



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

MAP OF MISSING LINKS

An analysis of typical barriers
in European regions introducing
Passive house technology with renewable energy

IEE PassREg

PASSIVE HOUSE REGIONS WITH RENEWABLE ENERGY

Deliverable D4.5

Prepared by DNA in de bouw

Mei 2014

The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the European Union. Neither the EACI nor the European Commission are responsible for any use that may be made of the information contained therein.

CONTENTS

1. ABOUT THIS SURVEY	3
1.1. REASON AND PURPOSE	3
1.2. THE RESPONDENTS OF THIS SURVEY	3
1.3. THE EXECUTION OF THIS SURVEY	4
1.3.1. PROVIDING LIST OF BARRIERS AND NEEDED SOLUTIONS IN THE CONTEXT OF FRS AND ARs (WP 4.2.1)	4
1.3.2. <i>MAP OUT MISSING LINKS (WP 4.2.2)</i>	4
1.3.3. <i>ANALYSING THE NEED FOR SOLUTIONS IN THE REGIONS, PROVIDING INFORMATION (WP 4.2.3)</i>	5
1.4. HOW TO READ THIS DOCUMENT	5
2. MAJOR BARRIERS	6
2.1. INTRODUCTION	6
2.2. EERG-POLIMI (ITALY) - AR	6
2.2.1. MAJOR BARRIERS ON PROJECT LEVEL	6
2.2.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	7
2.3. CESENA (ITALY) - AR	7
2.3.1. MAJOR BARRIERS ON PROJECT LEVEL	7
2.3.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	7
2.4. PHP (BELGIUM) - AR	8
2.4.1. MAJOR BARRIERS ON PROJECT LEVEL	8
2.4.2. 2.2.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	8
2.5. NOBATEK (FRANCE) - AR	8
2.5.1. MAJOR BARRIERS ON PROJECT LEVEL	8
2.5.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	9
2.6. LEIF (LATVIA) - AR	9
2.6.1. MAJOR BARRIERS ON PROJECT LEVEL	9
2.6.1. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	9
2.7. ENEFFECT (BULGARIA) - AR	10
2.7.1. MAJOR BARRIERS ON PROJECT LEVEL	10
2.7.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	10
2.8. BURGAS (BULGARIA) - AR	10
2.8.1. MAJOR BARRIERS ON PROJECT LEVEL	10
2.8.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	11
2.9. ZAGREB (CROATIA) - AR	11
2.9.1. MAJOR BARRIERS ON PROJECT LEVEL	11
2.9.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	11
2.10. BRE (GREAT BRITAIN) - AR	12
2.10.1. MAJOR BARRIERS ON PROJECT LEVEL	12
2.10.2. MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	12
2.11. DNA (NETHERLANDS) - AR	13
2.11.1. MAJOR BARRIERS ON PROJECT LEVEL	13

2.11.2.	MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	13
2.12.	PMP (BELGIUM) - FR	13
2.12.1.	MAJOR BARRIERS ON PROJECT LEVEL	13
2.12.2.	MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	14
2.13.	PROKLIMA (GERMANY) - FR	14
2.13.1.	MAJOR BARRIERS ON PROJECT LEVEL	14
2.13.2.	MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	14
2.14.	TYROL (AUSTRIA) - FR	15
2.14.1.	MAJOR BARRIERS ON PROJECT LEVEL	15
2.14.2.	MAJOR BARRIERS FOR REGIONAL TRANSITION PROCESS	16
3.	ANALYSIS OF MISSING LINKS	17
<hr/>		
3.1.	GENERAL ABOUT THE ANALYSIS OF THE MISSING LINKS	17
3.2.	MISSING LINKS IN "REGULATION & POLITICAL AGENDA"	18
3.3.	MISSING LINKS IN "BUSINESS CASE & FINANCING"	20
3.4.	MISSING LINKS IN "KNOWLEDGE"	21
3.5.	MISSING LINKS IN "CAPACITY BUILDING"	22
3.6.	MISSING LINKS IN "APPLIED PRODUCTS"	25
3.7.	MISSING LINKS IN "PR AND MARKETING"	25
3.8.	MISSING LINKS IN "QUALITY ASSURANCE"	26
4.	MAIN OUTCOME	27
<hr/>		
4.1.	OVERVIEW OF MISSING LINKS IN THE PARTICIPATING REGIONS	27
4.1.	LIST OF GENERALIZED MISSING LINKS	27

Appendix

- 1: Solutions from Aspiring regions
- 2: List of missing links
- 3: Chard of missing links of participating regions

1. ABOUT THIS SURVEY

1.1. Reason and purpose

European regions can and should learn from lessons learned by preceding regions that have developed the right conditions for the large-scale out roll of Passive house building Technology with suitable supply of renewable energy. Many achievements of frontrunner regions and also of upcoming aspiring regions can be initiated in other regions. But certainly not all barriers occurring in a specific regional context can be addressed by already developed and proven solutions.

This analysis of the demand for solutions maps out missing links on regional level and on European level.

On regional level the listed missing links are discussed and compared. Also solutions are indicated that can help to overcome actual barriers.

After a focused search for solutions during the PassREg¹ project the need for (the further development of) solutions will be elaborated. This may help to determine the course of further developments in Europe.

Focus of this survey was initially on aspiring regions, but with the survey on-going the examination of missing links in frontrunner regions appeared to be significant and of importance for the understanding of the transition process as well.

This document's name "Map of missing link" maybe could raise some questions, especially the use of the imagery "missing link". From the transition process of regions we have realised that the transition depends on a complex of factors. Only when development takes place on all aspects at the same moment synergetic dynamics and transition takes place. It can be seen as a spiralling development; all aspects need to part in the same stages of the transition, once one aspect is missing the development of the other aspects will be effected and the spiral will not level up until all missing links are solved.

With this document we intend to give an overview of the missing links appearing in the participating regions as the reverse to the already flowering collection of solutions described in the PassREg-SOS² database.

The "List of missing links" could be read as a "to do"-list of the participating European regions. By analysing the missing links of a region and comparing this to other regions a clearer picture appears of the phase and kind of transition process in that region. This overview could help to decide whether or not specific solutions could possibly be an answer to appearing problems of the regional transition.

Reflecting the variety and also the overlaps of missing links the question was to be answered whether or not there are prototypes to differentiate of regional transition processes. And also whether or not the regions transition evolves following comparable stages. These questions will be part of the advisory rapport when finalizing this survey and the PassREg project.

1.2. The respondents of this survey

This survey takes place in the framework of PassREG. The respondents of this survey are participants of this project.

Participants from frontrunner regions (FR):

¹ PassREg = IEE project for Passive house development with renewable energies in European regions,

² PassREg-SOS = database for Passive house development with renewable energies in European regions:
http://passregos.passiv.de/wiki/PassREg-Solutions_Open_Source

- PMP, Brussel (B)
- ProKlima, Hannover (D)
- IG Passivhaus Tirol, Innsbruck (AT)
- PHI, Darmstadt (D) representing Heidelberg and Frankfurt

Participants from aspiring regions (AR):

- eERG-Polimi, Milan (IT)
- Community of Cesena (IT)
- PHP, Antwerpen (B)
- Nobatek, Aquitaine (FR)
- LEIF, Riga (LV)
- Eneffect, Gabrovo (BG)
- Municipality of Burgas (BG)
- Municipality of Zagreb (HR)
- BRE, Cardiff (GB)
- DNA in de bouw, Arnhem-Nijmegen (NL)

1.3. The execution of this survey

1.3.1. Providing list of barriers and needed solutions in the context of FRs and ARs (WP 4.2.1)

The participating organizations have provided the information for this survey in a questionnaire developed by DNA in de bouw, the leader of WP 4 and of this survey. This questionnaire was part of the preparation of the Cross-over workshop at partner meeting in October 2013.

Purpose of this workshop was an exchange between partners of the solutions developed in the partner regions and of PassREg activities in different WP's. The problems the participating regions are facing in their transition were intently not emphasized during this workshop in order to keep the focus on sharing solutions. But the collection of missing links was presented in an overview and - off course - the discussion of (meaningful) solutions happened intuitively out of the context of experienced missing links. One result of this workshop, an overview indicated solutions (from other regions) being useful for introduction in the participants region is attached in the appendix.

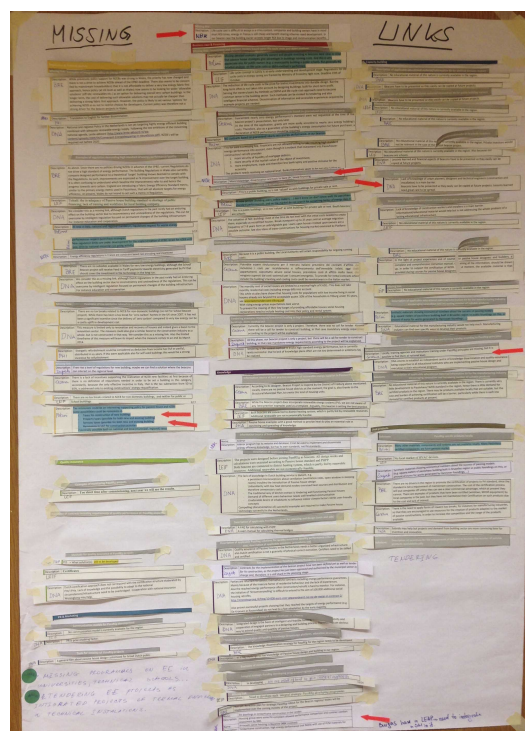


Fig. 1; Compilation of missing links at the Cross-over workshop

1.3.2. Map out missing links (WP 4.2.2)

The part of the questionnaire on major barriers and on missing links then was extracted and combined into a collection of all major barriers and into a "List of missing links". Both documents have been elaborated, completed, ambiguities have been removed and coherences have been discussed. This happened mainly via telephone and mail contact between the partners and DNA in de bouw and some additional Internet research. It appeared that the list of freely described major barriers provided valuable complementing information to the framed answers to the questionnaire of missing links.

The partners were asked to label their missing links rating the urgency/importance. After analyzing the information a generalization of experienced missing links was possible.

1.3.3. Analysing the need for solutions in the regions, providing information (WP 4.2.3)

Discussing the tangible missing links in the partners regions started whilst coordinating the development and further advancing of solutions for implementation in the aspiring regions (partner calls in May and June 2013). Throughout the PassREg project information on available solutions have been shared amongst the participants in order to find ways to overcome experienced barriers. The defining of missing links and the sharing of appropriate solutions explicitly happened before and during the Cross-over workshop and alongside the development of the database PassREg-SOS. The partners are developing and enhancing solutions to solve the missing links. This is an ongoing process and will be reported at the end of the PassREg project.

During the project, DNA in de bouw collected and processes actual information to complete the map of missing links. This Map of Missing Links aims to point out the need for further research and development of solutions and will finally be the base for an advisory report about the need of further development of solutions in the participating regions.

1.4. How to read this document

This document and the survey is the preparation for an advisory report about the requirements of (further development of) solutions after the closing of the PassREg project. For now the activities in the participating regions are dealing with the missing links and the solutions appear in an on-going process.

Chapter 2

Major barriers (and their possible solutions) provide a first impression on the nature of barriers appearing in the regions of participants of PassREg.

Chapter 3

The Analysis of Missing Links outline the remarkable points derived out of the “List of missing links”.

Chapter 4

Out of the Analysis a list of generalized missing links has been derived.

Appendix

In the appendix you find the discussed “List of missing links” and some additional material.

2. Major barriers

2.1. Introduction

This chapter presents the major barriers that appear to block the way to the general application of Passive House standard with RES³ in construction and refurbishment experienced by the partners of the PassREg project. Both, the partners from frontrunner/experienced regions and aspiring/beginning regions were asked to describe the top three major barriers. This was an open question as to the nature of the barrier, so the following list reflects the priorities in the respondents' minds rather than any pre-set notion in the set up of the questionnaire.

Assuming the possibility that there is a different perception of barriers on the level of beacons/construction projects and the regional development in general the participants were asked to describe the major barriers from both perspectives. Awareness of the barriers and solutions in the level of projects may shed light on the situation in the whole region and make the latter easier to deal with. Hence the answers about the projects will be listed below before those of the region.

The participants were also asked to describe solutions (associated suggestions to solve the problems). After every problem or barrier comes an arrow, followed by one or more solution(s) suggested by the same respondent.

The descriptions of the major barriers and solutions speak for themselves and will not be discussed in this chapter. But they have been processed into the analysis of the corresponding missing links.

2.2. eERG-Polimi (Italy) - AR⁴

2.2.1. Major barriers on project level

1 Sometimes the initial costs of Passive Houses are higher than those of standard quality buildings

- consider total costs of life cycle in the design phase;
- include improvements in summer comfort;
- consider also the higher future value of buildings

2 Some products or components that meet Passive House standards are missing on the local market

- disseminate information of products available on other markets;
- subsidies for research and development activities in local industries;
- information campaign to increase user demand

3 Insufficient visibility of beacon projects to stakeholders

- info sessions;
- open visits to buildings;
- meeting with building occupants and with designers;
- use of local media

³ RES = Renewable energy supply

⁴ AR= Aspiring region

2.2.2. Major barriers for regional transition process

- 1 Current regulations are less ambitious than Passive House standards
→ The example project may spur improvement of the local regulations
- 2 Sometimes higher initial costs for new buildings and refurbishments up to Passive House standards
→ good design of Passive Houses;
→ possible impact of our activities on public funding, supporting Passive House strategies [once long term benefits are clear]
- 3 Missing knowledge about Passive House strategies on the part of policymakers and building owners
→ hold info sessions and organise direct meetings to explain this; spread information of success examples in front runners regions; dissemination of PassREg-SOS

2.3. Cesena (Italy) - AR

2.3.1. Major barriers on project level

- 1 Bureaucratic process of project approval, very long waiting time before realization, especially bothersome in the private sector
→ streamline the procedures, at least for NZEBs⁵, to encourage their implementation (reducing the time elapsing between the submission and approval of the project and simplify bureaucratic procedures, at least for private sector)
- 2 Not enough certified Passive Houses products and materials available on the market; their market is weak (low volumes) and there is little competition
→ providing incentives, such as tax reduction for manufacturers that make products that meet Passive House standards
- 3 No incentives or tax deduction for new NZEB buildings.
→ Italian government should provide incentives for the construction of new buildings with high energy performances and RES; e.g. tax deductions such as those already provided for the refurbishment of existing buildings

2.3.2. Major barriers for regional transition process

- 1 Italy has not developed an Action Plan for the implementation of NZEB yet
→ The Italian government will make available a set of technical standards for a building to be considered NZEB; their definition should be provided by 30 June 2014
→ Than an action plan can be defined
- 2 There are no incentives or tax deduction for new buildings. There should be some in order to stimulate NZEB
→ the tax deductions provided for the refurbishment of existing buildings should come to include the construction of new buildings that have high energy standards, such as Passive Houses and NZEB

⁵ Nearly Zero Energy Buildings

3 Scarcity of trained specialists in Passive Houses and NZEB, especially in public Administration

→ training courses will be organized in view of the regulatory obligations on NZEB for new buildings owned by public bodies, probably as of late 2018

2.4. PHP (Belgium) - AR

2.4.1. Major barriers on project level

1 Higher investment needed for the high-energy-performance of PH⁶ with RES

→ The municipality should develop a communication plan to raise interest of investors, showing innovation with a good rate of return and high future value

2 Less subsidies are available

→ The municipality should guard strict energy requirements, to further economies of scale, to stimulate the formation of construction teams and to stimulate integrated tendering for Design, Build, Finance and Maintain (DBFM, possibly EPC⁷-based)

3 Locally missing knowledge

→ legal knowledge: municipality should develop a legal framework for heat networks in collaboration with Flemish Region

→ user knowledge: education/information for future users has to be developed jointly by city and region

→ technical know-how: information/education for craftspeople should be developed on-site

2.4.2. Major barriers for regional transition process

1 Higher investment needed for the high-energy-performance of PH with RES

→ information should be developed and spread on Life Cycle Calculation and cost efficiency

→ economies of scale should help decreasing initial costs

2 Less subsidies are available

→ subsidy policy has to stimulate energy-efficiency beyond requirements of the actual regulations

3 Regionally missing knowledge,

→ make knowledge, tools and solutions regionally available for various target groups (project developers, architects, craftspeople, industry, ...)

→ expand available knowledge beyond the building (heat networks and smart supply systems)

2.5. Nobatek (France) - AR

2.5.1. Major barriers on project level

1 Uncertainty about economic factors, return on investment

→ Demonstration of relevant projects to inform and convince decision makers and investors

2 Uncertainty on technical aspects (timber frame construction for high rise buildings)

→ Nobatek does research and development on this topic

⁶ PH = Passive house

⁷ EPC= Energy Performance Contract

- 3 Lack of policy incentives
→ SME's⁸ should be supported conducting projects of renewable energy production or highly energy efficient renovation

2.5.2. Major barriers for regional transition process

- 1 Technical misunderstanding and prejudices against Passive House standards
→ Demonstrate and convince
- 2 French regulations and behaviour as centralized country
→ Demonstrate at local/regional level the originality and adaptability of NZEB standards compared to national standards and others labels. Convince the policy makers of the importance and the added value of NZEB standards
- 3 Economical and financial barriers
→ Provide technical arguments and develop new financial models based on performance guarantee

2.6. LEIF (Latvia) - AR

2.6.1. Major barriers on project level

- 1 Lack of skilled labour and qualified experts in building sector
→ Training courses in collaboration with European projects such as Build up skills of Intelligent Energy Europe (IEE)
→ Increase vocational training for workers in the construction sector
→ Training sessions for craftspeople and designers within PassREg
- 2 In Latvia there are 16 municipalities which have developed Sustainable Energy Action Plans (SEAPs⁹), but almost none of them mention NZEBs or Passive House standards
→ Develop an action plan for Passive house development in the region and its integration in SEAPs.
- 3 Perception that low energy buildings would be already good enough for Latvia and there would be no need to establish Passive House standards with Renewable Energy Supply
→ Arrange public discussions, PR campaigns
→ Educate and stimulate end-users to create demand

2.6.1. Major barriers for regional transition process

- 1 Lack of knowledge regarding Passive house Standard with RES not only between craftsmen, but also among the Latvian society.
→ Training sessions within PassREg project for craftsmen's and designers.
→ PR campaigns in exhibition halls related with construction sector, education web sites, etc.

⁸ SME = Small and medium enterprises

⁹ SEAP= Sustainable Energy Action Plan

2 There are SEAPs for municipalities in general, including transport, electro energy and heat sector. Energy efficiency measures are considered at heat sector, but not all municipalities include NZEBs in their action plans. There is no separate action plan for Passive house or NZEB development in municipalities.

→ Develop action plan for PH development in region and integrate it in SEAPS as well.

