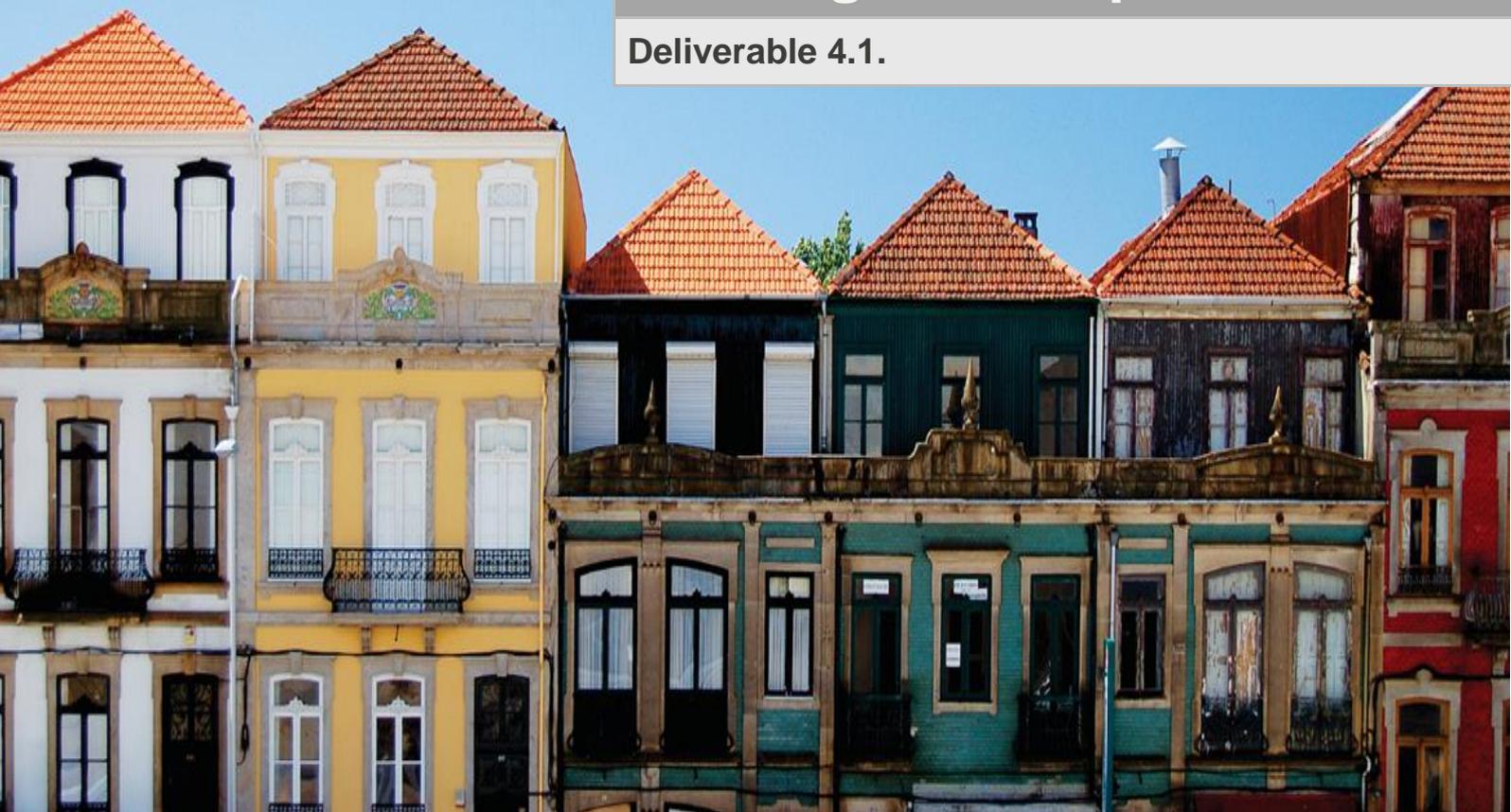


Recommendations on building Hubs report

Deliverable 4.1.



Deliverable	4.1. Recommendations on building Hubs report	
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Executive Summary

Energy efficiency in buildings has become a priority at regional, national and international level in the last years. In order to get insight into this development, the analysis of the recorded data is necessary. Investigations in the use of Energy Performance Certificates (EPCs) in the refurbishment market show that in many countries there is little experience in monitoring the implementation of EPC recommendations.

Therefore, the Request2Action programme, co - funded by the European Commission, was born across nine European countries. Its focus is on how data from EPCs, alongside other data, can be used to promote home energy efficiency.

Amongst other activities, five Hubs have been developed to pilot and exemplify EPC data for energy renovation of residential buildings by ADENE (PT), CRES (GR), ENEA (IT), EST (UK) and VITO (BE), each tailored-made to their specific country situation. These Hubs should be financially sustainable in the long-term; that is why business plans have been created for each of the Hubs. Details can be read in the deliverable 4.3. of this project.

This report condenses the analysis and the lessons learnt from designing, building and piloting Hubs to promote energy efficiency for residential buildings: in a first step, existing best-practices are analyzed. For that, not only Hubs related to the energy efficiency topics are considered. Out of this analysis, a generic Hub concept is produced in CHAPTER III .

A Hub is usually a web-based platform or tool where information available at various locations is centralized and made available for one or more focus groups. In order to build on experience, the analysis of existing best-practices took place. In this step, Hubs of various fields, not energy efficiency topics were considered. The aims, target groups, stakeholder involvement, its technicalities and business plans were looked at. A Hub can have one or several aims:

- Advice;
- Knowledge platform;
- Network creation; and/or
- One-stop-shop

As seen from the best-practices, the Hubs usually have more than one aim and target also more than one focus group since those depend on the aims. The focus group can be:

- Consumers
- Professionals, service providers, technicians, companies
- Architects, engineers
- Energy consultants
- Energy inspectors
- Public administration
- Associations
- ...

The best-practices analyzed showed various ways of engaging stakeholders. The most common approach is to involve them via newsletters and social media depending on their profile. In general, any action to engage stakeholders should meet the users' interest and triggers. Details on the best-practices approaches and technicalities can be found in ANNEX III.

In CHAPTER IV the current status regarding the building regulations and the EPC implementation in each country partners of the project is presented. The overview reveals a large discrepancy on data treatment amongst the countries showing the opportunities for energy efficiency Hubs in some of the countries. In Austria, Belgium, Italy, Poland, Portugal, Greece and Slovakia there is no central database for monitoring or market uptake of refurbishment activities. On the other hand, the Netherlands and the UK count with a national EPC database and monitoring system both managed by their national energy agencies.

Taking into account the best-practices and the country situation, the national Hubs were designed, developed and run in BE, GR, IT, UK and PT. Each of them are tailor made to the national and regional circumstances. Details about their definition, development and monitoring of each of the Hubs are found in CHAPTER V .

As a conclusion, CHAPTER VI presents the recommendations for any interested party in running a Hub. The recommendations are broken down into three phases of the Hubs: design, development and monitoring. Those are summarized in the following points:

1. During the design phase:

- a. Data protection policy should be clearly stated
- b. Be ambitious but do also foresee an evolutionary perspective for the hub.
- c. Discuss with IT professionals to explore the possibilities and foresee adaptability
- d. Identify the gap and needs of your customers
- e. Face to face contact provides very valuable information on expectations
- f. Do not overload the Hub with not-targeted information
- g. Ensure long-term sustainability with a well-thought business plan

2. During the development phase:

- a. Implement the HUB step by step focusing in the most relevant parts to operate it and future upgrade
- b. Do rely on experienced IT professionals
- c. Anticipate it will take more time than you think. Legal procedures, unexpected technical challenges can delay the implementation of the Hub.

3. During the monitoring phase:

- a. Secure the fidelity of users and their continuous feedback to secure quality and effectiveness
- b. Foresee upgrades on the feedback received
- c. Well-defined marketing actions are required when the Hub needs input from consumers.
- d. Appealing points are needed to enhance the Hub visits and usage
- e. Supporters can be very useful to promote the use of the Hub

Content

Executive Summary.....	3
Content.....	5
CHAPTER I Introduction.....	9
CHAPTER II Best-practices under the microscope.....	10
1. Topics of the best-practices hubs.....	10
1.1 Energy efficiency.....	10
1.2 Others.....	11
2. Type of content.....	11
2.1 Energy efficiency.....	11
2.2 Others.....	11
3. Target groups and stakeholders' involvement.....	12
3.1 Target groups.....	12
3.2 Audience reached.....	13
3.3 Stakeholder involvement.....	13
3.4 Contributors.....	13
3.5 Quality control.....	13
4. Hub technicalities.....	13
4.1 IT structure.....	13
5. Business plans.....	13
5.1 Maintenance costs.....	14
5.2 Barriers.....	14
CHAPTER III Generic Hub concept - definition.....	15
1. Hub aims.....	15
2. Target groups and stakeholders involvement.....	16
3. Hub technicalities.....	17
4. Business plans.....	17
CHAPTER IV Current status in partner countries.....	18
1. Austria.....	18
2. Belgium.....	18
3. Greece.....	19
4. Italy.....	19

5.	Poland	20
6.	Portugal	20
7.	Slovakia	20
8.	The Netherlands	21
9.	UK	21
10.	Conclusions.....	21
CHAPTER V Hands-on experiences from piloting Hubs		23
1.	Belgium	23
1.1	Design (definition)	23
1.2	Development	23
1.3	Monitoring and users experience.....	25
1.4	Conclusion	28
2.	Greece.....	28
2.1	Design (definition)	28
2.2	Development	29
2.3	Monitoring and users experience.....	30
2.4	Conclusion	31
3.	Italy	32
3.1	Design (definition)	32
3.2	Development	34
3.3	Monitoring and users experience.....	35
3.4	Conclusion	35
4.	Portugal	36
4.1	Design (definition)	36
4.2	Development	36
4.3	Monitoring and users experience.....	37
4.4	Conclusion	37
5.	UK	38
5.1	Design (definition)	38
5.2	Development	39
5.3	Monitoring and users experience.....	41
5.4	Conclusion	42
CHAPTER VI Recommendations		44
ANNEX I. References		47
ANNEX II. Overview Lists.....		48
▪	List of figures.....	48
▪	List of tables.....	48

ANNEX III. Best-practices hub's characteristicsVI-a

CHAPTER I Introduction

Request2Action is a programme across nine European countries, co - funded by the European Commission. Its focus is on how data from Energy Performance Certificates (EPCs), alongside other data, can be used to promote home energy efficiency. The current state of the building stock is being monitored in many European countries and energy related information is collected more and more in regional or national EPC databases.

In order to get insight into the development of the energy efficiency in buildings the analysis of the recorded data is necessary. Investigations in the use of EPCs in refurbishment market show that in many countries there is little experience in monitoring the implementation of EPC recommendations.

Within this workpackage, five Hubs are being developed to pilot and exemplify EPC data and insight Hub applications. Hubs are usually a web-based platform or tool where information available at various locations is centralized. A Hub can have one or several aims, from being a knowledge platform to become a one-stop-shop. The target groups will depend per aim. Also, the spectrum of possible content is very broad e.g. energy renovation, tourism information, services offer.

Within Request 2 Action, Hubs are being developed in the field of energy renovation of residential buildings by ADENE (PT), CRES (GR), ENEA (IT), EST (UK) and VITO (BE), each tailored-made to their specific country situation. For the long-term, the Hubs should be financially sustainable that is why business plans are created for each of the Hubs, outlined in the deliverable 4.3. of this project.

Within this deliverable 4.1, input from deliverable 4.3 and the actual partner experience on designing, building and piloting hubs are condensed to generate this recommendations report. This report is split in six chapters. In a first step, existing best-practices are analyzed. For that, Hubs within and without the energy efficiency topics are considered. Out of this analysis, a generic Hub concept is produced in CHAPTER III . CHAPTER IV presents the current Hub situation in the countries partner of the project while CHAPTER V describes the experiences of creating and piloting the Hubs in Belgium, Greece, Italy, Portugal and the UK. The last chapter produces recommendations derived from the experience and analysis for anyone considering to create and run a Hub.

CHAPTER II **Best-practices under the microscope**

Hubs exist of very different nature and topics. It can be from a simple database to a complex platform providing key information to various stakeholders. The overall aim is to create a general definition of what a Hub is. To do that, in a first step, best-practices are analyzed. Hub best-practices were identified from a broader context than energy building topics. That allowed us to integrate lessons learned from other sectors as well. In this chapter, the fourteen identified best-practices are summarized and presented. The hubs are from twelve countries and address diverse topics such as SMEs information, Barcelona city or building renovations. In this chapter, a summary of the topics, type of content, target and stakeholder groups, technicalities and business plans are presented. The detailed information per hub is shown in ANNEX III.

1. **Topics of the best-practices hubs**

In order to identify best-practices, the consortium not only focused on energy efficiency topics in buildings but also hubs with a broader scope. In this section, the identified hubs and aims are split between the ones on energy efficiency topics and the others.

1.1 **Energy efficiency**

Specific Hub Aims	Hub	Country
Promotion of quality standard for buildings	Klimaaktiv	Austria
Network creation energy savings, energy efficiency and raising awareness. Network of service providers, renovations market place, service providers	GimmeBudget	Portugal
	Zaask	Portugal
	Klimaaktiv	Austria
	Building the future	Greece
	Svizzera energia	Switzerland
	Regional center for innovation and technology transfer	Poland
	Zelenarchitektura	Slovakia
	Listminut	Belgium
Renovation advice. Information on renovation measures	GimmeBudget	Portugal
	Zaask	Portugal
	Klimaaktiv	Austria
	Renovation info service	France

	Verbeter uw huis!	Netherlands
	Zelenarchitektura	Slovakia
	TRY IT	Slovakia

Table 1: Hubs' classification per aims and country within the energy efficiency theme.

1.2 Others

Specific Hub Aims	Hub	Country
Information to live and study in Barcelona	BCU – Barcelona Centre Universitari	Spain
SME reporting to municipality support to activities in Europe	Impresainungiorno	Italy
Source of free digital maps for different users	OS Open Data	UK

Table 2: Hubs' classification per aims and country within other themes.

2. Type of content

The type of content varies per topic of the hub. They may contain:

2.1 Energy efficiency

Specific Hub Aims	Type of content
Promotion of quality standard for buildings	Information about the quality standard for buildings Information about the building declaration
Network creation energy savings, energy efficiency and raising awareness. Network of service providers, renovations market place, service providers Consumer access to the supply chain	Contact and registries lists of users, service providers, regional partners, experts, advice centers Cost calculators and other tools. Online toolkit for estimating energy efficiency performance and recommendations List of certified products and systems Best practices examples to reduce energy consumption and to improve energy efficiency
Renovation advice. Information on renovation measures	Information for the planning or renovation of buildings Funding and financing mechanisms Related legislation Events

Table 3: List of type of content per Hubs' aims within the energy efficiency theme.

2.2 Others

Specific Hub Aims	Type of content
Information to live and study in Barcelona	All necessary info to stay in the city
SME reporting to municipality support to activities in Europe	Enterprise index, AGCOM, electronic door for SUAP, PA online services, rules and laws, news
Source of free digital maps for different users	Various data sources are available via the Hub and contribute to the map such as: land registry, national statistics, transport, the Guardian, the world bank...

Table 4: List of type of content per Hubs' aims within other themes.

3. Target groups and stakeholders' involvement

The hubs are conceived and built for the target groups. The hub developers should make sure that the hub is attractive, interesting, simple and useful for the target groups. Actively involving relevant stakeholders is the key for the success of the hub.

3.1 Target groups

(1) Energy efficiency

Specific Hub Aims	Target groups
Promotion of quality standard for buildings	Architects Energy consultants
Network creation energy savings, energy efficiency and raising awareness. Network of service providers, renovations market place, service providers	Consumers Professionals, service providers, technicians Architects Energy consultants Engineers Energy inspectors Public administration SMEs, newly formed companies
Renovation advice. Information on renovation measures	Consumers Investors Associations

Table 5: Target groups per Hubs' aim within the energy efficiency theme.

(2) Others

Specific Hub Aims	Target groups
Information to live and study in Barcelona	Students, young researchers, tourists
SME reporting to municipality support to activities in Europe	SME and policy makers

Source of free digital maps for different users	Consumers, citizen, business and government
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Table 6: Target groups per Hubs' aims within the other themes.

3.2 Audience reached

Specific numbers on audience reached greatly vary per hub and targeted audience. The available information is presented in ANNEX III with details per Hub.

