



## Deliverable D7.1

# BC1 Demonstrator

### WP 7

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## Abbreviations

|        |  |
|--------|--|
| BC     | Business Case                          |
| CA     | Consortium Agreement                   |
| i.e.   | id est (engl. = that is to say)        |
| IPR    | Intellectual Property Rights           |
| RTD    | Research and Technological Development |
| S & T  | Scientific and Technological           |
| SME    | Small and Medium-sized Enterprise      |
| WP     | Work package                           |
| w.r.t. | With respect to                        |
| RTL    | Readiness Technological Level          |
| UTE    | Union Temporal de Empresas             |



## 1 Executive Summary

---

This document describes the four Spanish business cases of the NewBEE project. It intends to comply with the specific requirements for the work package WP7 “Demonstrators”, which is *“The development of demonstrators to validate and demonstrate the energy saving measures and energy generation within buildings aiming to incentivize and accelerate the adoption of energy efficient solutions”*.

In order to satisfy the previous points, it has been planned four different scenarios, in each one of them it is presented the utilization of different NewBEE's parts in different situations. Each business case outlines the application and integration of specific tools provided on the NewBEE platform and developed during the project in the Spain construction platform. The comparison of the current retrofitting approach with NewBEE approach and evaluation of outcomes for the stakeholders involved in the value chain is presented in the different scenarios:

- S1: A community of neighbors who requests a service retrofitting. The demonstrator simulates the global retrofitting of the facades of an apartment building.
- S2: A tender of a great work to show that a set of SMEs can tackle it. The demonstrator simulates how different SMEs can use the NewBEE tool to present a joint approach to tackle the subject of the tender.
- S3: A real work of retrofitting from which we can obtain both physical and economic data and compare them with NewBEE system. The demonstrator simulates how a retrofitting intervention can be done from the different user's perspective.
- S4: The MEEFS project to test accurately the E-PASS tool. The demonstrator simulates the MEEFS technology in an apartment building located in Merida.

Each one of the scenarios depicts a realistic scenario based on the experience that the partners have.

## 2 Introduction

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### 2.1 Document Purpose.

This document is the Deliverable *D7.1 BC1 Demonstrator*, which shows the results of the work done in the Task 7.1 *BC1 Demo: Spanish Retrofitting, block of residential buildings*. The main purpose of this task is the development of demonstrators to validate and demonstrate the energy saving measures and more specifically the development of a cluster of demos that will illustrate the entire NewBEE platform.

### 2.2 Approach Applied.

For the creation of this document the NewBEE consortium partners have carried out the investigation of information sources available in the literature, on the internet pages of the RTD organisations, ICT providers and industrial companies, as well as information on the current or recent research projects, dealing with topics relevant for the NewBEE S&T objectives. All these activities were supported by the partners' expertise in related areas.

### 2.3 Document structure.

- The document consists of Section 1. Executive Summary with a short and concise overview of the overall content of the whole document, to who the document is directed, main results described in it, interest for the reader and benefit the reader may expect from it.
- Section 2. Introduction which describes the purpose of this document, the position of this document with respect to the whole project, and the provision of a brief overview of the contents of the document.
- Section 3. Scenarios identified which demonstrate the NewBEE system in Spain retrofitting sector.
- Section 4 to 7 describes the different scenarios in detail.
- Section 8. Conclusions from the scenarios.

### 2.4 Document objective and background.

The objectives of this document are those depicted in the description of work, that is:

- Development of demonstrators to validate and demonstrate the energy saving measures and energy generation within buildings aiming to incentivize and accelerate the adoption of energy efficient solutions.
- Comparison of the current retrofitting approach with the NewBEE one and evaluation of outcomes for the stakeholders involved in the value chain.

It is also proposed some business models that could arise by using the platform, despite not all of them are real; all of them are realistic (based on the criteria of the experienced partners).

### 3 Scenarios identified

---

As it is explained in the previous section, in the case of Spain there are four scenarios for demonstrating the NewBEE system in real environment.

- S1: A community of neighbors who requests a service retrofitting
- S2: A tender of a great work to show that a set of SMEs can tackle it.
- S3: A real work of retrofitting from which we can obtain both physical and economic data and compare them with NewBEE system,
- S4: The MEEFS project to test accurately the E-PASS tool.

The main actor in the scenarios is the one specified in the following table:

*Table 1 Scenarios main actor*

|           | <b>OWNER</b> | <b>SME</b> |
|-----------|--------------|------------|
| <b>S1</b> | X            |            |
| <b>S2</b> |              | X          |
| <b>S3</b> | X            | X          |
| <b>S4</b> | X            | X          |

## **4 S1: A community of neighbours who request a service retrofitting**

### **4.1 Description**

The case studio chosen for this First Scenario in the Spanish business case is based on a realistic case that is currently being developed and solved by TEUSA Company. The original project consists in the global retrofitting of the façades of an apartment building. This retrofitting process includes a whole refurbish work starting from an improvement of the impermeability of some external elements, an ordering of the services that are installed on the façade and finally the most important issue is the energetic retrofitting of the façades (the rear and the front ones). Two different energetic retrofitting technologies are going to be used and implemented in the real case (Double Skin “ventilated façade system” and an ETICS (External Thermal Insulation System)).

The demonstrator is going to simulate the behaviour of the responsible of the building neighbourhood that at the beginning of the retrofitting process, even earlier than the choice of the enterprise and the technologies. From this point of view, it is very important to follow the logic behaviour of a non-expert actor (for example the president of the neighbour’s “retrofitting commission” present in many cases in Spanish models).

Therefore, this first scenario demonstrator is going to be limited to the assessment of the energetic performance of this apartment building (limited to the two mentioned technologies that are used in the real case), from the beginning of the process (since the decision to undertake the project is assumed until the enterprise and consultant are chosen, contacted and started up) . Four different modules of the NewBEE Platform are going to be used and demonstrated: Wiki, Pre-Assessment Tool, Financial Assessment Tool and Market Place.

- **Situation and location description**

The real building is situated in San Sebastian, a capital city in the Basque Country, northern part of Spain and very close to French border. It fits to a typical 60’s and 70’s urban expansion in the suburbs of the original and historical XIXth century city. Jose María Salaberria Street 11-13 and 15<sup>th</sup>. Next are the location and situation maps:



*Figure 1 - San Sebastian map*

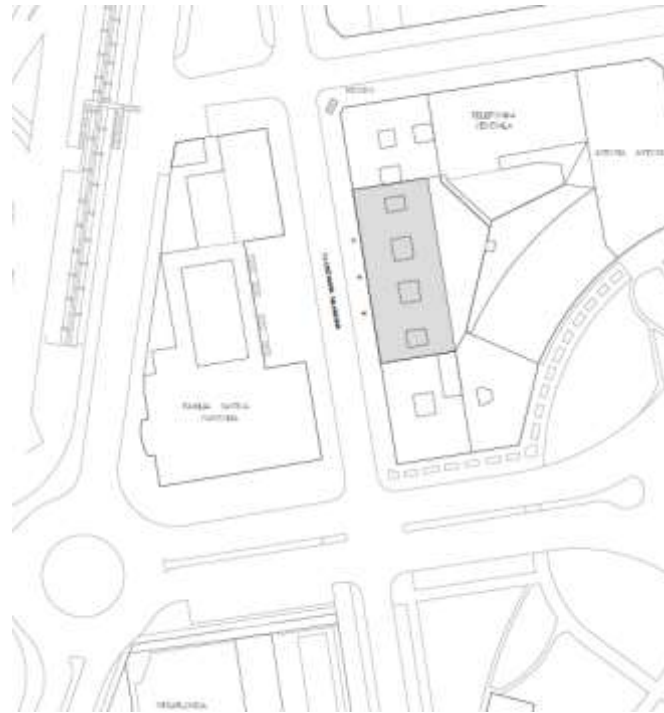


Figure 2 - Specific location map

The multi-residential apartment construction is built in concrete structure and stone tiles based façade in the front part and more conventional materials in the rear one. Three different door steads are located inside and distribute the different residential pieces into four and two apartment distributions per stair:

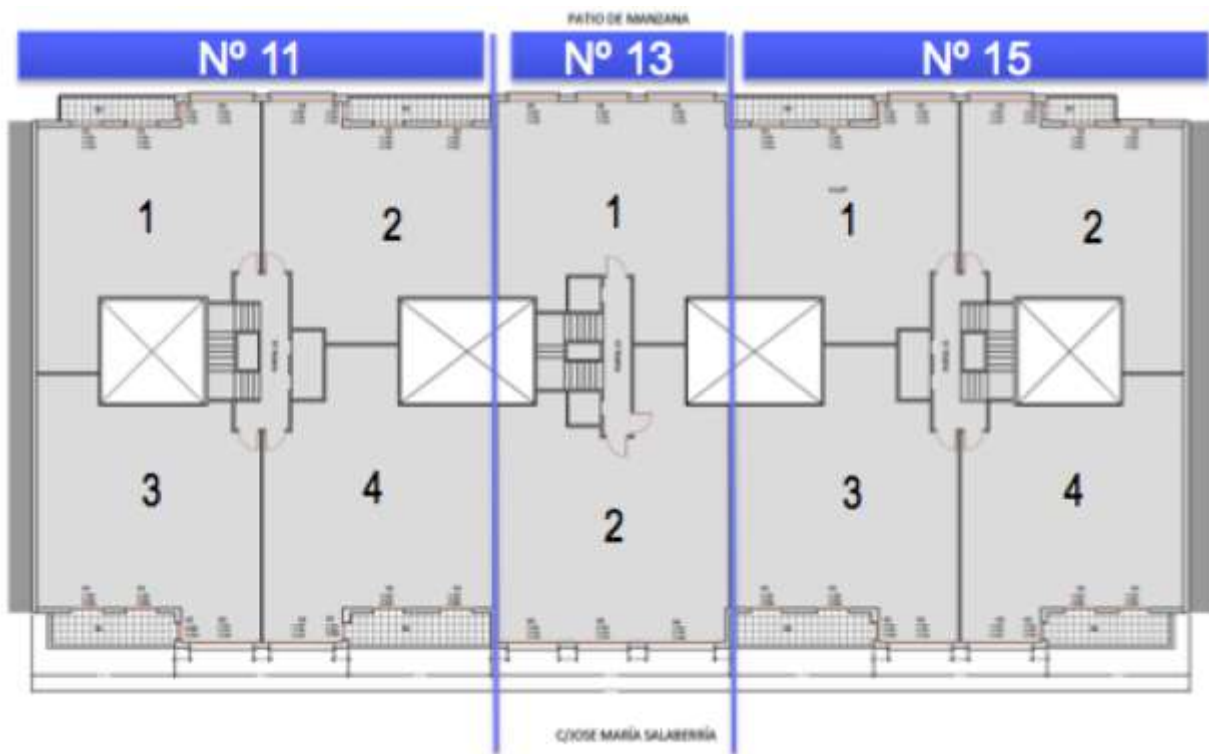


Figure 3 - Floor drawing

- **Composition, volume and building description**

The building is 9 floors high and as commented before it has two different façades. Besides it has a basement for car parking and some storage locals in the stage under the roof. In the following drawings and pictures these issues can be seen:



*Figure 4 - Side View*



*Figure 5 - Building picture*

The real project TEUSA is working on, contemplates the retrofitting of the façades using two different technologies:

- The part of the façade with the highest quality (Stone tiles) is going to be refurbished with a double skin ventilated façade. This technology uses besides the thermal insulation panels (made of mineral fibers as rock wool) an additional metallic structure to sustain the new ceramic pieces that produce the final façade appearance.
- The rest of the façade and the internal part of balconies are going to be retrofitted with an External Thermal Insulation System. Based on an EPS insulation panel overlaid by an acrylic coating finished with painting or also acrylic skin.

These two different technologies are applied in the façade as shown in the following draft and drawing, in red colour the double skin ventilated façade and in yellow line the ETICS:



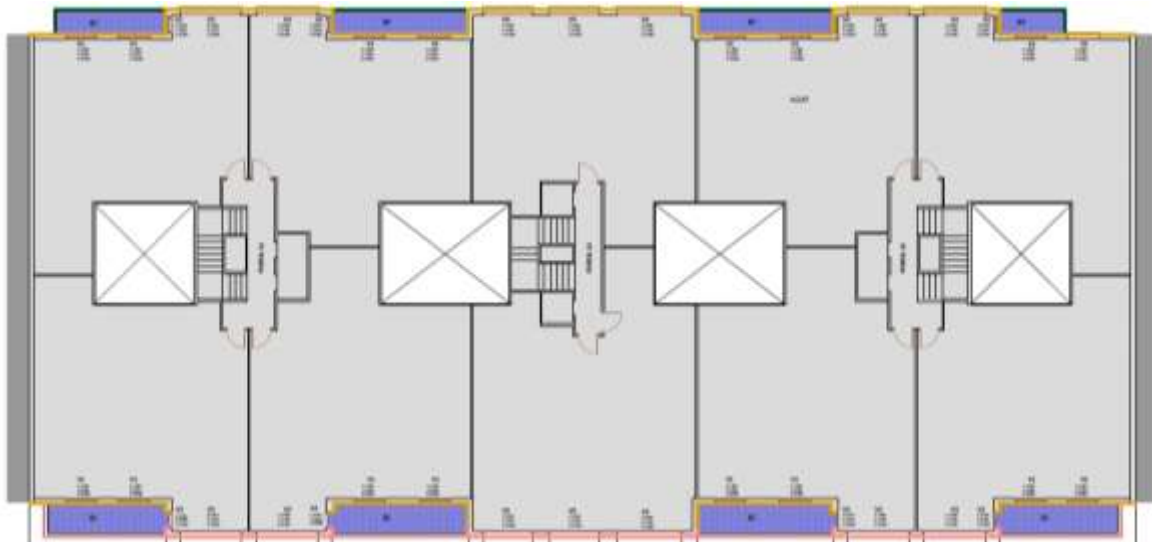


Figure 6 - Floor drawing

## 4.2 Business case workflow

Once the building and the customer description is done, it is explained how this customer is going to practice and search for a solution to his problem for retrofitting needs with the NewBEE platform and some of its modules.

In the diagram bellow, the workflow for this first scenario can be seen. In this case, some colour references are used to distinguish between different roles and functions inside the platform during the process of the platform uses. These colours are:

- Green: items and actions taken into the NewBEE platform or decisions taken after using different modules.
- Blue: items related to the customer and/or external data for the simulation and the demonstration of the scenario.
- Orange: items and actions taken by other actors, players and roles inside the value chain of the Project (SME, other enterprises, energy efficiency consultants)

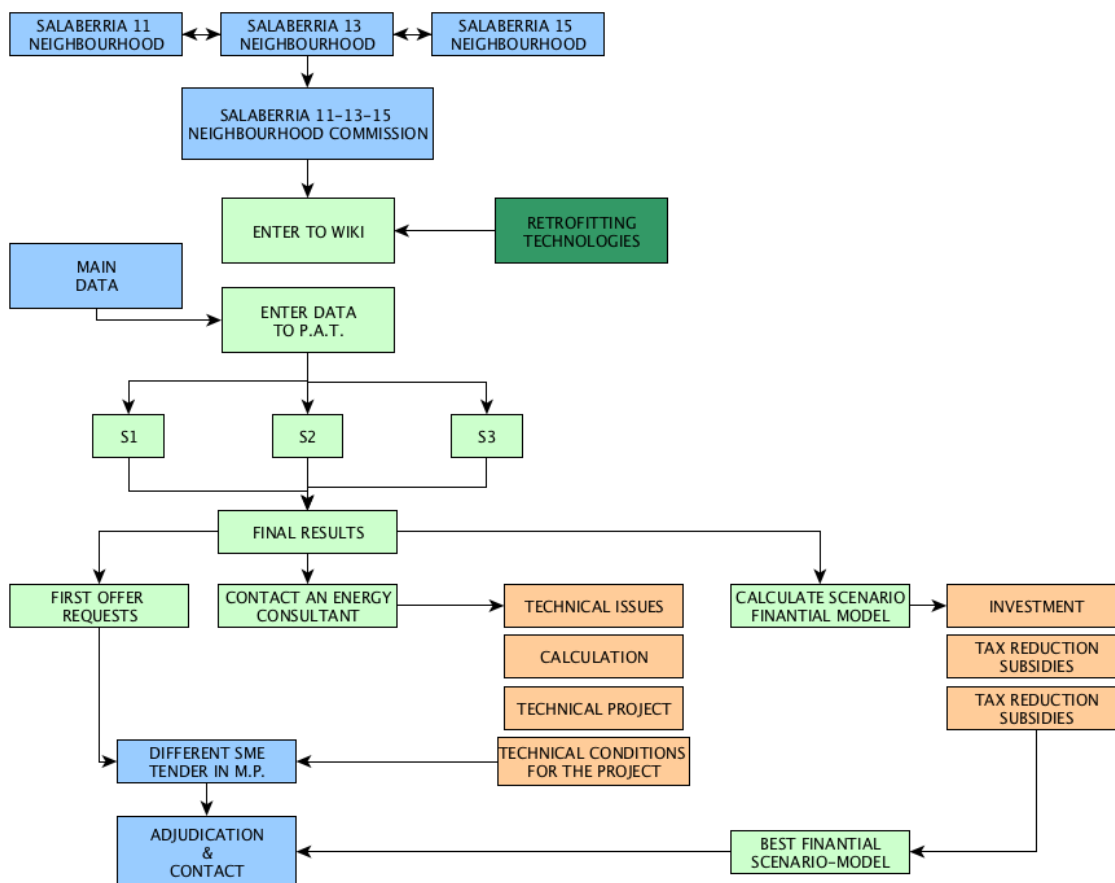


Figure7 - Flow diagram

**Entering the platform for the first time**

From the point of view of a customer, the first step is not to define the retrofitting project as it is. The community of neighbours has a rough idea of his needs, his interests and objectives for the building, but they need a leader, a guideline or a roadmap to follow if they want to reach the final result with satisfaction.

The first step is the creation of the Neighbours Commission. This Commission is going to take care of all the representation needs during different steps and times in the process. This commission is created in a general assembly of the neighbours and receives all the power and acting capacity to take decisions and to represent the Assembly properly. Once this Commission is created, their members begin to take first contact with retrofitting technologies in order to find which one fits better to their building parameters, study case, and interest. They can know the NewBEE platform previously or be guided by others to use this collaborative network and assessment tool to make their first approach to the Energy Efficiency World. This is going to be their first contact with the platform, the one that is going to guide and follow them.

**Wiki Module: introducing to the retrofitting technologies**

The Commission has decided to use de NewBEE platform and they start to get information by their own. In this point the wiki module of the NewBEE platform can be used to get general information about different technologies that can be applied in each case (façade, roof, ventilation, services...). In this case, following the same scheme that is being used in the real case, two different technologies are going to be consulted and learned by the Commission: the double skin ventilated façade and the ETICS. The following picture shows the screenshot of this point in the platform:



**NewBEE** Wiki Pre-Assessment Marketplace Contact My account

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## Thermal insulation composite system

| Overview                       | Structural factors  | Economic factors |
|--------------------------------|---|------------------|
| <b>Description</b>             | Thermal insulation composite systems are systems consisting of matching materials which are mounted onto the outer walls of buildings. One of these materials is an insulating material, which has to conform to strict health and safety requirements. Insulators for thermal insulation composite systems include polystyrene rigid foam, mineral wool, mineral foam, polyurethane foam, perlite, phenolic resin, wood fiber and need. Vacuum insulated panels are also possible. Today, the majority of old buildings, and some new ones, is insulated using insulators made of polystyrene or polyurethane. |                  |
| <b>Advantages</b>              | <ul style="list-style-type: none"> <li>• Energy efficiency. Improves the airtightness of the building, which avoids heat loss during winter time and keeps out the heat during summer time</li> <li>• Majority of thermal bridges can be eliminated</li> <li>• Preserves existing internal thermal mass, which reduces fluctuations in internal temperature</li> <li>• Greater flexibility in the choice of insulation material and thickness</li> <li>• May improve acoustic insulation</li> <li>• Occupants do not have to re-locate during the construction work</li> </ul>                                  |                  |
| <b>Disadvantages</b>           | <ul style="list-style-type: none"> <li>• Fire safety problems (polystyrene)</li> <li>• Living space will continue to be relatively slow to heat up</li> <li>• Junctions with windows etc. need redesign</li> <li>• Requires additive materials such as plasterwork or cladding to offer protection from external environmental conditions</li> <li>• Better protection against internal wall condensation and damp</li> </ul>   |                  |
| <b>Characteristic features</b> | Thermal insulation composite systems (ETICS) are multilayer structures for the insulation of exterior building walls  |                  |
| <b>Application barriers</b>    | High investment cost  |                  |
| <b>Information sources</b>     | <a href="http://db.zlw.de/asset/20044_DE-Fassadensysteme-Daemmsysteme.htm">http://db.zlw.de/asset/20044_DE-Fassadensysteme-Daemmsysteme.htm</a><br><a href="http://www.das-service.com/technik/und-forschung/produkte/etw/etw-schwebe/etw/etw-damm-verkuehlung/etw/">http://www.das-service.com/technik/und-forschung/produkte/etw/etw-schwebe/etw/etw-damm-verkuehlung/etw/</a><br><a href="http://img-wditer.de/leermedien/etw/etw.html">http://img-wditer.de/leermedien/etw/etw.html</a>   |                  |
| <b>Image</b>                   |   |                  |
| <b>Trade:</b>                  | Envelope (facade)   |                  |

Figure 8 - Wiki screenshot

NewBee technology wiki

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**Toolbox**  
[What links here](#)  
[Related changes](#)  
[Special pages](#)  
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[Browse properties](#)

## Double skin facade

| Overview                       | Structural factors  | Economic factors |
|--------------------------------|---|------------------|
| <b>Description</b>             | Double skin facades consist of two skins of which the inner skin is directly responsible for thermal insulation and the outer skin absorbs external impacts as well as exploits solar radiation. Double skin facades allow for new climate control and ventilation systems. They reduce heat loss during the cold season. Additionally, the natural ventilation of the cavity generates a climatic buffer which ensures fresh air ventilation to all offices without the usual problems incurred by conventional air-conditioning (noisiness, draft). Energy consumption is reduced significantly so that utilities can be reduced by up to 70%. Acoustic and thermal insulation is improved. |                  |
| <b>Advantages</b>              | <ul style="list-style-type: none"> <li>• Increased thermal insulation compared to metal</li> <li>• Allows for a more intricate shape and more freedom of design (compared to metal)</li> <li>• Reduced weight compared to conventional materials</li> <li>• Thermal bridges may be avoided by the use of GRP (fibreglass)</li> </ul>  |                  |
| <b>Disadvantages</b>           | <ul style="list-style-type: none"> <li>• High costs incurred by the processing of GRP</li> <li>• Disposal of GRP</li> </ul>   |                  |
| <b>Characteristic features</b> | Double skin facades consist of an insulating glass facade and a second plane that is arranged according to the concept behind or in front of the primary facade. The cavity is ventilated natural or mechanical   |                  |
| <b>Application barriers</b>    | High processing and disposal costs  |                  |
| <b>Information sources</b>     |   |                  |
| <b>Image</b>                   |   |                  |
| <b>Trade:</b>                  | Envelope (facade)   |                  |

Figure 9 - Wiki screenshot

### Pre-Assessment Tool Module: first approach to the retrofitting cost and energy savings

The neighbour commission has a first idea of the technologies to be used in their project to achieve some energy savings. But they must know if this retrofitting is going to be possible or not as the result of the final cost of the project and work. At this point, the NewBEE platform helps them to know if this possibility exists in the NewBEE system. Also, they can get information about energy savings, payback period and contact with different enterprises which have different capabilities and expertise that can make an offer that better fits their needs.

So they collect some essential and basic data to obtain first results in the pre-assessment tool. This data are detailed in the following points (see also next figure):

- Country: Spain
- Building type: apartment building
- Construction year: <1979
- Accommodation units more than 8 apartments
- Number of floors: 9
- Heated area: 8741m<sup>2</sup> (data taken from municipality)
- Consumption: 8100€/month

## Pre-Evaluación – Datos del edificio

Datos del edificio      Mediciones      Resultados

---

### CARACTERÍSTICAS DEL EDIFICIO

Por favor, inserte algunas características y números de su vivienda. Usaremos sus datos para el cálculo de los costos y los ahorros potenciales. No se almacenarán los datos. Antes de entrar en el mercado digital el sistema le preguntará si desea almacenar "su proyecto".

|   |  |
|---|--|
| <input type="text" value="Edificio de apartamentos"/> | <b>Tipo de edificio</b><br><small>Por favor seleccione la tipología de edificio. Esto ayudará a calcular los resultados de forma más precisa.</small>  |
| <input type="text" value="&lt; 1979"/>                | <b>Año de construcción</b><br><small>Año de construcción</small>   |
| <input type="text" value="más de ocho apartamentos"/> | <b>Número de habitáculos</b><br><small>Cuántas familias o cuántos habitáculos tiene su casa?</small>   |
| <input type="text" value="9"/>                        | <b>Número de plantas</b><br><small>Por favor, inserte el número de plantas que sean realmente utilizadas en la vivienda. Si usted tiene habilitado el espacio para vivir en el ático o en el sótano, por favor elija 0,5 pisos por cada uno.</small> |
| <input type="text" value="8741"/>                     | <b>Area climatizada (en m2)</b><br><small>Por favor, inserte los metros cuadrados del área climatizada. No incluir las plantas no habitadas.</small>   |

Figure 10 - Pre-assessment screenshot

## CONSUMO DE DATOS

Con el fin de calcular el ahorro potencial y los plazos de amortización de los periodos de inversión necesitamos su consumo actual de energía

|  |  |
|--|--|
| <input type="text" value="Calentador de agua caliente"/> | <b>Consumo de energía para</b><br>Si su sistema de calefacción incluye también el agua caliente por favor elija "Calentador w / agua caliente". Si usted tiene una caldera eléctrica sólo para la cocina elija "Calentador w / agua caliente" también. Para cualquier otra opción elegir "calefacción sin agua caliente" |
| <input type="text" value="324000"/>                      | <b>Energía térmica (kW/h / p.a.)</b><br>Por favor inserte su consumo de energía en kw / h por año. Por favor, consulte su factura de gas. Si se utiliza gasoil, por favor, calcule su consumo anual.   |
| <input type="text" value="8.100.00"/>                    | Si usted no sabe su consumo anual, puede insertar su coste mensual de energía térmica y el sistema calculará el anual por usted. Por favor, inserte el coste mensual de su factura en euros (EUR).   |

## LOCALIZACIÓN

Nosotros no necesitamos su dirección completa Sólo necesitamos el código postal o la ciudad con el fin de calcular medidas más precisas.

|  |   |
|--|---|
| <input type="text" value="20010 San Sebastián, España"/> | <b>Código postal</b><br>Por favor introduce el código postal y elegir entre el menú desplegable a continuación. |
|--|---|

Next step

Figure 11 - Pre-assessment screenshot

The tool asks for different scenarios. In each one of these scenarios, the commission can make some tests in order to know how to select different kind of technologies, and thus to obtain different costs and energy savings. Three different scenarios have been demonstrated:

- The first one shows the simplest way for making a retrofitting work in the building only making a refurbishment of the façade, the envelop of the building. (This is the scenario carried out by TEUSA in the real case).
- The second one includes also the retrofitting of the roof
- The third one (the most complete scenario) in which façade, windows and solar thermal technology are taken into account.

The following pictures show these three scenarios in the platform:

### PLAN DE ACTUACIÓN

Con el fin de simplificar las cosas le sugerimos algunas medidas estándar sobre los sistemas de calefacción. Usted tiene la oportunidad de crear y comparar hasta tres escenarios diferentes. Anímesey verá lo fácil que es ahorrar energía y reducir la huella de carbono.

|                                     | Escenario 1                         | Escenario 2                         | Escenario 3                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <b>Fachada</b>                      |                                     |                                     |                                     |
| W Roof                              | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| W Wall                              | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| W Basement                          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| W Windows                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| <b>Calefacción</b>                  |                                     |                                     |                                     |
| W Electro heat pump incl. hot water | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| W Boiler /w Petrol                  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| W Boiler /w Pellets                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| W Boiler /w Gas                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| W Hot Water with solar              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Figure 12 - Pre-assessment screenshot

### ECO MEDIDOR

Los eco-medidores muestran la energía consumida y el CO2 emitido para generar esa energía basándose en el mix energético. S1 a S3 representan los resultados de los escenarios Si desea, usted puede nombrar los escenarios...

Basado en el mix energético de su estado.

#### Energía (kWh/m2)



#### Emisiones CO2 (kg/m2)



### RETORNO DE LA INVERSIÓN

Sobre la base de los costes previstos y los ahorros potenciales se calculó el periodo de retorno de la inversión. No se consideró ningún costo de capital ni aumento potencial del coste de la energía en el futuro.

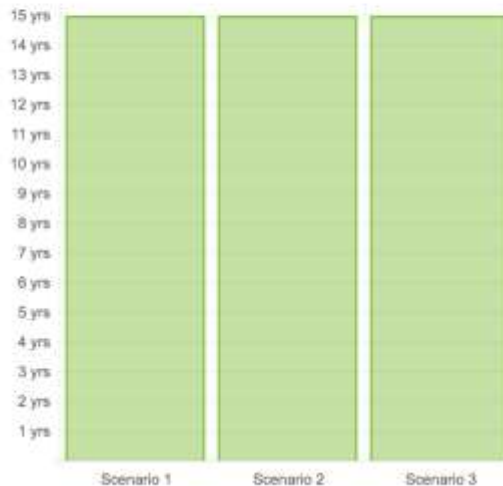


Figure 13 - Pre-assessment screenshot

| Eliga su favorito      | Scenario 1                     | Scenario 2                     | Scenario 3                     |
|------------------------|--------------------------------|--------------------------------|--------------------------------|
| <b>Medidas</b>         | <b>S1</b> (Eliminar Escenario) | <b>S2</b> (Eliminar Escenario) | <b>S3</b> (Eliminar Escenario) |
| W Roof                 | X                              | ✓                              | X                              |
| W Wall                 | ✓                              | ✓                              | ✓                              |
| W Windows              | X                              | X                              | ✓                              |
| W Hot Water with solar | X                              | X                              | ✓                              |

|                          | Escenario 1                 | Escenario 2                 | Escenario 3                 |
|--------------------------|-----------------------------|-----------------------------|-----------------------------|
| <b>Inversión Total *</b> | 244000 €                    | 395000 €                    | 519000 €                    |
| <b>Savings *</b>         | - 32 %                      | - 38 %                      | - 51 %                      |
| <b>Saved kWh / a *</b>   | 103680 kWh (29787.26 EUR/a) | 123120 kWh (35372.38 EUR/a) | 165240 kWh (47473.45 EUR/a) |
| <b>Payback period *</b>  | - 9 years                   | - 12 years                  | - 11 years                  |

Paso anterior
Guardar como PDF
Calcular este escenario
Solicitar presupuesto
Contactar con un consultor energético

Figure 14 - Pre-assessment screenshot

Among the results they obtain, the real case fits to the first scenario, in this one, the general costs of the retrofitting are 244.000€ and can obtain a 32% rate in energy savings with a 9 years Payback period of the investment. This can encourage the commission to continue using the platform and at this point they have three different possibilities that they can follow at the same time (as shown in the workflow scheme):

- To ask for proposals in the Market Place
- To contact an energy consultant
- To calculate the selected scenario's financial model

### Asking for proposals in the market place

In order to make a first tender selection among enterprises and to select a three-component group for a final proposal request, the commission is going to send the selected scenario to the market place. There, login and registration is necessary. Once registered, they fill up the form and put the different expertise profiles they need for the refurbishment, they fix a final date as shown in the following screen shots and finally they publish their retrofitting work as a business opportunity in the market place.

# Publica tu convocatoria

Crear Oportunidad de Negocio » Crear Oportunidad de Negocio » Mis ofertas » Publica tu convocatoria » Publica tu convocatoria »

**?**  
NO IMAGE

### AÑO DE CONSTRUCCIÓN

|  |  |                |
|--|--|----------------|
| <b>Ubicación</b>                         | 20010 San Sebastián, España                    |                |
| <b>Número de viviendas</b>               | Multi-family house with up to eight apartments |                |
| <b>Tipo de Edificio</b>                  | Block of flats                                 |                |
| <b>Año de Construcción</b>               | 1950-1974                                      |                |
| <b>Plantas</b>                           | 5,5  |                |
| <b>Material de construcción</b>          | Brick roofing                                  |                |
| <b>Fachada</b>                           | Masonry  |                |
| <b>Propiedad</b>                         | Housing association                            |                |
| <b>Número de Ocupantes</b>               | 90   |                |
| <b>Área calefactada/climatizada</b>      | 8.741  | m <sup>2</sup> |
| <b>Consumo Eléctrico</b>                 | 0  | KWh            |
| <b>Consumo calefacción/climatización</b> | 324.000  | KWh            |

Figure 15 - Marketplace screenshot

## DESCRIPCIÓN

|                                 |   |
|---------------------------------|---|
| <b>Problema identificado en</b> | <ul style="list-style-type: none"> <li>× Facade</li> <li>× Thermal comfort</li> <li>× Energy efficiency</li> </ul>                        |
| <b>Tecnología</b>               | <ul style="list-style-type: none"> <li>× Cavity wall, thermal insulation</li> <li>× External wall, external thermal insulation</li> </ul> |
| <b>Fecha Tope</b>               | 15.07.2015  |
| <b>Title</b>                    | Salaberria 11-13-15   |

Figure 16 - Marketplace screenshot



### Contact an energy consultant-technical expertise team

The commission and its members are not supposed to have any technical knowledge or skill in energy efficiency retrofitting and the normal step they take at this point once they have selected the scenario that fits better to their needs and interests, is to contact a bureau, a technical atelier or someone similar associated with architects that will guide them from the beginning to the end of the retrofitting process.

This step is also asked for filling in the market place form that they filled out for the business opportunity. Different studios will contact them to offering their services and then they will choose one of them. These architects will gather data about the building, its energy consumption and some construction aspects and they will design a technical project for the retrofitting of the external façades. This project will have and contain the technical conditions and prescriptions to be taken into account by the enterprises in the final tender to obtain the project as a business opportunity.

Previously, the Commission has chosen among the offers that they received in the market place for their retrofitting project three SME or collaborative entities. In this case, they will choose TEUSA as an expertise enterprise in façades retrofitting. TEUSA will contact them for the contract conditions and items and also will contact the technical studio in order to offer finally the real case and real conditions of technical project that fits exactly (after several measures and data recovering) to the building requirements.

