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BOOK OF PROCEEDINGS VOL 2 ONSITE SESSIONS



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One-stop-shops as a model to manage housing energy retrofit

A General Approach to Europe and Spain

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ABSTRACT: Energy renovation of buildings in the European Union would lead to important energy savings and a 26% reduction in consumption. But, despite these relevant benefits and the programs implemented to promote energy retrofit, in Europe and Spain, the housing renovation rate is low. The barriers faced by contractors, homes, and finance companies are impassable. So, in the international arena, and promoted by European directives, have appeared One-Stop-Shops (OSS), as integrated management entities to promote the energy renovation of dwellings, which seems a central element in the development of future strategies. This paper analyses the implemented experiences of OSSs in Europe, trying to identify the main elements, and proposes lines of action to strengthen OSS operation in the long term. To do it, documents, regulations, and data on the context were studied. Also explores the Spanish pioneering experiences through in-depth interviews. The results suggested that a lack of structural funding is one reason why activities were finished and that the most successful cases applied an 'all inclusive' model and supported families in the entire process. It is highlighted the relevant role played by European projects as a source of funding and specialist knowledge; as well as the pending solution barriers.

KEYWORDS: European and Spanish housing renovation policies, residential energy efficiency, barriers to home renovation, renovation of buildings and housing, energy performance

1. INTRODUCTION

Building stock in Europe is responsible for 40% of energy consumption, and 36% of greenhouse gas emissions. Around 35% of the buildings are over 50 years old, almost 75% of these are inefficient from an energy perspective, and only between 0.4% and 1.2% of the housing stock is renovated [1]. The situation is similar in Spain: buildings represent 30% of energy consumption (being the most relevant the residential sector), and 50% were built before the NBE-CT-79 rule of minimum criteria for thermal insulation in homes.

Since 2002, the European Union has developed a legislative framework to promote the rehabilitation of this obsolete building stock, and processes for improving the energy efficiency of buildings, with the enactment of the Energy Performance of Buildings Directive 2002/91/EC [2], and the Energy Efficiency Directive 2012/27/EU [3] that established that each member state must design a building renovation strategy, through specific actions, to achieve efficient, decarbonised building stock prior to 2050 [4].

Additionally, the EU promotes policies that help to create a stable framework for investment decisions and help the involved actors to make informed decisions to save energy and money. Also, the European Green Deal [5] defines energy renovation of public and private buildings as an essential measure to ensure that Europe is climate neutral by 2050. The set of European regulations obliges member states to

define the minimum energy efficiency requirements for new buildings, and existing buildings that required a renovation. Each member state must decide the requirements and the calculation methods to be applied. In consequence the member states have implemented different models for transposing EPBD regulations [6]. However, despite the implemented programs to promote the housing energy retrofit, and important efforts made, the adoption of extensive renovation at European level is still very limited. The European annual rate of relevant renovations in the residential sector is about 1%, basically due to the barriers that families must face to perform the actions to rehabilitate.

Important renovations must be defined as those that reduce a building's final energy demand for heating by between 50% and 80% [7]. In this context, the energy renovation of these buildings would imply a 26% reduction in energy consumption.

So, the One-Stop-Shops (OSS) have appeared in Europe, provided by the EU as integral management entities to promote residential renovation.

The main aim of this work is to analyse the OSS experiences in the European context, and deeply the pioneer experiences in Spain. This analysis is aimed to understand the organisational models of OSS, the services they offer, and overall the barriers it has overcome, and those that are still to be resolved. In addition, to propose strategies for future actions.

2. METHODOLOGY

The research develops a qualitative analysis of 31 implemented OSS European cases study, excluding Spain (Table 1), and an in deep qualitative analysis of 3 Spanish cases (Table 2) to generate a comparison and define the most relevant topics in both contexts.