3.3 Stakeholder involvement

Usually, the stakeholders are involved via registration, newsletters, events, courses, online discussions. Each stakeholder group finds their dedicated information with appropriate language and level of detail.

3.4 Contributors

The entities contributing to the hub are hub specific. Detailed information can be found in the ANNEX III.

3.5 Quality control

The quality control is hub specific; several apply the user's satisfaction to rank the providers or to help subsequent users selecting their providers. Other hubs follow internal quality control procedures or an external party which is in charge of the quality carry out the task. Detailed information can be found in the ANNEX III.

More information on stakeholder engagement in Retrofit Hubs development in [D5.7](#), stakeholder engagement.

4. Hub technicalities

The hubs are published in the national languages and sometimes also in English. The hub focusing on tourists is published in seven different languages.

The use of social media is very diverse depending on the hub and their targeted audience. ANNEX III presents the details for the different hubs.

4.1 IT structure

The back-end structure details are difficult to grasp for the Hubs.

The Greek hub is developed over three categories of software: (a) Content Management System (CMS), (b) database, toolkit and (c) HTML. The Dutch hub Verbeter uw huis!'s website is connected to a source database for housing with two million energy-saving packages for reference houses. These calculations are based on the actual calculation method for the energy label.

5. Business plans

The large majority of the hubs examined here are funded or co-funded by third parties such as governmental or European funds.

In the Portuguese contractors network platform, the contractors must buy credit when registering that they can later on redeem for contacts. When the credit is finished, they can buy more credit that will allow them to obtain more contacts. In the Belgian hub for services, 10% of the fee paid for the contracted services goes to the hub team.

As the hubs count on external funding, advertising is not needed as a source of income and therefore not found on the majority of the websites.

In the R2A deliverable D4.3 Hub business cases, the business plans for the hub developed within the project are elaborated.

5.1 Maintenance costs

Only two hubs disclosed the maintenance costs: Indication of yearly maintenance costs: 50,000€, and 0.5 FTE for the open source maps hub and 70,000€ for the Greek hub Building the future.

5.2 Barriers

Financing seems to be the most general barrier, especially when advertising is not permitted or the economic situation is not advantageous.

Licensing and terms of use were identified by the UK hub as barrier as this topic may be quite complex and simplification is preferred from the user point of view.

After studying the best-practices in CHAPTER II , in this chapter, the project partners proposed a general definition of a Hub. There are several aspects to cover when defining a Hub, those are: the goal or aim, the target groups and stakeholders, the ICT employed and the business plan for that Hub. All these topics are covered in this section.

1. Hub aims

As already presented in D4.2. Guidelines for setting up hubs, the Cambridge dictionary defines a Hub as “the central or main part of something where there is most activity”. When translated to a website hub, it means a website where several actions or activities are concentrated around a website, as represented in Figure 1.



Figure 1: representation of a website hub.

The hub should have a well-defined goal matching the targeted users’ needs. From the best-practices detailed in CHAPTER II , several general aims of a Hub could be outlined:

1. **Advice:** it can include information on the general issue, dedicated advice on the user’s situation, calculation tools. It is usually a first step in raising awareness on the specific building situation. It can also include advice on financing and funding possibilities.
2. **Knowledge platform:** Information distribution e.g. statistical data, applicable legislation. The user can find from general to practical information about the topics he is interested in and fitting his situation.
3. **Network creation:** Either between two or more market players. The user can meet and discuss with peers. Collective actions may be promoted.
4. **One-stop-shop:** Access to the complete value chain service or combination of several services for a tailor-made meta service. The user gets in contact with the supplier that will take up the role of single point of contact.

A Hub can fulfill one or several of the aims listed above. In the following table the specific best-practices hub aims are confronted with the general aims.

Specific Hub Aims	General Aim
Promotion of quality standard for buildings	Knowledge platform
Network creation energy savings, energy efficiency and raising awareness. Network of service providers, renovations market place, service providers	Network creation Knowledge platform
Renovation advice. Information on renovation measures	Advice
Information to live and study in Barcelona	Knowledge platform
SME reporting to municipality support to activities in Europe	Network creation One-stop shop
source of free digital maps for different users	One-stop shop

Table 7: General aim per specific Hub.

2. Target groups and stakeholders involvement

As seen in the best-practices, usually the hubs address more than one target group. The list of possible target groups varies:

- Consumers
- Professionals, service providers, technicians, companies
- Architects, engineers
- Energy consultants
- Energy inspectors
- Public administration
- Associations
- ...

As mentioned before, **stakeholder involvement** is crucial for the success of the hub. Active participation of the stakeholders is preferred over a passive one. The best-practices' Hub shed some light on different ways of engaging stakeholders. The most common approach is to involve them via newsletters and social media depending on the stakeholders' profile. Attention should be given to the usage of appropriate language (informal or professional). The presented information should be focus and precise. For some stakeholders it is important to have access to independent information.

When various stakeholders have access, it is preferred to have a log in to ensure confidentiality and that the intended information for each stakeholder is easy to find. Another way to engage stakeholders is by allowing them to embed the Hub website into their own with their look and feel ensuring further market penetration.

Stakeholders will be actively involved when the Hub enhances or makes easier their business e.g. allows them to make marketing actions, contact new customers or expand their network. Some Hubs ease the reporting requirements for the stakeholders or offer training courses. Further details can be found in ANNEX III.

Quality control should not be overlooked, the high quality of the content should always be ensured and within the view of the hub owner or designated entity in case of lack of resources or knowledge. The quality control can be kept in-house e.g. the project team is responsible to verify the data or delegated to a third-party e.g. the party responsible for the management of the Hub which could undertake the review of the content as well. The quality control relates not only to the content but also to the layout, design and performance. When the information presented in the Hub does not need to be regularly updated, the quality control may be done once before the launch of the Hub. Otherwise, every time the information is updated, it needs to be verified. Special care should be given to information uploaded by third parties e.g. users of the Hub. When opinions or forum platforms are enabled, close moderation by the Hub manager should take place ensuring quality and respectful posts. Some of the quality control practices rely on the feedback from the users e.g. some companies listed in the hub can be ranked based on a consumer satisfaction inquiry.

In any case, the team responsible for the quality must count with the right competences and expertise. Not all the quality control procedures were identified for the best-practices analyzed however some examples on implementation of quality control can be found in ANNEX III.

3. Hub technicalities

The supporting technologies of the hub are too aim-dependent as to draw general conclusions on it. When selecting the technologies, the developers should take into account the user experience. The hub should look attractive and dynamic and should have a quick reaction on the users' demands. It is advisable to consult the experts in this field.

4. Business plans

In D4.2 Guidelines for setting up hubs, the revenues streams were described. That section is reproduced again in this deliverable: In general, there are three types of revenue models:

- **Fully public funded model:** in this case the company owning the Hub receives enough funding from the governmental institutions to cover the costs. All the revenues come in the form of an annual fund or donation that can be dedicated to the Hub and/or encompassing several services that the agency performs for the state. In this case, the Hub is normally built as not for profit. Also the Hub may be funded by EU grants or EU structural funds.
- **Fully private funded model:** the income comes from privately owned entities. The Hub might be built for profit. It can be that a private company buys the Hub for their own use or that various private companies pay a fee for the use of the Hub or for advertising in it. For example, each professional registering in the Hub has to adhere to a model of credits which can redeem for contacts for submitting an offer. When the credit is spent, the professional may buy more to have access to more contacts. In another model, a percentage of the cost of the service goes as a commission fee to maintain the Hub. Also donors from the partners can contribute to finance the Hub. In all these cases, an estimation of number of users/advertisers must be done to estimate the fee considering the Hub costs. The Hub can be built for or non-for-profit.
- **A mixed public-private partnership:** in this configuration part of the income is received from the state funding to partially cover the costs and it is complemented by private funding. Again, the private company may come from a solely company or from various companies paying a using or advertising fee. The Hub can be built with the intention of making profit on the product or not for profit; it will mainly depend on the terms and conditions for the public funding.

In this chapter, the current status regarding the building regulations and the EPC implementation in each country partner of the project, that is Austria, Belgium, Greece, Italy, Poland, Portugal, Slovakia, The Netherlands and the UK is outlined. The overview allows identifying the opportunities of the Hubs developed under the Request 2 Action project.

1. Austria

The building regulations in Austria fall under the responsibility of the nine Austrian regional states, the Länder. The Länder and the federal state agreed on the development of a harmonized implementation of the EPBD in 2006.¹ The developed requirements were revised and with the adoption of the EPBD recast in 2010 (Directive 2010/31/EU), Austria proceeded on its way towards new and retrofitted Nearly Zero-Energy Buildings (NZEBs).² For the implementation of the EPBD recast Article 12, “Issue of energy performance certificates”, the Austrian Energy Certificate law was issued and renewed in April 2012. The new EAVG, which came into force on the 1st of December 2012, clarifies more precisely the issue of EPC and states mandatory advertising of the energy performance indicator. In addition, it introduces penalties in case of infringement.

There is no central database for monitoring refurbishment activities available. There are a few platforms where the landlords/building owners can find out about certificated planers, installers, energy experts, products, etc. (such as klima:aktiv Landkarte or IG Passiv).

2. Belgium

In Belgium, energy is a regional matter, therefore the situation of EPCs and actions to stimulate renovation measures are different in the Flemish, the Walloon and the Brussels regions. The Flemish region was the first to make EPCs mandatory (in 2008 the scheme was launched for houses for sale, in 2009 expanded to rental properties), followed by the Walloon region in 2010 and the Brussels Capital region in 2011. By January 2013 about 600,000 EPCs had been issued in Flanders, about 66% of those EPC were issued for houses for sale. During 2013, 142,208 EPCs were issued in Flanders, 67,193 in Wallonia, and 32,075 in Brussels region (BPIE, 2014). Energy advice is available in all regions and several information tools have been implemented in Belgium (Energy Efficiency Watch, 2013).

With regard to target achievement, the Flemish region is (based on the national energy efficiency action plan, NEEAP) the region with the highest savings. It is expecting to achieve energy savings of 13,9 % by 2016 (compared to the reference scenario) while Wallonia is expecting to save 7,9 % and thus not to reach the target of the Energy Services Directive and Brussels is likely to reach the target with 10% energy savings in 2016. The Belgian NEEAP lacks clear sectoral targets and an overall target for the mid and long term (Energy Efficiency Watch, 2013).

¹ The first guidelines (OIB GL6) on for implementing were finalised in 2007 for both new buildings and major renovations, and the regulations in the Länder came into force between January and May 2008.

² By having issued the OIB documents at the end of 2011, the technical transposition of the recast EPBD was finished, and the legal implementation started. One of the Länder has already fully implemented the new OIB documents since October 2012 in its construction law. Three more did the same by January 2013. The other Austrian Länder will follow.

Nevertheless, the rate of progress in 2015 was evaluated as somewhat higher than in the three previous years. Progress was made in building renovation in the public and residential sectors. However, renovation rates remain too low (Energy Efficiency Watch, 2015).

The EPC data is considered confidential information and there is no centralized database with information for the market uptake of energy renovation for residential buildings.

3. Greece

In Greece, Energy Performance Certificates (EPCs) have been issued since the beginning of 2011. The number of EPCs until January 2017 has reached 946,700, 68% for rented properties, 14% building sales, 0.5% new building certificates, while 16% were issued to enable applying for energy retrofit financing in the “Saving at Home” national programme.

One of the key causes of the slow market response to the refurbishment of residential buildings is the insecurity concerning cost-optimal measures. A Greek national platform for data monitoring refurbishment projects has been developed under the National “Building the Future” Programme managed by CRES. This platform, launched in April 2012, records and presents in a database energy efficient building products available in the market and provides relevant specifications, certificates, technical guidelines for application, as well as prices (including a discount rate) in collaboration with the Greek industries and providers of the products. Furthermore, a monitoring system for the implementation of energy efficient measures has been developed and is in the early stage of implementation.

Meanwhile, in February 2013 the existing law on the energy performance of buildings and EPCs was revised, adopting the requirements of the EPBD recast. The new Law foresees the revision of the minimum requirements through a cost optimum calculation methodology. This cost optimum study is to be launched by the Ministry for the Environment, Energy and Climate Change within the next few months.

4. Italy

In Italy responsibility for EPCs is delegated to Regions. Existing independent control and accreditation systems are managed by a few Regions and autonomous districts. A couple of regions only are already engaged in modelling data derived by EPC for policy making and for enhancing quality in the renovation supply chain. Knowledge of EPC recommendation implementation and, in general, monitoring data on building stock renovation are lacking, both at regional and national level. Certification is required in the recent financial instrument for promoting energy efficiency and energy production from small renewable equipment (contro termico). Uptake of energy efficiency measures is monitored through the 55% tax deduction scheme managed by ENEA. Following an EPBD implementation decree (2015) EPC data gathered by regions are now being sent to the SIAPE (national centralised information system managed by ENEA), that will produce statistics on downloadable aggregated Open Data.

Interoperability with the existing regional systems have been guaranteed both dealing with EPC and TBS Inspection database. ENEA also assists the Ministry and Local authorities in energy planning, strategies and standards.

ENEA, acting as National energy agency has a dedicated website to energy efficiency but a national hub focusing Building renovation was lacking at the beginning of the action.

5. Poland

In Poland, Energy Performance Certificates (EPCs) have been issued since the beginning of 2009, without any monitoring system up to date. The Ministry of Transport, Construction and Maritime Economy is responsible for the implementation of Directive 2010/31/EC and the Ministry is preparing a set of relevant regulations implementing the Directive and also aiming to improve EPCs and deployment of monitoring system of certificates. A new law on EPCs and the general implementation of the above mentioned Directive are expected in 2013.

6. Portugal

After running for 10 years, the Buildings Energy Certification System (SCE) registered already 1,25 million EPCs. Since 2009, around 2,500 EPCs for new buildings and 9,000 EPCs for existing buildings are being issued every month. The SCE is continually updated with information that will be useful for monitoring the implementation of the directive, from basic statistics (such as the number of certified buildings) to impact assessment, including estimated energy savings. 90% of EPCs in the database were issued for residential buildings and 10% for non-residential buildings.

So far, and even more for the upcoming future, the SCE is a valuable asset for:

- providing useful information for different target stakeholders (information is available for every EPC for each house or building);
- gathering in one single database knowledge about the building stock performance;
- providing insight information for monitoring energy national policies, namely the National Energy Efficiency Action Plan;
- allowing for the Identification and analysis of the financial and energy impact of implementing the improvement measures identified in the certificates;
- to support the implementation of financial incentives that promote the implementation of energy retrofit measures;
- to support the update of legislation, as the information available in the EPCs database allows predicting the impact in the evolution of energy requirements by providing detailed data on the housing stock and simulating the planned changes in advance;
- to the scientific community that frequently accesses the EPC database to use in research and development projects;
- to support real state agencies, who can access the EPC database to collect and validate information used to advertise the house on sale or rental;
- for Local Authorities to know more about “their” patrimony and better decide on supporting policies;
- supporting fiscal incentives defined to increase buildings energy efficiency, since the EPC is currently linked to financial support regimes that trust the EPC information and the measures identified in it to support energy efficiency measures.

All this information will catapult to the *Portal CasA+* (the Portuguese) hub, being available in a wide set of different formats to different stakeholders, that directly benefit from data visualization and can further prompt the uptake of energy retrofit measures.

7. Slovakia

Since January 2008 EPCs are mandatory in Slovakia for new, renovated, rented or sold buildings. From January 2013, the EU directive 2010/31/EU is transposed into the Slovak legislative framework. Changes were made in the global

indicator, which is the primary energy and energy performance certificates and energy labels have a new pattern in Slovakia. A report that comes along with the certificate contains tables and data that are useful for an independent control.

EPCs are under-used as a tool in Slovakia due to the ambiguous calculation methodology and the lack of uniform software. Other issues are the lack of data control and the registration of certificates. There are also deficiencies in the clarification of warranties for different activities according to the major renovation of buildings, impacting the possibility of an effective accountability in this area.

8. The Netherlands

In the Netherlands there has been a monitoring system for Energy Performance Certificates since 2008. Currently the database contains 2.1 million EPCs, most of them are EPCs for non-residential buildings. Approximately 10,000 EPCs are for residential buildings. Additionally the EPC recommendations and the improvement of the EPCs are part of the monitoring system. NL Agency is responsible for the national EPC database. A toolkit on financing constructions is currently being developed which will enable municipalities and other relevant stakeholders to learn about possible financing constructions they could use and replicate.

