Deliverable D5.1

NewBEE Platform

WP 5

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ABBREVIATIONS

BO	Business Opportunities
E-PASS	Energy Performance Assessment
ESCO	Energy Service Company
GUI	Graphical User Interface
GWP	Global Warming Potential
HVAC	Heating, Ventilation And Air Conditioning
ISO	International Organisation for Standardisation
LCC	Life Cycle Cost
SME	Small and Medium-Sized Enterprise
SW	SoftWare

1 EXECUTIVE SUMMARY

NewBEE Deliverable 5.1 describes the NewBEE platform and gives instructions for use and installation.

NewBEE platform is a set of web-based software tools accessible through internet. It includes the following tools:

- Pre-assessment Tool: the purpose of this tool is to support building owners to make a first estimation of needed refurbishment (in terms of retrofitting technologies and cost of them) and its potential energy savings.
- Financial Calculation Tool: the purpose of this tool is to support building owners to compare different financial alternatives for a retrofitting project.
- Market place: the purpose of this tool is to support SMEs to find Business Opportunities (BO) and to search for partners to create a joint group to elaborate an offer that satisfies the building owner requirements; and the owners to place a call for proposals, to choose an offer from those received and to find service providers.
- Energy Performance Assessment Tool: the purpose of this tool is to support SMEs (and advanced owners) to assess the potential savings of alternative refurbishment methods. It is not intended for normal building owners.
- Wiki based Knowledge repository: the purpose of this tool is to give building owners and professionals access to information on retrofitting technologies.
- Business Model Assessment tool: the purpose of this tool is to provide a short assessment to CEOs and management stuff of small companies that are interested to review their business model

The purpose of NewBEE D 5.1 "*NewBEE Platform*" is to provide a presentation and guidelines for two different target groups:

- NewBEE Users: presents a user manual for the users of the platform. The intended target group consists of building owners and SMEs that offer services for the refurbishment of buildings in different European countries. This user manual gives information about the purpose, users and intended use situations of NewBEE platform, instructions for use, and a short explanation about the offered calculation methods and data sources.
- NewBEE Service Providers: presents an introduction and guidelines for the installation and running of NewBEE platform. The target audience of this part of the document is those actors who will install and maintain the NewBEE platform in order to offer the NewBEE services to SMEs and to building owners. It gives information and instructions about the software functionalities and requirements for installation.

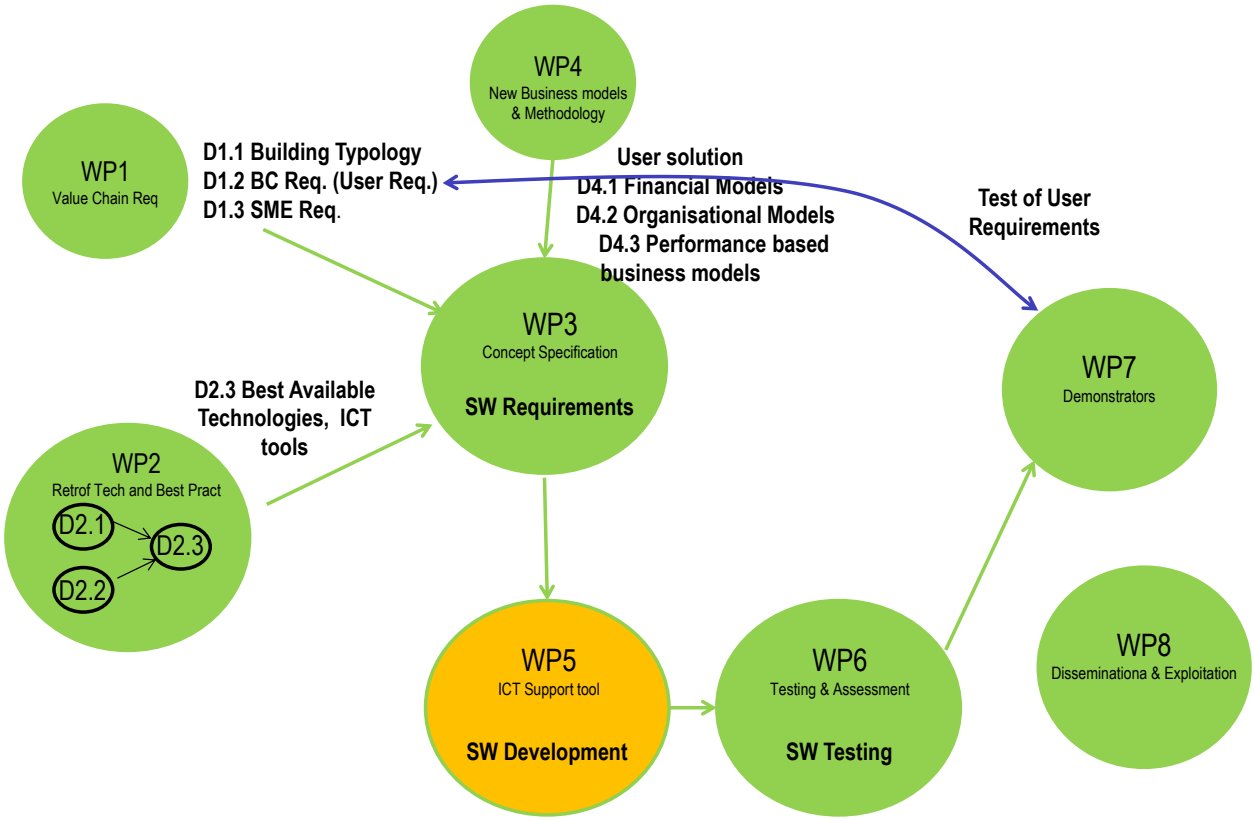
2 INTRODUCTION

2.1 Document Purpose

The purpose of NewBEE D 5.1 “NewBEE Platform” is to provide a presentation and guidelines for two different target groups: NewBEE Users (SMEs and building owners) and NewBEE Service Providers.

The NewBEE WP5 “ICT Support Tools” is dedicated to the implementation of the different web-based ICT tools that satisfies the user requirements identified in the WP1 and WP2 that served for the specification of the description of the overall NewBEE concept, the specification of the ICT tools.

Next figure clarifies the position of WP5 (marked in orange) inside the NewBEE work packages structure:



The purpose of this document is to provide a comprehensive user and installation manual of the NewBEE platform (ICT support tools) developed under this WP5 “ICT Support Tools” of NewBEE project.

2.2 Document structure

The document consists of:

- Section 1. Executive Summary with a short and concise overview of the overall content of the whole document, whom is the document, intended to, 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 provides a brief overview of the contents of the document.
- Section 3. User Manual presents instructions for the users of the platform. The intended target group consists of building owners and SMEs that offer services for the refurbishment of buildings in different European countries. This user manual gives information about the purpose, users and

intended use situations of NewBEE platform, instructions for use, and a short explanation about the offered calculation methods and data sources.

- Section 4. Installation and maintenance manual presents an introduction and guidelines for the installation and running of NewBEE platform. The target audience of this part of the document is those actors who will install and maintain the NewBEE platform in order to offer the NewBEE services to SMEs and to building owners.

Both section 3 and 4 provides instructions for each of the NewBEE tools:

- NewBEE platform system
- Pre-assessment tool
- Financing calculation tool
- Market Place tool
- Energy performance assessment tools
- Wiki-based knowledge repository.
- Business model support tool and

3 USER MANUAL

The NewBEE platform shows information about the aspects that are relevant to be considered in a retrofitting project. It is composed by the following six different tools:

- Pre-assessment tool
- Financial calculation tool
- Market Place tool
- Energy Performance Assessment tool (E-PASS)
- WIKI based Knowledge Repository
- Business Model Assessment tool

The users of the NewBEE platform are:

- **Building Owner** who owns a building where a problem exists (in terms of energy consumption), and wants to explore potential retrofitting technologies that may solve the problem, how to finance the project, to identify a Business Opportunity, to place a call for proposals (SMEs offers) and to find SMEs which can help to solve the problem.
- **SME** that is looking for the business opportunities created by the building owners, and create a response to that opportunity (an offer) either individually or creating collaboratively a joint team that will answer all the owner needs.

The following *Figure 3-1* shows the NewBEE platform welcome page, the NewBEE entry point, where clearly classifies the potential users into the two groups above mentioned:

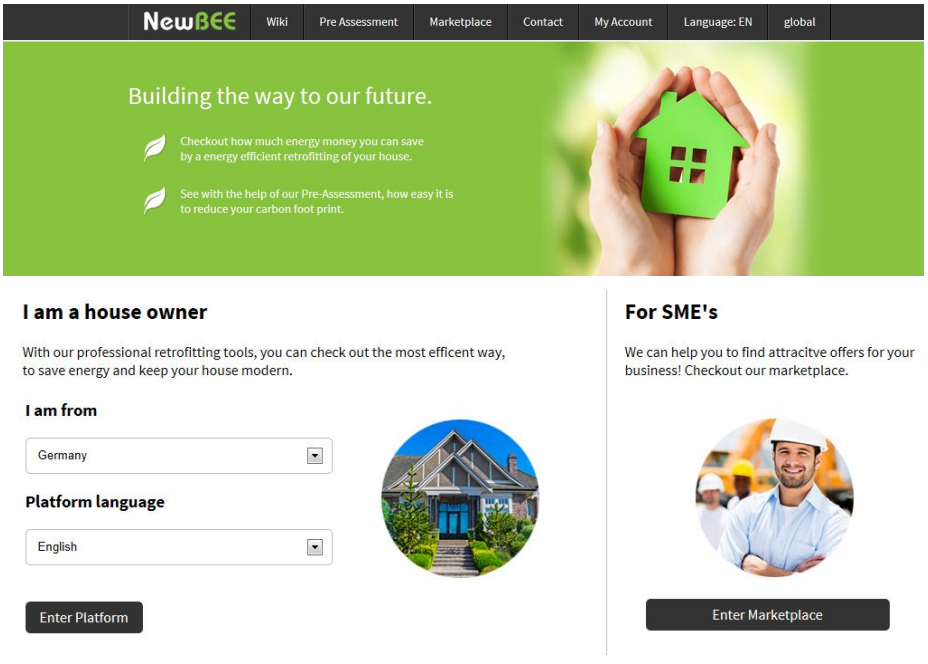


Figure 3-1: Two kinds of users for the NewBEE Platform

Next table shows the six NewBEE tools which are associated to the different users (building owners and SMEs):

Table 3-1: Users of the different NewBEE modules

	OWNER	SMEs
Pre-assessment tool	X	X
Financial module	X	X
Market Place	X	X
Energy Performance Assessment		X
WIKI Based Knowledge Repository	X	X
Business Model Assessment tool		X

Pre-assessment tool

- Building owners can use the pre-assessment tool to receive a first impression on where to start retrofitting and to identify the most appropriate retrofitting technologies based on their requirements. It allows different technology scenarios that might be appropriate to address the building problem at hand (taking into account e.g. building characteristics, local climatic conditions etc.) and for getting an estimation of the costs, together with the list of possible (co)financing.
- Although the tool is aimed to the building owner, the SMEs might also use the pre-assessment tool to check roughly the feasibility and profitability of a project initiated by the owner, or as a marketing / commercial tool to show a building owner the costs / benefits of the different retrofitting proposed solutions (scenarios).

Financial calculation tool

- This module is for the building owners and SMEs in order to analyze the investment by taking different financial instruments into account.

Market Place

- The building owners can use the market place to publish informed calls for proposals. After getting basic information, or in some cases without visiting the pre-assessment tool, the building owner publishes a “call for proposals” to invite SMEs with appropriate expertise, to place the offers for solving the retrofitting problem i.e. for a specific project.
- Market Place supports SMEs in the process of identifying Business Opportunities. The SME members and non-members (internal and external SMEs respectively), after finding a call which is in compliance with their expertise are either providing an offer straightforward to the entity publishing the call or are going through the pre-assessment tool to check roughly the feasibility and profitability of the corresponding project. Both cases can mean that the SME expects to be able to complete the project using only own resources (intellectual and material), in which case the interaction with the NewBEE platform is confined to support in identifying the optimal business model for corresponding context. In the case of seeing the need for additional resources the SME goes through the procedure of creating the virtual collaborative team to execute the retrofitting activity.

Energy Performance Assessment tool

- To be used by SMEs which need detailed professional content/support to assess the potential energy, cost and carbon footprint savings from different retrofitting activities. Compute the energy consumption of the building applying simulation tools such as e.g. calculation method, based on the simple single zone steady-state thermal analysis, taking into account previously identified building types' characteristics and different region/country specifics.
- Owners are not aimed to use this tool. Only some advanced owners with nearly professional knowledge might use it.

Wiki Based Knowledge Repository

- Wiki allows to building owners and SMEs to access information of retrofitting process:
  - Building typology
  - Available technologies for energy refurbishment
  - Financial models and opportunities
  - Performance based business models
  - Methods and standards for energy and cost saving calculation
  - Potential savings

Business Model Assessment tool

- It provides a short assessment to CEOs and management staff of SME that are interested to review their business model.

Following sub-chapters will describe each of the NewBEE main menu options.

3.1 LOGIN / REGISTER

3.1.1 REGISTRATION

In order to get access to all the features the NewBEE platform offers to users, a private person (e.g. a building owner) or a service provider (SME), the NewBEE platform will require the user to be registered beforehand creating an account where the user will provide general information like email address, name, type of usage (private or SME) and password.

Therefore the first step to access the full range of services provided by NewBEE will be to be registered by choosing the Login/register menu option.

To register on the NewBEE platform, the user must fill in several form input fields and provide general information about himself / herself. Next *Figure 3-2* shows the registration screen of the NewBEE platform which asks for the following information:

- Email address
- First name
- Last name
- Selection of usage (privately as an owner or as an SME)
- Password and its confirmation.

All these inputs are mandatory. Optionally the SME-user can select his/her company, which already is registered, from a dropdown menu.

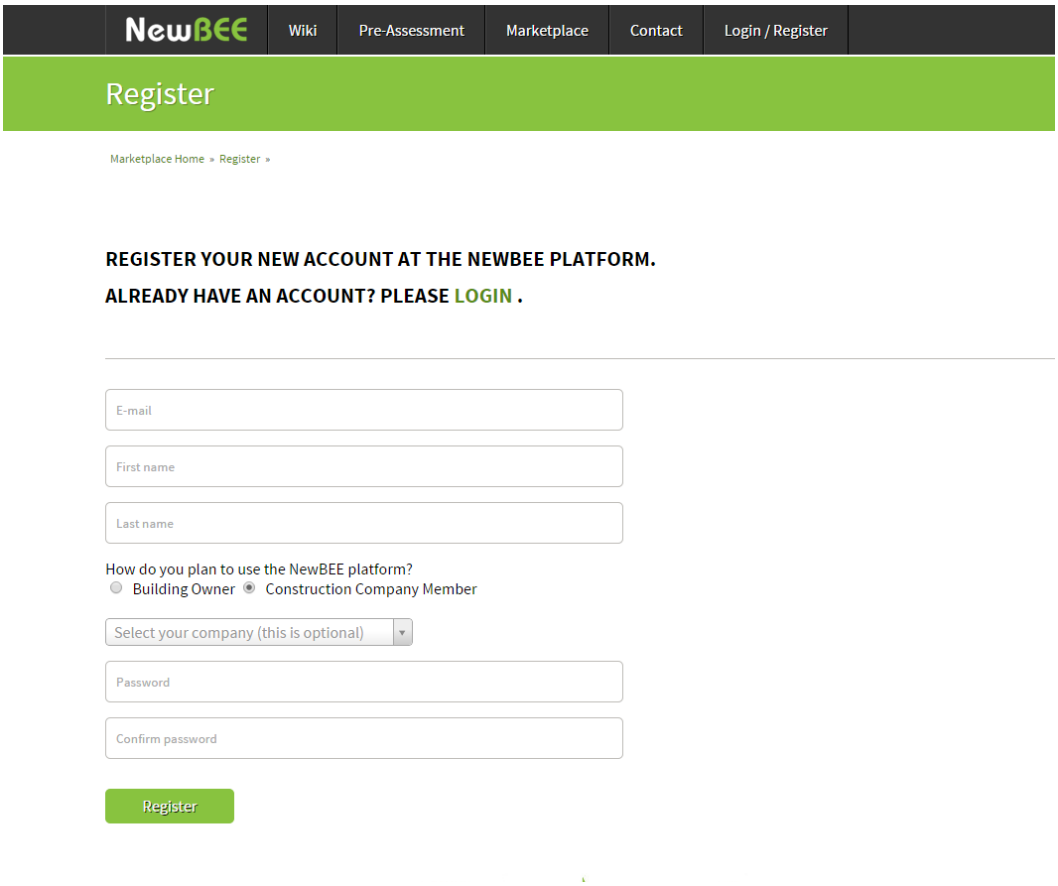


Figure 3-2: Registration screen of the NewBEE platform

To register an SME the SME-user has to either choose from the list of companies (see previous *Figure 3-2*) to associate his/her account to his/her company, which is already registered and listed in the dropdown menu. If his/her company is not already registered at the platform, the dropdown menu can be left blank and the user can nevertheless register as a “Construction Company Member”, but with no company affiliation yet.

The register button links the user to the following screen:

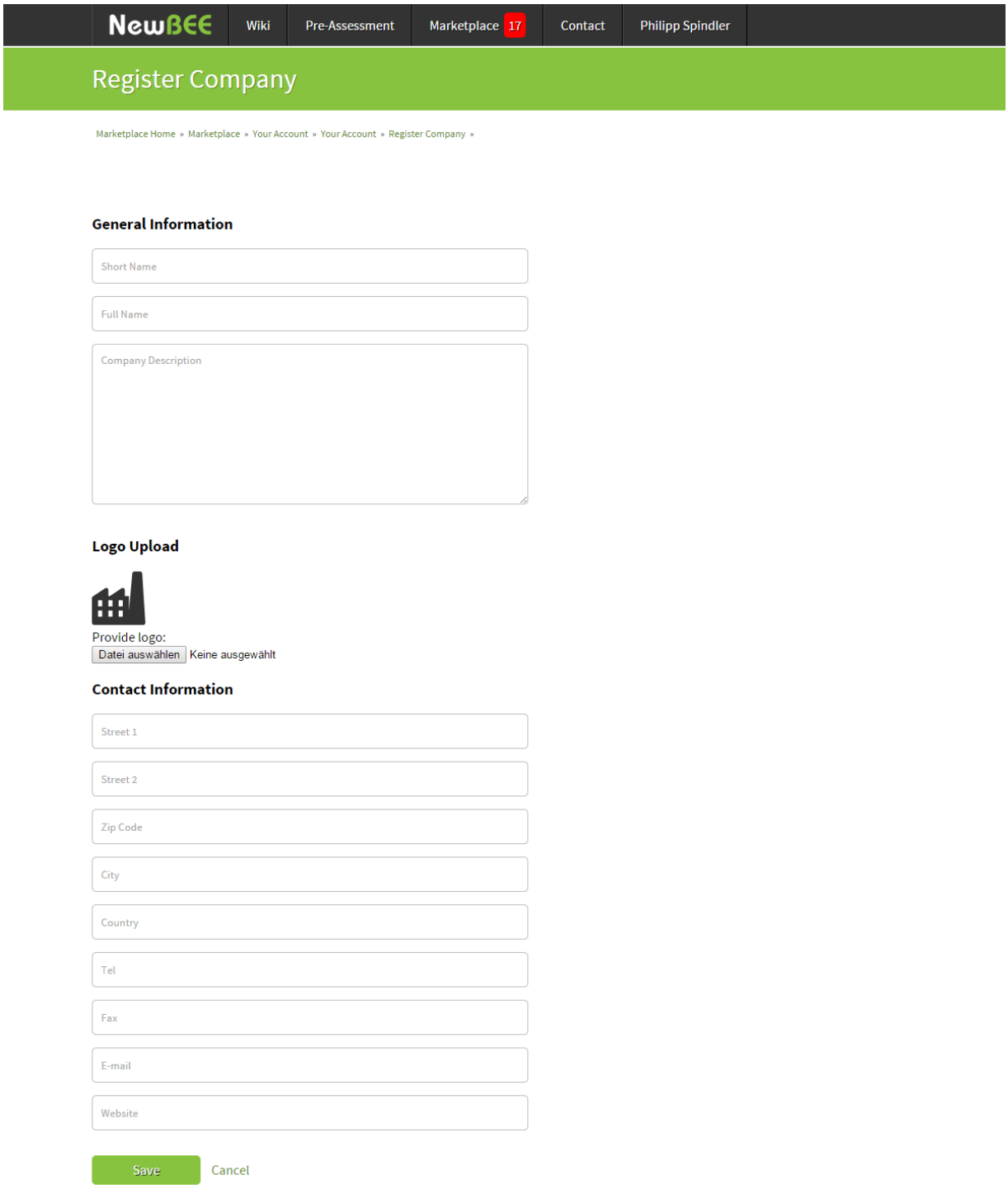


Figure 3-3: Registering a company on the NewBEE platform

The previous *Figure 3-3* shows the form of registering his/her company to the NewBEE platform, if the logged in SME-user has no company affiliation yet and is registered as a construction company member. The company can be described with the following information:

- Short Name
- Full Name
- Company Description
- Logo Upload
- Contact Information
    - Address Data (Street, ZipCode, City, Country)
    - Telephone number

- Fax number
- Email address
- Website URL

After registering a company on the NewBEE platform, only the user who registered his/her company can edit the profile page of this company, to present itself on the platform. In order to do this, a SME-user can modify within the following categories:

- General Information
- Offered Services and Disciplines
- Reference Projects (e.g. past projects)

Providing general information would yield in filling the following fields:

- Company full and short name
- Company description
- Logo Upload
- Contact Information with
  - Adress Data
  - Email
  - Telephone number
  - Website Url

SME-user can furthermore add the services and disciplines which the SME is offering on the market to the NewBEE platform and so, to the company profile page. Next *Figure 3-4* shows how to add services and disciplines to the SME profile page, i.e. the SME selects a service or a discipline from the dropdown menu and adds it to the service and disciplines list.