3 Limited knowledge about PH at the political level and major decision makers.

→ stimulate public demand for energy efficient solutions;

→ PR campaigns

→ educate end-users to create demand

2.7. Eneffect (Bulgaria) - AR

2.7.1. Major barriers on project level

1 There are no incentives for high levels of energy performance

→ Subsidy programme at national level based on energy performance of buildings

2 Shortage of knowledge and skills of construction workers

→ Constant control at the building site and quality assurance procedure agreed beforehand

→ Training and more projects to gain experience

3 Lack of information about Passive houses; opinions that PH houses are expensive and hard to achieve

→ Communication campaign;

→ introduction of life-cycle cost analysis;

→ monitoring of beacons.

2.7.2. Major barriers for regional transition process

1 Little or no demand for quality buildings and high-level energy performance

→ Information about benefits of Passive Houses tailored for each target group influencing end-user investment decisions

2 Lack of political understanding about the position of energy efficiency in relation to energy mix and energy planning

→ Reach politicians through national media

→ Stimulate public demand for energy efficient solutions

→ Use local authorities to communicate with end-users

3 Concern over the improper use of public money, and especially of EU funds for energy efficiency

→ Stimulate deep retrofitting projects by providing subsidies only if ambitious quality and energy efficiency criteria will be reached

→ Support business-as-usual schemes and projects with potential for large-scale market replication

2.8. Burgas (Bulgaria) - AR

2.8.1. Major barriers on project level

1 Lack of funding and co-financing programs

→ National funds should be set up to support the construction of Passive Houses.

- 2 Poor knowledge of standards and of the certification process
 - Awareness campaigns and
 - Good, fully operational examples; houses that are recognised as a 'best example' by the municipality will be a good way to convince business that PH with RES works
- 3 Poor quality performance
 - Better control during construction/ well educated control officials on the site (training!)
 - More well trained builders and tradespeople

2.8.2. Major barriers for regional transition process

- 1 Lack of adequate funding for PH+RES projects
 - Financial schemes to encourage the construction of PH+RES in the region, for example the creation of a municipal fund which will co-finance projects
- 2 Lack of well-trained professionals: designers, builders, etc.
 - Improve training of designers and builders through collaboration with educational institutions
- 3 Inadequate administrative capacity of the municipality to assist the realization of energy efficient projects
 - Conduct differentiated training for municipal employees each according to their specific commitments in the municipal structure;
 - Establish a separate energy unit in the municipality to support these projects.

2.9. Zagreb (Croatia) - AR

2.9.1. Major barriers on project level

- 1 Lack of decision makers' interest in setting higher targets for refurbishment projects in the region
 - explore options to refurbish at least one building in ZagEE (local refurbishment project) to PH standard and use it as a beacon, other than that there are some possible beacons outside City of Zagreb area that could also be used
- 2 Only a few professionals are able to apply the principles of NZEB, especially within the local administration
 - this is being solved directly through PassREg project activities - regional building forums and education of experts; also Build Up Skills Croatia project and recent forming of a Passive House Consortium are tackling this issue
- 3 The system of quality control includes only certification
 - the city will assign firms to test construction products to make sure they are in line with specifications when refurbishing public buildings, other than that local administration should start using PHPP¹⁰ to judge project documentation

2.9.2. Major barriers for regional transition process

- 1 Absence of good quality local beacon project to prove PH benefits
 - creating convincing beacon projects with a high level of quality would impact this.

¹⁰ PHPP = Passive house planning package, a calculation and design tool for Passive houses

→ prove financial benefits of such projects to convince the city to support PH standard refurbishments on public buildings

2 Limited size of market for materials used for passive buildings and the market of these buildings themselves

→ the Environmental Protection and Energy Efficiency Fund of the Republic of Croatia has introduced minimum requirements for each building component to qualify for financing

3 National policy for the implementation of legislation is not in line with the objectives set in relation to the NZEB before 2020

→ needs to be done on the national level, for local level city should explore options for reducing communal fees for PH's and NZEB's

2.10. BRE (Great Britain) - AR

2.10.1. Major barriers on project level

1 Few cost effective products (locally) for use in the scheme

→ Initially we need to use uncertified products

→ For the long term, encourage manufacturers to improve their products, gather evidence of performance and seek certification

2 On site delivery of design

→ additional training in trades and crafts have to be provided for employees of participating contractors prior to construction

2.10.2. Major barriers for regional transition process

1 Lack of funding mechanisms

a. to account for higher building costs of private developers. These developers can offset the increase in capital/ building costs by the in-use savings.

→ new financial arrangements, e.g. 'Green Mortgages' where owners could borrow more money on the basis that their spending (e.g. energy bills) will be lower over time due to NZEB

b. to account for higher initial costs when buildings will not be retained by developers (It is mainly a problem where the building developer intends to just sell the building. So there is no potential for them to recover savings in use – split incentives

→ new financial arrangements e.g. warm rent, Esco¹¹, valuation,

2 Passive House certification process is seen as a costly burden

→ Interpreting standards such as those measured by the National Calculation Method as PH equivalent, or

→ Considering Passive House calculations as 'deemed to comply' with conventional calculation method

3 Lack of high level political drivers towards achieving NZEB's ahead of the less stringent Energy Performance of Buildings Directive (EPBD)

→ BRE aims to continue to advise and lobby Welsh Government

→ meanwhile, expressing support for Local Authorities that try to be more flexible in setting higher performance standards for developments they influence, as a stepping stone towards wider acceptance of such standards

¹¹ ESCO = Energy service company

2.11. DNA (Netherlands) - AR

2.11.1. Major barriers on project level

- 1 Lack of knowledge of construction workers on the site
→ Adequate training and more projects to gain experience
- 2 Lack of understanding of political significance
→ Raise political awareness
→ Campaigns spreading information
- 3 High costs of Passive House products and services
→ More projects, making the Passive House standard the norm for construction
→ Funds based on LCC analysis
→ Esco's for energy saving measures
→ Integral design: (cost-) efficiency in the planning and construction phase

2.11.2. Major barriers for regional transition process

- 1 Lack of knowledge and confidence, high quality standards are not common in building sector
→ Training program, info sessions etc.
- 2 Lack of understanding of political significance, political diligence, regulations, tax-reduction, etc. should focus on energy reduction instead on energy generation
→ inform politicians
→ raise awareness and confidence, initiate a PR campaign
- 3 Financing problems:
 - a. Dutch building sector involved in a deep recession at present;
 - b. split incentives between landlords/developers (higher investment) and renters/sellers (lower energy bills);
 - c. many home owners are heavily in debt (and therefore reluctant or unable to get additional financing for retrofitting);
 - d. no supporting funds
→ Reverse downward economical spiral by initiating (retrofit-) projects with high standards of quality and energy-efficiency
→ Initiate finance schemes and funds; get national investors to invest in Dutch projects
→ Make integral design standard: (cost-) efficiency in the planning and construction phase

2.12. PMP (Belgium) - FR¹²

2.12.1. Major barriers on project level

- 1 Already solved: Not enough money for the slightly more expensive Batex buildings
→ A regional law now stipulates that 1.26 % of consumer electricity bills will be redistributed by the electricity supplier in the form of subsidies. Thus, on some 2,3 billion € of collected

¹² FR = Frontrunner region

bills, approximately 28 million € are to be used for bonuses for building Batex buildings (results in 100 € / m² bonus) and some other energy bonus

2 Already solved: Lacking interest in building Batex buildings among the construction professionals
→ Communication campaign to encourage builders, architects, etc. to answer Batex calls for projects and tenders (i.e. bottom-up promotion)

3 Already solved: Inadequate capacity to answer questions about Batex from professionals interested in calls for Batex projects and Batex tenders as their numbers increase (technical questions mostly)
→ other half of the 1.26 % will be put into advisory bodies, among which PMP as a consulting expert capable of answering quickly the requests of professionals
→ PMP runs training on Passive House building aimed at construction professionals

2.12.2. Major barriers for regional transition process

1 Already solved: Lobby: Architects Order, CSTC, and other labor unions of the construction sector are against the progress of the building towards Batex because that upsets their way of functioning.
→ The law of PH standard is already voted and has to be accepted.
→ already, PMP organised round tables during 1 year (in 2012) to debate questions relative to the various corporate building trades involved

2 The upcoming election of June, 2014: the current government of Brussels that voted for “Passive Brussels 2015” will not be re-elected after 2 mandates. The federation members who remain opposite to the legislation stimulating passive buildings press for representatives who are less sensitive to the energy question in an effort to get the law repealed after the election.
→ targeted communication is planned by PMP with the professionals of the various bodies towards their colleagues
→ mass communications via TV, radio and more clips like “Finally I visited a Passive House”

3 Already solved: The interest of the public for PH with RES needs to be stimulated
→ communication campaign about the benefits that will flow to the occupants (top-down), which will increase the demand for and thus the construction of Batex houses

2.13. ProKlima (Germany) - FR

2.13.1. Major barriers on project level

1 Inadequate planning process
→ Introduce and stimulate an integrated planning process

2 Lack of quality in construction
→ Implementing Passive House-elements in “standard procedures”

3 Controlling process needs to be developed
→ Improving quality assurance and “awareness” by monitoring energy results

2.13.2. Major barriers for regional transition process

1 Passive Houses need to be tested in practice, quality assurance should be improved and clients / residents should be assisted in operating the building.

(Some builders underestimate the energetic influence of e.g. ventilation systems. Optimal system functioning requires periodic maintenance and good instruction of users. The same applies to systems/sources of renewable energy e.g. heat pump systems that, at times, do not run as easily and reliably as a gas boiler.)

→ ProKlima provides projects on quality assurance, monitoring, operator information (e.g. user manuals)

→ ProKlima funds incentives, e.g. a particular funding program with consumption evaluation just started regarding the many new Passive Houses with heat pumps

2 Expectation of high investment costs and the use of a short time period for financial calculations (too short to consider full Life Cycle costs)

→ ProKlima tries to convince investors to consider total running costs

→ ProKlima supports studies for NZEB dealing with Life Cycle costs

3 Negative attitude of some large (commercial) housing companies in Hanover towards Passive Houses. Stems in part from negative experience gained in some pioneering projects, but also from the basic challenge of housing companies to offer stable and low rents. Financing energy-efficient refurbishment under the traditional rent-system is difficult because it excludes heating bills (split incentives).

A “warm rent” model could help, but this is difficult to implement given current housing programmes (models of rental reimbursement with transfer beneficiaries).

→ a separate funding program, developed in Hannover, to foster energy efficiency with stable rents (see <http://www.hannover.de/Leben-in-der-Region-Hannover/Umwelt/Klimaschutz-Energie/Akteure-und-Netzwerke/Klima-Allianz-Hannover/Förderprogramm-Energieeffizienz-mit-stabilen-Mieten>)

2.14. Tyrol (Austria) - FR

2.14.1. Major barriers on project level

1 Quality assurance

Projects succeed only when experts involved have adequate skills and expertise and when the project undergoes a strict certification trajectory. PHs with RES are being considered as complicated because they require extra training and effort in the certification process. This results in pointless prejudices and a tendency to lower standards in cases where the demand for quality is not strong.

→ campaigning

→ information and training facilities

2 High general construction costs

Due to rising land prices, rising construction costs and the stagnating income of tenants there is less of an ambition to invest in quality, energy-efficiency and RES. Because of split incentives of investors and occupants, the real estate industry became weary of high energy standards.

→ make lifecycle cost analysis a standard procedure for investors

→ campaigns to convince investors of their responsibility

→ information about long term advantages of PH with RES

3 Difficulties reaching passive house standard due to landscape factors (shadow in the valleys)

→ informing investors about the extra need for energy-efficiency in shadowy locations, regardless whether the standard of a certified Passive house will be met

- include this dilemma in regulations
- provide good examples of RES systems

2.14.2. Major barriers for regional transition process

1 Economic feasibility of Passive House design with RES is subject of controversy for a variety of interest groups in Tyrol (Chamber of commerce, chamber of engineers and architects, Austrian Federation of Limited-profit Housing Associations, administration, politicians). Their arguments focus on possible side effects high efficiency standards, such as higher building costs; failure to be socially responsible and unfair competition (see: http://www.umwelt-bauen.at/umwelt-bauen/fhs/files_fhs/1/U+B_Zukunftsinvestitionen_19112013.pdf?bereich=1)

→ campaign with convincing cost-analyses and monitoring data of operational costs to convince stakeholders of the investment being responsible

→ spread information

→ events like the Zagreb Energy Week to raise awareness and round tables to have an opportunity to publically counter opponents

2 Lobby of the industries of cement and brick and the industry of fossil fuels: The Industry of cement, stone and ceramics (united in the Chamber of Commerce WKO Austria) has been facing a declining market share and is therefore under great pressure. In contrast, the wood construction sector has developed from a niche market towards the supply of popular turnkey energy efficient homes. The educational level of brick and concrete workers is significantly lower than that of carpenters, so the major employers in the construction industry run into problems if they have to deliver high quality projects. Similarly, architectural offices run into problems because young architects are trained more as artists than as technicians and do not have the skills of e.g. energy efficient design anymore. As the building sector already faces economic problems, any extra cost of training construction workers or architects is a real barrier in the introduction of high standards. The lobby of sellers of fossil fuels and suppliers of related building accessories is an additional force against energy efficiency (e.g. <http://www.iwo-austria.at/moderne-oelheizung/fachwissen-informationen.html>).

→ spread information about successful projects

→ make training accessible

→ campaign and organise events like the Zagreb Energy Week to raise awareness and round tables to try and convince opponents

3 Not enough targeted subsidies for renovation and new construction

Although

- With an application for subsidy the evidence of the energy performance of new buildings has to be proved (energy certificate);
- in comprehensive retrofit an energy performance certificate from the state before the renovation and after renovation has to be handed;
- for individual measures the u-values of the details and proofs and certificates of products used has to be handed
- there is an extra incentive for use of PHPP

the actual regulations do not evoke the highest possible energy performance or demand proof of energy performance of Passive houses (PHPP, certificate). This appears as a lost opportunity to use incentives constructively.

→ Along subsidy for Passive houses and highly energy efficient retrofit a high standard consulting scheme should be obligatory

→ Quality assurance and PH certification should be part of incentives for Passive houses

→ Subsidized projects should be monitored after construction

→ The availability of incentives needs to be better communicated

3. Analysis of missing links





3.1. General about the analysis of the missing links

This chapter deals with the missing links as collected in the “List of missing links” (see appendix). From this overview the important points will be discussed.

The collection of the missing links has been through a questionnaire trying to tackle the whole complex of possible bottlenecks at the different stages of attempts to roll out NZEB-practice with Passive house technology with RES in a variety of European regions. The initial focus of the collection of missing links was on aspiring regions but missing links from frontrunner regions appeared to contain important information for aspiring regions.

The “List of missing links” is compiled following the questions from the questionnaire. The questions are grouped in various main topics. The main topics have been coded with colors in accordance with the color-codes used in deliverables of PassREg WP3.

After the missing links were compiled and sorted out, the participants were asked to give information about the level of urgency/importance of the different missing links. This has been done by labeling the missing links in 4 rates:

-  = considered as an crucial/urgent missing link
-  = considered as less crucial/urgent missing link
-  = missing link is not crucial/urgent
-  = missing link is solved or not present

An accurate interpretation of these rates cannot be given, as for instance “less urgent” can mean in one case that the missing link is not crucial/urgent at this stage of the transition in the region but in another case it can mean that this missing link is considered crucial/urgent but there are already activities underway to solve the problem.

The descriptions of the major barriers helped to understand more about the impact of the missing links. Therefore we flagged corresponding/overlapping missing links with: “**M**” as for major barrier in the “List of missing links”.

In the “List of missing links” PHI reported some missing links from the FR’s¹³ Heidelberg and Frankfurt. These posts will at that stage not be processed into this analysis of missing links because the information on the regions and context is too fragmentary to be taken into account of the analysis at this stage.

Looking back some questions should have been asked differently. In general the form of closed questions in the questionnaire appeared to be too constricting for the complexity of the regional contexts, stages of transition and the complexity of the issue of implementation of PH with RES itself. Therefore the descriptions of the major missing links from the open questions about the major barriers where a welcome source of additional information. Some questions in particular where difficult to answer. For instance in the question “Is sufficient information/educational material available for building certifiers?” the subject had to be clarified first by “Are there certified passive house certifiers in your region?”. The way the question was asked presumed that the respondents would directly understand this question is about the “certified Passive house certifiers”. Now “building certifier” could be interpreted as a whole range of certifiers active in the building sector. In the attempt to analyze the

¹³ Frontrunner region

answers of the respondents to this question they had to be considered in the context of quality assurance procedures in the region.

Other aspects need to be mentioned about this analysis: The main outcome of the questionnaire and, in detail, the descriptions of the missing links provide a picture of the state/level of the actual development in a region. But they also reflect the perspective and perception of the person and the organization that answered the questionnaire. The analysis has been executed as objectively as possible but cannot be expected to be uncoloured through the perception of those who submitted the answers as well as of the author of this report.

3.2. Missing links in “Regulation & political agenda”

This section of the questionnaire deals with government guidance for highly energy efficient buildings, such as policies, regional action programmes, regulations, standards and incentives.

When asked about **general policies of energy efficiency and the use of renewables**, respondents see existing policies as lenient and not as stringent as shown to be possible by, for example, Passive Houses in the field of built structures. Although one remark is made that, even though the standard of PH is clearly set, this standard would not cover the whole range of building types and utilization.

The relation between local and national policy appears to be crucial. The successes of the frontrunner region Brussels was possible because the legislative power about building standards was granted to the local government. One respondent (FR) describes the hindrance by the reactionary response to a high targeting regional energy policy. The national policy is in most cases seen as a legal basis for the development of NZEB with PH standards as they do not evoke NZEB but also do not particularly hinder the introduction. Energy efficiency is not incorporated as a prior responsibility in policy for RES.

Local and regional governments often develop policy tools like regional action plans, e.g. SEAPs in CoM. This is seen as a potentially success factor when specifically targeting NZEB with PH/highly energy efficient retrofit and RES.

Responses can be interpreted as indicating the absence of effective energy policy in 7 cases, misguiding energy policies in 5 cases and well directed but uncertain policy in 2 cases. The only respondent that considers this issue to be resolved is the one from Brussels where there is an adequately strict and well-financed regulation for the construction sector: his only concern is whether the new government will continue this regulation after elections (so his response may be added to the two about uncertainty). Weakness of the general energy policy is seen as a crucial hindrance in the dissemination of highly energy efficient housing with RES by 9 out of 14 respondents. 11 respondents describe this missing link as a major barrier.

More specifically as to **integrated regional action programmes**, 7 respondents indicate there is none in their region, 5 of them indicate there is one coming (as Success model, a PassREg Activity or as a SEAP in CoM's¹⁴), 3 indicate it is inadequate for implementing NZEB with PH standard, 4 are positive or report 'no missing link' in this context. One respondent (FR) states that, given the current process of lowering the high-energy requirements, a review to intensify the regional activities possibly is needed.

¹⁴ CoM = Cities of Majors

An action program or better implementation of it is considered crucial for the stimulation of PH with RES by 3 respondents (2 relate to major barrier), and considered of certain importance (at this stage) by 6 others.

