

## **GRASPINNO**

Transnational model, strategies and decision support for innovative clusters and business networks towards green growth, focusing on green e-procurement in EE/RES for energy refurbishment of public buildings.

# **Deliverable: 3.3.1 Report on the tools that will be used for the purposes of GRASPINNO pilots**

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**Date: (27/11/2016)**

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## 1. INTRODUCTION

### 1.1 SCOPE AND OBJECTIVES OF THE DELIVERABLE

The aim of this deliverable is to present all tools developed by earlier (MED/other) projects during previous programming periods to be used in GRASPINNO pilots. These tools include: GRASP eGPP platform, Databases, Transnational Mediterranean Network (TMN) and Life Cycle Cost (LCC) tool; CO-EFFICIENT Living Labs methodology; SIENA CARBON FREE 2015; PEEBPE; and BIOFOSS final studies and procurement documents for obtaining the EE improvement of buildings; ePRIOR and PEPPOL guidance and consultation in the process of eGPP in a seamless transnational environment. In this deliverable their functionalities are described, as well as the reasons and the ways in which they will be used in GRASPINNO project. Finally, identified best practices will be presented. This deliverable was produced by UPatras (LP1), Atlantis (PP1), Terre di Siena Lab (PP2), UMaribor (PP4) with the contribution of the TEIWM (PP13).

### 1.2 STRUCTURE OF THE DELIVERABLE

The deliverable is structured in 8 chapters:

- Chapter 2 presents the tools developed during GRASP project, and specifically eGPP platform, Databases, Transnational Mediterranean Network (TMN) and Life Cycle Cost (LCC) tool. Moreover, the way that these tools will be used in GRASPINNO is presented.

- Chapter 3 provides a description of the Living Lab Methodology developed during CO-EFFICIENT project and its use during GRASPINNO.
- Chapter 4 describes the final studies and the procurement procedures of SIENA CARBON FREE, as well as their potential participation in GRASPINNO.
- In chapter 5, the final studies and the procurement documents of PEEBPE are presented. Also, the future contribution of these results to GRASPINNO is described.
- Chapter 6 deals with the final studies and the procurement documents of BIOFOSS project, as well as the way that these will benefit GRASPINNO.
- In chapter 7, PEPPOL/ePRIOR guidance and consolidation are presented. In addition the contribution of these projects to GRASPINNO activities is analyzed.
- Finally, chapter 8 presents identified best practices identified.

## 2. GRASP

### 2.1 eGPP TOOL

The e-GPP Tool of GRASP offers Public Authorities an easy way to collect green specifications that can be used during tender preparation. Green specifications are available for the following domains:

#### 1. Energy Efficiency

- Building renovation
- IT Equipment
- Building climate control
- Public Lighting

#### 2. Renewable Energy

- Geothermal Energy
- Solar Energy
- Wind Energy

Registered users from Small and Medium Enterprises (SMEs) can search for Tenders and insert their Green Products. Registered users from Public Authorities (PAs) can easily prepare a Tender Package (TIP) and export it for further elaboration during tender preparation process.

#### 2.1.1 Description and functionalities

The GRASP online e-GPP tool provides the following functionalities:

- A WEB Site which provides to the users (SMEs and Public Authority (PA) staff) with access to the tool functionality, as well as typical authentication control and appropriate linking/redirection to the databases and their WEB interfaces. The tool, also, supports PAs to publish a single WEB page with information about a new tender (short description, basic data, and links to download tender docs).
- A tool section which supports browsing and search on the contents of the library with green specs of products and sustainability issues.
- A search facility which allows searching a catalogue of product suppliers to identify the suppliers that fulfill certain green procurement criteria as these are input by the Public Authorities for a new procurement of green products / services.
- A functionality to search the PA database to extract all relevant specs for a given category of product/service to be procured.
- Functionality by the tool to produce a standalone document of:
  - Green specs the new product/service should fulfill.
  - List of suppliers that can fulfill the specs.

Indicative budget of the procurement based on market prices.

- Functionality which allows PAs to search and identify offered products/services (i.e. from the "Suppliers (SME) database" which satisfy certain input green criteria and product/service specs.

- Creation of a draft tender in a format that is editable with standard text editing tools (e.g., Microsoft Word).

#### 2.1.1.1 Concepts and Terminology

There are several key concepts and terms that the user should be familiar with before using the e-GPP tool. These are listed below:

**Tender:** a published tender for green public procurements

**GPP:** electronic green public procurement

**Green specification:** a set of characteristics and features related to a green product

**Tender Information Package:** a set of information that describes the main specifications and criteria that the procured green product(s) should satisfy. In addition, it includes information about complying products from registered SMEs.

**Category:** a (green) category of products that can be procured through GRASP tools (e.g., IT Equipment).

**Criterion:** a specific criterion that a procured product can or must satisfy so that it is characterized as green product. These are used for comparing the various products and defining the degree of their “greenness”.

**Product type:** a term from a terminology that categorizes products of a specific green category.

**Complying supplier/product:** a supplier/product that complies to the green specifications and criteria specified in a Tender Information Package.

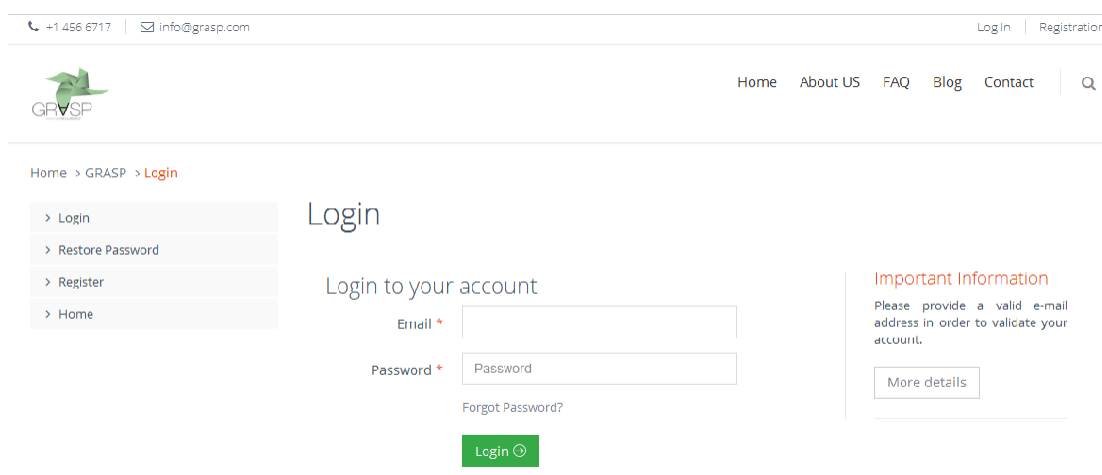
### 2.1.1.2 e-GPP tool User Manual

#### ➤ General description

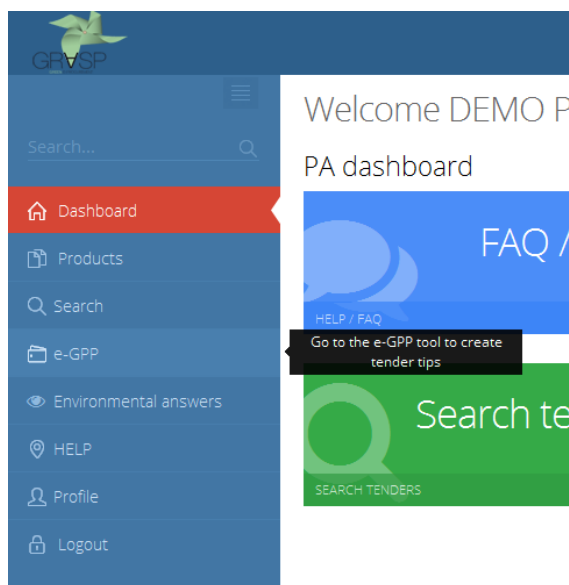
In this section we present detailed guidelines regarding the use of the GRASP online e-GPP tool. In order to make this User Manual more comprehensible, the guidelines for each specific tool's section/page are presented separately.

#### ➤ e-GPP tool Login

In order to log into the e-GPP Support Tool, the PA user has to visit the relevant GRASP website ([www.graps-egpp.eu](http://www.graps-egpp.eu)), login using his/her credentials and choose the e-GPP Support Tool from the top bar menu, and then is redirected to the login page shown below. After filling in her/his credentials the user is redirected to the main page ("Home" page) of the e- GPP Support tool.