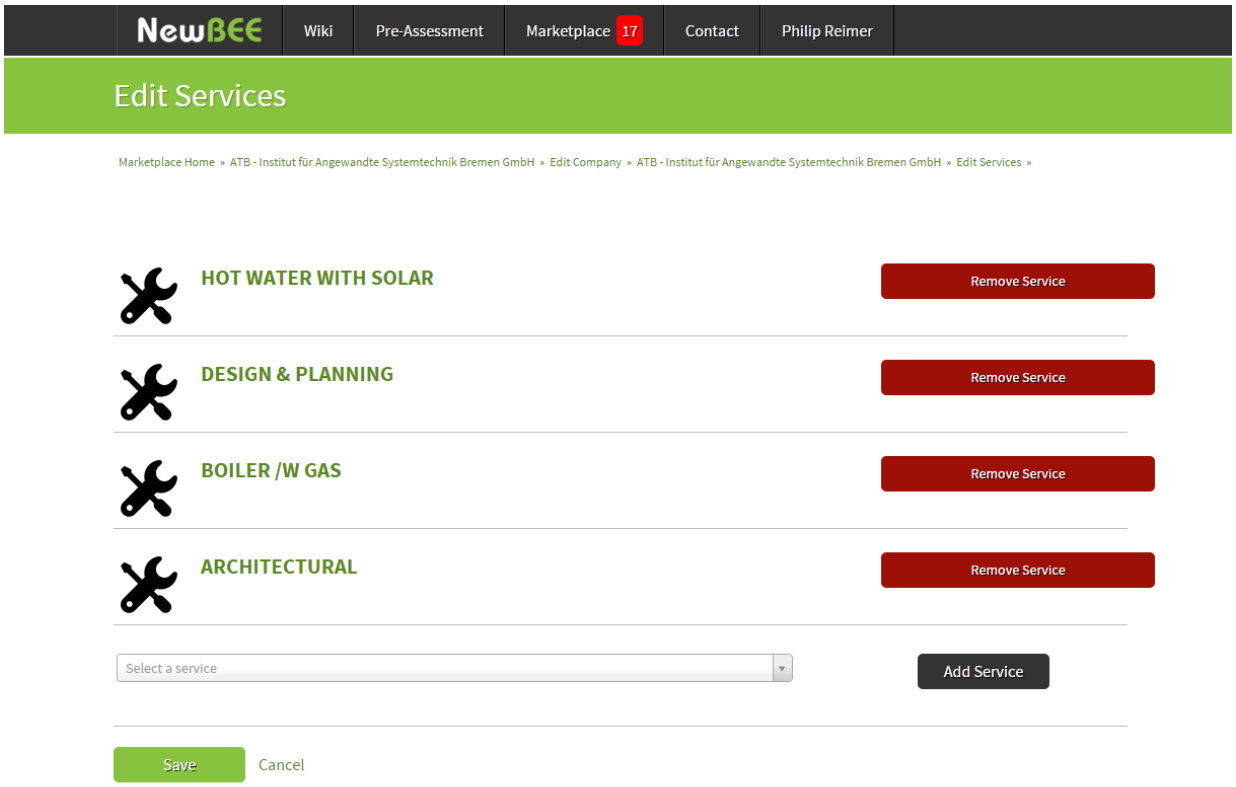


Figure 3-4: Adding Services to the SME profile

Moreover, a SME-user can also add reference projects to the company profile page, e.g. past very successful projects which would create a remarkable image of the SME (see *Figure 3-5*). The SME-user can describe such projects with the following criteria:

- Image Upload
- Project Name
- Project Size in square meters
- Project start and end date
- Used Project services
- Used Project disciplines
- Website of the Project
- Description of the project

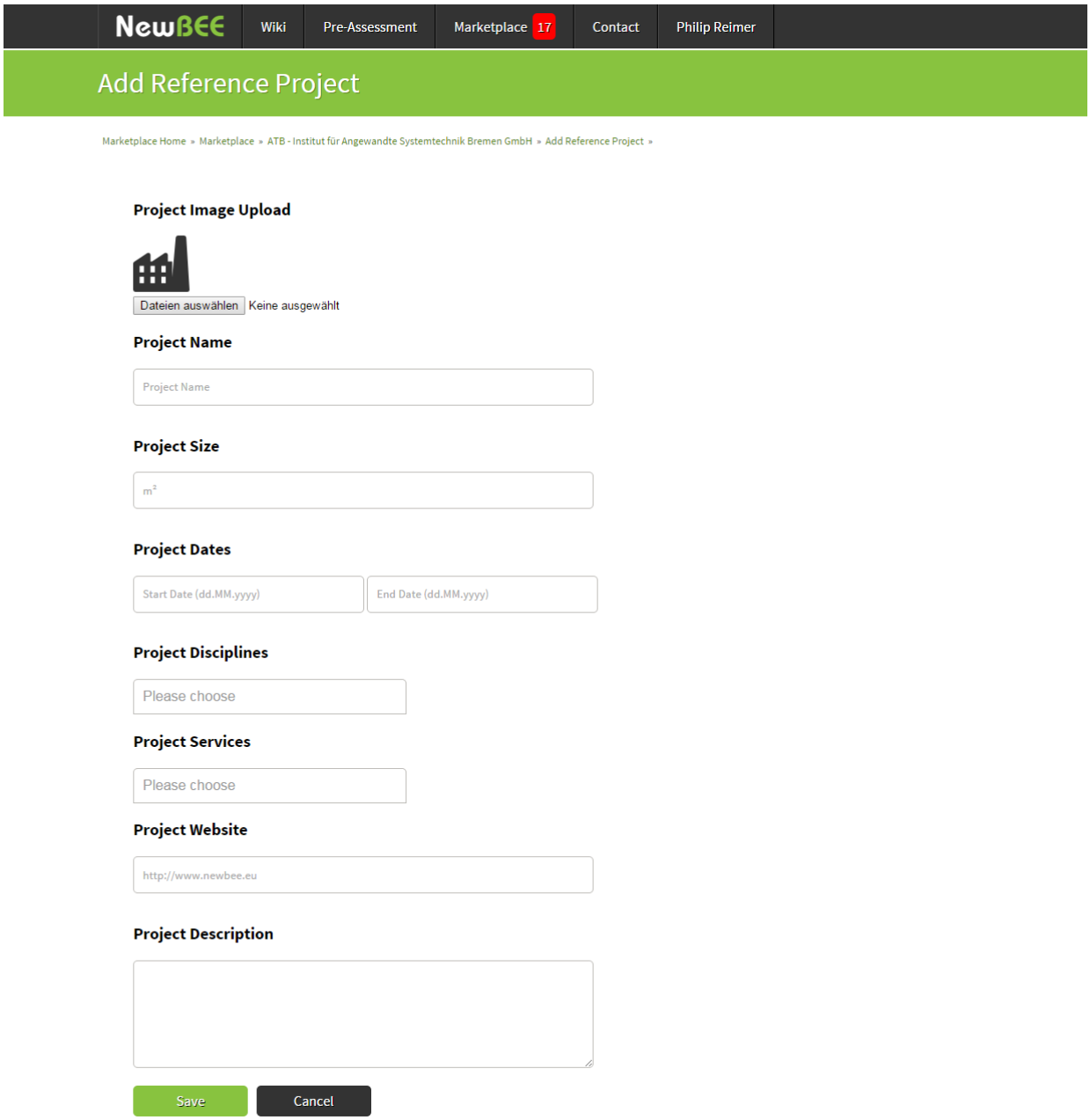


Figure 3-5: Adding reference projects to the SME profile

3.1.2 LOGIN

Once registered, the user will have to log-in with his user account and password in order to have full access to all the NewBEE services reserved only to registered members:

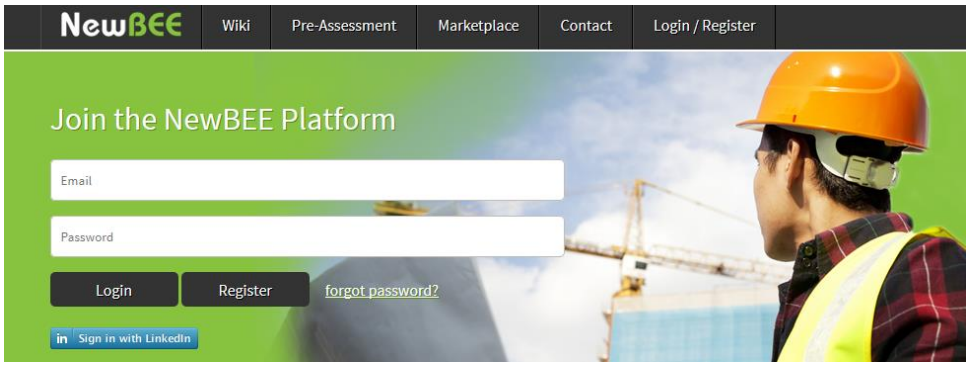


Figure 3-6: NewBEE Login screen

To make use of the pre-assessment tool or to access information of the WIKI based Knowledge Repository, it isn´t needed to be registered. However, if the owner wants to publish a call for proposal or a SME wants the details of the Business Opportunities published, it is needed to have an account to access to these functionalities of NewBEE platform.

3.2 MY ACCOUNT

Each registered user of the NewBEE platform has its own user account which can be found through the dropdown menu bar item “MyAccount” under the user’s name item.

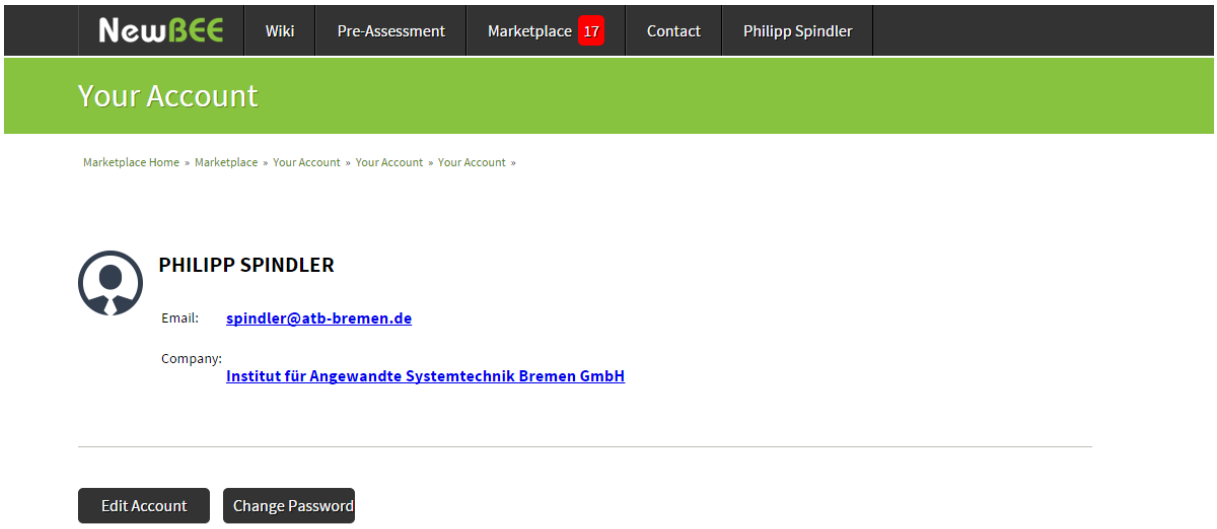


Figure 3-7: User Account Page

The previous figure shows the following information:

- User Name
- Email Address (Link to local Email-Client)
- Company (Link to company profile)

If the user wants to edit his account, e.g. to affiliate himself/herself with a company, the button “Edit Account” will link to the screen, where the modification of the account settings is possible. *Figure 3-8*

shows the account page of the registered user, where - amongst other information - the company affiliation is displayed.

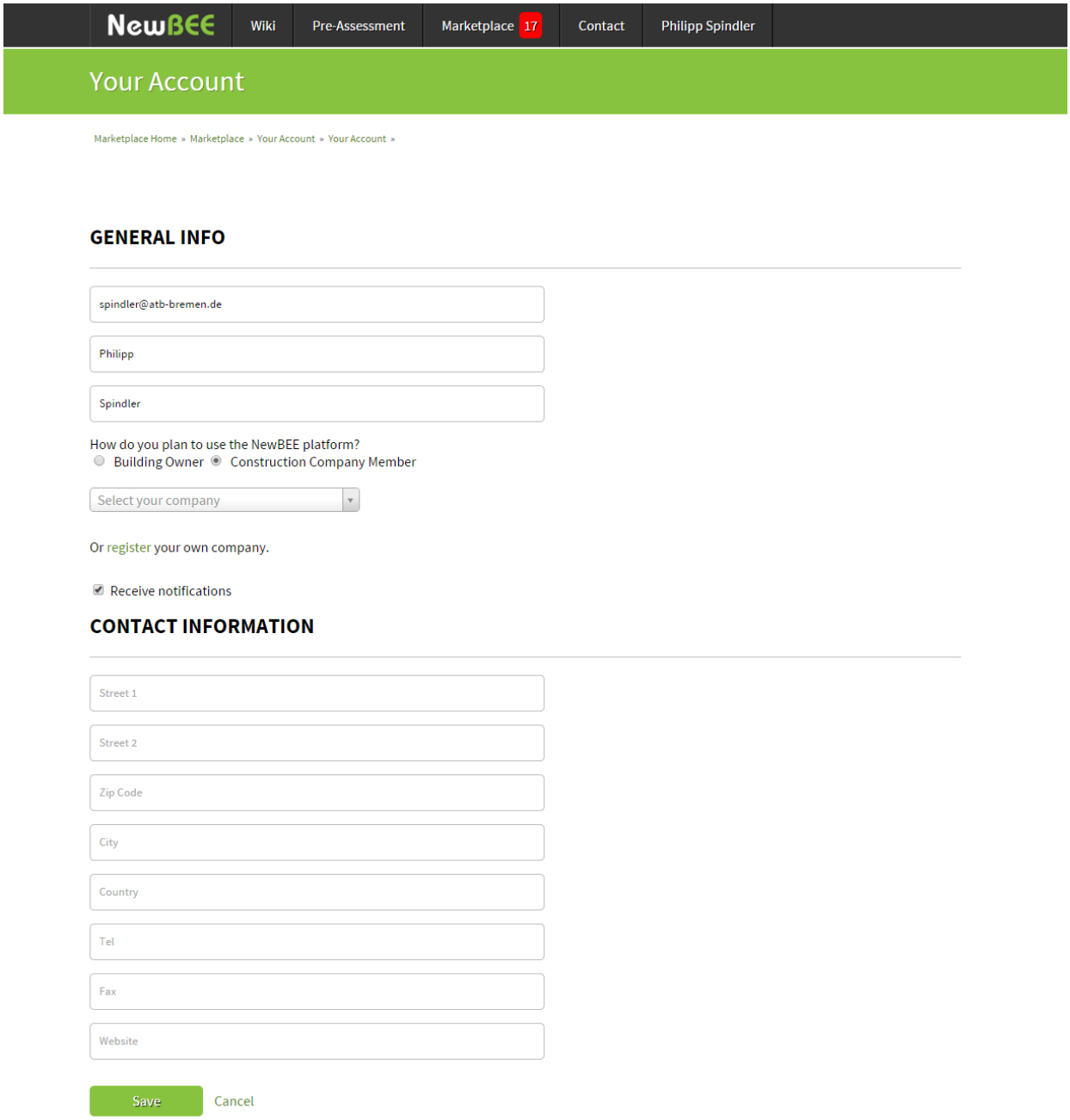


Figure 3-8: User Account Page with no company affiliation yet

If the user would have chosen his/her company from the register page (see above *Figure 3-2*), the dropdown menu in the user account page would be already filled with this company. Since currently, no company affiliation is selected by the newly registered “Construction Company Member”, and his/her company is not registered on the platform for now, the user is asked on the user profile page to register his/her company (see in the previous figure under “General Info” the text below the navigation menu “Or register your own company.”).

The “Or register your own company” link will launch the SME registration process described in the previous Registration/Login sub chapter.

3.3 CONTACT

Other functionality for the platform users (Owner or SME) is the possibility to request information about the platform or a retrofitting process. By using the Contact menu option, a web form to be filled up with the contact of the user (see *Figure 3-9*) will appear. In a short time the NewBEE members will put in contact with the user answering the question.

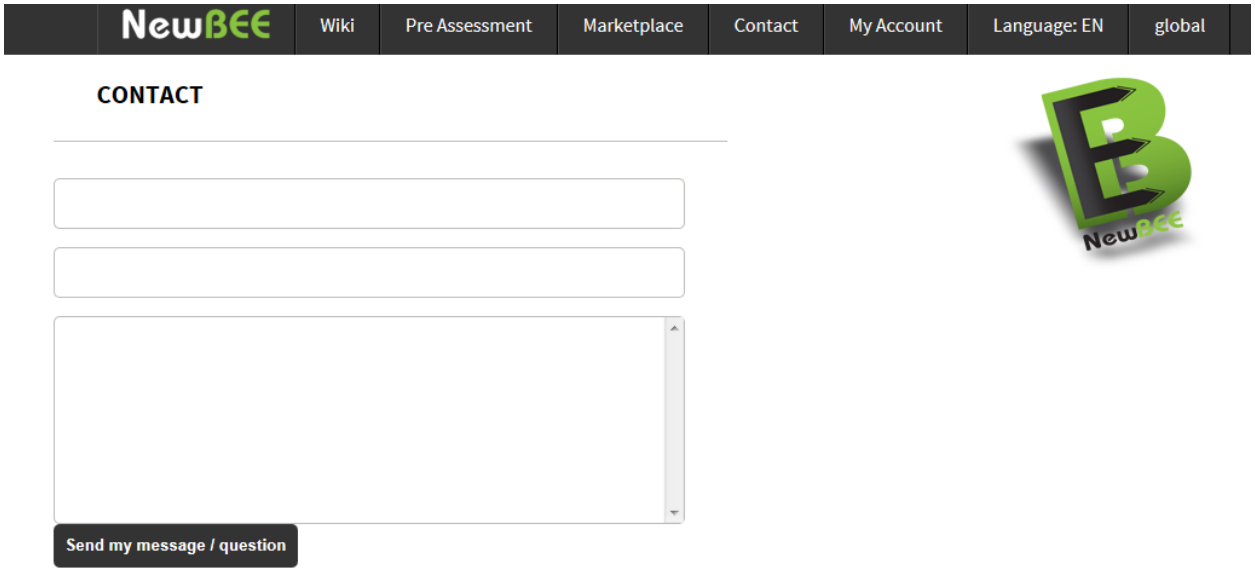


Figure 3-9: Contact form of NewBEE Platform

3.4 PRE-ASSESSMENT TOOL

Owner-user can use the pre-assessment tool to receive a first idea on retrofitting measures and to identify the most appropriate retrofitting technologies based on their requirements. It allows different technical scenarios that might be appropriate to address the building problem at hand. In result different scenarios can be chosen and analyzed by costs and earnings by energy savings.

The NewBEE Pre-Assessment Tool (see next *Figure 3-10*) provides a web-based user interface to support the following processes on behalf of the owner (additional remark: SMEs can go thru the same process in order to understand the owner):

- Insert building data and current energy usage
- Choose from different available measures and create one or more scenarios
- Display, save and print favourite scenarios
- Place project (ask for a call for proposal) in the market place or contact energy consultant or go to financial tool

In the Pre-Assessment the owner-user has to complete three main steps before he can place his project into the marketplace:

- Step 1: Building Data (basic house information)
- Step 2: Action (choose measures)
- Step 3: Results and confirmation (overview, eco meter and payback period)

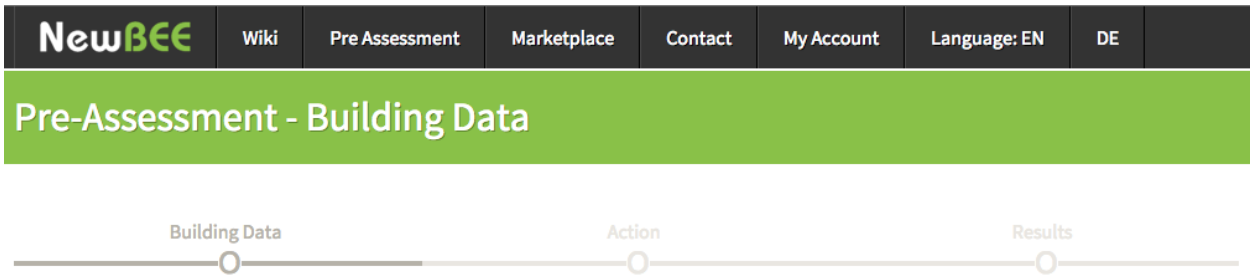


Figure 3-10: Pre-Assessment tool

3.4.1 STEP 1: BUILDING

In the first step the user has to enter the main characteristics of his house/project.

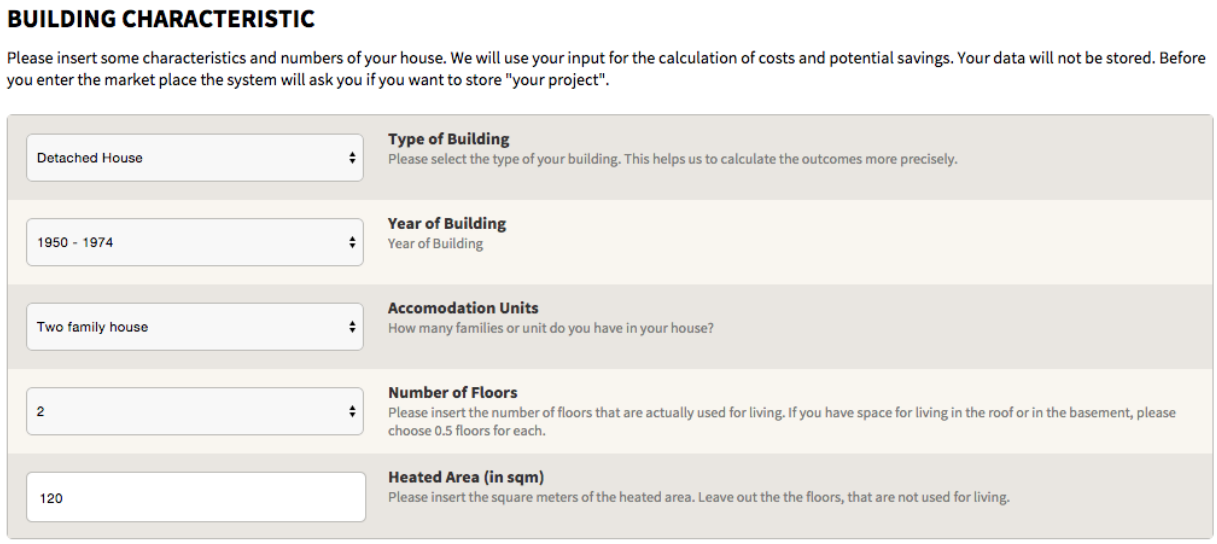


Figure 3-11: Defining building characteristics.

With this basic data the system will calculate the average energy consumption for the house.

To get a better result, the user has to enter his thermal energy consumption in kw/h or his monthly bill in EUR. The price of energy can be configured for each country.

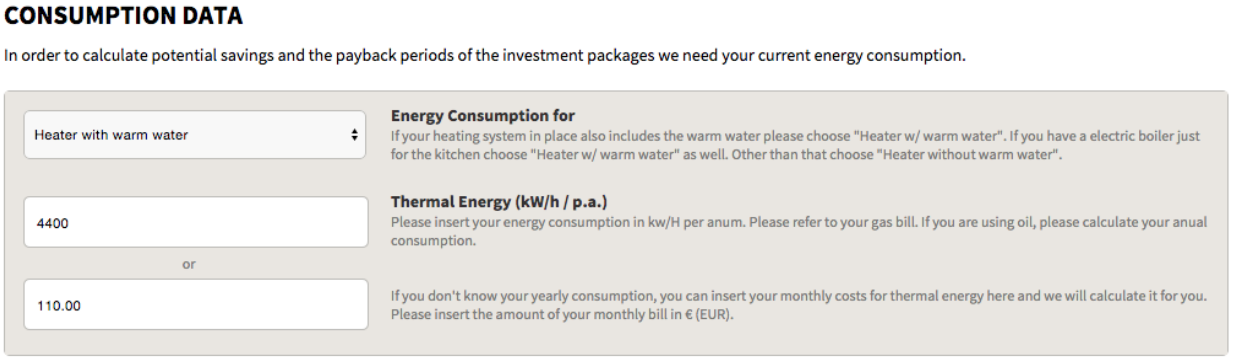


Figure 3-12: Definition of consumption data

In the last part of this first step, the location of the house is required in order to match the measure prices to the local prices. NewBEE Administrator can define multipliers for different regions of each country.