### Calculate a financial model for the selected scenario

As commented in the previous point, as well as the technical one, the expertise in financial issues is not supposed for the Commission and its members. The platform with its Financial Model Tool will guide them in calculating this issue to deciding what kind of financial model is required for their interests.

#### SALABERRIA

La tabla muestra los flujos de efectivo esperados por el proyecto durante su vida útil. El gráfico representa gráficamente la salida/entrada anual y los ahorros acumulados generados por el proyecto.

Volver al inicio

|                  |          |  |               |
|------------------|----------|--|---------------|
| <b>Inversión</b> | 244000 € | <b>Tipo Finanzas</b>                     | Own capital   |
| <b>% Interés</b> | 0 %      | <b>TIR</b>                               | 10.5 %        |
| <b>VAN</b>       | 351740 € | <b>Tiempo de retorno de la inversión</b> | 8.19149 years |

| Años | Los gastos anuales | Ahorro anual | VAN Salida | VAN Entrada |
|------|--------------------|--------------|------------|-------------|
| 0.   | -244000 €          | 0 €          | -244000 €  | 0 €         |
| 1.   | 0 €                | 29787 €      | 0 €        | 29787 €     |
| 2.   | 0 €                | 29787 €      | 0 €        | 29787 €     |
| 3.   | 0 €                | 29787 €      | 0 €        | 29787 €     |

Figure 17 - Financial calculation screenshot

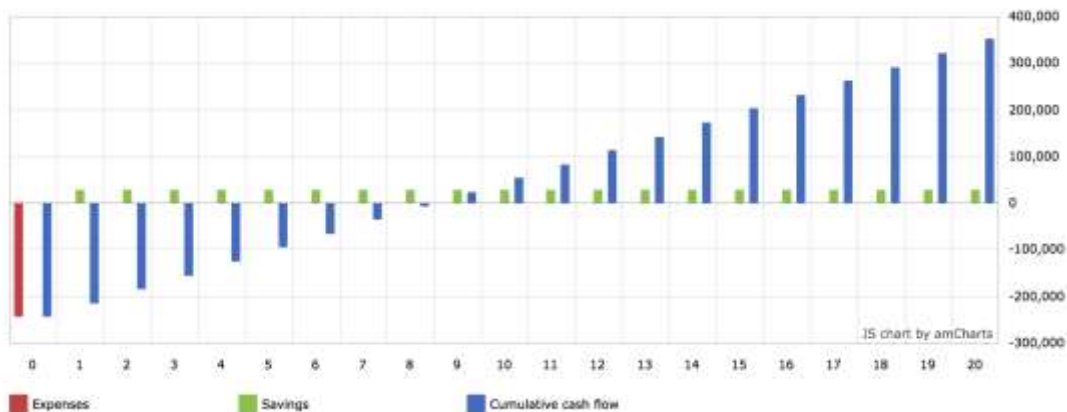


Figure 18 - Financial model chart

### 4.3 Business model

For this particular case it is necessary to explain which kind of business model is applied and followed by actors and how different roles and collaborative relations are taken in the retrofitting process from the beginning to the final result of the value chain. Items appearing in the Organisational Model Template in D4.2 are going to be applied and followed in order to give an ordered and reasoned explanation for the Scenario's particular case.

#### 4.3.1 ORGANISATIONAL MODEL

This picture shows the template for organisational models introduced in D4.2 in which three items can be seen to define the organisational model:

- Characteristics
- Collaboration Matrix
- Value Chain description

In the particular case, a General Contractor assimilated organisational model fits with the realistic point of view of the case, it is also the most used organisational model followed by Teusa in almost every projects, taking into account the characteristics of the company and the requirements of the market in this kind on retrofitting projects.

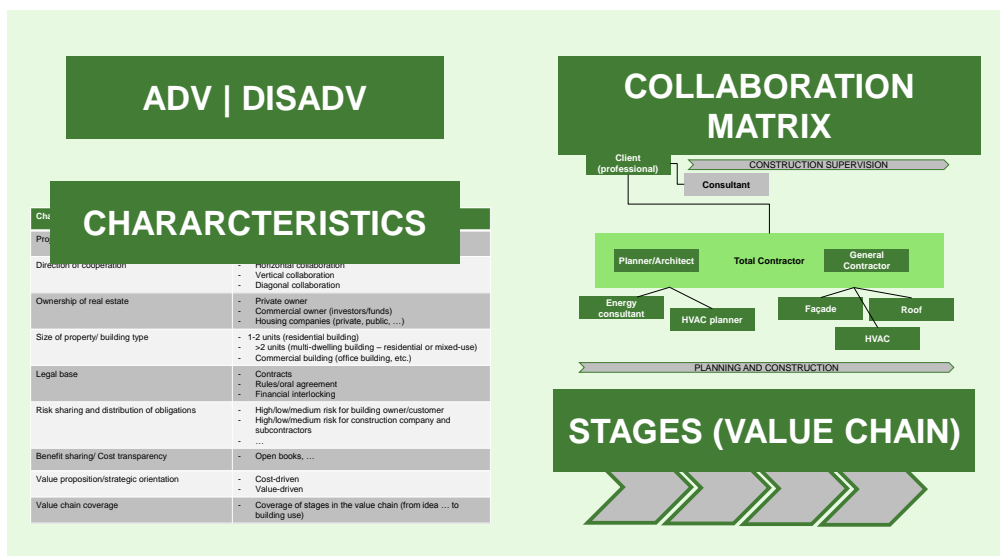


Figure 19 - Business model



### 4.3.2 DESCRIPTION

To describe the business model A. Osterwalder’s Canvas scheme will be applied and particularized to the scenario and the realistic case. Each item referred to the scenario is going to be described:

- Value Proposition: An energy efficient retrofitting and refurbishment work, modern technologies implementation for thermal insulation, new aspect and design for façades appearance, post-sale service during warranty period.
- Customer Segments: Neighbor Association-Community, and particular home owners.
- Channels: direct execution of the retrofitting project using supply transport ways for materials and technologies.
- Customer relationships: personal assistance at the building throw Teusa’s operating members. Telephonic assistance, e-mailing system and finally Technical Communication via architects and Customer’s technical interlocutor.
- Revenue Streams: Direct Payment at the beginning of the Project. Payment terms established in the contract.
- Key resources: technical know-how, technical assistance, and skills in retrofitting process (operators and employees).
- Key activities: Project planning, previous suppliers selection and on site work inspection and surveillance.
- Key Partners: retrofitting technologies suppliers and producers (ETICS: BAUMIT and Ventilated Façade: TEMPIO).
- Cost Structure: Scaffolding 20%, thermal retrofitting technologies suppliers 50%, technical staff and project managers 10%, direct working employees and operators 15% other company costs 5%.

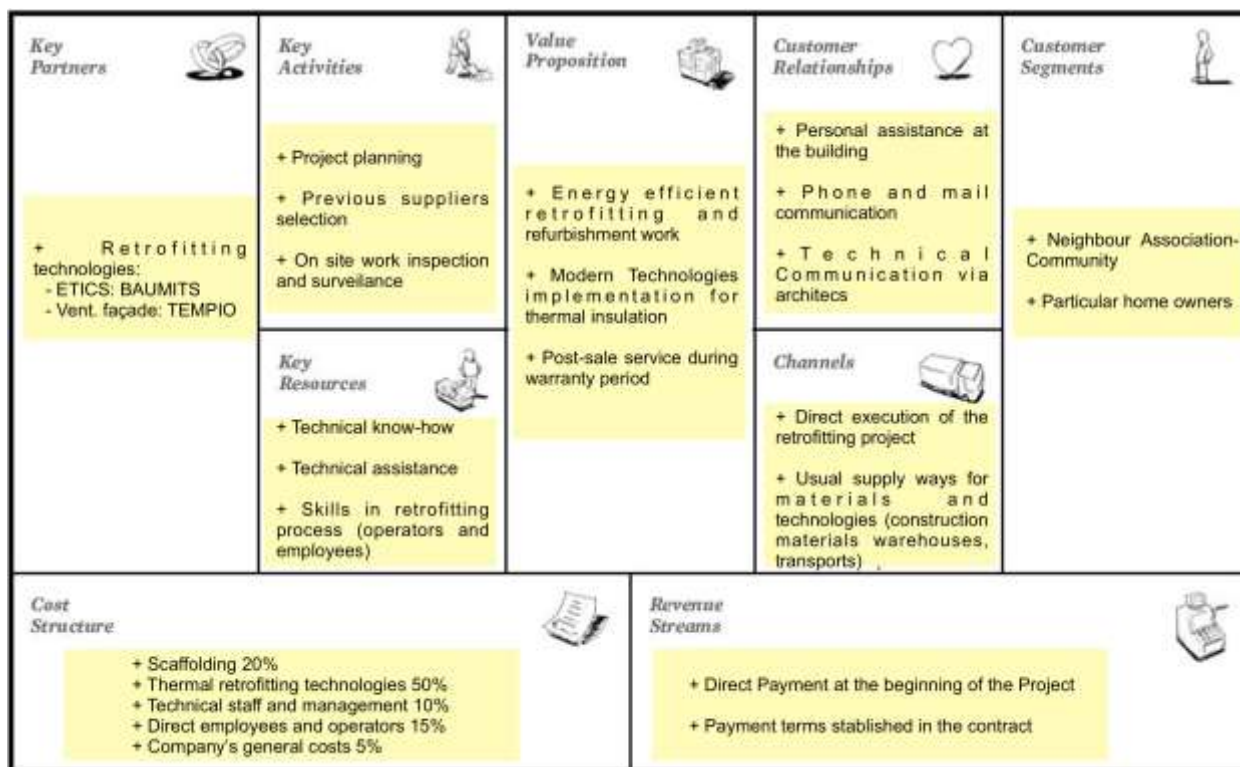


Figure 20 - Osterwalder's canvas

### 4.3.3 CHARACTERISTICS

The characteristics for this realistic case are the following:

- **Ownership of the real estate**  
As previously described, the ownership of this case is based on many Private Owners, organized into a Neighbourhood Assembly-Commission that takes all the important decisions concerning to the retrofitting project.
- **Size of property/ building type**  
The property is split into many small properties, one for each of the apartments of the building. The building is a 9 storey multi-dwelling residential building with some commercial activities in the ground floor.
- **Retrofitting costs**  
Global retrofitting costs: <1 million euro  
Energy efficiency retrofitting costs: 500 thousand euro
- **Time constraints**  
Planning and completion of the timing is crucial because of the extra cost potential of the scaffolding in façades non calculated in initial cost assessment.
- **Detailed requirements engineering**  
Because of a non-expertise profile of the owner, technicians, architects and consultants must be contracted by them in order to define all requirements as detailed as possible. With these requirements the general contractor will be able to define and assess the exact timing and budget of the project.
- **Guaranteed construction time**  
The project duration is established in the contract and penalizations are established in it for a non-justified delay in the project finishing time.

### 4.3.4 VALUE CHAIN COVERAGE

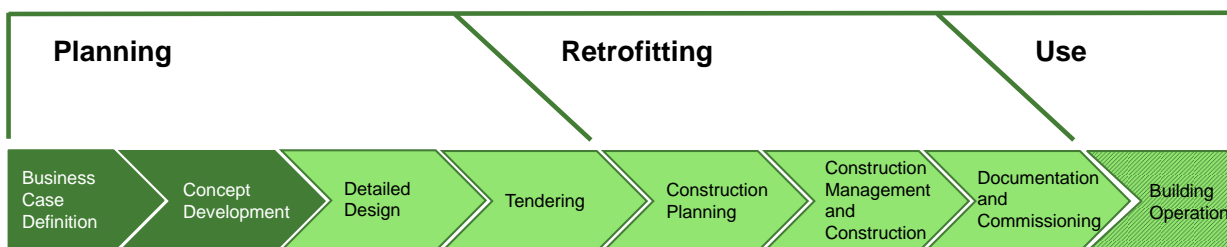


Figure 21 - Stages in business

**Business Case Definition:** In the first stage, the identification and detailing of the clients business case are identified and taken into account by the SME and the technicians-consultants. The objectives (quality, time, costs) have to be determined and the requirements and expectations of the customer have to be understood.

**Concept Development:** The retrofitting concept is defined. This includes the technical systems, in our case ETICS and Double skin Ventilated façade. These two technologies will establish every collaboration conditions in the general contractor organisation (because two different key partners are going to be found and contacted).

**Detailed Design:** The outcome of the detailed design includes final construction drawings, plans, material selection and determination of all technical variables and dimensions. Costs are updated according to the more detailed technical information. Based on the drawings and specification, the permit for the retrofitting project is secured. This work is done by the technician atelier or architects studio, and finally SME is going to define the final price of the project.

**Tendering:** In some organisation models a construction company was already involved from the early beginning, in fact, in this realistic case, TEUSA has previously collaborated with the architects to define technical solutions for the façades. However the final decision is always made at this stage and the final price of different offers is going to be the most important issue to be taken into account.

**Construction Planning:** The project including responsibilities and time schedule is planned and the project management system is implemented. In this case, TEUSA has implemented a multi-project management system and software that allows them a correct planning of the project and a real starting and finishing date are given with the global point of view of all the projects in construction at this point.

**Construction Management and Construction:** Suppliers are assessed and defined, all permissions are got and all bureaucratic management is already done. **Documentation and Commissioning:** The documentation is managed by the administrator of the property. This documentation is complex and consists in legal contracts, subsidies justifications, tendering documents, payment documents established in the contract and guaranty documents. If any step needs a decision the Commission of the multi-property is capable and has the capacity to take it with all guarantees.

**Building Operation:** Building operation includes also the demolition of the building and recycling of materials and technical systems, operating with scaffolding enterprises. Subcontractors' organisation, coordination and complex work flows in each step of the construction phase must be considered at this point in order to achieve a correct project end, to satisfy owner's needs and requirements and to finalise in the established operation time.

#### 4.3.5 COLLABORATION MATRIX

The following scheme shows the collaboration matrix used for this scenario in the demonstrator. Usually Teusa takes this General Contractor model in the retrofitting projects. It is a Medium Size Company and financially, from the point of view of technical requirements and taking into account its skills and commercial capacities, the company is strong enough to take care in a global sense of all the project aspects.

In this case three main actors or roles are taking part in the retrofitting project process. The client is the one which we have already described (its characteristics and situation) in the previous points when describing the NewBEE workflow process.

The client is represented normally in the daily work of the refurbishment work by the consultant, the technical atelier, architect studio or one similar figure. This role controls the technical aspects and decisions of the project and also he interprets the requirements in order to achieve the energy efficiency results as accurate as possible.

This technical figure has the direct relationship with project chief, the role in Teusa's organisation that applies the technical conditions set by the architect and also manages all partners, subcontractor companies and Teusa skill operator in the refurbishment works.

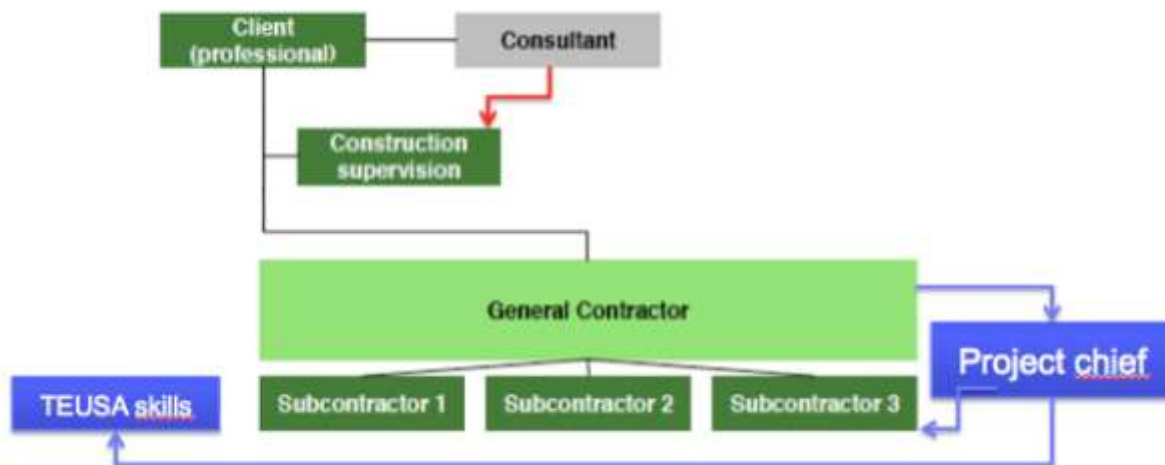


Figure 22 - Relation between partners

### 4.3.5.1 Financial Model

Financial model is extracted from the NewBEE platform module and based on the information given for the case and obtained

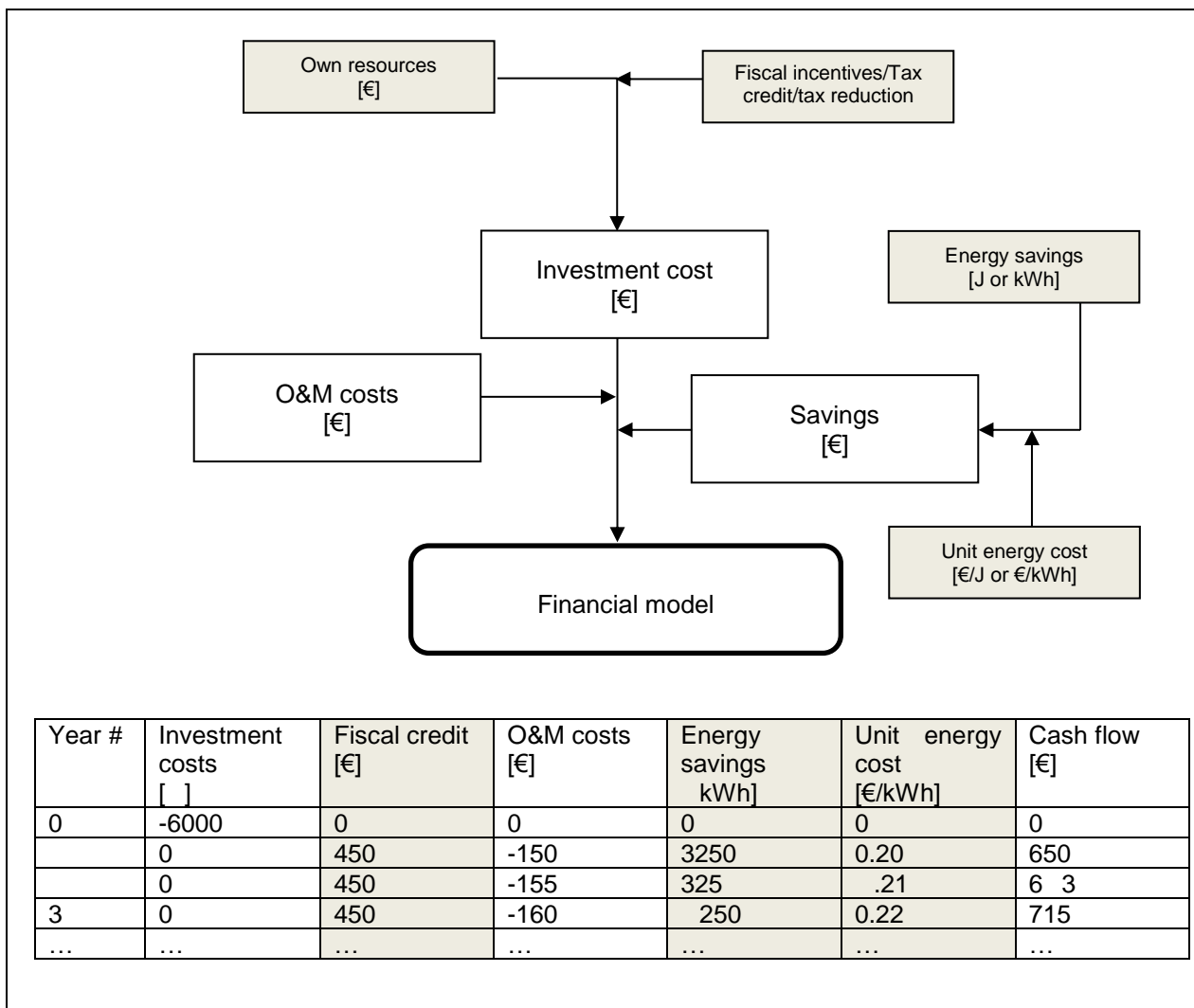


Figure 23 - Financial model

## 5 S2: A SMEs collaborative process to make a tender throughout a large retrofitting project

---

### 5.1 Description

At this stage it has been worked under the assumption that with the emergence of a public tender, different SMEs can use the NewBEE tool to be able to relate and finally be able to present a joint approach to tackle the subject of the tender.

These tenders will come with input information that should be taken into account:

- The object of the contract must be well defined.
- It will be possible to appear the need for advertising based on what is issued by the legislation on the subject by each country.

The different types of administrative contracts of work that may occur, and that allow collaboration between the different SMEs are as follows:

- First settlement: which give rise to the creation of real property.
- Refurbishment: set of expansion works, improvement, modernization, adaptation or reinforcement of existing Real property.
- Repair: the need to amend a prejudice produced by accidental or incidental causes.
- Conservation: when the impairment is produced by the natural use of the good.
- Demolition works: which aims to the demolition or destruction of a property.

In that way, the target of this scenario in which some SMEs will appear collaborating between them in a tender is to demonstrate that the technology of the NewBEE Platform is useful for creating the business opportunity. Indeed, to prepare, to plan and to launch an offer is to create a business opportunity.

In this scenario a Hospital must be retrofitted changing the roofs and the walls. By using the NewBEE Platform in a first phase, as it has been said, we develop a business opportunity, but the technology of the NewBEE platform will help us to gather several regional SMEs, to select them, and to maintain interactions among them for making the proposals for the tender using the Marketplace option of the platform, as we will show later, having previously testing beforehand results of different scenarios, in which the output by means of the pre-assessment tool of NewBEE Platform should enrich the overall proposal.

In this business case we will depict the flow of tasks that must be carried out to design, to make the tender and to execute it. It will be worth the final feedback of the execution in order to enhance the NewBEE platform performance.

### Considerations to be kept in mind for the SMEs before the joint collaboration

SMEs companies interested in participating in the execution of a work contract, as it is indicated above, must access the platform in order to seek complementarities in their activities, social objective, professional qualifications of the staff (when necessary), solvency, guarantees, corporate classification, and other issues of importance to the temporary union of companies that would form between them for successfully tackling the works contracted.

SMEs companies that become partners in a joint venture, must have sufficient solvency to undertake the work, taking into account the price of the specific work and, if needed, the revision of the same price formula, time, quality, aesthetic and functional characteristics, technical capacity of companies, availability and cost of spare parts, the maintenance, service after sales, capacity management, and so on.

Companies that make the phase of budgeting must steer the offer to be the most advantageous possible economically as well as making energy efficiency maximized with the minimum investment possible.

It is recommended to the Public Administration, that could be the owner of the property of the place in which the project will be constructed, and to all who have rights about the real property, to introducing an expert in energy-saving and other kind of performers within a technical committee in the adjudication phase in order to gain benefits for the owner. In such a way the method of evaluation of the criteria are justified objectively.

### **Legal considerations**

In order the Temporary Union of Organizations to have the searched effect, the involved companies shall comply with all legal and regulatory requirements that may be applicable, such as; the registration of the company in the trade register of the country in which to run the contract, appointment of proxies or representatives, legal measures to form the joint-venture, documentation related to the classification rule, documents relating to the membership in the registration of bidders of certain municipalities, etc.

The companies in the joint venture must additionally comply with the community provisions that are of application, issuing when necessary the declaration sworn or certified. In other cases, companies must prove their ability to comply with the legislation of the concerned country.

NewBEE tool will detect the companies that will not participate in the joint venture because they participated in the elaboration of the technical specifications concerning contracts, due to the fact that the above-mentioned participation could lead to restrictions to the free competition.

Also the NewBEE platform will establish a filter in relation not to assign to the same company contracts for surveillance, supervision, control and direction of the execution of works at the same time that contracts relating to the execution of the same works.

### **Considerations in relation to financial solvency**

The companies that make the joint venture up must have the proper administrative documentation in relation to the insurance of civil liability, to the annual accounts, to the reports on the overall volume of business, and to the activities of the contract made in a given period of time or to another series of documents that may be applicable.

### **Considerations in relation to the technical solvency**

The sheets of technical clauses, in contracts of this type, require information in relation to the works directly executed by each of the companies in the course of an identified period, declarations that include for example, the technical skill level of each company, academic and professional titles of personnel, environmental management, declaration on the company annual average of employees, statement of machinery, material and technical equipment, and so on.

### **Quality in relations in the UTE**

The companies that compose the aforementioned joint venture, previously establishing relationships between them through the NewBEE tool for budgeting of the works for the execution of a public works contract, must have solved the considerations above mentioned. This will provide an idea of the quality and the commitment of each one of the companies that are registered in the NewBEE. I.e., it should be clear the need for the fulfillment of certain documentation, and moreover, they may have some documentation already ahead, thus providing a high level of quality to companies involved in the NewBEE platform.

### **Prior to the award**

Another point to be considered, once the joint venture submits the offer related to the contract and according to a given tender offer, is the constitution of a provisional guarantee fund that the contracting authorities may require from the tenderers.

A definitive guarantee prior to the start of the contract may also be constituted, as derived from the same obligation, and that can be seen as a percentage of the budget base of the tender.

### **Future steps**

An interesting idea for the future could be that the call for tenders launched by the Administration directly could have a link from the NewBEE platform to them, thus causing a quick response by the companies participating in the same.

This way, NewBEE would be a platform that in addition to providing the service of bringing together companies, could be useful to inform about bids, technical and administrative specifications of public works, the possibility of working with private owners, informing of the results of other works already made, and so on, organizing all the different elements within the platform.

As said in D4.2 “Organizational Models”, based on the quotes of the different companies that strive to get the tender, the construction company for project execution is selected. In some organisation models a construction company was already involved from the early beginning but the final decision is always made at this stage. Depending on the organisational model applied for the project and national regulation or laws, the tendering procedure can be also a public competition.

## 5.2 Business case workflow

In this scenario, and in order to clarify the steps, a flow diagram is depicted. The present flow diagram shows the phases and the different relationships within them. On the one hand, the most important point to be considered is the relationship of each phase with the NewBEE Platform. On the other hand, the “Tender and Adjudication phase” shows the method to be covered when a tender is carried out. Bellow, the diagram explanations have been added.



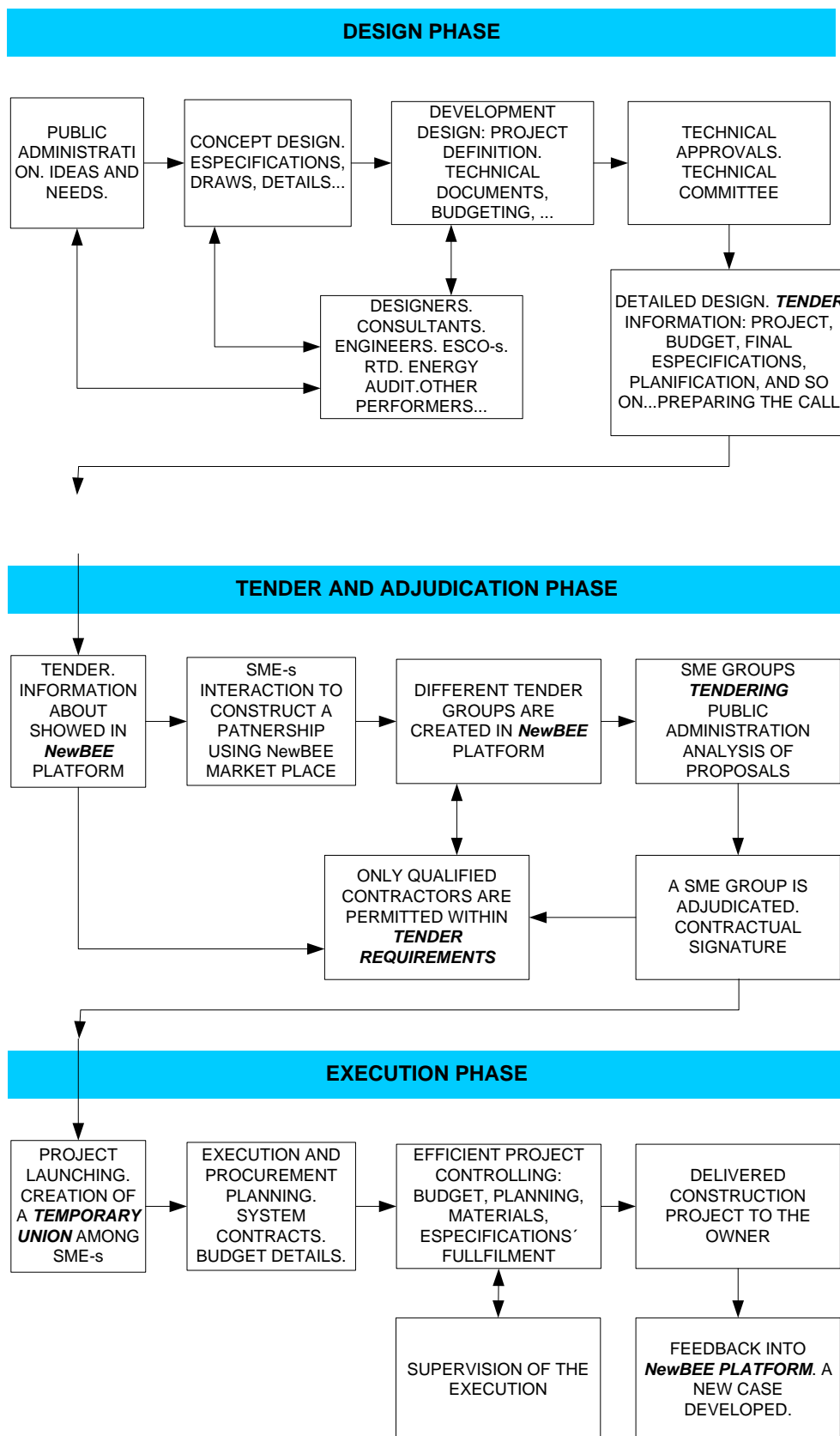


Figure 24 - Phases in retrofitting



## Design Phase

The main steps in this phase are:

1. Idea.
2. Concept design.
3. Development design.
4. Other performers.
5. Technical approvals.
6. Detailed design and call preparation.

When going through each specific phase, as determined above, a public client on behalf of a public owner, or by himself when enough economic resources are available, defines the idea to be carried out.

The idea is defined in a first drawing or sketch in order to start to prepare the concept design: the specifications, drawings, and other detailed information.

In the earliest time the public client could prepare a call to define a project, or when a project is adequately defined, the development design is prepared. At this stage, outputs and assessment from different performers like consultants, engineers, designers, RTD-s, energy audit companies and so on, are extremely important for configuring a development design.

That advanced design must be approved in a next step. A technical committee guarantees the proportionality of the project, the scope, the specifications, the budget, the due date of the project as well as all the necessary information to launch the public tender.

The final step gathers all the information to prepare the document defined as “The Call”, with all the necessary information to be given to the tenders for preparing the proposals.

### **Public Administration registering in the NewBEE Platform for this business case**

Once the call is prepared, the public administration enters into the NewBEE platform by registering in it:



Figure 25 - Login screenshot

The registration must be as a owner, specifically a public one in this scenario. The public owner creates his account confirming the links the platforms sends to the new owner. In that way the account for the new client is created.

However if he hasn't been registered, he has to create a profile inserting descriptive information about the company like: e-mail address, first name, last name, selection of usage, password and its confirmation.

Next figure shows the registration screen of the NewBEE platform.

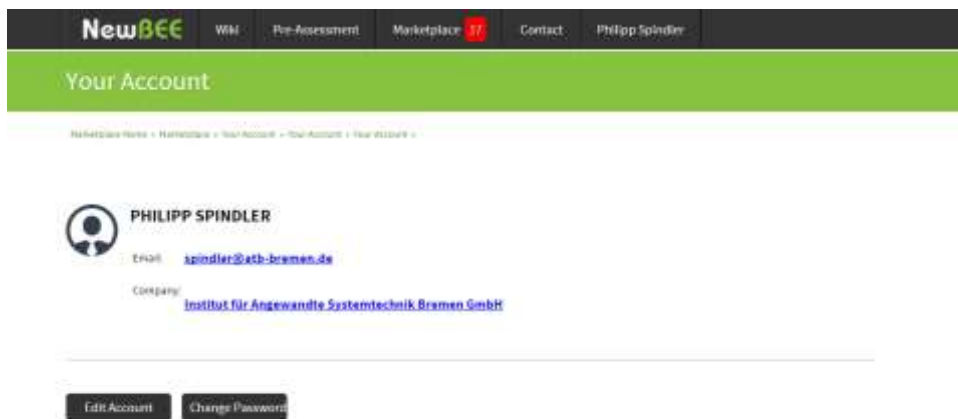


The screenshot shows the registration page of the NewBEE platform. At the top, there is a navigation bar with the NewBEE logo and links for 'Wiki', 'Pre-Assessment', 'Marketplace', 'Contact', and 'Login / Register'. Below this is a green header with the word 'Register'. The main content area contains the following elements:

- A breadcrumb trail: 'Home > Register >'.
- A heading: 'REGISTER YOUR NEW ACCOUNT AT THE NEWBEE PLATFORM. ALREADY HAVE AN ACCOUNT? PLEASE [LOGIN](#).'
- Form fields for 'Email', 'First name', and 'Last name'.
- A question: 'How do you plan to use the NewBEE platform?' with radio buttons for 'Building Owner' (selected) and 'Construction Company Member'.
- A dropdown menu for 'Select your company (this is optional)'.
- Form fields for 'Password' and 'Confirm password'.
- A green 'Register' button.

Figure 26 - Registration screen of the NewBEE platform

Contact information and general information will be introduced in the platform.



The screenshot shows the 'Your Account' page of the NewBEE platform. At the top, there is a navigation bar with the NewBEE logo and links for 'Wiki', 'Pre-Assessment', 'Marketplace' (highlighted with a red dot), 'Contact', and 'Philipp Spindler'. Below this is a green header with the text 'Your Account'. The main content area contains the following elements:

- A breadcrumb trail: 'Home > Marketplace > Your Account > Your Account > Your Account >'.
- A profile picture icon.
- The name 'PHILIPP SPINDLER'.
- The email address 'spindler@atb-brremen.de'.
- The company name 'Institut für Angewandte Systemtechnik Bremen Simbit'.
- Two buttons: 'Edit Account' and 'Change Password'.

