Porto Energy Hub

Energy Efficiency for all.

D 2.3 Porto Energy Hub Business Plan

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1. Introduction

Building renovation is key for energy transition at the city level. As already explained in previous PEER documents, the fragmentation of the value chain related with buildings renovation acts as an access barrier to sustainable retrofitting as many homeowners perceive renovations, in particular, the energy-related ones, as complex and risky due to unstable factors influencing works duration and costs [1][2]. In this setting, One-Stop-Shops (OSSs) are described as promising tools as they act as a user-oriented instrument for sustainable renovation, providing local facilities (physical, virtual, or both) to deliver information, technical assistance, financial advice, and support, as well as the monitoring of energy savings after the end of the works [1][3]. The aim of these facilities is to simplify energy renovation processes and promote energy efficiency actions by motivating and supporting citizens, as well as to increase the quality of renovation works. From the customer perspective, OSSs are generally described as transparent and accessible advisory tools, while from the supplier perspective, they are described as innovative business models, being able to [1][2]:

- Accelerate buildings refurbishment by informing, motivating, and supporting building owners to follow energy efficiency actions throughout the entire so-called "customer journey";
- Facilitate interested, but not yet committed, energy users to implement an energy efficiency or other type of sustainable project;
- Ease the access to financing and occasionally offer better rates in loans;
- Improve the average renovation depth in terms of energy performance;
- Allow consumers to choose their most trusted and qualified professionals;
- Involve relevant stakeholders in the development and management of the projects to ensure that the developed tools are targeted to market needs.

Although it can be considered that there are different type of OSSs, it is generally accepted that they play an important role in supporting and fostering sustainable renovation and should preferably provide a full range service path from the design of the renovation and the creation of financial plans to the coordination of the process and assessment of the results. Besides, ensuring well-informed and evidence-based decisions, "full service" OSSs do not only facilitate the renovation process by accompanying and relieving the consumers throughout the process, but also

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enhance business opportunities for local contractors and companies [1][3]. However, so far, the few existing OSSs addressing sustainable renovation across the EU do not provide uniform service packages nor a standardised approach, as they too often focus exclusively on some specific aspects (e.g., awareness-raising) [1]. Therefore, there is still a long way to go for OSSs to become effective tools for building renovation.

In this scope, the Porto Energy ElevatoR (PEER) project aims at developing a bold renovation program to fight energy poverty, promoting buildings energy efficiency and self-consumption renewable energy communities, as well as mainstreaming new financial schemes. PEER has developed around the Porto Energy Hub (PEH), a dedicated OSS, to enhance public and private stakeholders' engagement, from Municipalities and Social Housing management entities to private institutions, individuals, and families. PEH will be the PEER brand and the central point to provide the entire range of information and services needed to implement energy renovation projects, enabling to boost synergies, and aggregate investment volume, as well as to engage the market and mitigate market barriers. PEH aims at creating and piloting an OSS providing advisory services for ten municipalities of the Porto Metropolitan Area – North of Douro River (PT).

This report has two main objectives: 1) to delineate a suitable business model canvas for PEH and 2) to discuss the underlying business plan. The document is organised as follows. Section 2 overviews the main OSS business models and Section 3 presents the proposed PEH business model. The Business Model Canvas has been selected for its capacity to explain the business models in a comprehensive and integrated way. Lastly, Section 4 concludes this report.

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2. Overview on selected OSS business models

As thoroughly presented and discussed in D3.1 – Benchmark report, and D2.2 – Replicable business models - different types of business models can be implemented in OSS with the aim of providing integrated home energy renovations and small-scale renewable generation, as is the case of the PEH. In this setting, business models can be either classified according with who are the provider and the actors involved or the degree of support provided [4]. In the scope of this work, the classification adopted is related with the degree of support. The typology of business model differs according to the amount of involvement in the process, meaning, to what extent the OSS is responsible for the renovation works and the level of follow-up given to the user over the process. As stated, the main type of business models is detailed in previous reports. However, to further inform and frame the presentation the PEH business plan, an overview of the most important types is identified as follows [2][4].

2.1. The facilitation model

The **facilitation model** is the OSS model which requires less involvement between the OSS and the user and therefore a lighter support is provided. Typically, in this model, the OSS staff advises on how to renovate the house and a list of suppliers can be provided but, from then on, the intervention itself is up to the citizen. In this setting, the role of this type of OSS is mostly to raise awareness of the benefits of retrofitting and local energy generation [2][4]. If the customer is willing to implement such interventions, the OSS will provide the required technical assistance by recommending the best technologies, a list of existing suppliers and offering advice on how customers may finance such measures, if required [4].

This model is the one able to attract customers more effortlessly, thanks to its free-of-charge service. Additionally, it is normally characterised by requiring moderate costs to be set up. These two factors converge in a necessarily simplified structure where services provided are restricted, meaning that it is also accepted that outcomes are moderate. Furthermore, in the facilitation model, customers must establish by

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themselves the contacts with different stakeholders (e.g., suppliers, contractors, banks, etc.) and coordinate them, which does not guarantee to significantly reduce the renovation burden to customers [4].

2.2. The coordination model

The **coordination model** requires a greater, but not full, involvement between the OSS and the customer since it advises on how the house can be renovated, establishes the contact and coordinates suppliers to deliver good services/products and comply with their commitment. However, suppliers are the ones responsible for the final outcomes [2][4]. Generally, in this model, the suppliers coordinated by the OSS would pay a fee for the publicity and other benefits they get by being part of the project and are directly remunerated by the customers requesting their services [4].

This type of OSS can also work with banks and financial institutions and coordinate them to provide financing. Partnerships with banks and public authorities can be established to provide long-term and affordable financing through, for instance, revolving loans [4].

Thus, this model requires OSS to coordinate existing market entities (suppliers) and ensure all OSS services are offered to citizens. However, it will only partially support the customer renovation journey and it is not responsible for the outcome of the renovation intervention. Nevertheless, to ensure the quality of interventions, the OSS can train the chain of suppliers and contractors so that the quality of the intervention is the desired one, as this is a crucial factor to attract customers. Although providing training can support an adequate quality of the renovation work, the achievement of energy savings resulting from the interventions cannot be ensured. Additionally, in this model, customers still must manage contracts and establish relationships with several actors[4].