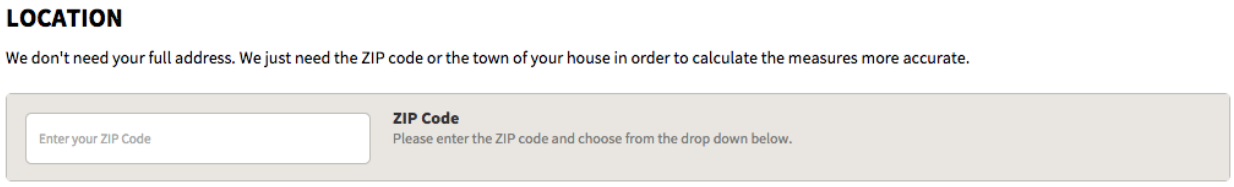


Figure 3-13: Definition of location

The System will try to autocomplete your country/zip code when you start typing.

3.4.2 STEP 2: ACTION

When moving to the next step, the user can see his progress in the progress bar.

Figure 3-14: Progress in the progress bar

In the step 2, the user has to choose his retrofitting measures he would like to apply to his house. The value for each measure depends on the region and country the house is located in.

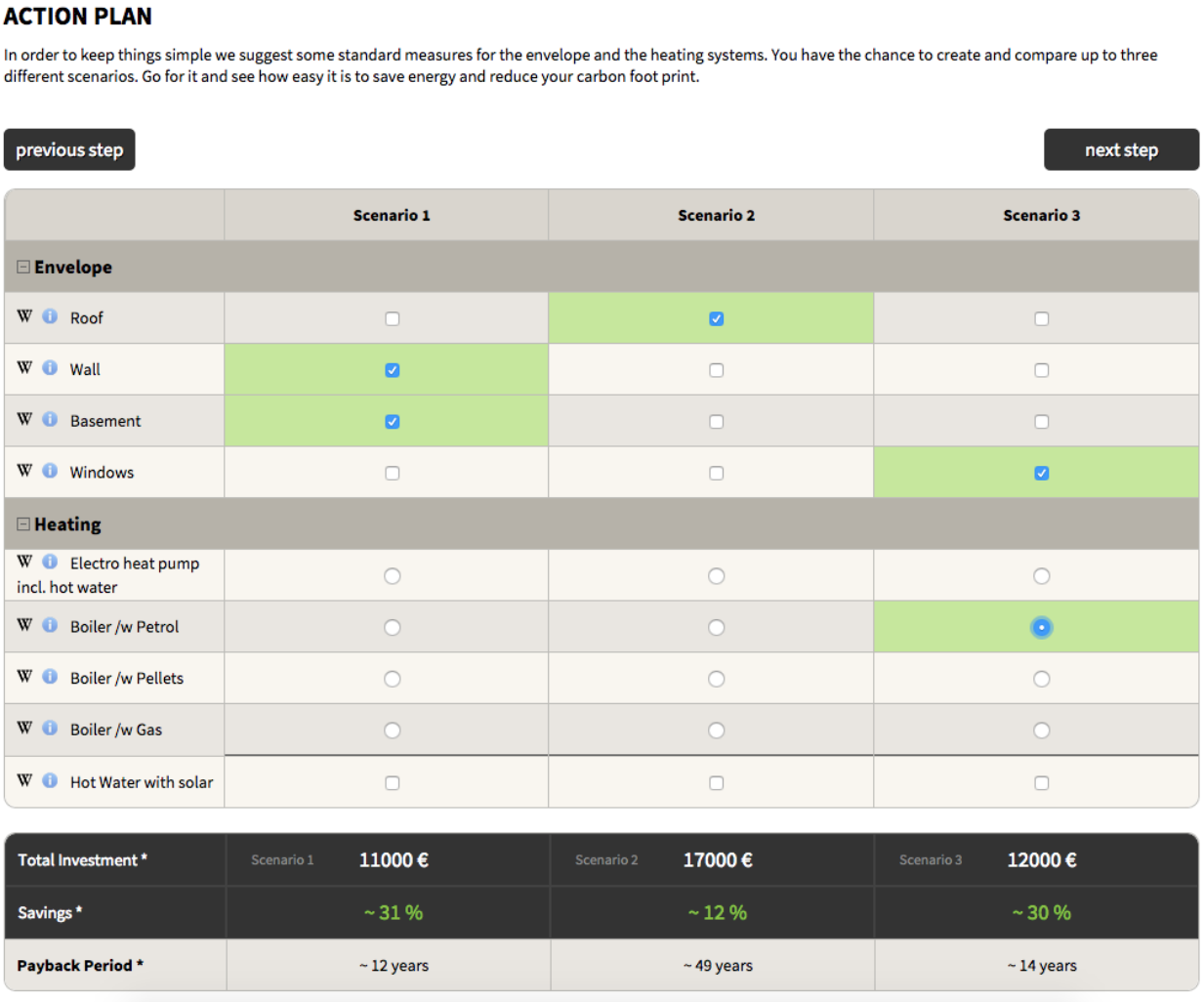


Figure 3-15: Definition of planned actions

Also the savings for each measure can be different for each country. All the values can be setup in the administration menu.

3.4.3 STEP 3: RESULTS AND CONFIRMATION

In the step 3, the user can see the results of the calculations the system did, separated in 2 groups:

- Eco Meter
- Payback period

The Eco Meter is a visual indicator how much energy you will save, compared to the current state of your building. Each scenario is in the same bar to compare to each other, from left (low energy consumption) to the right (high energy consumption). Also the CO2 emission in kg/sqm will be calculated and displayed the same way the energy consumption did.

The Payback period will be displayed in a bar graph.

Next *Figure 3-16* shows the outcomes of the calculations.

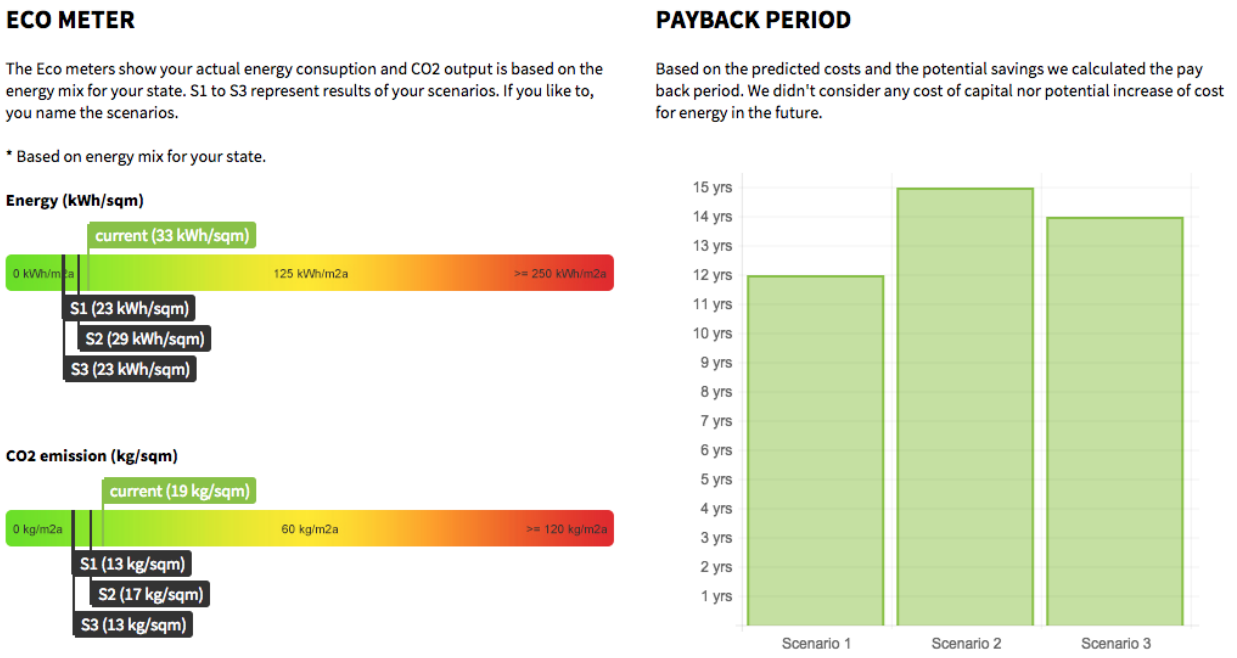


Figure 3-16: Viewing outcomes

In the second part of step 3, the user will see his choices compared to each other with the calculated values for each scenario

Choose your favorite	Scenario 1 ○	Scenario 2 ○	Scenario 3 ○
Measures	**S1** (delete Scenario)	**S2** (delete Scenario)	**S3** (delete Scenario)
Roof	✗	✔	✗
Wall	✔	✗	✗
Basement	✔	✗	✗
Windows	✗	✗	✔
Boiler /w Petrol	✗	✗	✔

Total Investment *	Scenario 1 **11000 €**	Scenario 2 **17000 €**	Scenario 3 **12000 €**
Savings *	~ 31 %	~ 12 %	~ 30 %
Saved KWh / a *	1240 kWh (356.25 EUR/a)	480 kWh (137.9 EUR/a)	1200 kWh (344.76 EUR/a)
Payback period *	~ 31 years	~ 124 years	~ 35 years
Financial Model Calculator	Calculate this scenario	Calculate this scenario	Calculate this scenario

Figure 3-17: Comparison of scenarios

He can choose his favourite scenario and proceed it to the marketplace, that is, to place a call for proposals into the NewBEE marketplace.

Also a short link to the financial model calculator is in the bottom for each scenario.

3.5 FINANCIAL CALCULATION TOOL

The financial calculation tool is a service for users who want to analyse the cash flow generated by a retrofitting project. The main purpose is to improve the owner´s level of awareness in the field of energy-economics.

The module let owners to simulate several ways on how to finance the project and provide schematic annual cash flows comprising expenses and savings generated by intervention. Users can simulate effects on cash flow of several finance opportunities and different energy cost scenarios.

The graphical user interface (GUI) and the user experience (UX) is designed to be used by a wide variety of people. *Figure 3-18* shows the starting page of the Financial Model Calculator tool. Users are required to fill three main panels:

- general data information,
- financial opportunities selector and
- energy saving estimations.

The financial tool uses data provided by users, in the starting page (see chapter 3.6) or in the pre-assessment tool. Inserting the ZIP code, module features select the specific country-dataset to consider in the calculation routines. Data about financial opportunities come from literature research, experts' consultation and web searches.

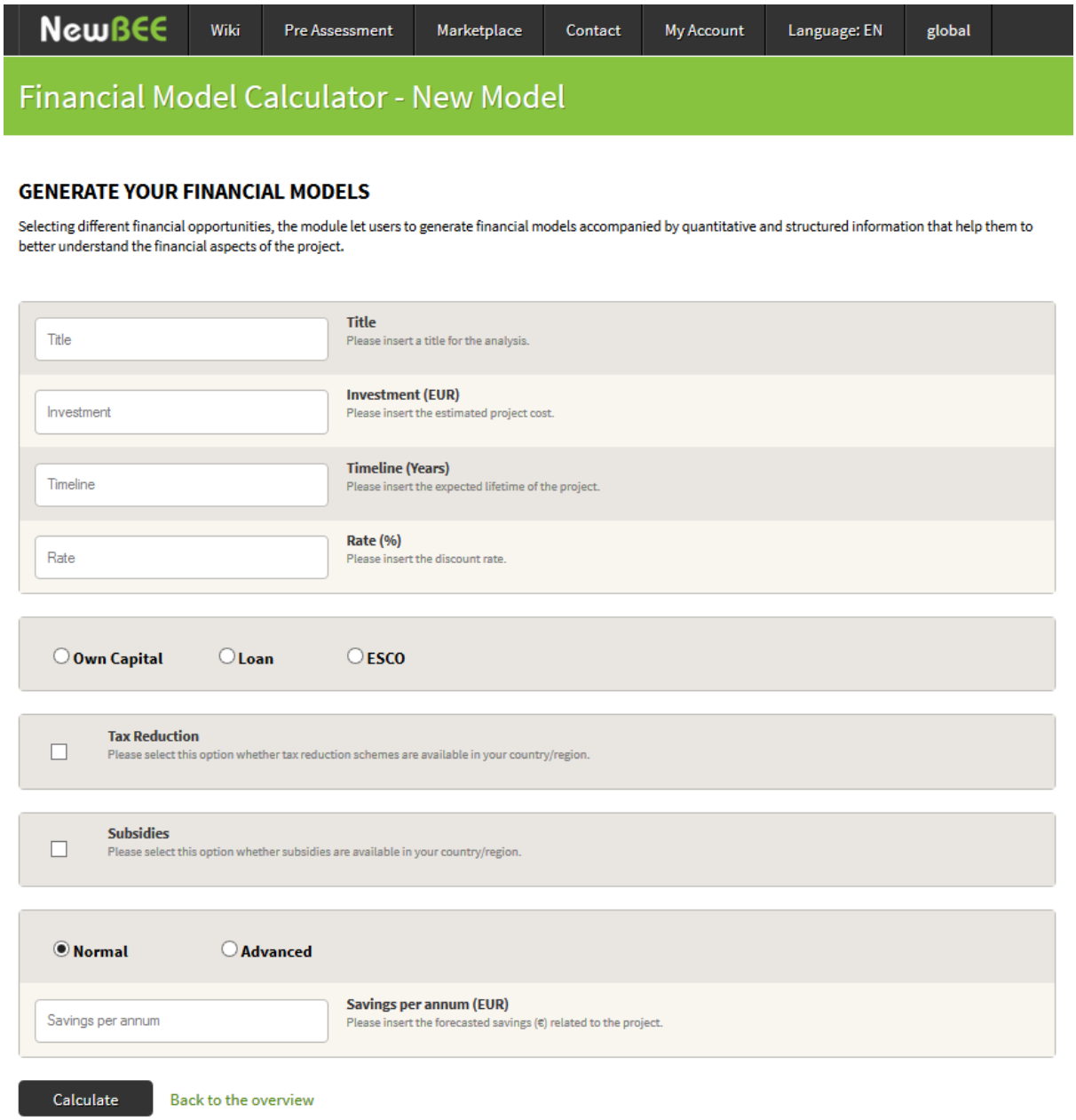


Figure 3-18: Starting page of the financial calculation module.

3.5.1 STEP1: GENERAL DATA INFORMATION

The first panel requires filling the module with general information of the project: a title, the amount of the investment, the duration and for users who want to generate a discounted cash flow analysis the discount rate.

Figure 3-19: General information step.

3.5.2 STEP2: FINANCIAL OPPORTUNITIES SELECTOR

The second step lets users to select financial opportunities and to simulate incentive schemes. It considers the three financing options: to use “own finance”, to simulate to examine a loan and to evaluate the ESCO model. It let users to simulate the effect of two incentive schemes: to consider the availability of subsidies and tax reductions.

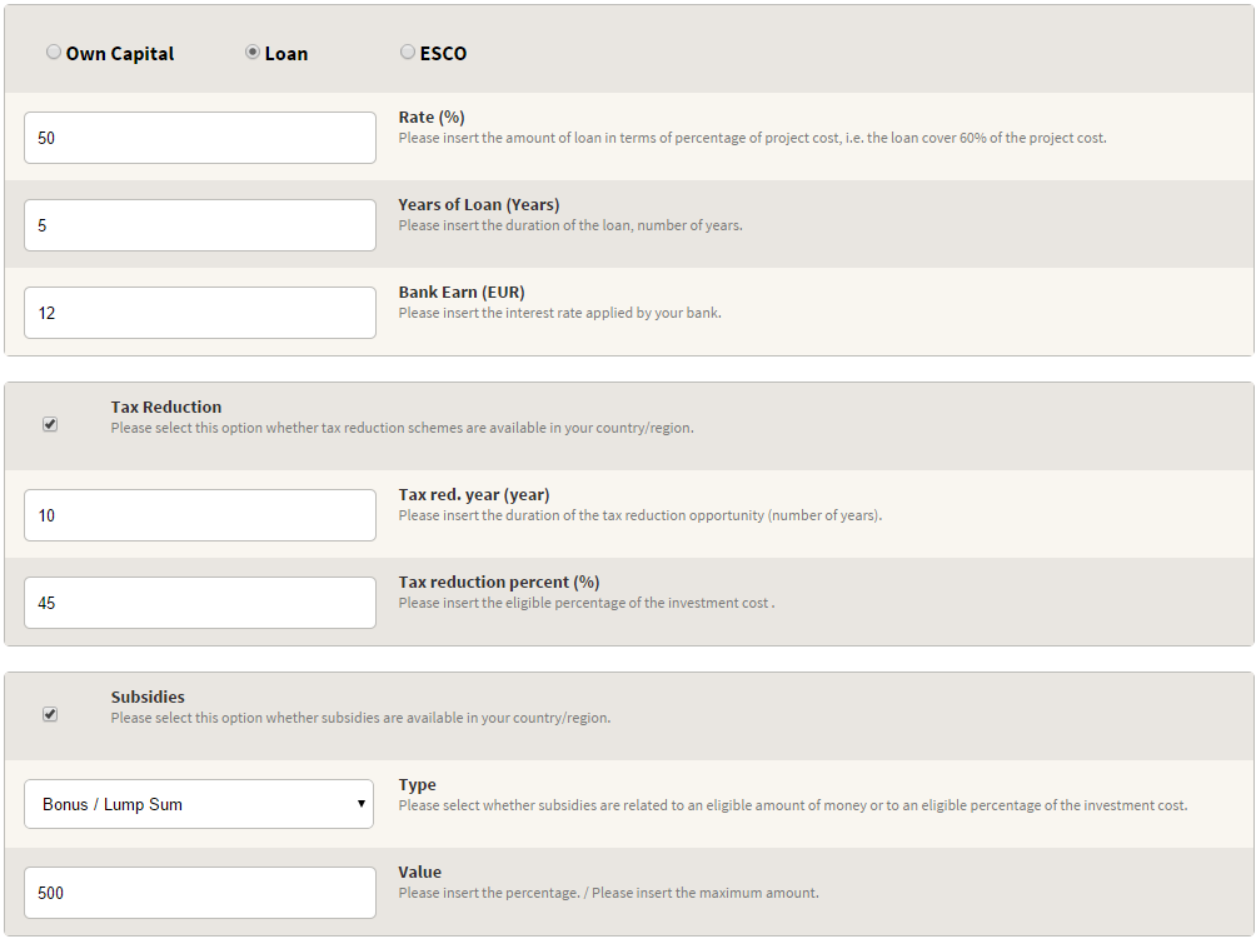


Figure 3-20: Financial opportunities step.

3.5.3 STEP3: ENERGY SAVINGS ESTIMATION

The third step requires inserting data about the envisioned energy savings generated by the project.

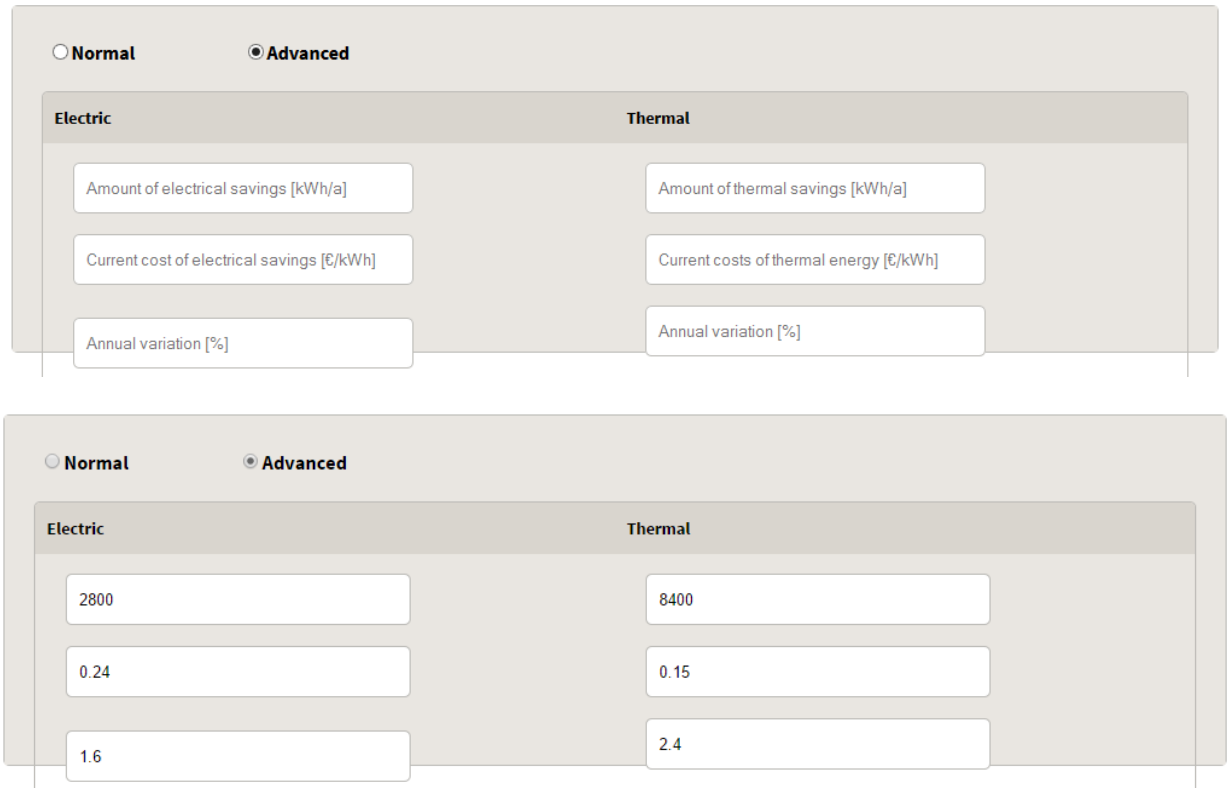


Figure 3-21: Energy savings step.

3.5.4 RESULT PAGE

The “results page” displays the cash flows generated by the project both in a table and graphical way.

NewBEE | Wiki | Pre Assessment | Marketplace | Contact | My Account | Language: EN | global

Financial Model Calculator

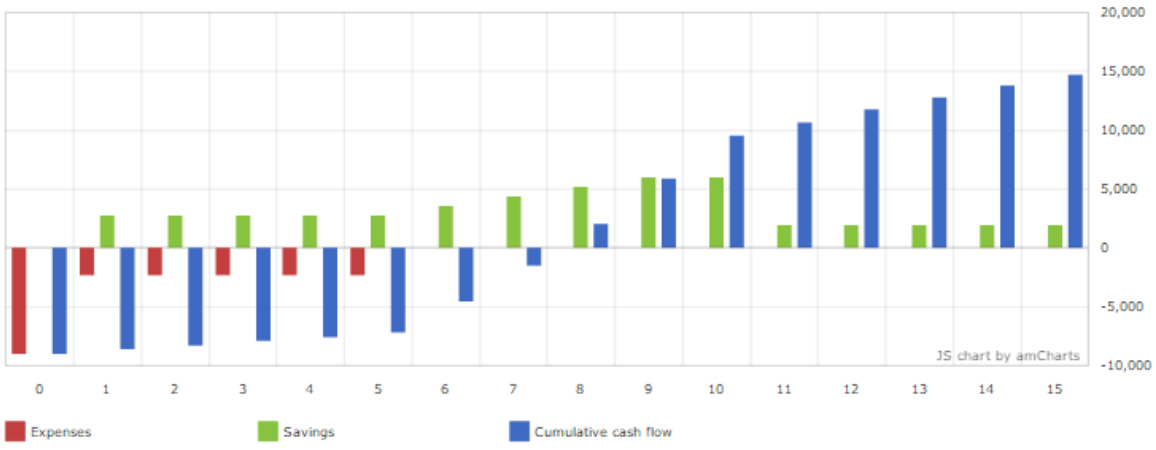
TEST 03

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.