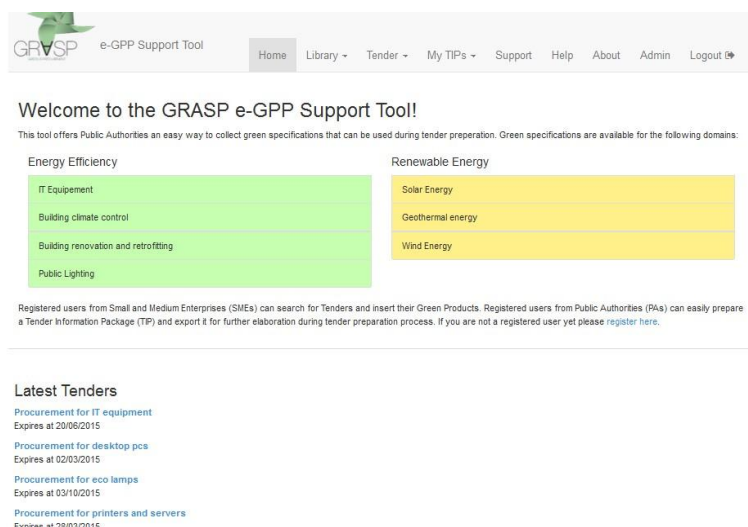
**Image 2.1** Login page



**Image 2.2** Menu for access to e-GPP tool

### ➤ “Home” Section

After its successful login, the user has access to the tool’s “Home” page. In this page the user is able to see general information about the GRASP online e-GPP tool. Moreover, the user can see the recent tenders created and published through the tool.



**Image 2.3** e-GPP tool "Home" page

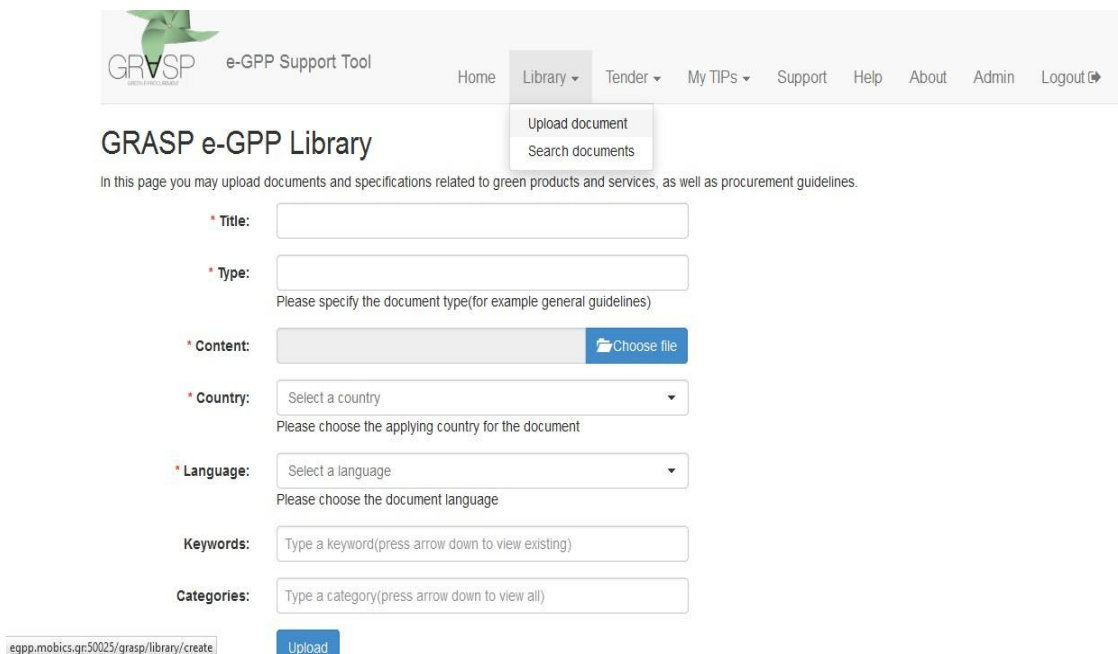
## ➤ “Library” Section

In this section, each user is able either to upload or search for documents related to “green” specifications of products/services needed to be procured. It is divided in two sub- sections:

- “Upload document” subsection.
- “Search documents” subsection.

## ➤ “Upload document” subsection

In this subsection the user can upload documents and specifications related to green products and services, as well as procurement guidelines. The user will be prompted to fill in a set of fields; most fields should be filled in, in order for the document to be uploaded:



GRASP e-GPP Library

In this page you may upload documents and specifications related to green products and services, as well as procurement guidelines.

\* Title:

\* Type:   
Please specify the document type(for example general guidelines)

\* Content:  [Choose file](#)

\* Country:  Select a country  
Please choose the applying country for the document

\* Language:  Select a language  
Please choose the document language

Keywords:  Type a keyword(press arrow down to view existing)

Categories:  Type a category(press arrow down to view all)

[Upload](#)

egpp.mobics.gr:50025/grasp/library/create

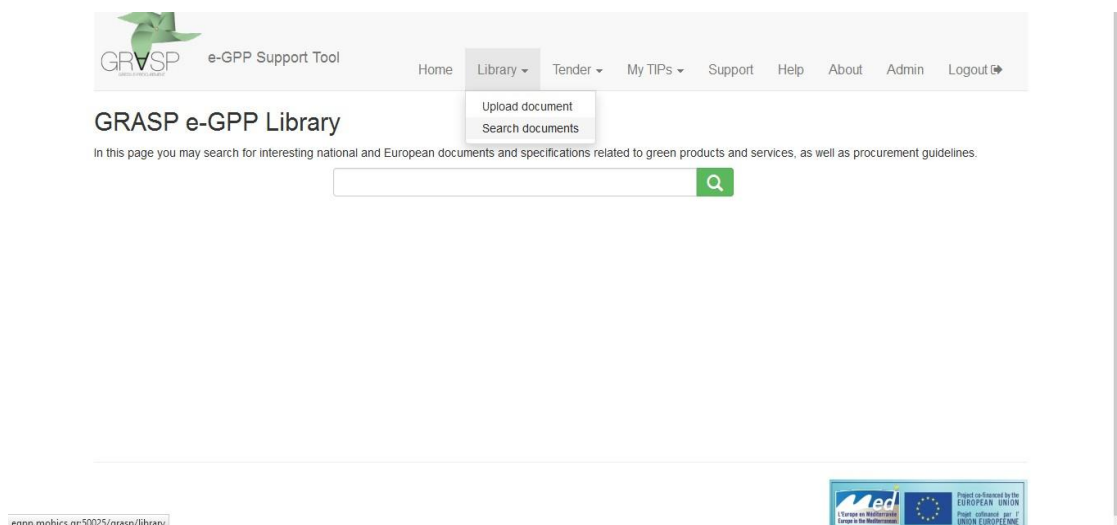
**Image 2.4** "Upload document" subsection

- **Title:** The title of the document.
- **Type:** The type of the document (i.e. EU “green” specs for IT equipment).
- **Content:** Selection of the appropriate file from the user’s local disk.
- **Country:** Selection of the applying country for the document.
- **Language:** Selection of the document’s language.
- **Keywords:** The user can type keywords related to the document’s content or select from a dropdown list with predefined keywords.
- **Categories:** The user can type categories related to the document’s content or select from a dropdown list with predefined keywords.


When all fields are filled in, the user clicks on the “**Upload**” button in order for the document to be uploaded.

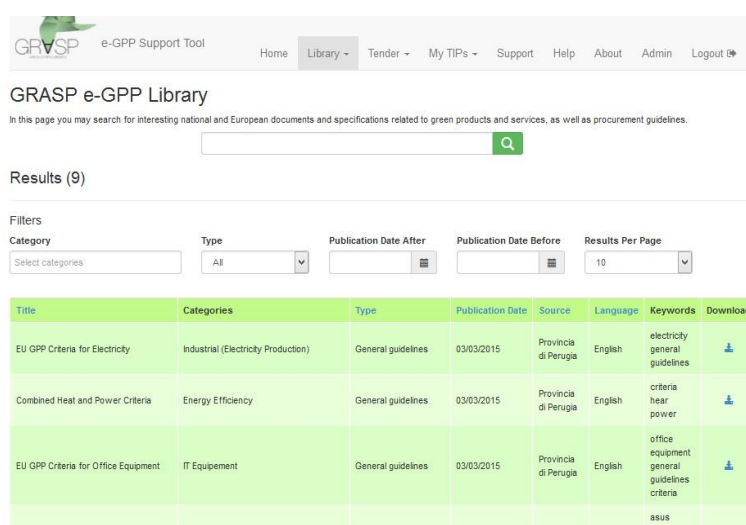
#### ➤ “**Search documents**” subsection

In this page the user may search for national and European documents and specifications related to green products and services, as well as procurement guidelines.