9. UK

In England and Wales, EPCs have been issued since 2008 and have now been issued on over 40% of homes. In Scotland, where there is a separate EPC regime but the certificates were introduced at the same time, 30% of homes have a certificate. In both countries there is an official EPC register (the Energy Saving Trust is the EPC register holder on behalf of government in Scotland but not England and Wales). There is a national monitoring database of retrofit activity – the Home Energy Efficiency Database, managed by EST – which measures all energy saving retrofit undertaken under government programmes. Alongside the launch of the new Green Deal energy efficiency financing mechanism, government (in Scotland and England & Wales) has taken powers to enable wider access to EPC data to enable the promotion of the Green Deal. EST staff are working with the Scottish government to assess potential to integrated EPC data into the wider housing energy efficiency monitoring database.

10. Conclusions

This overview shows the large discrepancies amongst the countries on the usage of the EPC data at regional and national level. In Austria, Belgium, Italy, Poland, Portugal, Greece and Slovakia there is no central database for monitoring or market uptake of refurbishment activities.

In Austria there are a few platforms with information addressed to building owners. Greece has a platform with energy efficient building products and a monitoring system for the implementation of energy efficient measures. However, the main obstacle for refurbishment is the insecurity concerning cost-optimal measures. Slovakia is still dealing with ambiguous EPC calculation methodologies and lack of uniform software as well as lack of data control and the registration of the certificates and deficiencies in the warranties of renovation actions.

On the other hand, the Netherlands and the UK count with a national EPC database and monitoring system. In the Netherlands, it is managed by the NL Agency since 2008, when the monitoring system was implemented. In the UK, it is managed by EST.

In this chapter the experiences from the partners building the Hub within the project will be presented. Each hub will describe the problem they are solving, target groups and stakeholders, how the back-end was designed and built and the general user experience. Some general conclusions of the building and monitoring experience, including dos and don'ts are outlined. The specific business cases per Hub are described in deliverable D4.3 business cases of the hubs.

1. Belgium

1.1 Design (definition)

The Belgian Hub started from scratch. Its main goal is to raise awareness, a knowledge platform, with two main target groups: policy makers and service providers. The available information will support policy makers to undertake policy measures or incentive programs based on relevant information. In a second step, service providers will have access to leads of consumers interested in renovations in a certain area.

An important part of the information presented in the hub is obtained via the households. The active involvement of the households is going to be supported by the cities or the DSOs who are in direct contact and with a larger penetration. The collected data relates to the building situation, interest in renovation as well as family composition and energy consumption. As an incentive to fill in the data, households receive a benchmark of their energy consumption with the Flemish average consumption of similar building, similar family.

The information is collected via VITO who setup a public website for the households to input their data. Likewise VITO checks that all the data meets the high quality standard and confidentiality requirement demanded.

1.2 Development

The Belgian hub is composed of three main parts:

- in the first part, the **public website**, the input from the households is collected. This is a basic HTML website, the goal was to keep it as simple as possible with low burden for the users. During the development phase, the demanded information was adapted according to the city interests. This sometimes varied depending on their particular situation. As an example, Genk city is interested in addressing electrical heating in their area. Therefore, releasing the pilot was of crucial importance to adapt the Hub to the stakeholders' needs.

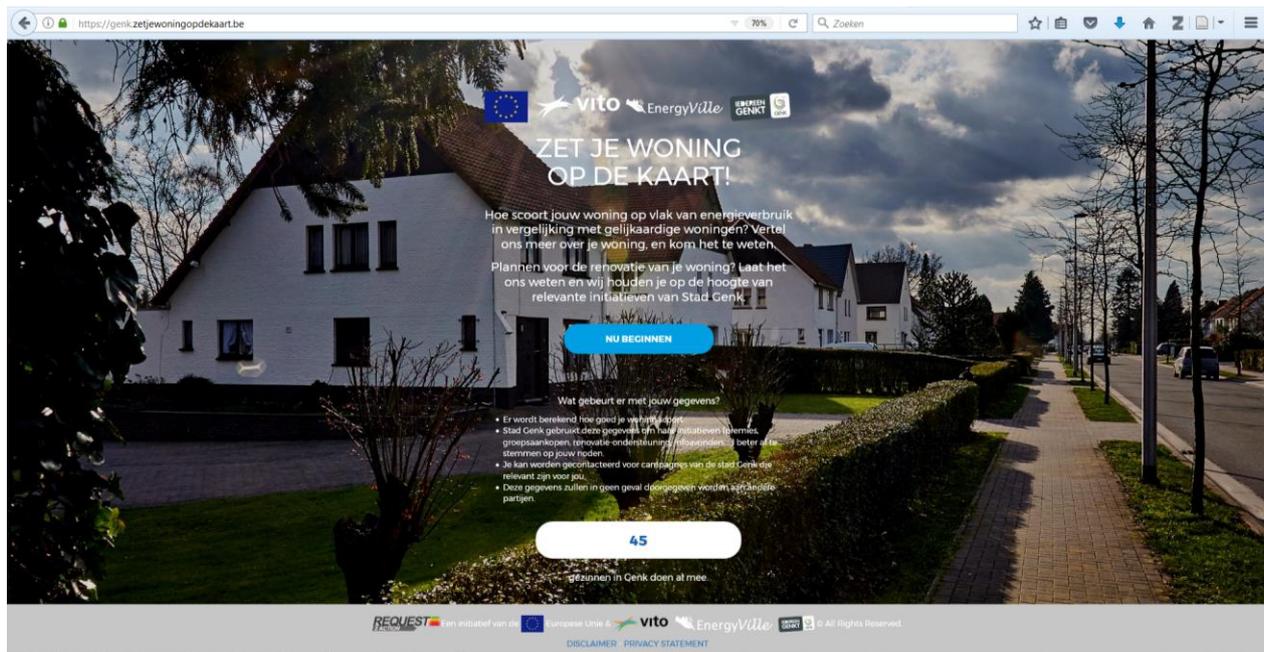


Figure 2: Screenshot of the public website for Genk city

- the second part is the **database** where all the gathered information is stored. The database used for the visualization page contains Flemish GRB building geometry data and the survey results from public R2A hub (building current status, renovation intention). In the future, it may also gather different data flows from collaborative partners, such as inhabitant profile from municipalities. All these data points in the database have a specific geographic tag and they can be further visualized on the frontend map. At the same time, any type of data owned by the user with a geographic tag can be included in the database and visualized in the GIS-map website. The system as it is set-up offers a large flexibility in that aspect.

- the database information is visualized by the users via a **GIS-map website** including a statistics section. In terms of the frontend, the GIS (geographic information system) based interface retrieves the geo-related data points from the backend, visualize them on the public open map layer and gives an overview of the current building status (building components, energy consumption if available), together with building owner's renovation intention. The log-in system of the frontend gives the user different levels of access right since some data is subject to confidentiality. The user can query the backend database for further insights by combining different type of features and using different functions (filters) of this tool.

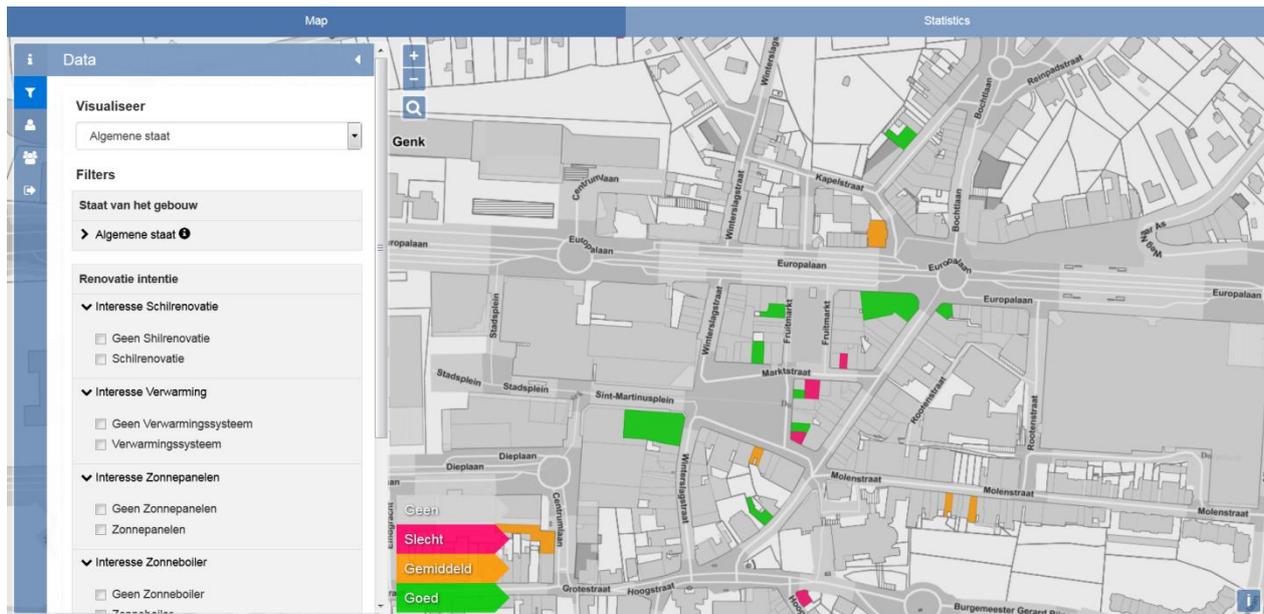


Figure 3: GIS-map data visualization

The development workload was split between an external contractor for the graphic design of the public website and the in-house IT department for building the database and the GIS-map visualization website.

On the one hand, the challenge was to create a simple and appealing customer site so that the user would not feel discouraged during the process of filling in the information, while still acquiring the relevant data for the policy makers and service providers. This was achieved by reducing the number of questions and steps of the website to the minimum and by a clear graphic design where extra written information was neither needed for comprehension nor required to input. Moreover, to incentivize the household to fill in their data, the benchmark of his/her energy consumption with the average in Flanders is sent to his/her email.

On the other hand, the challenge on the data GIS-map visualization page was to obtain a clear, simple and useful data view for the two types of users. The data available is processed and presented in various maps. The user is able to filter the data to obtain the map which interest him. Several rounds of comments internally, a peer-reviewed process with the experienced R2A partner and feedback from the customers helped refining the filters and to simplify the view. Especially the GIS-map visualization of the information on multiapartment buildings had to be treated separately. A different pattern was implemented for these types of buildings showing the color of the worst entry. The information per apartment can be visualized by selecting the building.

Finally, the fact that the necessary information was spread along various institutions and in different formats hindered the integration and processing of the database. Some of the data was subject to confidentiality which required different treatment per user rights. This fact was also hampering the gathering process.

For all the components, the servers are located at VITO premises.

1.3 Monitoring and users experience

This hub encountered several issues that delayed the planned launch. However, the hub was presented periodically to policy makers from different cities, DSOs and banks. In all the cases, high interest was expressed from the potential users. Moreover, different collaboration possibilities were explored with DSOs and banks. The fact that the two main DSOs in the region are merging also complicated the implementation.

At this point in time, three public websites can be found online for Genk city³, Eandis⁴ and Infrax⁵. Each received the log in to visualize the information collected by its own public website.

Genk city launched their public website for collection of information during the month of March 2017. Mid April the joint press-release of Genk city – EnergyVille⁶ was sent out. At the same time a LinkedIn article was published⁷. Genk city is interested in using the city portal for the renovation campaign specially focusing on electric heating they will start in October this year. Therefore, this intermediate period is used to collect the information on the building stock.

Genk city has planned other marketing activities to ensure a larger market uptake before October. At the beginning of June almost 50 Genk households have filled in the data. They plan to:

- Publish an article in the city magazine
- Promotion on the city website
- Google advert/facebook campaign in September 2017
- Dedicated leaflets designed by the district developers
- They are planning info sessions on collective renovations/energy scans campaigns for electrical heating
- Nudging actions are under evaluation

The two regional DSOs Eandis and Infrax have also implemented the city portal within their BENOveren campaign⁸. The campaign is launched by the Flemish government. More than half of the Flemish homes date from before 1970s, at that time, buildings were not insulated at all. This campaign focuses on boosting renovation and to greatly improve the energy performance of the building stock^{9, 10}.

³ Genk.zetjewoningopdekaart.be

⁴ Eandis.zetjewoningopdekaart.be

⁵ Infrax.zetjewoningopdekaart.be

⁶ <http://www.energyville.be/nieuwsbericht/zet-je-woning-op-de-kaart>

⁷ <https://www.linkedin.com/pulse/city-portal-genk-marlies-van-holm>

⁸ BENOveren, dat is nog beter renoveren!: BENOveren is even better renovation!

⁹ https://www.eandis.be/sites/eandis/files/documents/ik_benoveer_-_benoveren_beter_renoveren.pdf

¹⁰ <https://www.mijnbenovatie.be/>

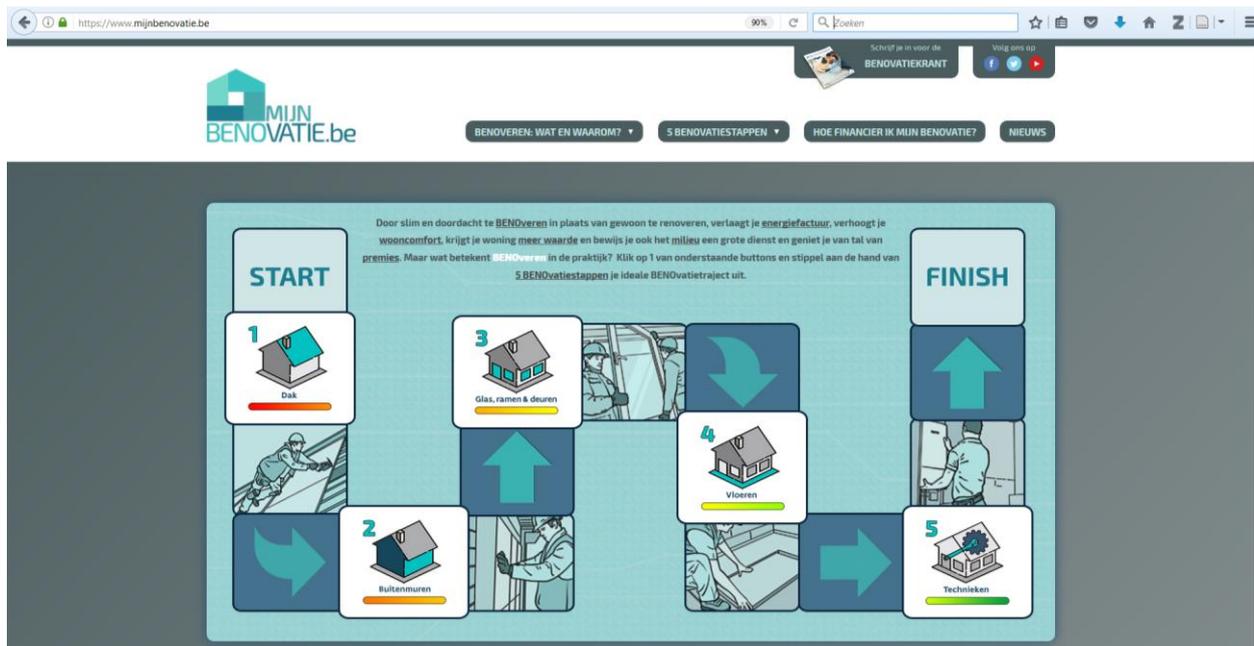


Figure 4: Screenshot of mijnbenovatie.be indicating the renovation steps

Eandis published their zet je woning op de kaart mid April. At the beginning of June more than 80 households had found it and fill in without any particular marketing actions. The marketing actions are being planned together with Infrac and the new company resulting from the merge of both. Infrac published at the beginning of June their zet je woning op de kaart also linked to their BENOveren campaign.