Back to Overview

Invest	18000 €	Finance Type	Loan
Rate	5 %	IRR	8.9 %
NetPV	5380.71 €	Timeline	9.31677 years

Years	Expenses	Savings	PV Output	PV Input
0.	-9000 €	0 €	-9000 €	0 €
1.	-2328.23 €	2742 €	-2217.36 €	2611.43 €
2.	-2328.23 €	2742 €	-2111.77 €	2487.07 €
3.	-2328.23 €	2742 €	-2011.21 €	2368.64 €
4.	-2328.23 €	2742 €	-1915.44 €	2255.85 €
		Show more data		
Sum	-20641.15 €	48420 €	-19080.01 €	33786.17 €



Back to Overview

Figure 3-22: Example of the result page.

3.6 GLOBAL & LANGUAGE: NEWBEE ADMINISTRATORS

The NewBEE platform and more precisely the pre-assessment and the financial tools are designed to have a different configuration for different countries or regions. This applies for the language of the

graphical user interface, the description of the measure and of course to the parameters used for the calculations. NewBEE administration functionalities include the maintenance of the following parameters:

- Set up language settings
- Define regional measure including retrofitting cost and saving potentials
- Define cost leverages for different regions of one country based on the zip code
- Define characteristics of building types
- Enter the country's energy mix including carbon footprint

Each country can define its own parameters for the Pre-Assessment split in four different parts:

- Building specific values
- Measures / Prices
- Cost Index
- Savings

3.6.1 BUILDING SPECIFIC VALUES

Buildings

Here you can edit the building specific values for your country.

All | Germany | Spain | Finnland

ID	Method ID	Region	Key	Value	Edit Parameter
1	4	global	factor_a	205	Edit
2	4	global	factor_b	2	Edit
3	4	global	factor_c	3	Edit
4	4	global	window_price	400	Edit
5	4	DE	u_value	1.1	Edit
6	0	global	avg_kwh_sqm	800	Edit
7	0	DE	energy_price_kwh	28.73	Edit
8	0	global	test	0	Edit
9	0	global	energy_price_kwh	30	Edit
10	0	global	u_value	1	Edit

Figure 3-23: Definition of building specific values

The NewBEE administrator can add specific values for different countries e.g. the energy price. If no value is set for a specific country, the system will take the global (default) value.

3.6.2 MEASURES / PRICES

Measures / Prices

In this table you can specific add and edit the prices for the measures depending on your country. If there is no data for your country, the global value will be taken instead.

All | Germany | Spain | Finnland

ID	Region	Method	Value	Edit
1	ES	roof	68	Edit
2	ES	wall	74	Edit
4	DE	windows	300	Edit
5	DE	boiler_gas	5000	Edit
6	DE	boiler_oil	5000	Edit
7	DE	boiler_pellets	8500	Edit
8	ES	solar	8000	Edit
9	DE	heat_pump	12500	Edit
10	global	roof	40	Edit

Figure 3-24: Definition of measure / prices

Every measure can have a different price for each country. If no values are given, the system will take the global (default) value.

3.6.3 COST INDEX

In some countries some regions may be more expensive than others. The administrator can define a multiplier for a specific region based on the first digit of the zip code.

Cost Index

This list is representing the pricing in your country based on the zip code. The cost index 1 is representing 100% costs.

All | Germany | Spain | Finnland

Zip Code	Region	Cost Index	Edit Index
0	DE	0.9	Edit
1	DE	0.8	Edit
2	DE	0.9	Edit
3	DE	0.9	Edit
4	DE	1	Edit

Figure 3-25: Definition of cost index

If no multiplier is defined, the base value for each measure will be taken (1 = 100%)

3.6.4 SAVINGS

Each country has an own savings table. Depending on the construction year of the building and the measure, different amounts of energy can be saved.

Germany

Measures	1918	1919	1950	1975	2001
Roof	12%	12%	12%	12%	0%
Wall	25%	25%	25%	20%	10%
Basement	8%	8%	8%	6%	0%
Windows	15%	15%	15%	8%	0%
Boiler	33%	33%	33%	33%	33%
Boiler /w Petrol	20%	18%	15%	12%	0%
Boiler /w Pellets	20%	18%	15%	12%	0%
Boiler /w Gas	20%	18%	15%	12%	0%
Hot Water with solar	8%	8%	8%	8%	8%

Figure 3-26: Country specific savings

This table is required for each country otherwise it will take the global (default) value for the savings parameters.

3.7 MARKET PLACE

The purpose of the market place is to help SMEs to find Business Opportunities (BO) in refurbishment market and owners to find service providers.

The market place enables building owners to:

- Register refurbishment projects publishing a call for proposal from scratch or with the help of the Pre-Assessment tool;
- Search for service providers;
- Receive refurbishment offers, i.e. the building owner can see all offers SMEs made according to his/her published business opportunities

The market place supports SME that provide disciplines and services for energy efficiency refurbishment by enabling:

- Registration in the platform (if not done previously, as previously described in chapter 3.1)
- Business opportunity (refurbishment project) search
- Partner search to create a joint offer with a team
- Send an offer to the building owner by first creating a team on the published retrofitting project

In order to get access to the all the Market place functionalities the user has to be registered and logged in the NewBEE platform as already described in the Login/register menu option.

Once registered and logged in to the NewBEE platform, a SME-user as well as an owner-user can gather information about SMEs on the platform, which maintain a public company profile, with additional

information like e.g. offered services and disciplines and reference projects. Through this search, SME-users can search for business partners or owner-users can get more details about SMEs which helps the owner-user to foster his decision of selecting SMEs for his/her refurbishment project.

One of the main functionalities for registered SMEs is to find Business Opportunities in the marketplace, i.e. to find refurbishment projects, which have been published by a building owner. SMEs can get detailed information about each business opportunity published. They can respond to such a Business Opportunity by proposing an offer through contacting directly the house owner or creating a team of SMEs to collaborate on a specific refurbishment project as a whole.

Another main functionality for registered private house owners-users is to publish a call for offers – so called business opportunities for refurbishment projects – on the marketplace to which in turn SMEs can apply with an offer. There are two possible ways to publish a Business Opportunity on the marketplace:

- Creation of a new Business Opportunity from scratch and without any Pre-Assessment
- Creation of a new Business Opportunity based on the data from the Pre-Assessment Tool

Following are the different options for SMEs and owners to use the market place in different refurbishment and project situations.

3.7.1 SME REGISTRATION

The procedure to register an SME in the NewBEE platform is detailed in the chapter 3.1.

3.7.2 BUSINESS OPPORTUNITY SEARCH

One of the main functionalities of the NewBEE platform is to search for a Business Opportunity (refurbishment project). *Figure 3-27* shows the User Interface where Business Opportunities can be found. Refurbishment projects can be searched by guest-users (not logged in users) and registered SME-users also, whereas guest-users only have the possibility to filter business opportunities by zip code and can only see the list of business opportunities but not start any further actions without registering at the platform.

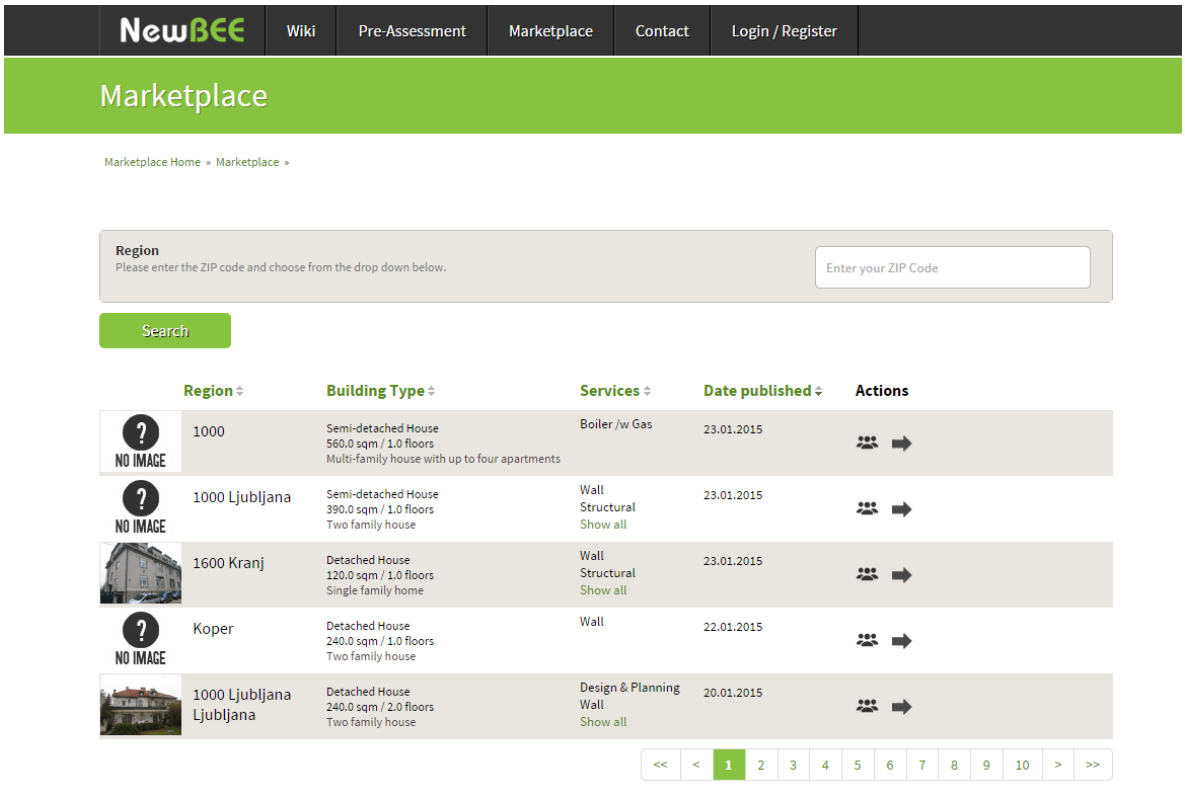


Figure 3-27: Business Opportunity Search as Guest-User

For any further activity like contacting house owners, see details of business opportunities or create a team for a business opportunity, a platform registration is required. Registered SME-users can browse Business Opportunities in a more advanced way. Like next *Figure 3-28* shows, SME-users can filter Business Opportunities by the following criteria:

- Location via Google Maps API Integration
- Search Radius around the given location
- Date published Interval (from – to)
- Building type
- Accommodation
- Disciplines
- Services
- Technology
- Problem
- Description

Additionally, a help text supports the user in the searching process.

Registered SME-users can also use action items like creating a team for a certain business opportunity or contacting the owner directly.

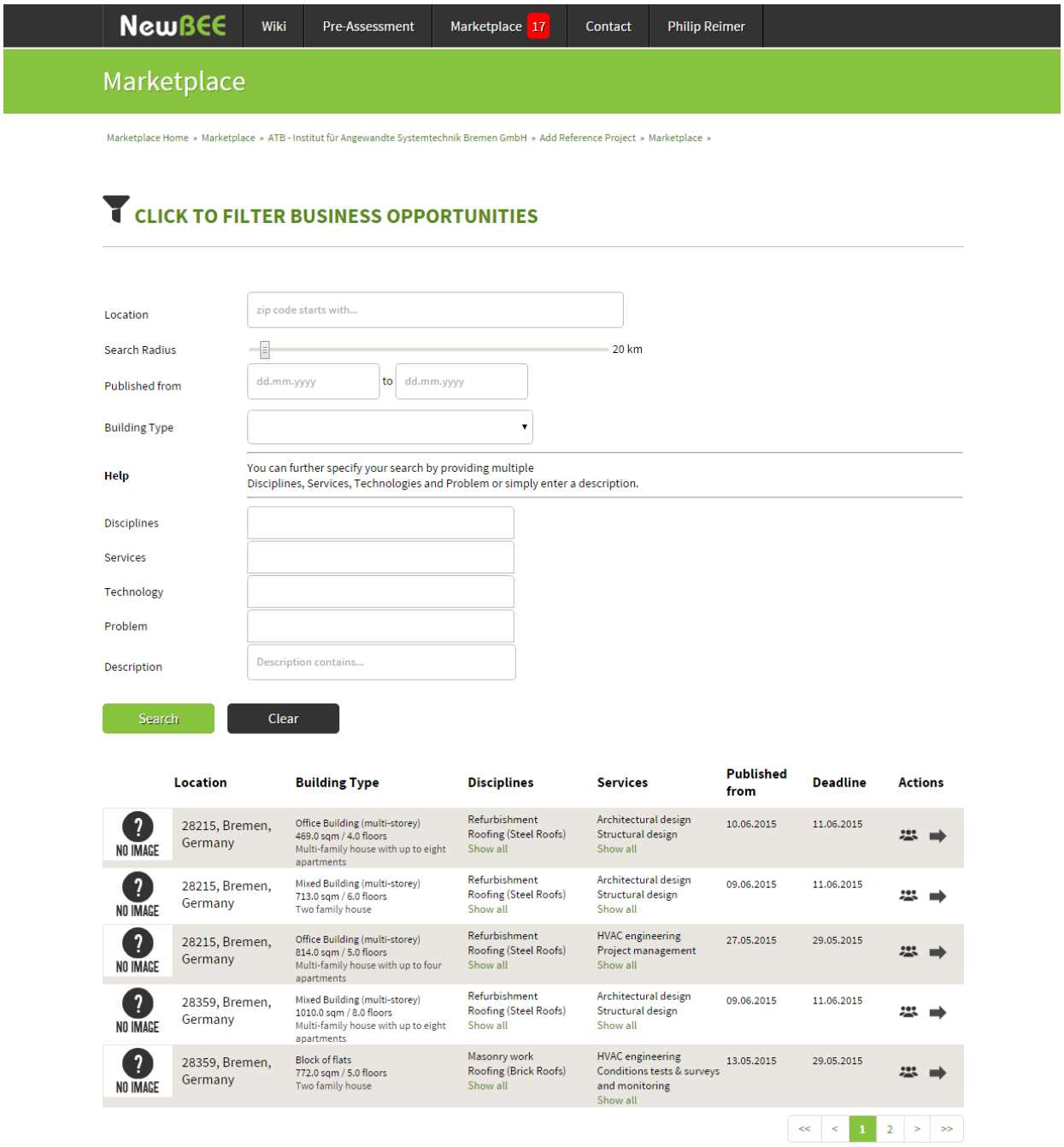


Figure 3-28: Business Opportunity Search as a registered SME-user

3.7.3 PARTNER SEARCH BY AN SME-USER

If an SME wants to find appropriate partners for collaboration on a Business Opportunity, the SME can create a team and find possible partners for each needed service and discipline. On the one hand, the NewBEE system proposes a list of suitable partners for each needed service / discipline, from which the user can choose from. On the other hand, a SME can also select a specific partner through the search-enabled “select-box” as depicted in *Figure 3-29*. On top of that, it is also possible to browse SMEs by their company profile and get useful information about appropriate SMEs for a collaboration refurbishment project.

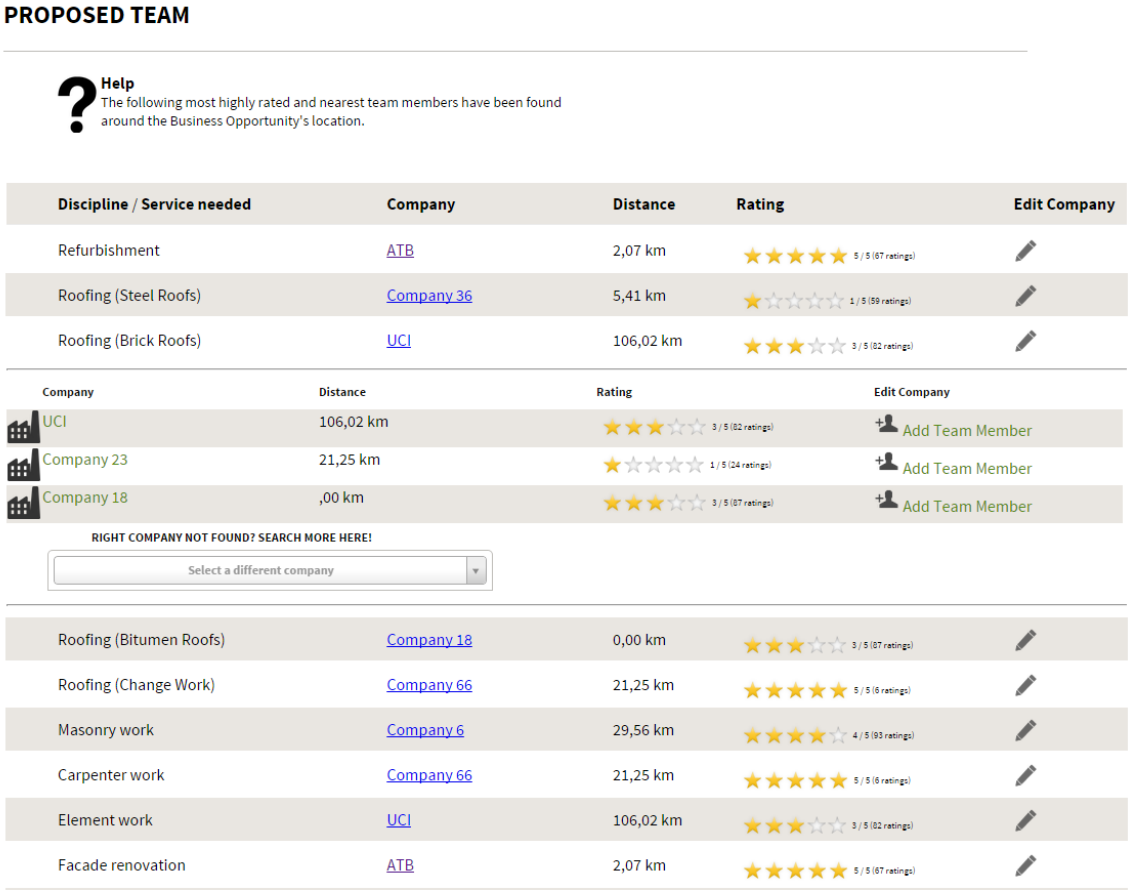


Figure 3-29: Team Creation and Partner Search

3.7.4 PROJECT REGISTRATION BY AN OWNER

To publish a Business Opportunity call on the NewBEE marketplace, the owner-user needs to fill in the following information (see list of bullet points below). If the owner used the Pre-Assessment Tool beforehand, all refurbishment information regarding the envisaged project come from the Pre-Assessment to the marketplace and the user lands on a webpage which looks like *Figure 3-30*.

Here, all inputs fields which correspond to the Pre-Assessment data are pre-filled, but are still editable for further adaptions like image and file uploads. On this site, final corrections and adaptions towards the refurbishment project can be done and the business opportunity can be published on the marketplace. If no Pre-Assessment has been used beforehand, the owner-user can also reach this site through the navigation bar and create a new business opportunity from scratch. In the latter case, no input fields are pre-filled and the owner-user has to fill these manually. The mandatory inputs are the following:

- Location via Google Maps API Integration Accommodation Unit
- Building Type
- Construction Date
- Heated Area
- Floors
- Main Building Material
- Façade
- Ownership
- Number of Occupants
- Electricity Consumption
- Thermal Consumption
- Picture Upload

- File Upload
- Title of refurbishment project
- Description
- Related Problems
- Interesting Technologies
- Needed Services and Disciplines
- Visibility of the business opportunity

Figure 3-30 shows the creation of a BO based on the data coming from the Pre-Assessment Tool.

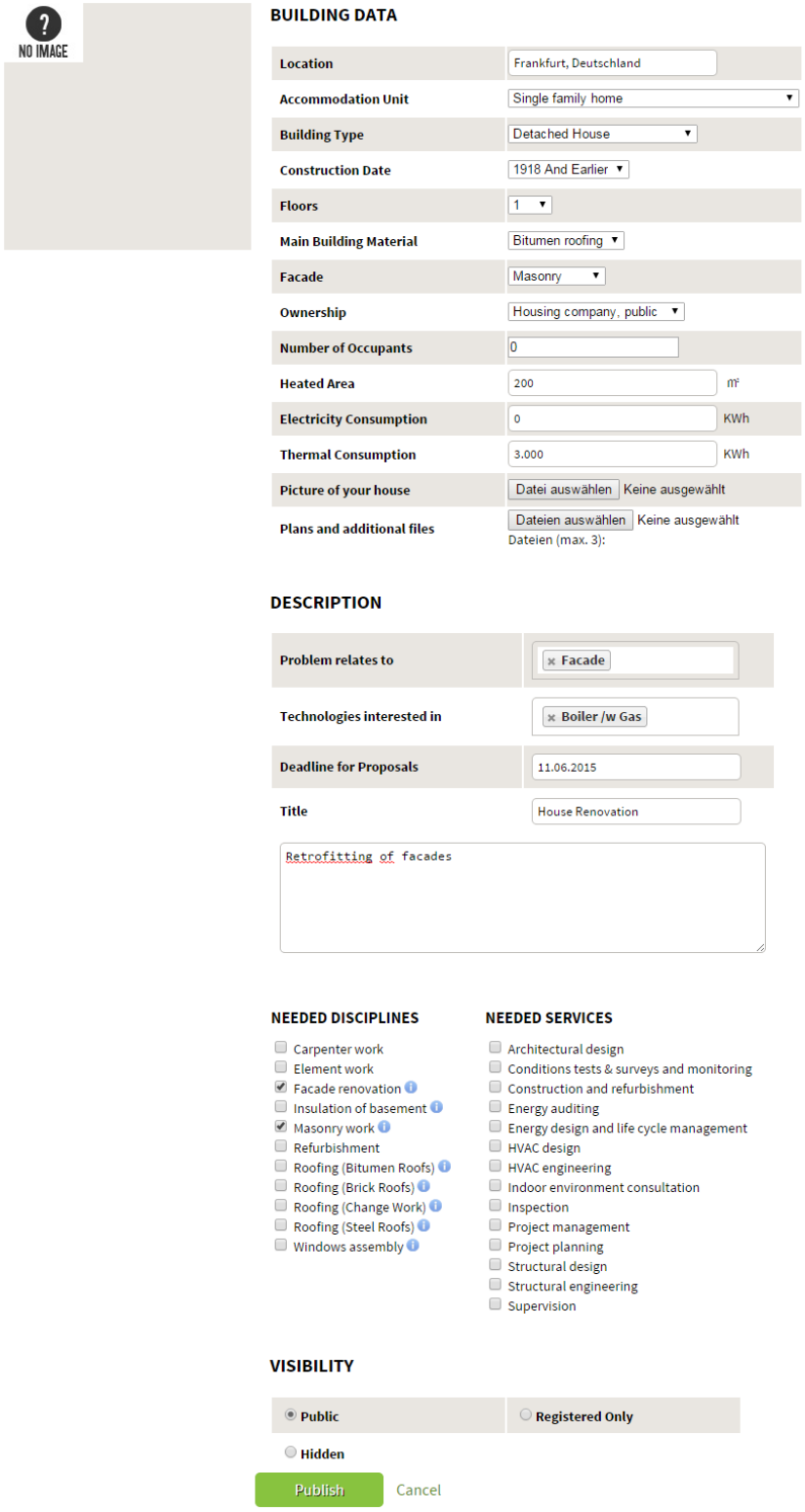


Figure 3-30: Publish a BO as a building owner incl. Pre-Assessment

3.7.5 OFFER MANAGEMENT

One core functionality of the NewBEE platform is to respond via a so-called “Offer” (tender, proposal) to a specific business opportunity, which has been published on the maketplace by a house owner. Moreover, the SME can respond to a business opportunity alone without help from other SMEs or as a collaborative team of SMEs.