**Image 2.5** "Search documents" subsection


The user should enter specific words in the search tab and then by clicking  the system will display all related documents. In case the user leaves the search field empty and clicks this button, the tool will display all available documents.



**Image 2.6** Search results

The table includes the following document details:

- **Title:** the title of the document.
- **Category:** the categories associated to the specific document.
- **Type:** the type of the document (i.e. EU “green” legislation, “green” specs, etc.).
- **Publication Date:** timestamp of the date the document was published.
- **Source:** the document’s source.
- **Language:** the document’s language.
- **Keywords:** the associated keywords to the specific document.
- **Download:** a link to download and open the document.

When the search results are displayed, the user can apply various filters (Category, Type, Publication Date After, Publication Date Before, Results per Page), in order to filter the search results and find more easily the documents he wants. By selecting  the user will be able to download the respective document.

By clicking on the titles of the result table columns, the user can sort the results in ascending or descending order.

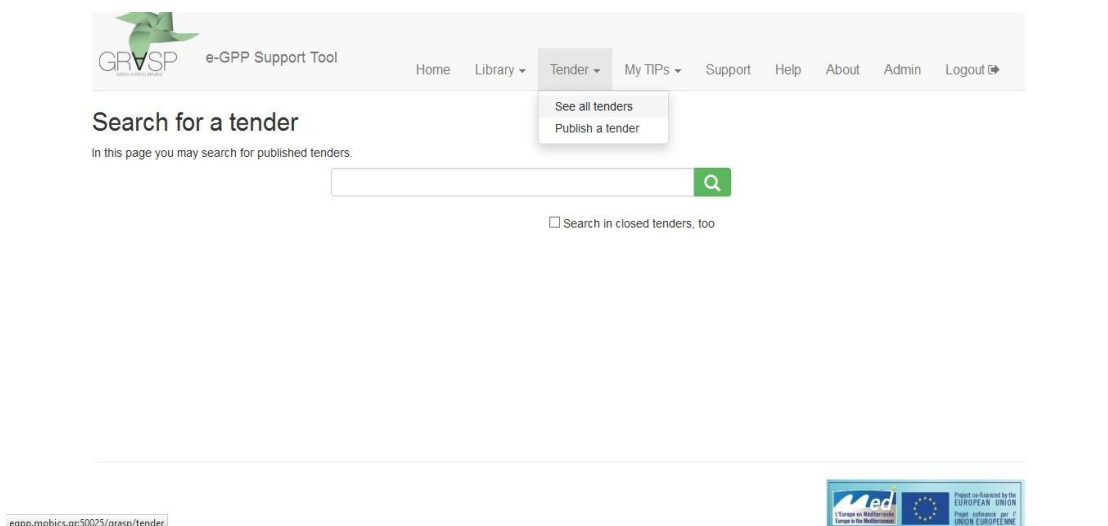
### ➤ “Tender” Section

In this section the user is able to search for tenders already created/published or publish a newly created tender. This section is also divided in two sub-sections:


- “See all tenders” subsection.
- “Publish a tender” subsection.

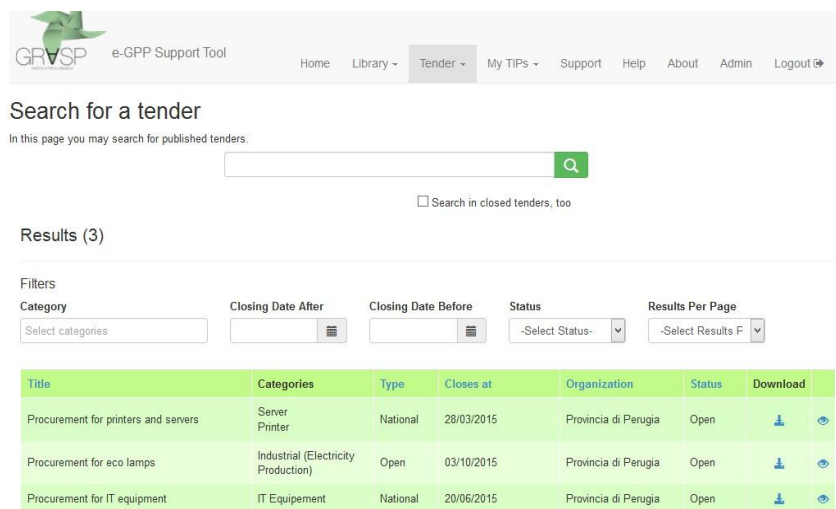
## ➤ “See all tenders” subsection

In this page the user may search for published tenders.



**Image 2.7** “See all tenders” subsection



The user should enter specific words in the search tab and then by clicking  the system will display all related tenders that are still open. In case the user leaves the search field empty, the tool will display all available tenders. Moreover, the user can tick the box “Search in closed tenders, too”, so as the tool to display tenders that are closed, at present.

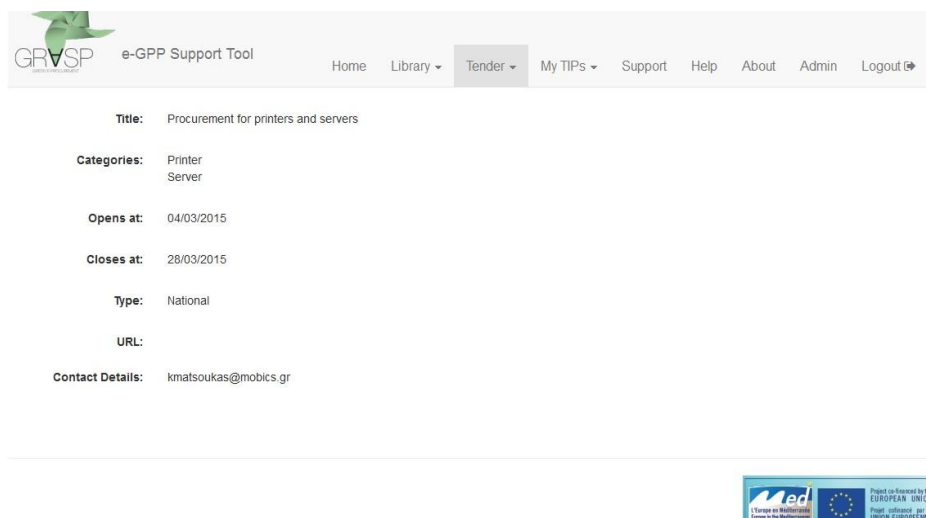


**Image 2.8** Tenders search results

The table includes the following information:



- **Title:** the title of the tender.
- **Categories:** the associated categories to the specific tender.
- **Type:** the type of the tender (i.e. national, regional, open, closed, etc.).
- **Closes at:** date when the tender closes.
- **Organization:** organization which published the tender.
- **Status:** the status of the tender (i.e. closed, open, etc.).
- **Download:** link to download/open the tender file.

When the search results are displayed, the user can apply various filters (Category, Closing Date After, Closing Date Before, Status, Results per Page), in order to filter the search results and find more easily the tenders he is interested in. By selecting  the user will be able to download the respective document. By selecting  the user can see general information about the respective tender, as submitted through the "Publish a tender" subsection.



