual rate of 25 000 dwellings and 159 000 m2 of office floor.

ANNEX II: EXAMPLES OF EXPERIENCES OF THE UNDERTAKEN ACTIONS

Info Sessions Examples

Info Session	
When	14th April 2015 (AM)
Where	Trinity College, Carmarthenshire
Participants	21
Target group	Construction industry stakeholders, Local Authority, Architects, Contractors, Consultants
Objectives (resulting from consultation of needs with those involved in the beacon project)	Session to update the industry about the progress on the Carmarthenshire beacon project, update on the progress of NZEB Regulations and options for Wales, presenting PassREg feedback and experience from Front runners as a route to deliver NZEB with PH + RES.
Related to PassReg beacon projects	Carmarthenshire Burry Port Junior School
Programme	- Update of Regulatory context for the UK and what this means to Wales - Introduction to Passivhaus and the PassREg project - Lessons learned from Front Runner Regions in implementing PH + RES for NZEB - Transferrable lessons for Wales and the UK - Q&A session
Summary	The session was attended by a wide mix of industry stakeholders, including Local Authority members. They were very optimistic about the Passivhaus approach as a way of delivering NZEB in Wales, compared to non fabric-first ideas. It served to raise awareness and enthusiasm for Passivhaus within the Beacon region.

Info Session	
When	21th January 2014
Where	Burgas Municipality
Target group	Burgas Municipality representatives, local stakeholders, architects, building

	companies, manufacturers, representatives of regional media
Objectives (resulting from consultation of needs with those involved in the beacon project)	• Planning and constructing Passive house –step by step • products used in the construction of passive houses- opportunities for manufacturers
Related to beacon project	Art gallery in Burgas Municipality

Info Session	
When	3rd December 2013 11:00 – 13:00
Where	Borghetti Passive House - Montiano – (FC)
Participants	44
Background Participants	Technical Institute Students
Objectives (resulting from consultation of needs with those involved in the beacon project)	Presentation of the PassREg projects and of the Beacon project. Presentation of Passive House solutions of the Beacon project. Presentation of the Passive House components used and standards achieved on the Beacon project. Stressing the importance of low energy consumptions and low production of carbon emissions.
Related to PassReg beacon projects	Case Finali Social Housing
Summary	The third info session has been organised following the interest provoked by the Passive House Days (8-9th November 2013), when the Borghetti House has been opened to the public for the first time. The architect Gabriele Borghetti, from the Archefice studio, designer of the Beacon project, guided the visit of the house, showing the building techniques to the public. During the visit, the Architect Borghetti presented to the students the Social Housing project, a residential compound build to the PHPP.

Press releases	02.12.2013 Cesena institutional website http://www.comune.cesena.fc.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/1508419.06.2013 Cesena Environment website

Info Session	
When	3rd September 2013
Where	Nijmegen
Target group	The DNA-network and key actors in the region Arnhem-Nijmegen: officials, architects, social building corporations, experts, local planners, investors, representatives of regional media
Objectives (resulting from consultation of needs with those involved in the beacon project)	• Short presentation on PassREg project's aims • The relationship between passive house standard and successful implementation of the energy strategy of the Municipality by 2020 • Presentation of the different aspects of the developing of the Passive House beacon project GWLO • Guided tour
Related to beacon project	Generatie Wooncomplex Landgoed Oosterhout (GWLO)

Info Session	
When	November 2014
Where	Mascalucia (Sicily region)
Target group	regional/ local politicians and decision makers, owners of buildings + planners, architects, building experts + suppliers of products, regional construction industry
Objectives (resulting from consultation of needs with those involved in the beacon project)	presenting first year monitoring result about beacon; presenting success example of the local beacon project; showing that Passive House buildings supplied by renewables are actually possible and advantageous; disseminate experience and capacity developed during the beacon project construction; presenting main outcomes of PassREg projects.
Related to beacon project	MASCALUCIA Zero-Energy Passive House

Info Session	
When	13-14 March 2014
Where	Gabrovo
Target group	Local stakeholders, architects, building companies, financial institutions, elected representatives and municipal experts from Bulgarian cities
Objectives (resulting from consultation of needs with those involved in the beacon project)	Standard of habitation (air quality, temperature comfort, etc) Social benefits Market and financing opportunities Policy to real action process
Related to beacon project	Sun Kindergarten Beacon project

Info Session	
When	November 8th 2012
Where	Talence, France
Participants	30-35
Target group	Professionals of construction (architects, engineers), building owners, students
Objectives (resulting from consultation of needs with those involved in the beacon project)	Give information about the place of PH standards in France amongst the other standards and regulation, how PH standards have been adapted to the local climate context of souther-europe regions. Show the possible energy and economic performances to expect from regional PH implementation in Aquitaine. Present a successful operational implementation of PH in Aquitaine. Demonstrate the success of other regions who integrated massively the PH in their construction standard: example of Bruxelles.
Related to PassReg beacon projects	Maison Passive au Pays Basque (Didier Rospide, Carbone64), Groupe Pichet
Programme	- Introduction. Presentation about PH standards (objectives, means, regulation context, others standards). Marie Pauly - Barriers and opportunities about PH develoment in France. Emmanuel

	Dufrasnes (architect). - « Passive » initiatives in Aquitaine : MPPMF (Stéphanie Decker), Maison Passive Pays Basque (Didier Rospide) - Presentation of the PassREg project and perspectives in Aquitaine (Germain Adell)
Summary	The session was attended by professionals of the construction sector (architects, engineers, economists), building owners, students. A part from the presentations, it offered large opportunities of debate about all the topics mentioned. The feedback from the participant was very positive.