As to **regulations** in the field of construction, the (mostly nationally formulated) prescriptions for energy efficiency or renewable energy, again, are considered to be too lenient. Even though seen as a legal basis for the development of NZEB with PH standards as they do not evoke NZEB but also do not particularly hinder the introduction. One respondent states that accepted national energy-tools (and related regulations) are not compatible to PHPP and Passive house standard.

The absence of clear characteristics of the NZEB category, the absence of PH standard with RES in NZEB-regulations and the absence of clear demands of high-energy retrofit has been declared as problematical. One respondent states the problem that regulations on energy efficiency exist separate from regulations on RES.

Of the respondents 9 indicate that the prescribed levels will not be effective to lead to the 'greening' of the housing stock in their region. 1 responds that mandatory regulations for EPBD including NZEB standards will be introduced soon, 3 respond that regulations supporting NZEB need to be finalized/optimized: additions are needed on quality of ventilation; on monitoring results after construction; and on the integration of NZEB regulations into urban planning. For 1 respondent, FR, the prescribed standard is no problem. Altogether, 5 respondents consider improvements of construction regulations of some importance and 6 others crucial to the regional success of PH with RES; 3 describe major barriers linked to the regulatory framework.

Specifically to **incentives and funds** on highly energy efficient buildings with RES, 9 respondents indicate these are missing in their region. 3 indicates such incentives are available but do not function optimally (support is too little; procedures too complicated; scope should be enlarged to types of buildings other than residential ones and to retrofiting; existing fund should cover whole region). 1 respondent (FR) is satisfied with the present incentive scheme.

11 respondents see this item as a more or less crucial factor for the large-scale introduction of PH standard with RES. 10 responds call it a major barrier (1 FR considers this as a major barrier but has solved it). For 1 respondent these specific incentives are no priority due to the fact that a well functioning funding scheme was introduced to bring about higher standards – although not targeting NZEB or highly energy efficient retrofit standards. This aspect is not explicitly mentioned but may well show up in other regions where a kind of funding system for retrofiting is introduced.

2 respondents emphasize that public financial support should address not only construction itself but also related fields such as training to make the actual realisation of PH with RES possible.

Tax remissions constitute a financial incentive that may be particularly easy or attractive. Of the 6 respondents to whom this is a crucial matter, 5 are from Aspiring regions and 1 is from a Frontrunner Region. The 6 prize this stimulation instrument because 1) it can pertain to many types of tax, including local taxes, 2) it is implemented for other desired activities already, 3) it might be an easy starting point as it just reduces government income without causing government spending, 5) it has proven effective in other applications, and 6) it can reach private home owners who cannot benefit from assistance schemes for public housing. Two respondents perceive major barriers if this means of stimulation remains under-used. In 2 regions lowering taxes would not be an effective measure because taxes are low already. One respondent remarks that tax remissions are hard to handle because it creates more work for the administration. For one respondent the unsteadiness (unpredictable duration) of tax measures appears problematic. To speed up the introduction of highly

energy efficient refurbishment the lowering of income tax of private building owners is considered as a useful measure.

3.3. Missing links in “Business case & financing”

This section deals with financial factors such as investment tools considering the energy consumption and running costs, construction contracts with the resulting energy performance of the building specified, property valuation considering the benefits of high level energy-efficiency, rental contracts including heating and tendering. Generally, respondents in the aspiring regions don't know how to start with these practices while those in the frontrunner regions consider the present use too little.

Long-term investment models such as **Lifecycle analysis** are not familiar in practice to 8 respondents and are known but little used according to 3 respondents. Reasons presented for limited interest in them include 1) that in the present economic crisis contractors cannot afford to consider the long term; 2) that at the moment energy is relatively too cheap to make long term investments interesting enough; 3) that given the lack of regional examples of buildings with very low energy bills few are willing to commit contractually to a success in that regard; and 4) that these analyses are labour intensive.

High expectations regarding this type of analysis is apparent from the 7 respondents who call this factor crucial for the success of NZEB with energy efficient construction and from 5 others calling it important. Main barriers were signaled on the question of long term investments in 6 regions.

Construction contracts or loans that include stipulations on energy performance are not in use in the region of 6 respondents and are just beginning to be used in the regions of 4. The standard reasons regarding assurance of quality and energy performance. According to respondents from regions where the use of these types of contracts is beginning, initial applications might concern equipment only (e.g. indoor climate control installations), or non-residential buildings (e.g. service structures in stead of residential buildings) or that the introduction may be the doing of a particular bank (e.g. “green” loans for larger amounts when proof of strict energy standards is available). Indeed, one of the reasons given for the slow dissemination of these loans in particular is that they are not in line with traditional national banking practices. Some interest in these contracts and loans is apparent from the 5 respondents who call these energy-based contracts and loans a crucial factor and the 5 respondents who call them important.

Property valuation taking the advantages of the energy performance of PH with RES into account is not common according to 8 respondents and is beginning according to 5. Eight respondents report that there is practical no market for PH buildings with RES and potential buyers would not be aware of advantages and the implicit extra value of highly energy efficient houses. One respondent calls for research in his region as to how much home buyers or prospective renters are willing to pay more for a low energy building: the valuation of homes depends on much more than their energy aspect.

Two respondents from more experienced regions comment that the extra value assigned is not enough to make up for the extra initial costs of developing low energy buildings. The higher initial costs make Passive House standard impossible for social housing handling limited rents. However, another respondent claims in response to another question that housing corporations cannot leave out renters' energy costs in their planning if they want to make affordable living possible in the future.

In all, 5 respondents call energy considerate valuation crucial and 4 call it important.

Rental contracts including heating/cooling are not known in practice to 9 respondents and are known only as an exceptional practice to 4 others, amongst them 2 of the 3 frontrunner regions who do not consider this as a missing link. In one region rental contracts including heating/cooling seems to be daily practice, regardless energy efficiency. Two respondents consider the actual legislation around the limits of social rents a hindrance to make highly energy efficient social houses accessible for tenants. Rental contracts including heating/cooling costs are deemed crucial by one respondent and important by 3. One respondent (FR) considers the problem with the outdated renting system with limited rents for social housing as a major barrier.

Tendering in a manner that includes energy performance comes close to DBFM¹⁵ tendering. Of the respondents 6 have no experience with this and 3 do. Reasons that are mentioned for it not being used include 1) the absence of legal definition in this country of NZEB; 2) the uncertainty about the average energy performance and related data; 3) uncertainty whether expected energy savings will materialize. Although no respondent explicitly states that without tendering the large scale introduction of NZEB will be facing hindrance, the introduction of this type of tendering is seen as crucial by 2 respondents and as important by 6.

3.4. Missing links in “Knowledge”

This section of the questionnaire deals with examples of successful applications of renewable energy supply in Passive houses, local adjustment of standards, service installations, design tools, integrated design and available consultation.

As the frontrunner regions are likely to have more experience with these matters than the aspiring regions, the answers of these two groups will be discussed separately under each question.

The first question of this sections deals with **successful applications of renewable energy supply in Passive houses**, possibly generated on site, in passive houses or other NZEBs. Of the 10 respondents from AR's 8 are, and 2 are not, familiar with examples of this in their region. At the same time 3 of them say there are regionally accessible sources of information on these examples and 7 say there is no information on the use of this type of energy in that setting. Of the respondents from the FR's, the majority are familiar with examples but at least half is not satisfied with the information available on these. Points of attention that are mentioned regarding renewable energy include the need to bridge the gaps between the time and place of generation and those of use of the energy, and opportunities of the electric grid in that respect, and the present subsidies for electricity in some countries that make renewable energy stand out as more expensive there. Only one respondent considers this matter crucial, calling for both more technical information (e.g. on smart grids) and more legal information (e.g. on heat networks). Of all 13 other respondents, 6 attach some importance to this matter.

The second question deals with the **adaptation of energy efficient design principles to local (climate) conditions**. Think in this regard of the climate differences between northern and southern Europe. Of the 10 aspiring regions 3 indicate such adjustments, 2 report the beginning of efforts in that direction and 5 don't know of any such adaptations. This may have to do with either the presence of particular local design elements or with the dissemination of information about them. Of the advanced regions the majority indicate they do have accessible regional information on adaptation examples. None of the 14 respondents calls this matter crucial, while 4 respondents attach some importance to it.

¹⁵ Under DBFM, bids are requested for designing, building, financing and maintaining a particular structure for a particular period all together in one bid.

Third is a question about **solutions for building services in very low energy buildings with RES**. Half of the respondents from aspiring regions say they know of solutions in this regard and half say they don't. Meanwhile, 4 of the 10 of them indicate there is accessible regional information on this and 6 indicate omissions in this respect. The respondent who knows of solutions but not of useful information about them states that the available information is tailored to designers and operators only, that this is not enough and that it is not easy to disseminate. A respondent who is positive about both solutions and information still points out that quality assurance procedures are missing in this context, especially with respect to ventilation systems. A respondent who reports no solutions and no relevant information in his region claims that passive houses are so well insulated that they need less of these costly service machines. This matter of good solutions on adapted building service installations is considered crucial by 2 of the 14 respondents and of some importance by 5.

Next is the question about **suitable planning and design tools for PH with RES**. Only 4 of the 14 respondents say without reserve that these are available; 3 from the frontrunner regions and 1 from the aspiring regions (this one is within 50 km from a frontrunner region). By contrast, 6 of the 10 respondents from aspiring regions say these tools are beginning to be available and the 3 remaining ones say these are missing. Of all 14 respondents 3 consider lack of these tools crucial and 5 others attach some importance to this matter. The following question deals with integral, integrated or cohesive design. Among the 10 aspiring regions this runs about 50-50: 4 respondents indicate this is or is near common practice, 1 indicates beginnings of this but 5 indicate it is not usual at all. Asked about its importance when this matter is brought up, 3 call it crucial and 4 other respondents call it somewhat important. When asked, in another part of the questionnaire, to list the three top barriers in furthering the practice of very energy efficient construction, 2 respondents list this specific matter. One of these is from an aspiring region, and points out that different fields and different construction phases are not brought in harmony. The other is from a frontrunner region and notes that a particular case where an integral approach was applied showed excellent results.

The last question of this section concerns **streamlined consulting schemes** for private owners and/or investors. Of the 4 respondents from frontrunner regions the majority report that these are available, but from the 10 aspiring regions only 1 says so. From the aspiring regions another 6 indicate that this practice is beginning, but 3 indicate this is not available. Some of these concern situations where there is little private ownership of real estate. Only 1 respondent calls this matter crucial: she is from an aspiring region and notes that early attempts may be limited 1) in range of improvements that are covered, 2) in extent to which quality control is included and 3) in geographic region of availability.

3.5. Missing links in "Capacity building"

This section of the questionnaire deals with capacity building for the effort to make energy efficient construction and renovation more commonplace. To bring about a transition from conventional to very energy efficient construction a strategy is called for involving communication with various target groups. Asked whether such a broad **dissemination strategy** has been formulated for their region, only 2 out of the 14 respondents say this is in place. Another 4 say a strategy is beginning to be formed, 6 say there is none, 1 acknowledges a strategy but calls it a failure and 1 gave no clear answer. When the issue of a clear strategy is brought up in this question, 3 respondents call it crucial and 6 attach a lesser but still significant importance to it. When asking in another question for the six worst barriers to general acceptance of energy efficient construction, 4 respondents mention the dissemination strategy specifically. The story of the failed strategy

comes from a respondent who also considers this item a major barrier: in his frontrunner region a group of construction workers that have few career perspectives had not been targeted within the strategy, and their representatives now lobby against the entire concept of energy efficient construction.

More specifically as to **training according to the principles of PH with RES**, this is said to be adequate by 3 respondents (1 from an aspiring region and 2 from frontrunner regions). In addition 10 respondents say this is beginning (9 from aspiring regions and 1 from a front runner region), and 1 gave no clear answer. Training is called crucial according to 3 out of 13 clear responses and somewhat important according to another 6. Even of the two respondents who think the training issue is resolved (i.e. of no further importance), one considers it a major barrier: this is the city where the utility companies were made to pay for special courses in design schools and craft training centres, but the demand for these courses has remained high for years on end. When the same respondents are asked to list the six most important barriers to furthering energy efficient construction, the matter of training is mentioned by as many as 9 respondents.

Focussing on **informing political decision makers and other public officials**, sufficient information material on energy conserving construction is available for this target group according to 4 respondents (1 from an aspiring region and 3 from frontrunner regions). There is some material for decision makers but it is not sufficient according to 5 respondents (all aspiring) and there is none according to 4 (also aspiring, one front runner region gave no clear answer). When asked about the information for this target group, it is considered crucial by 4 respondents, somewhat important by 5, a resolved issue by 3 (all of front runner regions) and of no importance yet by 1 (an early aspiring region). When asked to list six key barriers to the dissemination of energy efficient construction, 4 respondents point to this matter as a major barrier. One of these 4 notes that political and professional administrators need not just information but also items that will make them interested in matters of climate, cost and construction in the first place.

Information and educational material on energy efficient construction aimed at **public housing authorities and managers/owners of other public buildings** is sufficient according to 4 responses (2 from aspiring and 2 from frontrunner regions) out of 13 clear responses. Another 5 report inadequacies in this type of information (4 from aspiring regions and 1 from a front runner region) and 3 report its absence (all from aspiring regions). One of the respondents who signalled an inadequacy in this regard does consider specific information on public buildings crucial. A lesser but still significant importance is attached to this matter by 3 others (2 reporting inadequacies and 1 reporting none, all from aspiring regions). For only 2 respondents this matter is no problem i.e. of no importance now (both from frontrunner regions). In response to a question about the top barriers in making energy efficient structures more common, one respondent from an aspiring region and one from a frontrunner region point specifically to this type of information.

Information and educational material on energy efficient construction aimed at **private owners/investors** is sufficient according to only 2 responses (both from frontrunner regions) out of 13 clear responses. Another 4 report inadequacies in this type of information (3 from aspiring and 1 from a front runner region) and 7 report its absence (all from aspiring regions). The respondent from one region where no material for investors is available notes that in its absence, all sorts of rumours about passive or energy efficient construction go unchecked and place it in a negative light. Furthermore, one of the respondents who signalled an inadequacy in this regard does consider information for investors crucial (in his aspiring region). A lesser but still significant importance is attached to this matter by 7 others (all from aspiring regions). Only 2 respondents attach no importance to this matter on account

of the fact that they consider this matter completely resolved (both from frontrunner regions). In response to a question about the top barriers in making energy efficient structures more common, 2 respondents point specifically to this type of information (1 from an aspiring region and 1 from a frontrunner region). The one from a frontrunner region is concerned that the focus of investors in construction used to be on low costs, while energy efficient structures require rigorous quality control during and after their assembly or improvement. Information and educational material on energy efficient construction aimed at building certifiers is sufficient according to 3 responses (all from frontrunner regions) out of 13 clear responses. Another 3 report inadequacies in this type of information (from aspiring regions) and 3 report its absence (again, all aspiring regions). One of the respondents who signalled its absence and one who signalled an inadequacy in this regard do consider information for certifiers crucial. A lesser but still significant importance is attached to this matter by 2 others (1 reporting inadequacies and 1 reporting none, all from aspiring regions). For the 3 respondents indicating sufficient information of this kind this matter requires no further attention i.e. is not important. In response to a question about the top barriers in making energy efficient structures more common, none of the respondents point specifically to this type of information.

The next question is about information for the **manufacturing industry**, i.e. firms that produce construction parts and materials. Information on energy efficient construction aimed at this target group is sufficient according to 5 responses (2 from aspiring and 3 from frontrunner regions) out of 13 clear responses. Another 2 report inadequacies in this type of information (both from aspiring regions) and 8 report its absence (all from aspiring regions). Some importance is attached to this matter, without calling it crucial, by 6 respondents (all from aspiring regions). For only 4 respondents this matter is no problem i.e. of no importance (1 from an aspiring region and 3 from frontrunner regions). In response to a question about the top barriers in making energy efficient structures more common, none of the respondents point specifically to this type of information.

The following question is about **information for the building industry**, i.e. firms that construct new or renovate old buildings. Information on energy efficient construction aimed at this target group is sufficient according to only 3 responses (1 from aspiring and 2 from frontrunner regions) out of 13 clear responses. Another 6 report inadequacies in this type of information (5 from aspiring regions, 1 from a frontrunner region) and 4 report its absence (all in aspiring regions). The matter is called crucial by 3 respondents and given a lesser but still significant importance by 5 respondents (4 from aspiring regions and 1 from a frontrunner region). For only 3 respondents this matter is no problem i.e. of no importance (1 from an aspiring region and 2 from frontrunner regions). In response to a question about the top barriers in making energy efficient structures more common, 4 of the respondents point specifically to this type of information. Oddly, these are not the ones who call information for the building industry crucial. One of them notes that relevant courses are available from only one organisation (one location?) in their country. Another points out that separate representations of foreign companies are not enough. Still another notes that without an adequately trained work force, investors will shy away from this novel way of building. And the fourth one tries to indicate the volume of (re)training that must be done to get the whole industry to switch. In another interesting answer, one of the aspiring regions points out that merely educational material will not do but that a complete educational infrastructure will be required.

Finally, information on energy efficient construction aimed at designers is sufficient according to only 4 responses (2 from aspiring and 2 from frontrunner regions) out of 13 clear responses. Another 6 report inadequacies in this type of information (5 from aspiring regions and 1 from a forerunner region) and 3 report its absence (all from aspiring regions). Of the

aspiring regions, 3 call this matter crucial (none from the frontrunner regions do). Some importance is attached to this matter, without calling it crucial, by 5 respondents (4 from aspiring regions and 1 from a forerunner region). For only 1 respondent this matter is no problem i.e. of no importance (from a frontrunner region). 3 respondents pointed major barriers specifically to information for this target group. One of these characterises modern education for architects as oriented to the arts instead of to building physics. Another one calls for materials that are particularly clear and attractive. And the third one now has to get all information of this kind from a neighbouring country with the same language but with different regulations.

3.6. Missing links in “Applied products”

This section of the questionnaire focuses on products that are used in the construction or renovation of highly energy efficient buildings. Because the market for such products is more developed in frontrunner regions than in aspiring regions, these two types of region are separated out in this discussion.

The first question of the section is whether there are **local products available, suitable for use in PH with RES**. Of the 10 respondents from aspiring regions only 1 says that there are: his region is about 50 km away from a frontrunner region. All 3 of the frontrunner regions that submitted answers also say that local products are available. None of the respondents consider this matter crucial, but 5 do attach some importance to it. All of these are from aspiring regions. Meanwhile, when asked to list barriers to the promotion of energy efficient construction, 4 of these respondents do include the issue of local products (again, all from aspiring regions). When even a region where at present the very first energy efficient buildings are being erected calls this a major barrier, they don't shy away from looking into the future.