Since SMEs would work on several business opportunities at the same time it is necessary to manage these offers in some way.

SMEs can participate in offers initiated directly by them or initiated by others (after receiving an invitation).

Figure 3-31 shows a list of offers which either the logged in SME-user started alone (single SME offer) or where the logged in SME invited team members to collaborate on this offer (team-based offer). In the latter case the logged in SME is the so-called “Initiator” of the offer.

Shown is the following information:

- Region of the Business Opportunity
- Building Type
- Needed Services and Disciplines
- Status
- Team (Status of the invited team members like “Rejected”, “Pending”, “Accepted”)
- Action Items
    - Details of the Business Opportunity (Magnifying glass icon)
    - Edit Offer (Pencil Icon)
    - Closing Offer (Prohibition Sign Icon)
    - Contact Owner (Arrow Icon)
- Supportive help text in order to explain the user what this screens is showing

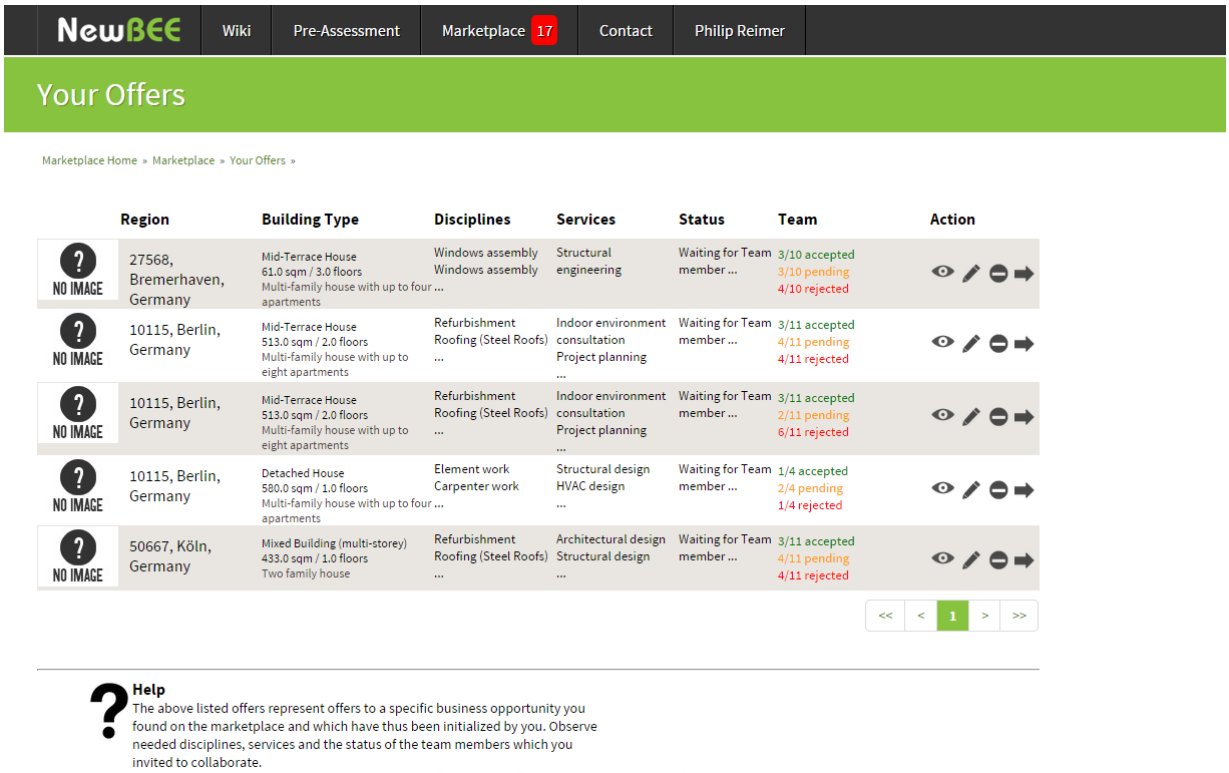


Figure 3-31: Management of offers both started alone and initiated by the SME

The next *Figure 3-32* shows all offers, where the SME has been invited to collaborate within a team on an offer as a response to a Business Opportunity. For the purpose of usability and clarity the screen is subdivided in a view of tabs with the categories “Accepted”, “Pending” and “Rejected” indicating the status of the logged-in SME. That means e.g. the tab “Accepted” shows all Offers where the logged-in SME accepted a team invitation. Moreover, each tab holds a table which consist of the following information:

- Initiator (i.e. SME which started the offer and invited the logged in SME to collaborate on that)
    - Additionally the rating of this SME is displayed
- Business Opportunity Summary

- My Disciplines (i.e. the disciplines which the logged in SME will provide in the team)
- My Services (i.e. the services which the logged in SME will provide in the team)
- Offer Status
- Team (Status of all team members)
- Action Items
    - Details of the Business Opportunity (Magnifying glass icon)
    - Status, i.e. possibility to accept or reject an offer invitation (Checkmark sign Icon, Prohibition sign Icon)
    - Contact Initiator (Arrow Icon)

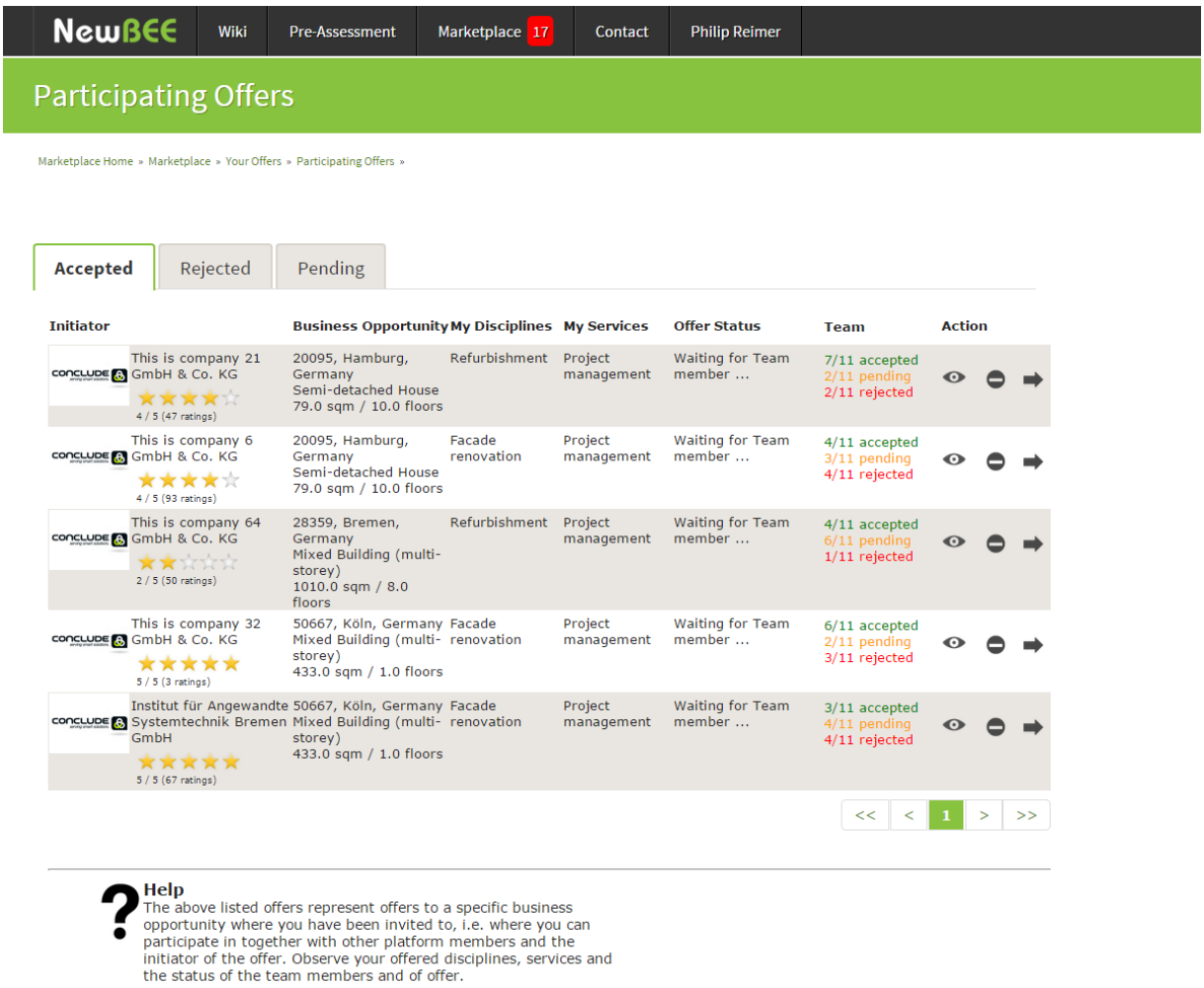


Figure 3-32: Management of Offers where the logged-in SME has been invited to collaborate with

3.7.6 How a building-owner selects the wining offer

The SMEs before proposing an offer to a building owner's BO use to contact with the building owners. Nevertheless, as already mentioned above, building owners can publish BO on the marketplace and get offers by SMEs elaborated alone or with a collaborative team.

The landing page of a logged-in building owner on the marketplace is shown in *Figure 3-33*. The table shows each BO published by the building owner represented as a table row with main basic information about it in different columns. The owner is waiting for offer proposals by interested SMEs and gets informed directly via the owner's account information if SMEs are interested. The column "Activities" is showing the number of SMEs interested in the BO (which sent an offer to the building owner) and the number of visits the BO has had (SMEs viewing the BO).

As long as no SME is interested in a certain BO, the column “Activities” is showing “0 SMEs interested”, and the owner is still able to edit the business opportunity (pen-icon; see green box in the figure below). If no offer is provided for a business opportunity up to a certain deadline given by the owner, the business opportunity is deleted from the system automatically after the business opportunity expires.

If offers have been proposed to a BO, it is indicated under the same column “Activities” with the number of offers (see red box in the figure below). From there, the owner sees details about the offer or directly contacts the SME who proposed the offer and get into communication via the company profile information. It is also possible to reject certain offers by the building owner, if the offer does not fit the owner’s requirements.

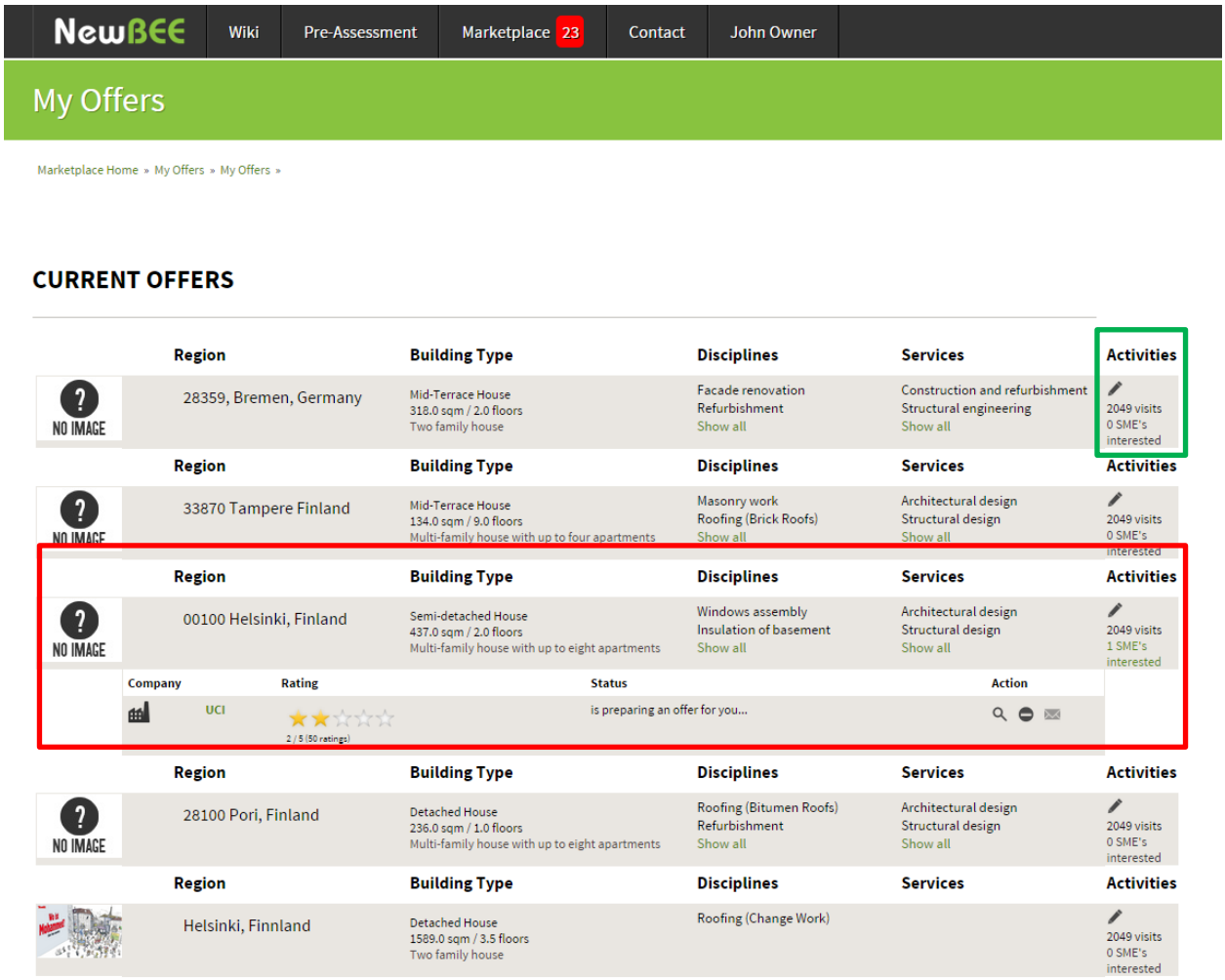


Figure 3-33: A building owner can see all offers proposed for his/her business opportunity

After a retrofitting project has been fully carried out and finished (outside of the scope of NewBEE platform), the status of the project changes to “finished” and thus appear in the “Finished Projects” list on the building owners marketplace landing page (see *Figure 3-34*) with again main basic information of the project. From there, the building owner can rate project partners (SMEs) and also view his/her ratings already made on previous projects on the platform.

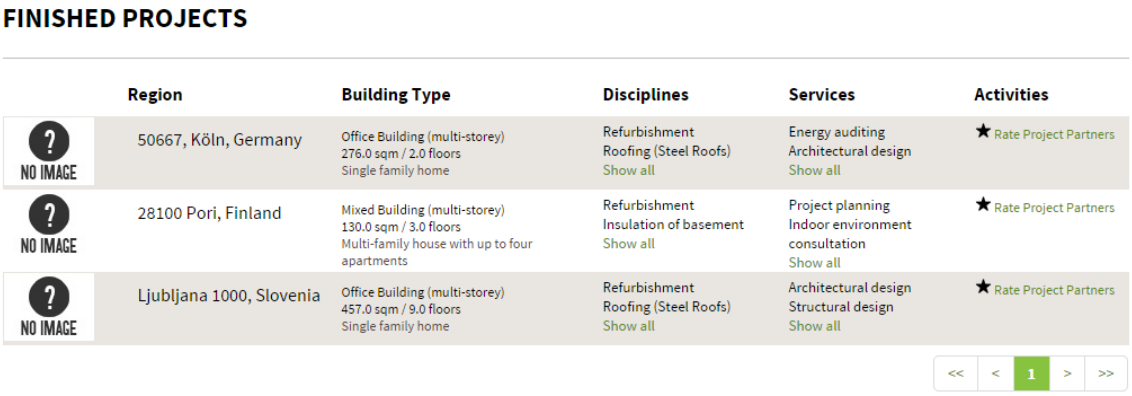


Figure 3-34: Finished retrofitting projects of the building owner

3.7.7 SME RATING

When one SME or a team of SMEs have been working on a refurbishment project of one owner-user and the project gets finished by the time, the owner-user has the possibility to assess the work done by each SME in that refurbishment project. For this, the owner-user can give stars from zero to five stars and provide a feedback in a textual form. Next *Figure 3-35* shows how an owner-user can rate the work of an SME within a specific project, which has ended.

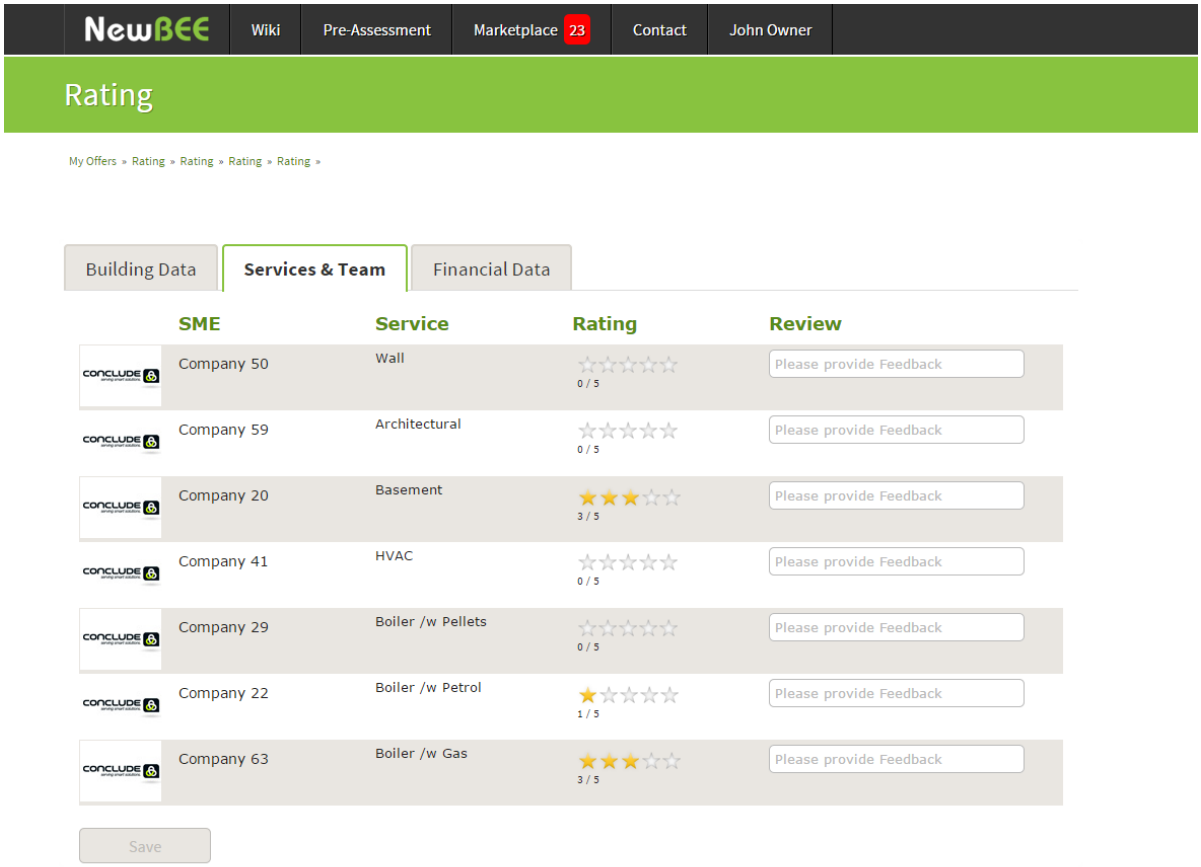


Figure 3-35: SME Rating

3.8 ENERGY PERFORMANCE ASSESSMENT TOOL

The platform provides a link to energy performance assessment tool E-PASS. With the help of this tool, the SMEs and advanced owners can assess the potential energy, cost and carbon footprint savings from different refurbishment actions.

The user of the tool can assess the energy performance and the saving potential. The saving potential is assessed in terms of:

- energy consumption (kWh/a)
- cost (e/a)
- GWP (kg CO2e/a).

The tool is available for exploitation by SMEs which do not have much resources of their own to develop and learn energy performance assessment tools but which need energy performance assessment tools in making consultancy, design, product development, marketing, and renovation project management. Typical users can be for example SMEs who offer:

- Consultancy for energy design and life cycle management
- Condition tests, surveys and monitoring
- Inspection
- Energy auditing
- Project planning
- Project management
- Architectural design, HVAC design/engineering
- Product solutions (structural and HVAC) for improved energy performance (exterior walls, roofs, ventilation systems, heating systems, electrical installation, sanitary engineering)

Most of the input data, that the calculation needs, is located in a knowledge data base, from where it is collected during the first assessment. These intelligent assumptions and the knowledge base will be customized and tuned for the selected European countries. The user has to know only few parameters of the building in the first phase of assessment; the complex simulation model is made with the help of default values stored in the databases. Tool makes "intelligent" assumptions for the refurbished building. Assumptions are based on the basic data of the building (location, building type etc.). The E-PASS will fetch all necessary details (the U-values, window-types, water consumptions, electricity consumptions, electric appliances etc.) from the data base. The building and system details can be specified afterwards as needed.

The easy-to-use-principle is as follows:

- Only few input data needed
- Results are available in few seconds
- When assessing the change because of different refurbishment measures, the basic data can be changed rather easily.

In the starting point the required initial information is as follows:

- Building type
- Weather zone
- Construction year
- Room temperature (Heating set point and Cooling set point)
- Heating type
- Cooling type
- Building volume
- Floor height
- Number of floors
- Dimensions
- Number of occupants
- Number of apartments.

To assess the saving potential data about structures, windows, ventilation, hot water, electricity use, and heating type has to be handled.

E-PASS tool proceeds through 4 STEPS as depicted in the following picture:

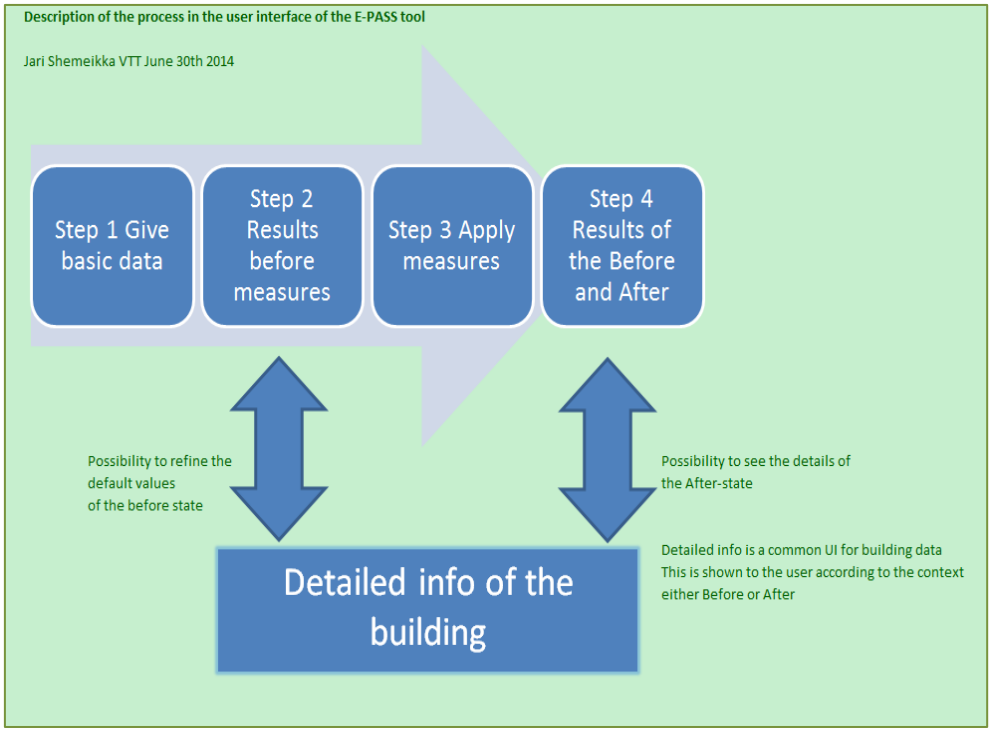


Figure 3-36: 4 steps of E-PASS tool

3.8.1 STEP 1: BUILDING BASIC DATA

The purpose of the first step is to define the building. This data is needed in the calculation of the present (before retrofitting) energy performance of the building.