2.3. The all-inclusive model

The **all-inclusive model** assumes a high level of involvement between the OSS and homeowners. This model provides a stronger support to customers as the OSS itself plays the role of a contractor, including signing contracts with customers and offering them integrated energy efficiency service packages under its own responsibility. In

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this model, the OSS sells the renovation journey as a whole service package, which effectively reduces the users' burden. This model can be set up independently without the support from any local authority as it can be tailormade to address specific customer' needs and offer distinctive services (e.g., house extensions or adaptations to specific situations can be among the home renovation products available). Following the all-inclusive model, the OSS is typically responsible for the quality of the works, and sometimes, besides offering existing financial instruments from partner banks or authorities, it can also develop its own financing scheme, including getting paid by customers through service fees or loans.

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3. The PEH business model canvas

The PEH business model does not fit directly in any of the BM types presented before but rather results from a combination of all of them as this allows to accommodate the services PEH aims to offer and to replicate it across various municipalities.

The following section describe the underlying business model, following the Business Model Canvas developed by Osterwalder and Pigneur [5]. The Business Model Canvas is a strategic management tool that allows to visualize a business idea through a set of nine blocks: customers, value proposition, channels, customer relationships, revenues, key resources, key activities, key partners, and costs (Figure 1).

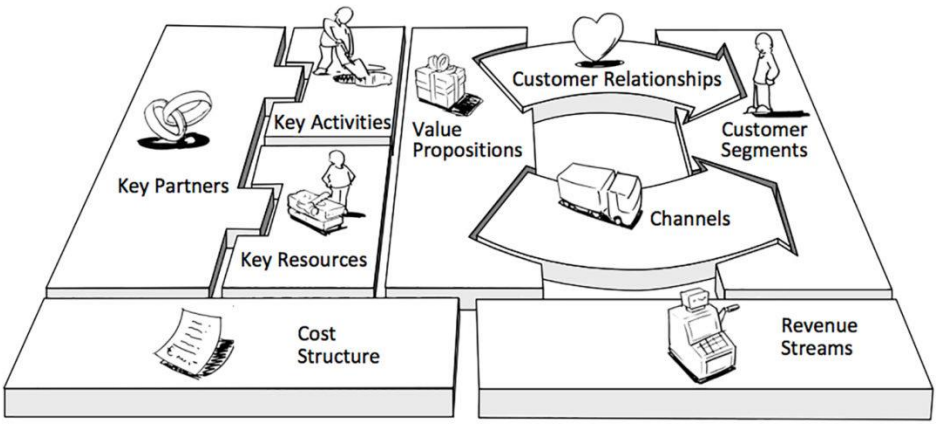

Figure 1: Business model canvas [5].

The nine blocks can be grouped in four main dimensions: infrastructure, offering, customers and finances. The infrastructural dimension includes the things needed to run a business: people, processes, technology, and partners. Therefore, the *Key activities*, *Key resources,* and *Key partners* blocks. The offering dimension describes the unique value offered by the business to the customers – the *value proposition*. The customers dimension refers to everything involving customers: who are they, how are they reached and what kind of relationship is created with them – *Customer segments*, *Channels* and *Customer relationships*. Lastly, the financial dimension is aimed at knowing what costs the business has and how it produces revenue – *Cost structure* and *Revenue streams* blocks.

Considering this division, the PEH business model canvas is presented in Table 1 and a block-by-block explanation considering the four main dimensions are provided as follows.

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Table 1: Porto Energy Hub business model canvas.

<table>
<tr><th>Key-Partners</th><th>Key-Activities</th><th>Value Proposition</th><th>Relationship</th><th>Customer segment</th></tr>
<tr>
<td>• Professional and industry associations (e.g., AICCOPN, architects, engineers, APESE, APREN, technology suppliers, auditors, certifying entities)
• Financial entities (e.g., commercial banks and private investors) and funding bodies (e.g., Fundo Ambiental)
• Other partners (e.g., media)</td>
<td>• Provide access to direct and high-quality information regarding energy efficiency and renewable energy interventions, legal aspects, and available financial tools in this domain.
• Link to an experts' database (auditors, engineers, contractors, technology suppliers, etc.)
• Supervising and monitoring of the interventions carried out to ensure the quality of works
• Training of people (municipal staff) to support PEH customers in the physical desks and conduct screening surveys
• "Walk-through" technical inspection/audit for preliminary analysis
• Marketing and communication activities</td>
<td>• Centralisation of access to information and services in a single site
• Monitoring and support from A to Z - from evaluation and proposal of interventions to implementation
• Insurance of the quality of work</td>
<td>• One-to-one attending/ meetings
• Online/virtual relationship (e.g., phone call, website)
• Information and dissemination sessions (e.g., workshops and communication campaigns).</td>
<td>• Residential customers, namely single-family houses, apartments, and condominiums.
• Although the PEH OSS will be available for citizens from all income levels, a special attention will be provided to low-income ones
• Private social solidarity institutions (IPSS), social economy entities, other entities (public or proven) with housing</td>
</tr>
<tr><th colspan="3">Key-resources</th><th colspan="2">Channels</th></tr>
<tr>
<td colspan="3">• Physical spaces, desks in municipal halls
• Human resources: technical staff to support customers + staff onsite to provide basic information, screen the requests and forward customers to the technical staff + IT team + Marketing team
• IT supporting tools (back office structure to manage contacts and allow customers relationship management)
• Website and online tools to provide generic advice on energy efficiency actions, disseminate the project and allow clients to contact the technical staff
• Funding
• Database of experts, suppliers, funding sources, etc.</td>
<td colspan="2">• Websites, newsletters, social media, phone, banners, other communication means, local events, flyers, digital billboards
• Physical OSS/desks
• Key-partners' social media and websites
• Fairs and exhibitions</td>
</tr>
<tr><th colspan="3">Cost Structure</th><th colspan="2">Revenue Streams</th></tr>
<tr>
<td colspan="3">• Fixed costs: human resources for administrative, management and technical support; communication and marketing campaigns; market analysis; staff training; IT costs (e.g., website and data processing)
• Variable costs: correlated with the workload (e.g., need to reinforce the technical team or subcontract services) and complexity of requests</td>
<td colspan="2">• Fixed revenue streams: subsidies (e.g., municipal financial support, fees from entities included in a marketplace, fees paid by users)[1]
• Variable revenue streams: patronage</td>
</tr>
</table>

[1] These revenue streams will be crucial to keep the operation of PEH after PEER lifetime. Thus, these income sources are not yet being exploited. Still, they are being studied to ensure the economic feasibility of the service after EU funding.