Table 1: European OSS cases studied

OSS Name	Leader type	Country	Beginning
RenoBooster	PPP	Austria	2019
Huisdokter	PPP	Belgium	2005
HomeGrade	Pub	Belgium	2017
EERSF	PPP	Bulgaria	2005
Aradippou OSS	Pub. PPP	Cyprus	2018
ProjectZero ¹	Pub	Denmark	2009
BedreBolig	Pub	Denmark	2013
PKA – Sust. Sol.	PPP	Denmark	2015
Frederikshavn	Pub	Denmark	2017
Ecofurb	Pr.	England (UK)	2009
Parity Projects ²	Pr., Coo	England (UK)	2013
KredEx	Pub	Estonia	2009
Energies POSIT'IF ³	Pub, Coo	France	2013
Pass Rénovation ⁴	Pub, Coo	France	2013
ARTÉÉ	Pub	France	2015
OKTAVE	Pub	France	2017
RenoHub	PPP	Hungary	2019
SuperHomes	Pr.	Ireland	2015
Mantova	Pub	Italy	2020
Leeuwarden ⁵	Pr.	Netherlands	2013
Woon Wijzer Winkel	Pr.	Netherlands	2015
Huizenaanpak	Pr., Coo	Netherlands	2014
Stroomversnelling	Pr., Coo	Netherlands	2015
Reinmarkt	Pub	Netherlands	2014
Bolig Enøk	Pr.	Norway	2009
Tighean Innse Gall	Pr.	Scotland (UK)	2014
ALIEnergy	Pub	Scotland (UK)	2011
MunSEFF	Pub	Slovak Repub.	2011
Slovseff	Pub	Slovak Repub.	2014
Energiesprong	Pr.	UK, Fr., Germ.	2013
FinEERGo	Pub	Various *	2019

Notes: a) Complementary, additional or optional names; ¹ Zero Home, ² Retrofit Works, ³ Île-de-France Énergies, ⁴ SPEE Picardie, ⁵ Slim Wonen Met Energie, b) Type of leader entities; PPP: Public-Private Partnership, Pub.: Public, P.: Private, Coo.: Cooperative.

Table 2: Spanish OSS cases studied

OSS Name	Region	Leader type	Type
GarrotxaDomus	Catalonia	Foundation	Coordination
OSIR	Extremadura	Administration	Coordination
OPENGELA	Euskadi	Administration	Coordination

The European analysis has been developed between April and September 2021 into the following stages: 1) identification of OSS using official reports and studies [5, 6, & others], research projects (Eracobuild, INNOVATE, COHERENO, and Refurb), scientific papers, and institutional websites of OSS focused on energy renovation in multi-family and single-family housing; 2) elaboration of a database with selected variables organized in the next groups of contents: a) general OSS data (leader entity, country, operating since, program/project, European plan, National plan, Regional plan, website), b) type of dwelling (single or multi-family), c) macroeconomic & environmental variables (GDP, CO2PC, Renewable Energy %), d) mass media (internet, showroom, office,

to the door...), e) passive improvements (isolation, ventilation, enclosures, solar protection devices, water recycling), f) active improvements (photovoltaic plates, boilers, heat pumps, heat recovery), g) other improvements (functional, aesthetic, accessibility), g) responsibility for the works, h) offered services (green marketing, energy audit, project redaction, financing, grant management, permission management, search of suppliers, bidding for works, supervision of works, set up, monitoring of works, post evaluation), i) customers (private owners, co-owners, companies, tenants), and j) partners (providers, manufacturers, specialised advisers, financial entities); 3) selection of cases, according to defined criteria, and 4) analysis of documentary information and the database. The variables have been analysed individually, within each group, detecting the most relevant in percentages.

For Spanish case, once identified four operative OSS, in-depth interviews were made to promoters of the three in the most advanced stage. The structure of the used forms is: general data, background, barriers addressed, offered improvements & Services, structure and operation, and obstacles overcome to implement it. The steps have been: 1) identification of OSS, 2) collecting information through public documents (webpages and audio-visual material), 3) contrasting and complementing them through a form applied to their promoters, and 4) deepen certain aspects through an in-depth interview.

To establish similarities and the most important topics, an analysis & discussion between European and Spanish cases has been developed, and final comments have been developed.