The basic data is given by writing the information in accordance with the guideline given or with the help of a drop-down list which provides the user the different option for each parameter.

The required building basic data required is the following:

- Name of the building;
- Country (drop-down list);
- Building type (drop-down list);
- Weather data (drop-down list);
- Cooling point;
- Heating point;
- Space heating type (drop-down list);
- Space cooling type (drop-down list);
- Conditioned floor area;
- Number of floors;
- Number of residents.

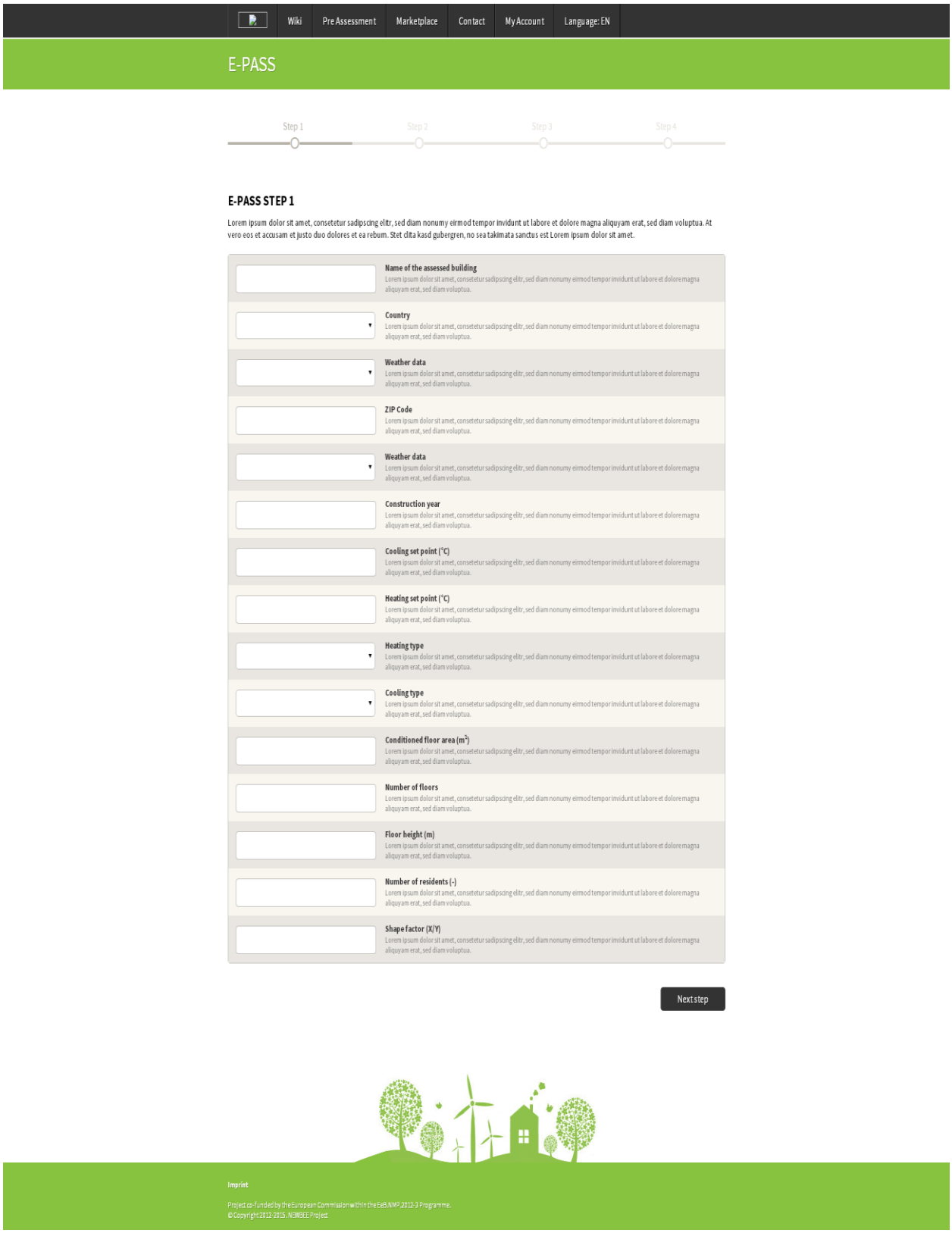


Figure 3-37: Step 1 of energy performance assessment tool

3.8.2 STEP 2: RESULTS BEFORE MEASURES

The purpose of the Step 2 is to assess the initial energy performance values for the building with the help of the given basic data. In this step the tool calculates and presents the following values:

- energy consumption (kWh/m2, a)

- peak load (W/m2)
- CO2 emissions (kg/m2,a)

for heating, cooling and electricity and the amount of water consumption.

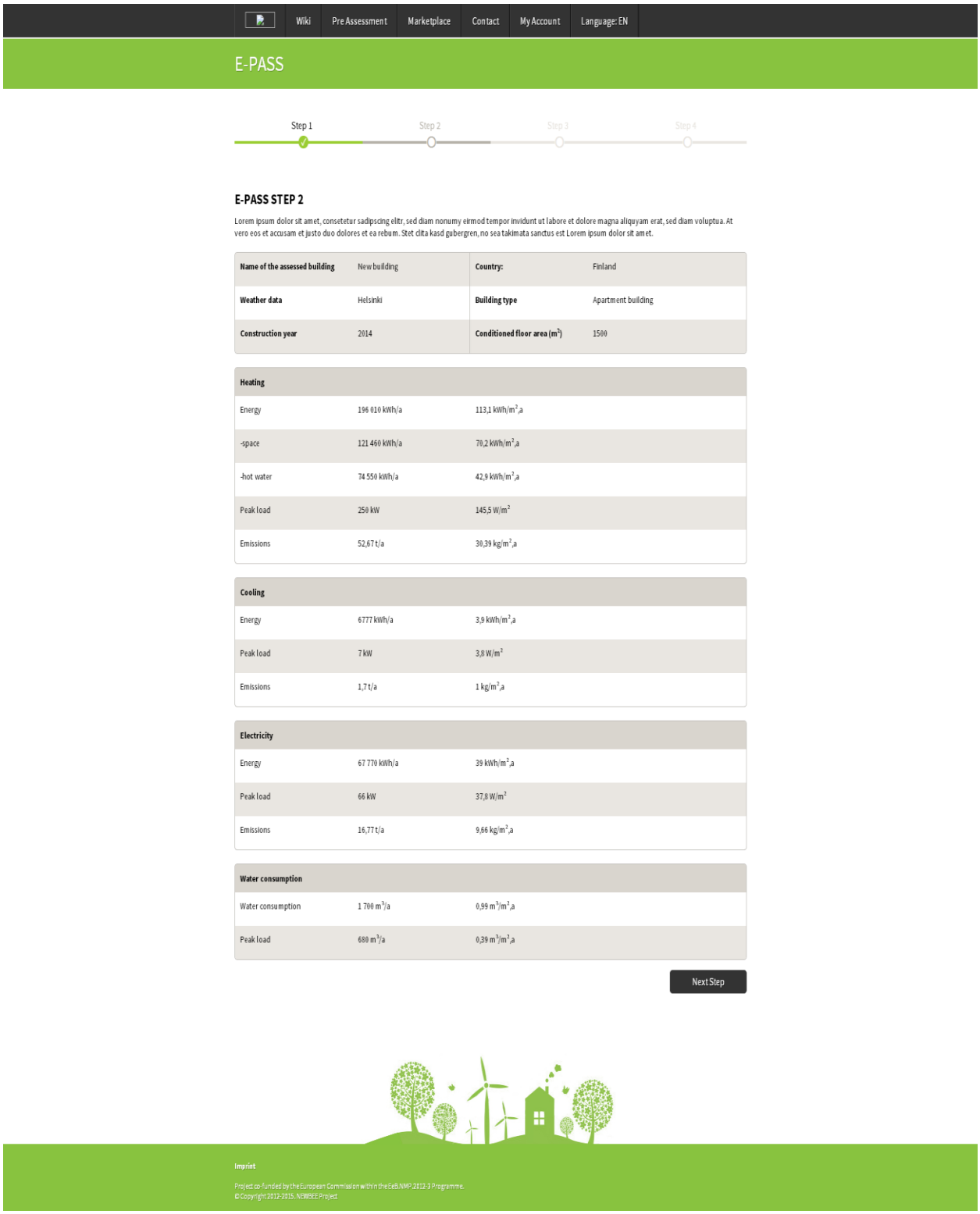


Figure 3-38: Step 2 of energy performance assessment tool

3.8.3 STEP 3: APPLY MEASURES

The purpose of the Step 3 is to select refurbishment methods for the building. The measures are structured as follows:

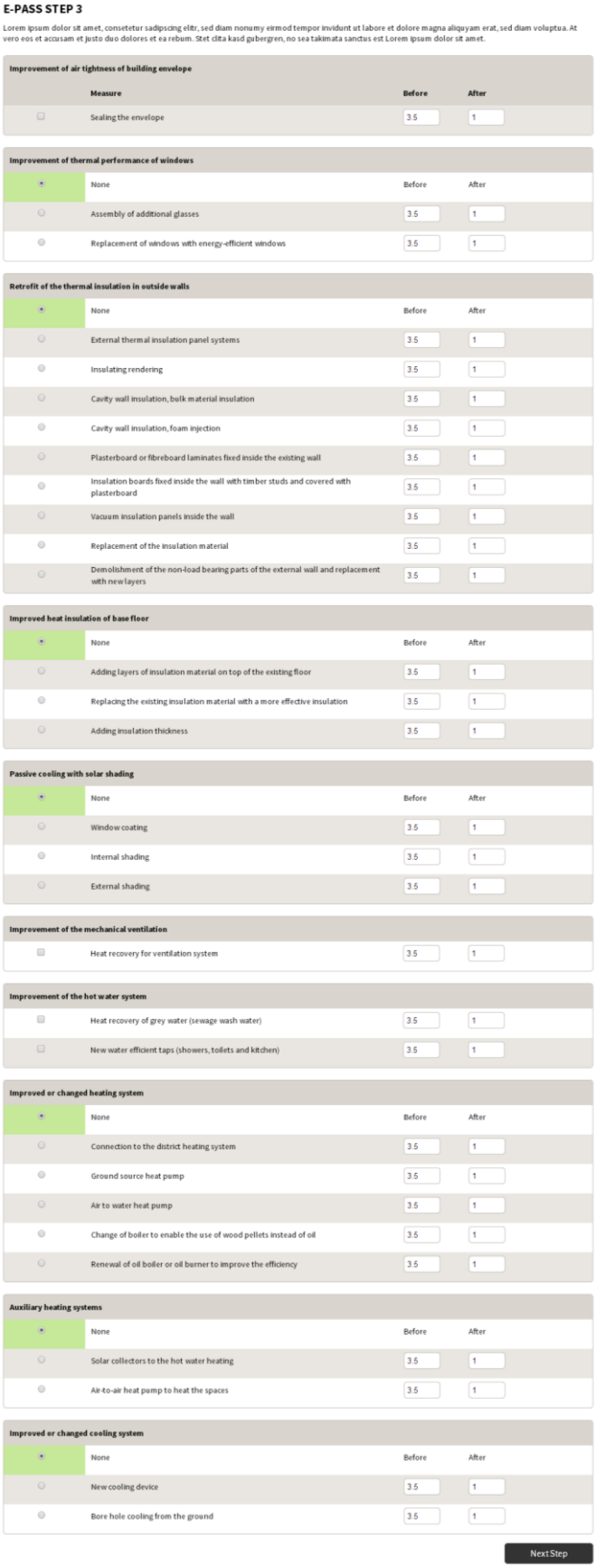
- Improvement of the air tightness of building envelope
- Improvement of the thermal performance of Windows
- Refurbishment of the thermal insulation of external walls
- Improvement of heat insulation of the base floor
- Improvement of the heat insulation of the upper floor
- Passive cooling with solar shading
- Improvement of the mechanical ventilation
- Improvement of the water system
- Improvement or change of the heating system
- Use of auxiliary space heating systems
- Improvement or change of cooling systems

For each of these types, the tool lists alternative measures. For example for the improvement of change of the heating system the tool gives the following alternatives:

- None
- Connection to district heating system
- Ground source heat pump
- Ari to water heat pump
- Change of boiler to enable the use of wood pellets instead of oil
- Renewal of oil boiler or oil burner to improve the efficiency

Correspondingly for example for the improvement of the thermal performance of exterior walls, the tool lists alternatives such as insulating rendering and external insulation panel systems.

For each refurbishment measure the tool defines the situation before like for instance giving the default U-value of for exterior wall before refurbishment and after the application of the chosen measure.



E-PASS STEP 3

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Improvement of air tightness of building envelope

	Measure	Before	After
☐	Sealing the envelope	3.5	1

Improvement of thermal performance of windows

		Before	After
◉	None		
○	Assembly of additional glasses	3.5	1
○	Replacement of windows with energy-efficient windows	3.5	1

Retrofit of the thermal insulation in outside walls

		Before	After
◉	None		
○	External thermal insulation panel systems	3.5	1
○	Insulating rendering	3.5	1
○	Cavity wall insulation, bulk material insulation	3.5	1
○	Cavity wall insulation, foam injection	3.5	1
○	Plasterboard or fibreboard laminates fixed inside the existing wall	3.5	1
○	Insulation boards fixed inside the wall with timber studs and covered with plasterboard	3.5	1
○	Vacuum insulation panels inside the wall	3.5	1
○	Replacement of the insulation material	3.5	1
○	Demolishment of the non-load bearing parts of the external wall and replacement with new layers	3.5	1

Improved heat insulation of base floor

		Before	After
◉	None		
○	Adding layers of insulation material on top of the existing floor	3.5	1
○	Replacing the existing insulation material with a more effective insulation	3.5	1
○	Adding insulation thickness	3.5	1

Passive cooling with solar shading

		Before	After
◉	None		
○	Window coating	3.5	1
○	Internal shading	3.5	1
○	External shading	3.5	1

Improvement of the mechanical ventilation

		Before	After
☐	Heat recovery for ventilation system	3.5	1

Improvement of the hot water system

		Before	After
☐	Heat recovery of grey water (sewage wash water)	3.5	1
☐	New water efficient taps (showers, toilets and kitchen)	3.5	1

Improved or changed heating system

		Before	After
◉	None		
○	Connection to the district heating system	3.5	1
○	Ground source heat pump	3.5	1
○	Air to water heat pump	3.5	1
○	Change of boiler to enable the use of wood pellets instead of oil	3.5	1
○	Renewal of oil boiler or oil burner to improve the efficiency	3.5	1

Auxiliary heating systems

		Before	After
◉	None		
○	Solar collectors to the hot water heating	3.5	1
○	Air-to-air heat pump to heat the spaces	3.5	1

Improved or changed cooling system

		Before	After
◉	None		
○	New cooling device	3.5	1
○	Bore hole cooling from the ground	3.5	1

Next Step

Figure 3-39: Step 3 of energy performance assessment tool

3.8.4 STEP 4: RESULTS

The purpose of the Step 4 is to recalculate the energy performance of the building after the chosen refurbishment methods have been done.

The tool presents the values for

- Before stage
- After stage
- Savings

The tool assesses

- Energy consumption for space heating and hot water (in kWh/a and kWh/m2,a)
- Use of electricity for appliances (in kWh/a and kWh/m2,a)
- Use of energy for space cooling
- Carbon footprint (in kg/a and kg/m2,a)
- Energy cost (in €{a)
- Investment cost (in €)
- Payback time (a)

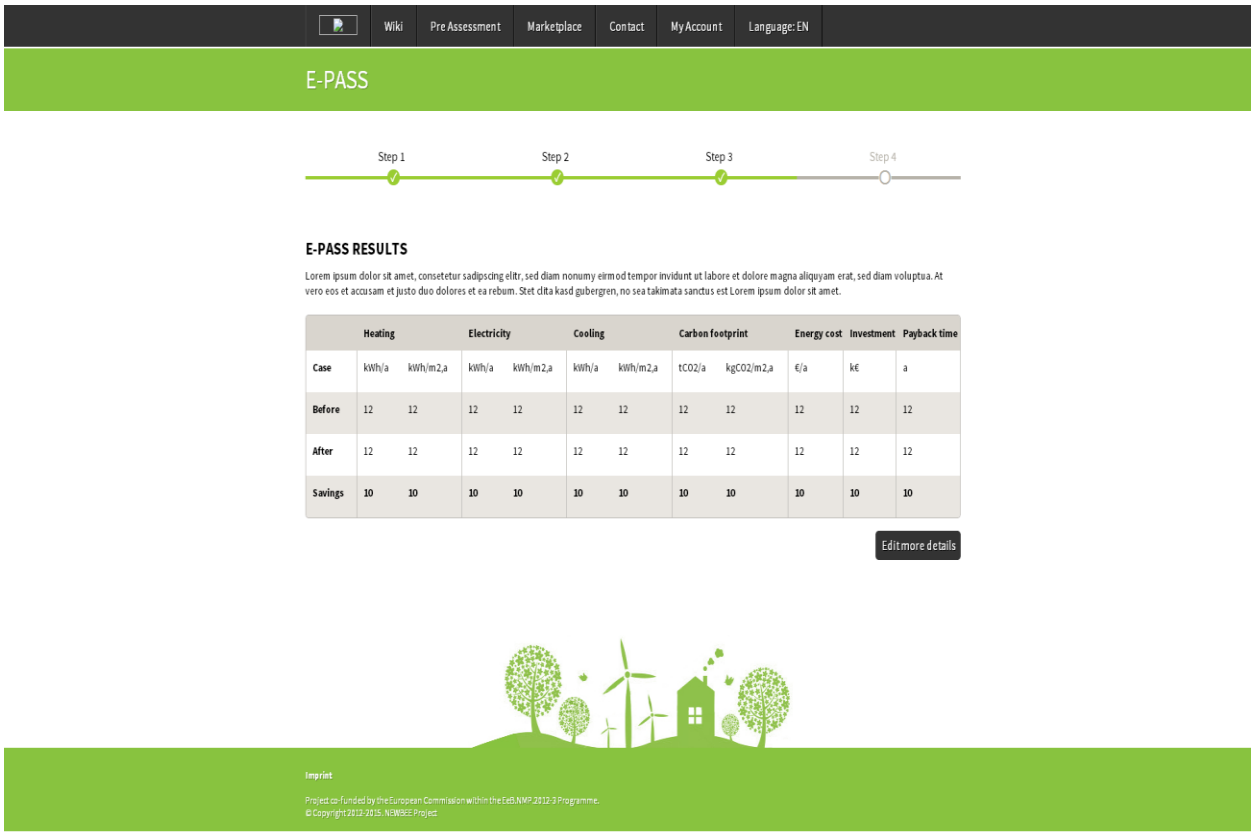

Figure 3-40: E-PASS result page

When needed detailed background information can be given as follows by clicking the *Edit more details* button:

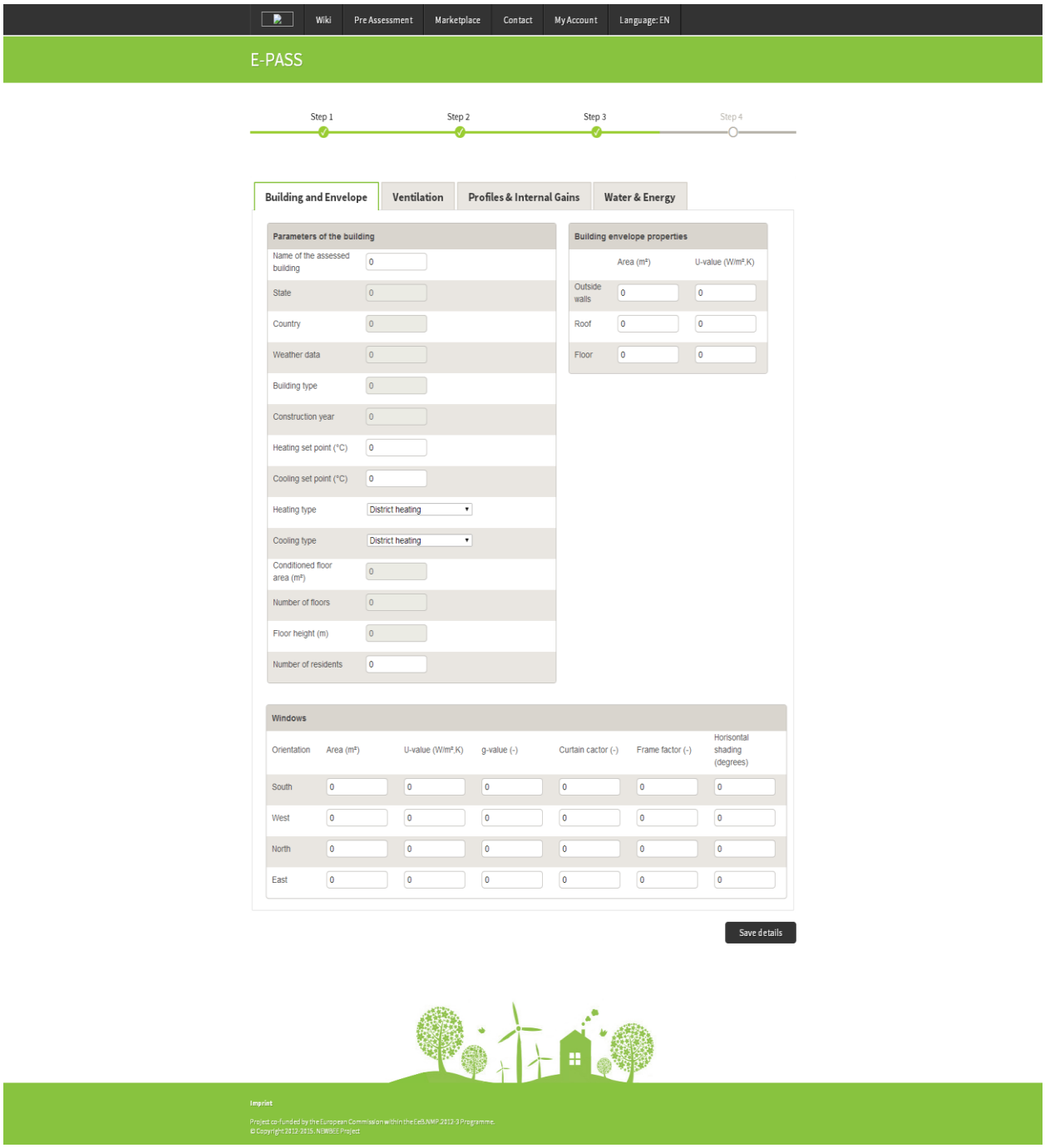

Figure 3-41: Change of input data in E-PASS

3.8.5 CALCULATION METHOD AND DATA SOURCES

The energy performance assessment of E-PASS follows the principles of ISO 13790[1]. The method is a dynamic hourly based heating and cooling simulation method.