Figure 27 - Account details screenshot

When pointed out, the information is collected within the platform and the platform client's profile is therefore fulfilled. A business opportunity can be created with the "Marketplace" button by the technical committee responsables and other stakeholders in this design phase.

### **The business opportunity**

The scenario in which we are working, consist in the retrofitting of the roofs and walls of a Hospital, with a investment of 1.500.000 euros in order to cover the roofs with new materials as well as to cover the walls with a system for isolating them in order to enhance the energy efficiency.

The building consist in an unique building with 4 floors and 6.500 m<sup>2</sup>, and the consumption of electricity is estimated in 6.100 €/month.

The call that has been launched by the platform will invite different large organizations, but also groups of organizations that can be constituted as an UTE (Temporary Union of Organizations, also called a Cluster or joint venture).

In our case we show the manner to operate with different regional SMEs that work between them to constitute an UTE, but previous to the offer it must be shown in the Marketplace option of NewBEE platform. This way, it can be showed by the screenshot bellow the way to specify the information about the tender itself. It would be necessary also to show some links in order to recall all the groups that are going to attend the tender that there is more information within and outside the platform, and that the platform does not avoid the responsibility of the groups of SMEs to obtain other complementary information.

**NewBEE** Wiki Pre-Assessment Marketplace **23** Contact Ion Izaga

## Create Business Opportunity

Your Account > Your Account > Your Account > My Offers > Create Business Opportunity >

**BUILDING DATA**

|                            |  |
|----------------------------|--|
| Zip Code                   | 20018  |
| Accommodation Unit         | Single family home                                 |
| Building Type              | Semi-detached House                                |
| Construction Date          | 1980   |
| Heated Area                | 4000 m <sup>2</sup>                                |
| Floors                     | 4  |
| Electricity Consumption    | 5500 kWh   |
| Thermal Consumption        | 25000 kWh  |
| Picture of your house      | <input type="text"/> Examinar                      |
| Plans and additional files | Ficheros (maximo 3): <input type="text"/> Examinar |

**DESCRIPTION**

|   |                 |
|---|-----------------|
| Title   | PUBLIC HOSPITAL |
| <input type="text" value="The case is related to a public hospital with four floors,"/> |                 |

Figure 28 - Business opportunity screenshot

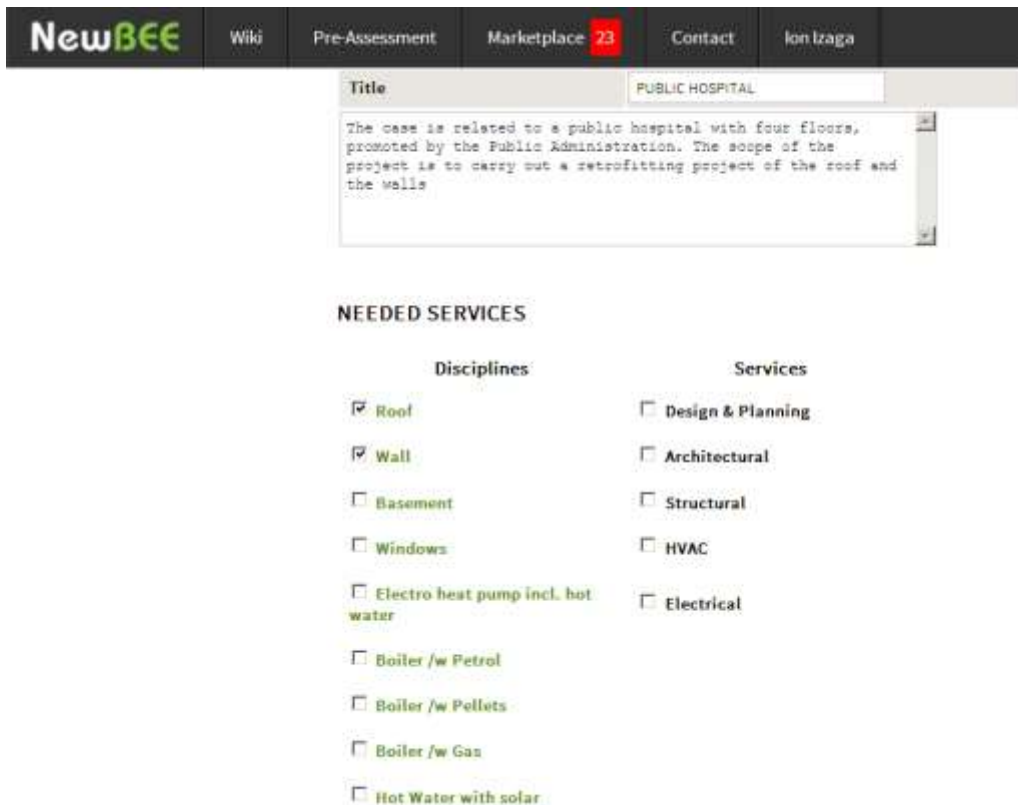


Figure 29 - Business opportunity screenshot

Once the information is saved, this screenshot appears informing that the call is launched:

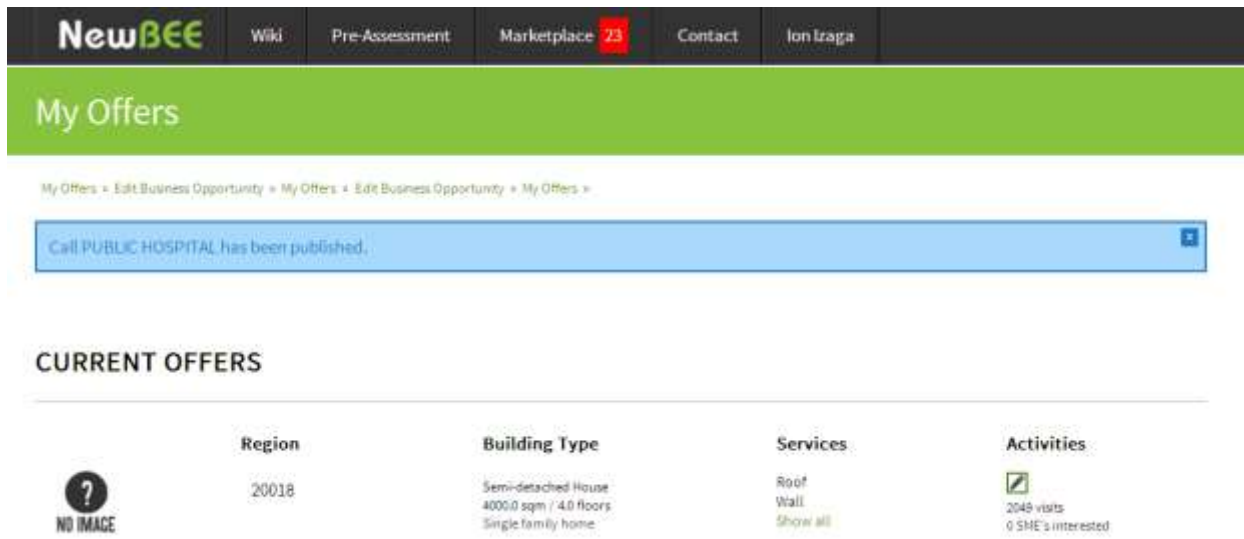


Figure 30 - Current offers screenshot

The offer must also be published fulfilling the laws or regalements because of the fact that this particular scenario must be ruled as a public tender under public administration contract's law or similar ones.

## Tender and adjudication phase

The Tender and Adjudication phase separates the design phase and the execution phase from each other in a deliberate manner. At that point, every project partner or as it is said, every SME, has the possibility of deciding whether the partnership continues within the group formed or not. Even the group formed could be dissolved if the qualified SMEs are not prepared to accomplish the project object of tender.

This phase is the phase in which different SMEs start to interact together, once the owner has designed specifically all the points of the tender.

The different steps are defined as:

1. Tender information analysis
2. SMEs interaction
3. Creation of different tender groups.
4. SME groups Tendering
5. Adjudication of a Group

A tender is launched and the information appears on the NewBEE platform by a line that appears when entering the Marketplace option of the Platform in order to permit different SMEs to reach the information of the scope of the project to be performed.

Next to that, the different organizations that are inside the NewBEE platform in the form of a user or an experienced SME could interact among them to create a NewBEE group, with the scope of accomplishing the particular launched tender. All users or Regional SMEs must be registered in the Platform.

Several companies appear within the topics related to our business case, and it is possible that NewBEE Platform could help to generate different groups of SMEs qualified by the rating and other systems of punctuation.

### ROOF



### WALL



Figure 31 - Score screenshot

Different companies are gathered together, and the responsible of gathering the companies to constitute a future Joint Venture will take into account the possibilities that the NewBEE tool offers in order to make a previous analysis of the situation using the Pre-Assessment tool, due to having a clear idea of the results that will appear utilising different wall covering and roof covering systems and taking into account that distinct scenarios could be simulated in advance.

The companies that intervene in the future Joint Venture do not have the obligation of using this tool, but it is recommendable to use it. This tool could be a way of achieving a basic approach in order to design the proposal in response to the bid launched. The basis for the common proposal will be drafted in such a way.

Moreover, when the organizations that go together to a tender catch the basic information for making the offer should be normally easy for them to introduce new changes and improvements of the proper Pre-Assessment tool in order to obtain new insights for an improved proposal.

The different qualified groups attend the tender with the required confidentiality and legal and other requirements' fulfilling. The proposals are done using the NewBEE tool in order to have an idea of the options that would be suitable for the launched project within the bid. The SMEs that improve the information collected in the platform would enhance the probabilities of being the winners of the bid.

When the proposal analysis is done by the public entity, it must be a public communication of the results, making only one of the groups or organizations presented as the winner one, previous to starting the execution phase.

### **Execution Phase**

The steps to carry out the project are:

1. Project launching and creation of a temporary union.
2. Execution and procurement planning.
3. Efficient project control
4. Supervision of the execution
5. Delivering of the project.
6. Feedback into NewBEE platform

When the project is adjudicated to a group of SMEs, that group will be constituted in a format called "Temporary union of organization" once demonstrating the fulfilment of all needed requirements.

With an early inclusion of all project partners within the group, construction and running costs can be efficiently influenced with a technical and times study that will take into account calculations and planning in order to minimize the impact among all collaborative companies, with the aim of achieving the scope of the project: "economical, aesthetically valuable and constructively thought-out property".

Supervision of the proper client is totally necessary in order to accomplish legal issues. In that way the public owner will delegate to a Project Director the responsibility of controlling the project scope, content, and fulfilment of all the necessary requirements.

The project will be delivered and the Project Director will make the certificate of approbation of the overall project.

When that occurs, a new case must be prepared to be fulfilled in the NewBEE platform in order to demonstrate the power of the collaborative way of working using the NewBEE platform to all organizations. Information, opinions, and other feedback points will help to construct a more reliable NewBEE platform in that way. Specially, NewBEE will collect all the added value topics in which the SMEs' Cluster have been successful on their tenders in order to gather within the platform the knowledge that is really worthy for other tenderers and SMEs for future bids or projects carried out individually or in a collaborative manner using the NewBEE platform. Since the Wiki link is introduced in the Platform, the feedback process to it is very powerful.

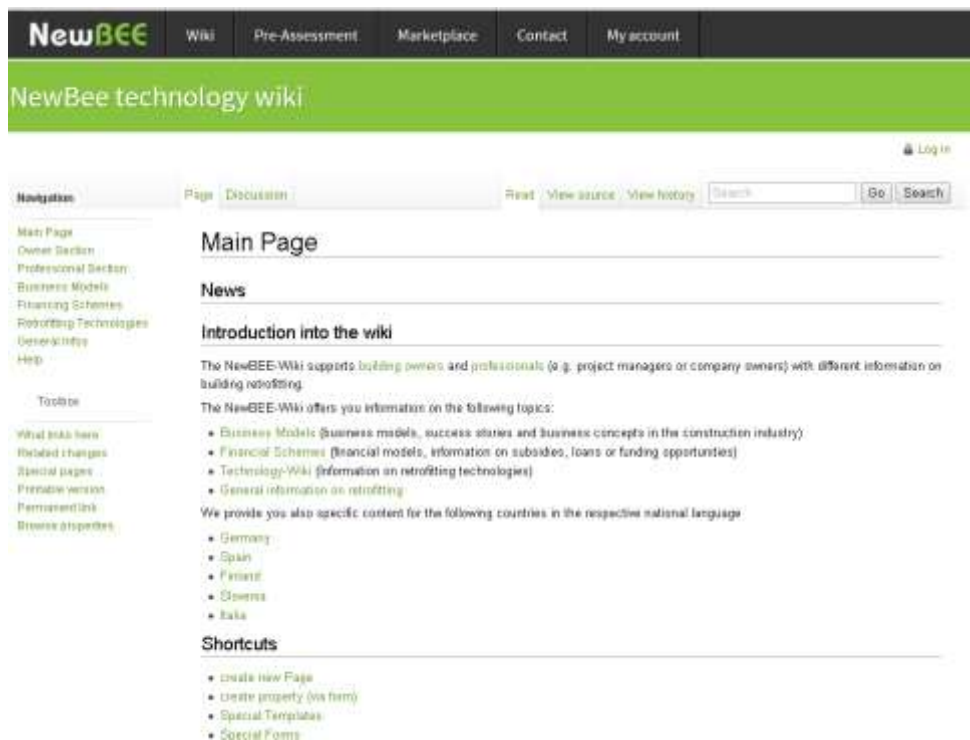


Figure 32 - Wiki screenshot

Moreover, the feedback into the NewBEE platform could also be taken into account for enriching the list of tasks of a particular specialty that could be carried out in a work, the measure types to introduce new parameters and so on.



### CARACTERÍSTICAS DEL EDIFICIO

Por favor, inserte algunas características y números de su vivienda. Usaremos sus datos para el cálculo de los costos y los ahorros potenciales. No se almacenarán los datos. Antes de entrar en el mercado digital el sistema le preguntará si desea almacenar "su proyecto".

|  |   |
|--|---|
| Edificio de apartamentos                   | <b>Tipo de edificio</b><br>Por favor seleccione la tipología de edificio. Esto ayudará a calcular los resultados de forma más precisa.  |
| 1979 - 2005                                | <b>Año de construcción</b><br>Año de construcción.  |
| Vivienda plurifamiliar de hasta ocho apart | <b>Número de habitáculos</b><br>Cuántas familias o cuántos habitáculos tiene su casa?   |
| 4  | <b>Número de plantas</b><br>Por favor, inserte el número de plantas que sean realmente utilizadas en la vivienda. Si usted tiene habilitado el espacio para vivir en el ático o en el sótano, por favor elija 0,5 pisos por cada uno. |
| 6500                                       | <b>Área climatizada (en m2)</b><br>Por favor, inserte los metros cuadrados del área climatizada. No incluir las plantas no habitadas.   |

### CONSUMO DE DATOS

Con el fin de calcular el ahorro potencial y los plazos de amortización de los periodos de inversión necesitamos su consumo actual de energía

|                             |   |
|-----------------------------|---|
| Calentador de agua caliente | <b>Consumo de energía para</b><br>Si su sistema de calefacción incluye también el agua caliente por favor elija "Calentador w / agua caliente". Si usted tiene una caldera eléctrica sólo para la cocina elija "Calentador w / agua caliente" también. Para cualquier otra opción elegir "calefacción sin agua caliente". |
| 244000                      | <b>Energía térmica (kW/h / p.a.)</b><br>Por favor inserte su consumo de energía en kw / h por año. Por favor, consulte su factura de gas. Si se utiliza gasoil, por favor, calcule su consumo anual.  |
| 6,100.00                    | Si usted no sabe su consumo anual, puede insertar su coste mensual de energía térmica y el sistema calculará el anual por usted. Por favor, inserte el coste mensual de su factura (€uro), (EUR).   |

Figure 33 - Pre-assessment screenshot

### CONSUMO DE DATOS

Con el fin de calcular el ahorro potencial y los plazos de amortización de los periodos de inversión necesitamos su consumo actual de energía

|                             |   |
|-----------------------------|---|
| Calentador de agua caliente | <b>Consumo de energía para</b><br>Si su sistema de calefacción incluye también el agua caliente por favor elija "Calentador w / agua caliente". Si usted tiene una caldera eléctrica sólo para la cocina elija "Calentador w / agua caliente" también. Para cualquier otra opción elegir "calefacción sin agua caliente". |
| 244000                      | <b>Energía térmica (kW/h / p.a.)</b><br>Por favor inserte su consumo de energía en kw / h por año. Por favor, consulte su factura de gas. Si se utiliza gasoil, por favor, calcule su consumo anual.  |
| 6,100.00                    | Si usted no sabe su consumo anual, puede insertar su coste mensual de energía térmica y el sistema calculará el anual por usted. Por favor, inserte el coste mensual de su factura (€uro), (EUR).   |

### LOCALIZACIÓN

Nosotros no necesitamos su dirección completa Sólo necesitamos el código postal o la ciudad con el fin de calcular medidas más precisas.

|                             |   |
|-----------------------------|---|
| 20018 San Sebastián, España | <b>Código postal</b><br>Por favor introduce el código postal y elegir entre el menú desplegable a continuación. |
|-----------------------------|---|

Next step

Figure 34 - Pre-assessment screenshot



| NewBEE             |                                   |                                     |                                     | Wiki                                | Pre Evaluación | Mercado | Contacto | Mi Cuenta | Language: ES | ES |  |
|--------------------|-----------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------|---------|----------|-----------|--------------|----|--|
| Paso anterior      |                                   | Siguiente paso                      |                                     |                                     |                |         |          |           |              |    |  |
|                    |                                   | Escenario 1                         | Escenario 2                         | Escenario 3                         |                |         |          |           |              |    |  |
| <b>Fachada</b>     |                                   |                                     |                                     |                                     |                |         |          |           |              |    |  |
| W                  | Roof                              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |                |         |          |           |              |    |  |
| W                  | Wall                              | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |                |         |          |           |              |    |  |
| W                  | Basement                          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                |         |          |           |              |    |  |
| W                  | Windows                           | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                |         |          |           |              |    |  |
| <b>Calefacción</b> |                                   |                                     |                                     |                                     |                |         |          |           |              |    |  |
| W                  | Electro heat pump incl. hot water | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                |         |          |           |              |    |  |
| W                  | Boiler /w Petrol                  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                |         |          |           |              |    |  |
| W                  | Boiler /w Pellets                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                |         |          |           |              |    |  |
| W                  | Boiler /w Gas                     | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                |         |          |           |              |    |  |
| W                  | Hot Water with solar              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |                |         |          |           |              |    |  |

Figure 35 - Pre-assessment screenshot

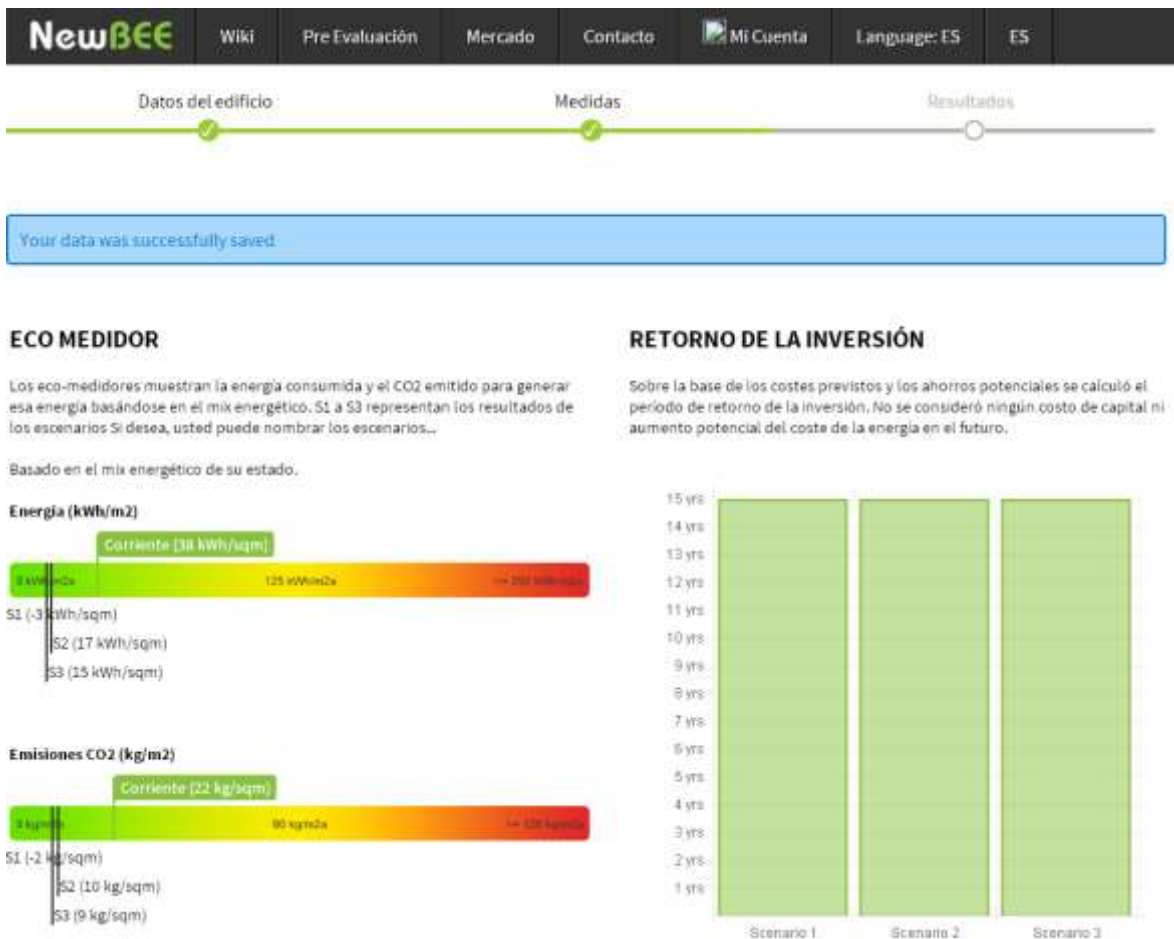


Figure 36 - Pre-assessment screenshot



\* **Descargo de responsabilidad:** El cálculo está diseñado sólo para propósitos ilustrativos y sus resultados no constituyen una promesa o garantía de los costes y el ahorro que se pueda recibir. Los autores no asumen ninguna responsabilidad formal de los resultados incorrectos del modelo, mala interpretación de la entrada y salida del modelo, o las acciones tomadas por los usuarios con base en los resultados

Figure 37 - Pre-assessment screenshot

The best scenario appears to be the second one, and this scenario is selected:



\* **Descargo de responsabilidad:** El cálculo está diseñado sólo para propósitos ilustrativos y sus resultados no constituyen una promesa o garantía de los costes y el ahorro que se pueda recibir. Los autores no asumen ninguna responsabilidad formal de los resultados incorrectos del modelo, mala interpretación de la entrada y salida del modelo, o las acciones tomadas por los usuarios con base en los resultados

Figure 38 - Pre-assessment screenshot

In the market-place appears the bid case once the inner team has decided about which of the scenarios is going to be chosen.

NewBEE
Wiki
Pre Evaluación
Mercado 23
Contacto
Ion Izaga Caminos

## Mis ofertas

[Inicio](#) > [Mercado](#) > [Mis ofertas](#) > [Crear Oportunidad de Negocio](#) > [Mis ofertas](#) >

### OFERTAS ACTUALES

|  | Comunidad Autónoma             | Tipo de edificio  | Disciplinas  | Servicios   | Actividades                           |
|--|--------------------------------|---|--|---|---------------------------------------|
|  | Donostia-San Sebastián, España | Office Building (multi-storey)<br>6500.0 sqm / 4.0 floors<br>Multi-family house with up to eight apartments | Carpenter work<br>Element work<br><a href="#">Show all</a> | Construction and refurbishment<br>HVAC design<br><a href="#">Show all</a> | <br>2049 visits<br>0 SME's interested |

### PROYECTOS FINALIZADOS

|  | Comunidad Autónoma       | Tipo de edificio   | Disciplinas   | Servicios   | Actividades  |
|--|--------------------------|--|---|---|--|
|  | 50667, Köln, Germany     | Office Building (multi-storey)<br>276.2 sqm / 2.0 floors<br>Single family home                           | Refurbishment<br>Roofing (Steel Roofs)<br><a href="#">Show all</a>  | Energy auditing<br>Architectural design<br><a href="#">Show all</a>             | <span style="color: green;">★</span> <a href="#">Puntuación Socio del Proyecto</a> |
|  | 28100 Pori, Finland      | Mixed Building (multi-storey)<br>130.0 sqm / 3.0 floors<br>Multi-family house with up to four apartments | Refurbishment<br>Insulation of basement<br><a href="#">Show all</a> | Project planning<br>Indoor environment consultation<br><a href="#">Show all</a> | <span style="color: green;">★</span> <a href="#">Puntuación Socio del Proyecto</a> |
|  | Ljubljana 1000, Slovenia | Office Building (multi-storey)<br>467.0 sqm / 0.0 floors<br>Single family home                           | Refurbishment<br>Roofing (Steel Roofs)<br><a href="#">Show all</a>  | Architectural design<br>Structural design<br><a href="#">Show all</a>           | <span style="color: green;">★</span> <a href="#">Ver Puntuación del Proyecto</a>   |

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>
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Figure 39 - Marketplace screenshot

[NewBEE](#)
[Wiki](#)
[Pre Evaluación](#)
[Mercado](#)
[Contacto](#)
[Mi Cuenta](#)
[Language: ES](#)
[ES](#)

## Cálculo Financiero

### GENERA TUS MODELOS FINANCIEROS

Selección de diferentes oportunidades financieras; el módulo permite a los usuarios generar modelos financieros acompañados de información cuantitativa y estructurada que les ayudan a entender mejor los aspectos financieros del proyecto.

[Nuevo cálculo](#)

| Título          | Modelo financiero | Inversión | Años de inversión | Tiempo de retorno de la inversión | Ahorro energético inicial | NPV    | IRR   | Impuestos | Subvenciones |
|-----------------|-------------------|-----------|-------------------|-----------------------------------|---------------------------|--------|-------|-----------|--------------|
| PUBLIC HOSPITAL | Own Capital       | 92000     | 30                | 2.43039                           | 37854                     | 489909 | 0.411 | 1         | 0            |

[Nuevo cálculo](#)

Figure 40 - Financial model screenshot

### PUBLIC HOSPITAL

La tabla muestra los flujos de efectivo esperados por el proyecto durante su vida útil. El gráfico representa gráficamente la salida/entrada anual y los ahorros acumulados generados por el proyecto.

[Volver al inicio](#)

|                  |          |  |               |
|------------------|----------|--|---------------|
| <b>Inversión</b> | -92000 € | <b>Tipo Finanzas</b>                     | Own capital   |
| <b>% Interés</b> | 5 %      | <b>TIR</b>                               | 41.1 %        |
| <b>VAN</b>       | 489909 € | <b>Tiempo de retorno de la inversión</b> | 2.43039 years |

| Años                              | Los gastos anuales | Ahorro anual     | VAN Salida      | VAN Entrada        |
|-----------------------------------|--------------------|------------------|-----------------|--------------------|
| 0.                                | -92000 €           | 0 €              | -92000 €        | 0 €                |
| 1.                                | 0 €                | 41074 €          | 0 €             | 39118.1 €          |
| 2.                                | 0 €                | 41074 €          | 0 €             | 37255.33 €         |
| 3.                                | 0 €                | 41074 €          | 0 €             | 35481.27 €         |
| 4.                                | 0 €                | 41074 €          | 0 €             | 33791.68 €         |
| <a href="#">Muestra más datos</a> |                    |                  |                 |                    |
| <b>Suma</b>                       | <b>-92000 €</b>    | <b>1151720 €</b> | <b>-92000 €</b> | <b>595849.66 €</b> |

Figure 41 - Financial model screenshot

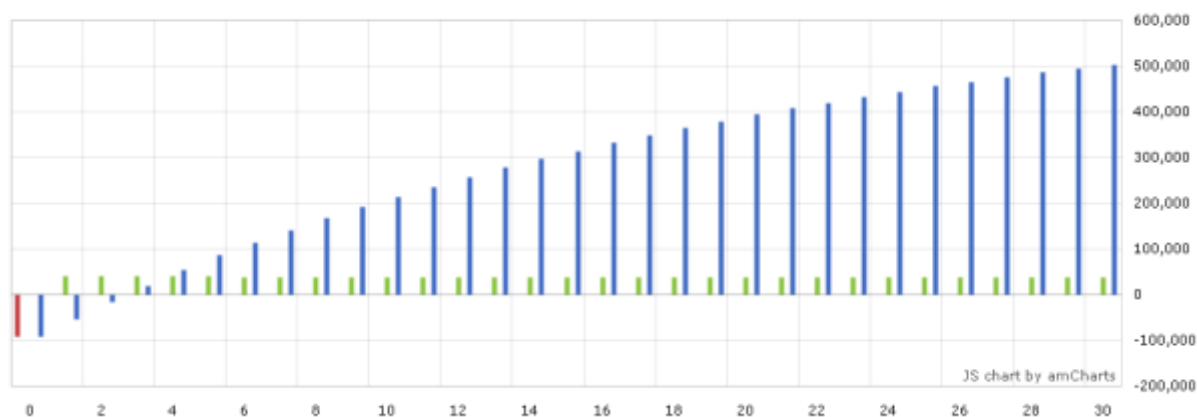


Figure 42 - Financial model screenshot

### 5.3 Business model

The business model contains inputs and outputs of the three defined phases: design phase, tender, adjudication phase and execution phase.

The temporary union of organizations created is responsible for fulfilling work's prices, deadlines and quality. Furthermore, the planning itself that was created in the design phase is improved by the usage of professional planning management and innovative technologies; the building goal is also well defined. These aspects reduce the risk of planning gaps, which avoids unnecessary costs and longer building periods in the execution phase.

The planning and construction periods are minimized also by the partnering model applied to all the involved actors, due to a good definition of the capability of the teams of each one of the members of the Union, and due to the previous analysis of the capacity of the resources available, including the time estimation for the procurement and materials delivery that must feed the critical path or critical chain of the project taking into account the interaction of the load of each one of the SMEs that participates in reaching the scope of the project.

That particular business case is presented as a large project for the construction of a Hospital. However small SMEs will work on it in a limited period of time, undertaking the work by a Joint Venture of SMEs and, after fulfilling the contract of the construction project, the different partners will act again separately managing their customers, markets and workloads.

The organizational model in which our business case is based is the one called ARGE model, which consists in the creation of a Joint Venture of small organizations as it was shown in the D4.2 Organizational models document, specifically in the 7.3 section.

A particular insight must be pointed out in this particular business model due to the management of qualified human resources during the project. Every SMEs collaborating on the project will have some experts for specific sub-sections or will have technology leaders and those persons or professionals will make the project sub-scopes more feasible and achievable for all SMEs that are interacting during the project.

The scope of this particular business model is to underline the contribution and subsequent effect of the collaborative modus operandi of small companies that together can multiply their competencies and synergies due to a good collaboration basis led by the NewBEE platform, making this way a powerful consortium.

Another benefit for making a powerful model is the possibility that enables such a system by managing different SMEs in a same hierarchical level. What is really important in these cases is to ensure that responsibilities and functions for each one of the organizations and teams are well defined and deployed in each phase and sub-phase of the project, as a part of the overall planning and control of the project as described before.

The value proposition of all organizations of the Temporary Union of Organizations will lead to an agreed contract with the client. And all partners will develop individual contracts between each other in order to accomplish the requirements of each task of the project within a global planning of it.

## 5.4 Advantages and Disadvantages

### 5.4.1 ADVANTAGES

The Temporary Union of Organizations is one of the possibilities for SMEs for participating in a collaborative manner in the achievement of the results of a particular project designed and developed by a public administration. The laws and procedures permit the creation of a Temporary Union, a new fiscal figure to achieve the scope of the overall project. In that way small enterprises can achieve the possibility of working together in large projects.

In such a way of collaboration, benefits and risks of individual SMEs are shared and all interactions and functions of each one of the participants are well defined, permitting synergies among partners.

Another advantage is that the Temporary Union of Organizations offers more freedom concerning human capacities or equipment, bundle technological know-how or integrate experts in consortia when required in each task of a particular phase of the project.

The ability to offer the needed capacity for large construction projects is also ensured in this particular model.

In that particular model the owner will have a responsible of the project, or the so called clients' Project Director or Project Supervisor. That professional is the responsible of controlling the project performance throughout the time scope maintaining a special relationship with the responsible of the construction management of the Temporary Union. In that manner coordination efforts and administration (or contractual) efforts will be minimized.

### 5.4.2 DISADVANTAGES

One of the big disadvantages of the pointed out business model, especially for the SMEs collaborating along a project is the risk that qualified human resources might change over to one of the other partners or to other companies that are not participating on the project which would lead to a reduction of the ability of the overall organizations to achieve the results on the committed due date. Anyway employees are less identified within the Temporary Union than in each one of their organizations.

Another disadvantage is related to the ability to define functions and responsibilities of each of the professionals along all the SMEs that contributes in each task of the project. When no clear definition of the above mentioned items and when there is not a good communication system, planned disruptions may occur in the relationship of the companies involved in the dependent tasks that may lead the project to fail in the delivery date accomplish and so generating more costs (even supposing that the content of the project would be respected by all partners).



### 5.5 Characteristics

| Characteristics                 | Main Application Area   |
|---------------------------------|---|
| Ownership of real estate        | <ul style="list-style-type: none"> <li>✓ Private owner</li> <li>✓ Commercial owner (investors/funds)</li> <li>✓ Housing companies (private, public, ...)</li> </ul>   |
| Size of property/ building type | <ul style="list-style-type: none"> <li>✗ 1-2 units (residential building)</li> <li>✓ &gt;2 units (multi-dwelling building – residential or mixed-use)</li> <li>✓ Commercial building (office building, etc.)</li> </ul> |
| Retrofitting costs              | <ul style="list-style-type: none"> <li>✗ &lt; 500 k€</li> <li>✗ 500 k€ - 1 mio€</li> <li>✓ &gt; 1 mio€</li> </ul>   |
| Time constraints                | <ul style="list-style-type: none"> <li>✗ Crucial</li> <li>✓ Important</li> <li>✓ Less important</li> </ul>  |
| Project size                    | <ul style="list-style-type: none"> <li>✗ Small project</li> <li>✓ Large project</li> <li>✗ Fast-track project</li> </ul>  |

Figure 43 - Temporary Union Organizations – Characteristics

### 5.6 Stages in the value chain

In the next figure it can be contrasted the phase of tendering, taking into account the scenario in which we had been worked at this stage. Tendering process is highlighted but also the concept development phase must be considered as well as the building operation phase that consists in the use of the real estate.