The second question deals with **incentives for industries to increase the number of suitable products** from the region. Clearly, the answer is that there are none in the 10 aspiring regions while there are in the 3 responding frontrunner regions. None of the 13 respondents calls this matter crucial, while 4 respondents attach some importance to it (all from aspiring regions). Incentives for local industries do not come up when asked about major barriers to make energy efficient building commonplace.

3.7. Missing links in “PR and marketing”

This section deals with strategic communication regarding Passive Houses with renewable energy supply.

9 respondents report there is a communication strategy developed, in 3 regions yet no strategic communication takes place at all. To 2 of the 3 respondents from FR's communication strategy or initiatives to improve visibility are no issue.

Optimization of the strategy is needed in several cases, but foremost the successful execution of such plans with target group specific campaigns. 7 respondents consider strategically raising of awareness, addressing prejudice and misunderstandings, convincing investors and creating market for NZEB using high-energy standards as a more or less crucial matter. As this question relates 7! times to major barrier strategic communication has to be understood as a major enabling factor.

As to **visibility of Passive house with RES**, many respondents from aspiring regions suggest events on the building site of convincing beacon projects. Also networking and target group specific approach, direct communication with stakeholders to large-scale events, media attention (e.g. national TV) or an instructional film belong to the suggestions.

6 respondents consider visibility a more or less crucial matter, 5 responses are related to actual major barriers.

3.8. Missing links in “Quality assurance”

Because the questionnaire was not clear about it some of the respondents got confused between the assurance of traditional standards and that of PH standards. In general, no PH specific **infrastructure of quality assurance** with certification, assistance, monitoring as present in FR's is available in AR's, except for 2 respondents. The matter of quality assurance is seen as a national matter in some cases. A general infrastructure for quality assurance of buildings is available following 10 respondents. 4 respondents explicitly state that they are not applicable to PH-standard and RES.

2 respondents from FR's declare that the infrastructure of quality assurance needs to be improved. 2 respondents emphasize that there is a lack of verification after construction is completed and call for better (standard) monitoring.

The existence of a well functioning infrastructure for quality assurance is regarded as somewhat important by 2 respondents and as crucial by 2. This question is 4 times linked to major barriers.

8 respondents report insufficient **availability of solutions for quality assurance** in their regions. Educated designers, construction workers and certifiers, criteria sets, descriptions and procedures, monitoring after construction but also effective regulations are required. 4 respondents state that there is a need to improve the functioning quality assurance, e.g. the procedures of quality control and certification itself, extension of the quality criteria sets with performance criteria for smart grids, heat supply networks and retrofit. 2 respondents criticize the absence of regulations requiring quality assurance: without regulation Passive house certification is seen as a costly burden and therefore not common - even though in both regions all ingredients for a good quality assurance are available.

As to **quality monitoring**, most respondents indicate that this is not common. Exceptions are the city of Zagreb, where the local authority is statutorily obliged to monitor energy consumption and RES performance in public buildings and the FR's. However, many respondents indicate monitoring of some PH (beacon-) projects will be/have been carried out.

4 respondents attach some importance to this matter, the most important reason given is that showing good results of PH technology and RES helps building investor's confidence and surmounting prejudices. 1 respondent sees the monitoring energy performance of subsidized projects as a necessity to sensible use of public money.

Monitoring issues are related to the major barriers of 2 respondents (both from FR's).

As to **including quality requirements in PassREg contracts**, most respondents support the idea but indicate that this is not common practice at present. Exceptions are Burgas where a certificate will be required and Zagreb where a level of energy performance is prescribed. None of the respondents attach special importance to this matter.

4. MAIN OUTCOME

4.1. Overview of missing links in the participating regions

As a comparative picture and overview of the missing links in the participating regions a chart has been added in the Appendix.

4.1. List of generalized missing links

Following the analysis of the responses to the questionnaire **missing links at all the considered aspects can be determined**, although some are considered as more crucial/important at the stage of transition process in the respective region than others. We have ranked them according to the rates of urgency/importance imputed by the respondents.

General missing links are related to:

Average Theme:
Rate:

1.1.1.	Policy on energy efficiency and renewable energy supply
1.2.1.	Investment - and decision models (Lifecycle costs- and/or dbfm-method)
1.1.3.	Regulations demanding/supporting high standard of energy performance/quality
1.1.4.	Incentives/funds supporting a high standard of energy-efficiency in buildings
1.2.3.	Higher valuation of nearly zero energy standard or renewable energy supply
1.7.2.	PassReg-solutions for quality assurance
1.1.5.	Tax-remission related to guaranteed nearly zero energy performance
1.4.1.	Dissemination-strategy of PassREg-knowledge
1.4.2.	Training according to PassREg-principles
1.4.3.	Information/educational material for political decision makers/public service
1.6.1.	Communication model (communication strategy)
1.1.2.	Integral strategic PassREg development program
1.3.1.	Best practice examples of renewable energy supplies in Passive house(-neighbourhood)s
1.4.8.	Information/educational material for the building industry
1.4.9.	Information/educational material for designers
1.2.2.	Financial arrangements/contracts based on guaranteed nearly zero energy performance
1.4.5.	Sufficient information/educational material for private investors
1.2.5.	Integral/functional tendering / tendering based upon dbfm-method
1.3.3.	Specific PassREg-solutions for building services
1.3.4.	Suitable PassReg-solutions for planning and design (tools and aids)
1.3.5.	Integral approach
1.3.6.	Streamlined PassREg-consulting scheme
1.6.2.	Visibility of PassREg-strategies
1.7.1.	Infrastructure for the quality assurance
1.7.3.	Monitoring of the quality of PH-projects with RES
1.2.4.	Rental and leasing contracts including heating/cooling costs
1.4.4.	Information/educational material for public building owners
1.4.6.	Sufficient information/educational material for building certifiers
1.3.2.	Information about/examples of adaptation to climate and other local conditions
1.4.7.	Information/educational material for the manufacturing industry
1.5.1.	Local products for Passive houses with RES
1.5.2.	Incentives for the engagement of local industry
1.7.4.	Contracts including requirements of the quality performance

According to the additional input of the respondents the following additional themes seemed to be seen as general missing links also:

- (Growing) market volumes
- Economical stimulation
- Introduction of ESCO market into the field of PH with RES
- Limits on Passive house certification strategy (costly procedure, relation to policy/regulations dealing with projects/conditions/utilization where Passive house standards are not economical)
- Joining RES with prior energy-efficient measures in policy

APPENDIX 2: Solutions from AR's

Outcome of WP4-workshop "Solutions from AR's"

Innsbruck, oktober 11th 2013



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








: solution is chosen by another AR to implement





rate	Solutions: (considered as "very important" by submitting partners)	Submitted by															
		Submitted by	Chosen by	LEIF	DNA	Burgas Mun.	Nobatek	Polimi	Zagreb	PHP	Eneffect/Gabrovo	BRE	Cesena	PHI	PMP	ProKlima	IG PH Tiro
	Products locally																
	An innovative heat recovery system	Polimi															
	Communication																
	Exhibition "AGB Passive House Projects" and Guided tours including detailed explanations	PHI															
	Sohienhof Abende	PHI															
	Booklet: Praxiswissen Passivhaus (practical knowledge Passive House)	PHI															
	Beacon Project: Nieuw Zuid	PHP															
	Beacon Project: GWLO	DNA															
5	Meet the buyer / awareness raising events	BRE															
	Businesscase & finance																
	Italian crisis results in increasing request for Label A status buildings	Polimi															
	Elementary school in Torre del moro, enlargement of the elementary school in pievesistina, Kindergarten in Martorano, Techno-pole university of Bologna	Cesena															
1	Local authorities set higher development standards of their land. + using FIT (feed in Tariff) payments to subsidise low energy measures for housing.	BRE															
1	Guide to performance contracting with ESCO	PHI															
	PPP for new buildings but also for retrofit daycare centre	Proklima															
2	Pro & cons of guaranteed Energy saving vs. Hared savings Performance contracts	PHI															
2	overview of costs, energy costs for heating / cooling included by regulations	Zagreb															
	Justifying NZEB on the basis of lifecycle costs	BRE															
1	Roghorst	DNA															
	Policy																
	Passive house act of the city of Frankfurt	PHI															
	All municipal buildings will follow the passive house standard	PHI															
	Climate change financial instrument CCFI co-financed projects	LEIF															
3	De stroomversnelling	DNA															
	KfW loans for energy efficient buildings	PHI															
	Quality																
	ZAG EE project	Zagreb															
	Knowlegde																
	Adaptation to mediteranean climate	Polimi															
	PHP Ecohuis KampCare are organizing providing knowledge, information, training in Antwerp	PHP															
1	Training of professionals	Proklima															
	Training courses starting from beacons activities (e.g. In Sicily region)	Polimi															
	Some PHPP calculations to investigate energy performance impact of design solution	PHP															
	Woningborg certificationstrategy, quality-assurance PHPP	DNA															
	Training course for passive house contractors	PHI															
3	Other events at local level (lab, meetings, public events, communication strategy with involvement of all actors)	Cesena															
1	Consulting regarding Passive /house Certification	PHI															
	Education & information																
2	Saxion brochures and flyers	DNA															
1	passivhaus tradesperson course	BRE															
1	innovation development for highly energy- efficient housing	DNA															
	Research institutes	Cesena															
	Training institution - high school of architecture, constructions and geodey, maybe the B free University	Burgas Mun.															
1	sustainable building facilitator network	Brussels															
	Implementation of EE Knowledge in universities & engineering shoos	?															

APPENDIX 2: List of missing links






1.1. Regulation & Political agenda




1.1.1. Policy on energy efficiency and renewable energy supply


		Rate ¹
eERG-Polimi:	Targets of national and local policy on energy efficiency are less ambitious than Passive house standard with RES. A quantitative NZEB definition is missing in Italy.	 M²
Cesena:	Policies on energy efficiency are not geared to the construction of Passive houses with RES. Instead they focus on energy improvement of existing buildings and on renewable energy sources without taking the potential of energy saving into consideration. This is also due to the fact that in Italy technical standards for NZEB have not been defined yet.	 M
PHP:	Municipalities (for example Antwerp and Ghent) and provinces (for example Province of Antwerp) use Passive house standards for their own buildings and as an element in some architectural contests. However Flemish policy does not allow local governments to impose their own criteria, i.e. the Passive house standard, for building permits. To support the pioneering role of the cities, the Flemish government has defined a strictly prescribed set of E- and K-levels for local governments to use in new neighbourhoods where more ambitious energy requirements can be desirable. The local governments have to stick to these criteria. (see for this regulation: http://www.ejustice.just.fgov.be/mopdf/2014/01/28_1.pdf#Page35) In general, specific energy requirements for various types of passive renovations are still missing. Passive houses, in turn, are not yet including the large untapped potential for RES in buildings, energy flexible buildings and renovations of monumental buildings.	
Nobatek:	Recently in 2012 the French national government and the Aquitaine Region have approved a Regional Plan for Climate, Air and Energy (SRCAE). Moreover, the national regulation concerning the energy performance of buildings (<i>Réglementation Thermique, RT</i>) has been thoroughly improved recently. It aims at highly energy efficient buildings by prescribing certain means (construction methods) and certain results (to be checked with regulatory computation tools). Most of the efforts in the building construction sector focus on the respect for and anticipation of implementation of this new national regulation. Thus, it is difficult for regional authorities to propose incentives for NZEB or anything that goes beyond the recent national law. Demonstrations of the advantages of NZEB compared to buildings consistent with the new <i>Réglementation Thermique</i> are still missing. They may help to get more demanding regional policies adopted in Aquitaine.	 M
LEIF:	The targets for the Latvian energy policy scenario related to renewable energy sources and energy efficiency until 2030:	 M

¹ Rate:  = considered as an crucial/urgent problem
 = considered as less crucial/urgent problem
 = not crucial/urgent
 = not present/solved











² M = this missing link correspond with at least one major barrier as described by the respondents




	<ul style="list-style-type: none"> - to ensure 50% of RES in gross final energy consumption; - to reduce energy and energy sources imported from current third-country suppliers by 50%; <p>This should reduce the average heat energy consumption for heating in buildings down up to 100 kWh/m²a.</p> <p>There is no action plan for Passive house or NZEB development in municipalities. This should be integrated in SEAPS.</p> <p>The laws and regulations adopted so far in the Republic of Latvia, in the field of NZEB and energy efficiency neither determine nor provide for standards for Passive houses with RES; however, they do form the legal basis for further measures.</p>	
Eneffect:	<p>There is no specific Bulgarian energy efficiency strategy; energy efficiency is part of the general energy strategy in the country. In the Energy strategy, energy efficiency in buildings (supported by RES) is not regarded as a key issue. Instead the focus is on security of energy supply and production of electricity. We think an energy efficiency strategy, if and when adopted, should focus on the large untapped potential for energy efficiency in buildings.</p>	 M
Burgas:	<p>There is no policy supporting Passive house projects with RES. See also at the answer of Eneffect above.</p>	 M
Zagreb:	<ol style="list-style-type: none"> 1. City of Zagreb is one of the first capitals that has signed the CoM initiative in 2009 and took on the obligation of reducing the CO₂ emissions by 20% by 2020. Moreover, it developed a Sustainable Energy Action Plan for the city of Zagreb. In this plan, the building sector is recognized to have a big potential for achieving energy savings. However, there are no incentives or specific measures being implemented related to passive and low energy buildings. 2. At present regional decision makers are not interested in setting higher targets for refurbishment projects. 3. The national policy for implementing legislation is not in line with the objectives set in relation to the NZEB in 2020. 	 M
BRE:	<p>While previously policy support for NZEBs was strong in Wales, the priority has now changed and there is not a drive to achieve NZEBs ahead of the EPBD deadline. There also seems to be concern (led by mainstream homebuilders) that it is not affordable to deliver a very low energy fabric first approach, hence policy (at UK level as well as Wales) now seems to be looking for wider 'allowable solutions' (off site renewables etc.) as an option for delivering overall zero carbon buildings. In the longer term, the cost of delivering such allowable solutions may not actually be cheaper than delivering a strong fabric first approach. However, the policy is likely to allow various 'options' for achieving NZEB so as not to restrict choices for developers. Current policy was therefore not a strong driver for the beacon projects in Wales.</p>	 M
DNA:	<ol style="list-style-type: none"> 1. National and regional policy are not yet aimed at highly energy efficient buildings combined with adequate renewable energy supply. NZEB's will not be required before 2020 according to the concerning national agenda, called Lente-akkoord (http://www.lente-akkoord.nl/wp-content/uploads/2009/04/Convenant-Energiebesparing-in-nieuwbouw.pdf) 2. Main focus of policy is on encouraging RES and more efficient heat supply. This policy leaves the potential of energy-reduction out of 	 M

	consideration, while energy-reduction should be prior and certainly should be integrated.	
PMP:	<p>Political progress will depend on the outcome of elections and there is no guarantee that political achievements will remain in place under a changed political power. E.g. the election of June 2014 will cause the departure after 10 years (2 mandates) of the current minister. She got the current laws approved. But a number of representatives remain opposed to passive buildings. They now campaign for candidates that are not sensitive or less sensitive to the energy question. Their purpose: try to repeal the law after the election.</p> <p>Hence PMP is planning targeted communication with the professionals of various bodies towards their fellow professionals in these same bodies. In addition PMP plans mass communications via TV, radio and clips like "Finally, I visited a passive house".</p>	 M
ProKlima:	<p>City of Hannover and Region of Hannover focus on Passive houses with renewables (NZEB) in their sphere of influence (public buildings, preferences when they selling land, etc.) The gap between national regulations (qualities a project must have by energy laws) and regional goals (qualities a project should have for environmental purposes) often lead to discussions with investors – as higher investment costs are a crucial barrier.</p>	
Tyrol:	<p>Some of the main stakeholders achieve success lobbying against the present ambitious targets of energy efficiency in buildings. The motives are diverse, e.g.:</p> <ul style="list-style-type: none"> • The chamber of commerce/building sector is complaining about targets in energy efficiency being too high, causing higher construction costs [and, thus, fewer construction projects]. • The brick, cement, ceramics and stone sector has been losing market share to timber construction systems for years. Energy efficient standards seem to be easier to handle in timber constructions; timber craftspeople are better educated, skilled and more used to higher quality standards than bricklayers. (See: http://www.diebauzeitung.at/neue-denkansatze-gefordert-111363.html) • Architects and engineers are confronted with rising costs of additional training for their employees to compensate lack in specific education at schools and universities. As the education of architects is shifting from engineering to arts, the competence of architects becomes limited to questions of design. But an energy efficient design needs specific knowledge of materials, construction and building physics. This additional training requirement leads to resistance. • In refurbishment often no architect is involved; it is done by engineers and contractors without design competency. This very often leads to a destruction of the aesthetical qualities of the buildings and by consequence to a public disgust of thermal retrofit. (http://www.energiebau.at/index.php/profi/daemmstoff-orgien-das-ist-kultureller-selbstmord/menu-id-27.html) • The chamber of commerce and the Austrian Federation of Limited-profit Housing Associations GBV are cooperating to achieve lower costs and efforts in social housing constructions in response of rising land prices, rising general construction costs and the stagnating 	 M




	incomes of tenants.	
PHI:	The City of Heidelberg: German legislation on “new development areas” allows for free definition of boundary conditions when a new site, classified as “development zone”, is developed. Frankfurt: Translation to English for further dissemination	









1.1.2. Does your region have an integral strategic PassREg development program/regional action plan involving local stakeholders?



		Rate
eERG-Polimi:	There is a success model being developed as part of the PassREg project. It includes capturing the interest of and activities for all building sectors and actors and end users.	
Cesena:	Cesena developed the Success Model (SM), an Action Plan that involves collaboration between the City and local stakeholders. It was developed in accordance with the municipal administration. The implementation of this SM is difficult because the Italian government has not yet defined standards for NZEB or specific requirement regulations.	
PHP:	A regional action plan will be developed as part of the PassREg project in the coming months	
Nobatek:	Passive house standards are more demanding than current French regulation, notably concerning air tightness, but it is very difficult to change the mindset of local policy-makers about this.	
LEIF:	There is a need to develop such an ‘integral strategic PassREg developing program.’	
Eneffect:	The municipal energy efficiency programs required by the government are not well prepared and are implemented only superficially. The level of control by the National Sustainable Energy Agency is unsatisfactory. The SEAPs under the CoM are difficult to prepare (problems with data collection from private sector) and even more difficult to implement. Only a few cities can manage. Nevertheless, local strategic planning is crucial. It requires a strong political will and the understanding that plans are to be executed and not just to fulfil legal requirements.	
Burgas:	No development plan or action plan yet. They will come as part of SEAP of Burgas Municipality.	
Zagreb:	The City of Zagreb has a sustainable Energy Action Plan, a key document for energy efficiency measure implementation on the city level. This plan includes numerous measures related to energy efficiency and RES application in buildings. Moreover, the plan will be reviewed and it will include steps to spread the concept of passive buildings.	
BRE:	An action plan for strategic PassREg rollout for the Beacon regions / Wales will be implemented over the coming months of the project.	
DNA:	Together with stakeholders we put a lot of effort into launching a regional action plan. However, it may take years before sufficient political acceptance is gained.	

PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	<p>Not just in Tirol, Austria and Germany, the construction industry (and especially in the category of brick, cement, stone) aims to dilute the high energy requirements of the EPBD: the current versions in Austria of the Energy Efficiency Act of OIB guidelines prove that the requirements were scaled back again in some areas.</p> <p>An integral strategic PassREg developing program/regional action plan may be a link to a better manifestation. Currently there are regional actions taking place where IG Passivhouse is participating and trying to implement PassREg targets:</p> <p>new EU Project Synfonia http://www.standort-tirol.at/page.cfm?vpath=newsroom/news&genericpageid=38903 Innsbrucker Energieentwicklungsplan http://www.klimafonds.gv.at/assets/Uploads/1JaegerIKB.pdf ÖROKO Innsbruck https://oeroko.innsbruck.gv.at/page.cfm?vpath=microsites/oeroko/oeroko-25</p>	
PHI:	Unknown	





1.1.3. Regulations demanding/supporting high standard of energy performance/quality







		Rate
eERG-Polimi:	<p>National and local regulations generally are less ambitious than the Passive house standard with RES. In many cases, local (municipal or regional) regulations allow Passive house standards as an improvements of the relevant energy regulations. Certainly RES requirements are not linked to energy efficiency regulations.</p> <p>Regulations typically focus on total primary energy consumption limits, while they don't required explicitly energy consumption limits (for heating, cooling, domestic hot water, lighting, electrical uses, ...). Generally regulations don't fix any limits for lighting and other electrical uses.</p>	
Cesena:	<p>1. The present legislative framework doesn't really support interventions in buildings to reach high-levels of energy performance. Moreover, there are no fixed standards by which a building can be placed in the NZEB category yet. At the legislative level some kind of standard is necessary because at the moment neither central government nor the municipality feel compelled to adhere to energy standards that can be reached in Passive Houses. Nevertheless, after Emilia-Romagna's Resolution no. 156/2008 of the Legislative Assembly, there are compulsory criteria and limits for new construction and strong retrofit efforts in Cesena.</p> <p>2. Streamlining and reducing time of the bureaucratic procedures of project approval for NZEB's could encourage their implementation.</p>	 M
PHP:	<p>The Flemish Energy Agency has developed an action plan to promote NZEBs in advance of the EPBD, but the out-roll takes some time. Particularly, the quality of ventilation systems is not regulated yet. Moreover, for renovations there are no standards other than the EPBD</p>	




	while the renovation market is larger than that for newly built homes – particularly in cities.	
Nobatek:	New national regulations include an ambitious objective of energy performance of new buildings and renovation (see previously mentioned <i>Reglementation Thermique</i>). It includes targets in terms of energy performance and means/quality to achieve it. However the definitions adopted are probably not in complete agreement with the definition of NZEB as proposed in the PassREg project. Comparative studies are being carried out on this topic.	
LEIF:	Laws and regulations adopted in 2013 in the field of NZEB and energy efficiency neither describe nor provide standards for Passive Houses. Still, they will form the legal basis for further measures. In Latvia, NZEB is defined on the basis of a maximum energy consumption for providing heat of 30 kWh/m2a, which is twice as much as the Passive House Standard of 15 kWh/m2a.	
Eneffect:	New regulations have to be adopted setting an ambitious national nZEB definition and launching an incentive program requiring high standard of energy performance of new buildings and renovation.	
Burgas:	As the accelerated introduction of low energy buildings is not a priority of the authorities at the time, they delay the introduction of new requirements in design. It is necessary to amend the legal framework, because current standards are not demanding high-energy-efficiency of buildings at all.	
Zagreb:	Croatian legislation specifies energy grade C to be a requirement for refurbishments and new buildings, and it makes energy certification mandatory. However, deciding to go for a passive or low energy standard is optional.	
BRE:	1. There are no policies that give priority to NZEBs over EPBD compliance. Current regulations do not drive a high standard of energy performance. The present Building Regulations in Wales compare designed performance to a theoretical 'target' building deemed to comply with the Regulations. As such, improvements are expressed as % improvement over the target building. It is often confusing to understand which baseline the improvements refer to and hence difficult to assess progress towards zero carbon. England are introducing a Fabric Energy Efficiency Standard metric, similar to the primary energy metric used in Passive House. This will set absolute targets for energy efficiency. At present, Wales do not intend to set such a metric in Regulation. 2. As long as the National Compliance Calculations is required in addition to the PH certification process, the latter is seen as a costly burden.	
DNA:	1. Dutch building regulations should anticipate on the changing building sector. The set standards of energy efficiency where meant as minimal standards while the execution interpret this as maximum. Therefore the actual regulations are a hindrance for the introduction of highly energy efficient buildings. 2. Accepted energy calculation tools and corresponding regulations do not fit with the design of PH with RES. 3. The unclear definition of NZEB makes it hard to distinguish good examples and avoid misconception.	
PMP:	No missing link	

ProKlima:	We think that regulations should combine “theory with practice”. Regulated evaluation of the projects might be helpful, as it would provide a chance to know about missing links and to improve the NZEB process. Monitoring is very important and should be legislated.	
Tyrol:	Energy efficiency targets are still not part of urban/regional planning. At the moment there are some first attempts to implement energy efficiency targets in integral planning in Tyrol: - a new EU Project Synfonia (see: http://www.standort-tirol.at/page.cfm?vpath=newsroom/news&genericpageid=38903) - Innsbrucker Energieentwicklungsplan (see: http://www.klimafonds.gv.at/assets/Uploads/1JaegerIKB.pdf) - ÖROKO Innsbruck (see: https://oeroko.innsbruck.gv.at/page.cfm?vpath=microsites/oeroko/oeroko-25)	
PHI: (Heidelberg)	Decision of the City Council of Heidelberg to sell land for Passive Houses only: This information is given to groups visiting Heidelberg Bahnstadt but is not available online.	

1.1.4. Incentives/funds supporting a high standard of energy-efficiency in buildings




		Rate
eERG-Polimi:	By now in Italy, national and regional mandatory regulations demand lower energy use but no Passive House standards. New regulation is under development for the implementation of EPBD in which standards will be recast for NZEB. This will be proposed by the ministry in June 2014 (on going activity)	 M
Cesena:	1. Jurisdiction doesn't support the realization of buildings with a high-level energy performance. Moreover, it poses no effective restriction as to what can be designated as a so-called NZEB. Thus, the present rules do not support highly energy efficient buildings as Passive House projects with RES. 2. There is a lack of incentives supporting the realization of NZEB: first because there are no fixed standards to place a building in this category, second because the only effective incentive in private sector construction is the tax deduction from 50% to 65% and this extra percentage is granted already when meeting the existing energy requirement.	 M
PHP:	Previously Passive houses were successfully supported by Belgian federal income tax reduction. This federal support measure was eliminated in the last reform of the State: energy became a regional issue. The Flemish Region no longer supports grants for Passive houses and the new frame of reference are the E- and K-level. Grants offered by Flemish energy distribution net managers are now higher for lower E-levels. However, the available grants are relatively low compared to the Brussels Region and clients have to apply in an inconvenient manner via different channels. Lack of public money is also a concern in the renovation of schools and the construction of social housing.	 M
Nobatek:	In France, private companies and households are traditionally reluctant to engage in energy saving measures as long as there are no fiscal incentives. Some incentives for energy efficient buildings are already	 M













	<p>implemented at the national level: e.g. low or zero interest rate loans, tax reductions. Also the implementation of <i>white certificates</i>, aimed at energy providers, have recently encouraged “top-down” energy saving measures from the main energy providers towards their clients (EDF, GDF, Poweo, Altagaz and Direct Energie, among others, are concerned). But all these regulations do not enhance NZEB, partly because they do not work properly in general and partly because they do not target a high standard of energy efficiency.</p>	
LEIF:	<p>1. Shortage of public financing for Passive house building standard; 2. Another factor is the lack of an adequately trained workforce for highly efficient construction with RES in Latvia.</p>	
Eneffect:	<p>1. The existing program for renovations gives an enormous subsidy without much concern for energy performance. We think public money should be granted only for guaranteed energy and CO2 savings. 2. There are no incentive/subsidy program(s) targeting the energy performance of buildings. Consequently there is no support for new “passive” or “low-energy” buildings with RES.</p>	 M
Burgas:	<p>There are no available funds or subsidies to encourage this type of building. Most funds are spent on the renovation of existing buildings in accordance with regulations that fall far short of the "Passive House" standard.</p>	 M
Zagreb:	<p>1. Recently, the Croatian Fund for Environment Protection and Energy Efficiency introduced novel loans to finance new construction or refurbishment projects as well as activities in three basic areas: environmental protection, energy efficiency and the use of renewable energy sources. There is a grant, a zero interest loan and a subsidy for the interest on other loans. Requirement of these incentives is energy efficiency and each building component has to meet a minimum specification. Passive House standard is not mandatory: the requirements are not as demanding as the Passive House standard. 2. Another thing is that a national quota was introduced to limit the number of PV projects that can receive a guaranteed feed in tariff. This is not helping to increase RES.</p>	
BRE:	<p>1. There are no subsidies available in Wales for very low energy buildings with RES. The School Beacon project will receive Feed in Tariff payments towards electricity generated by PV that should cover the investment in the technology in the long run. 2. We do think funding or innovative mechanisms to support Passive House projects and RES are needed. E.g. ‘Green Mortgages’ where owners could borrow more money on the basis that their spending (on running costs) will be lower over time due to NZEB.</p>	 M
DNA:	<p>1. Dutch incentives in the past rarely had an enduring effect on the building sector due to their inconvenience (much paperwork) and (foremost) their unsteadiness (volatility). This can be overcome by intelligent regulation focused on the continuously changing nature of construction. For instance through (financial) support of adequate education and supporting networks/cooperation of stakeholders. 2. We think some financing scheme or fund targeting the extra costs of highly efficient design is necessary to achieve broader adaptation of PH</p>	 M

	with RES.	
PMP:	<p>1. Subsidies are needed to support the more expensive construction of some Batex buildings. On the electricity price charged to the consumer, it was decided that 1.26 % will be redistributed by the electricity suppliers. On some 2.3 billion € of collected invoices, this will yield approximately 28 million €. This is to be used for building Batex buildings (resulting in a 100 € / m² grant) and for some other grants.</p> <p>2. To develop the number of Batex buildings construction firms need to be stimulated to answer to Batex-calls.</p>	 M
ProKlima:	The funding model of ProKlima might be helpful to enhance the region`s implementation of highly energy efficient retrofit/PH with RES (Region of Hannover)	
Tyrol:	<p>1. The Tyrol system of subsidies focuses on residential buildings. Subsidies for other types of buildings (leisure-, sport-, school-, office-, production-, warehouse- and shopping buildings, etc.) could make energy efficient construction and retrofitting with RES more attractive (see: http://www.klimafonds.gv.at/foerderungen/aktuelle-foerderungen/2010/mustersanierungsoffensive-2/)</p> <p>2. Subsidized energy-efficient refurbishment should be better advised and monitored; e.g. in Vorarlberg housing subsidy for thermal refurbishment is combined with a mandatory counselling, working out a most efficient step by step strategy for the specific building. Thus, a most efficient use of the subsidies is guaranteed.</p> <p>3. High construction costs cause much discussion; these costs are mostly caused by a lack of knowledge of energy efficient design on the part of architects/engineers. Financial support for adequate and targeted education would help to overcome this.</p>	 M
PHI:	Unknown	

Comments and discussion:











1.1.5. Tax-remission related to guaranteed nearly zero energy performance




		Rate
eERG-Polimi:	<p>Tax-remissions could be an interesting support tool for Passive houses and NZEB's:</p> <p>remissions could include those of:</p> <ul style="list-style-type: none"> - Taxes for construction of new buildings - Property taxes (possible for both new and existing building) - Services taxes (possible for both new and existing building) - VAT for (re)construction activities <p>This is possible of both national and local (municipal, regional) taxes.</p>	
Cesena:	There is a lack of incentives supporting the realization of NZEB. The only effective incentive in Italy for private sector is the tax deduction from 50% to 65%. This is granted already for meeting just the existing energy requirements, so there is no stimulus to go beyond that level e.g. to the Passive House level.	 M
PHP:	Income tax reduction related to energy and NZEB is reduced since the last State reform (only roof insulation is still eligible for tax reduction). On the other hand, the Flemish region introduced a reduction on real estate tax	 M

	for newly built houses with a low E-level. Renovation gets lower VAT compared to new construction, but this covers all renovations and is not related to any energy requirements.	
Nobatek:	Tax remission on energy performance should be based on reliable simulation models. Incentives also should be based on regulatory calculation tools. However, this is not on the political agenda.	
LEIF:	National legislation does not provide separate tax levies in relation to reconstructed or renovated buildings. However, real estate tax may serve as an instrument to improve energy efficiency of buildings and to foster renewable energy in buildings. (Riga City Council started to develop municipal regulations, which include decreased real estate tax for renovated buildings. There are proposals to apply real estate tax reduction in the amount of 90% to insulated multi-apartment residential buildings. But these are not Passive houses, just renovated old soviet era buildings).	
Eneffect:	Tax remission exists for private buildings. But real estate taxes are comparatively low so the tax-remission is not really a motivation by itself. This is not strong enough to further NZEB projects. Exemption from real estate taxes for a period of 10 years, as is the case, could be augmented by lowering other taxes or fees collected by the municipal administrations, e.g. waste tax.	
Burgas:	There are tax breaks for private buildings, which reach high-energy standards, but there is no tax break for municipal buildings.	
Zagreb:	There are no tax benefits available at the moment. There are some initiatives trying to tackle this issue.	
BRE:	There are no tax breaks related to NZEB for non-residential buildings. While there has been a tax break for 'zero carbon' homes in the UK since 2007, it has not been a significant incentive since the delivery of 'zero carbon' compared to very low energy can be a costly uplift in development cost.	
DNA:	Tax-measures in the Netherlands are limited to renovation and they do not require a high energy-standard. Indeed this measure gives a boost to the renovation sector. A similar boost could be given to the construction industry as a whole, but this regulation does not do so. Also, the limited timeframe of this measure will lower its impact as it comes to an end soon.	
PMP:	No missing link.	
ProKlima:	Refurbishment costs should reduce national income taxes also for private single building owners. This would speed up the renovation process.	
Tyrol:	N.B. Very hard to handle because it requires additional administration.	
PHI/Frankfurt:	Energetic refurbishment could be the basis of a deduction from income tax (full or partly, distributed over x years). If this were applicable also for owner occupied buildings this would be a strong incentive for energetic refurbishment.	
PHI/Heidelberg:	Refurbishment reduces income tax only for dwellings that are rented out.	








1.2. Business case & Financing







1.2.1. Investment - and decision models (Life cycle costs- and/or dbfm-method) supporting sustainable NZEB design and -investment

		Rate
eERG-Polimi:	Sometimes higher initial costs are a retarding factor in decisions for high-energy standards. We miss detailed analyses: owners and people investing in beacon projects just have a general notion that Passive house strategies will yield advantages in the running costs of the building. And this is appreciated also by public owners (e.g. when a municipality builds a public school). But generally NO detailed analysis on life cycle costs or DBFM-method is performed.	 M
Cesena:	LCC-analyses for projects are almost unknown and generally no detailed analysis of lifecycle costs or DBFM-method is performed. There is a lack of knowledge of these analytical methods.	
PHP:	Lifecycle cost analysis for co-generation options is required only when developing heat networks. At present lifecycle costs of construction, especially for smaller buildings, are rarely considered.	 M
Nobatek:	Lifecycle cost is difficult to accept at the time of a crisis such as the present economic one, companies and building owners have short ROI times in mind, energy in France is still cheap and benefit sharing schemes need development. In our beacon project the building owner accepts longer ROI for the sake of image and communication benefits.	 M
LEIF:	In Latvia the Lifecycle concept is at an early stage of understanding and development. Regulations for life cycle costs in energy saving were set by the Ministry of Economic Affairs only recently. They tried to include lifecycle costs for energy saving, but this is still under development.	
Eneffect:	Despite the EPBD requirements, life-cycle cost analysis is not required nor extensively used in practice. Moreover, there is no practice or regulation on “green” procurement for public buildings. We think the current practice for selection of projects on the “lowest price” criteria should be abandoned, life-cycle cost analyses should be obligatory for public buildings and “green” public procurement procedures should be introduced.	
Burgas:	At the moment in Bulgaria life-cycle-cost analysis is not required for public buildings.	
Zagreb:	There is a lack of successful local projects that would encourage investors to go for passive and low energy buildings. Usually it is still considered to be (too) expensive without some support in the form of incentives. During the present hard economic situation it is even harder to prove the benefits. Lifecycle cost analyses would be a possible solution.	
BRE:	There is only little consideration of lifecycle costs at present.	
DNA:	The reduction of life cycle costs is the pivot for (extra) investments in durable design. But the long-term often is not taken into account into the designing buildings; the motivation of developers is typically for short-term profit. Serving the owners/users by methods such as DBFM and life-cycle-cost-approach needs to become common in the building sector. Such methods can be evoked by particular forms of tendering and by intelligent	 M






	financial schemes. Dissemination of information and accessible example-projects are needed.	
PMP:	No missing link	
ProKlima:	ProKlima supports life cycle costs methods (e.g. VDI 2067) to balance cost effectiveness for Passive houses / NZEBs and thereby give reasons to build to high standards. This is still not common for all projects. It is very helpful but also quite labour-intensive.	 M
Tyrol:	Life cycle costs sometimes are taken into consideration when decisions are made about investments. Still, this approach needs to become common practice. As economic feasibility of Passive House design with RES is subject of controversy of different groups of decision makers in Tyrol, a generally respected cost-analyses and monitoring tool and an associated campaign are urgently needed.	 M
PHI:	Unknown	