3. SOME BARRIERS TO ENERGY RENOVATION

The processes of renovating the housing stock are limited by a series of barriers that affect families (economic, lack of knowledge and information, lack of capacity to implement renovations, etc.)

Frequently, the decision of housing energy renovation is affected by negative experiences of owners, and the consequence lack of trust regarding advisors and contractors [8], also supported by the “do it yourself” culture [9]. Based on the review of the literature, we organize them as follows:

- *Barriers and market failures*: a) informational asymmetry based on that some of the actors involved in the residential renovation process do not have the necessary knowledge of energy efficiency [10]; b) economic factors: conditioned by the necessary capital, and the facts that its recovery is uncertain and long-term. The empirical evidence indicates considerable penalisation of future savings, and divided incentives [11]; c) behaviourism, considering that the decision of homeowners to develop renovations is influenced by personal (awareness, attitudes, experiences, beliefs, and skills), contextual and external factors [12], and e) legal framework and

management, considering also that studies suggest that some national energy efficiency action plans of some members states might not be adequate, and new policies are necessary [13].

- *Determinants*: a) inconveniences in the decision process is a widespread problem for confused and asymmetric information [14], and that is not a dichotomous process, but a complex with specific problems in each stage [15]; b) social factors, for example habits, which induce actions regardless of the context, or the reluctance to invest in residential improvements [16]; c) understand rehabilitation as a housing adaptation process [17], or as gradual on time [18]; d) EE lack of knowledge and fragmented supply [19], & e) demand disaggregation [20].

In this scenario of difficulties in rehabilitation, the OSSs have gradually emerged, mainly in Europe and USA, in national, regional, and local settings, with a range of regulatory frameworks, adapted to these, with difficulties that this implies.

4. EUROPEAN OSS ANALYSIS

Some studies, such as Boza-Kiss and Bertoldi [21], Cicmanova et al. [8], or Krosse, L., et al. [22], review implemented OSSs, many of which promoted by European initiatives. These enable measures to be adopted that improve dwellings' energy efficiency, at the same time as they offer a renovated dwelling that meets the homeowner's real needs [18].

To overcome the barriers of lack of information and knowledge, a One-Stop-Shop should consider, in accordance with the model and considering its scope, the active participation of the owners of dwellings to be renovated. Also, is essential the identification of a market segment. According INNOVATE classification [23], based on the degree of support offered and in the context of energy renovation of dwellings, four OSS operation models are identified: a) Facilitation: offers a first approach of the client to the benefits of energy retrofit, provides information at no cost that is oriented towards the customer, and acts as a facilitator of the processes, b) coordination: contacts customer with a suppliers, previously endorsed and carry out energy renovation works, and with financial entities if is required. They can control the process but do not take responsibility for the results, c) all-inclusive: acts as a contractor, offering packages of services: information, coordination with suppliers, contractors & financing. It is responsible for the process and, sometimes, guarantee energy saving after works, and d) ESCO: similar to all-inclusive in services, but also guarantees energy savings after the works. The cost of the investment is paid to the company through generated energy savings.

4.1 Some outstanding cases

- *Retrofit Works (U.K.)* started in 2013 as part of the Green Deal. It is based on a cooperative of SMEs of contractors, local suppliers (including technicians) qualified in energy, social agents, and the energy

consultancy Parity Projects (PP). They have formed since 2017 an OSS. The process starts with a web tool provided that families can use to find out about possible improvements and necessary investment. Those who are interested contact PP and, if is necessary, one technical coordinator visit the home to carry out an onsite assessment. Then, the three proposals of RW cooperative members are sent and a service contract is signed with PP, which carries out the technical monitoring of the works with the selected RW contractor. The operating costs of PP are covered by commission paid by the contractors.