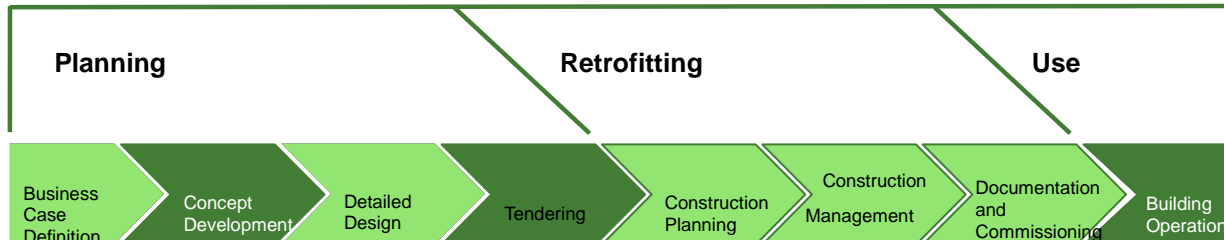


Figure 44 - Joint venture – Stages in the value chain

The tendering phase within the stages in the value chain is a stage of activity inside the NewBEE platform and not only in the way that companies reach new relationships among them, but also for the feedback that the NewBEE platform would receive from the organizations that are emerging as a Temporary Union Organization and taking into account the performance of them throughout the project that could help other future joint ventures to organize the entire collaborative project. In that sense information gathered in the platforms for a particular kind of client and/or user would be of special interest.



### 5.6.1 ORGANISATIONAL MODEL

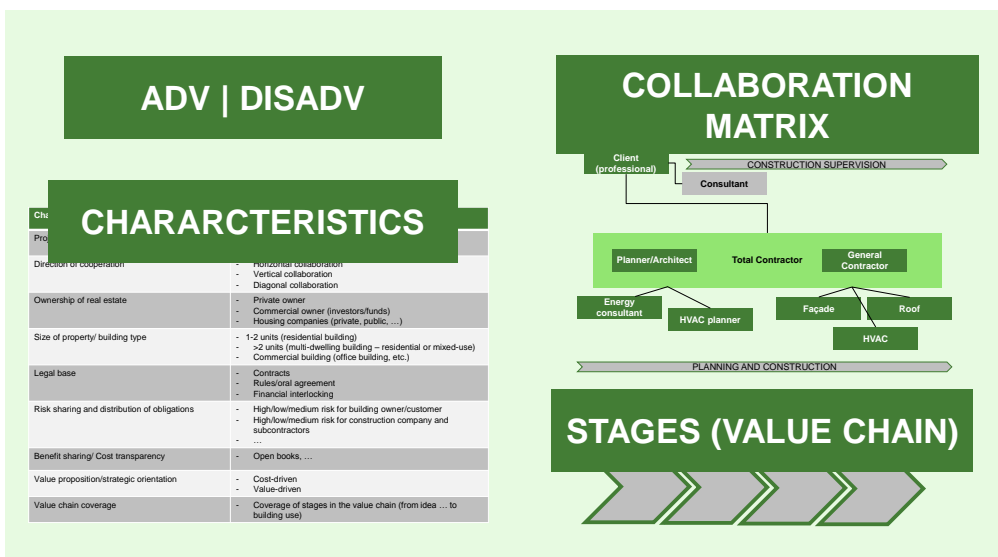


Figure 45 - Organizational model

The template defined in D4.2, is very useful to understand the business case scenario. Along this business case, all points will be treated.

For this particular scenario where a tender is launched, a organizational model must be defined and the way to clearly define it will be by means of a figure. The scheme is determined bellow.

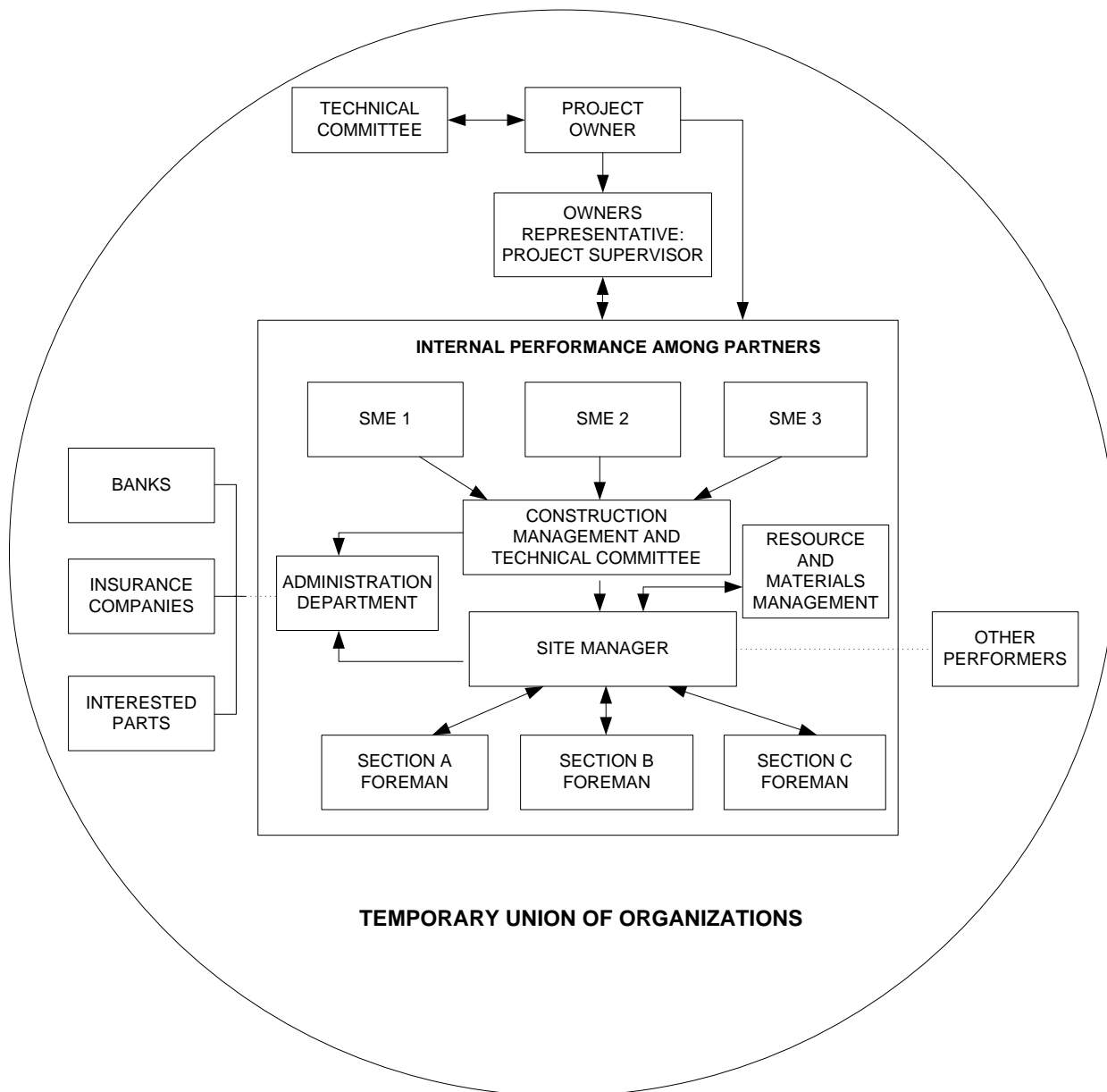


Figure 46 - Temporary union of organizations diagram

5.6.2 DESCRIPTION

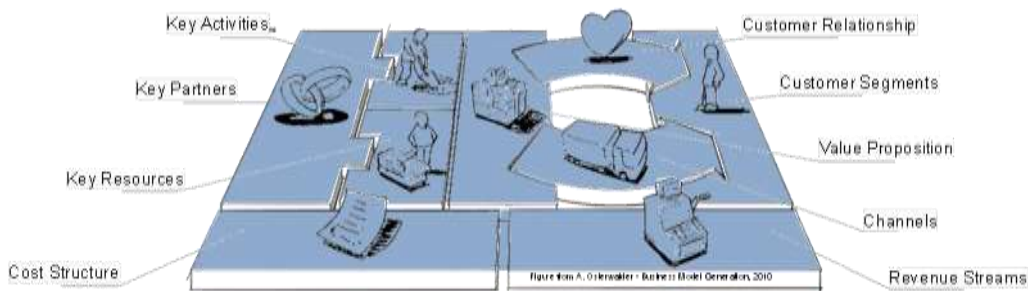


Figure 47 - Canvas example

In this particular business case scenario, the SMEs interact among them for generating an added value to the final customer, that is the owner of the public asset.



Other business opportunities would occur in a future using the NewBEE platform. In such a way, the canvas bellow will resume the possibilities that emerge by using the above mentioned business model detailed in its characteristics, organizational model and collaboration potential.

|  |   |  |  |  |
|--|---|--|--|--|
| <p><b>Key Partners</b></p> <p>Site Managers of SMEs.<br/>Foremen of SMEs.<br/>Suppliers.<br/>Other professionals or performers.<br/>Client's designer.<br/>Client's project supervisor.<br/>Client's technical committee.<br/>Financial institutions.</p>  | <p><b>Key Activities</b></p> <p>All related to the Temporary Union of Organizations:<br/>Planning management.<br/>Risk, safety management.<br/>Expertise technical building competencies of SMEs.<br/>Expertise in construction-related issues and processes related competencies.<br/>Budget development, control and management.<br/>Contractual relationship between SMEs.</p> | <p><b>Value Proposition</b></p> <p>Project Transparency.<br/>Assured Budget, project content and due date performance.<br/>Assured quality.<br/>Reduce risk of claims.<br/>Lower operation and warranty costs.</p>   | <p><b>Customer Relationship</b></p> <p>Relational.<br/>Solution driven.<br/>Business to public institutions.<br/>Dedicated team performing for the Union and the Client.</p>                                       | <p><b>Customer Segments</b></p> <p>Public buildings: school, hospitals, offices, catalogued buildings, other public buildings...<br/>Patrimonial buildings.<br/>Registered buildings.<br/>Residential buildings.<br/>Scope: National, regional, international...</p> |
| <p><b>Key Resources</b></p> <p>Professional expertise<br/>Service expertise<br/>Management expertise<br/>Planning. Multi-project environment<br/>Dedicated Resources, machinery and equipment<br/>Site Manager competence and ability</p>  | <p>Integration of customer communications (milestones) in the project planning.<br/>Resource management within each SMEs performance and between SMEs.<br/>Financial and work contribution of each member of the Union.<br/>Negotiation and bidding.<br/>Lessons learnt.</p>  | <p>Project guaranteed.<br/>Good after-sales service.<br/>Life-cycle approach.</p>  | <p><b>Channels</b></p> <p>Personal approach, or direct contact<br/>Meetings with the client<br/>Technical meetings<br/>Advertisements<br/>Involve the client in our communication service throughout the Union</p> |  |
| <p><b>Cost Structure</b></p> <p>Cost of each one of the tasks for each SMEs, within the project cost roadmap<br/>Same economical and financial structure for all SMEs<br/>Same accounting system<br/>Same administration procedures: insurances, expense classification, provisions, machinery utilization and so on.<br/>Supporting guarantee costs</p> |   | <p><b>Revenue Streams</b></p> <p>Contribution margin achieved and net profit for the Union.<br/>Net profit provided due to new particular proposals along the timeline of the project not initially budgeted<br/>Cash administration: financing sources and capital contribution of members for making possible the activity among parts</p> |  |  |

Figure 48 - Canvas representation- Osterwalder canvas of Temporary Union of Organizations for large real estate retrofitting

## **Value propositions**

The value proposition of a joint venture would be related to the project that would appear in a call. In that project the client defines clearly his needs, and the punctuation system is described in the documentation attached to the project.

The value proposal of a particular joint venture or UTE, has more probabilities to be adjudicated if the UTE itself does not overlook the fact of making the designed project with the highest transparency as possible, with an adequate communication between the SMEs contribution throughout the project and the client or the client's representative in the work, with the best quality saleable by papers or certificates, with the minimum risks and cost, and fulfilling the budget, the content and the due date of the project.

All the work must also take into account the after-sales service, the guarantee of materials introduced in the work, and the overall lifecycle of the project until the use phase in the value chain in order to make a suitable offer with all these general conditions of the works, and taking into account the limitations that exist.

The value proposition of a tender would have a lot to do with the segment or the type of building that is being considered.

## **Customer Segments**

The value proposition is designed to satisfy a client's need. In such a way, the project under consideration would be circumscribed to different geographical areas as could be regional, national, international, and so on.

On the other hand, the client's scope will be the construction of large projects as hospitals, schools, residencies and other buildings of different kind as monuments, catalogued or registered buildings, residential building and others.

These buildings have gaps concerning energy efficiency which means the opportunity for improvements on energy efficiency. The segment is very interesting for comprehensive and large renovation projects. Sub-segments, as above mentioned, are cultural heritage buildings where holistic, complete (including earthquake resistance for example) retrofitting measures have to be applied.

## **Customer relationship**

When the tender is adjudicated to a particular UTE, it would be necessary a system of communication between the Client, and/or its representative in the work and the UTEs representative that generally is the site manager. Therefore it is essential that there exists a relational interaction between both parts in the work. The executor and the supervisor on behalf of the client will constitute a solution driven working method and will control it until the scope of the work would be achieved.

That relationship would be reinforced if a dedicated and professional team attends some technical meetings for the sake of a better quality project completion. The UTE in that way makes a significant contribution by its technical service.

Under a more general point of view, key client or their representative figure or organisation will be invited to become a member or an associated member of the joint venture system of communication in order to be able to influence the organisation, project delivery methods, support best practices development and evaluation and to drive the needed changes in different policies such as public procurement, cost planning, contract models, public tendering, etc. NewBEE platform would enable the different SMEs that have been constituted in a joint venture the possibility to make some contributions to Client's needs.

Long-term relationships (if applicable) might be built on organisational, project or service level.

## **Channels**

Direct contact with companies/clients will be the main way to reach new potential clients. For example, contacts with clients' representatives from previous projects (finished ones) or from R&D projects.

The meetings directly with the client that involves our communication system during the work along it and once it has been finished are another powerful channel.

Advertisement made within the NewBEE platform as individual SMEs or in the form of the joint venture or UTE will be useful as a strong channel of communication with the client or its representative or committee. NewBEE may have the possibility of presenting partners and cluster members, their competences and technological referencies, a detailed presentation of services and options for that joint

venture business model and recently completed retrofitting projects and case studies as well as giving information about the project delivery methods, energy efficiency performance and new parameters reached compared with the initially established in the form of objectives.

### **Key partners**

In this kind of model, many different actors are included with different roles and aims of partnering.

The client needs a partnership in order to design an adequate project, taking into account the information and recommendations of companies, offering energy efficient solutions and covering all services the building would need. All other supporting organizations can be considered in this stage previous to the tender itself.

The key partnership along the project will be constituted by the client's representative and the joint venture representative as the more important key partners. In another level will be circumscribed other performers, suppliers, sector or subsections foremen, and other actors involved in the execution of the work.

The financial institutions service could be remarkable when the SMEs gathered in a joint venture do not have enough financial resources or appropriate treasury for undertaking the project.

### **Key resources**

The key resources will be confined to the execution phase. These key resources are crucial to attain the objectives of the work.

This way, a professional service and management and a multi project environment expertise are the keys to ensure a good project quality, service, minimum cost, and rapid project completion.

The expertise will help the system itself to be more productive due to the following reasons e.g.:

- An expert of managing multi project environment would obtain better exploitation of the critical path or critical chain of the project planning of each section.
- An expert of management knows how and when is the best moment to carry out the procurement procedures and know-hows and when to acquire machinery and other auxiliary elements.
- The professional expert knows the best way to apply the procedures of construction ensuring quality results.
- The service expertise will help to take into account the maintainability of the building as well as all other aspects that would enable the joint venture representative to make some new proposal if and only if these new services and materials are not programmed in the initial project.

Site manager has a vital role coordinating the distinct professionals and know-how, and will be the engine that would harmonise the activities on the site.

### **Key activities**

The key activities of the SME cluster for large real estate retrofitting project can be such defined above in the Osterwalder's business model representation.

Previous to initiate the tender process, the negotiation and bidding is a key activity to be considered.

When the work is adjudicated to the joint venture, the cluster must be created, and the procedures established for an adequate management: organization chart, functions, definition of rules for collaboration, inclusion of new members, contractual matters, and so on.

Once the Cluster is organized the operation activities must be settled: operational procedures, procedures for exploitations of technical expertise, management of construction-related issues and processes related competencies, budget development, control and management, development and set-up of methodology of best (sustainable) retrofitting technology, integration of customer communications (milestones) in the project planning, resource management within each SMEs performance and between SMEs, financial and work contribution of each member of the Union, support services for project implementation and so on.

Lessons learnt and best practices will be incorporated to the NewBEE platform. Each joint venture or cluster should release documentation and material related to the best practices concerning the energy efficiency work done.

## Revenue streams

Different financing models will be customised to that particular scenario in which a project is developed, and combining different financing sources in a coherent way. The client must consider different alternatives for fund collection: banks, public funds, subsidies, and so on.

Joint venture's revenue streams must be considered in the sense of budget completion, and therefore from the money coming from the net profit of the entire UTE when project has finished. Also project enlargements conveniently budgeted would be a source of new revenue streams.

The results of treasury activities of the Cluster and the net profit obtained would not have to coincide, because of the way each one signifies (conceptually) and are way the parameters are calculated.

## Cost structure

Cost management should deal with three categories of costs as direct costs, project supporting costs, and overhead costs. These concepts of costs, and the revenues that derive from the certificate costs will lead to know the net profit of the operations by applying the accounting system procedures. The enlargement of the project will lead to new revenues and new costs that must be considered within the cost and revenue monitoring system.

Also, a well defined methodology for pricing and agreement on profit set-up and share should be developed and implemented on the retrofitting project level and just in the moment the cluster is created.

### 5.6.3 CHARACTERISTICS

- **Ownership of the real estate**

The ownership of the real estate building will be a public ownership where the client must consider different ways of reaching the perceptive funds for undertaking in a first tender the project itself fulfilling all requirements to satisfy work's scope, and the needed money to carry out the execution of the project itself.

- **Size of property/building type and retrofitting costs**

For the present business case, the retrofitting costs are important due to the large building size. Building types like schools, hospitals, residencies, and heritage building are project of great extension and they suppose the investment of a lot of money.

- **Time constraints. Guaranteed construction time.**

The time will not be a constraint parameter in such a way of collaboration, if and only if, there is a project management system that enables the excellent coordination between SMEs and the coordination of critical professionals assigned to critical tasks within the project critical path or chain.

In that sense the project construction time will be guaranteed since the very beginning of the tender process.

- **One hub towards the customer during the whole project**

As said before, the customer will be satisfied if the overall work is finished in time, with the content defined initially in the documents of the project and with the budgeted quantity of money invested.

But during the work different kind of new services could be necessary to our final customer, and the site manager will communicate the fact to the representative of the client in the work so that the customer could decide to tackle or not the enlargement of the initial project.

- **Detailed requirements engineering**

One of the reason of bid adjudication can come from the detailed procedures of execution of each responsible of SMEs intervening in the Cluster. The know-how of the technical expertise and the team prepared to do the work with adequate procedures is the key for fulfilling the requirements that the project documentation requires for the entire UTE.

- **Holistic service portfolio**

The holistic service must be guaranteed since the beginning of the processes of bidding. The services could include the after sales guarantee service, and other services applicable during the timeline of the execution of the project.

Other saleable services could appear during the execution of the work that could be communicated to the client and could be approved, resulting in more revenue streams.

- **Team and partnering concepts**

The key of having the necessary synergies among parts is the team working concept extended to the overall performance of the project. When the project experts and workers guided by a qualified Site Manager work along with the “flow” concept, the entire project performance would be enhanced.

### 5.6.4 VALUE CHAIN COVERAGE

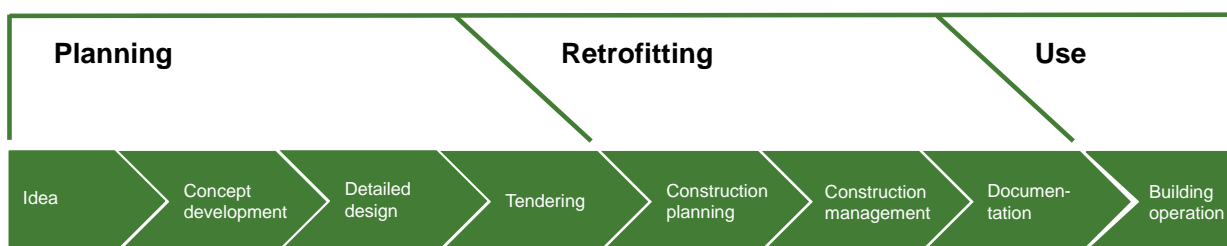


Figure 49 - Value Chain coverage phases

In our Tendering business case, and as depicted in the above mentioned flowchart, all phases of the value chain are covered, but only the highlighted phases are substantial and critical for the way the model must be considered during business case performance applying the selected business model.

### 5.6.5 COLLABORATION MATRIX

The following figure depicts the collaborative space created by all the stakeholders that participate on the project completion within the business model defined for that scenario.

As one can see, all the partners are connected to each other in a unidirectional way or bidirectional, showing a clear relationship among different partners in the project.

The early phases of the project are considered in the collaboration matrix in order to let know the idea that when a tender emerges, there must be previously a good work from performers like architects, engineering studies, ESCOs, and other stakeholders for converting the idea of the public owner in specifications during all steps of the project that will serve for fulfilling the work satisfactorily.

As one can see, all partners are connected by communication flows. The flows depicted in the upper part of the figure are the steps that are necessary to be carried out before the tender is launched.

Once the contract is adjudicated to a Cluster of SMEs the Site Manager is the principal agent that will be in permanent contact with the Client’s Technical Supervisor along the work timeline.

During the construction the site manager will work with the principal collaboration of the project planner and the technical work team that would be assessed by the experts on different issues related to the work. Each SME’s foreman on the other hand will respect the technical decisions made by Technical Work Team supervised by the Site Manager in a convenient manner.



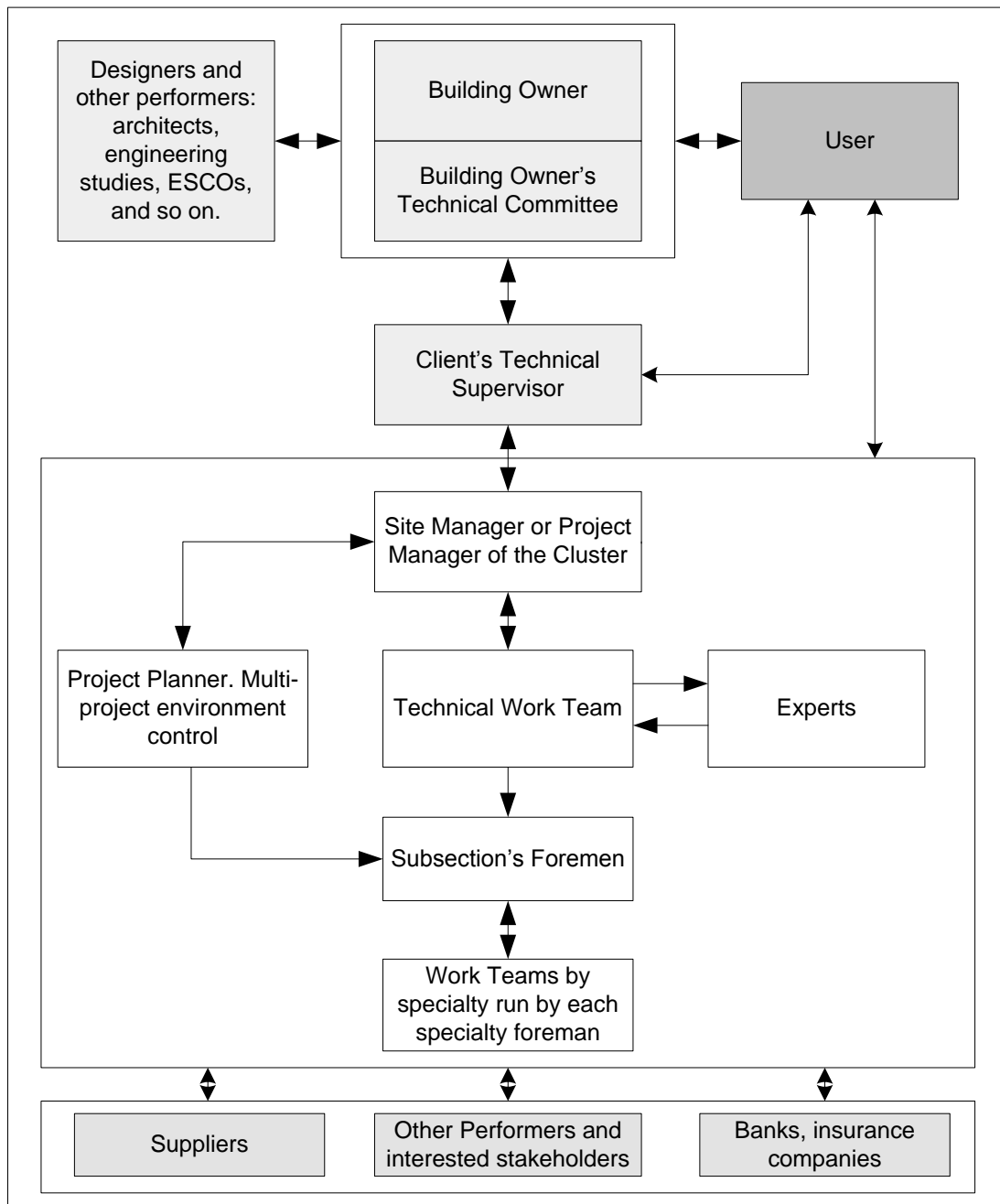


Figure 50 - Stakeholders involved

In the figure below NewBEE platform's performance is depicted. The platform is useful for the companies for approaching to new forms of interacting with the public or private clients.

The capital and revenue stream, the relationship, the information and material flow are drawn according to the present business case scenario and the business model configured for it.

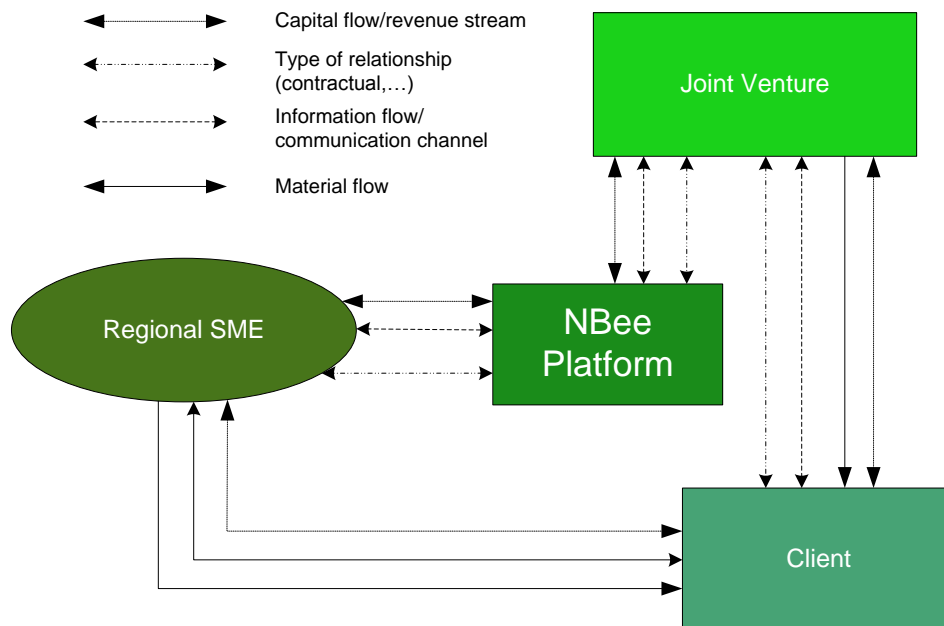


Figure 51 - Capital flows

### 5.6.6 FINANCIAL MODEL

The NewBEE Platform helps the tenders to have an idea of the outputs of the Financial Calculator tool available in Pre-assessment tool.

In such calculator tool it has been introduced the information specified for the business case. The owner is the first “client” of the platform that would be interested in the results that pre-assessment tool by means of the financial calculator tool contributes. In later phases “the clients” of the platform are the proper organizations that will interact to prepare the tender.

The screenshot shows the 'Cálculo Financiero' section of the NewBEE platform. It includes a navigation bar with links like Wiki, Pre Evaluación, Mercado, Contacto, Mi Cuenta, and Language: ES. Below the navigation bar is a green header for 'Cálculo Financiero'. The main content area is titled 'GENERA TUS MODELOS FINANCIEROS' and contains a table of financial models. A 'Nuevo cálculo' button is visible above and below the table.

| Título          | Modelo financiero | Inversión | Años de inversión | Tiempo de retorno de la inversión | Ahorro energético inicial | NPV    | IRR   | Impuestos | Subvenciones |
|-----------------|-------------------|-----------|-------------------|-----------------------------------|---------------------------|--------|-------|-----------|--------------|
| PUBLIC HOSPITAL | Own Capital       | 82000     | 10                | 2.43039                           | 37854                     | 489909 | 0.411 | 1         | 0            |

Figure 52 - Financial model screenshot

The model that has been used can be depicted in the following diagrams considering the different variables: availability of own resources, fiscal incentives or taxes, subsidies, the investment to estimate previous to launch the tender, savings, and so on.

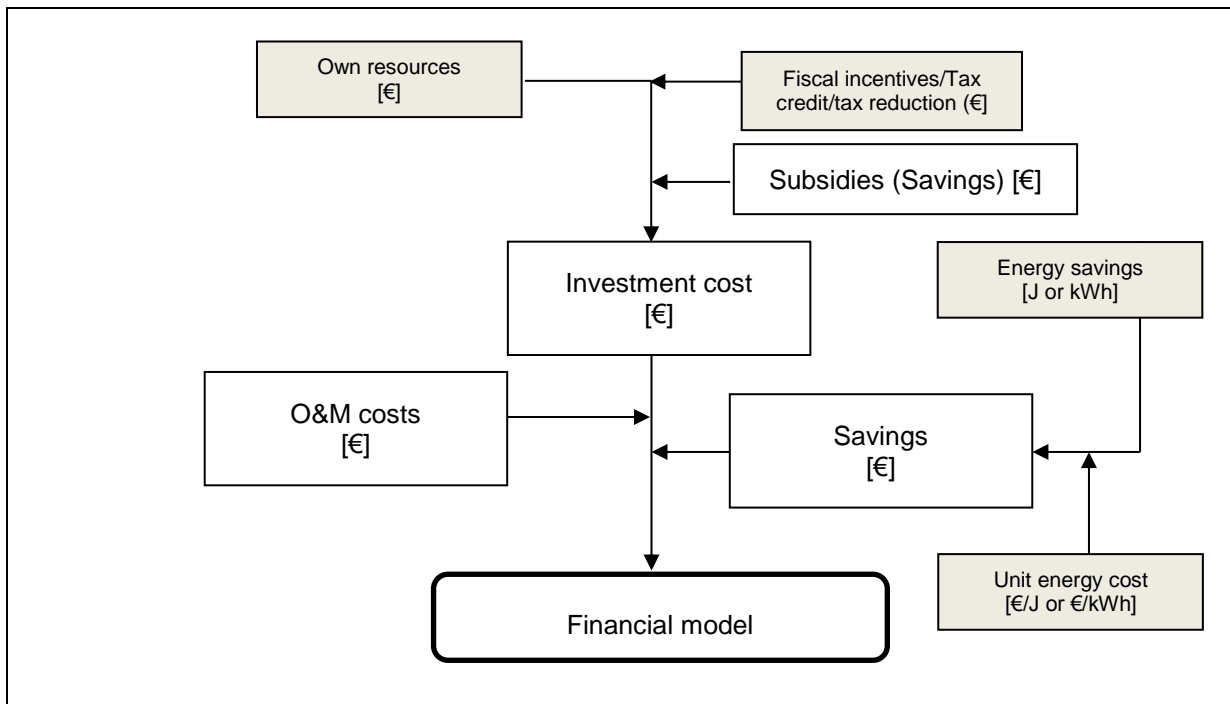


Figure 53 - Financial model schema

| NewBEE            |                    |  |                 |                    |
|-------------------|--------------------|--|-----------------|--------------------|
| Wiki              | Pre Evaluación     | Mercado                                  | Contacto        | Mi Cuenta          |
| Language: ES      |                    |  | ES              |                    |
| Volver al inicio  |                    |  |                 |                    |
| <b>Inversión</b>  | 92000 €            | <b>Tipo Finanzas</b>                     | Own capital     |                    |
| <b>% Interés</b>  | 5 %                | <b>TIR</b>                               | 41.1 %          |                    |
| <b>VAN</b>        | -489909 €          | <b>Tiempo de retorno de la inversión</b> | 2.43039 years   |                    |
| Años              | Los gastos anuales | Ahorro anual                             | VAN Salida      | VAN Entrada        |
| 0.                | -92000 €           | 0 €                                      | -92000 €        | 0 €                |
| 1.                | 0 €                | 41074 €                                  | 0 €             | 39118.1 €          |
| 2.                | 0 €                | 41074 €                                  | 0 €             | 37255.33 €         |
| 3.                | 0 €                | 41074 €                                  | 0 €             | 35481.27 €         |
| 4.                | 0 €                | 41074 €                                  | 0 €             | 33791.68 €         |
| Muestra más datos |                    |  |                 |                    |
| <b>Suma</b>       | <b>-92000 €</b>    | <b>1151720 €</b>                         | <b>-92000 €</b> | <b>595849.66 €</b> |

Figure 54 - Financial model screenshot

As it can be demonstrated, the savings produce the decreasing of cumulative cash-flow and the pace to happen is very smooth. It signifies both the tender and its content could be reconsidered or the criteria of the tender should be reconsidered to adjust the investment needed in the design phase.