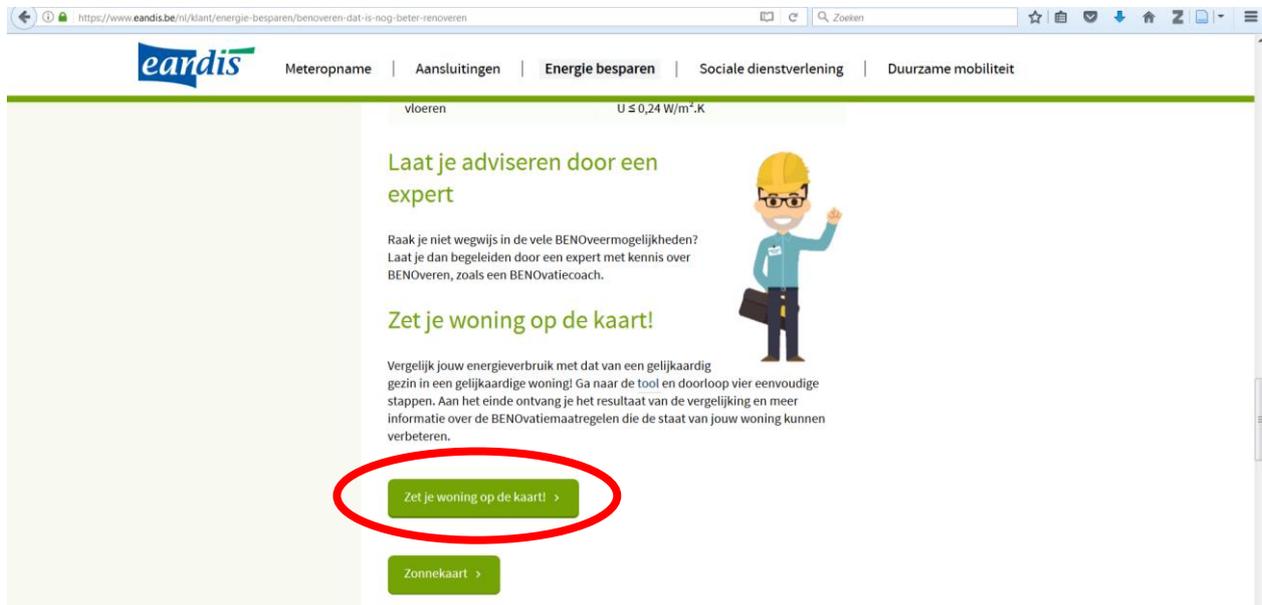


Figure 5: Screenshot of the link to the zet je woning op de kaart in Eandis website

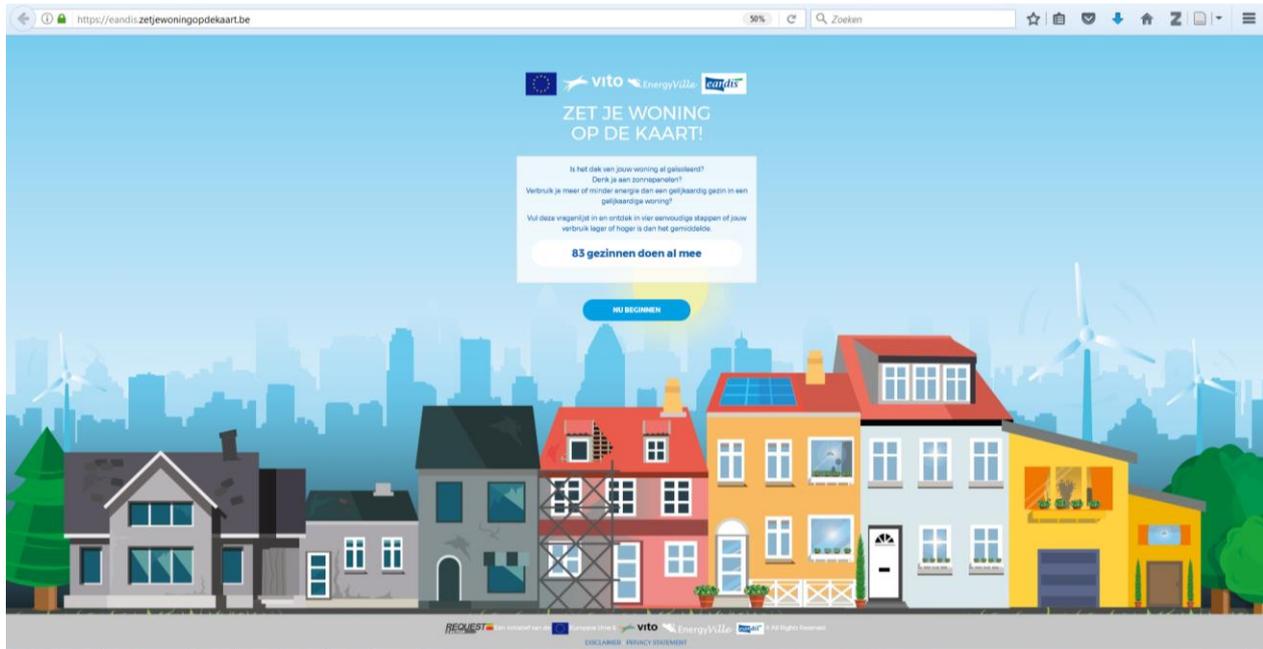


Figure 6: Screenshot of the front page of the Eandis 'zet je woning op de kaart'

Within this limited experience, the users expressed their enthusiasm with the Hub and its smooth operation. Suggestions were received particularly on the benefit of the household when they fill in the data since it is limited at this point in time. There are plans to enhance not only the visualization of the benchmark but also to link it to a renovation advice generated by a separate tool developed by VITO.

1.4 Conclusion

Building the Belgian hub from scratch was a challenge in itself. The initial definition was being fine-tuned following discussions with the IT department and feedback from potential users. This interaction with potential users and partners, although time consuming, has proven to be extremely valuable for a successful hub definition.

The piloting phase was clear evidence of the need of marketing actions when the Hub needs input from consumers.

Prepare well in advance the data privacy policy for all the partners involved. The usage of the data should be clearly stated towards the Hub user.

2. Greece

2.1 Design (definition)

The Greek HUB intends to be the most important Greek source of information related to energy renovation in buildings. The ultimate goal of EPCs is to create a demand-driven market for energy efficiency in the building sector. Providing owners and occupiers with objective information to assess, compare and improve their properties' energy performance may not only add a new dimension to the decision-making process, it might also transform the real estate market. The greater the tenant's interest, the greater is the incentive for the owner to improve the energy efficiency of the building. The Greek HUB wishes to become a bridge linking the building users with the existing energy efficient solutions and enhance the up-taking of energy renovation measures.

The HUB addresses to four categories: home owners, trades people and services providers, local authorities interested for their residential building stock and policy makers to get specific information and trends and prepare the future national supporting actions to building energy retrofitting.

The trades associations provided an important source of information, since its first draft, contributed to the data presented and are continuously supporting the HUB activities. The stakeholders provided valuable help related to the layout and features of the HUB by participating in various events (workshops, exhibitions).

The quality control of the information and data provided is carried out by CRES energy efficiency experienced personnel. Especially the data presented in the HUB are provided by official sources, i.e. the ministry of Environment, and Energy, the National Statistics Authority, and the national trades associations.

2.2 Development

The Greek HUB "EnergyHUB for ALL" (<http://www.energyhubforall.eu/>) is conceived, designed and maintained by CRES. It is programmed in *html code together with the *css code for the graphic design. It consists of a user friendly public website which contains large amounts of information related to energy renovation in buildings. Figure 7 depicts the Greek HUB main page. Since the hub's content is addressed to more than one key actors it was decided not to divide the Hub according to the categories of the interested parties.

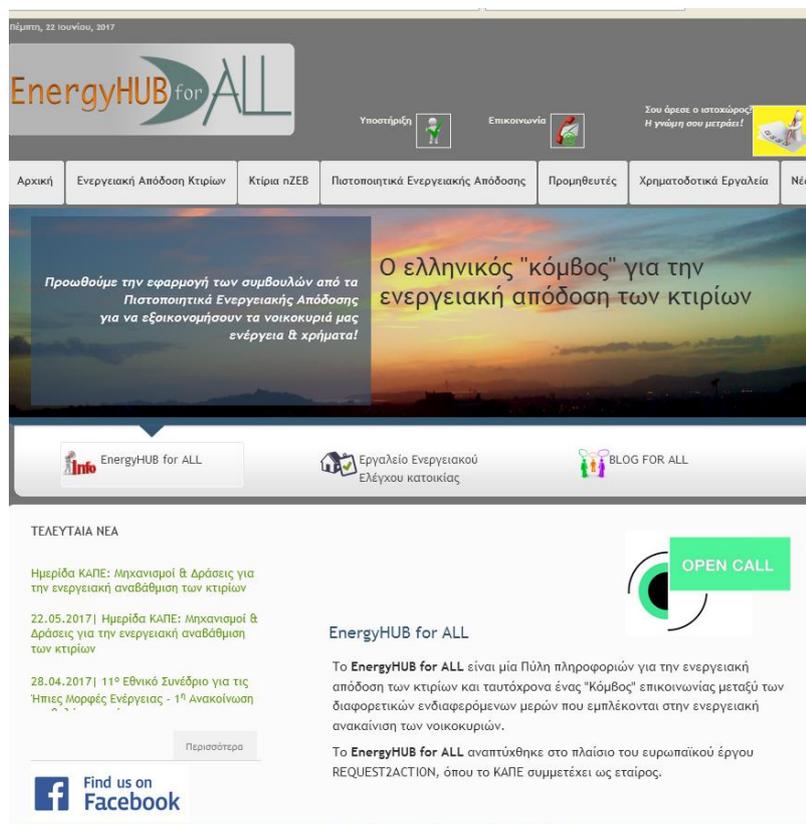


Figure 7: The Greek HUB main web page.

The database for the various suppliers was designed to have a common, friendly layout, with easy search and visualization features. During the development phase, this database took a specific form so as to accept easily new additions and data update of existing entries. The statistical data related to EPCs are acquired from the national body responsible for all issued EPCs and are aggregated in order to be presented on the HUB.

The Home Energy Check tool is embedded in the HUB and is connected with the national software for energy calculations and energy categorization through a platform that connects the flash input data format with the software in an application server. The HEC (Figure 8), in only 11 simple steps, has the ability to calculate the current energy needs of a house and to come up with various energy renovation solutions. Another interesting feature is that the HEC saves all the performed runs. Various scenarios are tested and through an analysis, important findings can be derived related to the most preferred solutions, geographical area, type of house (residential-flat), floor area, and

energy saving achieved. Another intriguing feature is the ability to connect the results from the HEC use with the suppliers database so that the user can get direct information on where to find the energy renovation technique(s) he tested.



Figure 8: The Greek HEC tool.

The simplicity of layout, the user friendly navigation, the right sizing of the web pages so that the user is not tired, were key parameters taken into consideration during the design process of the HUB.

2.3 Monitoring and users experience

The HUB content was determined by CRES with the contribution of many trades associations who are also the registered supporters of the Hub. Valuable input to the information provided in the Hub was given by stakeholders who attended the 3 project workshops, through e-mail contact with home owners, energy consultants, and energy auditors. The EnergyHUBforAll was officially launched at the end of December 2015. It was advertised in more than 16 Greek websites and the Buildup sites. In Figure 9 some advertisements of the Greek Hub can be found. Since the launch of the Hub, more than 7,800 unique visitors used it until end of May 2017 and more than 44,000 pages were reached. Additionally, 5 presentations in exhibitions and workshops about buildings were carried out and 5 articles regarding the Hub have been published in magazines and web pages.



Figure 9: Advertisements of the Greek HUB.

The stakeholders engagement was an important part during the development of the HUB and their contribution on its content and layout was often asked for. Two workshops took place in Greece to get the input of the various

stakeholders through the completion of HUB evaluation questionnaires and personal contacts. An embedded in the HUB questionnaire was also related to get the feedback from the users. Until the end of May 2017, 55 questionnaires had been submitted online. The stakeholders showed great interest (see Figure 10) on the Hub design, the information provided for funding mechanisms, and the search for trades people. More information regarding the stakeholder’s engagement process and results can be found in Deliverable D5.7.

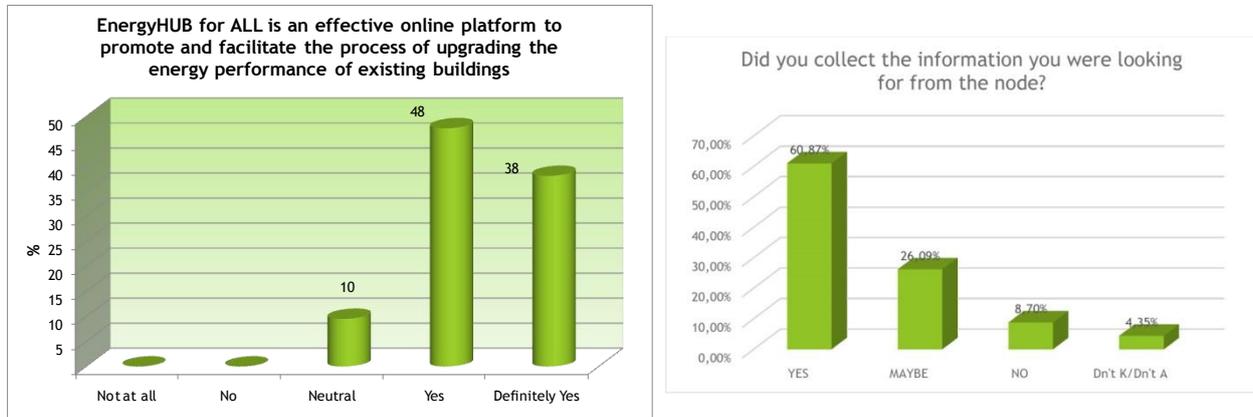


Figure 10: Findings from the questionnaires analysis.

In the future marketing activities, it is considered to add more energy efficient building products and technologies both in the suppliers area and on the HEC tool. Interest has been shown on energy efficient bricks, and additional thermal insulation product types.

CRES is also in the process to add two more associations in the Hub supporters, namely the Association of Greek Contracting Companies (SATE) and the Union of Building Constructors.

2.4 Conclusion

The creation of the EnergyHUBforAll has been a challenge because it had to fulfil many different requirements, i.e. to be appealing to the general public (homeowners), provide information in different levels of users – from people with no particular knowledge about energy renovation solutions, to policy makers and energy consultants, explain in simple way how energy efficiency in buildings can be achieved and why it is important, and finally become a knowledge platform for key actors (trades people, financiers and decision makers), as well as a monitor platform for refurbishment activities. The result is an ergonomically designed web site which is a vast information resource on energy efficiency in buildings, nZEBs, funding mechanisms, and related projects. Additionally, the HUB provides with updated statistical data for EPCs, a search tool for trades people related to energy retrofit actions and an interacting tool to get accustomed with possible energy renovation activities.

The development of the Hub went through various phases, taking into account the stakeholders opinion, the various supporters’ suggestions and the state approval. The following lessons-learned are highlighted:

- The Face to face contact provided very valuable information on expectations, information put on the HUB.
- Supporters can be very useful to promote the use of the HUB.
- Valuable feedback was received from stakeholders regarding the usefulness of the HUB contents.

- Attractions are needed to enhance the HUB visits and use. i.e. use of special landing page and/or cross linking.

3. Italy

3.1 Design (definition)

A national hub on building energy renovation was lacking in Italy. The **R2A Italian Hub, Portale4e**¹¹ aims to be a knowledge platform and a **one-stop-shop for the 3 main target groups**: policy makers, trades-people and professional, citizens. Main focuses of the Hub are:

Information: Standards, technologies, incentives, news. The **Home Energy Check, named 4ECasa**¹² simple test for homeowners and tenants to verify consumptions and get advice on refurbishment opportunities and benefits was developed on purpose for this hub within REQUEST2ACTION.

Methodologies: Audit, assessment, monitoring, planning tools and methodologies. The R2A **DIPENDE**¹³ data-tool, Integrated Database of Energy Building Planning is available on the Hub.

Networking : the hub will be supported by a community that will contribute to the Portal contents and get visibility in return.