- *OKTAVE (France)* is led by town and city councils and promoted by the agency for ecological transition ADEME and the Gran Este region. It brings together two financial companies, one of a social nature. The OSS provides a service that includes customised assistance on technical, financial, and administrative aspects under a model of a single point of contact. It draws up a financial plan that combines subsidies, tax credits, and zero interest loans for up to 15 years, and it seeks an ESCO to recover the investment with energy savings. The contractors and suppliers are local and trained, and accredited by OKTAVE, included in a register of qualified suppliers. The process starts with a free energy audit to assess the solutions and draw up a quote and an estimation of financing possibilities. It continues with the signing of a payment agreement for the provision of services, the search for suppliers and contractors, and an analysis of the suitability of the technical and financial proposal. With the fees, the management of subsidies (whose amount is paid in advance through a revolving fund), licences, and loans begins. The works are monitored, accepted, and put into operation.

- *BetterHome (Denmark)* offers diverse predefined renovation packages for private home-owners. Through automated, customised services and a web application, the potential customer first informs the installers and preselects the measures. Then, the homeowner through direct contact with the technical team can adapt the package and the technical and financial terms to their specific needs. The OSS works with local craftspeople, who receive training and tools to guarantee quality services. Better-Home carries out the promotion, quality control, monitoring, and customer care. In 2016, it completed over 200 projects and it has gradually expanded.

A different scheme is that implemented in France by the Ile de France region. A new, semi-public company was created and an ESCO was developed to offer a complete value chain for renovation [9].

5. SPANISH CASE STUDIES

The OSS concept in Spain appears in 2014 ERESEE as "local rehabilitation agencies." Although the local rehabilitation offices existed previously, linked to the rehabilitation of the public housing stock and within the framework of the integral rehabilitation of

degraded neighbourhoods. Unlike these offices, the concept of OSS: a) is not necessarily linked to an integral rehabilitation, b) nor is it aimed at areas of vulnerable population, & c) nor is in public housing. In this context three local operational OSS experiences are studied, all derived from European projects.

5.1 GarrotxaDomus (GD)

Is the evolution of HolaDomus (HD), pilot project in the framework of the EuroPACE Project, managed by EuroPACE Foundation, a non-profit entity with public-private participation: GNE Finance and Olot City Council, which has supported it and intends to extend it on the province through GiDomus. The pilot test had an agreement with GNE Finance. The owners had the possibility of financing with 5.5% APR rates, 1.5% commission, without cancellation or refinancing commission, within a period of 5 to 15 years.

The OSS model GD simplified interaction between owners and the other involved actors. The process begins by offering services of an energy office aimed at providing advice to reduce consumption through information on habits and housing improvements by effective messages based on people's needs. Subsidies are also managed and information is provided on affordable financing lines; the building license, the IBI and ICIO bonuses are processed and the owner is assisted to request budgets, within a portfolio of 70 validated professionals. To speed up the process, GD has, in addition to the physical office, a website with all the necessary information and each procedure is optimized to contain precise information to, for example, report a license or grant a subsidy.

Some 430 middle-income households and single-family homes have benefited, 95 assisted in drafting energy projects; a third part executed, another third part in execution and the rest in the previous phases. The most measures applied have been: insulation, air conditioning with photovoltaic support, enclosures... In general, the demand comes with a certain level of awareness, that increases as receive advice. The best valued services are support, centralized dialogue and assistance in obtaining subsidies. On the other hand, it can be seen that in the case of multi-family housing, the lack of affordable financing and, above all, the need for the agreement of the Homeowners' Meeting, makes it difficult to deploy renovations.

5.2 OSIR

The Office of Integral Services for the Energy Rehabilitation of Housing (OSIR) is an initiative of the Extremadura Government and Extremadura Energy Agency (AGENEX), with the support of the European projects H2020: HoseInvest and INNOVATE. It is aimed at multi-family homes. The office is in Badajoz, and is studied new openings in Mérida and Cáceres.

Previously, a diagnosis and rehabilitation potential study was carried out in the Interreg FINERPOL project framework, and training for the construction sector through the REHABILITE project. Then appear

OSIR and the Extremadura Housing Energy Efficiency Guarantee Fund (GEEVE). The fund is nourished by public resources (ERDF included), is managed by Extremadura Avante and seeks to mitigate the risk of participating financial entities. Thus, the entities offer loans to owners with special conditions; return terms of 15 years, reduced rates (less than 4.5% APR), without commissions (except opening). In order to the fund to accredits guarantee, renovations must affect the envelope, include an active system, and improve one step in the EPC energy class.