E-Pass is based on

- identification of cost-optimal energy saving refurbishment methods

1 ISO 13790:2008 Energy performance of buildings -- Calculation of energy use for space heating and cooling

- calculation of energy consumptions and investment costs of both individual refurbishment methods and combination of those methods, in case of which also annual savings in energy costs and pay back time are evaluated

E-Pass supports to understand how the energy and cost audit have to be performed for determination and marketing of cost-optimal combinations of energy saving refurbishment methods to support companies in marketing activities.

E-Pass covers small houses, blocks of flats and office buildings in Spain, Germany, Slovenia and Finland. For that purpose modelled types houses represent the typical technology of age and type of house.

The information of alternative energy saving refurbishment methods and current performance of buildings of different age is based on several sources, most important of which are

- the national valuations of cost-optimalization of energy performance requirements according to Commissions delegated regulation 244/2012 (comparative methodology framework for calculating cost optimal levels of minimum energy performance reguirements for buildings and building elements)
- backgroung material concerning energy labelling of existing buildings (in Finland the Ministry of environment)
- research results on cost-optimal refubishment methods in Europe (SUSREF[2], MECOREN[3])
- information collected from individual companies producing energy saving refurbishment methods.

The costs of refurbishment methods cover investment and annual energy costs. Annual energy costs have been calculated directly using present unit costs (€/kWh/a). As a comparison, it is possible to use the demand for profit (6%) for invested capital. The method is based on ISO15686-5 (life cycle costing).

The investment costs are presented as average values. However, recognized real unit costs are recommended to be used. The variation may be between -15 …+30 % depending on project and building size, needs of extra work and present trade cycle.

The included refurbishment methods are all available in market with competitive prices. The investment cost includes all material, labour and sub cost caused by demolition, patching and construction of systems, structures and surfaces. The theoretical share of direct energy saving actions is not given separately.

3.9 WIKI-BASED KNOWLEDGE REPOSITORY

The NewBEE wiki gives building owners and SME-user access to information on refurbishment. Content that is provided in the wiki aims to support the main target of the NewBEE project: “strengthen collaboration in the retrofitting value network”. The focus in this context is to support three specific situations that typically occur in a construction project or in strategic planning:

A) Support for owners looking for independent information on refurbishment
B) Support for management stuff that strives to improve the business model of their company
C) Use of the wiki during the planning stage of a refurbishment project. Project managers can explain basic aspects of a retrofitting project to their clients by means of the information available in the NewBEE wiki. For instance project managers can use the knowledge base to explain main retrofitting technologies to their customers.

The main parts of information are as follows:

- Building typology
- Available technologies for energy refurbishment
- Financial models and opportunities
- Performance based business models
- Methods and standards for energy and cost saving calculation

[2] http://cic.vtt.fi/susref/, http://www2.vtt.fi/inf/pdf/technology/2012/T30.pdf

[3] http://www.vtt.fi/sites/mecoren/?lang=en, http://www.vtt.fi/inf/pdf/technology/2012/T26.pdf

- Potential savings

3.9.1 INSTRUCTIONS

Due to the above explained application cases of the wiki has two default paths. The main page provides a general overview on all content available in the wiki and guides the user to the other main information areas (technology, business models, refurbishment information in general, financing opportunities). Alternatively, there is a wiki page that summarizes most important information for owners and the counter piece for professionals.

In addition to the English main part of the wiki some country-specific information (e.g. in German) is available.

Information on business models and retrofitting technologies is edited by the NewBEE consortium. All other information given in the wiki is based on external information sources. Normally only a link to respective sources is provided. The following illustration summarized the main structure of the wiki.

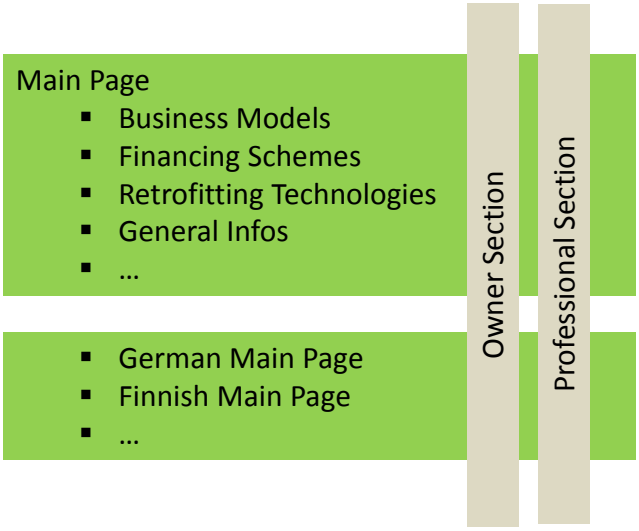

Figure 3-42: Structure of the Wiki

The owner section specifically helps owner-users to navigate through the information data base and supports the user with direct links to the technology data base, the market place, funding and financing opportunities, specific business models that are adequate for small projects and a link to general information on retrofitting.

The professional session is designed towards the needs of SME-user and presents specifically the following information to the user, whereas the main focus is on business model redesign.

- Guidance for business model design (Offer for business and strategy managers)
- Funding and financing opportunities (Opportunity for the project manager to use the section for discussion with the client)
- Refurbishment technologies (Possibility to present customers most important retrofitting technologies and explain advantages and disadvantages)
- General information (some interesting additional information for professionals like motivational factors for retrofitting)

Technologies are assigned to the property “trade” to enable better structuring of the property according to their nature (e.g. insulation of external wall). The structure that is implemented in the NewBEE wiki is presented in the illustration below.

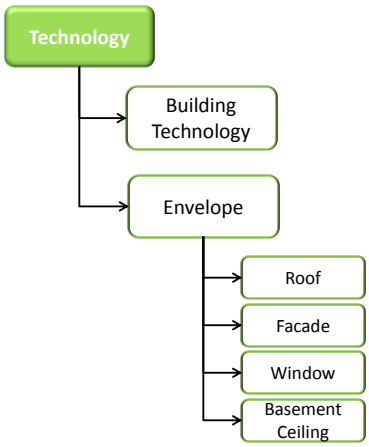

Figure 3-43: Structure of the technology model template

Business models are assigned to the property “Model Type”. This property has three different characteristics (Project delivery system, Contract model, Case study).

The navigation between the pages is possible with the traditional navigation side bar top right in the wiki but to ensure usability also a lot of hyperlinks to other internal wiki pages and external homepages are available. If needed the semantic search algorithms of the media wiki can be accessed.

Some information in the wiki is always presented according to the same wiki template to ensure better usability for non-professionals and the enable users to compare information (e.g. different technologies). However, due to the technical limitations of a semantic media wiki an automated comparison of different information (such as technologies) is not possible. Information in the wiki that follow always the same structure is the description for technologies and business models. The following illustration *Figure 3-44* presents the structure of the business models.

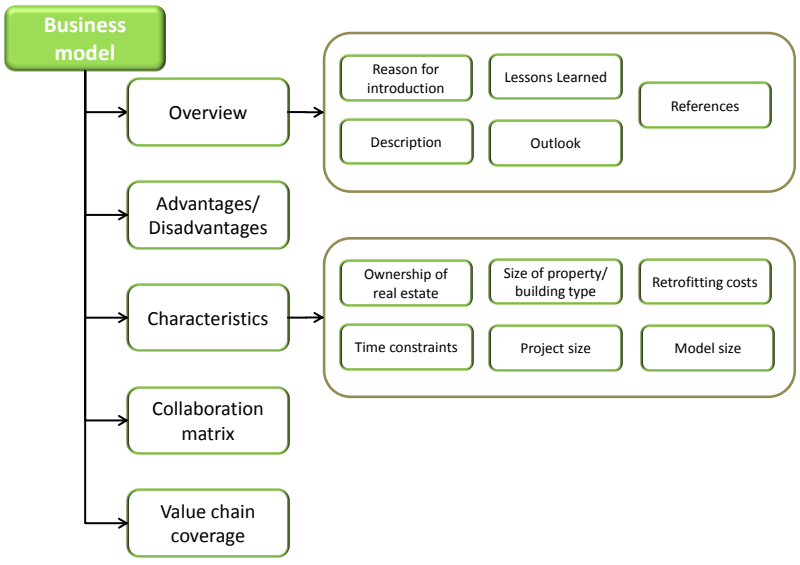

Figure 3-44: Structure of business models

3.9.2 SOURCES OF DATA

The information used for the Wiki-based knowledge repository information was collected from NewBEE deliverables D2.1 Building Best Available Technologies, D4.1 Financial Models, D4.2 and D4.3 Performance Bases Business Model and structured in a WIKI. Country and region specific documents are

connected by hyperlinks with information on refurbishment technologies, evaluated energy saving schemes, and business models.

3.10 BUSINESS MODEL ASSESSMENT TOOL

This toll is aimed to provide a short assessment to CEOs and management stuff of small companies that are interested to review their business model. The business model gives a first orientation concerning optimization potentials to them.

Opposed to other tools such as pre-assessment tool or energy assessment tool, the business model assessment exclusively addresses the needs of small business and not the needs of building owners except the needs of large building owners acting as facility managers. Concerning the overall methodology and objective of NewBEE to bridge the gap between small business and private house owners the business model assessment helps SMEs to prepare for the future. Due to the better integration between customer and the value chain (market place), transparency concerning technical retrofitting measures (e-pass tool) and initial guidance for the customer (pre-assessment) there is a need that future business models of SMEs in the retrofitting sector should be more tailored and more flexible. The business model assessment will support this process of change. The business model assessment should be used before the other offerings for business model improvement on the NewBEE platform are used. It is recommended that after the review of the current business model in a second step the business model handbook in the wiki is used to improve the business and success stories as well as business model descriptions are used to get suggestions for a possible new orientation.

The tool is a guided questionnaire that gives users the opportunity to do a qualitative rating of their company performance concerning different aspects of their business model. Answers are multiple choice – i.e. the users will tick the box with the answer that reflects the actual performance of his company concerning each aspect that is scrutinized in the questionnaire. Questions are aligned to the Osterwalder Business model framework. Therefore it is ensured that all building blocks of a business model are considered in the NewBEE assessment. The assessment covers the business model performance in general but also aspects that are related to the market (such as acquisition skills or competitive strategy), to the internal organisation (e.g. project management capabilities, resource availability) or networking aspect (such as relationships in the supply chain or network competency in general). The number of questions the user is asked are around 20.

3.10.1 INSTRUCTIONS

The tool is implemented into the NewBEE platform. The user is guided through some questions in an online-survey. The result of the short assessment is presented to the user by means of the web-browser. After answering all questions the result is presented to the user and, if required, the results are also available for downloading in a short pdf-report.

The starting point of the business model assessment tool is the link found in professional section within the NewBEE wiki. Here the link to the assessment tool will be provided. In addition it could be started like the other tools via the main page of the NewBEE wiki.

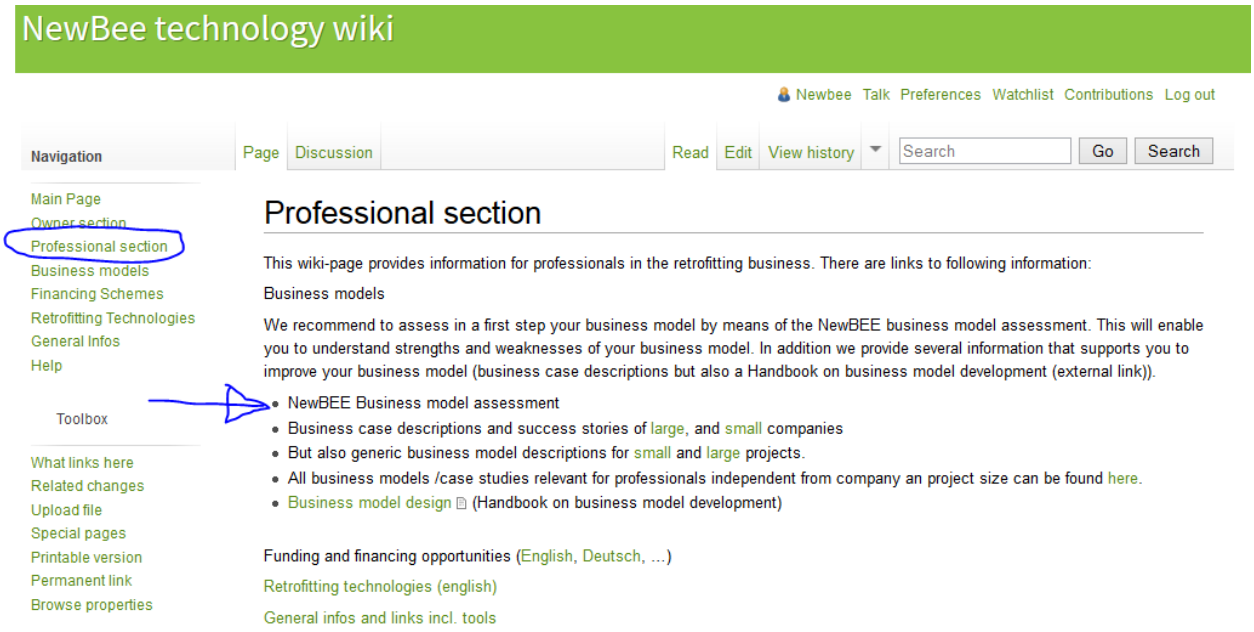

Figure 3-45: Embedding of business model assessment tool

Following the link opens the start page of the business model assessment. Question by question the user will is guided through the assessment. A first mock-up for a question is shown in the following illustration *Figure 3-46*. Please read first the description of each assessment item and rank your own company afterwards. You can use the buttons to navigate through the questions. The final page will give you the opportunity to submit your questionnaire.

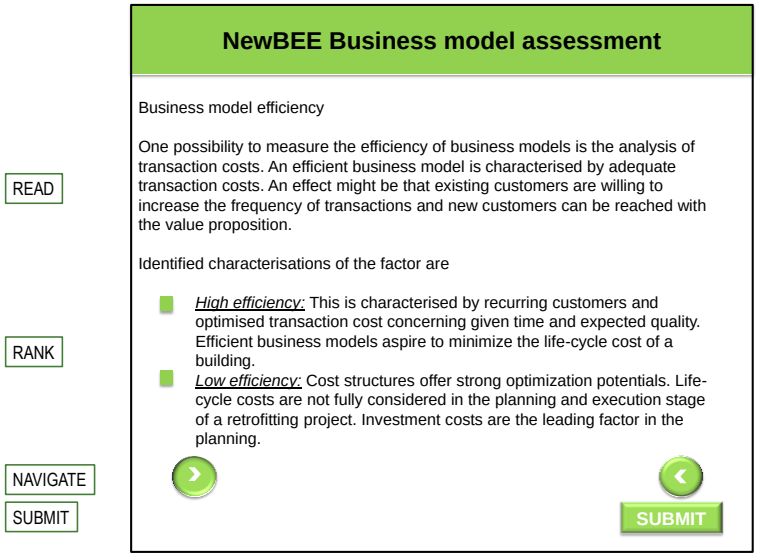

Figure 3-46: Example Assessment criteria

After submission of the questionnaire you can download your result.

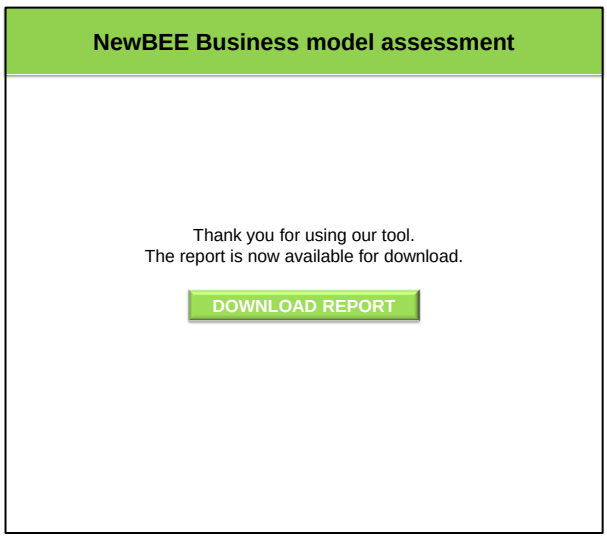

Figure 3-47: Mock-up for report download

4 INSTRUCTIONS FOR IMPLEMENTATION

4.1 PURPOSE AND TARGET GROUP

The purpose of this chapter is to provide detailed information about the software system requirements for NewBEE installation and software functionalities for the actors who start to run the platform and maintain it for the use of building owners and SMEs.

4.2 NEWBEE PLATFORM

NewBEE platform is a set of web-based tools accessible through internet. These tools are:

- Pre-assessment tool
- Financing calculation tool
- Market Place tool
- Energy performance assessment tools
- Wiki-based knowledge repository.
- Business model support tool and

The applied NewBEE platform architecture is depicted in the following *Figure 4-1*:

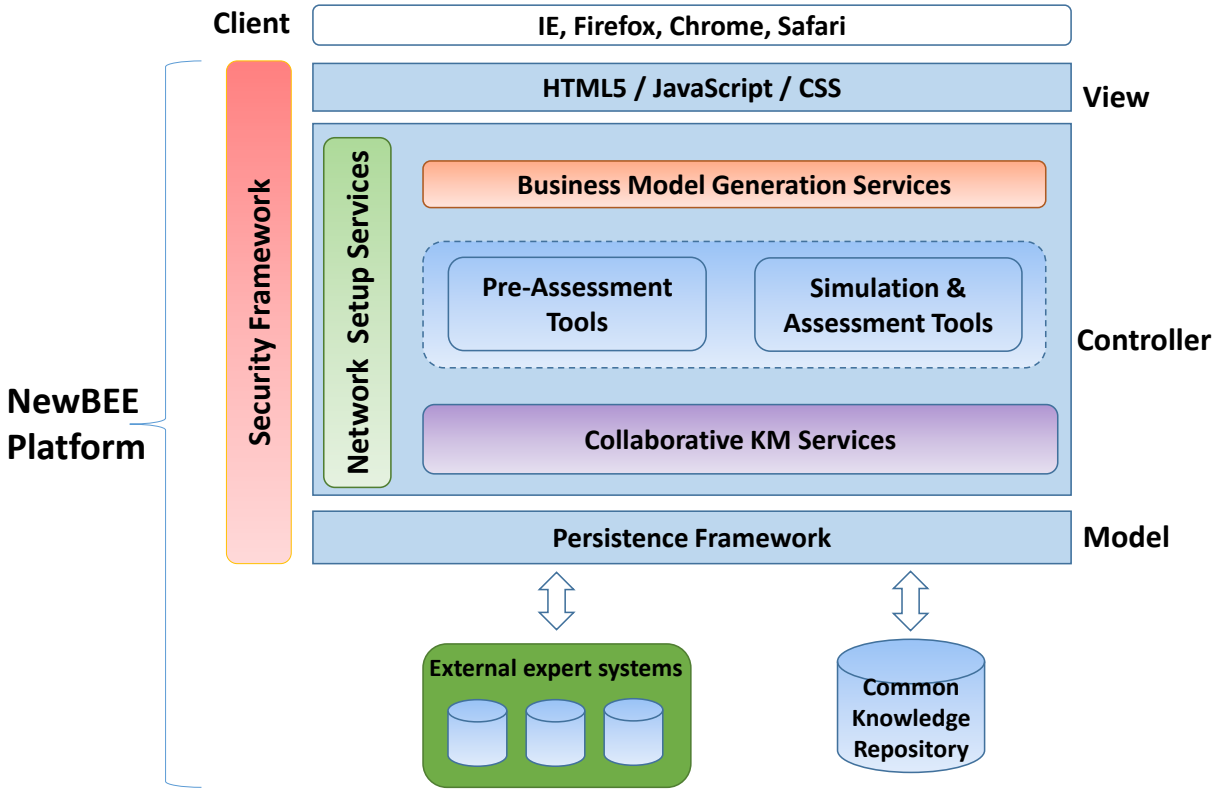

Figure 4-1 NewBEE Platform architecture

4.2.1 SOFTWARE REQUIREMENTS FOR INSTALLATION

The NewBEE platform is a browser-based platform and therefore no installation is mandatory for the users.

The NewBEE providers who will run the platform and maintain it for the use of building owners and SMEs at European level or at country-specific level will need to have the following software components (usually named as LAMP platform) installed in the server:

Table 4-1: Software Components needed for running NewBEE platform

Function	Software Tool	Version	Link
Web Framework	Apache	6.17	http://apache.org/
JavaScript Framework	jQuery	1.9	http://www.jquery.org/
Database	MySQL	4.2	http://mysql.org/

Besides these software requirements for the running of the NewBEE platform, it will require the customization of the graphical user interface for each country (language of the user interface) the description of the measure and the country-specific parametrization as already described in the user manual chapter of this document.

4.3 PRE-ASSESSMENT TOOL

Owners can use the pre-assessment tool to receive a first idea on retrofitting measures and to identify the most appropriate retrofitting technologies based on their requirements. It allows different technology scenarios that might be appropriate to address the building problem at hand (taking into account e.g. building characteristics, local climatic conditions etc.) and for getting an estimation of the costs and energy savings. SMEs might as well use the pre-assessment tool as well in order to be prepared for questions that my occur. After the rough cost and savings analysis the user (in this case owner) will use the data for the evaluation of available financial instruments for his project. ,

4.3.1 SOFTWARE REQUIREMENTS FOR INSTALLATION

There are no SW requirements in addition to the general SW requirements of the NewBEE platform. The tool is integrated into the web interface of the NewBEE platform. The use of the tool is browser-based and therefore no installation is mandatory for the users.

Users (SMEs and owners) can exploit all functionalities by a web-browser able to interpret and perform script in “JavaScript” language. Commonly used browsers such as IE v. 10, Google Chrome v. 39, Mozilla Firefox v. 34 and Safari v. 5 or their newer versions are able to render and correctly visualize the module.

4.4 FINANCIAL CALCULATION TOOL

Cash flows of refurbishment projects can be assessed with the financial calculation tool. Different financial alternatives can be assessed to calculate the expenses and savings.

4.4.1 SOFTWARE REQUIREMENTS FOR INSTALLATION

There are no SW requirements in addition to the general SW requirements of the NewBEE platform. The tool is integrated into the web interface of the NewBEE platform. The use of the tool is browser-based.

Users (SMEs and owners) can exploit all functionalities by a web-browser able to interpret and perform script in “JavaScript” language. Commonly used browsers such as IE v. 10, Google Chrome v. 39, Mozilla Firefox v. 34 and Safari v. 5 or their newer versions are able to render and correctly visualize the module.

4.4.2 DESCRIPTION OF SOFTWARE FUNCTIONALITIES

The financial calculator module lets user to investigate the cash flow generated by energy efficiency projects. It deals with investment cost, financial opportunities, energy savings and related economic savings. Main software functionalities are: cash flow calculations and graphical representations.

It let users to graphically visualize annual cash flow both in tabular and graphical way; applying several financial opportunities users are able to generate different scenario raising their knowledge and awareness in economics of energy efficiency field.

There are no interfaces with other modules and databases of the NewBEE system.