**GRVSP** e-GPP Support Tool
 Home Library **Tender** My TIPs Support Help About Admin Logout

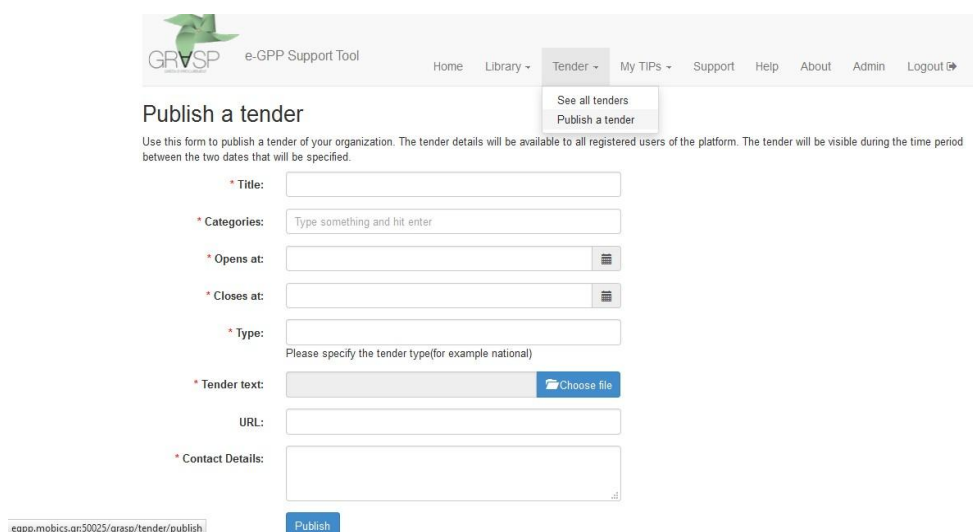
**Title:** Procurement for printers and servers  
**Categories:** Printer Server  
**Opens at:** 04/03/2015  
**Closes at:** 28/03/2015  
**Type:** National  
**URL:**  
**Contact Details:** kmatsoukas@mobics.gr

**Image 2.9** Tender's General Information

### ➤ “Publish a tender” subsection




In this section the user can publish a tender on behalf of his organization. The tender details will be available to all registered users of the platform. Each tender will be visible during the time period between the two dates (open date, closure date) that will be specified. The user will be prompted to fill in a set of fields; most fields should be filled in, in order for the tender to be published:



**GRVSP** e-GPP Support Tool
 Home Library **Tender** My TIPs Support Help About Admin Logout

**Publish a tender**
See all tenders  
Publish a tender

Use this form to publish a tender of your organization. The tender details will be available to all registered users of the platform. The tender will be visible during the time period between the two dates that will be specified.

\* **Title:**   
 \* **Categories:**   
 \* **Opens at:**    
 \* **Closes at:**    
 \* **Type:**   
 Please specify the tender type(for example national)  
 \* **Tender text:**   **Choose file**  
**URL:**   
 \* **Contact Details:**

egpp.mobics.gr:30025/grasp/tender/publish
 **Publish**

**Image 2.10** "Publish a tender" subsection

- **Title:** The title of the tender.
- **Categories:** The categories associated to the tender (i.e. IT equipment, photovoltaics, etc.).
- **Opens at:** Selection of the date the tender is planned to open.
- **Closes at:** Selection of the date the tender is planned to close.
- **Type:** Selection of the tender's type (i.e. national, regional, etc.)
- **Tender text:** Selection of the appropriate tender docs from the user's local disk.
- **URL:** link to the tender's website/webpage/dedicated link. This field is optional.
- **Contact Details:** the contact details (i.e. phone, fax, email, etc.) of the person responsible for the tender.

When all fields are filled in, the user clicks on the "**Publish**" button in order the tender to be published in the tool.

### ➤ **"My TIPS" Section**

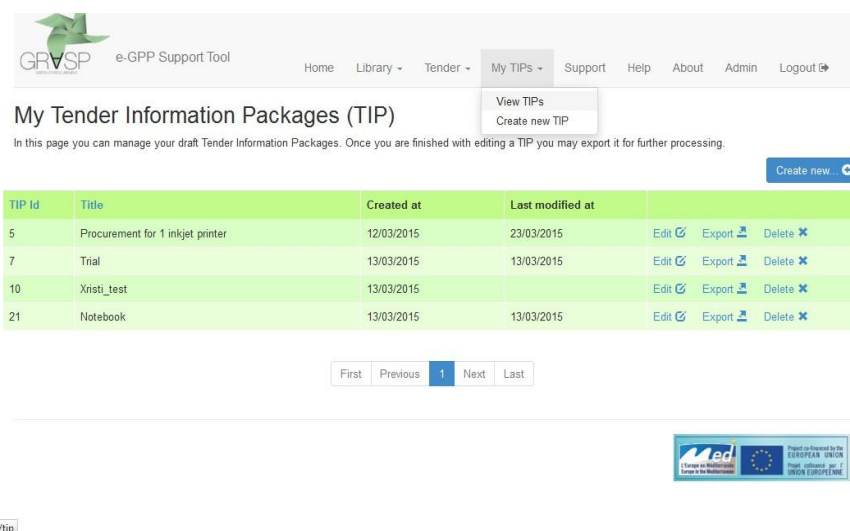
In this specific section of the e-GPP tool, a user can create a new TIP (Tender Information Package) or view TIPS he has already created. This means that this section, includes 2 different subsections:

- "View TIPS" subsection.
- "Create new TIP" subsection.

### ➤ **"View TIPS" subsection**

This section displays a list with all the available TIPS created by the

user. In this page the user can manage his own draft TIPs (Tender Information Packages). Once the user is finished with editing a TIP he may export it for further processing. The exported document (rich text document format, RTF) contains a summary of the TIP that also includes the market offerings, which comply with the criteria and specs chosen. Also, if no complying products are found, it provides recommendations which are automatically generated by the system.




**Image 2.11** "View TIPs" subsection

The displayed table includes the following information:

- **TIP Id:** The specific ID of a TIP
- **Title:** the title of the TIP
- **Created at:** the date the TIP firstly created
- **Last modified:** the date of the TIPs most recent modifications

Moreover, there are various options for the user to manage each specific TIP. More specifically:

 : Edit the information/data of a specific TIP. If edit is chosen

then the user is redirected to fill in or change any information for this specific TIP.

**Export** : Export a document containing all data of a TIP, for further processing. If export is chosen then a text file (in .RTF format) pops up with all information available for that TIP.

**Delete** : Delete a specific TIP. If delete is chosen the user is asked to confirm or not the deletion of the TIP.

**Create new...** : When selected, redirects the user to the “Create new TIP” subsection.

The export functionality outputs all TIP related data as an editable document. This includes, basic TIP information, list of criteria met, list of products and services matching the TIP requirements, market prices, etc. A sample of the product table that is exported is depicted in the following picture.

**Complying Products**

Requested Services: Warranty  
 Estimated Price Range: 120  
 Expected Price: 1123  
 Average Price: 120

**Potential Suppliers: 1**

Product Name	WorkCentre 3045
Price	120
Percentage Difference from Average Price	+0%
Percentage Difference from Expected Price	-836%
Services	Warranty(Four years), Technical Support(One year)
Power Consumption	+

**Image 2.12** Extract from TIP export file

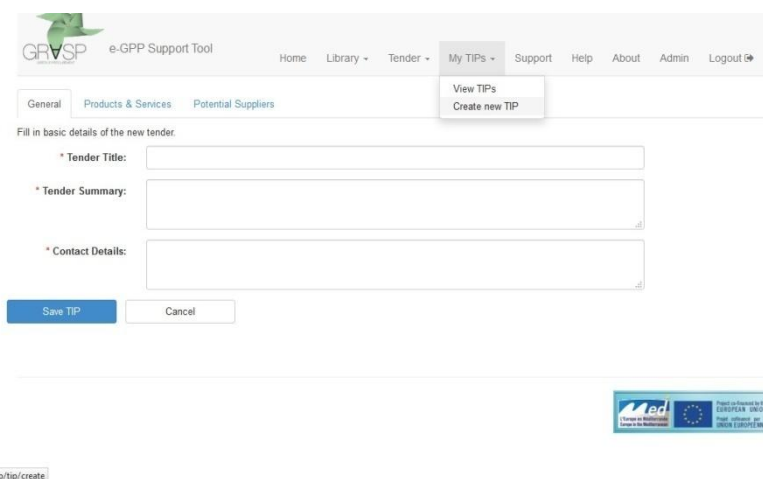
### ➤ **“Create new TIP” subsection**

In this page, the user can create a new TIP by filling in the following tabs:

- General
- Products & Services
- Potential Suppliers

### ➤ **“General” tab**

This section asks for some mandatory information on the Tender title, Tender summary and Contact details. “Save TIP” button should be clicked to ensure information backup.



**Image 2.13** "Create new TIP" page / “General” tab

### ➤ **“Products & Services” tab**

The user has to fill in information to be stored in the system under the relevant product sheet. The user must use these forms to describe the green specifications and criteria of the procured products

and services. **For each product/service that needs to be procured the following form must be filled in:**

Product 1 ✕
+

### General Info

Fill in general info about the procured product. Once you select the product/service category and type, a list of potential suppliers and the respective products is automatically calculated (see relevant tab).

\* Title:

\* Category:
 ☒ Energy Efficiency
 ☐ Renewable Energy

\* Type: Please select category

\* Quantity:

\* Quantity unit:

\* Expected unit price:

\* Technical description:

\* Green Spec description:

### Related Criteria

Specify the criteria that the offered products/services should satisfy. Use the "Expected values" field as follows:

- If one value is inserted, it refers to the minimum criteria requested.
- If two or more values are inserted, the offered products/services should satisfy at least one of them.