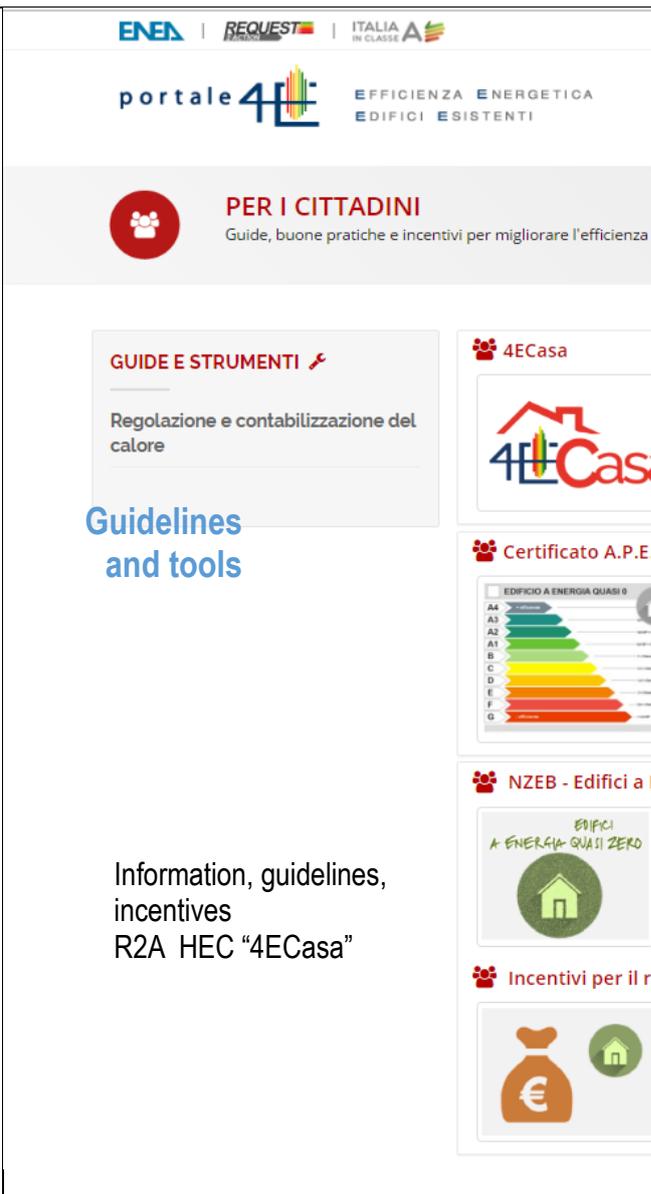
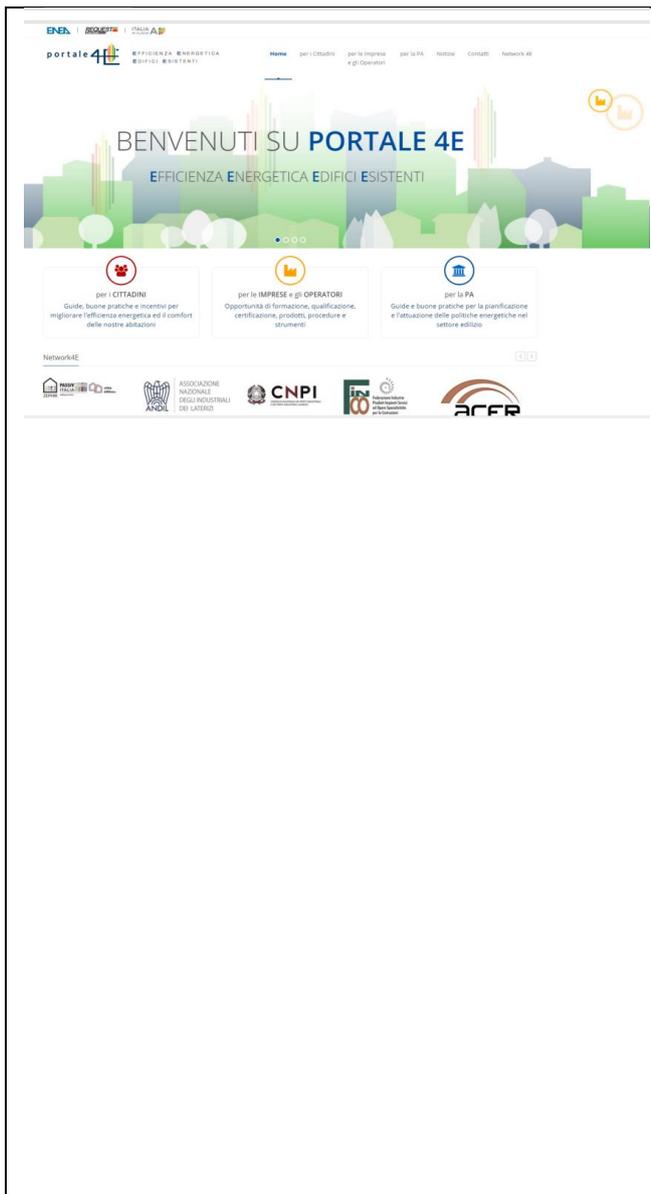
The main contributors to the content are researchers and employees at the ENEA-UTEE technical unit. A panel review is predicted before upload of contents, led by the R2A coordinator for Italy and including internal and external reviewers. The quality of the hub so far was also helped by the stakeholders input (see REQUEST2ACTION D.7).

Main pages are: citizens, enterprises and professionals, local authorities, news, network4e, contacts.

¹¹ <http://www.portale4e.it/>

¹² <http://www.portale4e.it/4Ecasa/index.aspx>

¹³ http://www.portale4e.it/centrale_dettaglio_pa.aspx?ID=1



Information, guidelines,
incentives
R2A HEC "4ECasa"

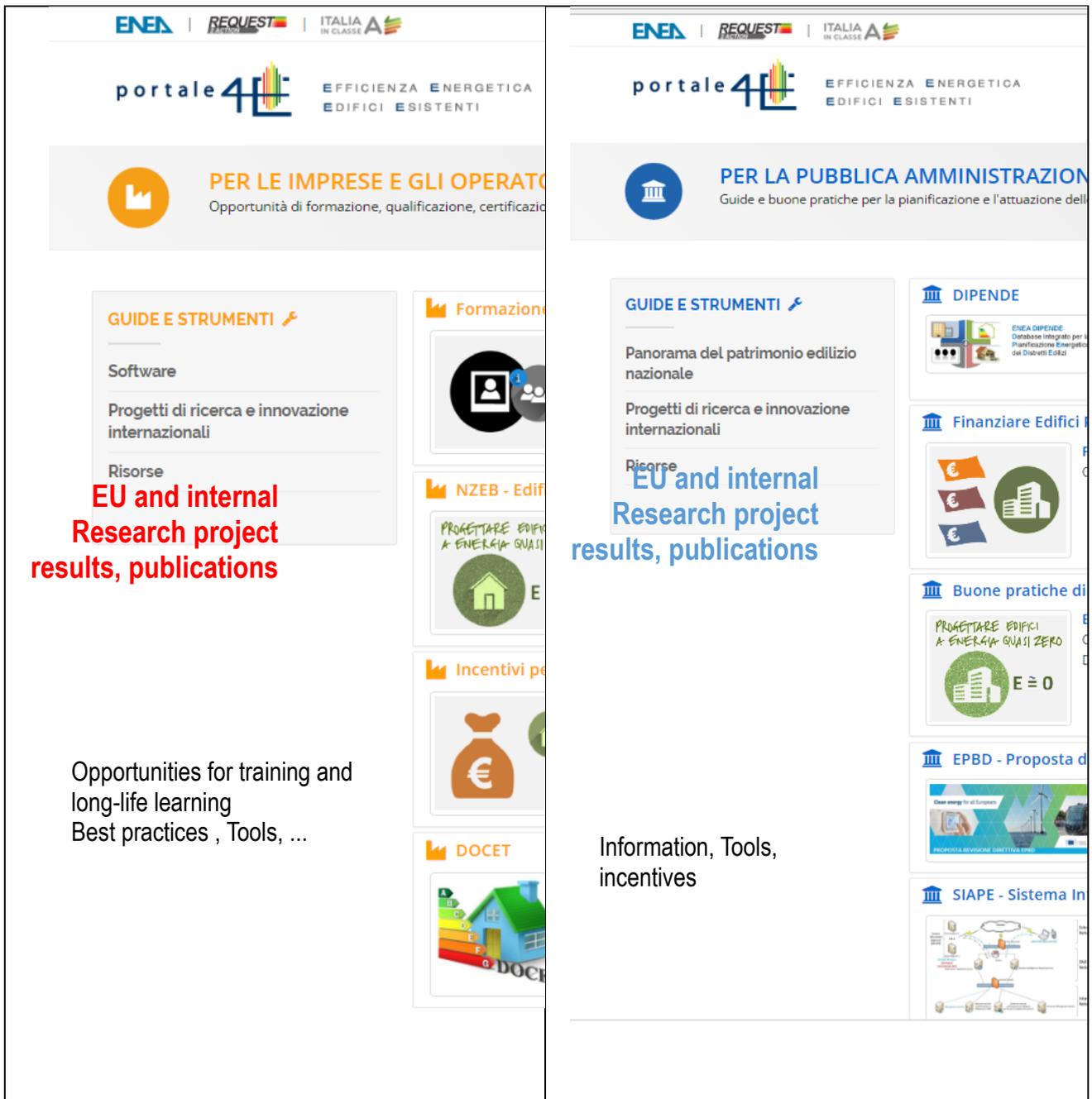


Figure 11: Screenshot of the homepage and of the targeted sections of the Italian Hub www.portale4e.it

3.2 Development

ENEA initially used their own ICT resources to develop the platform. The 1st Hub version had been embedded in the ENEA EE Unit website. This 1st version was created through the basic version of PLONE open source software under Windows, a Content Management System (CMS) which allows users to create, manage and publish content to a website without requiring a high level of technical skill. Nevertheless the result was not completely satisfactory from a graphic point of view and usability, was too overloaded with information, and there was a certain interference with the structure of the “mother” ENEA-UTEE unit website.

So, following the 2016 stakeholder evaluation (see D5.7), a decision was taken to re-focus the content and to go for a stand-alone website and the ICT development was subcontracted to a software-house (as originally predicted in the R2A Grant).

The HEC excel tool by ENEA was provided to the software-house in order they could develop the on-line web interface (PC, notebooks, tablets, smart-phones). The HEC requirements included quick inputs and user-friendliness but also the possibility to register data from householders.

This way the website will collect data on EPCs and actual home consumptions. This feeds a database that can be analysed by ENEA and crossed to other building and energy data. Other data are being transferred to the SIAPE (EPC national information system) by Italian Regions through and agreed xlm file. The data will be analysed and released on the website in an aggregated format (as soon as they are available) and will contribute to further extend the application of R2A DIPENDE tool.

In order to have a new-generation responsive website, the following technologies have been used: *Windows server 2008, IIS 7 - Internet Information Services, Data Base SQL Server 2008, Html5, Css3, Programmazione.net, Library JQuery for the events, Framework Bootstrap for web interfaces, API google map, google chart and analytics.*

The software house (Soluxioni.it) has provided ENEA with a management application in order ENEA personnel can easily and independently control contents, editing existing pages, adding new sections, removing old content, uploading new videos, by use of a simple web-based editor similar to Microsoft Word, that will contribute to the Hub sustainability.

3.3 Monitoring and users experience

A first positive feedback on the Hub was collected from some 50 stakeholders in October 2014. A first version of the portal was already published at the end of 2015 and comments was gathered in 2016 . The new portal was ready in February 2017 and is being publicly running online from late April 2017. The new portal had to undergo an internal review, comprising a first check of the HEC algorithm and function.

The new hub was shown to different stakeholders in May 2017 but it has not been officially launched in order to allow further insertion of some more relevant pages. A soft launch will occur on 23rd June and the official launch on 11th July 2017, during the presentation of the annual Energy Efficiency report published by ENEA.

A first marketing action occurred, with a selection of six relevant stakeholders (their LOGOs are displayed on the Hub). They committed to contribute to several sections (technical guidance and innovative products professionals, territorial data, best practices) under ENEA review. Appreciation was expressed on the content, that includes different aspects of building renovation (techniques, financial instruments, advice), and on the new Hub style.

In line with the R2A aims Local Authorities asked for more and easier accessible data on energy efficiency of the building sector and a page was built on the overview on consistence, consumptions and potential savings of the national building stock.¹⁴

Until March 2019 the Italian will be run under the PIF, Information and Training programme for Energy Efficiency, funded by the Ministry of Economic development within EED article 12 implementation.

3.4 Conclusion

Do rely on experienced website developers! Secure the fidelity of users and their continuous feedback to guarantee quality and effectiveness

Do not overload the Hub with not-targeted information!

The sustainability of the Portal will be mainly assured by the mandate of ENEA Agency, that foresees a similar service. Nevertheless in-kind contribution is being provided and is key for quality, consistence and effectiveness of the Hub.

¹⁴ http://www.portale4e.it/pa_guide_dettaglio.aspx?ID=1

Trades unions and professional associations engaged in contributing to promote low-carbon refurbishment through the Hub so having the opportunity to find more customers (using the Hub as a meeting platform). They asked for more info on best practices of building energy retrofit, deep renovation and NZEB, but also for a focus on cooling techniques and calculation methodologies.

Policy makers – (national, regional, local) are keen to share best practices and debate on dataset availability and interoperability (EPC data are due according to a Decree June 2015), inform progress and policy interventions, and welcomed R2A tools to acquire insight for planning. They recently¹⁵ discussed and agreed on establishing a network to exchange experiences and create opportunities for collaboration and project funding. This network might be conveyed by portale4e.

Portale4e will be further developed in this sense, showing territorial peculiarities.

4. Portugal

4.1 Design (definition)

The Portuguese retrofit action hub, *Portal CasA+* aims at responding to a market gap between home owners and energy efficiency solutions providers. The goal is to develop a one-stop-shop to bring together all key players of the renovation process, promoting a closer contact between the different actors, fostering the commercial relation between demand and supply, reinforcing market trust and boosting the easier adoption of energy retrofit measures.

The *Portal CasA+* hub addresses homeowners, installers, energy experts, public authorities, insurance and banking (these two at a later stage), that can further reinforce the market support to the efficient uptake of these measures.

The hub is managed by ADENE. The business model around it foresees it can be self-sustainable, based on the marketing that will be made by the companies that want to be present on the list of suppliers (builders) of the hub, as well as others in evaluation.

ADENE will oversee all the commercial interactions between the suppliers and the dwellers, assuring a smooth interaction and providing support throughout all the process.

Monitoring the implementation of the energy retrofit measures is the key point. To this end the hub allows the dwellers (or the solution providers) to register the installation of the energy retrofit measure in their private area, acknowledging the acceptance of one of the budgets received from a supplier or manually registering the installation from another source.

Quality monitoring will be assured via random surveys to both suppliers and dwellers, to track how their experience was around the hub, from the beginning of the interaction with the supplier, to the budget request and implementation process.

4.2 Development

The Portuguese hub presents a public and a private area.

The public area aims at providing overall information about the hub's goal, services provided, target audience and overall functioning policy, aiming to attract new users.

¹⁵ Workshop Pianificazione energetica a livello locale: esperienze e condivisione | Lancio della rete ALEP-I-Net, http://www.enea.it/it/comunicare-la-ricerca/events/alep-i-net_22mag17/ENEA-Roma

The private area is available both for dwellers to register their homes and for suppliers to register their services.

The hub builds upon the EPC database centralized information, allowing it to be enhanced and further detailed at the home owners' level. Through the hub the home owner can easily access information on the building solutions, active appliances and energy efficiency measures. He is also invited to upload information relating to the energy use profile, energy and water consumption monitoring, register existing appliances, etc., fostering the creation of practical energy retrofit opportunities. The data provided for each house is analyzed allowing the hub to provide real time and automatic recommendations, based on the energy profile and on the type of solutions available at the house. It also allows the home owner to access qualified companies that provide energy efficiency solutions as well as to evaluate and choose based on reviews of other users. All the process can be accompanied by specialized energy experts, providing advisory services to consumers, monitors implementation of improvement measures.

One of the critical points in the hub definition process was the **authentication process**, as it need to assure an effective data protection model. To that end the portal follows the same guidelines and procedures as those already **followed by the Portuguese public administration**, to access, for example, their online finance area (to declare the VAT deductible expenses).

4.3 Monitoring and users experience

The hub's monitoring is assured through the periodic collection and evaluation of several KPIS, such as:

- total number of users (home owners, energy experts, suppliers);
- EPCs issued promoted by the HUB (engagement of a Qualified Expert by a home owner)
- total number of energy efficiency measures listed in the EPCs
- number of energy efficiency measures available for each home (beyond the EPC)
- number of measures implemented (total and individual)
- number of contacts made with solution providers
- number of budget requests/budgets presented
- number of suppliers evaluated by home owners

At the moment, it's not possible to provide effective user's feedback, though this will be attained through surveys deployed on the hub (throughout the different stages of interaction) to all the stakeholders involved, from home owners, to energy experts and solutions providers. Also, user's feedback will work side by side with the EPC surveillance system to evaluate the Qualified Expert work during the EPC emission process and a large-scale quality assessment by home owners, who can edit and report on the wrong identification of building components and technical systems

4.4 Conclusion

Overall the hub is a mechanism to promote EPC, the information it entails and further support the home owner in his home energy retrofit process, allowing him to easily know which are the best measures, who to contact, how to require and evaluate budgets and easily maintain record of all this activity in one single platform.