1.2.2. Financial arrangements/contracts based on guaranteed nearly zero energy performance

		Rate
eERG-Polimi:	There are no contracts based on guaranteed nearly zero energy performance applied in our region. Passive house standards could help on this because they represent a complete system of requirements and limits, with a comprehensive calculation method and tool, and checking procedures (blower door test, etc.).	
Cesena:	As a guarantee of a building's low energy consumption for the future owner, a declaration of NZEB performance should be required. That would make it easier to obtain financing for the purchase of buildings with better energy performance. However, at the moment there are no contracts based on guaranteed energy performance in the region.	
PHP:	The first experiences with ESCO-developments for mostly non-residential projects are coming in. These include almost no experience with Energy Performance Contracting for single-family houses and apartment buildings. Awareness is rising, but the ESCO-market needs to be stimulated first.	
Nobatek:	EPC are still not mainstream in France, and many of them are used for projects involving equipment only. Typically, the performance of the building envelope is not part of the deal.	
LEIF:	There are no contracts based on guaranteed nearly zero energy performance applied in our region in the public sector. Perhaps a few in the private sector. Under CCFI (green investment schemes) there was one tender – “Low energy buildings” – that included energy performance criteria.	
Eneffect:	We think new procedure(s) for financing of projects with guaranteed nearly zero energy performance should be elaborated and generally accepted by the financing institutions (probably at first place by the Bulgarian Energy Efficiency & RES Fund). National subsidy programmes are using Cohesion policy instruments. Programmes of international donor institutions could also use them.	
Burgas:	Usually the financing to increase the energy performance of public	

	buildings is provided by operational programmes and funds. There is no local practice of using a contract that guarantees a certain amount of energy savings after the implementation of a package of energy efficiency measures in public buildings.	
Zagreb:	EPC are still not widely applied in Croatia. There are some ESCO firms but the market still needs to be developed. "Green" bank loans are available.	
BRE:	EPC are still not widely applied in Croatia. There are some ESCO firms but the market still needs to be developed. "Green" bank loans are available.	
DNA:	<p>Financiers are hardly willing to take standards promising high energy-performance into account, although it is permitted by national regulations. This in spite of evidence that investment into Passive house-construction/-retrofit provides</p> <ol style="list-style-type: none"> 1. more security of liquidity of mortgage debtors; 2. more security regarding the market-value of the object of investment; 3. more employment, trade and therefore less bankruptcy and a positive stimulus to the economy <p>The problem needs resolving on the national level. Banks themselves seem to be not able/willing to change their policy and are strictly bound to national regulations. The practice of ESCOs should be converted for energy efficient retrofit.</p>	
PMP:	No missing link	
ProKlima:	Banks should prefer highly efficient buildings for financial ratings. A life cycle cost should be the condition for such a rating.	 M
Tyrol:	No missing link	
PHI:	Unknown	

1.2.3. Higher valuation of nearly zero energy standard or renewable energy supply



eERG-Polimi:	At present, stakeholders (building users, policy makers, ...) don't know (or don't know well) the advantages of the Passive house standards, and on the market do not look for anything better than energy class A.	 M
Cesena:	At the moment there is no regulation prescribing the difference between NZEB and buildings in energy class A. There is even no awareness of this matter in general. Therefore there isn't a higher valuation of buildings built to a nearly zero energy standard.	
PHP:	Property valuers are still largely unfamiliar with NZEB and their calculation procedures do not include energy as an item. Also, a study is needed in Flanders to examine whether in the real estate market buyers or tenants are prepared to pay more for NZEB.	
Nobatek:	Nowadays in France it is difficult for nonspecialists to compare Passive house standards with the quantified objectives of both national regulations and other common energy standards. There is a need to clarify the differences and specificities.	
LEIF:	There is no market for NZEBs in particular. There are some NZEB owned by the municipalities, as well as other public buildings (because they participated in tenders in Climate Change Financial Instrument program,	

	where government support for low energy houses or NZEBs was as high as 85%). But it should be made available for private owners too, through publicity, awareness raising etc. That would make for “educated private house owners” and of course better construction companies as well.	
Eneffect:	There is no market for NZEBs in Bulgaria and in Gabrovo in particular. The only NZEB is owned by the municipality. The market should be stimulated through incentives for private owners and construction companies. These incentives should be based on (certified and strictly monitored) energy performance.	■
Burgas:	The market for NZEBs is not well developed in the municipality so it is difficult to define higher valuation of NZEBs. The Burgas beacon project involves a public building, owned by the municipality, so we cannot compare it to a private building that can be sold or rented out after construction.	■
Zagreb:	There is interest among citizens, and stakeholders are more or less aware of the passive and low energy standards. However one is not familiar with the details and overall there is lack of investor interest especially when they realise there are no financial incentives available.	■
BRE:	There is some evidence suggesting that in the housing market buyers are prepared to pay more for low energy housing (EPC A or B rating compared to EPC G rating). However, the higher price is likely to be inadequate to cover the additional up-front costs of building a Passive house. Moreover, public sector buildings will not be ‘valued’ in a way comparable to buildings for private sale or rent.	■
DNA:	Usually, the extra value of NZE-buildings does not make up for the extra initial costs to create them, especially in retrofitted houses. A break-even point at 25 years and an average migration-frequency of 7-8 years form insurmountable gaps. Loans on houses instead of on owners are a possible way out. See also ideas for lease-constructions for the housing market as examined by Platform 31. Also ESCOs on energy saving measures can be a solution.	■
PMP:	No missing link	■
ProKlima:	Truly (lifecycle-) cost analyses are needed: There is a problem with social Passive house projects and social rental fees (higher standard is not affordable with limited rental fees). This is often discussed and forms a real barrier for highly efficient buildings.	■
Tyrol:	The costs of buildings and properties have risen to the extent that the construction sector is under pressure [to provide cheap housing], which in turn puts pressure on investment and on the valuation of energy efficiency.	■
PHI/ Heidelberg:	There is the misconception that Passive house Standard is only for the rich. Publications on transparent cost analysis by PHI is available in German only. Translation into English is needed for broader dissemination.	








1.2.4. Rental and leasing contracts including heating/cooling costs

Rate

eERG-Polimi:	This solution is not available or very rare in Italy. This could be useful to support highly efficient energy renovation and high quality new construction.	■
Cesena:	Providing rental contracts that include heating and cooling costs could be revolutionary in the Italian market. In fact, today many apartments, especially in social housing, have quite low rental costs but relatively high energy costs, sometimes even more than rental costs. At the moment there are no rental or leasing contracts including heating/cooling costs in the region.	■
PHP:	We think social housing associations and real estate providers need to include heating/cooling cost into their company policies and rental systems. The private housing sector has almost no experience with leasing. More knowledge is needed about heating/cooling costs according to household size or user nature.	■
Nobatek:	There is no experience with rental and leasing contracts that include heating/cooling costs in our region. More knowledge and tools are needed to back financing based on Energy Performance and to disseminate examples of such contracts.	■
LEIF:	There is currently no experience of rental and leasing contracts that include heating/cooling costs. Knowledge and strategies to support rental NZEB would be helpful.	■
Eneffect:	Although the questions concerns the West-European rental practices and there is no relation to the Gabrovo beacon project, it is believed that on a market where housing units are rented by and from private owners and tenants (bills are paid by tenants), the certification of the energy performance would influence the market in a positive way. Energy certification for rented units is desirable.	■
Burgas:	When houses or offices are rented out, the tenants pay the energy bills. That fact should increase the interest of tenants in low-energy buildings.	■
Zagreb:	Rental and lease contracts are usually left to the owner to decide and some have a fixed price, while others include heating/cooling cost separately. Croatian legislation requires sellers and those who rent space out to get an energy certificate for their property.	■
BRE:	Commercially leased premises and social housing rental contracts do not generally include heating costs. Some private rentals (sublets of larger dwellings) may include heating costs for the simplicity of billing. In public buildings the Local Authority will retain responsibility for on-going running costs so these are not linked to rental contracts.	■
DNA:	The monthly rent of social housing is limited to a maximum of € 650,-. This does not take into account monthly residential costs such as energy-bills. And yet, studies have shown that housing costs for low income groups living in social housing already are beyond the acceptable level (see: woonlastenonderzoek tilburg.pdf). With rising energy prices, the expectations look gloomy. To keep on target to provide affordable living, social housing corporations need to include heating cost into their policy and rental systems.	■
PMP:	No missing link	■

ProKlima:	We think more projects/experience is necessary. There are problems with the existing regulations (e.g. Heizkostenverordnung): E.g. for (commercial) housing companies in Hannover it is a challenge just to offer stable, limited rents. Financing energy-efficient refurbishment under the traditional rent-system excluding heating bills is difficult. A “warm rent” model could help, but this is difficult to implement due to the interconnection with current housing programs and models of rental reimbursement for transfer beneficiaries. To deal with this, Hannover City has developed a separate funding program to facilitate "Energy Efficiency with stable rents" (see: http://www.hannover.de/Leben-in-der-Region-Hannover/Umwelt/Klimaschutz-Energie/Akteure-und-Netzwerke/Klima-Allianz-Hannover/Förderprogramm-Energieeffizienz-mit-stabilen-Mieten)	 M
Tyrol:	No missing link	
PHI:	Unknown	














1.2.5. Integral/functional tendering / tendering based upon dbfm-method leading to a high standard energy performance

		Rate
eERG-Polimi:	In Italy tenders are generally based on initial cost (initial investments for construction or renovation). It's rare that the whole life cycle is considered in a tender. In some cases, tenders are about construction or renovation + building management (called “project financing”) particularly for public and/or service buildings. But this kind of tendering rarely considers costs related to energy use in buildings.	
Cesena:	Since the tender for the beacon project is still running, it is not possible to describe the energy standards that will be required and how these will lead to a high energy performance. Moreover, in Italy the standards for NZEB are not defined yet so we do not know what characteristics can be included to what extent in tenders.	
PHP:	We think effective DBF(M) tools are needed for the renovation of public buildings, particularly schools. Municipalities have difficulty attracting investors.	
Nobatek:	There is still a need of adopting a precise definition of NZEB in order to be able to include it in tenders.	
LEIF:	Due to lack of knowledge and experience projects in this direction often do not reach the goals formulated at the start. There are discussions about multi-apartment residential buildings in Latvia that need to be insulated. If PH standards are economically justified, then it is not clear yet how they should be integrated in tenders. This pertains to both the public and private sector.	
Eneffect:	We think new public procurement regulations according to the new EU directives in this area (entering the EPBD in January) are a must. “Green” or “sustainable” public procurement should be preferred for public buildings, especially when donor institution money is used. This concerns both renovations and new projects.	
Burgas:	Legislative changes are needed to enforce “green” public procurement for renovation and new buildings with high-energy performance. Our beacon project covers only the design phase. It is set to become a	

	low-energy building and meet the "Passive house" standards. Changes are needed in the Public Procurement Act.	
Zagreb:	"Green" and "sustainable" procurements are incorporated in the City of Zagreb strategy. They are optional by Croatian Law i.e. they are allowed. The City of Zagreb has plans to launch pilot projects of green procurement to explore the benefits. However, at the moment ideas for these pilots focus on electric products more than on buildings or construction components. Also the most commonly used procurement process in Croatia is still the open tender procedure where cheapest offer wins. This causes problems since cheapest contractors often deliver poor work.	■
BRE:	No missing link	■
DNA:	Well aimed tendering is the easiest way to evoke high standard energy performance, but is currently rarely successful. Due to lack of knowledge and experience plans often are not too clear and ambitions fail to be realized.	■
PMP:	No missing link	■
ProKlima:	No missing link	■
Tyrol:	No missing link	■
PHI:	No missing link	















1.3. Knowledge

1.3.1. Are there best practice examples of renewable energy supplies in Passive house(-neighbourhood)s and is there an accessible source of information on this?











		Rate
eERG-Polimi:	There are some relevant cases of single buildings (single family homes, apartments blocks, schools) - see PassREg beacons in Italy, but no examples of neighbourhood yet. There is no regional experience with Passive house district specific renewable energy supply.	
Cesena:	Locally, there are no Passive houses at the moment at all; the goal, as stated in the Structural Municipal Plan, is to realise housing units of this kind soon.	
PHP:	Flanders does not have a lot of experience with smart grids. Knowledge is also missing regarding the legal framework of heat supply networks, which is a barrier for the development of the beacon project.	
Nobatek:	There are too few Passive house buildings projects in the Aquitaine region to obtain sufficient information about the impact of their renewable energy supply.	
LEIF:	Both beacon projects are connected to a district heating (DH) system. In Latvia each municipality has its own DH system, which is partly fed by renewable resources. Additional renewable energy is not economically feasible till now. The government is giving subsidies to the electricity provider (joint stock company "Latvenergo") and it returns 90% of its profits to the State. Inhabitants receive electricity cheaper than it is actually and that's why renewable energy is regarded as expensive.	
Eneffect:	There is no Passive house neighbourhood in Bulgaria. At this point there are also no initiatives for Passive house neighbourhoods (there are just few Passive Buildings in the whole country). The Passive house standard needs to be further popularized and to enter into city planning in order to ease and stimulate the formation of Passive house neighbourhoods.	
Burgas:	Unfortunately, in Bulgaria we cannot to talk about Passive house neighbourhoods yet.	
Zagreb:	There is plenty of information to gather and many informational events, however, there are few successful local projects, especially big scale projects.	
BRE:	While the beacon project does incorporate renewable energy systems (PV), we are not aware of any 'best practice' examples used as a template. Arguably, this beacon will set the best practice.	
DNA:	There is very little experience with Passive houses and PH- districts <i>with</i> renewable energy-supply in the Netherlands. Our beacon-project GWLO (a small settlement with a district heating system on biomass) is a good source of information. This information needs to be made accessible.	
PMP:	No missing link	
ProKlima:	We need more monitoring results to convince investors.	
Tyrol:	Due to shadowy situations in valley's a good solutions with RES are	




	needed. Quality of systems and broadly shared knowledge should lead to more trust and common practice with RES systems.	
PHI:	Unknown	

1.3.2. Is there an accessible regional source of information about/examples of adaptation to climate and other local conditions?














		Rate
eERG-Polimi:	We developed publications in collaboration with the Passive house Institute on adaptation of the PH concept to Mediterranean climate conditions. Moreover, we monitored a Passive house in Cherasco (Italy) as well as PassREg beacons. This knowledge needs dissemination.	
Cesena:	There is no best practice in the Municipality of Cesena. The planners will adapt best practices from other Municipalities or regions to local conditions, or will use other available research data.	
PHP:	No missing link	
Nobatek:	The adaptation to climate is usually guided by the use of unified degree-days (<i>DJU</i>). There are many sources of information, including identification of climate zone by location. Also available is the prescribed method for professionals making calculations on buildings and energy. Moreover, some standard tools are available to obtain local and dynamic conditions to be used for the assessment of building envelopes.	
LEIF:	Climate issues are not considered for any of the 5 Planning regions in Latvia. Capacity building in local administration and best practice examples are needed. This is also one of the solutions from Latvia region for PassREg-SOS what is needed to implement PassREgs.	
Eneffect:	Climate issues are not considered when it comes to city planning. Capacity building in local administration and best practice examples are needed.	
Burgas:	There is no best practice in the Burgas Region. The planers will adapt best practices from other regions to local conditions.	
Zagreb:	No, there is a lack of accessible information about adaptation to climate and other local conditions	
BRE:	No missing link	
DNA:	There are some well-documented practice examples. But best practice examples are not always replicable and developed PH technologies are not easily inserted in Dutch construction practice (e.g. joining window frames, pile-foundations)	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	The topographical situation in shadowed valley's leads to a conflict with the PH standard and to a higher demand on good solutions with RES. This is a hurdle in appreciation of the quality standard of PH.	
PHI:	No missing link	

1.3.3. Are there specific PassREg-solutions for building services and is there an accessible source of information on this?














		Rate
eERG-Polimi:	PassREg solutions are disseminated during the project. It is important to show that these solutions are suitable for nZEB and better buildings.	
Cesena:	The PassREg Set of Solutions is accessible for designers and operators, but this is not enough and is not easy to disseminate.	
PHP:	Procedures are missing for maintaining the quality of building services (particularly ventilation systems) and communication to the end-user after completion of the building.	
Nobatek:	The PassREg-SOS is accessible for designers and operators, but this is not enough and is not easy to communicate. The association “La Maison Passive France” promotes the passive European standard in France and provides many links to sources of information.	
LEIF:	There is a definite lack of knowledge in Latvia in this regard. EU projects, such as “Build Up Skills” and PassREg are trying to contribute training, awareness raising for tradespeople, and for construction companies etc. in order to promote the PH standard, NZEBs and to reduce energy consumption. There is a need for and a strong demand for a Passive house Platform in the Latvian language. And there is a call for information about suitable building services.	
Eneffect:	The use of PH-specific building services in Bulgaria is highly uncommon. There are no current regulations stimulating the use of mechanical ventilation with heat recovery or any other similar innovative solutions. The prices of these service units are still rather high for the national standard. Especially when dealing with private clients, this is the main reason why MVHR is not commonly used.	
Burgas:	Unfortunately there are no specific PassREg-solutions for building services and there is no accessible source of relevant information in Burgas Municipality. Probably the most detailed source of solutions is PassREg-SOS, which is a good basis but it’s not enough.	
Zagreb:	Use of Passive house components is rare and mostly done by individual enthusiasts and supporters of the concept.	
BRE:	No missing link	
DNA:	The lack of knowledge in Dutch building service is blatant, e.g. <ul style="list-style-type: none"> - a persistent misconceptions about ventilation (ventilation rates, open window in sleeping rooms) troubles the introduction of Passive house design, - Unfamiliarity with low heat demand evokes oversized heat-sources and distribution systems, leading to unnecessary costs, - The traditional way of kitchen extract is hindering the functioning of Passive houses, - The variations in demand of different user-groups requires well-targeted communication, - Unalterable desire of inhabitants to influence indoor climate requires user-friendly indoor climate control concepts. Compelling (documentation of) successful examples is needed to make	

	Passive house technology successful in the Netherlands.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	Even though the use of biomass and other renewable energy sources becomes common there are issues with lacking quality and service. Good practice examples need to be shown to convince investors.	
PHI:	Unknown	

1.3.4. Do you have access to suitable PassReg-solutions for planning and design (tools and aids)?














		Rate
eERG-Polimi:	Some regions in Italy adopted their own energy calculation tool according to the national standard, but it's not corresponding to PHPP. In other regions there is no free software available for energy calculation in buildings at all.	
Cesena:	In our region, it is not easy to find tools and aids for planning passive buildings. The only tool used at the moment is the PHPP, but it is not accessible and known to everybody.	
PHP:	We need tools for the design of urban RES-systems and net-zero energy balances.	
Nobatek:	It is sometimes difficult to find tools and aids for planning passive buildings. The only tool used at the moment is the PHPP, but it is not easily accessible and known to everybody.	
LEIF:	A FAQ for calculating with PHPP is missing. There are some other tools available, but they are rarely used in practice.	
Eneffect:	Tools and aids for energy planning and design are rarely used in Bulgaria. This is probably because in the training institutions (universities, etc.) no such subject/program is taught. The need to include this in the educational system is essential.	
Burgas:	Schools that educate future designers fail to train them in the use of tools and aids for energy planning and design.	
Zagreb:	While certain tools are available, the ones for energy planning and design are rarely applied in practice. Moreover, educational institutions rarely teach and focus on such tools and aids.	
BRE:	No missing link	
DNA:	A FAQ for calculating with PHPP is missing. And so is a users manual for calculating thermal bridges. Also PH courses held in the Netherlands would be helpful: working with these tools needs to be thoroughly taught.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	No missing link	
PHI:	Unknown	