### Related Services

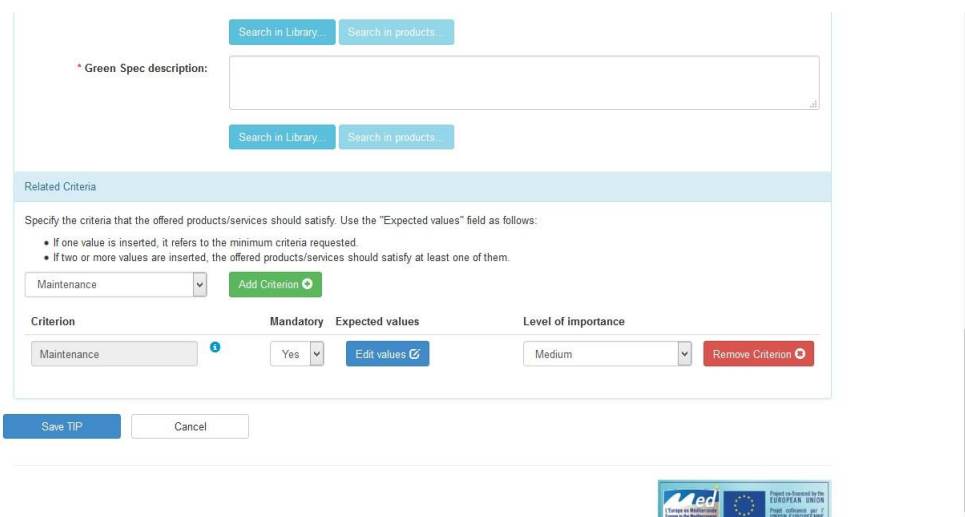
Specify the services that the offered products should satisfy.

**Image 2.14** Add product/service to a TIP

For each product/service the user should provide data regarding the following fields:



- **Title:** Title of the product/service to be procured.
- **Category:** Select the category that the product/service belongs to. Under section category the major options are **Energy efficiency** (selection between building climate control, building renovation and retrofitting, it equipment, public lighting) and **Renewable Energy** (selection geothermal energy, solar energy, wind energy).
- **Type:** The user must select the type of the product/service. The available options here are generated automatically, based on the user's selection in the field "Category".
- **Quantity:** Add the desired quantity of the product/service.
- **Quantity unit:** Specify the quantity unit (i.e. Kg, pieces, meters, etc.).
- **Expected unit price:** Indicate the expected unit price, based on the regular market prices for the specific product/service.
- **Technical description:** Provide a brief description of the technical specifications of the procured product/service. In case the user is not aware of specific technical specifications, he is able to search for data in the tool's library (selection of "Search in library" button) or in the products already available in the tool's DBs (selection of "Search in products" button).
- **Green spec description:** Provide a brief description of the "green" specifications of the procured product/service. In case the user is not aware of specific technical specifications, is able to search for data in the tool's library (selection of "Search in library" button) or in the products already available in the tool's DBs (selection of "Search in products" button).

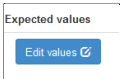

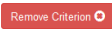
A very important activity, while adding products/services in a TIP, is the allocation of “green” criteria to each product/service. At the bottom of each product’s/service’s form there is a section entitled **“Related Criteria”**. From the drop down menu, the user can select a specific criterion and allocate it to the product/service. This drop down menu is created automatically based on the user’s selection in the “Category” field



**Image 2.15** Add a criterion to a product/service


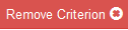
When a criterion is added, the user is able to edit it. This means that the user has the following options:

-  : Receive textual information regarding the meaning of the criterion.
-  : Define whether the criterion is mandatory or not.

-  : Edit the expected values of the criterion.
-  : Set the level of importance (low, medium, high) for the specific criterion.
-  Completely remove the criterion from the product/service.

In the Related Services section of this page, the user can select a specific desired service and assign it to the product. This drop down menu is created from a list of predefined services and it is not associated with a specific product category or type.

When a service is added, the user has the following options:

-  : Receive textual information regarding the meaning of the service.
-  : Completely remove the service from the product.



**Image 2.16** Related Services

Finally, "Save TIP" button should be clicked to ensure information backup.

### ➤ "Potential Suppliers" tab

By choosing the product or service the user has created, all market offerings, which comply with the criteria and specs chosen, appear in a list. The user is invited after filling the form for the product/service to first check all relevant and open listings.

Select the desired products/services you have already specified in order to see complying market offerings. These offerings refer to products registered by companies and can give you an indication of the availability of complying products and their price range. It is recommended to always make this check before proceeding with the preparation of a green procurement.

InkJet Printer

Spec description: Green spec description

Criteria: **Power Consumption**  
**Ergonomic requirements**

Services: **Warranty**

Potential suppliers: 1

Expected price range: 120

Product	Ergonomic requirements	Power Consumption *	Price
WorkCentre 3045	*	✓	120€

Criteria with \* are mandatory

Save TIP Cancel

**Image 2.17** Potential suppliers

By clicking on a specific product, the user can see if there are any products that comply with the criteria and the services he entered. The criteria marked with an asterisk (\*) were added as mandatory. Criteria not marked with (\*) are non-mandatory and the listed products do not necessarily comply with the non-mandatory criteria. On the other hand, all listed products offer the services the user has

already added.

By clicking on the product name, the user can view some basic information regarding this product. The complete list of services this product offers is also displayed, alongside with the offered service duration (in parentheses).

WorkCentre 3045

Description	Services	Tender Description	Full Description	Price
Model 3045V_B 3045V_NI Print speed up to 24 ppm Duty cycle Up to 30,000 images/month1 Recommended monthly print volume Up to 750 pages2 Two-sided output Manual Maximum print resolution 1200 x 1200 dpi Connectivity USB 2.0 10/100BaseTX Ethernet, USB 2.0, Wi-Fi Page Description Languages (PDL) Host-based Detailed specifications See specifications at Next Steps Find dealer at Find dealer at What's in the box Print cartridge (capacity: 700 pages3) Power cord USB cable (3045B) Fax cable (3045NI) Software and documentation NOTE: Some contents may be shipped separately	Technical Support(One year) Warranty(Four years)	The proven Hi-Q LED print engine enables the WorkCentre 3045 to be more energy efficient than competitive devices using laser technology Extra-quiet operation to minimize impact on busy offices	Print speed up to 24 ppm Duty cycle Up to 30,000 images/month1 Recommended monthly print volume Up to 750 pages2 Document handler Platen cover Automatic Document Feeder Capacity: 15 sheets Size: 5.83 x 8.27 in. to 8.5 x 14 in. Two-sided output Manual	120 €

**Image 2.18** Complying product details

If no complying products are found due to strict mandatory criteria or services, the system automatically generates recommendations. In the example of the following picture, the "24h support" service is not offered by any of the products.

InkJet Printer

Spec description: Green spec description

Criteria: **Power Consumption**

Services: **24h support**  
**Warranty**

Potential suppliers:

Expected price range:

No products were found with the specified services, but by using the following services separately the following number of products can be found:

Service name	Products found
Warranty	1

No products were found with the specified services, but by removing the following services the following number of products can be found:

Service name	Products found
24h support	1

**Image 2.19** Recommendations for relaxation of search criteria (services)

General Products & Services Potential Suppliers

Select the desired products/services you have already specified in order to see complying market offerings. These offerings refer to products registered by companies and can give you an indication of the availability of complying products and their price range. It is recommended to always make this check before proceeding with the preparation of a green procurement.