Info Session	
When	26/05/2013
Where	New Antwerp Courthouse
Target group	Present and future building owners and users
Objectives (resulting from consultation of needs with those involved in the beacon project)	Topic: the Nieuw Zuid development addressed with presentations on: • continuous (posters) on the development • district heating, by the City of Antwerp • energy efficient living, by Passiefhuis-Platform. The content of the presentation focused strongly on the key concept of comfort as an integral part of sustainable and energy efficient construction. The different measures (insulation, air tightness, ventilation and solar irradiation) were explained and illustrated with personal experiences. • landscaping of the project, by the architect
Related to beacon project	Nieuw Zuid Beacon project
Summary	A total of around 100 persons visited the event. Most of them visited the exhibition downstairs, interested visitors took the stairs to the permanent video and/or the courtrooms to attend a presentation. The presentation on energy efficient living was attended by 15 persons in total, spread over the 3 sessions. The public was mixed as for age, but it was clear that all participants were interested in energy efficient construction and allready knew some general basics.

	The content of the presentation focused strongly on the key concept of comfort as an integral part of sustainable and energy efficient construction. The different measures (insulation, air tightness, ventilation and solar irradiation) were explained and illustrated with personal experiences. The questions that followed concerned ventilation, orientation and insulation thickness, as well as more specific questions on the project like orientation or heating demand.

Info Session	
When	November 2014
Where	Zagreb – PH days 2014; Faculty of Architecture
Target group	Students (architects, surveyors, etc…), architects, planners, designers, energy experts
Objectives (resulting from consultation of needs with those involved in the beacon project)	Presentation of the PassREg projects and of the Beacon project. Presentation of other Passive House examples in City of Zagreb region. Analysis of the Beacon project features and details, dissemination of Beacon project outcomes and experiences. Analysis of the technical steps to realize a Passive House and of the tools and components that have to be used. Communication of the requirements that have to be fulfilled.
Related to beacon project	Case Sunny House, Campus Borongaj project

Training Sessions Examples

Name of PassREg partner	**Passiefhuis-Platform vzw (PHP)**

Training session	**Individual houses (newbuilt and renovation)**
When	12/06/2014
Where	Antwerp, EcoHuis
Target group	• Architects and engineers who work for city services involved with city development (new buildings and renovation) and (social) housing.

	• The technical advisors of the so-called "living offices" ("Woonkantoor"), where private house owners can get advise on their renovation or their newly build house.
Training focus	Individual houses (newbuilt and renovation) The content includes also an explanation on convincing the client, renewable energy legal requirements, PHPP calculation examples, example projects of high quality, etc
Related to beacon project	Nieuw Zuid Beacon project
Number of participants	17
Additional information	Evaluation forms were collected after the training to assess the opinion of the participants on the content and quality of the training.

Training session	**Non residential buildings**
When	28th October 2014
Where	Antwerp, EcoHuis
Target group	• Architects and engineers who work for city services involved with city development (new buildings and renovation) and (social) housing. • The technical advisors of the so-called "living offices" ("Woonkantoor"), where private house owners can get advise on their renovation or their newly build house.
Training focus	Non residential buildings ○ The content includes also information on solutions for the building envelope, thermography use, sun shading solutions, ventilation systems, renewable energy installations, monitoring of energy use, summer comfort, etc.
Related to beacon project	Nieuw Zuid Beacon project
Number of participants	27

Training session Apartment buildings	
When	13th October 2014
Where	Antwerp, EcoHuis
Target group	• Architects and engineers who work for city services involved with city development (new buildings and renovation) and (social) housing. • The technical advisors of the so-called "living offices" ("Woonkantoor"), where private house owners can get advise on their renovation or their newly build house.
Training focus	Apartment buildings ○ The content includes also information on compactness and orientation, technical solutions for larger buildings, renewable energy use, do's and don't's, illustrations with example projects, etc.
Related to beacon project	Nieuw Zuid Beacon project
Number of participants	32

Training Framework Examples

Training Framework for the Latvian Environmental Investment fund (LEIF)

Passive House standards are a niche field in Latvia and in both beacon regions, with only few houses build with Passive House criteria, but not even certified. Most of these buildings are **low energy consumptions** buildings **not** Passive houses, and don't reach perfectly all the Passive House criteria. If we look around, there is no Passive house at all in Latvia, especially with Passive House official certificate.

The course within WP3 has to be targeted to the first Beacon Project in Ergli - Energy efficient reconstruction of the service hotel of Ērgļi vocational secondary school with application of elements of passive buildings. The Beacon Project is a Secondary school that has completed the construction phase. The training will be developed in Vidzeme region in University of Vidzeme in Faculty of Engineering in 2013 autumn, when the study year and lectures starts for students in order to train tradesperson and to improve the quality of the Beacon projects.

The course within WP5 will be developed in the end of 2013 and will be to tradespersons interested in receiving the Passive House tradesperson certificate. At the moment, we are planning to organize this course in our second beacon – Tiskadi - Low energy refurbishment of two buildings: school and dormitories. Tradesperson course will be organised by Latvian Environmental Investment fund, which is

translating into Latvian and adapting the Tradesperson course material with the support of Passive House Latvia.

(We are planning, that would be very useful and also very good solution organize one training course in capital city of Latvia – Riga, but for now, this is only idea, we will consider it regarding our possibilities.)

Time frame

The above training sessions will be implemented in autumn 2013 and beginning of 2014 (to be confirmed based on best availability of the participants).