1.3.5. Do you use an integral approach and do you have access to useful facilities?

		Rate
eERG-Polimi:	An integrated approach is not commonly used. Different fields and different design and construction phases are not brought in harmony.	 M
Cesena:	No missing link	
PHP:	No missing link	
Nobatek:	More and more, the integral approach for design is adopted and there are already some regional technological centres to facilitate the deployment of the integration tools that are on the market.	
LEIF:	No, so far an integral approach is not common in Latvia. But we are working on it through trainings and education of the workforce.	
Eneffect:	Unfortunately (in the last few decades) the integral approach is not common in Bulgaria. Its implementation should start from the elaboration of the building regulations, so that professionals from different fields would be required to work together to meet the norms.	
Burgas:	A major drawback is that construction is done without an integral awareness. It is difficult to talk about an integrated approach. The municipality tries to change that at the local level but it takes more work to solve this problem.	
Zagreb:	The absence of an integral approach and cohesion among all professional fields that contribute to the building process is a big problem. In Croatia, design it is still broken up along the lines of construction, civil, machinery and electrical engineers that rarely worry about work in the other fields.	
BRE:	No missing link	
DNA:	We use integrated design as the basis of intelligent and feasible buildings, which enables the creativity and cooperation of the partners in the design and construction process. Therefore it is an obvious way to extend quality and quantity of Passive houses. Possibly, it can be made into the common mode of practice through, for example, the dissemination of knowledge and instruments. However, in the Netherlands, change is slow, e.g. the introduction of BIM ³ has already taken a long time and is still not common practice.	
PMP:	No missing link	
ProKlima:	Existing projects with a major part of the integral approach show good results in Hannover (e.g. PPP-Project 8 day care centers Hannover). There might be a need of more projects with an integrated planning process.	 M
Tyrol:	There are good regional examples, but integral approach is not common practice.	
PHI:	Unknown	












³ BIM = Building Information Modeling, a 3-D design tool for integrated design



1.3.6. Is there a streamlined PassREg-consulting scheme available for (private) house owners and investors?

		Rate
eERG-Polimi:	There is no widespread consulting scheme focussing on Passive house and PassREg solutions.	
Cesena:	There are advisory systems for homeowners. At the moment counselling can be conducted by designers and / or builders only.	
PHP:	Consulting is available for homeowners in major cities and in provincial information offices. A consultation scheme focussing on energy/innovation for investors still has to be developed.	
Nobatek:	Standard consulting schemes are already available for homeowners and investors. However they do not include PassREg solutions in a standard way at the moment.	
LEIF:	A streamlined consulting scheme is not commonly used in Latvia. The consulting schemes have to become more popular among owners. The Association Passive house Latvia is trying to develop such a PassREg streamline.	
Eneffect:	Unfortunately, the use of streamlined consulting schemes is highly uncommon. Most homeowners prefer not to use the help of professionals and most renovations are part of the grey economy. This in turn leads to inefficient investment and a low quality end product. The consulting schemes must be popularized on the basis of better cost-effectiveness due to their professional quality.	
Burgas:	A PassREg-consulting scheme is not a common practice in Bulgaria. Consulting schemes have to become more popular for owners.	
Zagreb:	There is no consultation scheme, only a couple of projects and initiatives to provide some information (local authorities, civil societies etc.).	
BRE:	No mainstream Passivhaus guidance. Advice is generally provided by qualified Passivhaus Designers as and when required.	
DNA:	The common scheme for energetic retrofit is via a subsidized procedure (so called Maatwerk-advies) where only (a range of) single measures are promoted. Moreover, no quality-control is provided, neither through the planning phase nor during or after retrofitting. Elsewhere in the Netherlands there are efforts to create a streamlined consulting scheme (Achterhoek Duurzaam), but not in our region yet.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	No missing link	
PHI:	Unknown	










1.4. Capacity building





1.4.1. Is there a dissemination-strategy of PassREg-knowledge developed in your region?

		Rate
eERG-Polimi:	There is no dissemination strategy at the moment. The success of the PassREg project could be a good starting point.	
Cesena:	In Cesena, a Communication Plan is developed for the PassREg project as well as a Success Model to implement the PassREg strategy. But these are not enough. PH standards should be included in regulations, there should be more examples and support structures and should be more widespread because the Passive house standard is not widely known.	
PHP:	Introductory workshops were held with the city, but the dissemination of PassREg-knowledge in the Antwerp region needs further development and stimulation.	
Nobatek:	In Aquitaine there is a Communication Plan for the PassREg project and a Success Model to implement Passive house Standards in the region. But at the moment no actual steps towards implementation are planned.	
LEIF:	The Association Passive house Latvia has a leading role regarding this issue. They are also offering PH tradesperson and PH designer courses and doing many other activities. The Minister of Environmental Protection and Regional Development has defined PassREg and NZEBs as one of his priorities.	
Eneffect:	PassREg-knowledge needs to be further developed and stimulated in order to be applied in the majority of future projects. Cases in the region where this knowledge was applied must be followed and set as an example, since they illustrate most correctly the effect of PassREg-knowledge. The experience from these cases can be distributed further on a regional level and may provide valuable guidance for future architects of Passive houses in Bulgaria. More national informational campaigns must be conducted, so they can cast light on the already existing Passive houses and stimulate the dissemination of Passive house concept in Bulgaria.	
Burgas:	The utilisation of PassREg-knowledge needs to be further developed and stimulated in Burgas Municipality. This topic will be included in Burgas Municipality SEAP 2014-2016.	
Zagreb:	There is no strategy on this particular theme at the moment, but the City of Zagreb SEAP does include measures and activities for raising awareness and increasing knowledge.	
BRE:	A knowledge dissemination strategy for PassREg needs to be developed for the region.	
DNA:	It's a big challenge to raise knowledge of Passive house design and building in our region.	
PMP:	As the passive concept spreads and becomes compulsory for ALL, the demand of training, information and control explodes literally and it became very difficult to answer and to support this generalized movement. We only manage part of it now. Since 16000 workers are concerned in	








	Brussels, training organisms built up by themselves and « auto-forms » the sector on gaps that have to be fulfilled. To be able to offer good support to the varied demands (Hospital, mosque, showroom, skyscraper, funeral home, bowlings ...) we have decentralized as much as possible the know-how and the sources of training, information, control, which means to train the trainers. We have divided the round tables by sector, integrate the different stakeholders in the trainings and the information. Considering the size of the market, mass and basic trainings are assumed by the administration or schools. Pmp takes care of the high level and specific trainings.	
ProKlima:	No missing link	
Tyrol:	The focus of knowledge dissemination has to be on builders and workforces that arrear experience and skills in energy efficient building.	 M
PHI:	Unknown	







1.4.2. Is training according to PassREg-principles available in your region?

		Rate
eERG-Polimi:	The training activities on Passive house standard (for passive house designers and tradespersons) are organized by Passive house national association	
Cesena:	Locally, training agencies and training institutions following PassREg principles are missing, but it is possible to find them at national level. Within the PassREg-project two training sessions (WP3 and WP5) will be organised for the beacon project building site operators and for tradespersons in general.	
PHP:	Although there is a good access to appropriate training, locally there is a shortage of skilled craftspeople, of knowledge of energy planning on the neighbourhood level, the legal knowledge of heat networks and the knowledge of the end users.	 M
Nobatek:	Training sessions will be held for tradespersons at the end of 2014. They will be the first initiatives of this kind in the Aquitaine region.	
LEIF:	There is a lack of skilled labour and qualified experts in the building sector. There is a PH Tradesperson course and a PH designer (CEPH) course.	 M
Eneffect:	Some institutions offer courses for PH Tradespeople. Training materials by the Passive Haus Institute (PHI) are not affordable for Bulgarian vocational training centres since there's still not much of a demand for such training.	 M
Burgas:	There is some training in this field but in most cases this takes place in Sofia, which makes it difficult to those from the region who want to attend. Poor knowledge results in poor quality performance of buildings. More well educated tradespersons and builders are needed.	 M
Zagreb:	There is a lack of skilled professionals. Educational institutions are conducting a Build Up Skills project with the support of the central and local government. Also through the PassREg project, trainings are being planned.	 M
BRE:	Training is available. Employees of contractors participating in NZEB projects need to be educated prior to construction.	 M














DNA:	DNA has established an independent centre of knowledge dissemination and quality-assurance to support all educational institutions who are including Passive house design or construction in their educational program. This is in a beginning phase.	 M
PMP:	In view of the increasing number of professionals interested in calls for projects, it is necessary to be capable of answering their urgent questioning about Batex, technical for the greater part → Other half of the money is put back in bodies, among which pmp as a consulting expert capable of answering quickly the requests of the professionals → Pmp commits trainings on passive building aimed at the building professionals → Communication campaign about the bonuses towards bottoms down (users) which increase of the demand and thus the construction of Batex.	 M
ProKlima:	No missing link	
Tyrol:	Training is available but obvious has not been accessible enough for majority of workforces of conventional builders. There is a dilemma for architects being more educated for a role as artist than on engineering capability. Still they are expected to be responsible for the quality of their projects.	 M
PHI:	Unknown	

1.4.3. Is sufficient information/educational material available for political decision makers/public service?

		Rate
eERG-Polimi:	PassREg activities are a good starting point, but PassREg solutions are not yet enough widespread	 M
Cesena:	Political decision makers can participate in workshops and study tours and can read brochures explaining the PassREg project, but this is not sufficient for complete information/education. Public departments haven't many specialists properly prepared on NZEB/ PH with RES.	 M
PHP:	The decision makers were given presentations on the beacon project on various occasions, and further information is to be developed as the project progresses.	
Nobatek:	The beacon project is still in the design phase, later on we will be able to use it as an exemplary case.	
LEIF:	No educational material for municipal staff and policy makers is currently available in the region.	 M
Eneffect:	There is a specific brochure / guide on application of the nearly Zero Energy Buildings (nZEB) concept in city development and its relation to other local policies (climate & air quality, employment, local SMEs, transport, water, etc.). Also there is a guideline on the role of energy efficiency in buildings / nZEB in the national energy strategy	 M
Burgas:	Some materials are available, but that does not mean that there is no need to develop new ones that give more detailed information or present it in a clear and attractive way.	














Zagreb:	Some materials are available, but they are not sufficient. City of Zagreb participated in many projects and programmes through which materials for decision makers were developed. Many EU projects as well, like Energy for Mayors, Leadership for Energy Action and Planning and some others. General awareness raising and capacity raising activities are numerous, but more focus on Passive House is what is missing. Within the local administration is a lack of skilled professionals able to apply NZEB.	 M
BRE:	No educational material of this nature is currently available in the region.	
DNA:	Beacon projects have to be well presented. They play an essential role in convincing political and other influential stakeholders.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	No missing link	
PHI:	Unknown	

1.4.4. Is sufficient information/educational material available for public building owners?


		Rate
eERG-Polimi:	There are only PassREg brochures, websites and the PassREg-SOS wiki available for public building owners	 M
Cesena:	No educational material of this kind is currently available in the region – only a PassREg brochure.	
PHP:	Only the general master plan of the beacon project is available. No specific educational material on how to reach energy targets.	
Nobatek:	No educational material of this kind is currently available that is specific to the region – only a PassREg brochure. More material is accessible from the La Maison Passive association.	
LEIF:	No educational material of this nature is currently available in the region.	
Eneffect:	There is an information kit / guideline for facility management related to energy issues and nZEBs in particular.	
Burgas:	Some materials are available, but that does not mean that there is no need to develop new ones that give more detailed information or present the information in a clear and attractive way.	
Zagreb:	Some information is available.	
BRE:	No educational material of this nature is currently available in the region.	
DNA:	Beacon projects have to be well presented so they convince public building owners to repeat this approach in future projects. Suitable informational material would be supportive.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	Some housing corporations still need to be convinced to aim for PH standard. Lack of qualified builders is the main reason why they reject high	 M

	energy efficient targets.	
PHI:	Unknown	

1.4.5. Is sufficient information/educational material available for private investors?

		Rate
eERG-Polimi:	There are only PassREg brochures, websites and the PassREg-SOS wiki available for private building owners. There is a need of convincing data of the costs and benefits of PH's with RES.	
Cesena:	No educational material of this kind is currently available in the region – only a PassREg brochure.	
PHP:	Only the general master plan of the beacon project is available. There is no specific material on the investment benefits of reaching the energy targets.	
Nobatek:	No educational material of this kind is currently available that is specific to the region – only a general PassREg brochure. More material is accessible from the La Maison Passive association.	
LEIF:	No educational material of this nature is currently available in the region. Also because our beacon projects are public projects (schools).	
Eneffect:	Simple magazine-like brochures with best practice examples from Bulgaria and countries close to Bulgaria are necessary. Affordability and replication potential are major issues.	
Burgas:	Some materials are available, but that does not mean that there is no need to develop new ones that give more detailed information or that are more clear and attractive.	
Zagreb:	No, and information they get is often wrong and causes a negative effect on the image of Passive houses (PH) and nZEB. There is interest among private owners since the city gets many questions about financial aid for refurbishment of private buildings. However, the city will not pay towards the improvement of private buildings.	
BRE:	No educational material of this nature is currently available in the region. Private investors would not be relevant in the case of public building projects.	
DNA:	Lessons learned and financial aspects of beacon projects have to be presented so the experience can be used easily in future projects. Suitable informational material would be supportive.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	Private investors need to be convinced of the advantages of the quality standard/ PH certification. Also of the application of suitable RES.	
PHI:	Unknown	

1.4.6. Is sufficient information/educational material available for building certifiers?

		Rate
eERG-Polimi:	There are only PassREg brochures, websites and the PassREg-SOS wiki available.	

Cesena:	Later, in the light of project experiences, a complete and comprehensive instruction manual should be written, containing all the information for Passive house designers and builders. This would support the implementation of PH. At the moment, the only available material is the one provided during PH courses at Zephir, which is not generally accessible.	■
PHP:	Further information would be needed on what is expected of certifiers (use of calculation tools and so on).	■
Nobatek:	No educational material of this particular kind is currently available in the region – only a PassREg brochure. Target group oriented material is accessible from the La Maison Passive association.	■
LEIF:	There is no market for building certification to the PH standard or to any advanced low-energy standard in the region, and hence no educational material on how to conduct that certification. The PassREg project is an exception. Demand has to be stimulated through informational and training materials.	■
Eneffect:	There is no market for building certification to PH standard or to any advanced low-energy standard. Demand has to be stimulated through informational and training materials.	■
Burgas:	No educational material of this nature is currently available in the region.	■
Zagreb:	Some materials are available, one wonders whether they are sufficient.	■
BRE:	No educational material of this nature is currently available in the region.	■
DNA:	Sufficient material is not available. The whole system of certifying does not meet the needs of Passive house quality assurance adequately.	■
PMP:	No missing link	■
ProKlima:	No missing link	■
Tyrol:	No missing link	■
PHI:	Unknown	








1.4.7. Is sufficient information/educational material available for the manufacturing industry?

		Rate
eERG-Polimi:	Information providing representative numbers of the success models in Brussels, Hannover, Tyrol (e.g. square meters of Passive house building built in Bruxelles region related to the amount of public funds spent on it, or the amount of euros for this type of public programme in Hannover, ...) would be helpful	■
Cesena:	No educational material of this kind is currently available in the region – only a PassREg brochure. In Italy there is Zephir, which provides courses and training on PH.	■
PHP:	Information is available from companies, but specific input from the manufacturing industry for the Beacon projects will depend on demand and building designs. It might be worthwhile to develop information on how to involve the manufacturing industry in construction teams.	■
Nobatek:	No educational material of this kind is currently available specifically in the	■








	region – only PassREg brochure. More material is accessible from the La Maison Passive association.	
LEIF:	No educational material of this nature is currently available in the region. There is currently very little development that meets PH/ NZEB standards in the region.	■
Eneffect:	Information for SMEs about possible production and/or distribution of PH-compatible components, materials and pre-fabricated elements is desirable.	■
Burgas:	Some materials are available. But developing new material that gives more detailed information or that present it more clearly or attractively is needed.	■
Zagreb:	Some materials are available, but they may not suffice.	■
BRE:	No educational material of this nature is currently available in the region. There is currently very little development in the region that meets the PH/ NZEB standard; hence there is little demand for certified products in the region. There may be products available locally that are suitable, but the cost and burden of certification will be a barrier, particularly while there is such low demand for certified products at present.	■
DNA:	Special educational material for the manufacturing industry would not help much. Manufacturing industry can find own specific ways to develop their products and attend general PH courses.	■
PMP:	No missing link	■
ProKlima:	No missing link	■
Tyrol:	No missing link	■
PHI:	Unknown	







1.4.8. Is sufficient information/educational material available for the building industry?

		Rate
eERG-Polimi:	There are only Passreg brochures, websites and the PassREg-SOS wiki. Summarizing the successes in front runners regions as Hannover and Bruxelles and underlining economic advantages would be beneficial.	■
Cesena:	No educational material of this kind is currently available in the region – only a PassREg brochure. In Italy there is Zephir, which provides courses and training on PH.	■ M
PHP:	Generally yes, except for smart grid/ heat network development.	■
Nobatek:	No educational material of this kind is currently available in the region – only a PassREg brochure. More material is accessible from the La Maison Passive association.	■
LEIF:	No educational material of this nature is currently available in the region.	■
Eneffect:	The virtually non-existent market requires basic information on available materials, components, technologies, pre-fabricated elements, etc. The only existing information comes from separate representations of foreign companies, which is not enough. No specific guidelines are available for the construction companies.	■ M

Burgas:	No educational material or sufficient information of this nature is currently available in the region.	
Zagreb:	Some materials are available, but one wonders whether they are sufficient.	
BRE:	No missing link	
DNA:	Lack of knowledge of construction workers and installers is a major barrier. Informational/educational material would help but may not do the job due to the lacking educational infrastructure.	
PMP:	In view of the increasing number of professionals interested in calls for projects, it is necessary to be capable of answering their urgent questioning about BateX, technical for the greater part. Other half of the money from the 1,26% from the energy bills is put back in bodies, among which pmp as a consulting expert capable of answering quickly the requests of the professionals. Pmp commits trainings on passive building aimed at the building professionals.	 M
ProKlima:	No missing link	
Tyrol:	Training is available but obvious has not been accessible enough for majority of workforces of conventional builders. This discourages clients to invest in highly energy efficient buildings and retrofit.	 M
PHI:	Unknown	










1.4.9. Is sufficient information/educational material available for designers?

		Rate
eERG-Polimi:	There are only PassREg brochures, websites and the PassREg-SOS wiki available for private building owners. There is a need of convincing data of the costs and benefits of PH's with RES.	
Cesena:	No educational material of this kind is currently available in the region. PH designer education material is only for people attending and paying for a PH designer course. In Italy there is Zephir, which provides courses and training on PH.	
PHP:	Promotion needed of material related to urban planning and energy flexible buildings	
Nobatek:	No educational material of this kind is currently available in the region – only a PassREg brochure. More material is accessible from the La Maison Passive association. Technical misunderstandings and uncertainty on technical aspects (e.g. timber frame construction for high rise buildings) need to be tackled.	 M
LEIF:	Yes, the materials of the PH CEPH course, held by Association Passive house Latvija, was translated it in the Latvian language to reach the local target audience.	
Eneffect:	The available information is limited; there are close to none specific university courses on energy efficiency in buildings and very few activities of continuing education and training for designers.	
Burgas:	There is poor knowledge of PH standard and certification process. Some materials are available, but that does not mean that there is no need to develop new ones that give more detailed information or that are	 M





	particularly clear and attractive.	
Zagreb:	Some materials are available, but are they sufficient?	
BRE:	No missing link	
DNA:	Lack of knowledge by urban planners, designers and technical engineers (construction and installation) is a major barrier. Although some initiatives and projects were carried out recently, no courses for designers are provided yet. Beacon projects have to be presented so they can be replicated in the future easily. Lessons learned certainly need to be spread.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	There is a dilemma for (young) architects being more educated for a role as artist than on engineering capability. Still they are expected to be responsible for the quality of their projects. Their education should include building physics and highly energy efficient design.	 M
PHI:	Unknown	

1.5. Applied products











1.5.1. Are there local products developed/available for Passive houses with RES?

		Rate
eERG-Polimi:	Many materials, components and systems are not available locally. Many certified Passive house components are imported from the German market.	 M
Cesena:	There are not enough certified PH products and materials available on the market. The majority of products, components and systems are not available locally, but they come from other parts of Italy and elsewhere. There are some components that are available locally and that fulfil PH standards, even if they are not certified. Nevertheless the market is weak (low volumes) and there is little completion.	 M
PHP:	No missing link	
Nobatek:	PH or NZEB certified construction can create a niche market for high performance products. We will address this via INEF4.	
LEIF:	HVAC ⁴ devices are not marketed locally.	
Eneffect:	Few PH-compatible products are produced at the local level; none of them are PH-certified. Even the products readily available from foreign producers are limited here as no specific demand is evident locally.	
Burgas:	currently we can not answer this question	
Zagreb:	Very few products are developed in our region. Some materials are from here. Moreover, there are local joinery producers and there is a firm producing solar and pv panels here.	 M
BRE:	The majority of PH certified products are imported from elsewhere in Europe. There are some locally produced components available that may meet the PH standard but these do not have up to date certificates.	 M




⁴ HVAC= heating, ventilation and air conditioning

DNA:	There are German and Belgian products available, however, their certification has to be adjusted to / accepted in the Dutch system (e.g. product safety, protection against theft). These Dutch certification requirements prevent the widespread application and acceptance of foreign Passive-house products. On the other hand more and more Dutch products dominate the regional market. They often are not PH certified and sometimes do not meet the Passive house quality needs, although they are sold as (cheaper) Passive house products. Designers should be trained to sift chaff from the wheat. Producers do not focus on regional markets.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	No missing link	
PHI:	Unknown	

1.5.2. Are there incentives for the engagement of industry to increase the number of suitable products available locally?