InkJet Printer

Spec description: Green spec description;

Criteria: **Printing mode**  
**Power Consumption**  
**Toners and cartridges manipulation**  
**Ergonomic requirements**

Potential suppliers:

Expected price range:

No products were found with the specified criteria, but by setting the following criteria to non mandatory the following number of products can be found:

Criterion name	Products found
Printing mode	1
Toners and cartridges manipulation	1

No products were found with the specified criteria, but by using the following criteria separately the following number of products can be found:

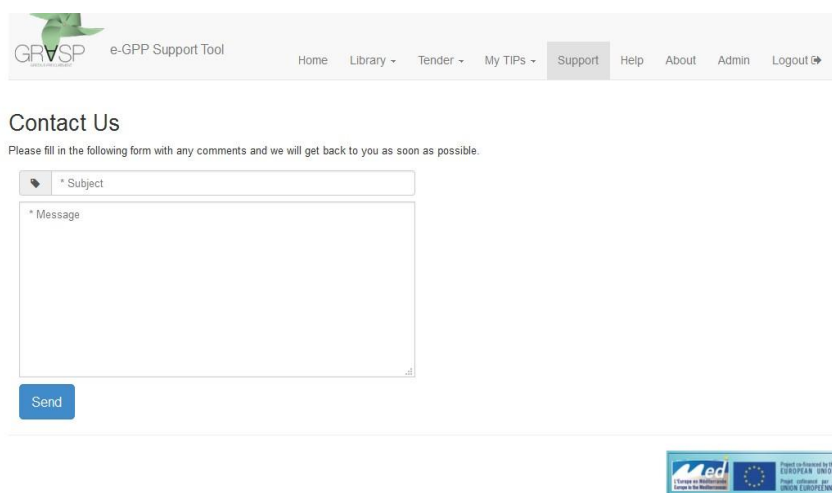
Criterion name	Products found
Power Consumption	5
Printing mode	1
Toners and cartridges manipulation	2

Save TIP Cancel

**Image 2.20** Recommendations for relaxation of search criteria (criteria)

## ➤ “Support” section

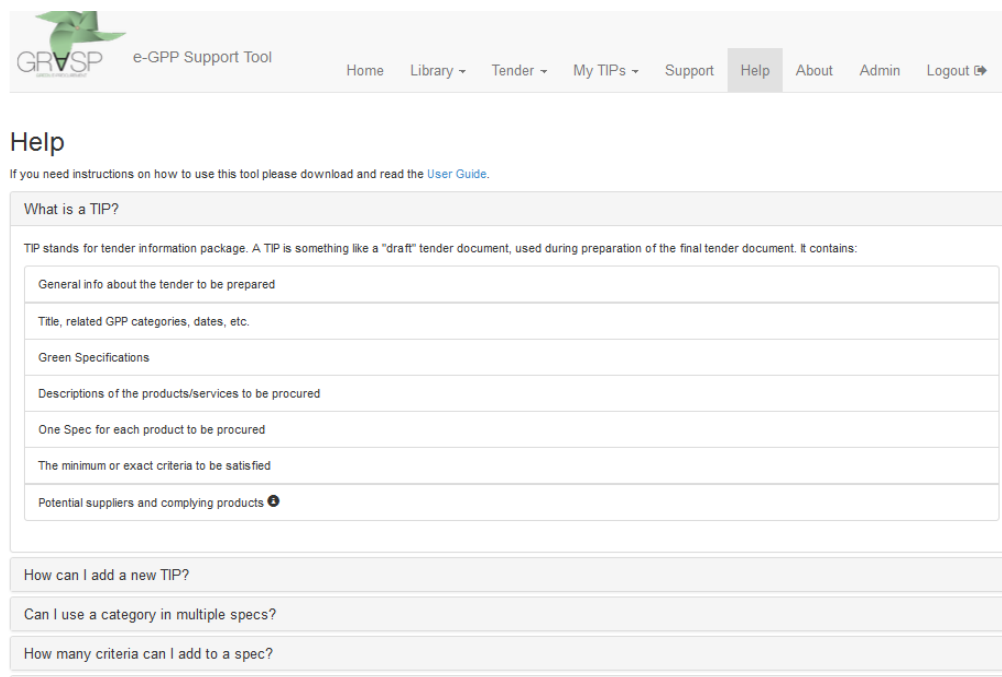
The user has the option to fill in the form with comments and/or questions, and send it to the e-GPP support team. The e-GPP Support team is responsible for the functioning and the structure of the site.



**Image 2.21** e-GPP tool Support page

## ➤ “Help” Section

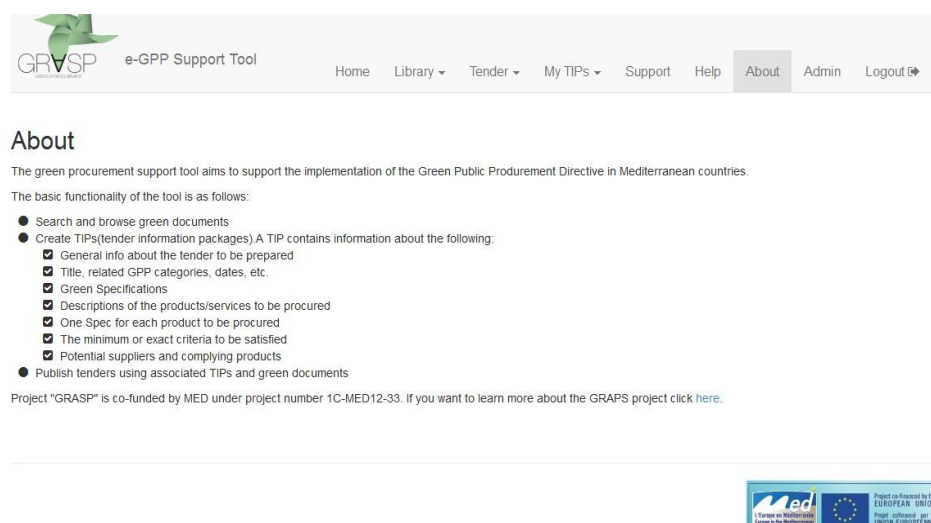
Users in need of information relevant to the structure and content of the e-GPP support tool may visit the Help section shown below. These include information on various questions, such as what a TIP is, how to add a new TIP, the use of multiple specs, the number of criteria to add to a spec, the number of values to a criterion etc.



**Image 2.22** e-GPP tool's "Help" page

## ➤ “About” section

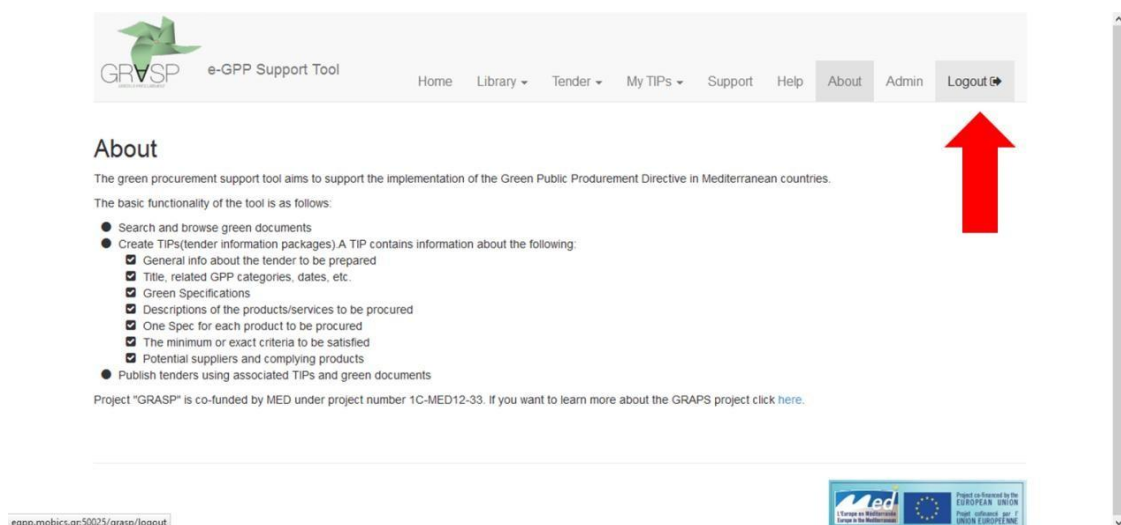
A description of the GRASP project and the basic functions used in e-GPP is offered in this section.



**Image 2.23** e-GPP tool "About" page

### ➤ Logout from the e-GPP tool and return to DB Admin

By selecting the Logout button, the user exits from the e-GPP Supporting Tool. By selecting the Admin button, the user returns to the DB Admin application.



**Image 2.24** Logout from the e-GPP tool

### 2.1.2 Participation in GRASPINNO

GRASP's eGPP tool, which has been one of the main outputs of GRASP project, will be upgraded and parametrized in the frame of GRASPINNO. More specifically, new possibilities will be added in the system, such as new categories of EE/RES and green criteria, among others. These alterations aim to take into consideration local legal framework and local-geography energy potential. The users of e-GPP tool will be able to use it in an advisory way in order to prepare a green tender via the TIP/TDT documents that derive from it. In conclusion, the eGPP tool, through the foreseen pilot activities of

GRASPINNO, is intended to advise and assist innovative PAs and SMEs in order to implement green tenders with green products, focused on energy refurbishment of public buildings.