OSIR identifies buildings with a high rehabilitation potential due to lack of insulation and inefficient central boilers (previous to 1980). In parallel, contact and inform via web. Then, contact the administration of buildings and the presidency of the community. A technician visits the building, identifies shortcomings and opportunities for intervention. Then, with the improvement proposals, its energy savings, estimate cost and the subsidy and financing options, OSIR summons the neighbors, who can agree to undertake them all, prioritize them by cost or reject them. OSIR does not assume the direction, but accompanies the homes in the execution and reception of works. Parallel to project drafting, uploads its characteristics, its cost and compliance with the parameters required by GEEVE to cover the credit to a computer platform of the financial entities. This overcomes the barrier of ignorance of the financial sector of the implications of energy rehabilitation. AGENEX technicians provide support and advice, although they have contracted staff to provide their services.

Ten months after its opening, 200 buildings have been visited and 170 diagnostic and improvement reports have been issued. 3 have agreed to undertake the improvements and 2 have completed the selection of the contractor that will implement them.

5.3 Opengela (OG)

OG was born with the support of the H2020 Hiross4all project, to promote the creation of OSS in vulnerable neighborhoods. The first two OG offices operate in Otxarkoaga (Bilbao) and Txonta (Eibar). It aims is to extend the initiative, opening new offices across Basque country. GNE Finance also participates with its knowledge in rehabilitation financing.

It promotes multi-family buildings rehabilitation, empowering the owners to become protagonists in decisions, and leading the actions. The rehabilitation focuses on energy efficiency (reaching "C" EPC class, improving one or two letters), including health, habitability, comfort and accessibility improvement. Almost 50% of the rehabilitation cost is covered by subsidies and the rest by owners. Also, owners can apply for an additional aid or credits, and the spills can be prorated (up 36 months). OG is working with GNE Finance, assisting on economic needs of owners with difficult access to conventional banking. Also, is designing a line of aid, so that communities of owners can assume payments, in case of late payment.

OG seeks to increase the household's confidence with a regulated, competitive and transparent action. In the process, through an agreement with owners, is managed a contract, including technical conditions, & contracting pool. Otxarkoaga (*Viviendas Municipales*), is still the owner of some houses, and is part of the owner's communities, thus this procedure is easy. In the case of Txonta, with private homes, OG has the support of City Council's Urban Planning Department, & regional Urban Rehabilitation Society (DEBEGESA).

The OG Otxarkoaga office has three technical professionals, specialized in energy rehabilitation, one with social communication skills. 25% of the personnel cost is covered by Hioss4all, the rest by aid from the Department of Territorial Planning..., of Basque Government. For its part, Municipal Housing covers the costs of premises, material and services. OG Txonta has a technician, depending to Eibar Town Planning Department, assisted on technical, legal, economic, and administrative services by DEBEGESA.

In OG Otxarkoaga, the OSS's reception has been so good, due to a previous intervention in envelopes of some buildings, that help to shows renovations, cost, and the "word of mouth" communication on benefits. The process begins with the information of the problems to the owners, including improvements, based on the available aid, preferences and economic possibilities. Then, an agreement is requested for the administrative contracting process that begins with the drafting of the technical conditions, continues with the public call, with the contracting table, the review of the offers and its interpretation.

In Otxarkoaga, action is being taken in 5 buildings (16 portals & 240 homes). In Txonta, the action is being taken on 17 portals (221 homes) with an emphasis on energy and accessibility aspects.

5. ANALYSIS AND DISCUSSION

In addition to initial Nordic countries experiences, operating OSSs are mainly in the Netherlands (5), France (4), and the U.K. (4). Of these, four OSSs have been operating since 2009 (ProjectZero in Denmark, Ecofurb in England, KredEx in Estonia, and Bolig Enøk in Norway). These are the longest running OSSs after the two that have been in operation since 2005 (Huisdokter in Belgium and EERSF in Bulgaria).