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3.1. Infrastructure

PEH key activities in short

PEH will perform mainly a guiding, supporting, advising, facilitating, and monitoring role by providing four main activities:

1. **Provide access to updated and high-quality information** regarding the technical side of energy efficiency and renewable energy interventions, the legal aspects framing energy efficiency and renewable energy production and the available financial tools and funding opportunities in this domain.
   Information in the energy topic is abundant and updated often but is frequently communicated in ways which are not easy to understand for non-experts. Thus, both through the project communication materials and website (portoenergyhub.pt) and physical meetings with PEH customers, the OSS will offer a free-of-charge information service. This service is being provided by municipal staff trained to provide generic advice to citizens, deliver the communication physical materials developed by the consortium and redirect to the website where information regarding technical, legal, and financial aspects of improving energy efficiency and renewable energy production can be found and is constantly updated. Besides information, the website also includes an online survey which allows for a preliminary assessment of energy efficiency potential. This analysis also fosters citizens awareness and is expected to trigger action.

2. For situations in which PEH customers are willing or are already implementing energy efficiency and/or renewable energy generation actions in their homes, **specific technical, legal, and financial support** might be required. This support can range from analysing energy invoicing and advising on energy retailers and tariff options, to tailored technical/legal/financial advice, support in administrative procedures, etc. In such cases, the PEH technical staff (composed by the Consortium members) will schedule a meeting with customers and provide this support. This service will be provided for free during PEER lifetime but is expected to evolve into a paid service afterwards, either by customers or the municipality. If justified (e.g., the citizen demonstrates an interest/need to carry

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out a larger intervention), a home visit may be scheduled. This visit will be carried out by a qualified expert who will perform a more exhaustive survey of the existing situation (e.g., pathologies and energy needs) and prescribe concrete energy efficiency solutions. PEER consortium has been discussing with municipalities their potential contribution in the costs involved with the travel and service of these experts, since such expenses are not foreseen in the scope of PEER. If not funded by municipalities, either partially or fully, the costs of such visits must be bear by customers. The consortium's understanding is that these visits bring significant added value because, in addition to a highly customised support (with the prescription of specific measures), high quality reports and technical specifications would be issued, thus facilitating interventions.

3. Create a **marketplace** of entities aiming at to support PEH customers in implementing energy efficiency and renewable energy production interventions. This marketplace, not yet in place but being designed, aims to create a direct and facilitated link between customers (demand) and service providers (supply), helping to circumvent a key barrier related with the difficulty of customers choosing companies to perform the work. Entities aiming to participate in the PEH Marketplace will pay a symbolic annual participation fee and whenever customers need to buy an energy efficient boiler, to replace their windows or to insulate their roofs, recognized entities will be indicated to them.

4. **Ensure the quality of the services provided** is also a key task of PEH. The quality of the works/equipment/services provided by the entities included in the Marketplace will be continuously ensured through surveys made to customers to assess their satisfaction.

Key resources

Considering the services PEH aims to offer, the most relevant resources are:

- Human resources, including technical experts (e.g., architects, engineers, energy certification experts, legal consultants to support the drafting of contracts);
- Physical spaces, digital platforms (to set up the OSS back office and manage data, contacts, etc.) and technical equipment, supporting the PEH structure;

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- Network of partners required to provide the PEH value proposition;
- Economic resources. At the launch, PEH will be fully financed by public funds (EU funds). After the PEER project lifetime, it is expected that local authorities willing to provide these services to their citizens will help to fund the initiative. Also, PEH may charge fees to provide some services as explained in the 'Revenue Streams' section.

Key partners

For the PEH success, several entities play a key role. Local and regional authorities, including municipalities and parishes, are key partners as they will promote PEH among their citizens and support the development of the initiative. Also, they are important mobilizers of PEH as, once the physical desks of PEH are located in municipal facilities, these entities are directly related with the services provided. Professional organisations, namely, construction companies, architects, engineers, equipment suppliers, etc., will also be key partners as they will integrate the PEH marketplace and provide the works. Banks and financial institutions are also major partners in this initiative as they will be asked to work with the project consortium and offer attractive financing conditions to PEH customers.

3.2. Offering

Value proposition: What benefits do PEH have to offer to the selected market segments?

PEH aims to be an initiative, available for all, to promote and facilitate energy efficiency interventions as well as renewable energy generation in residential settings, being a reference supporting tools both in Portugal and in Europe. By providing access to high-quality information, provide technical, legal, and financial advice, tailored to each case (i.e., age and situation of the dwelling, the available budget, and the time frame available to organize and perform the intervention), and facilitate the link between customers and suppliers, PEH will help to mitigate important renovation barriers, fostering buildings' deep renovation and renewable energy generation, contributing to mitigate energy poverty in the territory.

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3.3. Customers

Customer segments - Who will be the clients?

The customer segments requesting the PEH services can be divided into direct and indirect customers.

The first segment includes all the customers who directly contact the OSS requesting for support, namely, households (detached homes, apartments, etc.) from different socioeconomic levels (but with a particular focus on the most vulnerable citizens due to PEER's drive in mitigating energy poverty), condominiums, social housing managers, housing cooperatives, etc. Each of these types of customer will require a different type of approach as the projects' complexity, time used to provide support and type of support will be different. For example, while homeowners of detached homes may want PEH help choose the best energy efficiency options and funding options, condominiums face the challenge of multi-tenancy decision-making. Also, customers asking for help in deep renovation works and the ones requiring support in single measures can be considered as different markets as the type of requested help is completely different. In addition, people from distinct socioeconomic settings may ask for the PEH support which is ready to help all citizens. However, as part of the provided services which may be paid by users after PEER lifetime, an assessment of the financial conditions of customers may be required depending on the type of support asked (for specialized support, fees may be charged).