If the tender is launched, the clients of the NewBEE Platform will be the SMEs that attend together the tender in order to catch an idea of the results in the energy efficiency of the work.

C

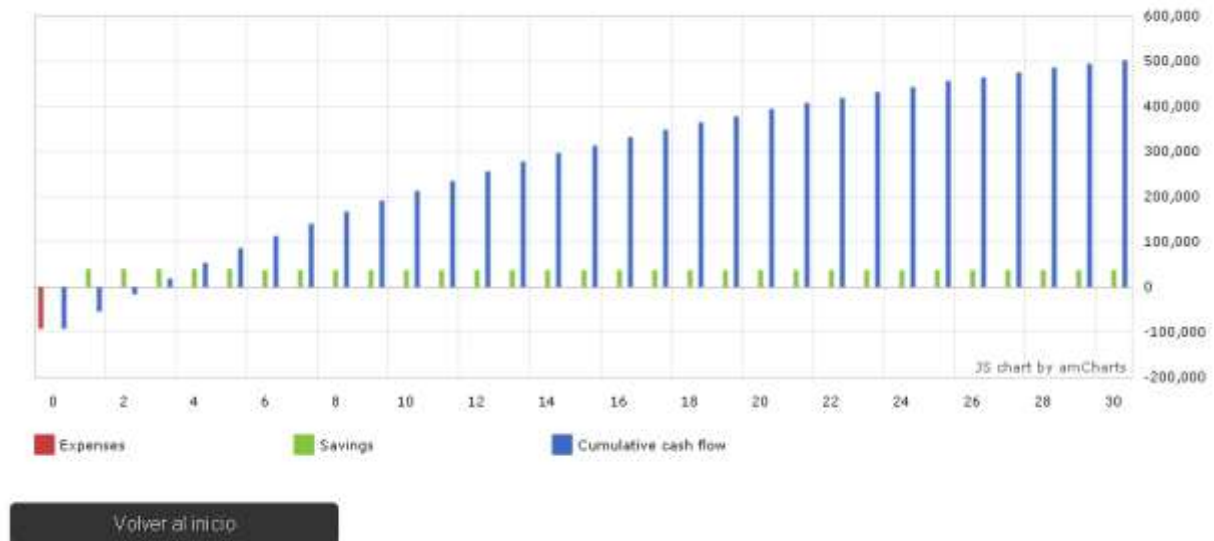


Figure 55 - Financial model screenshot

**6 S3: A real work of retrofitting from which we can obtain both physical and economic data and compare them with NewBEE system.**

**6.1 Description**

**6.1.1 BUILDING GENERAL CHARACTERISTICS.**



Figure 1 - Building general view

|                        |                                  |
|------------------------|----------------------------------|
| Name of the Project    | Facades retrofitting with ETIC's |
| Address                | Artegieta Kalea, 3 - 5           |
| Location               | Eibar (Gipuzkoa)                 |
| Zip Code               | 20600                            |
| Country                | Spain                            |
| Type of Building       | Residential Building             |
| Year of Building       | 2006                             |
| Accommodation Units    | 40                               |
| Number of Floors       | 7                                |
| Heated Area            | 3.100 m <sup>2</sup>             |
| Energy Consumption for | Heating with warm water          |
| Climate zone           | D1                               |
| Height (Sea)           | 174 m                            |
| Orientation (North)    | 110°                             |

Figure 56 - Building characteristics

The building is located on the outskirts of the town, near a mountain and with no other adjacent buildings, so it is very exposed to atmospheric agents and humidity.



Figure 57 - Building aerial view.

The building occupies a rectangular flat area of 740 m<sup>2</sup> and has a total floor area of 5,753 m<sup>2</sup>, divided into 7 floors. The main floor is destined to common areas, private storages and parking. Because of the unevenness of the ground, is divided into two different blocks with a scaling of a plant between them.

The building is 7 floors high and has four different façades (the front, laterals and the rear ones).

## FRONT FAÇADE



Figure 58 - Front façade of the building.





*Figure 59 - Building general view (2)*



*Figure 60 - Building general view (3)*



Five years after its construction some owners have already begun to suffer the first deficiencies of the construction. Most faults were repaired by the promoter, but some houses were still producing humidity, especially condensation, which could not be solved.

## REAR FAÇADE



Figure 61 - Rear façade of the building



Figure 62 - View of the rear of the Building

### 6.1.2 PROJECT DESCRIPTION

The construction of this building was promoted by IMESA, a public and municipal real-state agency of Eibar (Gipuzkoa), and subsidized homes were sold to local residents with few resources. A total of 40 houses about 77 m<sup>2</sup>, with a private storage and parking.

It was built in 2006, and five years later some owners have already begun to suffer the first deficiencies of the construction. Most faults were repaired, but some houses were still producing humidity, especially condensation, which could not be solved. Finally, the homeowners and the promoter reached an agreement to compensate financially to the housing association.

At this point, all homeowners united in the housing association, organized by their Administrator of Real Estates, began to seek help from various local construction companies and architects to solve their problems.

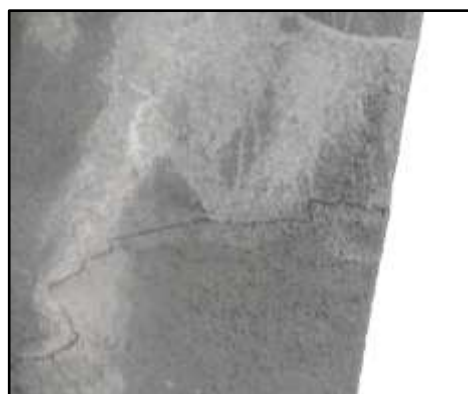
### 6.1.3 OWNER POINT OF VIEW

Due to a problem of water infiltration and condensation inside several homes, the homeowners choose to search in [www.newbee.com](http://www.newbee.com) a solution that eliminates the pathologies caused from the façade, while reducing the consumption of all homes.

Most important to the homeowners is getting feedback from various specialized professionals, to see if any of them proposals guarantees the elimination of moisture. But the homeowners also need to reduce costs to a minimum, so they want to contract directly with an expert company, without outsourcing.



*Figure 63 - Pathologies caused at the façade.*



*Figure 64 - Pathologies caused at the façade (2)*



*Figure 65 - Pathologies caused at the façade (3).*



*Figure 66 - Pathologies caused at the façade (4).*

#### 6.1.4 CONSTRUCTION COMPANIES POINT OF VIEW

Specialized construction companies to rehabilitate facades energetically registered [www.newbee.com](http://www.newbee.com) can access this offer. They can create team with other construction companies with whom they can form an alliance. We create a good alliance and these are the results:

##### During the work



*Figure 67 - Scaffoldings during the work.*



*Figure 68 - The terraces: Before and after.*





*Figure 69 - Building (Before and After).*





*Figure 70 - Building after renovation.*

### 6.1.5 THERMOGRAPHIC

Thermography is used to obtain thermal images of the building, in order to detect the distribution of the temperature on the Surface of the facade material. Thermographic cameras don't measure the temperature of the building envelope; the cameras measure the radiosity of the building. Radiosity refers to the total radiation leaving the surface modulated by the atmosphere intervention. The radiation involves the emitted, reflected and sometimes the transmitted energy. The thermal images produced are called as "thermograms". These are colour images with different distribution of colours, which are representing the variations in the flow of heat in the same region. The hotter regions appear in a different colour from the cooler.

They identify points in buildings where energy is being wasted. They can find any heat leaks in home insulation and windows. These problems are caused by limitations in construction.

The usual effects of thermal problems at the façade are these:

- Lower temperatures of the inner surface; in the worst case this may result in condensation problems, particularly at the corners.
- Significantly higher heat losses.
- Cold areas in buildings.



## THERMOGRAMS

### 1. BEFORE the renovation of the façade

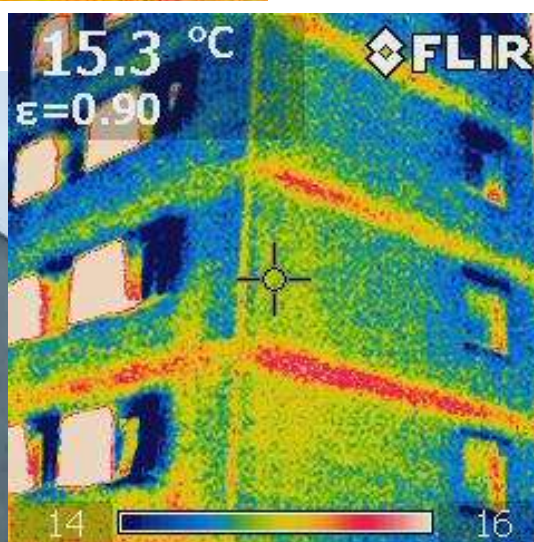
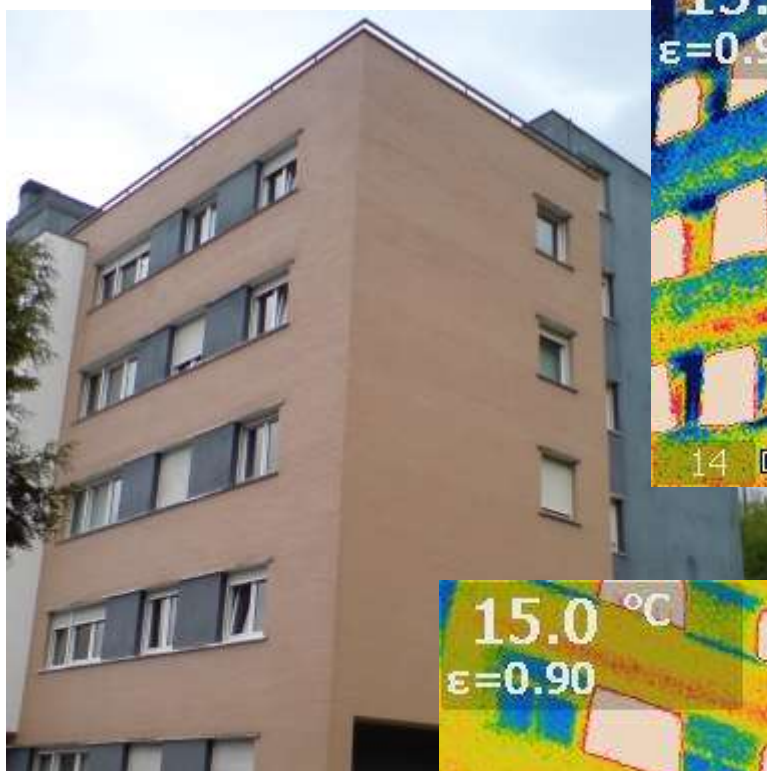
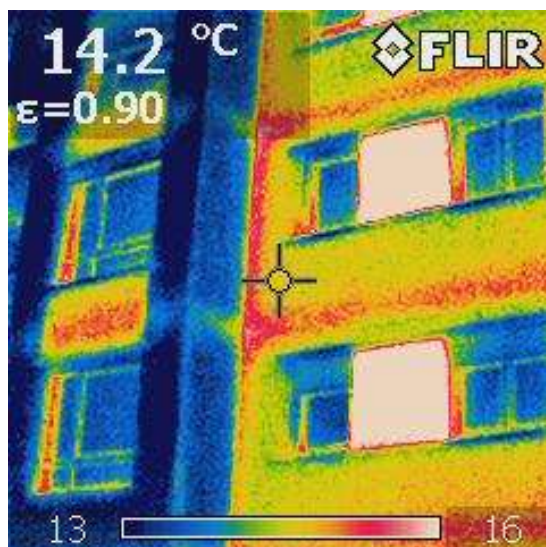
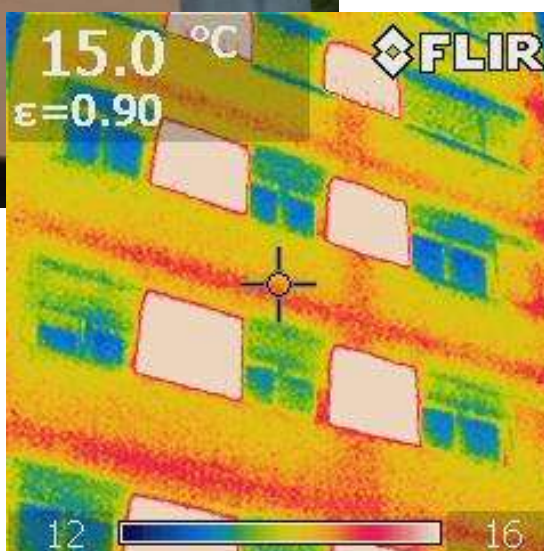


Figure 71 - Thermograms before rehabilitation.





2. AFTER the renovation of the façade.

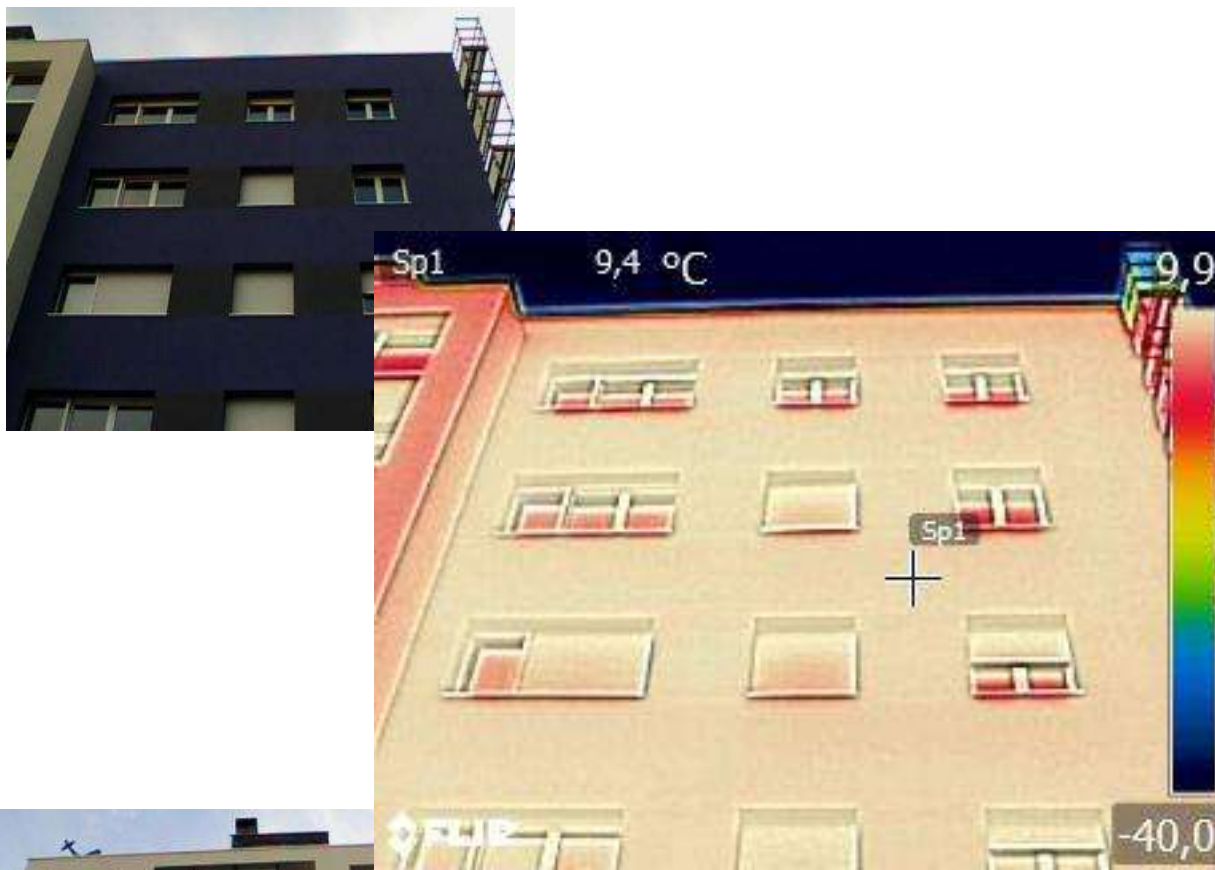
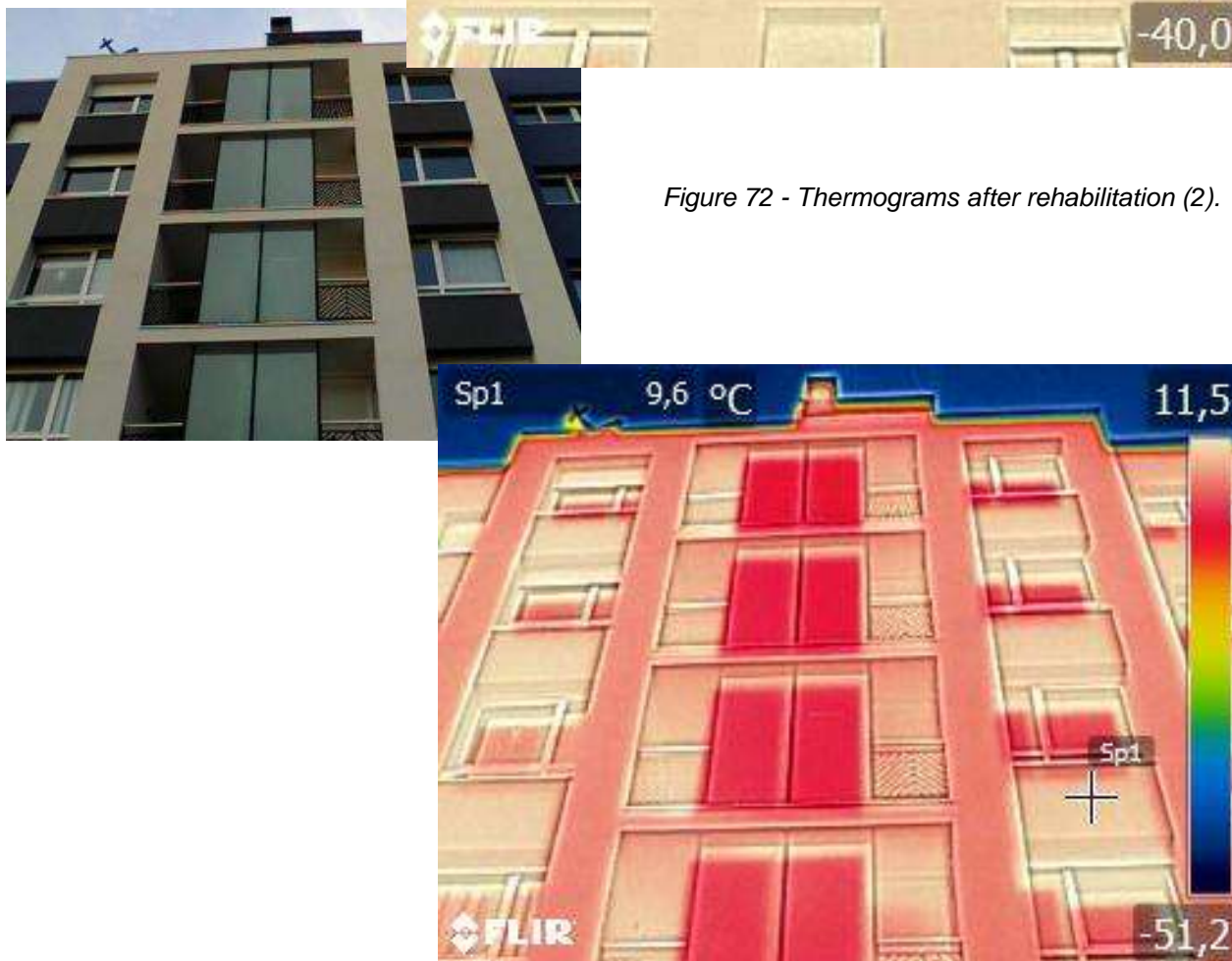


Figure 72 - Thermograms after rehabilitation (2).



## 6.2 Business case workflow

This section 6.2 describes step by step the platform. The study will focus on two types of users of the platform: first users are the building owners with a need or an idea of an energy renovation, and second users are companies (SMEs) that want to increase their business and bid offers through NewBEE. The section is divided in two parts: The first part is to register or login, and the second part covers all the tasks that each user (owner and SME) can carried out with NewBEE to develop business models.

### 6.2.1 REGISTRATION

To register on the website the first thing to do is enter at [www.newbee.eu](http://www.newbee.eu). When you start the web, there is a floating toolbar on the top with the options provided by the software and two shortcuts on the bottom. To start the registration, you can access directly from the MP area above the scroll bar or identify first as owner or SME choosing in each case the appropriate lower shortcut (then access to MP area)

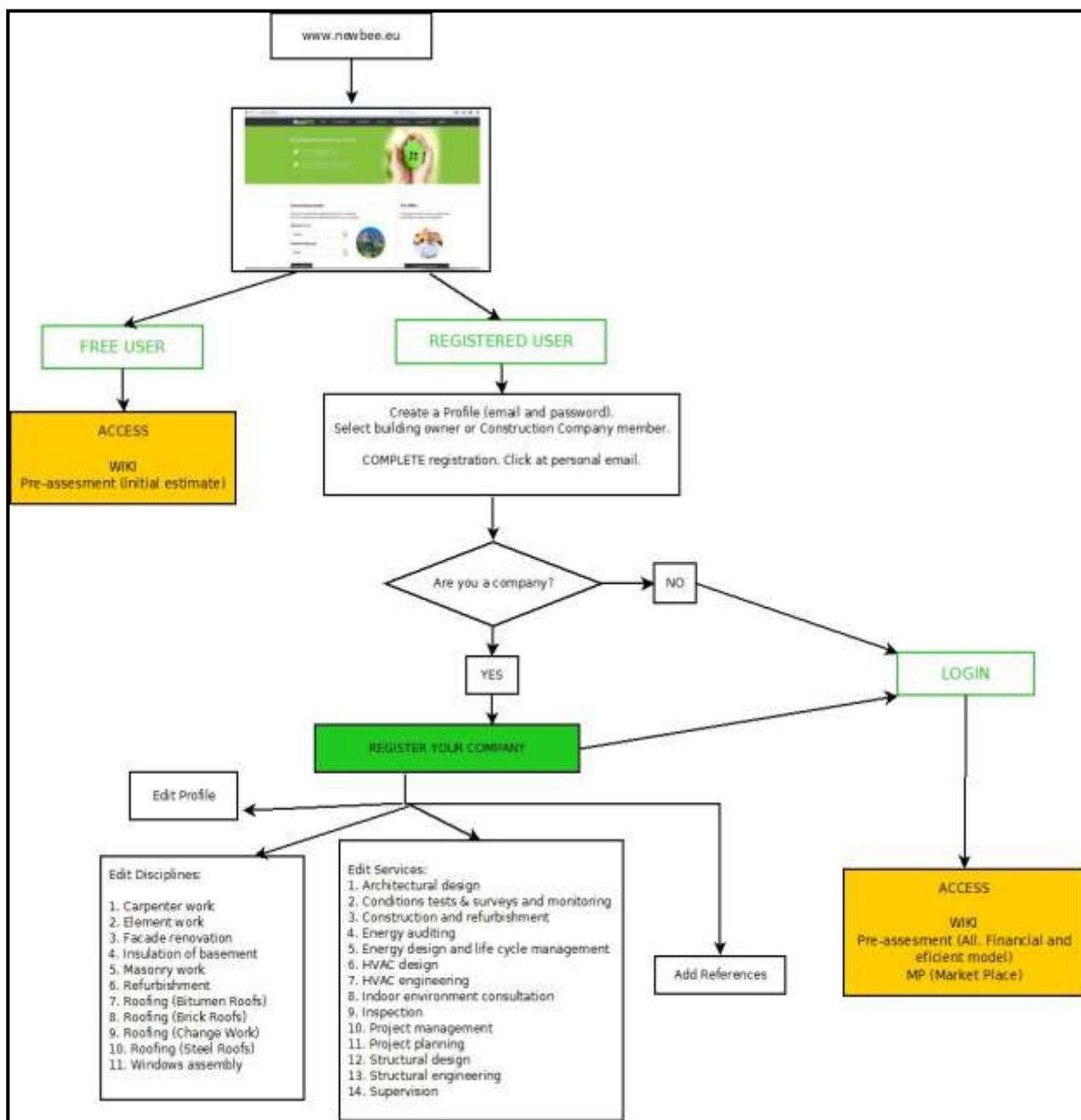


Figure 73 - Register and login workflow.

After completing the above steps, we are on the homepage of the MP.

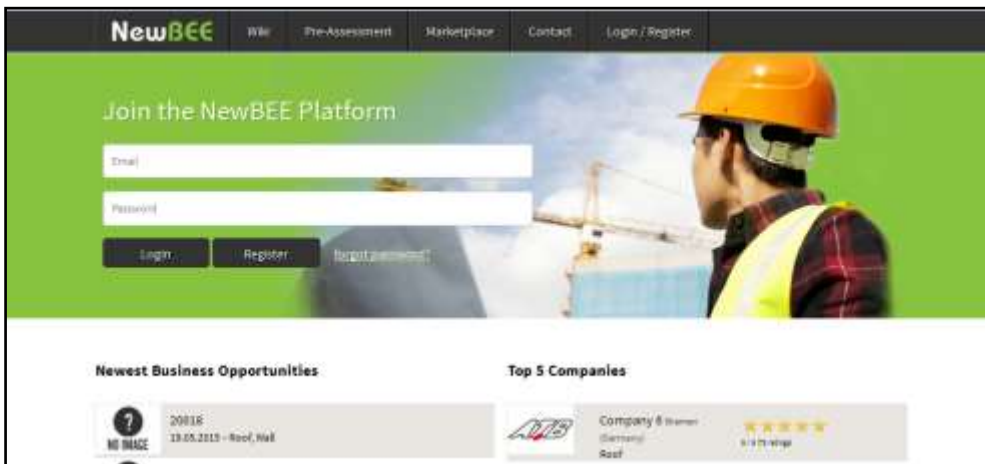


Figure 74 - Marketplace homepage.

To start the register you must click on the button "register". Then another window will open, in which you must fill in the information requested (user or SME). As shown in Figure 75, both registers differ in the selection of the category (building owner or construction company member). In this section, enter the name of the person concerned, the contact email and a password for NewBEE. The platform will fail until the data is not duly completed and after that a screen with the message "your registration has been successful" appears.



Figure 75 - Register page.

After completing this step, you will receive an email for the confirmation of the NewBEE register. Open the email and click on "complete" to continue with the registration or "cancel" to start again. By clicking on completion, is linked directly back to the NewBEE page and requested to confirm the account (reenter email and password).

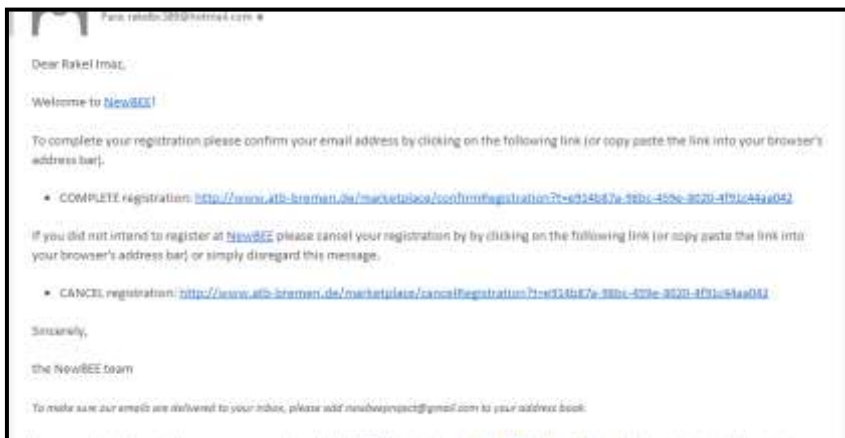


Figure 76 - First email of the registration

That is the last step, so the process is complete and you are ready to start working with NewBEE.

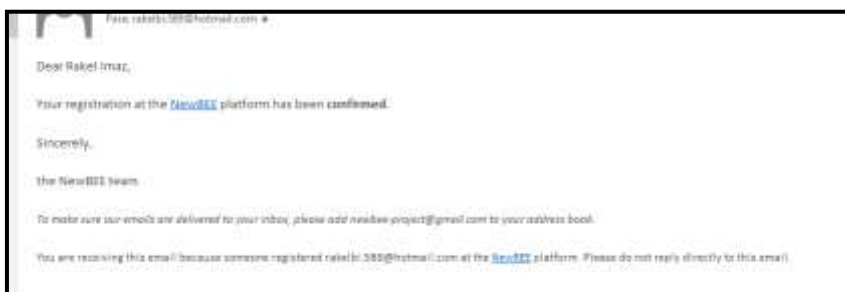


Figure 77 - Second email of the registration

### If the user is the Owner of a building.

The process to fill the user profile of an owner of the building is very simple. It is only needed to complete the following data: street, postcode (ZIP), city, country, telephone, fax, email.

Figure 78 - Register page.

### If the user is a member of a Construction Company

The first thing to do is to register the company at NewBEE. The objective is to enter all the general information of the company (Profile, disciplines, services and references).

The screenshot shows the NewBEE website interface. At the top, there is a navigation bar with the NewBEE logo and links for Wiki, Pre Evaluación, Mercado (with a red notification badge '17'), and Contacto. Below this is a green header with the text 'ESL 2 - Eslaban'. A breadcrumb trail reads: 'Confirmar Registro » Su cuenta » Registrar Empresa » Editar Empresa » ESL 2 - Eslaban »'. On the left, there is a factory icon and a list of four buttons: 'Editar Perfil', 'Editar Disciplinas', 'Editar Servicios', and 'Añadir Referencias'. A green circle highlights these buttons. To the right, under the heading 'Información General', there is a table of company details:

|            |  |
|------------|--|
| Nombre:    | ESL 2<br>Eslaban   |
| Dirección: | Avda. Otaola 27 esc. dcha. 3º izda.<br>Apartado 160<br>20600 Eibar<br>España |
| Tel.:      |  |
| E-mail:    | rakelbi.589@hotmail.com  |
| Web:       | www.eslaban.com  |

At the bottom right, there is a map showing the location of Eibar, with labels for 'El Corte Inglés' and 'Eibar'.

Figure 79 - General information and edit page.

In the table is shown all the information to be introduced for each company.

Table 2 - Needed information from each company

| PROFILE        | DISCIPLINES             | SERVICES                                  | REFERENCES  |
|----------------|-------------------------|---|---|
| <b>Name</b>    | Carpenter work          | Architectural design                      | <b>Examples:</b><br>Fulfilled projects<br>Photographs<br>Energetic projects<br>Partners |
| <b>Address</b> | Element work            | Conditions tests & surveys and monitoring |   |
| <b>Phone</b>   | Facade renovation       | Construction refurbishment and            |   |
| <b>E-mail</b>  | Insulation of basement  | Energy auditing                           |   |
| <b>Web</b>     | Masonry work            | Energy design and life cycle management   |   |
|                | <b>Refurbishment</b>    | <b>HVAC design</b>                        |   |
|                | Roofing (Bitumen Roofs) | HVAC engineering                          |   |
|                | Roofing (Brick Roofs)   | Indoor environment consultation           |   |
|                | Roofing (Change Work)   | Inspection                                |   |
|                | Roofing (Steel Roofs)   | Project management                        |   |
|                | Windows assembly        | Project planning                          |   |
|                |                         | Structural design                         |   |
|                |                         | Structural engineering                    |   |
|                |                         | Supervision                               |   |

NewBEE tool has several options. As a registered user you can access the Wiki and PAT areas. In the wiki you will find a database of the world of construction (laws and definitions of technical words). In addition to the tool, the PAT can perform a first technical, energy and economic, proposal for the work to be performed.

If the owner wants to ask for proposals about the idea to companies associated to NewBEE, after making the initial estimate should register as a user (house owner) on the platform. This is the difference between registered and those who are not. The occasional user, no registered, stay with the idea-proposal and the registered user can post the offer, expected to receive proposals from interested SME, create the team and start the work.



## 6.2.2 NEWBEE GENERAL WORKFLOW

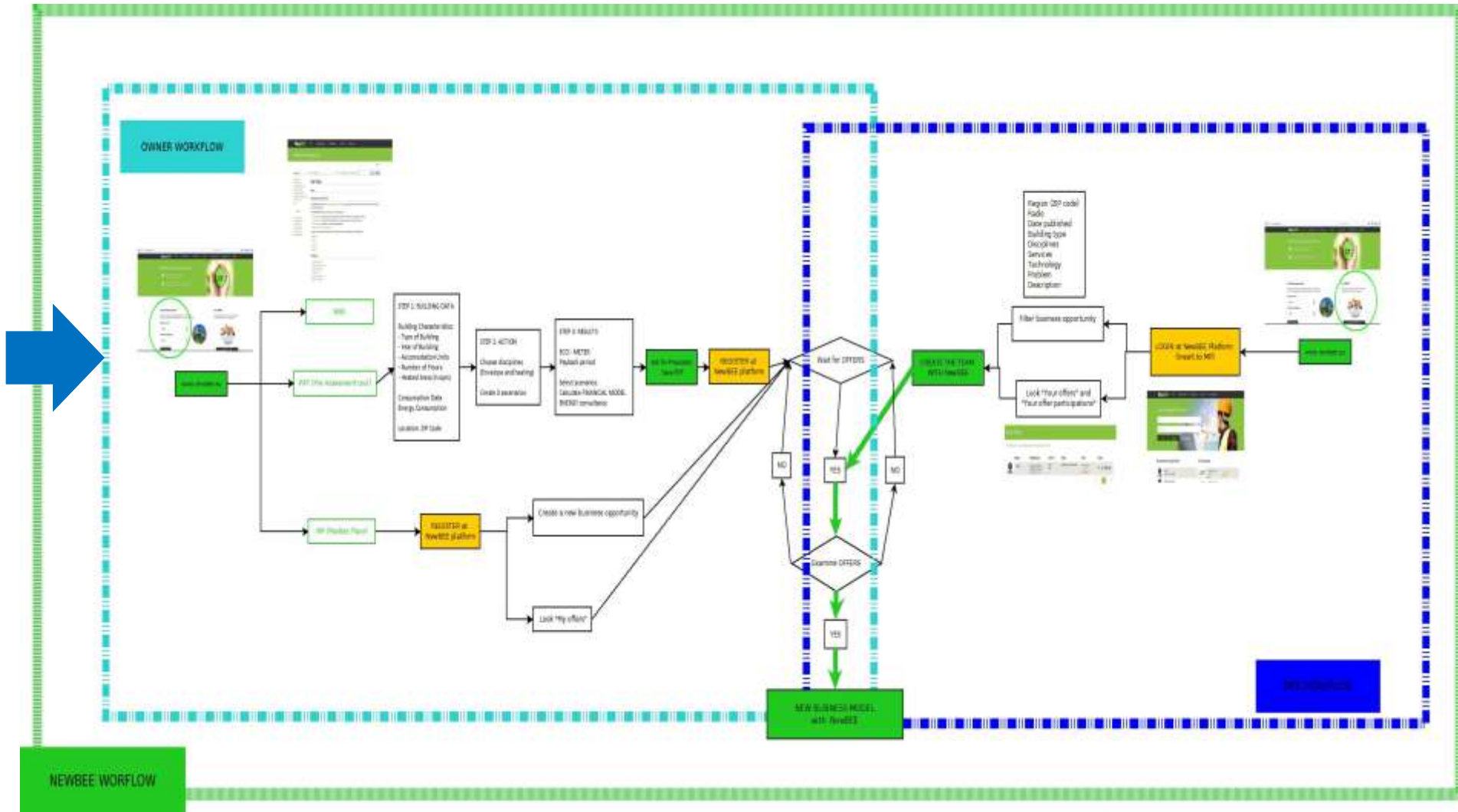


Figure 80 - NewBEE general workflow



At NewBEE workflow there are two actors: the users of the building and the Construction Companies. At the scheme (figure above) you can see that the 2 actors becomes together in one point at the center.