## 2.2 DATABASES

### 2.2.1 Description and functionalities

The databases developed in GRASP project can be used by Public Agencies and SMEs that are involved with tenders in the fields of renewable energy and energy efficiency. The development of the databases facilitates the recognition of quality specifications, promotes cooperation between public bodies, intermediary bodies and innovation centers, assists businesses to create synergies and fosters innovation.

Public operators can be benefited by increasing their knowledge in specific specializations within the fields of renewable energy and energy efficiency through their participation in the GRASP databases. The databases also support a network of procurers with similar profiles and provide directions on employing the standards and specifications that need to be followed for successful implementation of e-procurement policies for formulating a synthesis that leads to solutions to typical procurement applications.

SMEs are also greatly benefited by the GRASP databases, since they have the opportunity of disseminating their products and services related to the fields of renewable energy and energy efficiency. GRASP databases facilitate their participation in the process of green

tenders and supports their collaboration with Public operators that are involved in public e- procurement.

The databases were designed to address the required knowledge for each relevant specialization within the following fields of renewable energy and energy efficiency:

### **Energy Efficiency (EE)**

- Public Lighting
- Building renovation & retrofitting
- Building climate control
- Heating and cooling efficiency
- IT equipment

### **Renewable Energies (RES)**

- Solar energy
- Wind energy
- Geothermal energy

Moreover, for each category the following considerations/criteria were taken into account during the databases design.

### **Environmental criteria**

- Energy performance
- Key technologies
- Health
- Waste
- Emissions

## Financial considerations

- Useful economic life
- Operational cost
- Investment cost

The Database Management System (DBMS) that was designed for managing the GRASP databases is completely updatable and modular. This means that it can be expanded as its administrator wants, without modifying its structure, but simply inserting proper records. So, if in GRASPINNO there is the need of adding new categories, subcategories, types and every kind of product, this can be implemented easily, with the only constraint that it has to belong to an existing category.

GRASP databases have plenty functionalities and offer many choices to their users, both to PAs and SMEs. In the following chapters, all these functionalities are presented in detail.

### 2.2.1.1 Admin Functionalities

#### ➤ **Editing Admin details**

Admin can edit his profile; also he can add more information like: a) Organization information, b) Operating field specification, c) Other information; and manage his GRASP ADMIN account.

➤ **Editing of products**

Admin can edit, view or delete a product if its details aren't correct. SMEs are required to enter their products including their green criteria. Admin can also use live search to see what products other SMEs have entered; and make corrections

➤ **Editing or deleting a product TYPE**

Admin can add a type at any time, even if he is not inserting a product. He can also delete a type as long as it is not attached to any product.

➤ **Editing tender details**

Admin cannot edit tender details. This information is confidential and is managed by the PAs respectively.

➤ **Adding, editing or deleting a CATEGORY**

Admin can add, edit or delete a CATEGORY. He can add a category at any time, even if he are is inserting a product. He can also delete a category as long as it is not attached to any product or product type.

➤ **Adding, editing or deleting KEY ELEMENT / GREEN CRITERIA**

Admin can add, edit or delete a KEY ELEMENT GREEN CRITERIA. He can add Key Element at any time, even if he is not inserting a product. He can also delete a Key Element as long as it is not attached to any product. He also has to review from time to time if key element data are inserted correctly.

### ➤ **Adding, editing or deleting SME/PA accounts**

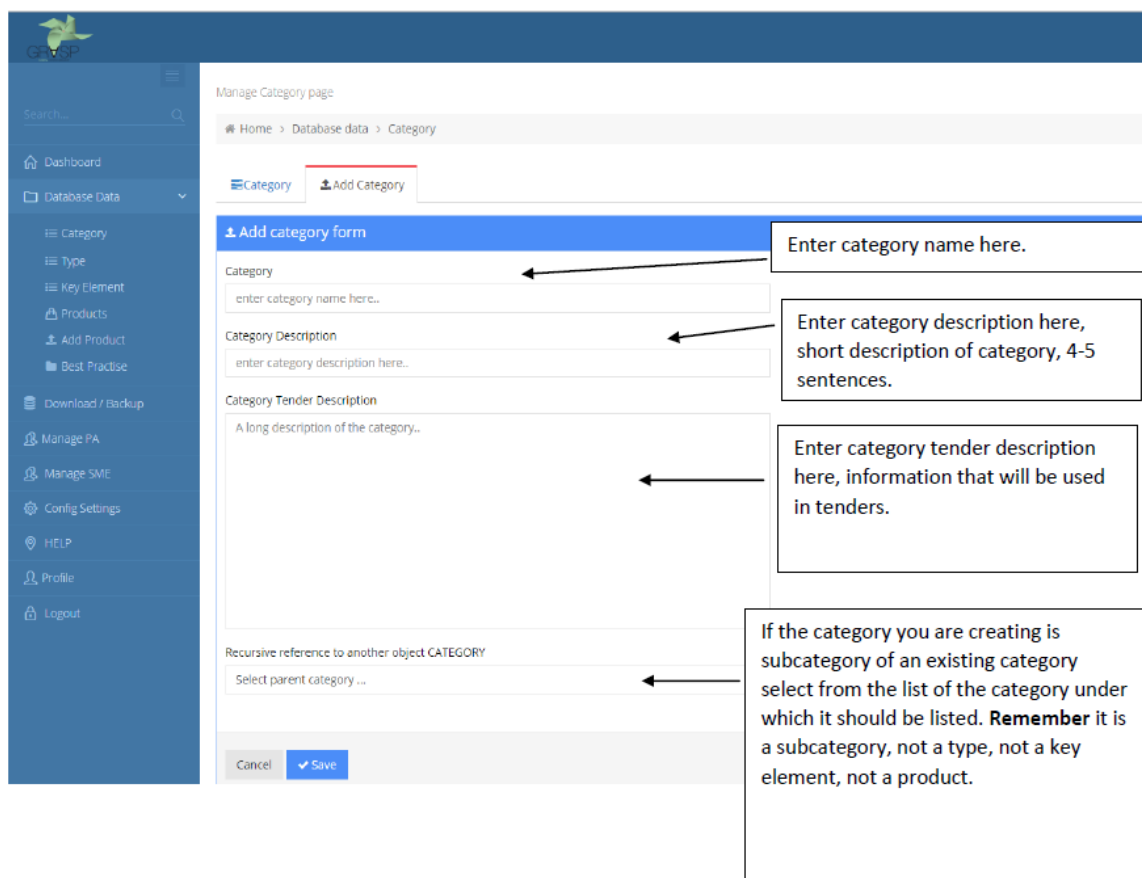
SMEs and PAs are registered through the sign up form provided on the front end platform. Admin can approve, ban or deactivate their accounts. He cannot delete an account as other related data are linked to their user profile.

### ➤ **Adding categories and subcategories**

To add categories Admin has to go under **Database data**, and select Category. To **edit** an existing category Admin has to click the **edit button** next to the category details row, provide the required information and click **Save** to save the changes.

Before Admin **deletes** a category, he needs to take some steps. First he needs to check if that category is not needed any more. He needs to check if no **types** are **linked** to it; also to be sure no **product** or key element is attached to the category he is deleting.

To add a category Admin has to click on "add category" tab. The add category form will be shown. He has to fill in the details required and click "save" to insert the new category into the database. To add a category he must not leave empty the recursive reference to another category; if it is a subcategory, he has to select the appropriate parent category.