The lessons learned through the process are:

- the critical importance of involving trade associations, to reinforce commercial partnerships and more easily access the market and achieve a critical mass of suppliers in the hub;
- be very transparent and precise on the platform user's policy, namely regarding data protection issues;
- be ambitious but do also foresee an evolutionary perspective for the hub.

Implement the HUB step by step focusing in the most relevant parts to operate it and future upgrade after, specially concerning feedback received meanwhile.

5. UK

5.1 Design (definition)

The purpose of the Hub in Scotland is to make EPC data, and other related data on the housing stock, available to the supply chain, local authorities, Scottish Government, public, universities and community groups in Scotland.

The Hub builds on existing work that EST was already undertaking with local authorities and the supply chain in Scotland to make EPC data available to them via a GIS platform.

EST undertook extensive consultation with the Scottish supply chain to understand their needs for data and what would be the most beneficial way for them to access the data.

Based on this analysis EST developed and demonstrated a pilot portal with the supply chain and received further feedback on this, in order to inform a portal to be included in the hub for WP4.

The stakeholders involved from the supply chain were a mixture of large and small installers of energy efficiency technology, as well as a number of industry body representatives such as the Solar Association.

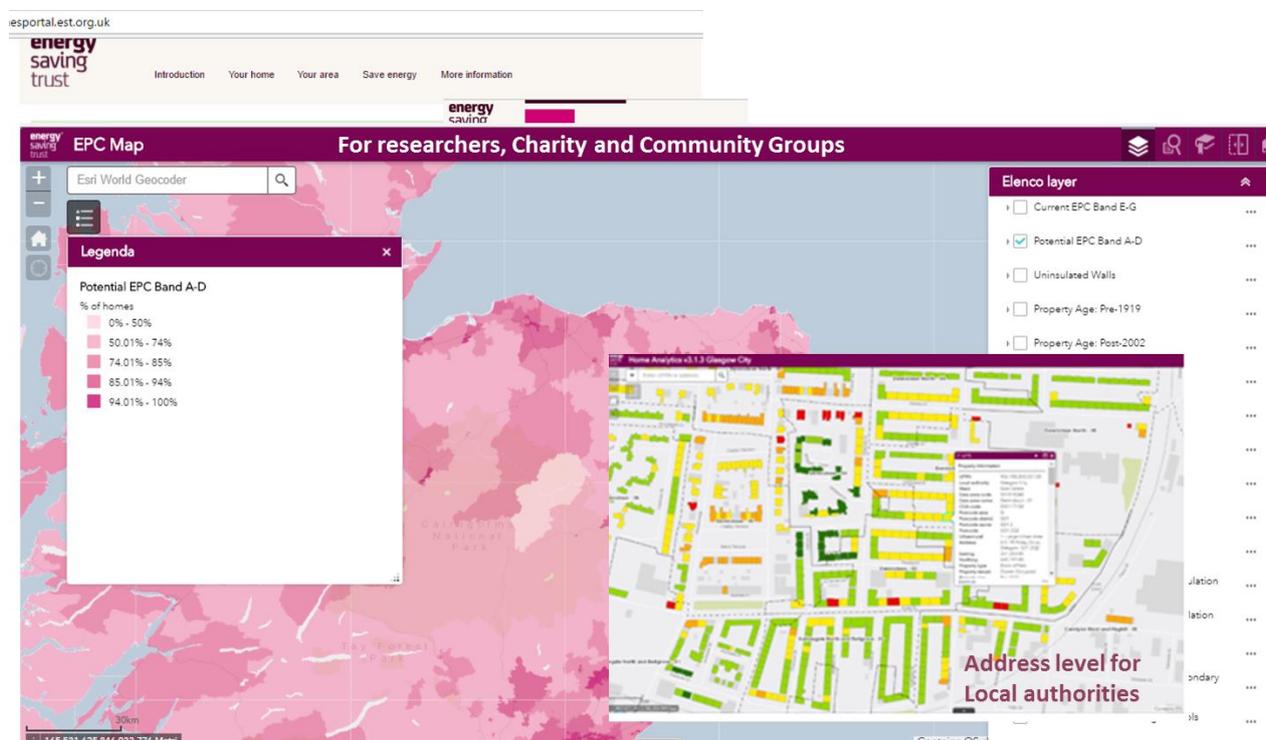


Figure 12 – Selection of screen shots of UK Hub

5.2 Development

Several specifications were considered when developing the EPC hub (Local Homes Portal) in the UK. There were a number of key factors that influenced our decision such as quality of service, cost, ability to support/update hub internally, experience with contractor (where applicable) and flexibility going forward. Since it was important that we delivered a high quality data service within a reasonable budget, we stressed that the hub must be fit for purpose. To do this, we spent time engaging with key stakeholders and user groups such as supply chain members, community groups and researchers. From our previous experience providing EPC data and maps to local authorities in Scotland, we already had a good understanding of their needs as well as the advantages and disadvantages of certain approaches to data provision.

From this engagement process, we were able to identify the EPC fields users were most interested in, the geographical scales that were most relevant for their work and preferred methods of displaying/delivering the data to them. This enabled us to create a specification document with a prioritised features list. Next, we used this specification document to finalise the backend/development approach to the reports and maps as well as create wireframes for the user interface. To reduce technical complexity, server costs and development time, the decision was made to display EPC data in the form of static reports and maps which would be updated and linked to the hub in regular intervals. From our experience using dynamic reports in the past, a direct database connection would require a higher spec webserver to support multiple users running queries simultaneously and would have a higher risk of crashing. Since the underlying data in the reports and maps would only be updated once or twice a year, the benefit of having a dynamic connection did not justify the added cost and risk.

Since EST did not have sufficient expertise to develop the user interface for the hub in-house, we solicited quotes from several web developers that we had worked with in the past. The proposals we received were comparable in terms of quality, so we chose the contractor that would provide the work at the lowest cost and deliver the interface on an open-source platform (Drupal) which we could update ourselves and did not require additional software licenses.

Over the course of the development phase of both the data assets and the user interface, several modifications were made to the initial specification and wireframes to account for additional constraints related to data sharing and site security. The final specification of the hub included the following components:

- 1. Website – a Drupal-based website hosted on an EST webserver and protected with an SSL certificate.**

Design

There is a public-facing section of the website tailored to householders and tenants who wish to download their EPC, compare the EPC rating of their home to average homes in their postcode area and access EST's Home Energy Check tool to get bespoke recommendations for improving the energy efficiency of their home.

Due to data sharing restrictions and the terms of use associated with some of the datasets that we provide as an integrated package with EPC data, all other users must create an account on the hub before access is granted. Supply chain members, community groups and researchers requiring access to EPC reports and maps only, can fill out the online account creation form, check a box confirming they agree to the terms and conditions of using the hub and gain instant access to the data.

Researchers or local authority users requiring access to Home Energy Efficiency Database (HEED) reports can request this through the online form however; their account is not automatically activated. When a request is received, an EST representative emails the user a form they must print out, sign and send back. Once their

proposal has been reviewed, they may be approved, denied or asked to provide further information. Once approved, their account is activated and they can login to view the relevant reports and maps.

Since local authority users and approved RSLs have access to the most comprehensive and granular level of data offered through the LHP, EST manages this user list internally. Each year, local authorities and RSLs are required to sign data sharing agreements that enable them to access the data. Once these are signed, EST coordinates with the various councils and RSLs to determine who should have access. For ease of use, accounts are manually created for each user and then emails are sent instructing users how to create their password and sign in for the first time.

Challenges

- Accounting for all the different user groups and what reports/maps they were allowed to access
- Installing the SSL certificate on the webserver
- Coordinating content so the user journey for each user group was as simple and straight forward as possible without overly complicating the design of the website

2. Reports – downloadable, Excel macro-enabled spreadsheets with query and dashboard functionality.

Design

Feedback collected from relevant stakeholders indicated a need to make the reports accessible in a form that users were familiar with and could facilitate data analysis offline. To meet this requirement, we made the reports available as Excel macro-enabled files that could be downloaded directly from the LHP. While the format of these files differs slightly depending on the type of data they contain all include some form of query tool that allows users to quickly filter the data by specific search criteria (e.g. show only the properties that are privately owned and have uninsulated cavity walls). Specific reports also include an aggregation tool that sums up address-level information at various geographical scales and dashboards which make trends and patterns easier to spot.

Challenges

- Time intensive to create, code and test the initial templates in Microsoft Visual Basic (VB)
- Large files eat up available space on the webserver and required special upload permissions within the Drupal backend
- Computers are trained to treat macro-enabled spreadsheets as potential viruses and therefore, require user guidance/training to ensure that users feel safe downloading them
- Some queries in the larger reports (i.e. local authorities with hundreds of thousands of homes) can take 30 minutes to an hour to run

3. Web maps – web apps developed using ArcMap and ArcGIS Online, hosted in Esri cloud.

Design

When working with large datasets, scrolling through thousands of rows in Excel is not the best way to analyse the data. Often times, it's not until you see a visual illustration of the data that you can identify important spatial patterns. To facilitate this type of analysis, web maps were always considered an integral part of the LHP. The challenge was to make them functional and performative without overwhelming the user with features.

In the end, we elected to develop the maps using Esri's ArcMap for Desktop and ArcGIS Online (AGOL). Esri ArcGIS desktop software is the most well-known GIS package globally and a majority of ICT teams within local authorities are familiar with it. AGOL is particularly attractive from a cost perspective because it allowed us to store our map files in the Esri cloud at a much lower cost than provisioning and supporting a separate server to host all the information.

Producing the maps involved several steps. On our local machines in ArcMap, we prepared the necessary geodatabases, created a tiling scheme and feature layer for each map, and generated tile packages for each variable being mapped. The feature layer and tile packages for each map were then uploaded to EST's AGOL account where they were 'buddied up'. The resulting web maps were then linked to a web app where the widgets were selected and the user interface was customized.

When a user accesses the web app they are able to use the search bar to find specific properties or regions, toggle between different layers (e.g. property type, tenure, age, EPC rating, wall insulation, loft insulation, heating type, energy consumption, etc.), execute queries to identify areas or individual properties that meet their specific criteria, export the results of the query to Excel for further analysis and take screenshots of the maps for inclusion in reports and presentations.

Challenges

- Creating a tile package for all of Scotland was too data intensive so instead we split the country into three regions which proved to be a good balance between speed of processing and number of files to upload/manage
- Tile packages take a long time to produce and therefore, require a python script and several users running the script on their user accounts simultaneously to fast track production
- Data sharing restrictions meant separate web maps and web apps had to be produced for each local authority (30) in Scotland – creating each manually was very time consuming so we used JSON code to apply formatting from a template web app to all the other local authority web apps which proved to be a much more efficient process
- Running complicated queries on large areas of the map will often result in the web app crashing, therefore we instruct users to use the query tool for smaller areas/neighbourhood analysis only

4. Database – SQL Server databases hosted on cloud server

Design

The data that underpins the reports and maps is stored in a series of SQL Server database tables on a cloud server managed by a sub-contractor. Because these databases are not dynamically connected to the reports or maps, a system outage or restart of the servers will not affect the availability of the LHP. The primary software EST uses to extract, transform, load, cleanse, model and organize the data is R – an open-source statistical package which can be connected to a SQL Server database via an ODBC connection.

Challenges

- Processing large datasets in R (i.e. objects with millions of records) can become time consuming
- Spreading the development environment across servers and local machines can make it more challenging to transfer files, share resources between developers and coordinate tasks

5.3 Monitoring and users experience

To help ensure users were able to make the most of the data and maps provided through the LHP, EST held several webinars and training sessions with various stakeholder groups (e.g. Scottish government, supply chain members,

local authorities). We also prepared extensive user guidance and data dictionary documents that were signposted on the LHP and available to download as PDFs.

To track the usage of the hub, we setup a Google Analytics account and linked it to the various pages on the LHP. This enabled us to track important metrics such as:

- How many users were accessing the hub?
- How were users navigating to the hub?
- What devices were users using to view the hub?
- Which pages they were navigating to?
- What reports were they downloading?
- What maps they were viewing?

During the monitoring and evaluation stage of the project we reported on these metrics in biweekly hub reports so that we could better understand our users and make any necessary changes to improve their experience. We also conducted focus group testing with specific local authority and Home Energy Scotland (HES) users to get detailed feedback about the hub and features they would like to see included in future iterations.

5.4 Conclusion

Based on our experience developing the Local Homes Portal for Scotland, there have been a number of key lessons that have emerged through the process:

- **Engage with internal stakeholders early in the project** – the development of the LHP involved various different teams within EST (e.g. Data Insight and Analytics, Supply Chain, Marketing, EU, Legal and IT). While we made efforts to integrate all relevant stakeholders into the project, there were some we did not initially include. Had we spent more time at the project conception phase considering which teams would possibly need or want to be involved in the project, we may have been able to read them in sooner and avoid delays or missteps.
- **Define use cases and design solutions accordingly** – it is important that the solution you develop directly addresses the needs of the end users. We found it helpful hosting workshops and webinars with key stakeholders during the design phase so we could understand what problems they were trying to solve. This helped us make important decisions on content (e.g. variables to include in reports/maps, queries fields, layers in maps), format and functionality (e.g. Excel reports, interactive maps). Having clearly defined use cases also helps to communicate the objectives and benefits of the project to other audiences.
- **Use open source software where possible** – there is a growing library of free, open-source software packages available that allow you to build databases, create web pages and analyse large datasets. The more you can move away from expensive, proprietary software, the more agile and financially sustainable your project can become.
- **Combine tile maps with feature layers for high performance maps** – from our previous experience developing detailed, large scale web maps, we knew feature layers alone would not get the job done because there is a limit to how many points can be rendered at one time, often causing performance to lag. By combining them with tile maps, we were able to vastly improve the look and feel of our web maps while reducing the instances of timeouts and glitches.
- **Beware unforeseen IT costs** – engaging with IT is an important first step in understanding the potential costs of developing an EPC hub or tool. Items such as website design and support, webserver provisioning and hosting, SSL certificate implementation, domain registration, website deployment and testing are all important pieces that should be accounted for in the project budget.
- **Don't forget to plan for support and maintenance** – it is also important to think about the long-term sustainability of the project. Who will be responsible for administrating and supporting the website? How will this be funded? From our experience, choosing a platform (e.g. Drupal) which we had the internal capability to

administer and update ourselves was a big win as this helped reduce future support costs and enabled us to make improvements to the site as we received user feedback.

CHAPTER VI **Recommendations**

In this chapter, the recommendations derived from the experience and the analysis work are summarized. These recommendations are addressed to anyone working towards building a Hub. The recommendations are split per phases: the design, development and monitoring phase.

4. During the design phase:

- a. **Data protection policy should be clearly stated**
If the Hub collects or uses personal data, one has to be aware that law is rapidly changing in this field making the use of personal data more restrictive. Clear obligations are outlined in the General Data Protection Regulation (EU) 2016/679 of last year. Moreover, it is advisable to review the national (and sometimes regional) implementation of the obligations related to the processing and treatment of personal data if that is somehow used in the Hub.
It might be that different stakeholders have different rights of personal data visualization. This flexibility needs to be accounted for at the moment of designing the IT system allowing for user identification via a log in and adapting the access to personal data accordingly.
- b. **Be ambitious but do also foresee an evolutionary perspective for the hub.**
The evolution and upgrade of the Hub is key for its success, otherwise it risks to be soon outdated and forgotten by the users.
- c. **Discuss with IT professionals to explore the possibilities and foresee adaptability**
IT tools evolve quickly offering new features more appealing and performant for the user. The Hub should be designed in a way that can keep up with the new trends and stay up to date. Otherwise, the Hub will soon be useless.
- d. **Identify the gap and needs of your customers**
Even though this might seem a recommendation at the stage of thinking of the Hub, in fact this should be a continuous process to be able to keep the Hub interesting for the users. This can be done via monitoring of implementation and collecting regular customer feedback, see point 4 below.
- e. **Face to face contact provides very valuable information on expectations**
Sometimes face to face meetings are necessary to obtain feedback that would be difficult to grasp otherwise.
- f. **Do not overload the Hub with not-targeted information**
The user may get discouraged when the Hub is too dense with information which is not addressed to him. The user needs fast access to the useful information he is looking for.
- g. **Ensure long-term sustainability with a well-thought business plan**
In-kind contribution may be key for quality, consistence and effectiveness in some specific cases when the owner of the Hub cannot receive financial contributions. Also foresee maintenance and support for the long-term.