At this point the business model is been created. The business model collects the needs and the barriers at the project, mixed with the experience of the construction company, all of that in an online environment.

To describes NewBEE workflow there are three important steps that involves the owner and the SME with the offer.

**6.2.2.1 STEP 1: BUSINESS MODEL GENERATOR - OWNER (Owner workflow)**

To describe the scenario S3 (by owner point of view) continue the following work flow. The first column describes the access to the wiki. The second and the third columns are the options to create a new business model. We will start with the access through the PAT.

- a. Login to the platform. Access PAT.
- b. Enter data as you can see in figure 28.

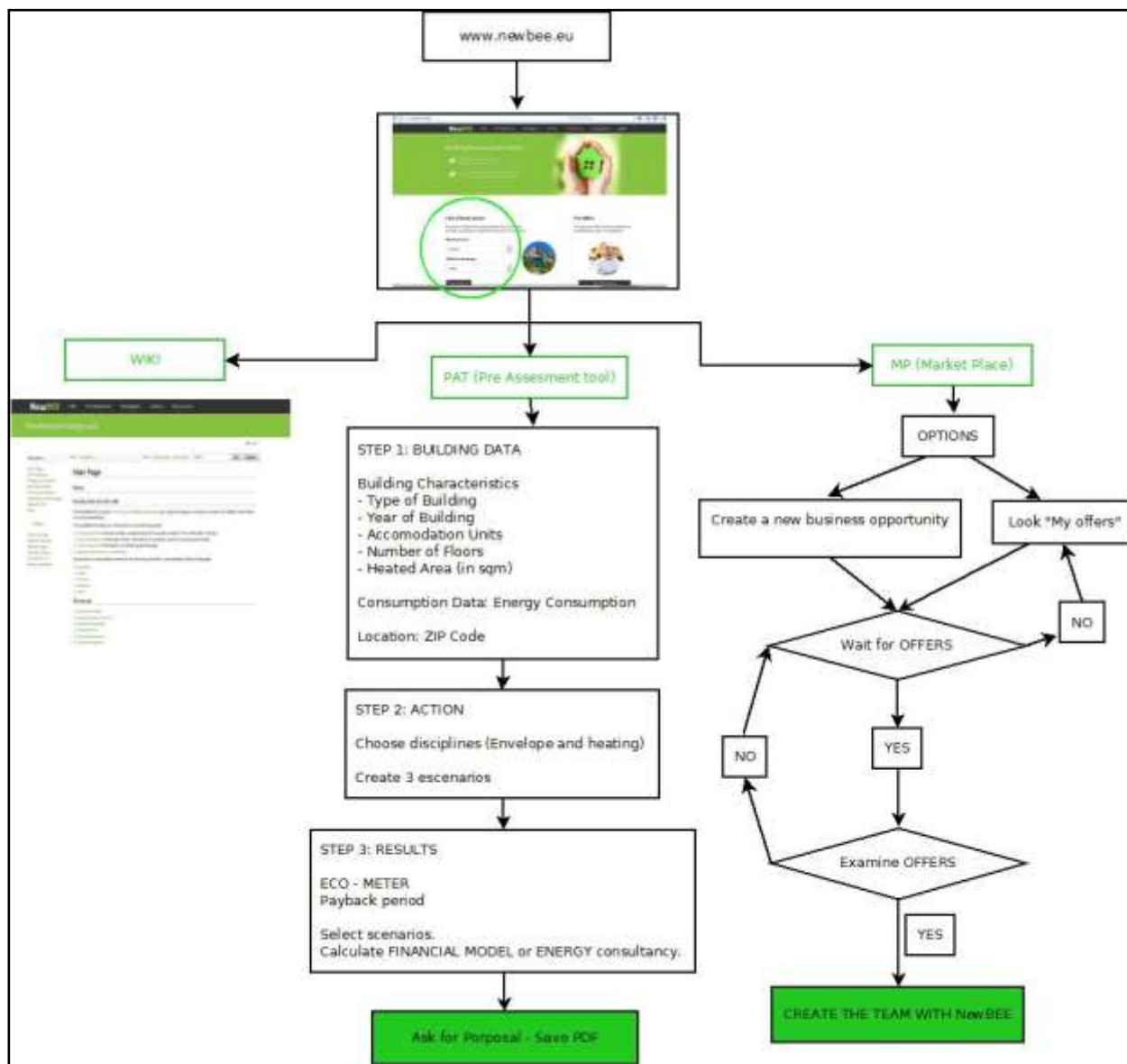


Figure 81 - Owner workflow

c. Click Next. The new screen it's to decide what task is to be performed on the building (Fig. 29).

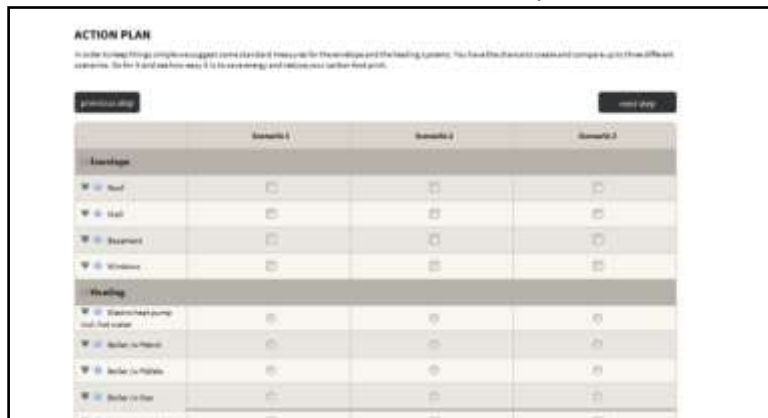


Figure 82 - Step 2: ACTION. Action plan

- d. The third display shows the results (Eco meter, Payback period). At this point, the generation of the idea it's done. The platform offers the option of creating a financial model and the option to contact with Energy Consultant.
- e. Once the particular scenario is defined, the offer will be published in the virtual market of NewBEE by clicking at Ask for Proposals.
- f. The user should register if you have not done it before.
- g. Public the offer. Select the Services and the Necessary disciplines. Click to Public and to finalize click PUBLISH.

Enter at [www.newbee-wiki.eu](http://www.newbee-wiki.eu)

Select where do you live and your language. In this case the owner selects Spain (Apartment) because is a block of flats and it is located in Spain.

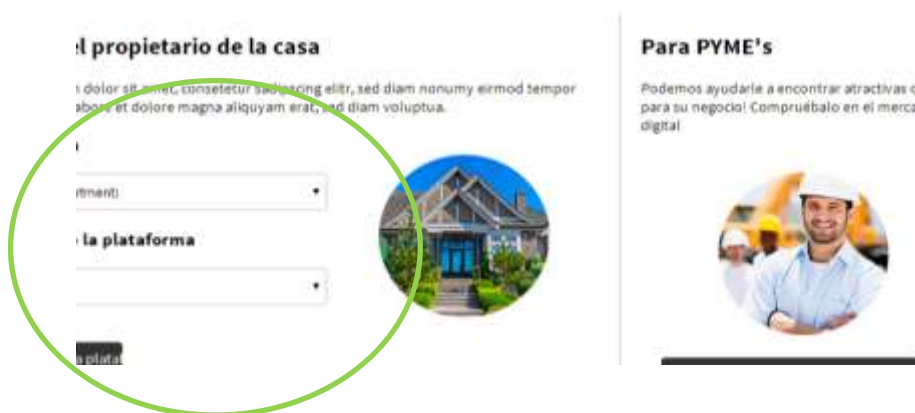


Figure 83 - Pre-assessment screenshot

NewBEE platform shows the first step at the PAT.

**STEP 1 (Building data):** The users enter the Building Data.

**Pre-Evaluación - Datos del edificio**

Datos del edificio      Medidas      Resultados

### CARACTERÍSTICAS DEL EDIFICIO

Por favor, inserte algunas características y números de su vivienda. Usaremos sus datos para el cálculo de los costos y los ahorros potenciales. No se almacenarán los datos. Antes de entrar en el mercado digital el sistema le preguntará si desea almacenar "su proyecto".

|                          |   |
|--------------------------|---|
| Edificio de apartamentos | <b>Tipo de edificio</b><br>Por favor seleccione la tipología de edificio. Esto ayudará a calcular los resultados de forma más precisa.  |
| 2006 - 2013              | <b>Año de construcción</b><br>Año de construcción   |
| más de ocho apartamentos | <b>Número de habitáculos</b><br>Cuántas familias o cuantos habitáculos tiene su casa?   |
| 7                        | <b>Número de plantas</b><br>Por favor, inserte el número de plantas que sean realmente utilizadas en la vivienda. Si usted tiene habilitado el espacio para vivir en el ático o en el sótano, por favor elija 0,5 pisos por cada uno. |
| 4480                     | <b>Area climatizada (en m2)</b><br>Por favor, inserte los metros cuadrados del área climatizada. No incluir las plantas no habitadas.   |

Figure 84 - Pre-assessment screenshot

### CONSUMO DE DATOS

Con el fin de calcular el ahorro potencial y los plazos de amortización de los periodos de inversión necesitamos su consumo actual de energía

|  |   |
|--|---|
| <input type="text" value="Calentador de agua caliente"/> | <b>Consumo de energía para</b><br>Si su sistema de calefacción incluye también el agua caliente por favor elija "Calentador w / agua caliente". Si usted tiene una caldera eléctrica sólo para la cocina elija "Calentador w / agua caliente" también. Para cualquier otra opción elegir "calefacción sin agua caliente". |
| <input type="text" value="332724"/>                      | <b>Energía térmica (kW/h / p.a.)</b><br>Por favor inserte su consumo de energía en kw / h por año. Por favor, consulte su factura de gas. Si se utiliza gasoil, por favor, calcule su consumo anual.  |
| <input type="text" value="8318"/>                        | Si usted no sabe su consumo anual, puede insertar su coste mensual de energía térmica y el sistema calculará el anual por usted. Por favor, inserte el coste mensual de su factura & euro, (EUR).   |

### LOCALIZACIÓN

Nosotros no necesitamos su dirección completa Sólo necesitamos el código postal o la ciudad con el fin de calcular medidas más precisas.

|  |   |
|--|---|
| <input type="text" value="20600 Eibar, España"/> | <b>Código postal</b><br>Por favor introduce el código postal y elegir entre el menú desplegable a continuación. |
|--|---|

Figure 85 - Pre-assessment screenshot

**STEP 2 (Action plan).** The users select the parts of the building to be renovated.

NewBEE
Wiki
Pre Evaluación
Mercado
Contacto
Mi Cuenta
Language: ES
ES\_APT

Pre-Evaluación - Medidas

Datos del edificio Medidas Resultados

#### PLAN DE ACTUACIÓN

Con el fin de simplificar las cosas le sugerimos algunas medidas estándar sobre los sistemas de calefacción. Usted tiene la oportunidad de crear y comparar hasta tres escenarios diferentes. Anímese y verá lo fácil que es ahorrar energía y reducir la huella de carbono.

Paso anterior
Siguiente paso

|                                     | Escenario 1                         | Escenario 2                         | Escenario 3                         |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> Fachada    |                                     |                                     |                                     |
| W <input type="checkbox"/> Roof     | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| W <input type="checkbox"/> Wall     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| W <input type="checkbox"/> Basement | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| W <input type="checkbox"/> Windows  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Figure 86 - Pre-assessment screenshot

| Calefacción                          |                          |                                  |                                  |
|--------------------------------------|--------------------------|----------------------------------|----------------------------------|
| W  Electro heat pump incl. hot water | <input type="radio"/>    | <input type="radio"/>            | <input type="radio"/>            |
| W  Boiler /w Petrol                  | <input type="radio"/>    | <input type="radio"/>            | <input type="radio"/>            |
| W  Boiler /w Pellets                 | <input type="radio"/>    | <input checked="" type="radio"/> | <input type="radio"/>            |
| W  Boiler /w Gas                     | <input type="radio"/>    | <input type="radio"/>            | <input checked="" type="radio"/> |
| W  Hot Water with solar              | <input type="checkbox"/> | <input type="checkbox"/>         | <input type="checkbox"/>         |

Figure 87 - Pre-assessment screenshot

**STEP 3: Results.**

At the first part of this step the owner can contrast the results. At the second part the owner can select some options. The first option is to ASK for PROPOSALS. The second option is to SAVE the calculation like a PDF and the last option is to contact with an Energy consultancy.

Figure 88 - Pre-assessment results screenshot

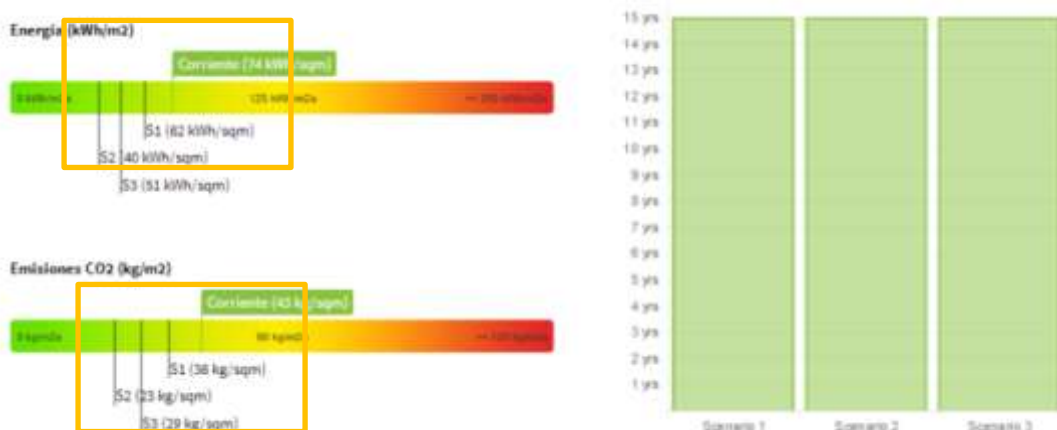


Figure 89 - Pre-assessment results screenshot

|                     |                               |                                |                                |                                       |
|---------------------|-------------------------------|--------------------------------|--------------------------------|---------------------------------------|
| Paso anterior       | Guardar como PDF              | Calcular this scenario         | Solicitar presupuesto          | Contactar con un consultor energético |
| Eliga su favorito   | Scenario 1                    | Scenario 2                     | Scenario 3                     |                                       |
| Medidas             | S1 (Eliminar Escenario)       | S2 (Eliminar Escenario)        | S3 (Eliminar Escenario)        |                                       |
| W Roof              | X                             | ✓                              | ✓                              |                                       |
| W Wall              | ✓                             | ✓                              | ✓                              |                                       |
| W Windows           | X                             | X                              | ✓                              |                                       |
| W Boiler /w Pellets | X                             | ✓                              | X                              |                                       |
| W Boiler /w Gas     | X                             | X                              | ✓                              |                                       |
| Inversión Total *   | Escenario 1 150000 €          | Escenario 2 271000 €           | Escenario 3 413000 €           |                                       |
| Savings *           | ~ 17 %                        | ~ 46 %                         | ~ 32 %                         |                                       |
| Saved KWh / a *     | 56563.08 kWh (16250.57 EUR/a) | 153053.04 kWh (43972.14 EUR/a) | 106471.68 kWh (30589.31 EUR/a) |                                       |
| Payback period *    | ~ 10 years                    | ~ 7 years                      | ~ 14 years                     |                                       |
| Paso anterior       | Guardar como PDF              | Calcular this scenario         | Solicitar presupuesto          | Contactar con un consultor energético |

Figure 90 - Pre-assessment scenario selection screenshot

The Pay-back period is: 10 – 7 – 14 years

SELECT SCENARIO: The user selects the Scenario 1.

|                     |                               |                                |                                |                                       |
|---------------------|-------------------------------|--------------------------------|--------------------------------|---------------------------------------|
| Paso anterior       | Guardar como PDF              | Calcular this scenario         | Solicitar presupuesto          | Contactar con un consultor energético |
| Eliga su favorito   | Scenario 1                    | Scenario 2                     | Scenario 3                     |                                       |
| Medidas:            | S1 (Eliminar Escenario)       | S2 (Eliminar Escenario)        | S3 (Eliminar Escenario)        |                                       |
| W Roof              | X                             | ✓                              | ✓                              |                                       |
| W Wall              | ✓                             | ✓                              | ✓                              |                                       |
| W Windows           | X                             | X                              | ✓                              |                                       |
| W Boiler /w Pellets | X                             | ✓                              | X                              |                                       |
| W Boiler /w Gas     | X                             | X                              | ✓                              |                                       |
| Inversión Total *   | Escenario 1 150000 €          | Escenario 2 271000 €           | Escenario 3 413000 €           |                                       |
| Savings *           | ~ 17 %                        | ~ 46 %                         | ~ 32 %                         |                                       |
| Saved KWh / a *     | 56563.08 kWh (16250.57 EUR/a) | 153053.04 kWh (43972.14 EUR/a) | 106471.68 kWh (30589.31 EUR/a) |                                       |
| Payback period *    | ~ 10 years                    | ~ 7 years                      | ~ 14 years                     |                                       |
| Paso anterior       | Guardar como PDF              | Calcular this scenario         | Solicitar presupuesto          | Contactar con un consultor energético |

Figure 91 - Pre-assessment scenario selection screenshot



**OPTION 1:** Click to the button **“ASK FOR PROPOSALS”**. (At STEP 3 of PAT)



Figure 92 - Pre-assessment scenario selection screenshot

At first to request a proposal it should be connected to the platform NewBEE.



Figure 93 - Login screenshot



PUBLISH you offer

NewBEE
Wiki
Pre Evaluación
Mercado 23
Contacto
Rakel Borrega

Publica tu convocatoria

Iniciar sesión » Publica tu convocatoria »

?

NO IMAGE

### AÑO DE CONSTRUCCIÓN

|                                   |  |
|-----------------------------------|--|
| Ubicación                         | 20600 Eibar, España                              |
| Número de viviendas               | Multi-family house with up to eight apartments ▼ |
| Tipo de Edificio                  | Block of flats ▼                                 |
| Año de Construcción               | después de 2000 ▼                                |
| Plantas                           | 5,5 ▼  |
| Material de construcción          | Bitumen roofing ▼                                |
| Fachada                           | Masonry ▼  |
| Propiedad                         | Housing association ▼                            |
| Número de Ocupantes               | 40   |
| Área calefactada/climatizada      | 4,480 m <sup>2</sup>                             |
| Consumo Eléctrico                 | 0 kWh  |
| Consumo calefacción/climatización | 332,724 kWh                                      |

Figure 94 - Marketplace screenshot

|                               |  |
|-------------------------------|--|
| Imagen de casa/edificio       | <input type="button" value="Seleccionar archivo"/> DSCN3380.JPG                                    |
| Planos y archivos adicionales | <input type="button" value="Elegir archivos"/> Ningún archivo seleccionado<br>Ficheros (maximo 3): |

### DESCRIPCIÓN

|                                 |  |
|---------------------------------|--|
| <b>Problema identificado en</b> | <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <input checked="" type="checkbox"/> Facade       </div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <input checked="" type="checkbox"/> Moisture and microbe growth       </div> <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <input checked="" type="checkbox"/> Thermal comfort       </div> <div style="border: 1px solid #ccc; padding: 5px;"> <input checked="" type="checkbox"/> Energy efficiency       </div> |
| <b>Tecnología</b>               | <div style="border: 1px solid #ccc; padding: 5px; margin-bottom: 5px;"> <input checked="" type="checkbox"/> External wall, external thermal insulation       </div>  |
| Fecha Tope                      | 29.07.2015   |
| Title                           | test   |
|                                 | test   |

Figure 95 - Marketplace screenshot

Select the Services and the Necessary disciplines. Click to Public and to finalize click PUBLISH

**DISCIPLINAS NECESARIAS**

- Carpenter work
- Element work
- Facade renovation i
- Insulation of basement i
- Masonry work i
- Refurbishment
- Roofing (Bitumen Roofs) i
- Roofing (Brick Roofs) i
- Roofing (Change Work) i
- Roofing (Steel Roofs) i
- Windows assembly i

**VISIBILIDAD**

Público  
 Oculto

Publicar
Cancelar

Figure 96 - Marketplace screenshot

Look "My offers".

Mis ofertas

[Inicio](#) > [Publica tu oferta](#) > [Mis ofertas](#) >

Tu anuncio en la Artigeta 2 ha sido publicado.

**OFERTAS ACTUALES**

| Comunidad Autónoma  | Tipo de edificio   | Disciplinas                       | Servicios                          | Actividades                       |
|---------------------|--|-----------------------------------|------------------------------------|-----------------------------------|
| 20600 Eibar, España | Block of flats<br><small>18.000,0 sqm / 5 floors</small> | Facade renovation<br>Masonry work | Architectural design<br>Inspection | 2049 visits<br>0 SME's interested |

Figure 97 - Marketplace screenshot

| Comunidad Autónoma  | Tipo de edificio  | Disciplinas  | Servicios  | Actividades                       |
|---------------------|---|--|--|-----------------------------------|
| 20600 Eibar, España | Block of flats<br>4480,0 sqm / 5,5 floors<br>Multi-family house with up to eight apartments | Element work<br>Facade renovation<br><a href="#" style="color: green; text-decoration: none;">Show all</a> | Architectural design<br>Conditions tests & surveys and monitoring<br><a href="#" style="color: green; text-decoration: none;">Show all</a> | 2049 visits<br>0 SME's interested |

Figure 98 - Marketplace screenshot

**OPTION 2:** Click to the button **“CALCULATE THIS SCENARIO”**. (At STEP 3 of PAT)

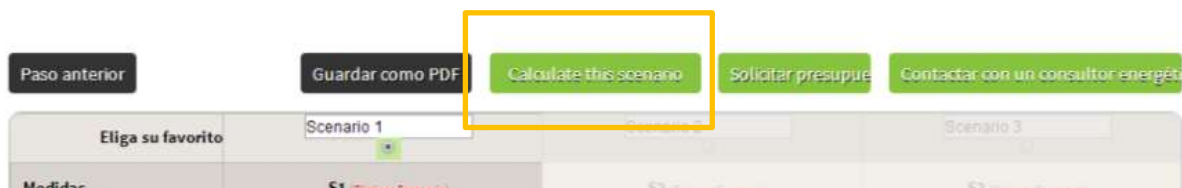


Figure 99 - Scenario selection screenshot

Enter data at the financial model calculator.

**NewBEE** | Wiki | Pre Evaluación | Mercado | Contacto | Mi Cuenta | Language: ES | ES\_APT

## Calculo del nuevo modelo financiero - Nuevo Modelo

### GENERE SUS MODELOS FINANCIEROS

Selección de diferentes oportunidades financieras, el módulo permite a los usuarios generar modelos financieros acompañados de información cuantitativa y estructurada que les ayudan a entender mejor los aspectos financieros del proyecto.

|  |   |
|--|---|
| <input type="text" value="Comunidad Vecinos ARTEGIETA 3-5"/> | <b>Título</b><br>Por favor, inserte un título para el análisis.   |
| <input type="text" value="150000"/>                          | <b>Inversión (EUR)</b><br>Por favor, inserte el coste estimado del proyecto.  |
| <input type="text" value="10"/>                              | <b>Años de inversión (Years)</b><br>Por favor, inserte el tiempo de vida útil del proyecto.   |
| <input type="text" value="0.5"/>                             | <b>% Interés (%)</b><br>Por favor, introduzca el porcentaje de descuento.<br><a href="#">Click here to learn more about "discount rate"</a> . |

Own Capital     Loan     ESCO

**Reducción de impuestos**  
Por favor, seleccione esta opción si se aplican reducción de impuestos en su país / región.

Figure 100 - Financial model screenshot

**Subvenciones**  
Por favor, seleccione esta opción si las subvenciones están disponibles en su país / región.

**Normal**     **Advanced**

**Ahorros anuales (EUR)**  
Por favor, inserte los ahorros previstos (€) relacionados con el proyecto.

[Back to the overview](#)

Figure 101 - Financial model screenshot

At this project there aren't tax reduction and subsidies.

See the results

NewBEE
[Wiki](#)
[Pre Evaluación](#)
[Mercado](#)
[Contacto](#)
[Mi Cuenta](#)
Language: [ES](#) / [ES\\_APT](#)

Financial Model Calculator

**COMUNIDAD VECINOS ARTEGIETA 3-5**

Figure 102 - Financial model screenshot

La tabla muestra los flujos de efectivo esperados por el proyecto durante su vida útil. El gráfico representa gráficamente la salida/entrada anual y los ahorros acumulados generados por el proyecto.

|           |           |                                   |               |
|-----------|-----------|-----------------------------------|---------------|
| Inversión | 150000 €  | Tipo Finanzas                     | Own capital   |
| % Interés | 0.5 %     | TIR                               | 1.4 %         |
| VAN       | 8124.75 € | Tiempo de retorno de la inversión | 9.23045 years |

| Años   | Los gastos anuales | Ahorro anual    | VAN Salida       | VAN Entrada        |
|--|--------------------|-----------------|------------------|--------------------|
| 0  | -150000 €          | 0 €             | -150000 €        | 0 €                |
| 1  | 0 €                | 16250.6 €       | 0 €              | 16169.75 €         |
| 2  | 0 €                | 16250.6 €       | 0 €              | 16089.3 €          |
| 3  | 0 €                | 16250.6 €       | 0 €              | 16009.26 €         |
| 4  | 0 €                | 16250.6 €       | 0 €              | 15929.61 €         |
| <input type="button" value="Muestra más datos"/> |                    |                 |                  |                    |
| <b>Suma</b>                                      | <b>-150000 €</b>   | <b>162506 €</b> | <b>-150000 €</b> | <b>158125.02 €</b> |

Figure 103 - Financial model screenshot

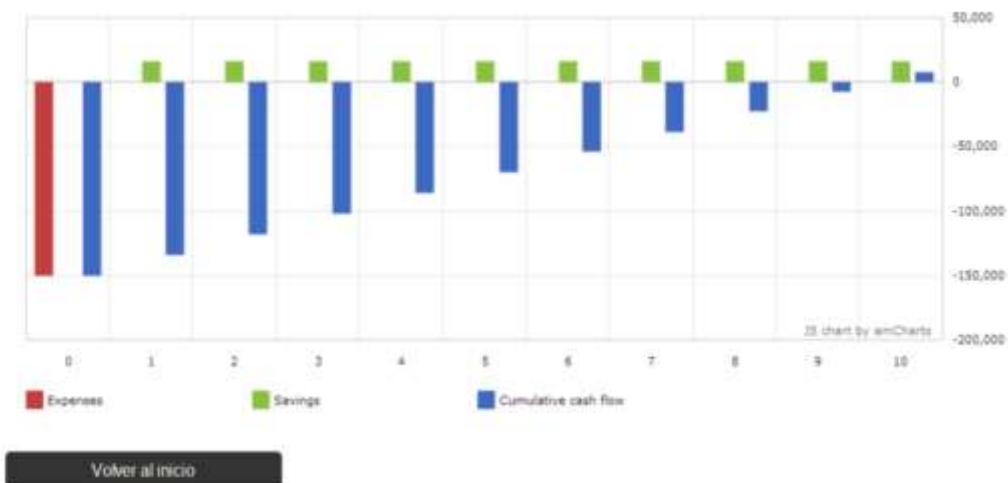


Figure 104 - Financial model screenshot

Selection of different financial opportunities. The module allows users to generate various financial models accompanied by budgetary and environmental information

NewBEE
Wiki
Pre Evaluación
Mercado
Contacto
Mi Cuenta
Language: ES
ES\_APT

## Cálculo Financiero

### GENERA TUS MODELOS FINANCIEROS

Selección de diferentes oportunidades financieras; el módulo permite a los usuarios generar modelos financieros acompañados de información cuantitativa y estructurada que les ayudan a entender mejor los aspectos financieros del proyecto.

Nuevo cálculo

| Título                            | Modelo financiero | Inversión | Años de inversión | Tiempo de retorno de la inversión | Ahorro energético inicial | NPV     | IRR   | Impuestos | Subvenciones |
|-----------------------------------|-------------------|-----------|-------------------|-----------------------------------|---------------------------|---------|-------|-----------|--------------|
| Artegieta 3-5                     | Own Capital       | 150000    | 10                | 9.23045                           | 16250.6                   | 8124.75 | 0.014 | 0         | 0            |
| Comunidad Vecinos Artegieta 3 - 5 | Own Capital       | 150000    | 10                | 9.07959                           | 16520.6                   | 10752   | 0.017 | 0         | 0            |
| Comunidad Vecinos ARTEGIETA 3-5   | Own Capital       | 150000    | 10                | 9.23045                           | 16250.6                   | 8124.75 | 0.014 | 0         | 0            |

Nuevo cálculo

Figure 105 - Financial model screenshot

**OPTION 3:** Click to the button “ENERGY CONSULTANCY”. (At STEP 3 of PAT)



Figure 106 - Scenario selection screenshot

Is the same as ASK for PROPOSALS. At the problem description you must include the option “Energy efficiency” and at Necessary disciplines the user must click to “Energy auditing” and “Energy design and Life Cycle management”.



Figure 107 - Marketplace screenshot



Figure 108 - Marketplace screenshot



Figure 109 - Marketplace screenshot



Now the user has two OFFERS: One for the renovation of the façade and the other one for the Energy consultancy.

**Registered users**

If the owner (registered user) enter the offer through the MP, there are two possibilities: Create a new business opportunity or to check current and finished offers.



Figure 110 - Marketplace screenshot

1. Create a New Business Opportunity

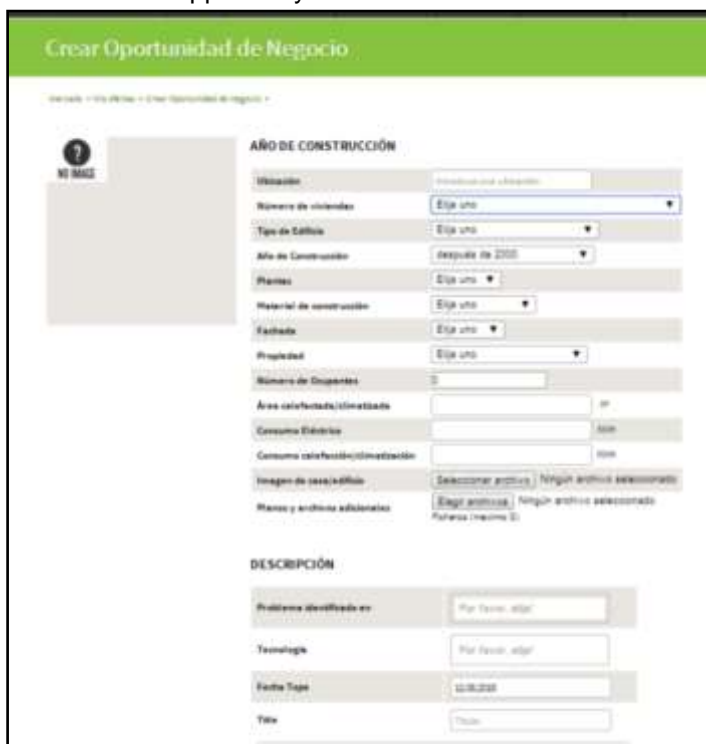


Figure 111 - Page of business opportunity

2. Look My Offers

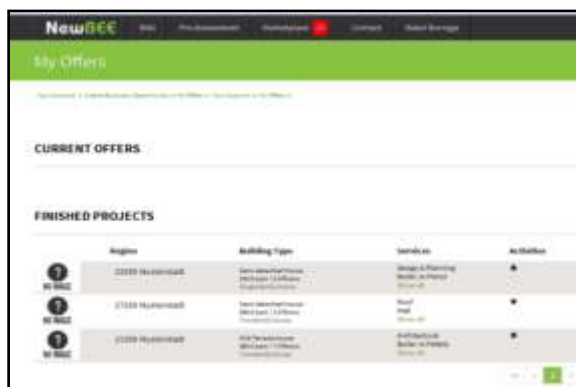


Figure 112 - Page of My Offers.

**6.2.2.2 STEP 2: Business model generator - SME (SME WORKFLOW)**

To describe the scenario S3 (SME point of view) continue the following work flow. Here is the workflow of a SME that came into the NewBEE tool. The first column describes the access to the wiki. The second and the third columns are the options to create a new business model. We will start with the access through the PAT.