The 'indirect customers' segment encompasses the "supply" side, meaning, the professionals (engineers, architects, qualified energy certification experts, etc.), contractors, suppliers, etc., which will be included in a pool of suppliers and experts – a Marketplace. The entities included in this segment benefit from the PEH in terms of business expanding, due to both the advertising and gathering of new customers. In return, a kind of brokerage fee (still to be defined) will be charged by the PEH as to be part of this network.

In future, a new indirect customers' segment may be created including other local authorities and agencies willing to replicate the PEH model in their territories. For these, consulting services may be provided (for remuneration) in exchange for guidance in OSS implementation.

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Channels

PEH will engage the 'direct costumers' segment through marketing and communication materials, and campaigns disseminated through traditional (physical materials – flyers and brochures), the project website and social media and in local events promoted together with local authorities (Fig. 2). The involvement of local authorities in the OSS promotion is key to ensure trust.


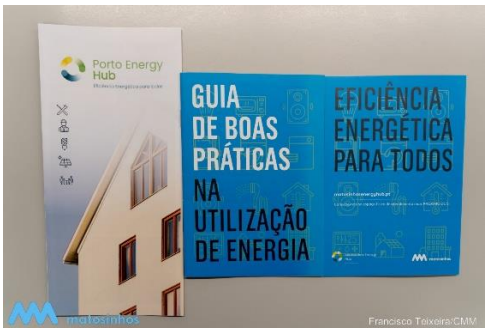

Figure 2: Matosinhos Energy Hub launch (with the presence of Matosinhos' City Mayor) and physical materials.

The services provided by the PEH are available both online - in the PEH website (https://portoenergyhub.pt/) - and in the PEH physical locations, which are being created in the already existing spaces of attendance in city halls with which citizens are already used to (e.g., City citizen shops).

The website is being constantly updated and informs all kind of customers about all the services available. A brief description of the project and its objective can be found on the landing page, which allows the user to be redirected to an online survey aiming at to perform a preliminary diagnosis of home energy efficiency needs (Fig. 3 right) or to continue to know more about the services provided (Fig. 3 left).

By continuing scrolling down the landing page, an illustrative scheme of the One Stop Shop is presented. By clicking on the type of support provided by the PEH, the user is redirected to a list of legislative documents in force (legal support), existing funding programs and incentives (financial support) and technical solutions for energy efficiency and renewable energy production (technical support) (Fig. 4). At the bottom of the diagram, it is also possible to consult and download the Porto Energy Hub project flyer (Fig. 5).

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Figure 3: Porto Energy hub landing page (https://www.portoenergyhub.pt).

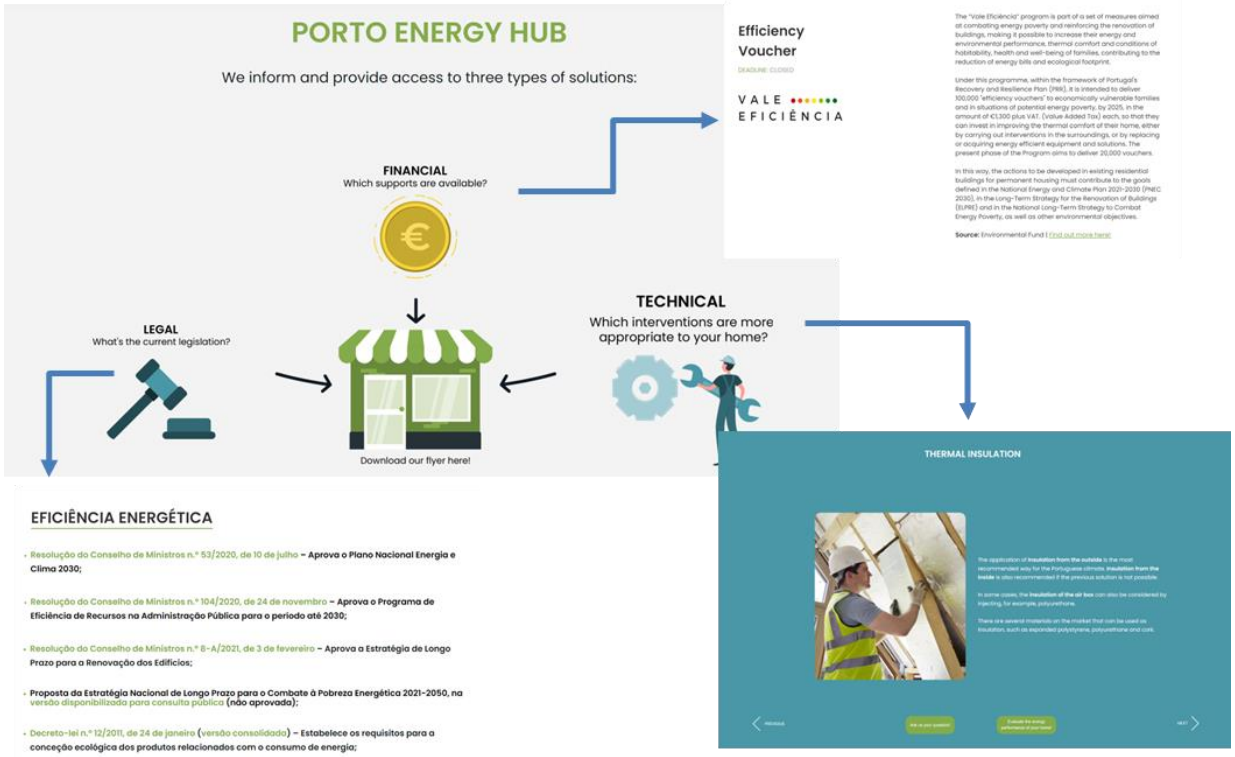

Figure 4: Porto Energy Hub support domains.