5. During the development phase:

- a. Implement the HUB step by step focusing in the most relevant parts to operate it and future upgrade
Even when designing a complex tool it is advisable to implement and release it in phases with upgrades. It is then necessary to set out priorities on target groups and functionalities. This approach allows for a faster release and gives you the possibility to adapt the Hub according to the market response.
- b. Do rely on experienced IT professionals
To avoid delays and undesired surprises, it is best to delegate the IT implementation on IT companies with proven experience with the necessary technologies. Try to use open source software as much as possible.
- c. Anticipate it will take more time than you think. Legal procedures, unexpected technical challenges can delay the implementation of the Hub.
And even then, it will take longer than you think...Usually this delays have a budget impact as well, be aware of unexpected costs.

6. During the monitoring phase:

In deliverable D4.2 guidelines for setting up Hubs, we emphasized the need to get customer feedback before the design of the Hub. After the implementation, when monitoring the market uptake, it is also important to get regular feedback from the users or to plan a way where they can easily send you feedback. The future adaptations of the Hub can be then tailored to the requests from the users, if found relevant.

Statistics on the access website can give detailed information on whether the Hub is used as intended or adaptations are necessary. Simple tools as google statistics may monitor the user profile, navigation scheme and timing. Helpful information is useful when thinking on the next updates.

In particular, during the monitoring phase:

- a. Secure the fidelity of users and their continuous feedback to secure quality and effectiveness
For every type of user intended to be engaged in the Hub, appropriate incentives have to be clearly identify. Those can vary very much depending on the reason for the user to access the Hub. If the user is passive, only looking for information, this should be clear, relevant and easy to find. If an active engagement is expected from the user, the benefit should be highlighted before action is requested.
- b. Foresee upgrades on the feedback received
This is an obvious point to continue the development an upgrade of the Hub. Listen to your users, what they need, what they would like to have and how. Their feedback may surprise you...
- c. Well-defined marketing actions are required when the Hub needs input from consumers.
For a market uptake, the marketing activities should be well defined and appropriate for the targeted audience. Language and mean should be chosen carefully, e.g. social media might not be adequate to reach your user.
The impact of the undertaken market activities should also be measured. By statistical tools a potential increase of users should be observed after a specific market action. If the goal is not achieved, the marketing actions need to be redesigned.

- d. Appealing points are needed to enhance the Hub visits and usage
Specially for the case of recurrent users, the Hub should foresee new information, tools or functionalities to keep the rate of visitors.

- e. Supporters can be very useful to promote the use of the Hub
Any type of marketing actions and promotion will be important for the market uptake. The use of supporters or ambassadors is also key since they can spread the word further than your possibilities.

ANNEX I. **References**

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ANNEX II. **Overview Lists**

▪ **List of figures**

Figure 1: representation of a website hub.....	15
Figure 2: Printscreen of the public website for Genk city.....	24
Figure 3: GIS-map data visualization.....	25
Figure 4: Printscreen of mijnbenovatie.be indicating the renovation steps.....	27
Figure 5: Printscreen of the link to the zet je woning op de kaart in Eandis website	27
Figure 6: Printscreen of the front page of the Eandis zet je woning op de kaart	28
Figure 7: The Greek HUB main web page.	29
Figure 8: The Greek HEC tool.	30
Figure 9: Advertisements of the Greek HUB.....	30
Figure 10: Findings from the questionnaires analysis.....	31
Figure 11: Screenshot of the homepage and of the targeted sections of the Italian Hub www.portale4e.it	34
Figure 12: Selection of screen shots of UK Hub.....	38

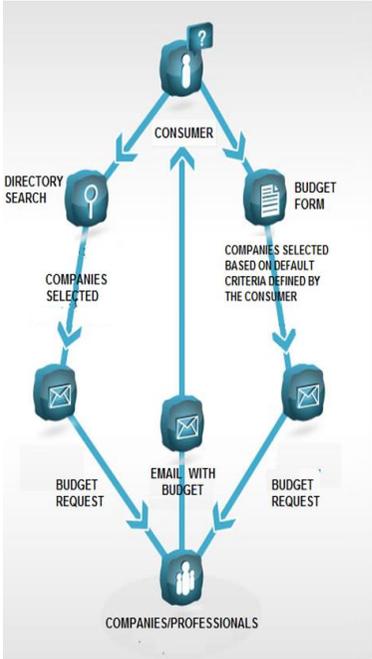
▪ **List of tables**

Table 1: Hubs' classification per aims and country within the energy efficiency theme.....	11
Table 2: Hubs' classification per aims and country within other themes.	11
Table 3: List of type of content per Hubs' aims within the energy efficiency theme.	11
Table 4: List of type of content per Hubs' aims within other themes.....	12
Table 5: Target groups per Hubs' aim within the energy efficiency theme.	12
Table 6: Target groups per Hubs' aims within the other themes.	13
Table 7: General aim per specific Hub.	16

ANNEX III. Best-practices hub's characteristics

	ADENE	ADENE	AEA	CRES
Hub Name	GimmeBudget	Zaask	klimaaktiv – Bauen & Sanieren klimaaktiv - Buildings	Building the Future
Link	http://www.gimmebudget.com/	www.zaask.pt / www.zaask.com	http://www.klimaaktiv.at/bauen-sanieren.html http://www.klimaaktiv.at/english/buildings.html	www.ktizontastomellon.gr
Organisation	GimmeBudget	Zaask Portugal	Austrian Energy Agency (general management of klimaaktiv)	Centre for Renewable Energy Sources and Savings (CRES)
Logo				
Contact Person	tbc	Luis Martins	Dlin Franziska Trebut	Anastasia Spanou / Andreas Androutsopoulos

<p>Aim</p>	<p>A mission of becoming Portugal largest online market capable of connecting consumers and professional service, always ensuring high quality of services at the best price. And revolutionize the way consumers get budgets and contract services locally.</p>	<p>On-line platform to obtain quotes from different service providers.</p>	<p>“Energy efficient construction and a high-quality restoration is the key to effective long-term climate change. The klimaaktiv building standard is the guiding principle for environmental and energy-efficient design throughout Austria.” (source: klimaaktive website) klimaaktive has developed a quality standard for buildings. Main theme is the promotion of this building standard and to create a network of experts. Target group are architects, energy consultants and future home owners.</p>	<p>“Building the Future” is a project for Sustainable Buildings and Green Development. Specifically, is a partnership between the public sector, manufacturing industry and citizens that related energy assistance, as follows:</p> <ul style="list-style-type: none"> • replacement or installation of frames and glasses, • replacement or installation of insulation, • installation of cool roofs, • replacement or installation of solar systems, • installation of thermal and cooling systems, • installation of lighting, • installation of BEMs <p>in residential and commercial buildings.</p> <p>The project sets as its main objective the contribution to achieving national targets for energy savings by 20% by 2020, creating buildings with low energy consumption. Specifically, the project aims:</p> <ul style="list-style-type: none"> - To reduce the energy consumption of the buildings and upgrading its environmental quality. - To reduce the financial cost of the owner who want to upgrade their buildings. - To reduce the operating cost of the buildings. <p>The project addressed to all citizens in an attempt to ameliorate energy efficiency and decrease energy consumption of the Greek residential and commercial buildings. The project covered the following activities for Greece:</p> <p>Certified products (insulation, cool roofs, solar collectors etc.) Discounts on product prices, through voluntary agreements with industry Energy saving Technical support and assistance to the companies for all their none certified products.</p>
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<p>Type of content</p>	<p>Registry of users (general consumer) Registry of professionals Access to budgets in two different ways</p> 	<p>Contacts of service providers.</p>	<p>Information for the planning or renovation of non-residential buildings (guidelines) - Information for the planning or renovation of residential buildings (guidelines) - Information about funding, consulting offers, expert surveys - Information about the klimaaktiv quality standard for buildings - Information about the klimaaktive criteria catalog - Information about the building declaration - Cost calculator and other helpful excel tools - Database about best practice examples - Contact list of regional partners, experts and klimaaktiv competence partners - Overview of energy advice centres - Information for choosing the right heating system for a building to home owners</p>	<p>CRES team developed the web system www.ktizontastomellon.gr of the project, that includes: The guidelines and legislation for energy saving in buildings (search, categorization, digitizing, data entry). The technical Instructions for the implementation of energy management systems List of certified products and systems and of their suppliers. Online toolkit for measuring the energy efficiency performance (software development) Database (dynamic platform) with the certified products and systems of the project (software development).</p>
<p>Target Groups</p>	<p>All consumers and professionals</p>	<p>General Consumers, Home Owners</p>	<p>Architects Energy consultants Clients/investors Building owners</p>	<p>Building owners, engineers, builders, energy consultants, energy inspectors energy products companies, installers / technicians technologies / products</p>

<p>Audience reached</p>	<p>5000 budget requests</p>	<p>tbc</p>	<p>1.300.000 people per year Type of visitors: architects, energy consultants, clients/investors, building owners</p>	<p>Type of visitors: trades people, building owners, investors and developers Number of visitors (available data from help desk system): about 150 visitors per month</p>
<p>Stakeholder involvement</p>	<p>25 companies/ professionals registered, offering services</p>	<p>Service Providers must register on a platform and give quotes to consumers. Execution of the work.</p>	<p>Actors are involved through newsletters and annual events (award event, State Prize for Architecture and Sustainability). The regional partners are in direct contact with the program management on a regular basis (workshops, working groups, projects; see also maintenance of the hub content) and coordinate the actions in their own regions.</p>	<p>13 associations of trading companies operating in the building materials sector are registered in the existing platform. This includes:</p> <ol style="list-style-type: none"> 1. the Aluminium Association of Greece (A.A.G), 2. the Greek Solar Industry Association (EBHE), 3. the Association of the Greek Heating Industry (ENEPIITHE), 4. the National Federation of Craftsmen and manufacturers of aluminium & iron (P.O.V.A.S), 5. the National Association of Paint and Varnishes Industry, 6. the National Federation of glass manufacturers (POEVY), 7. the Hellenic Association of insulation manufacturers (PSEM), 8. the Hellenic Association of wooden frames manufacturers, 9. the Hellenic Association of Expanded Polystyrene (EPS Hellas), 10. the Association of Producers and Distributors of extruded polystyrene (SYPAD), 11. Hellenic Association of Chemical Industries (HACI) 12. Association of aluminium installers – (SEKA) 13. Association of heating –cooling equipment suppliers – (SEYDAP) <p>These associations represent in total over 1000 members. In addition the project has up to 360 companies registered on existing platform.</p>

Contributors	In-house	Company that founded the website. Team of 8.	<p>“klimaaktiv is the Austrian climate protection initiative launched by the Federal Ministry of Agriculture, Forestry, Environment and Water Management” (source: klimaaktive website). The ministry is responsible for the strategic control. The Austrian Energy Agency is responsible for the strategic and operating management and coordination. klimaaktiv exists about 4 different programs: mobility, energy saving, renewable energies and buildings . The company “ÖGUT” is responsible for the project management of the klimaaktiv program buildings (http://www.oegut.at/de/themen/bauen-energie-innovation/klimaaktiv-bauen-sanieren.php)</p>	<p>Communication team (help desk, communication strategy and campaigns, etc.) Project team (entry and update of information regarding the legislation for energy saving in buildings, the list of certified products and systems and of their suppliers) Team of volunteer agreements (includes the assessment of the voluntary employment between the partner and the participant (supplier). Some tasks of the frame of volunteer agreements can be reviewed, if it is necessary (for example, to change the prices of the products/ systems that are available to citizens, etc.).</p>
Quality Control	Company ranking system based on Consumer Satisfaction Inquiry	Feed-back from users on a scale from 0 to 5.	<p>ÖGUT is responsible for the management of the program and therefore responsible for the review of contributions.</p> 	The project team verifies the technical specifications and licenses of products, in accordance with project requirements.
Launch data	2009	tbc	2004	April 2012
Languages	Portuguese	Portuguese	German and some parts in English	Greek
Social Media	None	Facebook, Twitter	Facebook, Twitter, YouTube	No

IT-structure	tbc	tbc	Regulated structure. Normal software used to program websites. You need some time to understand the software but it is not complicated	Close IT - structure/ development of 3 categories of software: (a) Content Management System (CMS), (b) database, toolkit and (c) HTML
Maintenance cost	tbc	tbc	Not recorded	€ 70.000
Business case	tbc	The system works with a model debts. Each professional who registers on the platform has to adhere to a model of credits, which can then redeem for contacts for submitting a budget. When the credits of a plan end, the trader can buy more and thus acquire more contacts. The sustainability of the platform works based on revenues generated by payments of these claims by professionals.	It is funded by the Federal Ministry of Agriculture, Forestry, Environment and Water Management	National Strategic Reference Framework (NSRF)
Advertising	No	No	No. You can have indirect advertising, if your building is listed as best practice example or if your building will be presented by the minister at the award event.	No
Barriers	tbc	tbc	It was enlarged step by step. Therefore no big difficulties are encountered. The hub benefits from the klimaaktiv brand and the serious and powerful network. Barriers are other national Hubs.	Lack of advertising through the media Economic recession

	ENEA	ENEA	ENEA	ENEA
Hub Name	BCU, Barcelona Centre Universitari	Impresainungiorno.gov.it	Svizzera energia	renovation-info-service.gouv.fr
Link	http://www.bcu.cat/	http://www.impresainungiorno.gov.it/home	www.svizzeraenergia.ch	http://www.renovation-info-service.gouv.fr/
Organisation	GdD Dissenyadors + Brandhaus. Es	Società di Informatica delle Camere di Commercio Italiane	Ufficio federale dell'energia (UFE) Mühlestrasse 4, 3063 Ittigen	Frances Ministry of Ecology, Sustainable Development and Energy and Ministry of Ecology, Sustainable Development and Energy. Corporate Communications Department and Editing Images
Logo		"InfoCamere"		 
Contact Person	Torrent de l'Olla, 219-08012 Barcelona T.+34932389049 – E. info@bcu.cat	egov@unioncamere.it	Julian Salinas, Ufficio federale dell'energia	Direction de la Communication Tour Pascal A - 92055 La Défense CEDEX Téléphone : 01 40 81 21 22 Directrice de la publication : Marie-Emmanuelle Assidon

<p>Aim</p>	<p>The hub is focused on Barcelona University, Research centre, Culture and Arts. It contains all the info you need to stay, to study and live in this city.</p>	<p>Services to the SMEs for reporting, recording and communicating their activities online directly to the Municipality. To provide the forms through the website. Allow access to the regional information points. Provide information and assistance for activities in Europe.</p>	<p>SwissEnergy is a platform informing, sensitizing, interconnects and coordinates the various actors to each other and supports the exchange of knowledge in the energy saving and energy efficiency field.</p>	<p>The “one-stop-shop” for housing energy renovation The Hub was launched in September 2013 and addressed to citizens, decision makers and public administration, stakeholders and companies. The aim is to increase the number of housing energy renovations in France, from 150,000 per year in 2012 to a target of 500,000 in 2017. The Hub provide: to building occupants or owners information on energy audits, technical options for energy renovation, financing schemes, an interactive database to find technicians available near home. To decision makers and public administration materials to implement raising-awareness campaigns. To stakeholders and companies information about how is possible become a certified company Furthermore, about 450 energy information centers (named PRIS for "Point Renovation Info Service") have been implemented over the whole French territory</p>
<p>Type of content</p>	<p>The hub is focused on Barcelona University, Research centre, Culture and Arts. It contains all the info you need to stay, to study and live in this city.</p>	<p>Enterprise index, AGCOM, electronic door for SUAP, PA online Services, format on line, rules and laws, news.</p>	<p>Info on fundings, laws, regulations and energy use in the following areas: buildings, mobility, SMEs, PA, energy production and training.</p>	<p>Texts and video are used to suggest best practice to reduce energy consumption and to improve energy efficiency in home, to give information about where and how to get fund, to present data on the possible energy savings and costs reduction. An interactive database is available to find companies near home. A blue telephone number is available to contact a call center</p>
<p>Target Groups</p>	<p>Young students and researchers, tourists, and in general for all those who go to Barcelona</p>	<p>SMEs and decision makers</p>	<p>Public administrations, citizens and enterprises</p>	<p>Citizens, decision makers and public administration, stakeholders and companies</p>
<p>Audience reached</p>		<p>tbc</p>	<p>tbc</p>	<p>tbc</p>