4.5 MARKET PLACE

The NewBEE Marketplace tool is implemented as a Java EE application in a common 3-tier architecture following the Model-View-Controller Approach:

1. Model Layer – enabling persistence of data and knowledge handled by the module
2. Controller Layer – encapsulating the module's business logic and
3. View Layer – providing graphical user interfaces to the module's users

Model Layer

The Model Layer incorporates a Persistence Framework (for integrating Data Base Management System - DBMS), which is responsible for enabling the different services comprising the Service Layer to access different data stores, i.e. to perform Create, Read, Update and Delete (CRUD) operations on these data stores. The Persistence Framework in this sense handles the conversion of data from the data store specific format – in most cases this will be the document model of a database – into the platform's object model and vice versa. This way, the different services can work on a unified object model abstraction and are able to transparently access different types of data stores.

Controller Layer

The Controller Layer comprises the module's business logic and consists of Network Setup Services and Collaborative Knowledge management Services. Besides those services the NewBEE Marketplace module makes use of the auxiliary services of the Security Framework to authenticate users and authorize access to the different module functionalities. These services are implemented as Enterprise Java Beans and hosted in a service execution environment provided by the used application server.

View Layer

The View Layer provides the platform's user interfaces, in form of HTML web pages tailored for common internet browsers.

The user interface will be primarily driven by the Apache Wicket framework, which is an open source component-based and stateful Web application framework for Java. The framework promotes a strict separation of presentation and view logic, where conventional XHTML pages are used as templates whereas the dynamic content and forms are handled in the Java code.

For asynchronous interaction with the user and communication with the NewBEE Marketplace module services, the JavaScript Framework jQuery is used.

The following *Table 4-2* lists the different frameworks and tools that have been employed for development.

Table 4-2. Overview of NewBEE development tools

Function	Software Tool	Version	Link
Java Application Server	JBoss AS	7.1.1	http://www.jboss.org/jbossas/
Web Framework	Apache Wicket	6.17	http://wicket.apache.org/
JavaScript Framework	jQuery	1.9	http://www.jquery.org/
Services	Enterprise Java Beans JBoss Seam	3.1 3.1.0.Final	http://docs.oracle.com/javaee/6/index.html http://seamframework.org/
Persistence Framework	Hibernate	4.2	http://hibernate.org/

4.5.1 SOFTWARE REQUIREMENTS FOR INSTALLATION

Installation of the NewBEE Marketplace module consists of simply copying the provided war-file to the deployment folder of a running JBoss Application Server.

Software Requirements for running

- Java Runtime Environment version 1.7

  For installation instructions please refer to the documentation from Oracle[4] or your respective operating system's documentation
- JBoss Application Server version 7.1.1.FinalFor installation instructions please refer to documentation from JBoss[5] or your respective operating system's documentation

Installation

- Copy the provided war-file "marketplace.war" to "JBOSS_HOME/standalone/deployments", where JBOSS_HOME refers to your JBoss Application Server's installation directory

4.5.2 DESCRIPTION OF SOFTWARE FUNCTIONALITIES

Functionalities

The NewBEE Marketplace module provides a web-based user interface to support the following tasks:

- **Common** tasks for **Building Owner** and **SME** (with minor differences)
  - Register on the platform
  - Create an account / SME profile
  - Search information on service providers
- **Building Owner** tasks
  - Publish a call
  - Manage proposed offer
  - Rank service providers
- **SME** tasks
  - Find business opportunities
  - Create a project team
  - Propose an offer
  - Manage Offers

The User interface can be accessed at http:// <IP_ADDRESS>:8080/marketplace, where <IP_ADDRESS> refers to your JBoss Application Server's IP address.

Interfaces

The NewBEE Marketplace module provides a RESTful Web Service to interface with the Pre-Assessment Tool. The Pre-Assessment Tool calls this RESTful Web Service to pass information about a potential business opportunity on to the NewBEE Marketplace module.

[4] http://docs.oracle.com/javase/7/docs/webnotes/install/index.html
[5] https://docs.jboss.org/author/display/AS71/Documentation

Table 4-3: Interface with the Pre-Assessment tool

GET /marketplace/owner/businessopportunity/new				
Summary Shows information about the potential Business Opportunity				
Description Returns an HTML representation of the potential business opportunity information that was gathered by the Pre-Assessment Tool. The displayed information is retrieved from the Pre-Assessment Tool's Web Service based on the submitted query parameters (see below). In case of an error, e.g. while retrieving the business opportunity information from the Pre-Assessment Tool, returns an HTML representation of the error.				
Parameters				
Name	**Located in**	**Required**	**Type**	**Description**
pub_bo_id	Query	Yes	String	The business opportunity's internal ID in the Pre-Assessment Tool
pub_bo_scenario_id	Query	Yes	String	The scenario selected in the Pre-Assessment Tool
Responses				
Code	**Description**			
200	HTML representation of the potential business opportunity information			
500	HTML representation of the error that occurred			

4.6 ENERGY PERFORMANCE ASSESSMENT TOOL

The energy performance assessment tool (E-PASS) consists of a calculation engine, database and user interface.

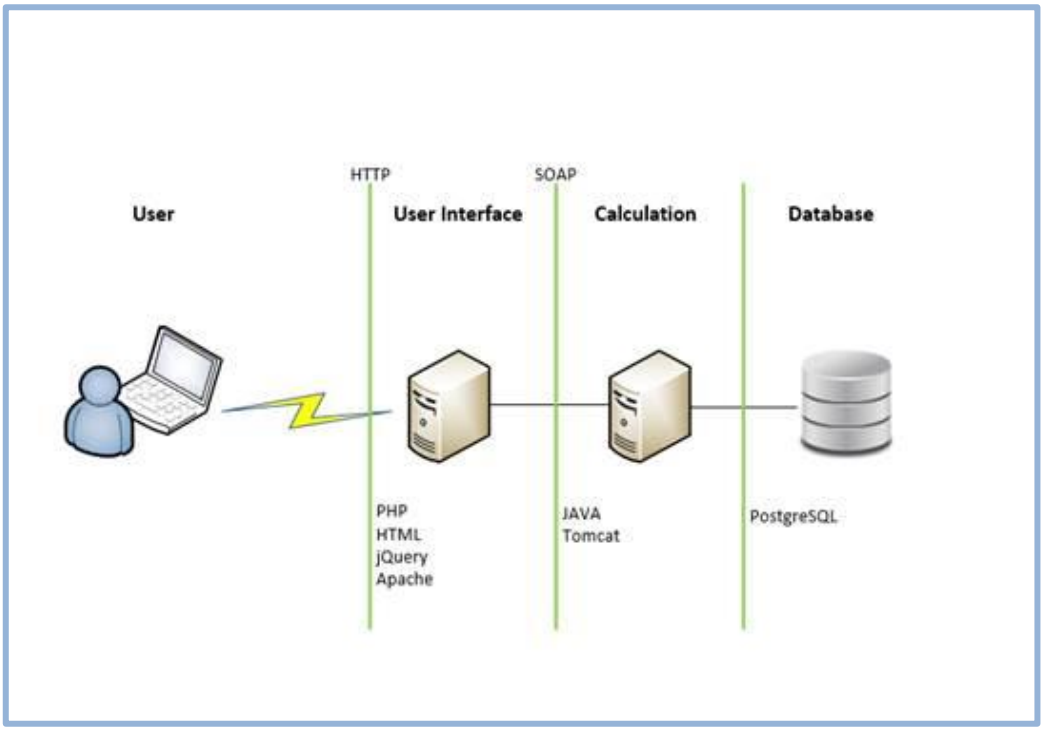

Figure 4-2: Description of E-PASS NewBEE

4.6.1 SOFTWARE REQUIREMENTS FOR INSTALLATION

The E-PASS tool is a browser-based tool and therefore no installation is required for the users.

The E-PASS provider who run the platform and maintain it for the use of SMEs (or advanced owners) at European level need to have the following software components installed in the server:

Table 4-4: Software Components needed for running E-PASS tool

Function	Software Tool	Version	Link
Java Application Server	Tomcat	8.0.23	http://tomcat.apache.org/
Web Framework	Apache	6.17	http://wicket.apache.org/
JavaScript Framework	jQuery	1.9	http://www.jquery.org/
Database	PostgreSQL	9.4	http://www.postgresql.org/

Besides these software requirements for the running of the NewBEE platform, it will require the customization of the graphical user interface for each country (language of the user interface) and the country-specific parametrization.

4.6.2 DESCRIPTION OF SOFTWARE FUNCTIONALITIES

The assessment tool uses data about building types and characteristics, refurbishment technologies, costs and carbon footprint. To make the tool relevant in local conditions, the needed data must be collected with the help of the data collection forms. The data collection form operates also as the database used by the calculation engine. The Excel-based data collection forms are available from VTT by request (also described as an Appendix of this document).

The data collection forms are divided to three parts: 1) building, 2) systems, 3) fuels. The system allows the input of data for 3 different building types. Although systems and fuels are land specific – not building type specific - these have to be combined separately with all 3 building types.

Building data consists of attributes (totally roughly 90 attributes) which are used as parameters in the calculation. Each possible improvement action (method of refurbishment) has an effect on one parameter and, additionally, an effect on cost and environmental impact.

The calculation engine is a dynamic assessment tool originally developed in EU CHRISMA[6] research project and containing the in-house implementation by VTT in accordance with ISO 13790[7].

The engine uses standard web-service interface which can be accessed by various software development environments for example PHP.

There are no interfaces with other modules and databases of the NewBEE system.

4.7 WIKI BASE KNOWLEDGE REPOSITORY

The NewBEE wiki gives building owners and professionals access to information on retrofitting. The wiki is a media wiki application based on the same software and engine used for “Wikipedia”.

4.7.1 SOFTWARE REQUIREMENTS FOR INSTALLATION

There are no SW requirements in addition to the general SW requirements of the NewBEE platform. The Wiki-based knowledge repository is integrated into the web interface of the NewBEE platform. The navigation and use is browser-based.

4.7.2 DESCRIPTION OF SOFTWARE FUNCTIONALITIES

There are no interfaces with other modules and databases of the NewBEE system but the software tools that are available on the NewBEE homepage will be linked into the wiki.

4.8 BUSINESS MODEL ASSESSMENT TOOL

The objective of this tool is to provide a short assessment to CEOs and management stuff of small companies that are interested to review their business model. The business model will give a first orientation concerning optimization potentials to them.

4.8.1 SOFTWARE REQUIREMENTS FOR INSTALLATION

There are no SW requirements in addition to the general SW requirements of the NewBEE platform. The tool is integrated into the web interface of the NewBEE platform. The navigation and use of the tool is browser-based.

4.8.2 DESCRIPTION OF SOFTWARE FUNCTIONALITIES

There are no interfaces with other modules and databases of the NewBEE system.

6 EU CHRISMA

7 ISO 13790:2008 Energy performance of buildings -- Calculation of energy use for space heating and cooling

5 ANNEX I: FUTURE DEVELOPMENTS

5.1 ENVISIONED IMPROVEMENTS IN FINANCIAL MODULE

User experience is of paramount importance in tools addressed to not-professional users. The design of NewBEE platform had paid attention to maintain calculation routines separate from display functionalities. This approach will let developers easily re-arrange visual page elements (inputs, texts, headings, etc) without affecting calculations.

Following there is an example of modifications applied to the starting page of the financial module in order to improve user experience and reduce filling time. The envisioned version has the same calculations capabilities but modifies the organization of information flows, making the users experience simpler and more detailed.

Users who get to the starting page from pre-assessment tool will find some fields already filled with values that come from the pre-assessment tool module. Users who reach the starting page directly or from the home page will find all fields empty (with no value).

Envisioned starting page has 4 main areas:

- location of the property which recall localized functions and values,
- current data panel,
- future data panel and
- economic opportunities panel.

Each panel has a toggle functionality that show/hide them according users' needs.

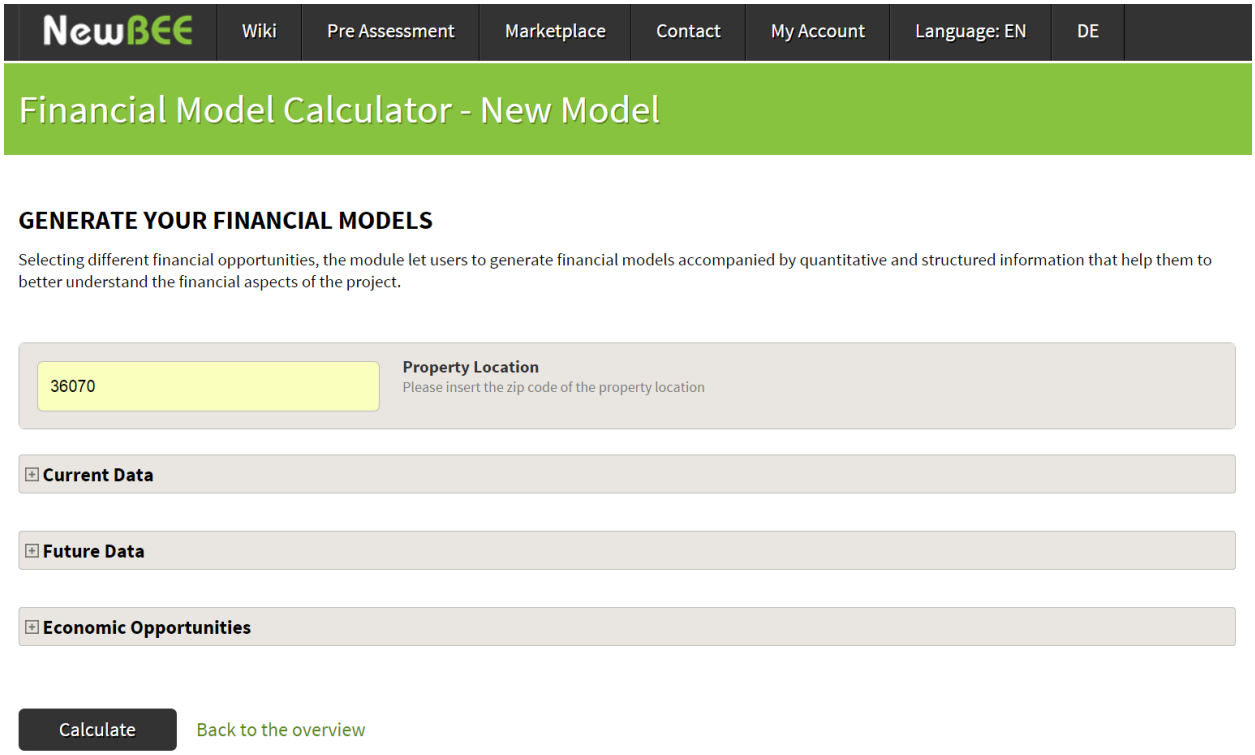

Figure 5-1: Future developments: expected starting page.

By clicking on **"current data"** toggle button, the starting page asks users to insert information such as a title for the analysis, the envisage investment cost, the expected lifetime of the investment, the expected annual savings (in simple or detailed mode).

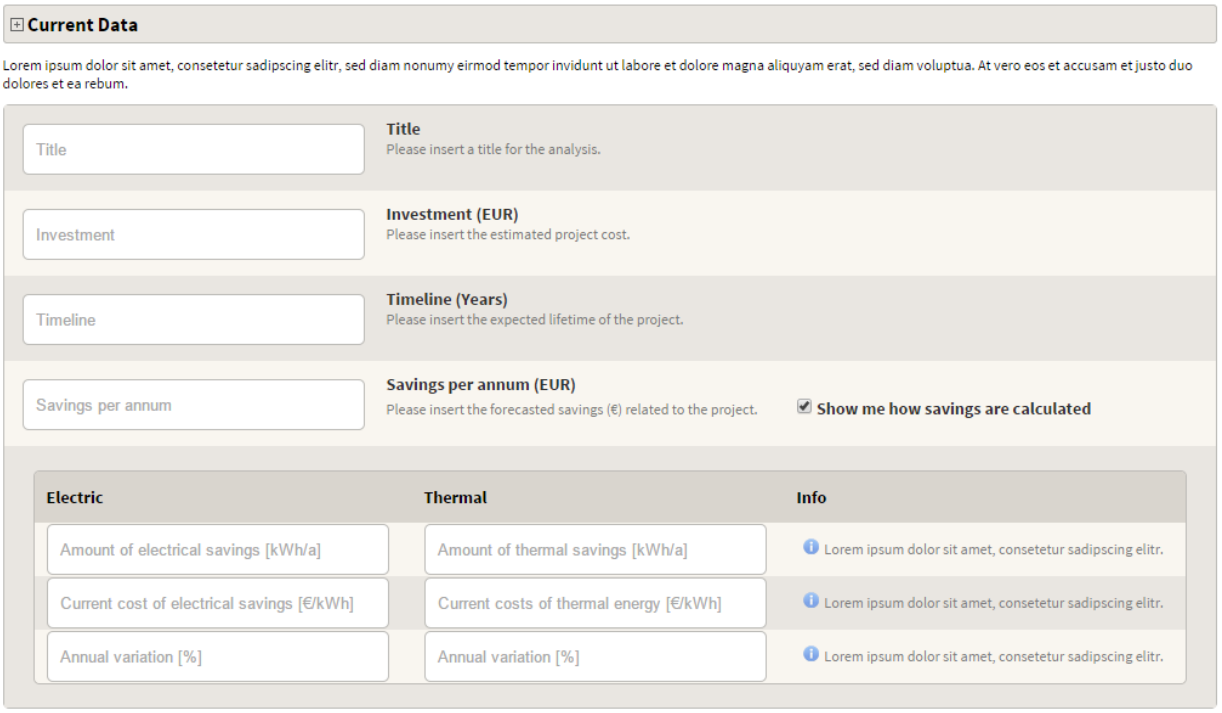

Figure 5-2: Future developments: expected "current data" panel.

By clicking on **"future data"** toggle button, the page shows users parameters that affect the calculation of cash flow during the whole duration of the project; information requested concern the discount rate, data of loan and change in energy prices.

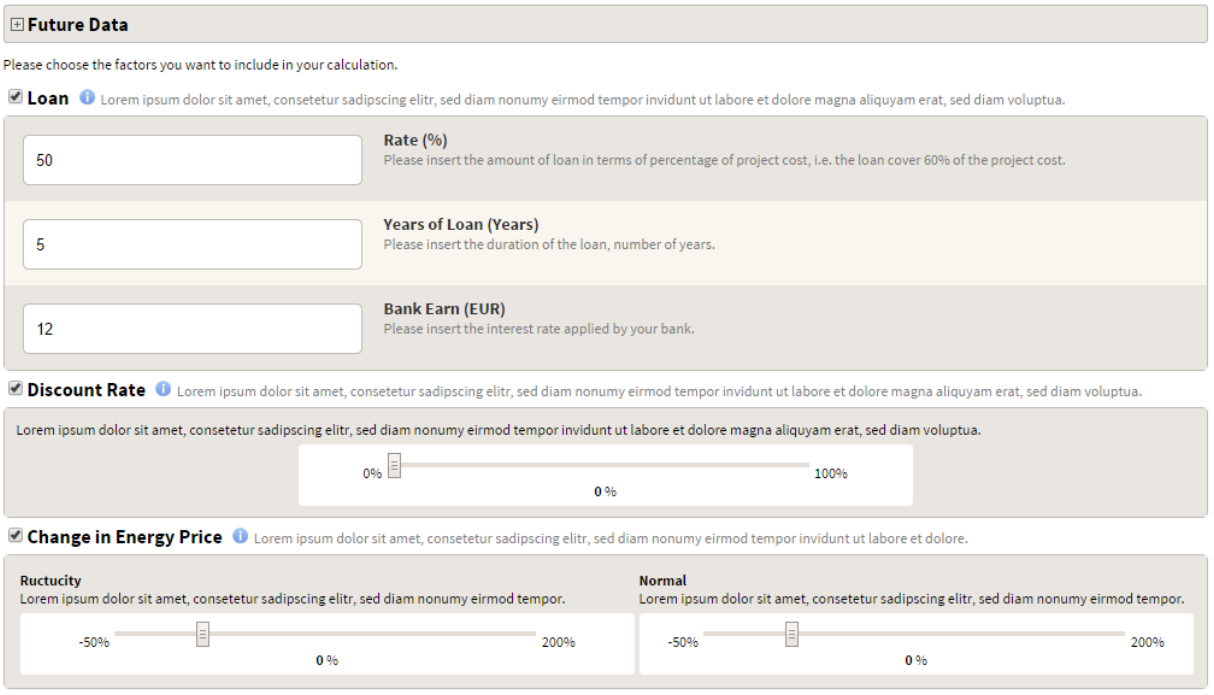

Figure 5-3: Future developments: expected "future data" panel.

By clicking on **"economic opportunities"** toggle button, the page presents options and fields related to available support scheme and financial subsidies. Currently users are able to simulate the effect of tax reductions, subsidies and ESCO mode.

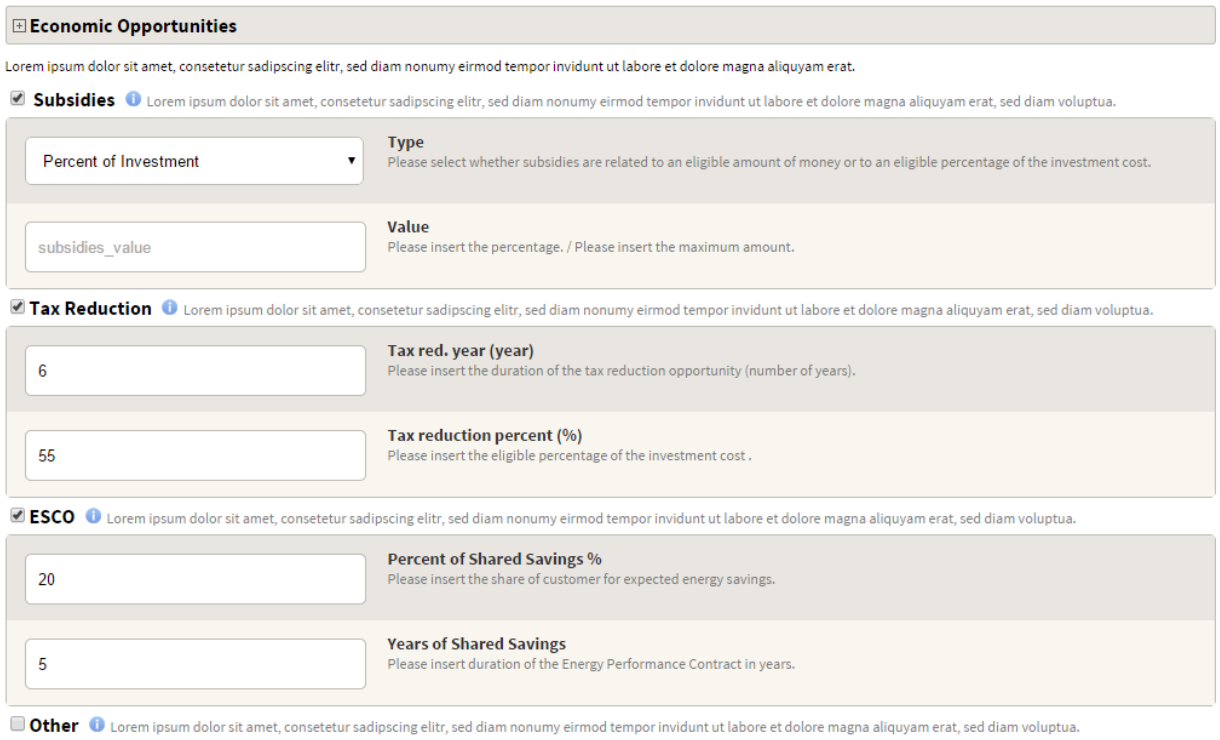

Figure 5-4: Future developments: expected "economic opportunities" panel.