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Figure 5: Porto Energy Hub flyer.

Continuing to scroll down the landing page, the steps of the support process provided by PEH are summarised and after that, a sum of several technical solutions and available financial schemes are presented allowing the user to know more about each one of them by being redirected to a more detailed description (Fig. 6).

Figure 6: Sum up of PEH support process, technical solutions, and available financing.

In the brief presentation of the technical solutions, it is also possible to consult and download a guide with practical tips on energy efficiency (Fig. 7). A flipbook with more detailed content on energy and water use efficiency, and a manual for citizens and municipal entities to support the creation of renewable energy communities are also being prepared. These materials will also be incorporated into the website once finished.

Figure 7: PEH energy efficiency tips.

The landing page ends with a diagnosis block which redirects users to the online survey (Fig. 8). The survey[2] allows citizens to provide detailed information regarding the efficiency of their homes and equipment, enabling an assessment report sent from the PEH technical team with the clear identification of the potential of energy saving measures and renewable energy production, also triggering a contact with the customer to further support on the implementation of measures.

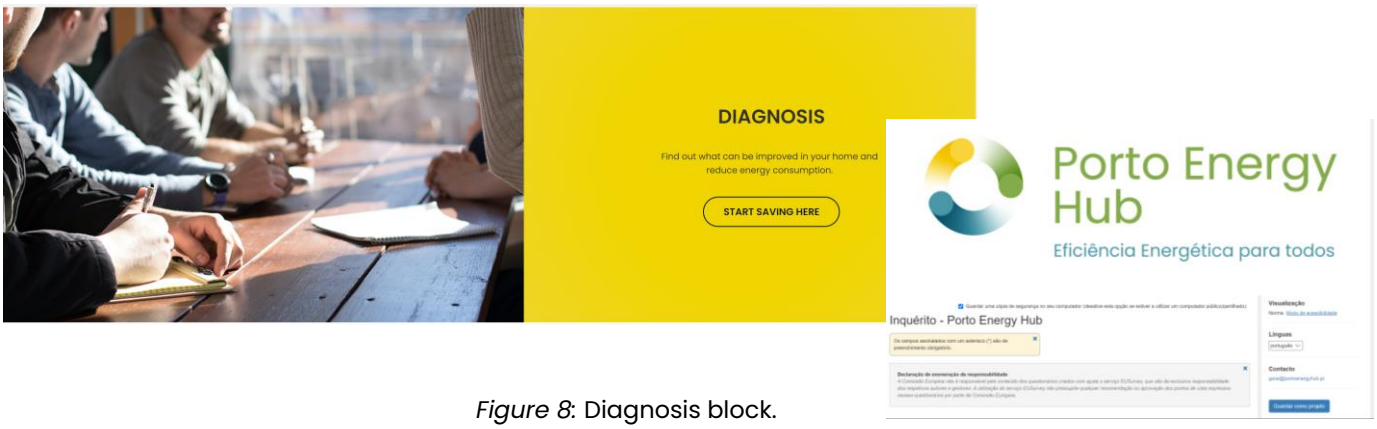

Figure 8: Diagnosis block.

[2] Available at: https://ec.europa.eu/eusurvey/runner/PortoEnergyHUB_Completo

The website also contains an "About us" section, in which the project characteristics, main goals and the locations of the already existing PEH OSS are presented (Fig. 9).

Figure 9: 'About us' section.

When more consolidated goals in terms of the pipeline (expected soon) become official, progress bars will be added to the objectives section to show the implementation state.

Additionally, the website includes a "News" section in which the main actions and achievements are being registered. This section is constantly being updated (Fig. 10).

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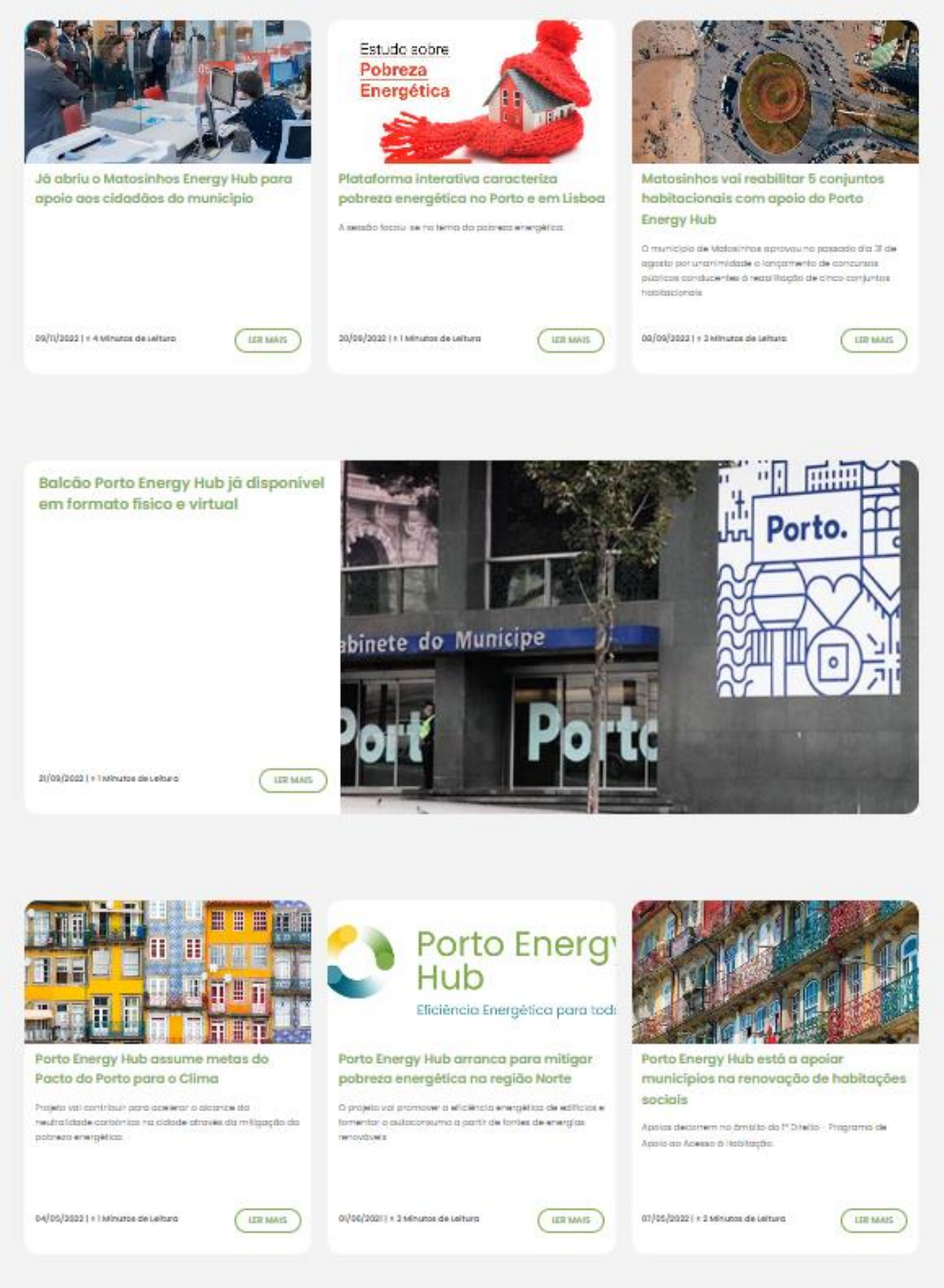