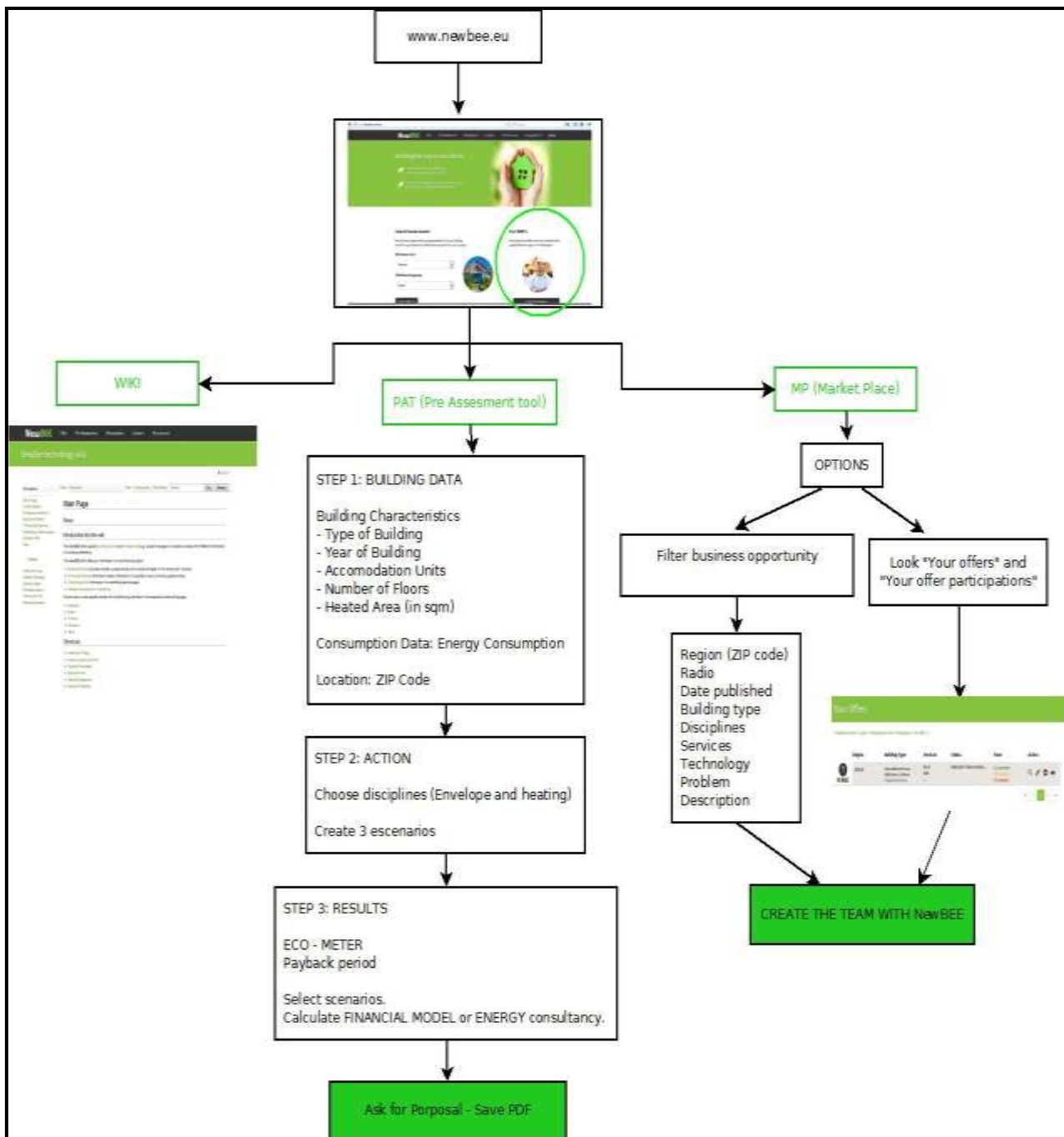


Figure 113 - SME workflow.

Just after starting the platform ESLABAN receives “Closest jobs” to the address off the Company. Here is the possibility to filter more business opportunity.



Figure 114 - Market place homepage.

Show details of owner and create a team.

- Click to “Contact owner”



Figure 115 - Marketplace owner selection screenshot



Figure 116 - Marketplace owner selection screenshot

- Click to “Create team”

| Servicios   | Fecha de publicación desde | Fecha Tope | Acciones  |
|---|----------------------------|------------|---|
| Energy auditing<br>Energy design and life cycle management              | 26.07.2015                 | 04.08.2015 |  → |
| Architectural design<br>Construction and refurbishment<br>Mostrar todas | 26.07.2015                 | 01.08.2015 |  → |

Figure 117 - Marketplace create team screenshot

Create the offer – Create Business opportunity.

| FECHA DE CONSTRUCCIÓN             |  |
|-----------------------------------|--|
| Ubicación                         | 20600 Eibar, España,                           |
| Número de viviendas               | Multi-family house with up to eight apartments |
| Tipo de construcción              | Block of flats                                 |
| Fecha de construcción             | después de 2000                                |
| Área calefactada/climatizada      | 4.480 m <sup>2</sup>                           |
| Plantas                           | 5,5  |
| Number of Occupants               | 40   |
| Main Building Material            | Bitumen roofing                                |
| Facade                            | Masonry  |
| Consumo eléctrico                 | 0 KWh  |
| Consumo calefacción/climatización | 332.724 KWh                                    |
| Publicado                         | 29.07.2015                                     |
| Visibilidad                       | Público  |

Figure 118 - Marketplace opportunity creation screenshot

|                         |   |
|-------------------------|---|
| Deadline for Contracts  | 29.07.2015  |
| Problemas Identificados | Facade<br>Moisture and microbe growth<br>Thermal comfort<br>Energy efficiency |
| Tecnologías Necesarias  | External wall, external thermal insulation                                    |
| Descripción             | test  |

Figure 119 - Marketplace opportunity creation screenshot

Click to the pencil if you want to choose another company.

**EQUIPO DE PROYECTO**

**Añadir**  
The following most highly rated and nearest team members have been found around the Business Opportunity's location

| Disciplina / Servicio necesario           | Empresa                          | Distancia | Clasificación | Editar |
|---|----------------------------------|-----------|---------------|--------|
| Element work                              | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Facade renovation                         | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Insulation of basement                    | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Masonry work                              | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Refurbishment                             | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Roofing (Bitumen/Roofs)                   | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Roofing (Change Work)                     | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Architectural design                      | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Conditions tests & surveys and monitoring | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Construction and refurbishment            | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Energy auditing                           | <a href="#">Biller wisselatz</a> | 30 km     | ★★★★★         |        |
| Inspection                                | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Project management                        | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Project planning                          | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |
| Supervision                               | <a href="#">E31</a>              | 1,52 km   | ★★★★★         |        |

[Connect again](#) [Cancel](#)

Figure 120 - Team creation screenshot

### EQUIPO DE PROYECTO

**Ayudar**  
The following most highly rated and nearest team members have been found around the Business Opportunity's location

| Disciplina / Servicio necesario | Empresa | Distancia | Clasificación       | Editar |
|---------------------------------|---------|-----------|---------------------|--------|
| Element work                    | ESL     | 1,32 km   | ☆☆☆☆☆ 0/3 aceptados |        |

**ELEMENT WORK**

| Empresa      | Distancia | Clasificación       | Editar                    |
|--------------|-----------|---------------------|---------------------------|
| ESL          | 1,52 km   | ☆☆☆☆☆ 0/3 aceptados | Añadir Miembro del Equipo |
| Estimant     | ,05 km    | ☆☆☆☆☆ 0/3 aceptados | Añadir Miembro del Equipo |
| Boiler w/gas | 14,51 km  | ☆☆☆☆☆ 0/3 aceptados | Añadir Miembro del Equipo |

Compañía seleccionada no encontrada? Buscarmás aquí!

|                   |     |         |                     |  |
|-------------------|-----|---------|---------------------|--|
| Facade renovation | ESL | 1,52 km | ☆☆☆☆☆ 0/3 aceptados |  |
|-------------------|-----|---------|---------------------|--|

Figure 121 - Team creation screenshot

To finalize click in CREATE TEAM.

Look "Your Offers".

## Tus Ofertas

Mercado » Mercado » Editar tu Oferta » Tus Ofertas »

El equipo para la oferta test se ha creado y se han enviado las invitaciones.

| Comunidad Autónoma  | Tipo de Edificio  | Disciplinas                              | Servicios  | Estado                      | Equipo  | Acción |
|---------------------|---|--|--|-----------------------------|---|--------|
| 20600 Eibar, España | Block of flats<br>70.0 sqm / 5.5 floors<br>Multi-family house with up to eight apartments   | Facade renovation<br>Masonry work<br>... | Architectural design<br>Construction and refurbishment<br>...            | Waiting for Team member ... | 0/8 accepted<br>0/8 pending<br>0/8 rejected     |        |
| 20600 Eibar, España | Block of flats<br>4480.0 sqm / 5.5 floors<br>Multi-family house with up to eight apartments | Element work<br>Facade renovation<br>... | Architectural design<br>Conditions tests & surveys and monitoring<br>... | Waiting for Team member ... | 0/15 accepted<br>15/15 pending<br>0/15 rejected |        |

<< < 1 > >>

**?** **Help**  
The above listed offers represent offers to a specific business opportunity you found on the marketplace and which have thus been initialized by you. Observe needed disciplines, services and the status of the team members which you invited to collaborate.

Figure 122 - Your offers screenshot

Offer reach to the owner. Wait until the owner decides which team performs the work.



**6.2.2.3 STEP 3: Business model generator – OWNER - SME.**

Enter at the platform

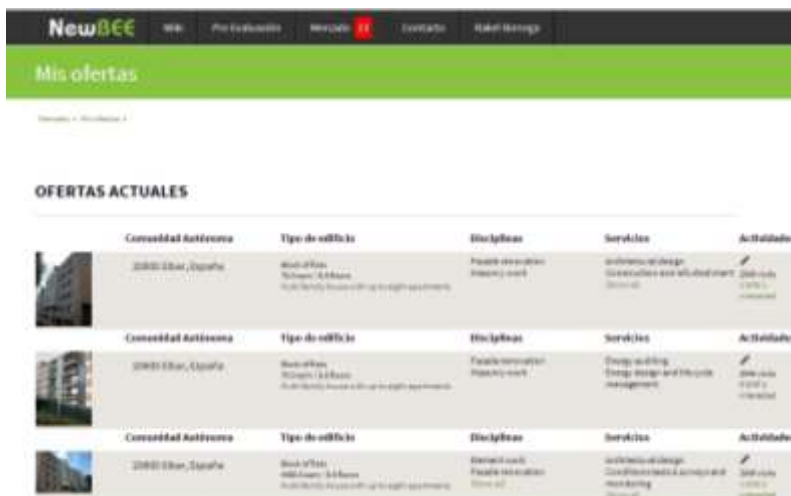


Figure 123 - Business model generator screenshot

The user has an offer for 1 SME. One SME is interested at the project.



Figure 124 - Marketplace screenshot



Figure 125 - Marketplace screenshot

If the owner decides to choose our company, the cycle of creation of the new business model closes.

Negotiations begin to be between the owner and the companies that create the team. The union of these companies in team and the customer guidance received would finish to define the cycle of creation of the new business model with NewBEE platform.

### 6.3 Business model

#### 6.3.1 ORGANISATIONAL MODEL

##### 6.3.1.1 Description

The business model elaboration for respective project activities has to be supported by guidelines and templates to ensure that SMEs of the VBE are able to succeed with their business evolution in the future. The Osterwalder business canvas will be the framework for the business model evolution. The canvas of the Scenario S3 is presented in the illustration below.

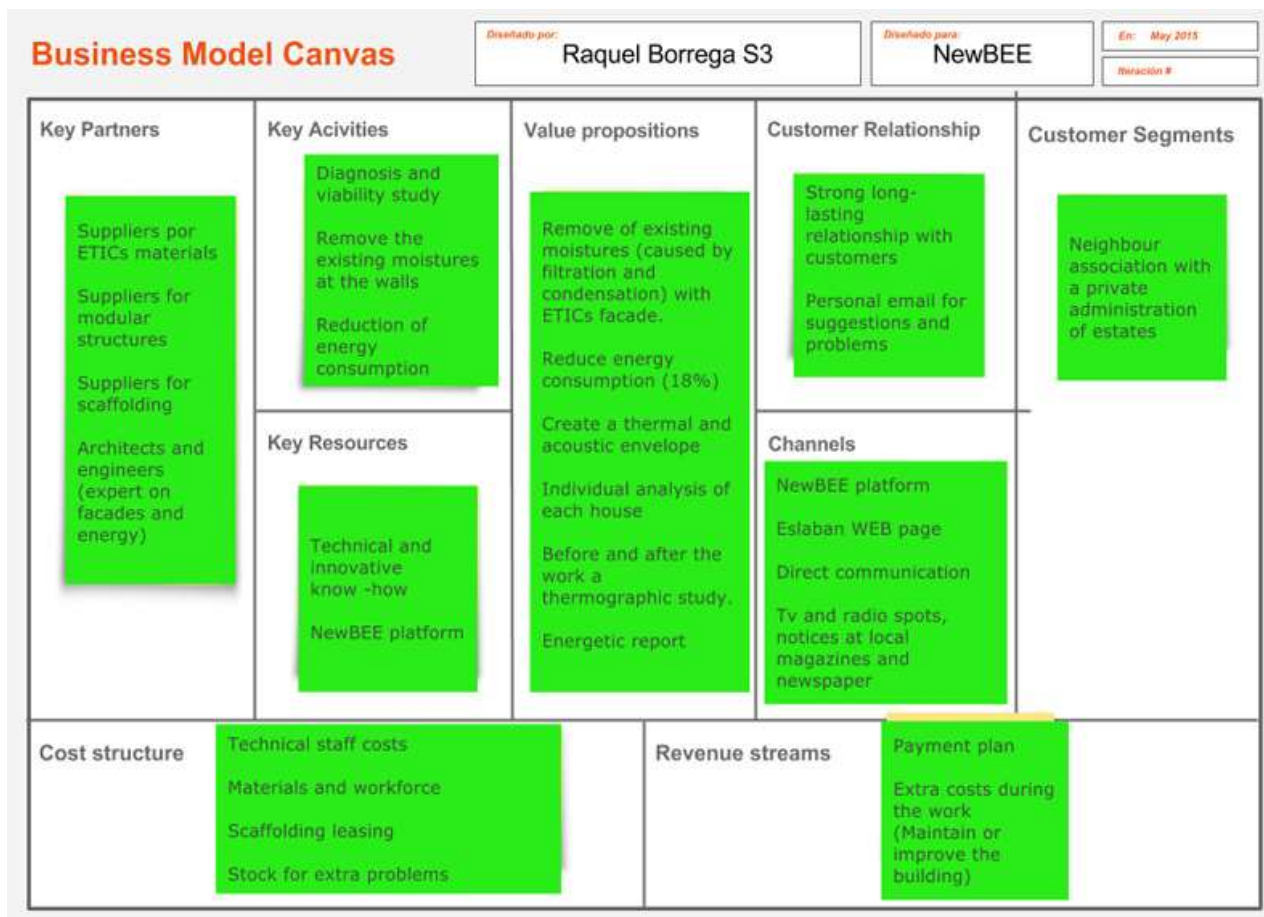


Figure 126 - Canvas for Scenario 3 (Spanish BC)

##### 6.3.1.2 Customer segments

NewBEE Business models will focus mainly on new business models and services for refurbishment of residential buildings. The Scenario 3 of the Spanish BC describes a Multi-dwelling building owned by a community association of housing companies.

##### 6.3.1.3 Customer Relationship

At ESL we decided years ago that we need to determine one person to be responsible for the customer care. If needed, the responsible person should act as mediator between workforce and technicians to ensure a common understanding.

#### **6.3.1.4 Customer Channel**

The analysis of aspects related to the customer channel reveals the low awareness of the customer. In addition to traditional channels for commercials, the NewBEE platform could provide structured country-specific information for the different customer groups and building types.

#### **6.3.1.5 Key partners**

The claim of the NewBEE platform should be to assist companies in finding business opportunities, selecting the most qualified partners based on assessment criteria, providing different kind of information on network management and collaboration in general and enabling collaboration in one synchronised process. The problems concerning collaboration are diverse. Examples mentioned by the partners are closer collaboration between energy consultants, designers and institutes in the field of energy efficiency analysis or better engagement of designers and city authorities in the planning process. New collaboration schemes have to consider mechanism providing enough securities for adopting long-term guarantees also in small company associations.

A main driver for the growing importance of SME collaborations in building refurbishment is the application of sophisticated technologies. The collaboration scheme identified for respective projects should enable networks to offer holistic solutions to customers due to the presence of specialised SMEs with in-depth technological know-how and their contribution to the value chain organisation that manages all the requirements from different trades towards the selected retrofitting technology. Furthermore, the NewBEE platform should assist companies to identify appropriate partners and attract new partners with complementary skills to join the VBE.

#### **6.3.1.6 Key resources**

The research work should foster collaboration for specific projects (e.g. support the partner selection) but also give guidance concerning SME networks on business model development, financial schemes or retrofitting technologies.

#### **6.3.1.7 Key activities**

Related to the key resources mentioned above, the research activities in the NewBEE should support SMEs in setting-up successful collaborations by means of best class guidelines, templates or best practices for network set-up including technology determination and selection of financial models and organisational archetypes.

### 6.3.1.8 Characteristics

Table 3 - Business characteristics

| Characteristics                 | Main Application Area                                  |
|---------------------------------|--|
| Ownership of the real estate    | Private owner with administration of estates (private) |
| Size of property/ building type | Residential building. With 40 accommodation units.     |
| Retrofitting costs              | < 500 k €  |
| Time constraints                | Important. We signed at the contract.                  |
| Project size                    | Large project  |

#### 6.3.1.9 Ownership of the real estate

It has to be taken into account that the type of ownership influences the collaboration mechanism in the retrofitting project. In this scenario the ownerships are **private owners** normally not experienced in conducting a retrofitting project, with the help in organisation of a housing company (Administration of estates)

#### 6.3.1.10 Size of property/ building type

The building of the scenario is a **residential building with more than 2 units**. According to the definition of building typologies from work package 1 (deliverable 1.1), NewBEE partners differentiate between 1-2 units and more than 2 units for residential buildings, but there are 40 house owner units.

#### 6.3.1.11 Retrofitting costs

Retrofitting costs are related with the size and complexity of the project. In this case we considered it like a **large project** for an SME, because requires powerful project teams, sophisticated risk-benefit mechanisms, specific contract types and corporate forms as well as explicit management structures.

#### 6.3.1.12 Time constraints

Regarding the project, the **time component** might be one of the most critical measures. In this scenario the time was very important for owners, and one of the parts of the contract between customer and SME was the lead time.

#### 6.3.1.13 One hub towards the customer during the whole project

For the work team the communication with the customer was very important. We created a personal email where customers could ask for suggestions and problems. This email was managed by the architect and the engineers of the company.

#### 6.3.1.14 Detailed requirements engineering

Differences between customer expectations and the as-build result arise often due to missing or insufficient **requirements engineering**. In addition to the expectations of the customer, the experience of building users and, if possible, facility managers should be considered for the to-be definition of the building. Their knowledge on weak spots in the building might positively influence the to-be design of the building.

#### 6.3.1.15 Holistic service portfolio

Especially private investors (the same as this case) are interested to **get support** not only for planning and construction but also for communication with other stakeholders such as neighbours and authorities.

#### 6.3.1.16 Guaranteed construction time

A **guaranteed construction time** is sometimes more important than a guaranteed maximum price. Like in this scenario for tenants and owner occupiers it is highly important that the construction works are

finished in the shortest time possible. We gave a guarantee that we finish the works in 8 months, and we finished it in 6 months.

**6.3.1.17 Team and partnering concepts**

New business models have to support team and partnering concepts to enable a win-win situation for all stakeholders in the value chain and a fair competition in the market. Many studies and success stories show that an important lever in the construction industry is the applied collaboration mechanism.

**6.3.2 VALUE CHAIN COVERAGE**

The concept of a value chain has assumed a good position in the strategic analysis of the construction sector. Value creation has the aim of capturing the maximum value-added in financial terms, and the supply or workforce chain view aims for designing operationally efficient supply chains. There is a difference between the planned value chain at first and the last value chain at work in the building. Because of that, we only explain the value chain between the idea and the building operation, including the documentation and organisation of the business model.

At this chain there are 3 areas: (1) the study of value proposition (idea and concept development including the tender phase) (2) the operational footprint decisions for planning, documentation and management and (3) the normal building operation.

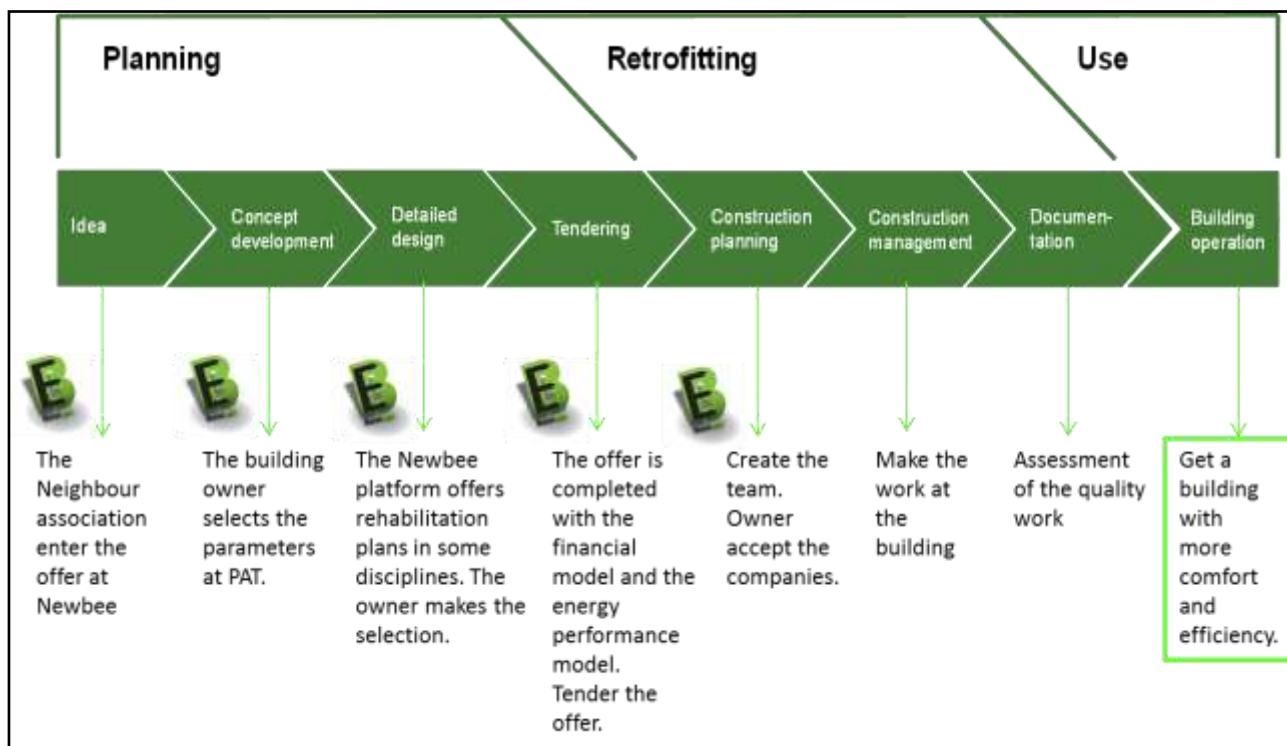


Figure 127 - Copy for an email that invites to participate in a NewBEE project.

### 6.3.3 COLLABORATION MATRIX

For more than 10 years, ESLABAN has been active as a general and total-service contractor, due to its experience. As a general and total-service contractor, we execute complex projects for old buildings, as well as modifications and renovation, with a focus on the housing and public sector.

We view ourselves as optimizers of quality and work processes, and simultaneously, as risk minimizers. The strict observance of agreed-upon costs and deadlines gives our clients the necessary security. The long business partnerships with subcontractors over the years help us to achieve our goals.

A Total Contractor is a one-stop shop project coordinator under a single contract sometimes also called general (coordinating) contractor or master contractor. ESL develops a differentiation through innovations and implementation of new inputs in any projects in progress, such as method of design and build. In this method, ESL takes roles as both the main contractor and provider of integrated design team from the commencement of the project. This way, customers do not necessarily deal with other parties as all needs have already been handled by one party as a coordinator. This results in positive impacts on the cost incurred by the customers, as well as the risk mitigation of cost increases and the assurance that the completion project will be delivered on schedule.

ESL at the construction sector focuses on the cooperation between the Company, clients and partners of other companies. The Company designs and builds various projects (Rehabilitation of facades and roofs installation of lifts, energy improvements). These services include:

- Roles and responsibilities as the Main Contractor.
- Coordinating internal design team (technical office) and third party consultants, such as: architects, structures, scaffoldings.
- Daily monitoring of all aspects during the construction process.

Just like the total construction manager, the total contractor is commissioned by the client with planning and execution work. Unlike the total construction manager, however, he performs part of the work itself. Similar to the total construction manager, he also bears overall responsibility.

Total Contractor have to cover the aspects requirements engineering, management of planning and execution, cost calculation and technical system integration

The next collaboration matrix illustrates the design-build contractual relationship in which a single company is responsible for both design and construction. The owner pays the project cost and, in return, receives the completed project from the design-build contractor.



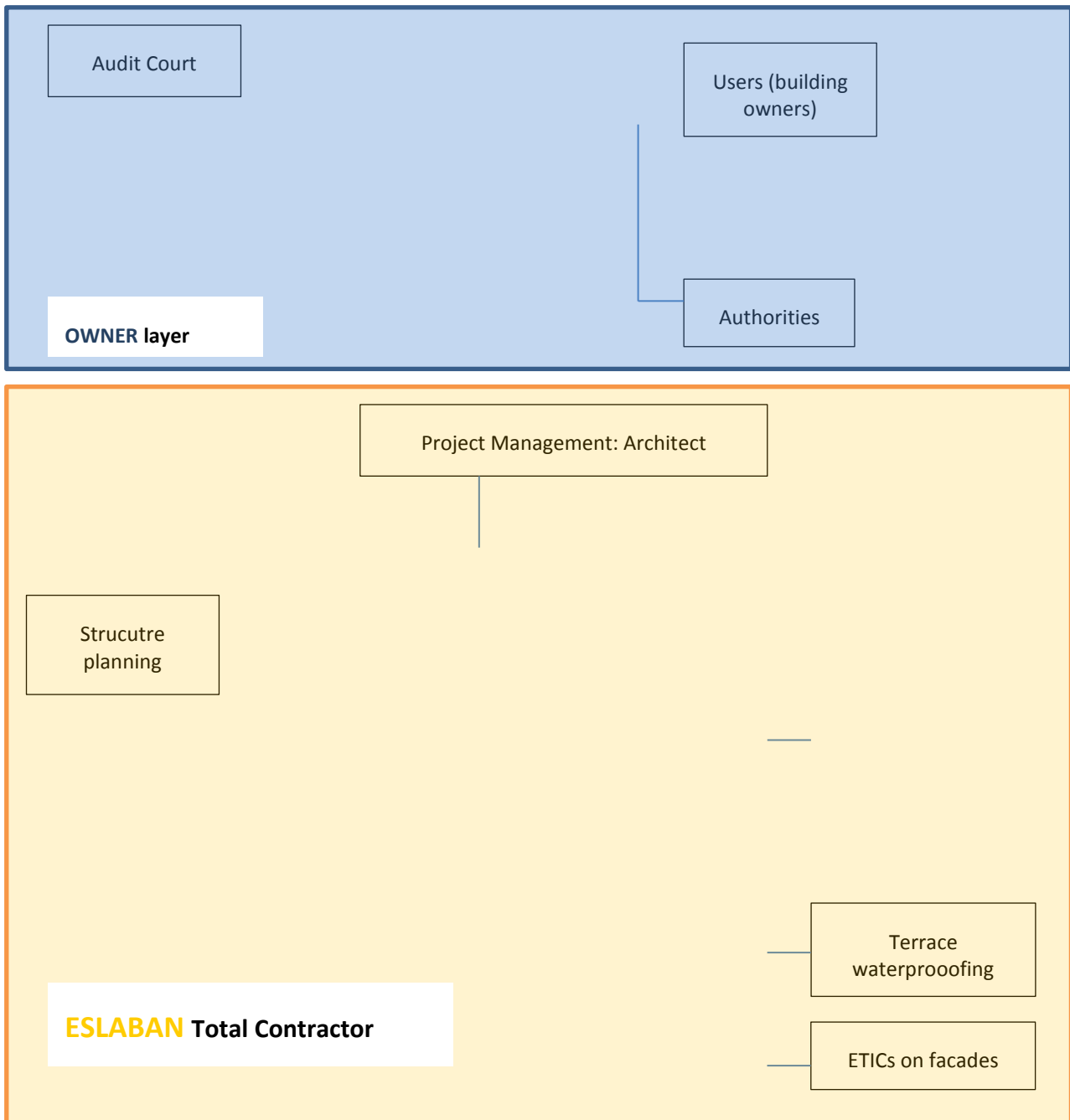
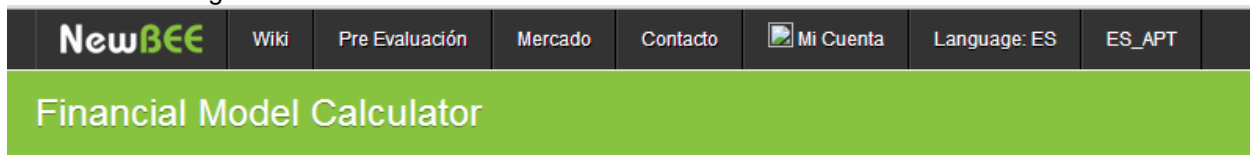


Figure 128 - ESLABAN Collaboration matrix (total contractor)

### 6.3.4 FINANCIAL MODEL

Financial model is extracted from NewBEE and based on the information given for the user. Calculations using the tool:



#### COMUNIDAD VECINOS ARTEGIETA 3-5

Figure 129 - Financial model calculator screenshot

a. The table shows the expected cash flows from the project over its lifetime.

Volver al inicio

|                  |           |  |               |
|------------------|-----------|--|---------------|
| <b>Inversión</b> | 150000 €  | <b>Tipo Finanzas</b>                     | Own capital   |
| <b>% Interés</b> | 0.5 %     | <b>TIR</b>                               | 1.4 %         |
| <b>VAN</b>       | 8124.75 € | <b>Tiempo de retorno de la inversión</b> | 9.23045 years |

| Años              | Los gastos anuales | Ahorro anual | VAN Salida | VAN Entrada |
|-------------------|--------------------|--------------|------------|-------------|
| 0.                | -150000 €          | 0 €          | -150000 €  | 0 €         |
| 1.                | 0 €                | 16250.6 €    | 0 €        | 16169.75 €  |
| 2.                | 0 €                | 16250.6 €    | 0 €        | 16089.3 €   |
| 3.                | 0 €                | 16250.6 €    | 0 €        | 16009.26 €  |
| 4.                | 0 €                | 16250.6 €    | 0 €        | 15929.61 €  |
| Muestra más datos |                    |              |            |             |
| <b>Suma</b>       | -150000 €          | 162506 €     | -150000 €  | 158125.02 € |

Figure 130 - Financial Model generator screenshot

b. The graph represents the outputs / inputs and accumulated annual savings generated by the project

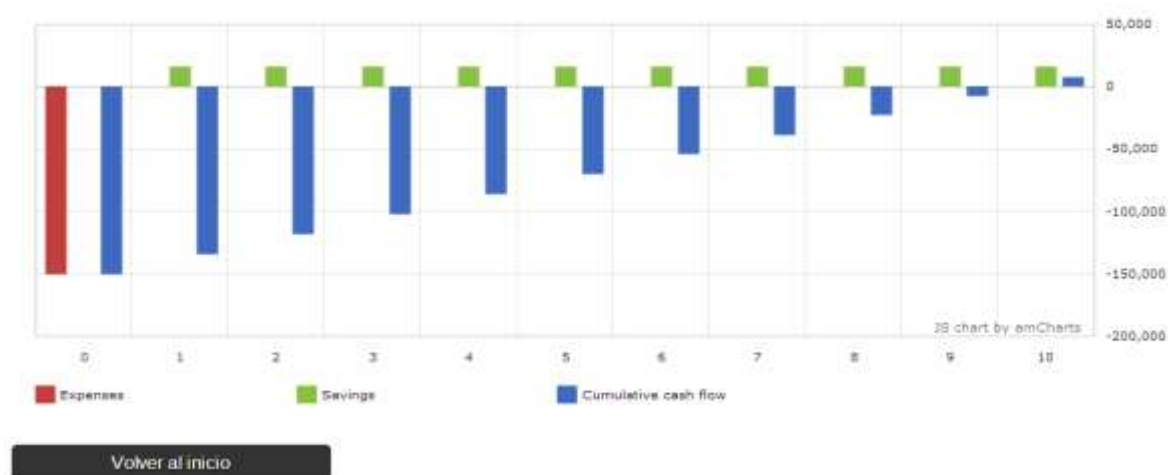


Figure 131 - Financial model screenshot

## 7 S4: The MEEFS project for testing the E-PASS tool.

---

### 7.1 Description

The target of this study is to demonstrate that the technology is useful by using as study object an apartment building located in Merida (Spain). This building has been retrofitted using a mix of technologies and the consequences of each one in the building performance have been separated so that they can be used for comparing the data obtained in this study with a realistic use case in which a customer wants to know beforehand the behaviour he can expect. The comparison between the results given by the MEEFS study and the results from the NewBEE platform can provide us with an idea of how well the approach works. Specifically it is going to be tested the E-PASS tool for comparing energy data as well as the economic ones.

### 7.2 Business case flow

The business case flow can be described as follows:

1. An owner realizes that the building in which he lives needs retrofitting and he is considering taking advantage of the situation for making the insulating of the building façade at the same time that he tackles the structural work.
2. The owner seeks for a provider who can advise him on what improvements in the energy performance of the building is possible to get. These savings will determine the time lapse in which the amortization of the system will be done.
3. When he looks for providers in its neighborhood he ends up with a small provider that usually acts as a total contractor (**D4.2 reference**).
4. This “total contractor” is not used to this type of work (to improve the building insulation), but he knows of a platform that could help him to have a complete organizational model for accomplishing the task as well as giving him arguments for convincing the customer to accept his offer. The NewBEE platform.
5. For getting arguments of the benefits that the customer can expect using the E-PASS tool.