Regarding *Nature and Initiative*, highlights public initiatives (16 cases, 51.61%), two collaborating with a cooperative and one case through a PPP. In general, public entities are town councils, with support of regional or national energy agencies. Almost half the OSS use all-inclusive model (optimum), 26% a facilitating model, and 24% a coordination model.

About *Financing for operation*, most (28 cases, 90.32%) have received public financing of European programmes or projects, mainly to cover its operating costs. Many of these start as pilot test in the project framework. Of these, the ones that are not operating, generally shut down, if it functioned as a pilot test,

without future funding. In relation to the model, the ESCO type use private financing as they act as agencies that use energy savings to finance customers and make it profit.

About *Communication Channels*, the most used to attract clients are Internet (webs) and mass media. Customer service offices also play a relevant role. The next most common means of communication is local meetings. The showroom option was only observed in all-inclusive and consultancy models and the 'door-to-door' method only in all-inclusive.

Regarding *Offered Improvements*, In the passive ones, there is a tendency to more integrated. In the buildings, the main passive improvements are focused on insulation (30 cases, 96.77%), types of doors-windows (26 cases, 83.87%), and ventilation (25 cases, 80.65%). In active ones, there is a clear predominance of photovoltaic panels incorporation (26 cases, 83.87%) in multi-family housing, and heat pumps (23 cases, 74.19%), followed by boilers.

Regarding *Provided Services*, the main ones are: energy audit (27 cases, 87.10%), project (23 cases, 74.19%). Those that are least frequently offered are: acceptance of the works, and other improvements.

About *Customer Target*, in some cases, OSSs focus on a local office but act in different regions or internationally, particularly when they form part of a programme that involves many cities: Bolig Enøk, Energiesprong, FinEERGo, or Reinmarkt...

Is important to highlight the cases with a model addressed both single-and multi-family buildings market, as successful building renovation business models: EnergieSprong, Oktave, and BetterHome.

In Spain, despite its diverse nature, OSS share the impulse of public administrations, which distinguishes it in relation to those of other European countries, mostly private. Although the responsibility of the administrations in promoting energy rehabilitation is clear, its participation in the OSS (with public funds) entails difficulties. For example, the limitation in contract services, based on supplier records.

Another distinctive feature is that it is aimed to multi-family housing, with a set of added challenges: a) complexity of obtaining an agreement from the owner's community, b) financing for the community and coverage of non-payments, and c) in deprived areas, organizational problems and lack of daily management. For this reason, the participation of multi-family building management professionals is crucial. Also, is important to act as a link between the neighbourhood communities and the OSS, as in OSIR.

The third characteristic is its "facilitation" type. This is understandable, considering the role of the administrations. But in a context of fragmentary information regarding benefits, possible measures, cost/benefit ratio, financial aid and assistance, this model represents a very significant evolution.

Also noteworthy are the international initiatives of consulting companies, installers or organized

distributors, which make it possible to group together a fragmented service market. Spanish cases integrate these services and try to prioritize professionals with technical, economic and administrative solvency. It also highlights the efforts to unite professional, industrial and financial associations. Thus, these experiences respond to the OSS model desired by the EC, beyond that the provision of integrated services.

6. FINAL COMMENTS

The preliminary results suggest at the European level that the lack of structural financing is a cause of the closure of its activities and that the most successful ones respond to the all-inclusive model, assisting families throughout the process. Likewise, the important role that European administrations and projects play as a source of funding and, of specific knowledge, is highlighted; as well as the obstacles that have been overcome to implement them and those pending resolution.

In Spain, OSS are emerging in a critical moment; the imminent arrival of EU NextGeneration fund, which management can be assisted by these, especially when there are resources and initiatives from the EC and the EIB to finance technical assistance in efficiency of public and private entities, as well as studies for the establishment of OSS.

In sum, a point of no return has been reached in which OSS appear as a relevant actor in meeting the challenges associated with the climate emergency.

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