Figure 10 'News' section.

Alongside the website, Porto Energy Hub social media platforms (LinkedIn and Twitter) are important communication channels. These platforms are weekly fed with new and relevant information both with project progress and national and international news on energy (Fig. 11).

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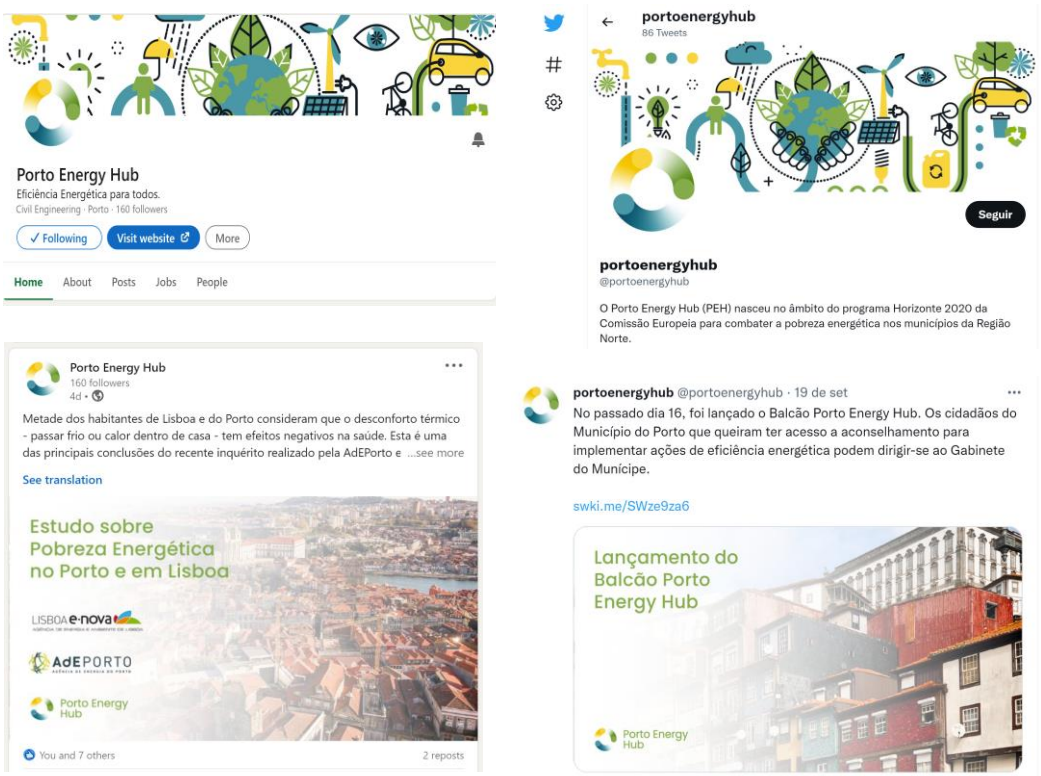

Figure 11: Porto Energy Hub social media.

The PEH physical shops are always open to public. When going to these spaces, citizens are received by municipal staff which will explain PEH services, provide basic support by redirecting citizens to the project website and advice for the filling of the assessment survey. The municipal staff are previously trained by the project Consortium on this issue. These spaces are also provided with communication materials (i.e., flyers and energy efficiency brochures) to disseminate the project. If citizens are willing to have a customized advice, appointments with PEH technicians are scheduled and the support process is triggered.

Customers relationship

The type of relationship established with customers depends on their level of proactivity and need for support. For those who find the information they need to perform the energy efficiency interventions by their own on the PEH website and social media, a kind of 'self-service' relationship is established. In these situations, customers find all the information they need by visiting PEH website and through it they are able to decide what solution would be better for their case and perform the remaining processes by themselves. If required, these customers can still ask for PEH assistance

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in any stage of the process (e.g., for energy audits, buildings inspection, suppliers' suggestion, contract drafting, monitoring of results). In turn, those who need/prefer to have support throughout the whole implementation process can have it by filling out the survey and ask for a technical meeting with PEH staff, establishing a direct face-to-face relationship. Phone and online conversations will also be possible.

3.4. Finance

Cost structure

The costs of PEH include fixed (administration and management, communication and marketing, staff training, IT costs, physical spaces/office costs) and variable costs (dependent on the workload – number of clients and complexity of help required – and time spent with customers). PEH cost structure is presented in Fig. 12.