For doing so he makes the following procedure:

- a. In the first webpage the “total contractor” writes data related to the characteristics of the building that is going to be retrofitted.
- b. In the second one some values for the actual consumption are proposed. Then the customer verifies that the values that the tool gives for energy consumption are wrong. The tool gives the chance of editing additional details regarding the characteristics of the building that are supposed in the first iteration. The “total contractor” just clicks on the button “Edit more details”.
- c. The “total contractor” realizes then that in the huge amount of parameters there are some values that are wrong assumed:
  - i. The “Window Type” the apartment has is “SINGLE” instead of the kind assumed “SELECTIVE TRIPLE”.
  - ii. The window area for the south orientation is different from the proposed, so he changes it by changing the value of “WindowAreaCoefficientForSouth” to 0.5 and the proportion between the window and the floor areas.
  - iii. Regarding the ventilation, the “Air flow” per hour is not properly set. The actual value is 1 entire renovation per hour.
  - iv. As there is not a heat recovery system, the value of “Heat recovery efficiency” is set to 0.
  - v. The number of “Occupants” is set to 1.
  - vi. The Schedule has to be set for expressing the fact that on workdays the occupation of the building is of half the day, so that the customer fills the form with a value of 0.5 for workdays. For Saturday and Sunday he writes 0.7. Despite the possibility of segmenting the occupation in two different parts, it is not needed since we have an occupancy factor that can be used to express that a person is not always at home.

6. Once the “total contractor” pushes the button “Save details”, the system goes back and remakes the calculations offering once more the Step 2, but this time with the new parameters included. The customer realizes that the new calculated results for the consumption are more accurate.
7. The “total contractor” then goes ahead and goes to the Step 3 in which he has to decide which retrofitting work is better for him. When he sees the options, the only one he selects is the “Retrofit of the thermal insulation in outside walls”.

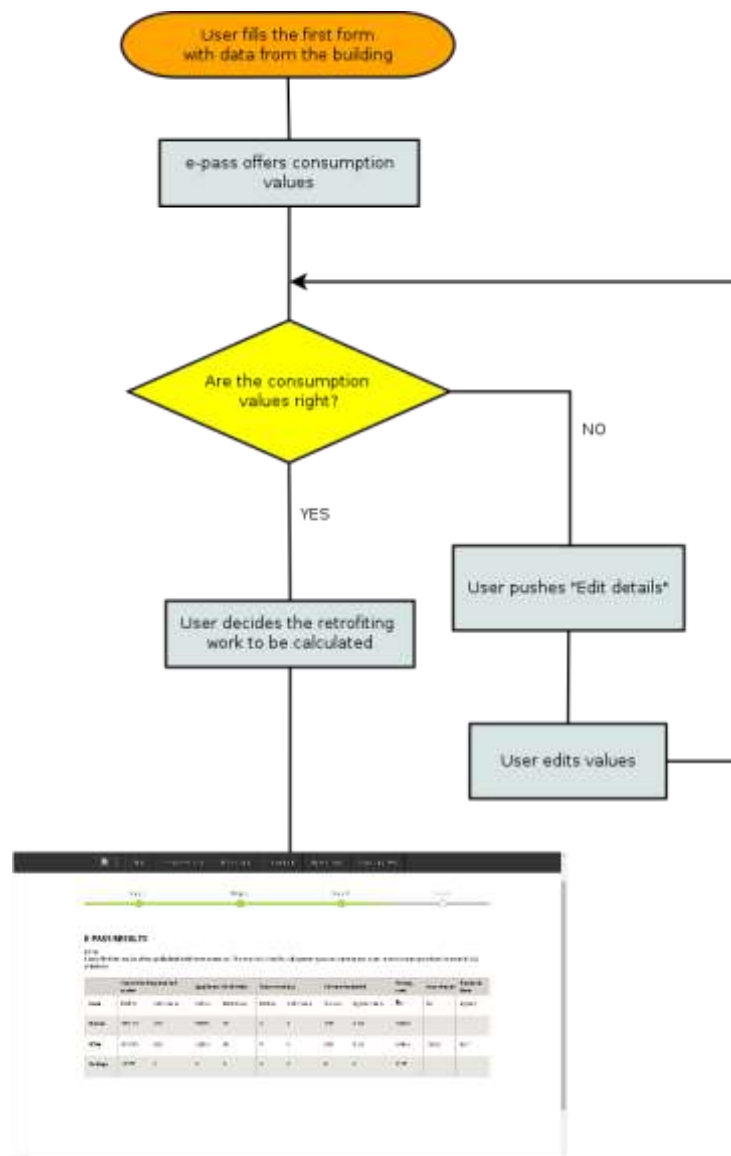


Figure132 - E-PASS utilization flow diagram

## 7.3 Business model

### 7.3.1 ORGANISATIONAL MODEL

After some reading of the wiki part of the NewBEE platform, the “total contractor” realizes that the model better suits to the situation is the One-stop-shop for single family houses Ref D4.2 (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung E. V, 2014), the reasons for that is that the customer does not want to be involved in the project because he does not have a good criterion and he has full confidence in the supplier with whom he has been contacted first because of the good references he had. He decides then to change his usual way of acting and adopts the One-stop-shop for single family houses model. He realizes that this model could fit to a lot of possible business.

| Characteristics                 | Main Application Area   |
|---------------------------------|---|
| Ownership of real estate        | <ul style="list-style-type: none"> <li>✓ Private owner</li> <li>✗ Commercial owner (investors/funds)</li> <li>✗ Housing companies (private, public, ...)</li> </ul>   |
| Size of property/ building type | <ul style="list-style-type: none"> <li>✓ 1-2 units (residential building)</li> <li>✗ &gt;2 units (multi-dwelling building – residential or mixed-use)</li> <li>✗ Commercial building (office building, etc.)</li> </ul> |
| Retrofitting costs              | <ul style="list-style-type: none"> <li>✓ &lt; 500 k€</li> <li>✗ 500 k€ - 1 mio€</li> <li>✗ &gt; 1 mio€</li> </ul>   |
| Time constraints                | <ul style="list-style-type: none"> <li>✓ Crucial</li> <li>✓ Important</li> <li>✓ Less important</li> </ul>  |
| Project size                    | <ul style="list-style-type: none"> <li>✓ Small project</li> <li>✗ Large project</li> <li>✓ Fast-track project</li> </ul>  |

Figure 133 Business model characteristics

In the wiki it is said that: “[...]In an ideal one-stop-shop business model a single actor offers full-service holistic renovation packages including consulting, independent energy audit, renovation work, follow-up (independent quality control and commissioning) and financing. Different types of actors may play the key role in a one-stop-shop for energy efficient renovation of single-family houses. In some models the service provider collaborates with financing institutions to provide renovation financing. There are differences on how customers are contacted while the similarities are more on how the service is provided. [...]”.

The advantages using this model are:

- The customer has an easy way of interacting with the construction actors by talking to the provider he decided to choose.
- The fact that this organizational model fosters the formation of regular groups of partners so that the possible synergies between the members will be fostered as well. For the first contacted provider it is important because he does not have as much experience in the fields involved as he would like.

#### 7.3.1.1 Description

The business our one-stop-shop provider has in mind could be represented in canvas as follows:

|  |   |  |  |  |
|--|---|--|--|--|
| <p><b>Business Idea:</b> Provide to the customer one single interlocutor during the process of retrofitting a building.</p> <p><b>Product / Service Idea:</b> We are going to serve him as the only contact point in the entire process.</p>   |   |  |  |  |
| <p><b>Key Partners</b></p> <p>We need as partners:</p> <ul style="list-style-type: none"> <li>• A workers squad.</li> <li>• An architecture studio.</li> <li>• A company for the administrative work.</li> </ul> <p>We also need a materials supply company.</p> <p>We need from them to cover the entire retrofitting process.</p> <p>The process will imply to:</p> <ul style="list-style-type: none"> <li>• Business case definition.</li> <li>• Concept development.</li> <li>• Detailed design.</li> <li>• Tendering.</li> <li>• Construction Planning.</li> <li>• Construction Management and Construction.</li> <li>• Documentation and Commissioning.</li> <li>• To advise in the building operation if needed.</li> </ul> | <p><b>Key Activities</b></p> <p>We do need to find competent and trustful partners.</p> <p>We need to coordinate them in a efficient manner.</p> <p>We need to be comfortable for the client in the interlocution as well as in the contract.</p> <p>We need to use social networks for communicate with partners as well as getting new customers.</p> <p>The only revenue stream is going to come from the final customer. It is needed a payment time table associated with the work already done.</p> | <p><b>Value Propositions</b></p> <p>We propose to ease the construction process by using a personal treatment that is possible thanks to a relation that is going to last the whole project duration and it is going to consist in one single interlocutor.</p> <p>The customers do not feel comfortable when they have to meet many people. The existence of one single responsible makes possible the customer confidence about the solution that is proposed.</p> <p>This value proposition is done by several providers (known as general contractors) but they do not have the platform needed for establishing relations in an easy, fast and cheap way.</p> | <p><b>Channels</b></p> <p>Through which channels do our customer segments want to be reached?</p> <p>Customers usually look for solutions in the internet; it is there where we have to be in.</p> <p>The NewBEE platform is the best option for integrating the whole set of partners as well as it could provide work demands made by the customers.</p> | <p><b>User Segments</b></p> <p>Our customer's niche is owners that do not have time for being involved in the whole process.</p> <p>This niche is almost every building owner that could need a retrofitting work and whose do not want to be involved in complicated contracts.</p> |
|  | <p><b>Key Resources</b></p> <p>What Key Resources do our Value Propositions require? Our Distribution Channels? Customer Relationships? Revenue Streams?</p> <p>We need a social network for being able of achieving the most of our key activities.</p> <p>We need a strong commitment with the customer needs.</p>  |  |  |  |
| <p><b>Cost Structure</b></p> <p>There is not a big investment in this business structure, but a considerable amount of time needed for starting is foreseen.</p>   |   | <p><b>Revenue Streams</b></p> <p>The customer pays for not be bothered with details, or at least of most of them, for the others, what he wants is a concise summary, usually he does not want a formal report. This fact can be translated to the contracts; the customer prefers to do only one single contract than many of them.</p> <p>The most common analogue practice in Europe is to hire separately the design and the construction works.</p> <p>The customer usually pays in two parts, one at the beginning of the project and the other at the end.</p>  |  |  |

Figure 134 - Canvas business representation



### 7.3.1.2 Characteristics

| Characteristics                 | Main Application Area   |
|---------------------------------|---|
| Ownership of real estate        | <ul style="list-style-type: none"> <li>✓ Private owner</li> <li>✗ Commercial owner (investors/funds)</li> <li>✗ Housing companies (private, public, ...)</li> </ul>   |
| Size of property/ building type | <ul style="list-style-type: none"> <li>✓ 1-2 units (residential building)</li> <li>✗ &gt;2 units (multi-dwelling building – residential or mixed-use)</li> <li>✗ Commercial building (office building, etc.)</li> </ul> |
| Retrofitting costs              | <ul style="list-style-type: none"> <li>✓ &lt; 500 k€</li> <li>✗ 500 k€ - 1 mio€</li> <li>✗ &gt; 1 mio€</li> </ul>   |
| Time constraints                | <ul style="list-style-type: none"> <li>✓ Crucial</li> <li>✓ Important</li> <li>✓ Less important</li> </ul>  |
| Project size                    | <ul style="list-style-type: none"> <li>✓ Small project</li> <li>✗ Large project</li> <li>✓ Fast-track project</li> </ul>  |

Figure 135 - Typical characteristics of the one-stop-shop business model.

### 7.3.2 VALUE CHAIN COVERAGE

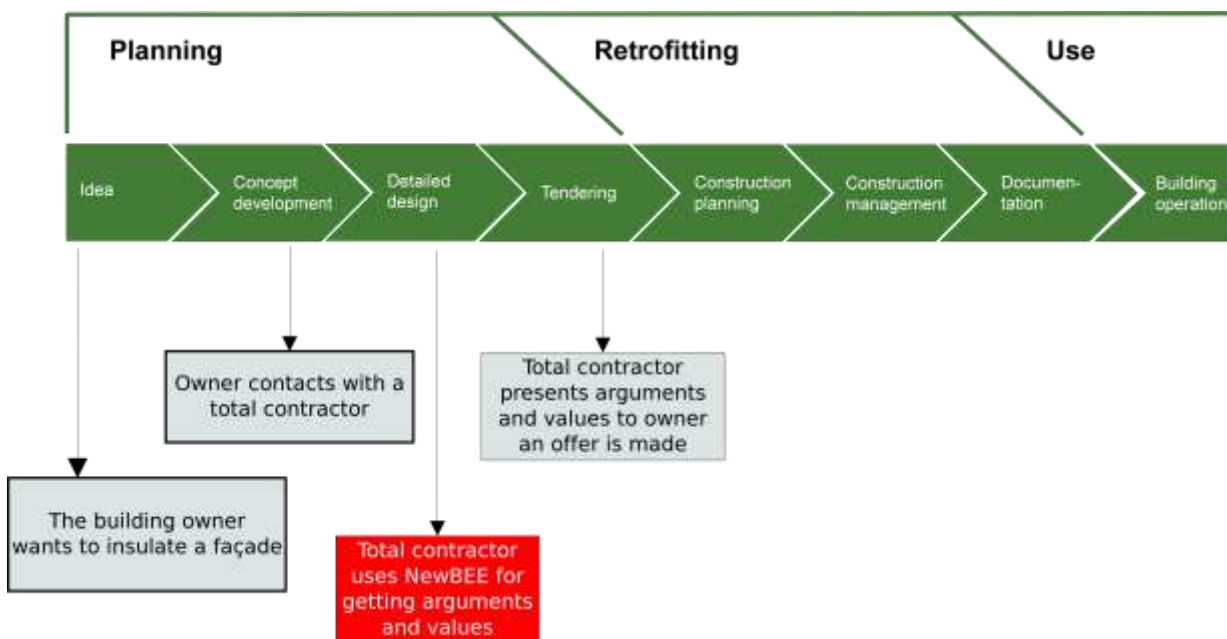


Figure 136 - Value Chain coverage for E-PASS tool

One particularity of this business model is the paramount importance of the planning phase since it is the cornerstone for the relations between the different partners being smooth. If everything is well planned shall not appear any insurmountable obstacle between the partners.

In the retrofitting phase, it is very important to foster the general mutual trust and this is done mainly by implanting clearness into the whole process.

7.3.3 COLLABORATION MATRIX

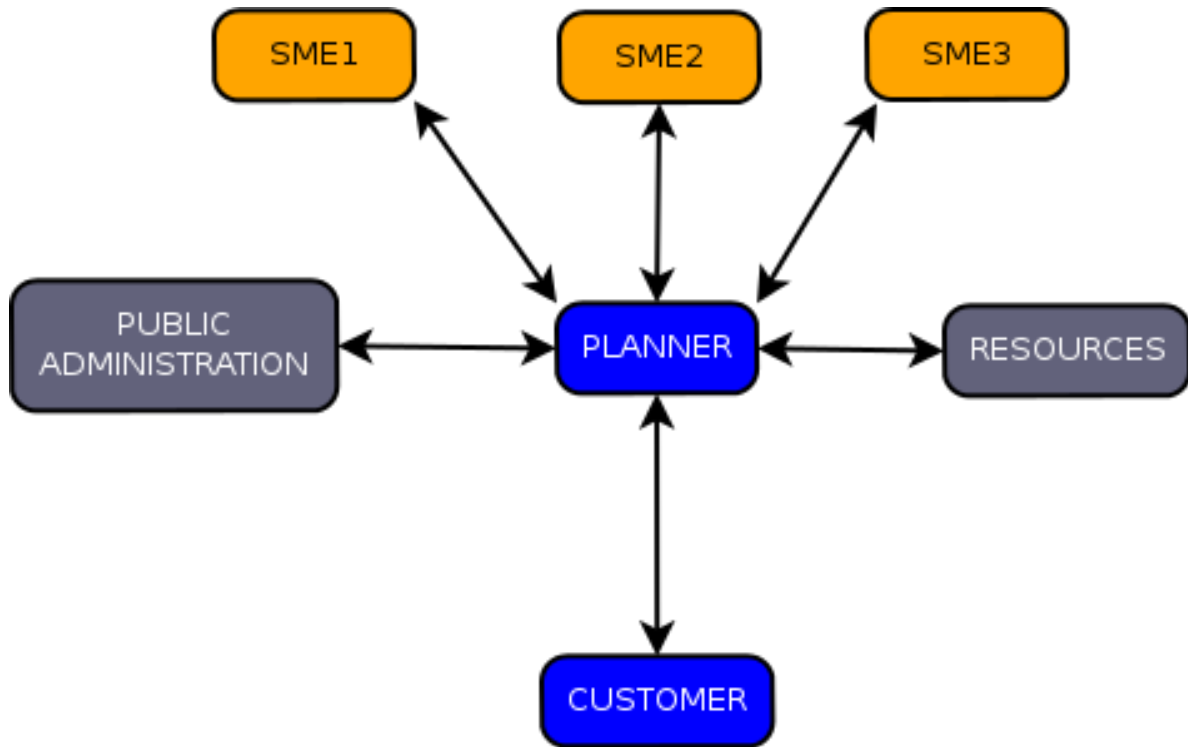


Figure 137 - Diagram that illustrates the relations **and contracts** between actors in the "One-Stop-Sop" business model.

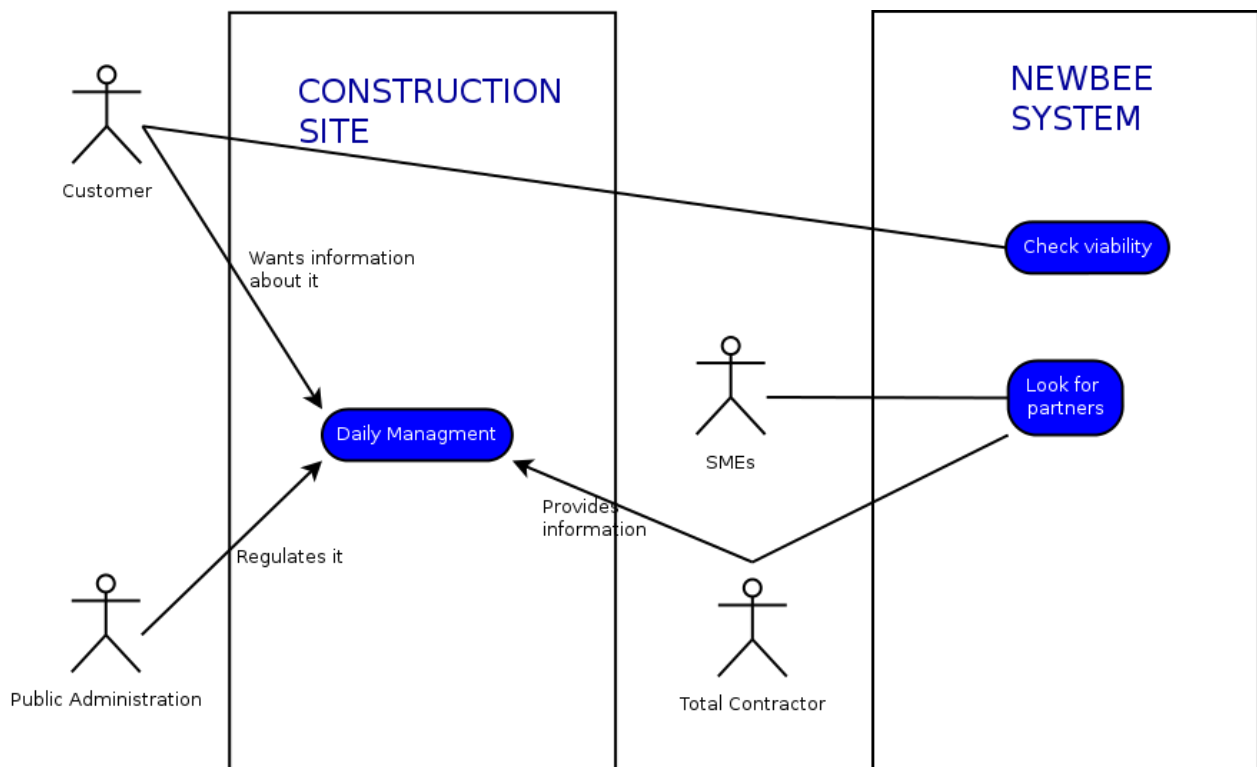


Figure 138 - Basic use cases diagram

Usually ACCIONA plays the manager role for many kinds of works. One of them is the retrofitting of singular buildings or infrastructures.

In this kind of works, it is important to be able of assuming risks due to the singularity of the construction work. The use of paradigms can reduce at minimum this possible risk.

One of this paradigms is the one called “total contractor” that was explained in D4.2. This paradigm reduces the interaction among the different actors with the owner one. This fosters the gathering of information that the owner always has. He can ask everything to the same person.

Anyway, each project ACCIONA carries out has its own singularity so that it is not a good idea to restrict the model to an inflexible one. There have been several configurations for the communication model but with the same basis. For example:

- The customer is the public administration, so that they manage the acquisition of construction licenses.
- The customer has several works at the same time, so he wants to control the communications with the providers in order to get better prices thanks to the materials volume the owner manages.
- One of the SME has experience in the work to be done, so that he knows exactly what the relations we should have with the administration are. So that this SME is the contact with the public administration.

#### 7.4 Comparison between the MEEFS results and those obtained with NewBEE

**All data presented into example and related to MEEFS is the property of Meefs Retrofitting consortium.**

In the project MEEFS it has been considered different technologies separately at first. It has been obtained the following table depicting how could be the amortization for an insulation system like the one considered in this scenario. This has been calculated using some assumptions:

- An initial energy Price of 34ct/kWh.
- An average energy price in Spain calculated on basis of annually 1% price increase for 20 years period.

*Table 4 - MEEF System insulation yearly accumulated payback*

| Year      | Yearly cost | Accumulated Cost | Yearly revenue | Accumulated revenue | Payback         |
|-----------|-------------|------------------|----------------|---------------------|-----------------|
| <b>1</b>  | 206,21 €    | 206,21 €         | 174,68 €       | 174,68 €            | <b>-31,52 €</b> |
| <b>2</b>  | 2,33 €      | 208,54 €         | 174,68 €       | 349,37 €            | 140,83 €        |
| <b>19</b> | 2,33 €      | 248,15 €         | 174,68 €       | 3.318,98 €          | 3.070,84 €      |
| <b>20</b> | 2,33 €      | 250,48 €         | 174,68 €       | 3.493,66 €          | 3.243,19 €      |

These results can be compared with those obtained using the E-PASS tool that are also calculated for a yearly period:

## E-PASS RESULTS

Done!

Please find the results of the applied refurbishment measures. The impact is listed by sub-system type and summarized as an *impact* on the operational costs and CO<sub>2</sub>-emissions.

*Table 5 - Results from MEEFS project*

| Case    | Space heating and hot water |                       | Appliance electricity |                       | Space cooling |                       | Carbon footprint    |                                      | Energy cost | Investment | Payback time |
|---------|-----------------------------|-----------------------|-----------------------|-----------------------|---------------|-----------------------|---------------------|--------------------------------------|-------------|------------|--------------|
|         | kWh/a                       | kWh/m <sup>2</sup> ,a | kWh/a                 | kWh/m <sup>2</sup> ,a | kWh/a         | kWh/m <sup>2</sup> ,a | tCO <sub>2</sub> /a | kgCO <sub>2</sub> /m <sup>2</sup> ,a | €/a         | k€         | a(year)      |
| Before  | 64623                       | 646                   | 2803                  | 28                    | 0             | 0                     | 24                  | 0.24                                 | 5094        | -          | -            |
| After   | 60641                       | 606                   | 2803                  | 28                    | 0             | 0                     | 23                  | 0.23                                 | 4818        | 19817      | 71.8         |
| Savings | 3982                        | 40                    | 0                     | 0                     | 0             | 0                     | 1                   | 0                                    | 176         | -          | -            |

The comparison can be presented as follows:

*Table 6 - Comparison between results from both projects*

| <i>measure</i>               | <i>MEEFS</i>        | <i>E-PASS</i>                                      |
|------------------------------|---------------------|--|
| <b>Savings in heating</b>    | 174,68€             | 176€   |
| <b>Insulation investment</b> | 105€/m <sup>2</sup> | 10180€ / 100m <sup>2</sup> = 101.8€/m <sup>2</sup> |

The values are similar despite they are not equal. This value demonstrates that the e-pass tool calculates the energy savings related to the insulation work in a convenient way for advising of what the owner can expect from this work.

## 7.5 Financial Model



**NewBEE** Wiki Pre Assessment Marketplace Contact My Account Language: EN ES\_APT

### Financial Calculator

#### INTRODUCTION OF THE FINANCIAL ANALYSIS

Definition and formulation of financial models is a challenging task but it provides valuable insights to SMEs and building owner. The results of the financial model (a set of financial statements, key operational metrics, a set of key drivers and assumptions, charts, comments, balance sheets, etc.) creates a "map" for both building owner and analyst to investigate the strategies for financing the retrofitting process.

In the vast majority of businesses, all organisations and stakeholders employ basic financial analysis tools to examine the value, the money flows, the impacts of investments and the opportunities offered by limited resources. The same tools and the same approach can be equally used for energy efficiency projects.

The module provide the cash flow analysis, the Payback period analysis (PBT), the discounted cash flow analysis, which provides a Net Present Value (NPV), Internal Rate of Return (IRR), and the Cost of Conserved Energy analysis.

[Go to the financial calculator](#)

Figure 139 - Financial calculator tool

For making a financial analysis it is considered the following situation:

- An investment of 3000€ for a 100m<sup>2</sup> apartment.
- An amortization period of 20 years.
- A discount rate of 7% taking into account the two factors that mainly form the rate; the opportunity cost (temporal money value) and the risk taken.
- The money comes from a loan for the 60% of the total investment, duration of 5 years and at 5% interest.
- It is not applied any tax reduction.
- Neither any subsidy.

When the owner applies these values to the Financial Calculator Tool we do obtain the following results:

24/7/2015

Financial Model Calculator

[BEE](#) | 
 [Wiki](#) | 
 [Pre Assessment](#) | 
 [Marketplace](#) | 
 [Contact](#) | 
 [My Account](#) | 
 Language: EN

ES APT  
Financial Model Calculator

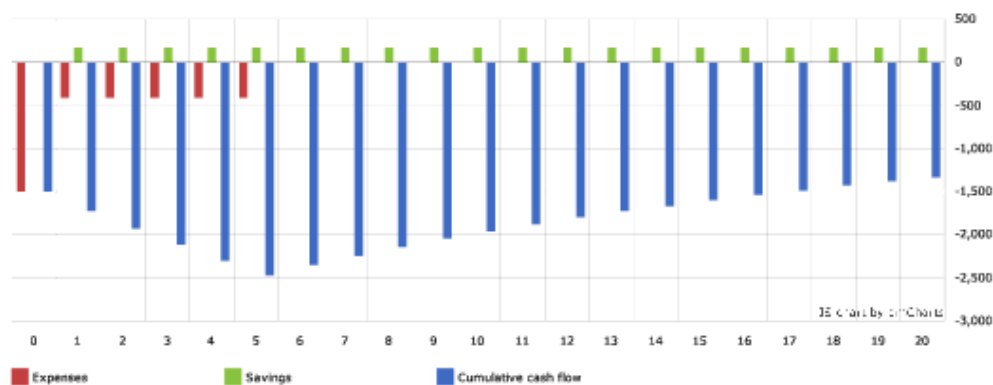
### MEEFS

The table shows cash flows expected by the project during its lifetime. The chart graphically represents the yearly output/input and the cumulative savings generated by the project.

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|               |            |                     |               |
|---------------|------------|---------------------|---------------|
| <b>Invest</b> | 3000 €     | <b>Finance Type</b> | Loan          |
| <b>Rate</b>   | 7 %        | <b>IRR</b>          | 1.4 %         |
| <b>NetPV</b>  | -1156.65 € | <b>Timeline</b>     | 17.2414 years |

| Years                          | Expenses         | Savings       | PV Output         | PV Input         |
|--------------------------------|------------------|---------------|-------------------|------------------|
| 0.                             | -1500 €          | 0 €           | -1500 €           | 0 €              |
| 1.                             | -409.74 €        | 174 €         | -382.93 €         | 162.62 €         |
| 2.                             | -409.74 €        | 174 €         | -357.88 €         | 151.98 €         |
| 3.                             | -409.74 €        | 174 €         | -334.47 €         | 142.04 €         |
| 4.                             | -409.74 €        | 174 €         | -312.59 €         | 132.74 €         |
| <a href="#">Show more data</a> |                  |               |                   |                  |
| <b>Sum</b>                     | <b>-3548.7 €</b> | <b>3480 €</b> | <b>-3180.01 €</b> | <b>1843.35 €</b> |



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<http://www.newbee.wiki.eu/finance/show.php?id=112>

1/1

Figure 140 - Financial model calculator screenshot

In the hypothetical use case described before, this tool explains how the investment is going to be amortized. Usually the owner does not have any financial knowledge but the economic data is presented in a so clear manner that even a person who is not an economist can understand what it is represented. The graph illustrates the way the investment is going to be amortized in a pleasant way and the raw data is presented in a clear and understandable way, for a person who has a minimum financial knowledge.



## 8 Conclusions

---

### 8.1 Conclusions from S1

- Platform functionality conclusions:
  - All the modules that have been used for the demonstrator have been checked with several inputs and the outputs were logic ones.
  - Neither bugs nor failed progress situations have been found in each step of the scenario demonstration.
  - Links between one module and the next one have been properly achieved and all information given for the first time was linked to the next operations (e.g. data used for the Pre-Assessment Tool has been used by the platform for the Financial Tool).
- User point of view conclusions:
  - The platform is very easy, useful and intuitive. Non expertise people were asked for testing the usability for a “first time user” and every step was clear and logic for them.
  - Information, conclusions and recommendations given by the platform in the final steps were very interesting for users and the main objective of the platform was achieved (customers were involved in the platform and they become interested in finding more information, in asking for proposals as well as in getting consultancy).
- SME-Business point of view:
  - Data given by the platform were realistic and reliable: illustrative budget and retrofitting Project costs were very similar to the real ones used by TEUSA in the retrofitting process in operation.
  - Pre-Assessment tool has been considered by the SMEs asked the most useful and interesting module in the platform because it achieves two important points:
    - A first Price and a financial approach that avoids waste of effort for SMEs commercial departments.
    - This first approach is a powerful marketing tool that encourages the customer to continue investigating and being involved in the retrofitting world and market.

### 8.2 Conclusions from S2

In this scenario it is depicted how a small company could use the platform in order to be able to comply with the terms established in a tender that the company alone is not able to, as well as it is depicted how a client could make a tender in an easy way.

The platform is used in a realistic scenario for both perspectives. It has been used in:

- A tender publication by the public administration using the marketplace part of the system.
- A tender acceptance by a small company using the marketplace.
- Searching information of the specific retrofitting work using the wiki and the pre-assessment tool.

In each of the three scenarios the platform has demonstrated that covers the main characteristics it has to have for being useful. Anyway, despite it is clear that it is not yet a commercial product; we could say that the readiness level could reach a TRL7 that it is defined as “System prototype demonstration in an operational environment.” (European Commission, 2014).

Gathering the results of the whole set of conclusions, we can infer that:

- Data obtained from the platform as results are realistic and they can be obtained quickly.
- The most useful part is the “Pre-assessment” one. It seems to be the one with more possibilities of having acceptance in the professional environment.
- The platform is technologically mature, it can be said that it is at least in a TRL7 which is defined by the EU (European Commission, 2014) as “system prototype demonstration in operational environment”.
- The platform covers a broad spectrum of retrofitting issues as well as it gives service to all the actors involved.

From the previous points it can be said that the system leads the way of the collaborative platforms related to retrofitting works. Despite it is not ready for the actual market yet, the two technological levels that remains for being a ready one can be covered with only a small investment as well as the system can currently serve as an example of how this goal can be reached.

### 8.3 Conclusions from S3

The conclusions of the use of the tool are analyzed from the point of view of the user (is it used?) and from an approach to product (is the product ready to be sold?).

From the point of view of the user, the main remarkable points are:

- The tool is easy to use. Only takes a few minutes and it is free (PAT).
- To make the financial model you need knowledge about current legislation (e.g. subsidies) but it is not very complicated. The results are presented in quickly and very intuitive manner.
- The existence of an “indicative” price (People want to know how much can cost your changes at home).
- Quick budgets.
- Everything you need is in one site.
- You save time and money.
- The customer can compare offers and see projects and services from different companies registered in the marketplace part.

From the point of view of the product:

- New channel for customers.
- Marketing and calculation tool.
- Serious web with qualified professional (supported by EC).
- New calculator of Budgets never seen before in the internet.
- It connects users with building professionals (companies and freelancers).
- Potential users: any owner of a building and construction SMEs (energy sector, rehabilitation, architecture and design).
- Trend: people look for their needs in the internet (travel, flights, restaurants ...).
- Trend: Governments promote and support energy rehabilitation (subsidies, tax reductions ...).

## 8.4 Conclusions from S4

For demonstrating that the NewBEE platform is useful, it was used the study that was done in the scope of other research project called MEEFS. Specifically, it was demonstrated the use of the e-pass tool for advising about what energy savings can a final customer expect from a refurbishment work. These results are almost equal to those obtained in the MEEFS project thus the specific part of the platform is demonstrated with a high degree of compliance. After this demonstration, the Financial Tool is checked for having an idea of how the investment is going to be amortized and it throws reasonable values when you compare them with those obtained in the MEEFS project. In conclusion, since the NewBEE results have been compared with a high degree of correspondence with the MEEFS' results, we can infer that the values obtained are right enough for having an accurate idea of what you can expect from the retrofitting work.

Moreover that fact, we can see that the parts demonstrated (E-PASS and financial tool) behave in a professional way when it is used in a realistic case. It should not be difficult to make profit of the fact of being able to estimate what savings you can expect at early stages with a speed never seen before, and thus, to be able of discarding retrofitting actions that are not going to be amortized in a more than reasonable period of time.

## 9 Final Conclusions

---

Gathering the results of the whole set of conclusions, we can infer that:

- Data obtained from the platform as results are realistic and they can be obtained quickly.
- The most useful part is the “Pre-assessment” one. It seems to be the one with more possibilities of having acceptance in the professional environment.
- The platform is technologically mature, it can be said that it is at least in a TRL7 which is defined by the EU (European Commission, 2014) as “system prototype demonstration in operational environment”.
- The platform covers a broad spectrum of retrofitting issues as well as it gives service to all the actors involved.

From the previous points it can be said that the system leads the way of the collaborative platforms related to retrofitting works. Despite it is not ready for the actual market yet, the two technological levels that remains for being a ready one can be covered with only a small investment as well as the system can currently serve as an example of how this goal can be reached.



## 10 Annex I - References

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