		Rate
eERG-Polimi:	There are only research and development activities in industries. Sometimes they are co-funded by national or regional governments. This should be intensified.	
Cesena:	There is the need to apply forms of reward (tax breaks, for instance) to encourage manufacturing industries to produce PH-components. This would increase competition (lower the price, improve access) and enlarge the range of the products available.	
PHP:	No local incentives.	
Nobatek:	No local incentives.	
LEIF:	No such incentives.	
Eneffect:	No such incentives. There is a lack of understanding that investments in energy efficient (EE) construction furthers regional sustainability, and that the industrial production of associated products, including support for those providing the technologies, materials, services, would help in this regard.	
Burgas:	No such incentives.	
Zagreb:	No incentives are available.	
BRE:	There are no drivers in the region to promote the certification of projects to PH standard, since that standard is not a requirement for mainstream construction. The cost of the certification process will make companies turn away unless they can see a clear commercial advantage, which at present they cannot. There are examples of products that have been certified (windows, MVHR ⁵ equipment) by local companies in the past, but they have not maintained their certification on such products due to the cost and lack of interest.	
DNA:	We are not aware of such incentives in our region. Subsidy may help, but projects and demand from the building sector are more convincing as a	

⁵ MVHR = Mechanical ventilation heat recovery















	base for invention and innovation.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	No missing link	
PHI:	Unknown	

1.6. PR & Marketing

1.6.1. Is there a communication model (communication strategy) available for the NZEB development based on Passive house standard with RES in your region?













		Rate
eERG-Polimi:	There is a communication strategy developed but there still is a need of targeted campaign and communication, increase visibility of beacon projects and convince stakeholders of the advantages of PH with RES.	 M
Cesena:	There is a communication strategy developed.	
PHP:	The communication strategy will be improved as a result of the PassREg project.	
Nobatek:	Technical misunderstanding and prejudices against Passive House standards have to be unravelled and encountered.	 M
LEIF:	No communication model is currently available for the region.	 M
Eneffect:	Communication strategies for energy efficiency at national and at local level have not been developed. Still many efforts are needed for raising general awareness and fighting prejudices. Target group differentiation and elaboration of correct messages for each group is crucial.	 M
Burgas:	Communication strategy was established within the project, but it needs development and upgrade.	 M
Zagreb:	Zagreb has a general marketing strategy for most energy efficiency and RES related subjects. Possibly, this could be more specifically oriented to nZEB development based on Passive house standard.	
BRE:	A communication strategy will be drawn up shortly for the PassREg project.	
DNA:	There is a regional communication strategy developed but the prerequisites need to be created for a successful execution. PR deserves high priority as an enabling factor and needs a lot of dedicated work.	 M
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	Facing an active lobby of (“natural”) opponents and prejudice against the high energy levels established by law and regulations good campaigns and communication strategy is necessary.	 M
PHI:	Unknown	


1.6.2. How could PassREg-strategies become more visible?

		Rate
eERG-Polimi:	Through direct communication via stakeholders networks, large scale events, regional media	 M
Cesena:	PassREg-strategies may be more visible through large-scale events and through involving the local and regional media	
PHP:	Events for citizens on the building site	
Nobatek:	Events for citizens and decision makers on the building site.	
LEIF:	There is a lack of information about PH with RES and the perception that lower energy standard is good enough. Materials in our national Latvian language would help. Development of a Latvian Passive house platform with all kinds of materials from PassREg-SOS wiki, but in Latvian, and integrating new materials. TV broadcasts, interviews with experts.	 M
Eneffect:	There is a lack of information about PH with RES and the opinion that PH's with RES are expensive and hard to achieve. Through video materials; user-friendly media kits, connections with national TV networks and reports by national media	 M
Burgas:	Through short films such as "how to do", campaigns in schools, media support – TV networks!!!	
Zagreb:	Better media reporting and realisation of successful projects that can be disseminated as examples.	
BRE:	No missing link	
DNA:	Execution of communication strategy: mediagenic small- and large scale events, informative and inspiring network activities, target group specific approach, inspiring material and publications; a general film about passive house design customized for broad Dutch public	
PMP:	The number of Batex buildings can be developed by a communication campaign towards bottoms up (Builders, architects, etc.) to incite them to answer Batex calls for projects. To be developed and improved continuously. Enlarge the interest of the public for this PH with RES by communication campaign about the bonuses towards bottoms down (users), which increase of the demand and thus the construction of Batex. To be developed and improved continuously.	 M
ProKlima:	No missing link	
Tyrol:	Campaign, making beacons and successful application of RES visible	 M
PHI:	City of Heidelberg not prepared to give guided tours to interested groups = missed opportunity for knowledge transfer.	











1.7. Quality Assurance




1.7.1. Is there a well functioning infrastructure for the quality assurance (tests, certification and/or other specific methods) established in your region?

		Rate
eERG-Polimi:	There is a well functioning certification scheme based on national regulation in some regions as Lombardia (north of Italy). A scheme for quality assurance is not developed.	
Cesena:	There is no quality assurance infrastructure in the region because that is a national matter.	
PHP:	There is a compendium of building related requirements, planning consultancy, voluntary certificates based on design parameters and blower-door test reports, but there is no verification of parameters after construction is completed.	
Nobatek:	Not implemented yet, in discussion	
LEIF:	There is not even one certificated PH building, even our best example in Latvia, beacon project Ergli in Vidzeme region, which was in national news, Minister of Environmental protection and regional development ministry visited it, we brought there all mayor stakeholders, architect did extra work to prepare all documentation required for certification, with help of PassREg project, we did PR activities and tried to advertise it, but we still couldn't get sponsors and find money to pay for the certificate - and we didn't get it.	
Eneffect:	We think strict regulations and control over the execution of building projects is necessary.	
Burgas:	An infrastructure for quality assurance of buildings is available, but it is not adapted to meet the requirements for passive buildings. We need to upgrade it to be more effective.	 M
Zagreb:	Energy certification is a must before building, advertising, selling or renting out an apartment or a building. Other methods like LEED, BREEAM or DGNB certification are not common. Also the system of certification only includes certification and needs to be developed with assistance, control and monitoring.	 M
BRE:	No missing link	
DNA:	The dutch certification-approach does not correspond with the certification structure elaborated by PHI/ iPHa. Lack of knowledge needs to be overcome and the PHI/iPHa structure needs to be adapted to the national circumstances/infrastructure. Cooperation with national insurance Woningborg (an insurance fund for public housing corporations) may help.	
PMP:	Compulsory passive construction implies that there will not be certifications anymore, it will be the administration which will give, or not, the building permit with passive concept as a basis. Regular Monitoring is made on buildings, on demand of the government of Brussels, to check the energetic quality.	
ProKlima:	The quality assurance process in connection with the proKlima-funding-conditions is well introduced. But there is a constant need of adjustment/improvement of quality assurance and assistance of client in	 M











	operation and training the planners.	
Tyrol:	<p>1. The quality of construction is very much dependent on the skills of the architect and work force. Awareness raising and accessible training is needed.</p> <p>2. Incentives are not demanding certification. This results in bad performing buildings.</p> <p>3. A problem with the certification-strategy of passive houses rises when buildings are situated in shadowy valleys. Instead of being convinced of the need of better thermal performance clients reject the certification.</p>	 M
PHI:	Unknown	




1.7.2. Are sufficient PassReg-solutions for quality assurance (quality performance criteria sets, descriptions and procedures) available in your region?

		Rate
eERG-Polimi:	Quality assurance is lacking on airtightness, efficiency in electric energy use and in the actual control of energy performance of buildings after construction.	
Cesena:	Criteria sets, descriptions and procedures for quality assurance have not been defined yet in Italy for the construction of new PH or NZEB or for retrofitting existing buildings to these standards. There is only a classification in energy classes, and software to calculate that.	
PHP:	Quality performance criteria still have to be defined for smart grids and heat supply networks and for renovations. A Technical Specifications Document for ventilation systems is being developed to be referred to in tendering documents.	
Nobatek:	There is a big need for more educated designers and construction workers to ensure quality performance.	
LEIF:	There is a lack of materials and knowledge regarding quality assurance, and regarding life cycle costs, etc.	
Eneffect:	Quality assurance in Bulgaria is unsatisfactory. The regulatory framework is ineffective. It must be revised and made more strict and thorough. The builders on site (carpenters, concrete and steel workers, etc.) have no knowledge regarding the construction of Passive houses and hardly any experience in energy efficiency.	
Burgas:	We need well-trained workers and designers. Also, quality control does not work effectively enough at the moment and new criteria for the assurance and assessment of quality are needed.	
Zagreb:	We urgently need more educated designers and construction workers to ensure quality performance.	
BRE:	The necessary procedures are developed and accessible but as long as PH certification is not required to meet the national standard it is seen as a costly burden.	
DNA:	Quality assurance of Passive houses in the Netherlands needs a better-organized infrastructure (tools, professionals who can use them and regulations and clients demanding quality standards); actual Dutch PH certification and also the regular energy standard is no guaranty of	














	physically correct execution. Certifiers need to be trained and certified.	
PMP:	No missing link	
ProKlima:	The procedure of quality control needs to be optimized. This is an on-going learning process.	
Tyrol:	The necessary procedures are developed and accessible but as long as PH certification is not required to prove for subsidies or to meet the national standard it is seen as a costly burden.	
PHI:	Unknown	

1.7.3. Is the quality of PH-projects with RES monitored in terms of building physics, energy performance, indoor climate, costs etc?

		Rate
eERG-Polimi:	Monitoring the performance and quality of Passive Houses with RES is not common practice here. One beacon is under monitoring, another beacon is under initial phase of monitoring (completion of monitoring system, and first part of monitoring system already completed).	
Cesena:	Monitoring the performance and quality of Passive Houses with RES is not common practice here. There is a beacon project that will be monitored.	
PHP:	Building and network monitoring and post-construction evaluation of the buildings would be helpful to create investor and user confidence.	
Nobatek:	Monitoring the performance and quality of Passive Houses with RES is not common practice here. There is a beacon project that will be monitored. Some monitoring data are available from projects linked to NZEB even if not clearly identified as passive: the quality of the results is generally very high. Some recent projects in the residential sector should provide much more monitoring information.	
LEIF:	Monitoring the performance and quality of Passive Houses with RES is not common practice here. One of Latvian beacon was completed a year ago, so we will see a first monitoring report soon.	
Eneffect:	At present there is no practice of continuous complex energy monitoring and no interest in this area. The monitoring methodology for the beacon project is still not clear. Any methodological support will be welcomed. Cooperation with research institutions has to be initiated and supported.	
Burgas:	Monitoring the performance and quality of Passive Houses with RES is not common practice here.	
Zagreb:	Local governments monitor the energy consumption and performance of RES in public buildings, as they are obliged to do so by law. Private buildings are not monitored.	
BRE:	No missing link	
DNA:	The monitoring of PassREg-projects and also of projects that are being built according to the national building standard would be helpful to generate more confidence about PassREg- technology. Also there is a need for convincing data on air quality to generate confidence about balanced ventilation systems.	

PMP:	No missing link	
ProKlima:	Monitoring takes place not for all projects, but for many. There is a need to improve quality insurance and “awareness” by monitoring energy results.	 M
Tyrol:	Monitoring the performance of subsidized constructions should be part of the procedures of distribution of incentives.	 M
PHI:	Unknown	

1.7.4. Do contracts for PassREg-building projects include requirements of the quality performance?

		Rate
eERG-Polimi:	This is not common practice but in PassREg related buildings generally passive house standard and phpp calculation are adopted.	
Cesena:	This is not common practice.	
PHP:	Specified requirements should be integrated in the contract with the project developers (no specific templates).	
Nobatek:	This is not common practice.	
LEIF:	Requirements for energy performance should be integrated in the contract with the construction companies. This is not common practice.	
Eneffect:	Requirements for energy performance should be integrated in the contracts with the construction companies. Legally grounded examples of this are needed, both for public buildings and private ones.	
Burgas:	The draft contract of our beacon contains a requirement to achieve quality to be proved by a certificate. This has to become common practice to ensure high quality performance of buildings.	
Zagreb:	City of Zagreb includes quality requirements in the construction contracts when tendering for public buildings; usually a particular level of energy performance is prescribed.	
BRE:	No missing link	
DNA:	Contracts including quality requirements are applied but not common.	
PMP:	No missing link	
ProKlima:	No missing link	
Tyrol:	No missing link	
PHI:	Unknown	

Appendix 3

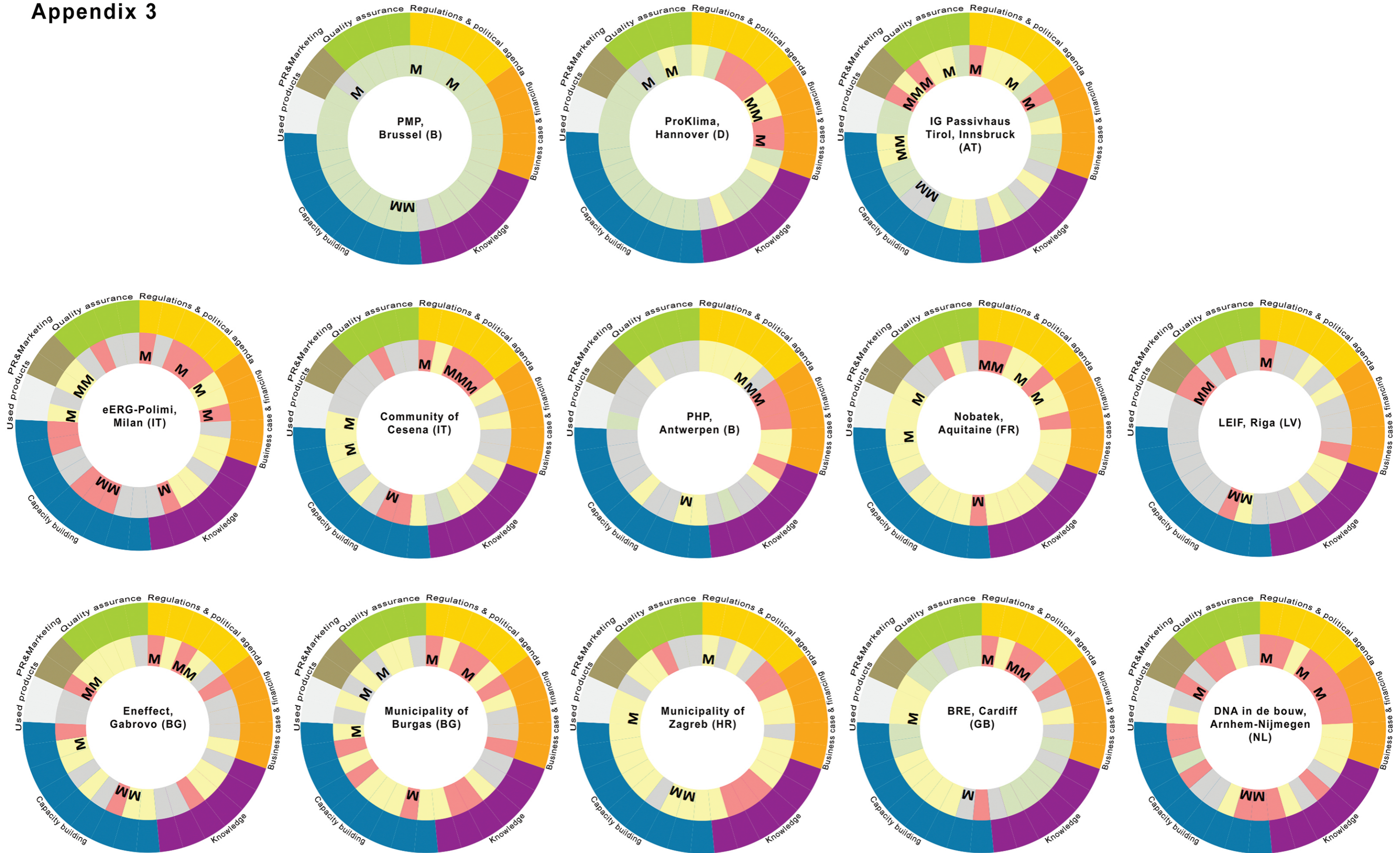


Chart of missing links in participating regions

- = considered as an crucial/urgent missing link
- = considered as less crucial/urgent missing link
- = missing link is not crucial/urgent
- = missing link is solved or not present
- M** = this missing link is related to a major barrier.