Municipalities willing to install a physical PEH space are expected to provide dedicated spaces for front-office services. Municipal employees, appointed by the municipal structure, will receive training to be the first line of service to PEH customers. This first meeting will trigger the entire subsequent process ensured by the PEH staff (back-office service). The costs related with the physical spaces as well as the municipal staff will be ensured by municipalities offering PEH as an additional local service to their citizens. Therefore, these costs will not be considered as PEH direct costs.

Human resources will represent the highest costs for PEH, considering the need to maintain a team to provide technical, legal, and economic advice as well as to deal with the administrative tasks. As for the PEH staff, during the PEER project lifetime, the consortium partners will provide the necessary technical, financial, and legal support. After the end of the project, this support will continue to be provided by the Porto Energy Agency staff allocated to this role. A reinforcement of manpower may need to be considered as well as the intermittent hiring of expert services. Also, specific (technical) outsourced support may need to be hired. Therefore, subcontracting costs may need to be safeguarded. However, these costs can be mitigated if municipalities' staff (from several backgrounds such as technical, legal, etc.) can absorb the support developed under the PEER project and provide, at least, part of the advisory service.

In addition, the home visits represent costs which can be considerable. Such expenses may be either supported by municipalities or customers.

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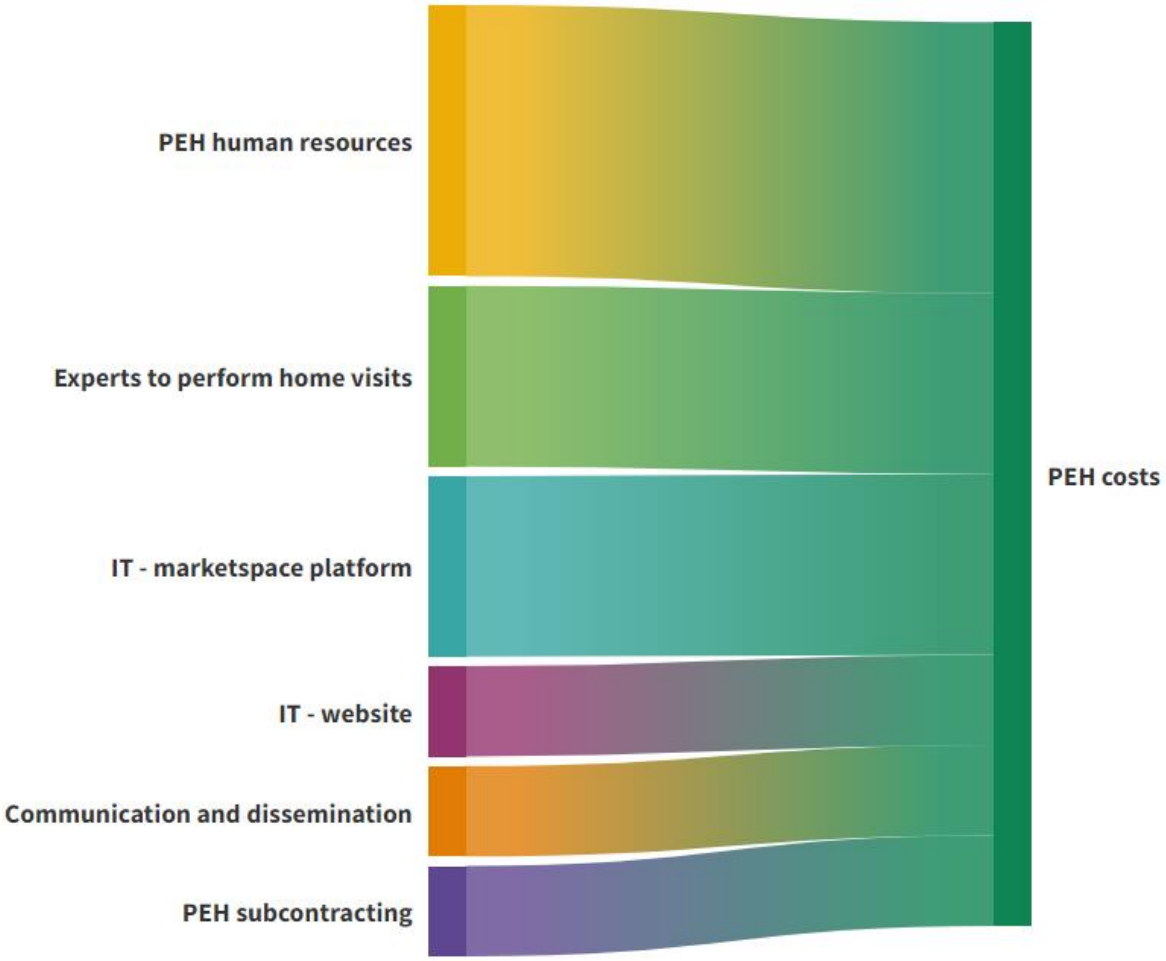

Figure 12: Porto Energy Hub cost structure (illustrative).

PEH staff will also manage the relationships with the entities constituting the PEH marketplace aiming to reinforce and renegotiate collaborations. The marketplace will operate under a platform which must be created to the effect. The costs related with this platform are not foreseen in PEER. Also, the project website was funded by PEER. However, after PEER lifetime, the website must be updated and maintained. Lastly, marketing and communication activities will also need to be maintained after PEER lifetime, representing costs PEH business model must consider. These costs can also be mitigated if municipalities willing to continue to provide PEH services after PEER assume the communication and marketing costs.

Revenue streams

The revenue streams will change over time, according to the evolution of PEH. In the launch phase, PEH costs will be covered by PEER funding. In this phase, PEH services

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will be available for free which allows PEH to engage the network of stakeholders and to assess the quality and the benefits that come from the services offered. When PEH reach the operating speed (phase-out of EU funds), the access to basic information will be free of charge for all costumers but technical advice and tailored consulting services (e.g., home visits, etc.) may need to be paid by the customers (or financed by municipalities) through fixed fees. Also, the entities willing to belong to the PEH marketplace will pay a brokerage fee. In a more mature phase, PEH is expected to be able to share its know-how with other entities interested in developing their own OSSs. This service can be provided in the form of consultancy or training courses, which will also be paid for. Figure 13 exemplifies the revenue streams expected for PEH.