Stakeholder involvement	The interaction level is quite high with a good mix of scientific and cultural contents, artistic contents and practical information.	With content clear, focused and in-depth.	Informal and direct language. Wide information in energy use in all the different areas.	Confidential language, offer of training courses, availability of experts
Contributors		Associazione Nazionale Comuni Italiani e UnionCamere	Direzione del programma SvizzeraEnergia Ufficio federale dell'energia (UFE) Mühlestrasse 4, 3063 Ittigen	The web site is editor by: Ministry of Ecology, Sustainable Development and Energy and Ministry of Ecology, Sustainable Development and Energy Corporate Communications Department and Editing Images Téléphone : 01 40 81 21 22 Directrice de la publication : Marie-Emmanuelle Assidon The web site is hosted by: INTEGRA, 25 boulevard des Bouvets, 92741 Nanterre Cedex Tour Pascal A - 92055 La Défense CEDEX he www.renovation-info-service.gouv.fr
Quality Control	tbc	UnionCamere		tbc
Launch data	tbc	tbc	tbc	sep/13
Languages	Spanish, Catalan, English, French, German, Chinese and Russian	Italiano	Italian, French and German	Frances
Social Media	No	No	FB, Twitter and YouTube	No
IT-structure			tbc	tbc

Maintenance cost	tbc	tbc	tbc	tbc
Business case		No	tbc	Governative found
Advertising	Yes	No	No	No
Barriers	No	None	No	Nothings, it is very friendly graphic interface

	EST	KAPE	RVO	SIEA
Hub Name	OS Open Data	Świętokrzyskie Centrum Innowacji i Transferu Technologii Sp. z o.o. / Regional Center for Innovation and Technology Transfer Ltd.	Verbeter Uw Huis!	ZELENARCHITEKTURA
Link	http://www.ordnancesurvey.co.uk/business-and-government/products/opendata-products.html	http://www.it.kielce.pl/	www.verbeteruwuis.nl	www.zelenarchitektura.sk
Organisation	Ordnance Survey (UK)		Cooperation between 2 organisations: Milieu Centraal and RVO	Zelená Architektúra (Green Architecture)
Logo				
Contact Person	Emma Kemp, Partner Field Account Executive Emma.Kemp@ordnancesurvey.co.uk Mike Wooles, Digital Marketing Manager	Science & Development Director: Phd Włodzimierz Grochal Tel: (+48) 41 343 29 16	Marijke Wobben marijke.wobben@rvo.nl	info@zelenarchitektura.sk

<p>Aim</p>	<p>Brings together various sources of open data to produce detailed digital maps of the UK, which can be tailored to the needs of diverse audiences, both individual and organisational.</p> <p>Different services are offered to different customers (not the same set of services for all customers). The different services offered are available via the link above.</p>	<p>Since 18 December 2001 “Świętokrzyskie Centrum Innowacji i Transferu Technologii Sp. z o.o.”, works as a non-profit institution. The company’s mission is stimulating province through:</p> <ul style="list-style-type: none"> • Scientific and research transfer, • Quality systems ISO. <p>The Company is leading the sequence of advisory activities and information, it is a kind of hub. “The Świętokrzyskie Centrum Innowacji i Transferu Technologii” is acting in the scope in Enterprise Europe Network (EEN), Gate2Growth(LIFT), and in “Domestic Network of Innovation” (KSI). EEN is providing assistance micro, small and average in finding cooperation with technical partners and associating with knowledge units. LIFT is online portal which contains:</p> <ul style="list-style-type: none"> • Offer of the producer, • Offer of the investors, • Networks about sources of financial, experts and services, • International producer and investors network. <p>KSI it is a group of contractors providing advisory services about character innovation, according to the determined and studied standard.</p>	<p>Www.VerbeterUwHuis.nl gives information on measures that will bring your energy bill down. Advice on energy saving measures is calculated on the basis of parameters such as :</p> <ul style="list-style-type: none"> - Type and size of the building and residence - Year of construction - Number of occupants - Type of insulation, glazing, ventilation and heating - Use of solar energy - Actual use of energy for heating 	<p>Green Architecture portal brings news from the field of clean and energy efficient architecture. It contains the database of energy efficient building structures in Slovakia, as well as good examples from other countries. It offers a communication platform for those interested in the implementation of energy efficiency measures, professionals and general public. It is available for the exchange of contacts, professional assistance, as well as advertising.</p>
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<p>Type of content</p>	<p>The OS provides Maps. The following data sources are available via this website and contribute to the development of tailored end products for the customer / user.</p> <ul style="list-style-type: none"> • Land Registry Linked Open Data (The Land Registry public datasets e.g. House Price Index background data, price paid data, transaction data) • Environment Agency Datashare (Provides direct access to the UK Environment Agency's datasets) • Office for National Statistics (The ONS is the UK Government's main survey organisation and its main producer of official statistics. This Open Geography geoportal provides the route for users to search, view and download a wide range of geography reference products to enable the collection, production, and presentation of accurate and consistent statistics. Browse everything that ONS produces by theme. You can also view their publications, datasets and tables in isolation) • Transport for London (This includes information such as live London Underground (train) data, timetables and road disruption feeds) • Department for Transport statistics (Includes a wide range of statistics, in tables and publications, covering attitudes toward transport, freight, National Travel Survey) • data.gov.uk (This is the UK National Government's data portal and stores a vast body of data. Searches can be done by publisher or tags e.g travel and transport) • OpenDataManchester (Provides access to various data sets relating to Manchester City Council / area covered by MCC) • Warwickshire County Council datasets (Provides access to various data sets relating to Warwickshire County Council / area covered by WCC) • OpenStreetMap (A free editable map of 	<p>Information about the law, policies and programs of the European Union; developing the cooperation between business, administration and science entities; raising awareness of sustainable and efficient energy significance.</p>	<p>After completing your home data the calculation will result in:</p> <ul style="list-style-type: none"> - your options for energy measures - the investment for the energy measures - the savings that will be achieved. <p>You'll also get information about:</p> <ul style="list-style-type: none"> - grants or loans that are available in your specific town or region - detailed information about the recommended measures - how and where you can find energy advisors and installers - consumers' experiences at various energy saving measures 	<p>Best practice examples, technologies, events, expert literature, advertisements, etc.</p>
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	<p>the whole world)</p> <ul style="list-style-type: none"> • Guardian Datastore (Data from the Guardian newspaper) • The World Bank (Downloadable access to over 7,000 indicators from World Bank data sets) • Ministry of Justice (Access to UK Ministry of Justice statistics) <p>In addition to this the site also provides links to various other useful data sites.</p> <p>How the information is presented to the customer depends on the customer and the type of information requested. This could be via a download portal, hard copy on disk etc. Application Programming Interface is in development and they were not in a position to discuss this.</p>			
<p>Target Groups</p>	<p>All customers are broadly defined as being either:</p> <ol style="list-style-type: none"> 1. Consumer / Citizen 2. Business / Government <p>This dichotomy is based on the complexity of the information requested. While requests for information from the consumer / citizen group is relatively straight forward, requests from the business / government group tend to involve bigger data sets and require a much higher level of skills and expertise. E.g. GIS mapping capabilities. Within this breakdown there are various audiences both individuals and organisations such as consumers / householders, surveyors, architects, Local Authorities, Schools, and Universities etc. During the initial developmental phase of the project a UX Designer was brought in. This person interviewed various areas of the business to identify the diverse tasks (public, consumer, business etc.) and get customer feedback through them. These were then</p>	<ul style="list-style-type: none"> • Small and medium – sized enterprises, • Companies newly being formed, • Local governments, • Individual entrepreneurs and investors. 	<p>Home owners</p>	<p>Architects, Companies active in the building sector, experts, general public.</p>

	<p>grouped as per above. Ideally, if they had more time they would have preferred to have approached the various audience / customer groups independently.</p> <p>Ongoing testing of sections of the site and trials using different terminology/ labelling is being carried out to refine the messaging.</p>			
Audience reached	<p>We did not obtain specific numbers.</p>	<p>No data</p>	<p>50.000 visitors per year</p>	<p>Architects, planners, students of architecture, everybody else who is interested in the topic of sustainable architecture and new technologies in this field.</p>
Stakeholder involvement	<p>Two main ‘customers’: The UK Government’s Department of Business, Skills and Innovation (BIS) who part fund this activity and the customers within the two broad groups mentioned above. There are separate requirements within both groups. BIS has its reporting requirements which are tried to be addressed as much as possible via the website / Hub itself to make for a much more streamlined and efficient process. All other customers engage with OS via the web site and the type of queries they submit / requests for data they submit influences the level of interaction. The licensing requirements also influence the type and level of interactions. Consumers/ Citizens receive their service in partnership with an online commercial shop which is able to convert surveys into formats suitable for maps. Businesses make direct payments for the services they require. OS has an overarching agreement with the UK government which enables central and local government bodies and organisations to access a certain level of data. However there are limits to this and they are responsible for paying for any services outside of their licensing agreement. Customer demand shapes the way that</p>	<p>Entrepreneurs interested in innovations. Direct meeting, online contact.</p>	<p>Stakeholders can refer to the website www.verbeteruwhuis.nl or built this website into their own website; with their own look and feel. In this way reliable and independent information on energy savings will be given to home owners in a uniform manner.</p>	<p>Portal administrator is cooperating with professional architects and other professionals according to the filling of the content of web portal. Stakeholders are regularly receiving the newsletter. There are partner organizations – manufactures of insulation materials, building systems, consultation companies or expert journals.</p>

	customers are able to approach OS for information and also how information is presented to the customers. E.g. grouping of pages, decision tree, and access to external links.			
Contributors	The website is maintained by an in house team of 10-12; who manage all aspects of the hub maintenance including web editors, analyst and content editors. Having an in house team also ensures that that they are able to exercise flexibility as priorities for information change. They are also able to get the customer and developer together at short notice to ensure requirements are fully understood and priorities.	Brain trust caring for the high standard of the product. More information: http://www.it.kielce.pl/onas/kadra.html	Milieu Centraal and RVO	Partner organizations, professionals, architects, etc.
Quality Control	There is an internal two stage process for quality control. Anyone (content owners) within OS can write or publish a page. However before it goes live, the page is reviewed by a group of in house editors with expertise in areas such as language, page layout and design etc. to ensure that what is available is external /customer focused and not internal focused. Their recommendation is that external copy writers and editors should not be used as they do not usually fully grasp what is trying to be achieved and often the 'organisational voice' is lost in the process, with material then having to be rewritten internally. Where guest editors provide Blogs the source is clearly cited.	ISO Quality System is implemented.	Milieu Centraal and RVO	Portal administrator who is professional architect is responsible for that.
Launch data	Not asked.	2001	2011	2010
Languages	Available in English and Welsh. They have some international clients but the information is presented in English.	PL/ EN	Dutch	Slovak
Social Media	Facebook, Twitter, Blogs, LinkedIn, Youtube and Google+ Apart from promoting specific services to specific groups; the various channels are also used to communicate what else is	Facebook	active on social media via Milieu Centraal	Facebook, Twitter, Google+, Pinterest;

	<p>happening across OS. Least engagement via Google+ but they are persisting with this as it is expected to become quite popular in the future. There is one dedicated web editor who monitors all Social Media activity and responses / updates accordingly.</p>			
IT-structure	<p>Not asked as we felt this was not relevant given we have a specific budget to work to.</p>	No data	<p>Website is connected to a source database for housing with two million energy-saving packages for reference houses. These calculations are based on the actual calculation method for the energy label. All information in the source database is freely available to other parties through a webservice.</p>	
Maintenance cost	<p>Same as above. However they did indicate that the setting up of the site took about a year to a year and a half but this is because the work involved moving from a two domain structure to a one domain one.</p>	No data	<p>Indication of yearly maintenance costs: €50.000,- and 0,5 fte</p>	
Business case	<p>Some funding from BIS. They also have a commercial arm to the organisation offering paid for service.</p>	EU grants	Funding by government	Advertising, donors, partner organizations, etc.
Advertising	<p>Yes but given how well know they are and as the sole non ministerial government depart providing this service there is much less need for advertising. They do however have contributions from guest bloggers, respond to press enquiries, and have some media campaigns the most recent being via BBC News. More information on this can be requested if needed.</p>	Yes	No advertisement on the website	Yes

<p>Barriers</p>	<p>During the transition from the previous website with two domains to the current one which has one (which is better suited for Google searches), an external expert was brought in to carry out an organisation wider review. Due to the lack of time the expert was not able to interview customers. Their recommendation is that where possible, develop headings for the site (Hub) and present to the customers rather than the internal staff. This is because often internal focus can get in the way of presenting information in ways that are suitable for external audiences. Having two main 'customers' who could influence the development process i.e. BIS their funder and everyone else with interest in OS data and services. The 'internal voice' and having to manage this throughout the process. Ensuring that while the content specialists provided the information it was fit for purpose for an external audience and the inward focus was apparent on the website. Licensing and terms of use. This can be quite complex and they are in the process of refining this and making it simpler by ensuring that only the necessary complexities are being passed on to the customer and there too only to the relevant individuals. Part of their business development activity is exploring how consumers can get maps without the complexities of licensing agreements etc. Making it consumer / layman friendly.</p>	<p>tbc</p>		<p>There are aims to expand the possibilities for the interaction of more different stakeholders. There is need for more financial resources as well as building a greater confidence, trust and willingness for cooperation between different construction professions.</p>
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	SIEA	VITO
Hub Name	TRY IT	ListMinut
Link	http://www.siea.sk/vyskusajte-si/c-6050/zateplovacie-a-vymena-okien-v-rodinnych-domoch/	www.listminut.com
Organisation	Slovak Innovation and Energy Agency	ListMinut
Logo		
Contact Person	Eduard Jambor	Christophe Kalbfleish
Aim	Web application is aimed for those who are planning to implement concrete measures according to major renovation of administrative buildings, residential buildings or family houses. Also for everybody who is basically considering the investment to energy efficiency measures. FLASH applications allow to try and see individual elements of insulation systems as well as different types of RES.	People can request services and indicate how much they are willing to pay for it. The software searches for service providers in the neighbourhood and sends them the information, so they can accept the job if wanted. Afterwards, service provided are evaluated by the clients.
Type of content	In case of major renovation of buildings it is divided to administrative buildings, residential buildings and family houses. With regards to RES technologies it provides the information about heat pump, biomass boiler and two types of thermal solar collectors.	Service requests/ examples.
Target Groups	Building owners, tenants and their representatives, housing associations, professionals	Individuals
Audience reached	We count only the visits of the whole SIEA website. Just an example, for the year 2013 we had 115 603 unique visitors. We expect similar number in the year 2014.	20519 people use the service

Stakeholder involvement	There is not a big stakeholder involvement at the moment. They are just able to see different parts of insulation systems and different RES technologies. Application is helping to show them what level of energy savings are they able to reach with them.	
Contributors	During the preparation of the application we were cooperating with professionals and experts.	Team of 11 people: CTO, CEO, CMO, Legal advisor, Business Developer, CCO, Freelance web developer, growth hacker, communication intern (3)
Quality Control	Experts and professionals were reviewing the content of the application before we have launched it.	After a service is executed, the one who requested the service can assess the persons who performed the service. These result of these assessments will be shown to other applicants.
Launch data	February 2014	February 2013
Languages	Slovak	Dutch, French
Social Media	We promote it through our Facebook account.	Facebook, Twitter, LinkedIn, vimeo, YouTube
IT-structure	-	
Maintenance cost	Yearly maintenance costs are not significant; those are included in the maintenance of the whole SIEA company website. Main investment has been done for the creation of the application.	
Business case	It is funded through SIEA project called Live by Energy. This project is co-funded from EU Structural funds.	About 10% of the job costs go to the listminut team as a commission fee. Applicants should take this into account for the price setting.
Advertising	No	No advertisement on the website.
Barriers	Pictures related to major renovation and RES technologies are pretty what can attract members of target groups. On the other hand information offered there are quite simple so it might not be highly useful for some of the professionals.	

This is a public report.

P **Project Details**

Duration: 36 months

Coordinator: Jon Rattenbury, EST.

N **Partners**

Austrian Energy Agency, AEA, Austria

Centre for Renewable Energy Sources and Saving, CRES, Greece

Energy Saving Trust, EST, UK

Flemish Institute of Technological Research, VITO, Belgium

**Italian National Agency for New Technologies, Energy and Sustainable Economic Development
ENEA, Italy**

**Netherlands Enterprise Agency, RVO.nl,
Netherlands**

**Polish National Energy Conservation Agency,
KAPE, Poland**

Portuguese Energy Agency, ADENE, Portugal

**Slovak Innovation and Energy Agency, SIEA,
Slovakia**