Patronage can also be an option of additional income. This income will be especially addressed to support home renovation interventions of citizens unable to financially support such actions, contributing to effectively mitigate energy poverty in the territory.

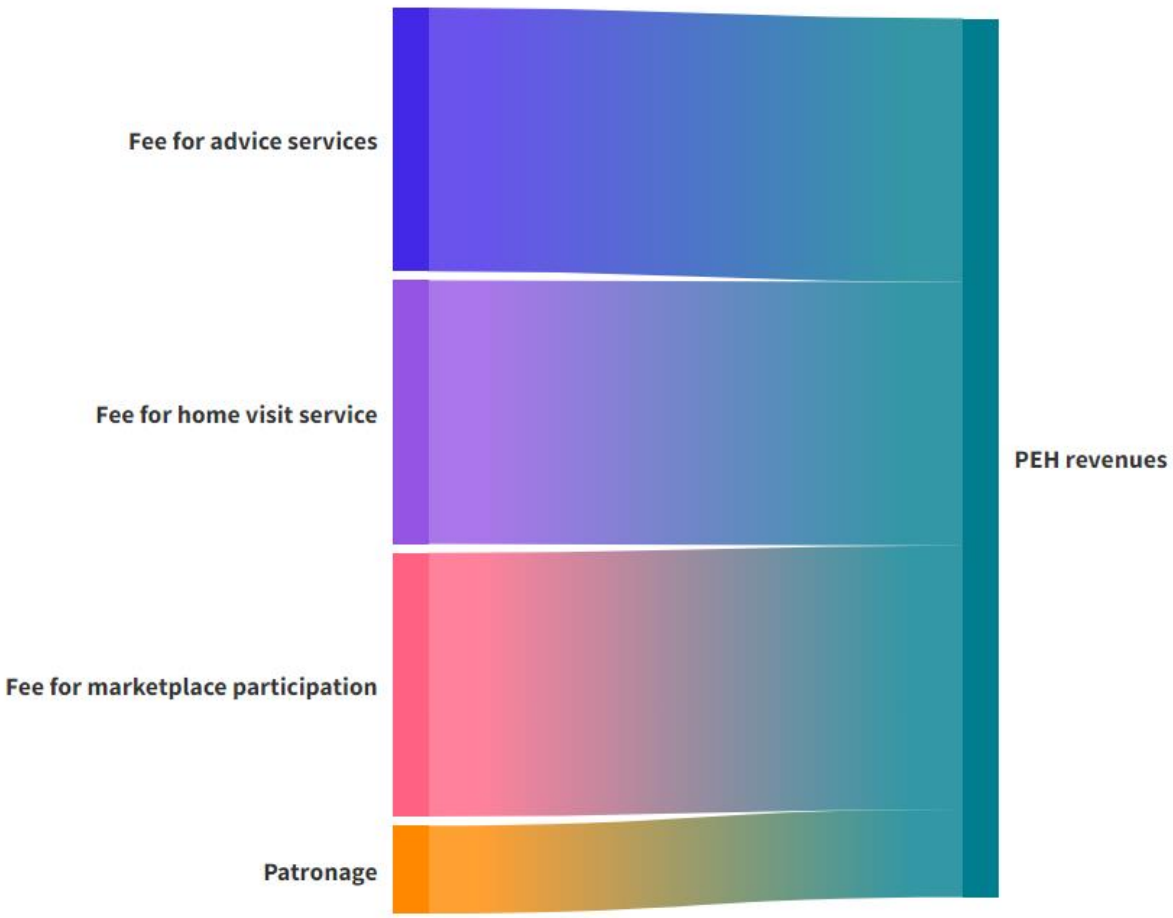

Figure 13: Porto Energy Hub revenues structure (illustrative).

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4. Conclusion

The sustainable renovation of the existing building stock is consensually seen as central for the necessary energy and climate transition of the cities. In this context, One -Stop-Shops can be a valuable tool in tackling identified barriers and guiding citizens throughout the fragmented and complicated value chain necessary for renovation interventions. This report aims to present the business model canvas for the Porto Energy Hub. This OSS is a combination of previously identified models of one stop shops. The business model canvas presented in this report considers four dimensions: infrastructure, offering, customers and finances. Importantly, it defines not only the customers segments, but also the different activities considered within the advising service and how the costs and revenues structure can be articulate in order to assure sustainability after the PEER project.

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References

[1] U. EBC, "ONE-STOP-SHOPS FOR SUSTAINABLE RENOVATION A KEY TOOL TO INFORM, MOTIVATE, ASSIST & SUPPORT," 2021. Accessed: Nov. 16, 2022. [Online]. Available at: https://www.ebc-construction.eu/2021/03/15/one-stop-shops-for-sustainable-renovation-a-key-tool-to-inform-motivate-assist-and-support/

[2] Energy Cities, "HOW TO SET UP A ONE-STOP-SHOP FOR INTEGRATED HOME ENERGY RENOVATION?," 2020. Accessed: Feb. 23, 2022. [Online]. Available at: https://energy-cities.eu/wp-content/uploads/2020/07/INNOVATE_guide_FINAL.pdf

[3] JRC Science for Policy Report, "One-stop shops for residential building energy renovation in the EU," Accessed: Jan. 12, 2022. [Online]. Available at: https://op.europa.eu/en/publication-detail/-/publication/423a4cad-df95-11eb-895a-01aa75ed71a1/language-en

[4] Padova Fit Expanded, "D2.1. ANALYSIS OF EXISTING ONE-STOP-SHOP INITIATIVES IN EU AND BEYOND," 2020. Accessed: Feb. 23, 2022. [Online]. Available: https://www.padovafit.eu/fileadmin/inhalte/Documents/D2.1_Analysis_of_existing_one-stop-shop_initiatives_in_EU_and_beyond.pdf

[5] A. Osterwalder and Y. Pigneur, *Business Model Generation: A handbook for Visionaries, Game Changers, and Challengers*, 1st ed. New York: Wiley, 2010. ISBN: 978-0-470-87641-1

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