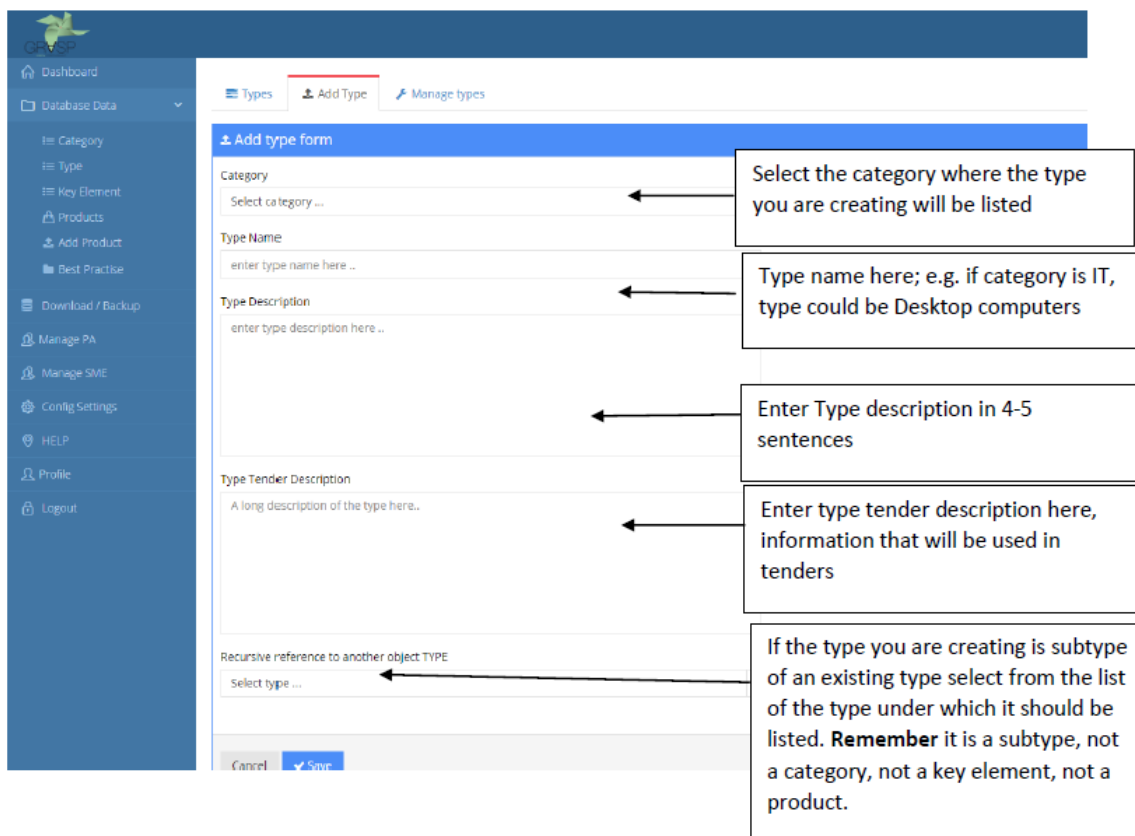
## ➤ Adding Types and sub types

To add types Admin has to go under **Database data**, and select Type. To **edit** an existing type he has to click the **edit button** next to the “type details” row, provide the required information and click **Save** to save the changes.

Before he **deletes** a type, he needs to take some steps. First he needs to check if that type is not needed any more. He needs to check if no **sub types** are **linked** to it; also to be sure no **product** is attached to the type you are deleting.

To add a Type Admin has to click on “add type” tab. The “add type” form will be shown. He has to fill in the details required and click

“save” to insert the new type into the database. To add a type he must not leave empty the recursive reference to another type; if it is subtype, he has to select the appropriate parent type.



The screenshot shows the 'Add type form' interface. The form includes the following fields and annotations:

- Category:** A dropdown menu with the text 'Select category ...'. An annotation points to it: 'Select the category where the type you are creating will be listed'.
- Type Name:** A text input field with the placeholder 'enter type name here ...'. An annotation points to it: 'Type name here; e.g. if category is IT, type could be Desktop computers'.
- Type Description:** A text input field with the placeholder 'enter type description here ...'. An annotation points to it: 'Enter Type description in 4-5 sentences'.
- Type Tender Description:** A text input field with the placeholder 'A long description of the type here...'. An annotation points to it: 'Enter type tender description here, information that will be used in tenders'.
- Recursive reference to another object TYPE:** A dropdown menu with the text 'Select type ...'. An annotation points to it: 'If the type you are creating is subtype of an existing type select from the list of the type under which it should be listed. **Remember** it is a subtype, not a category, not a key element, not a product.'

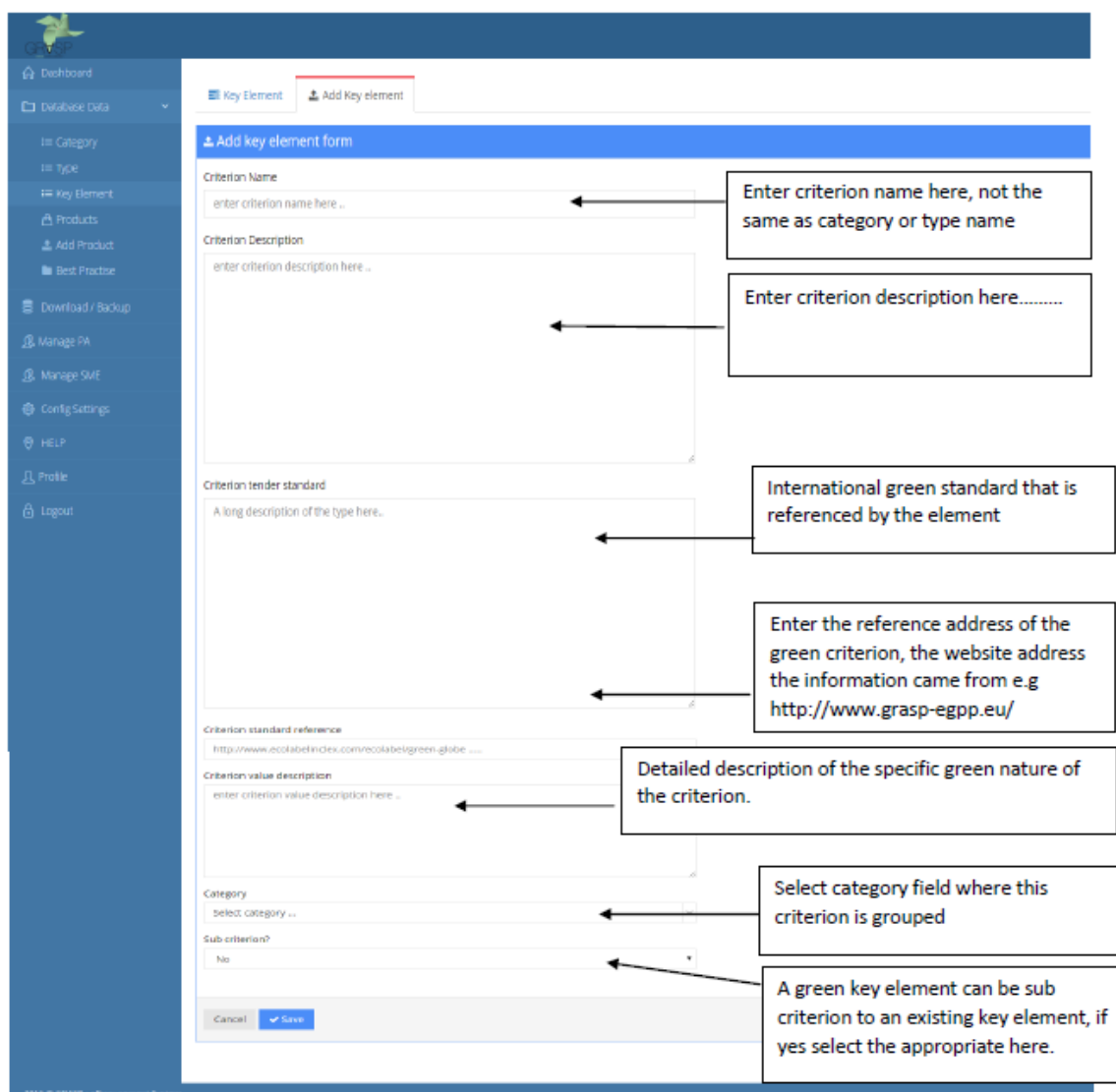
At the bottom of the form are 'Cancel' and 'Save' buttons.

### ➤ Adding Key Element / Green Criteria

To add key element Admin has to go under **Database data**, and select Key Element. To **edit** an existing key element he has to click the **edit button** next to the “key element details” row, provide the required information and click **Save** to save the changes.

Before he **deletes** a key element, he needs to take some steps. First he needs to check if that key element is not needed any more. He needs to check if no **products** are attached to the key element you are deleting.

To add a Key Element Admin has to click on “add key element” tab. The “Add key element” form will be shown. He has to fill in the details required and click “save” to insert the new key element into the database. To add a key element he must not leave empty the recursive reference to another object; if it is a sub key element, he has to select the appropriate parent field.



**Add key element form**

Criterion Name  
enter criterion name here ..

Criterion Description  
enter criterion description here ..

Criterion tender standard  
A long description of the type here.

Criterion standard reference  
<http://www.ecolabelindex.com/ecolabelsgreen-globe> .....

Criterion value description  
enter criterion value description here ..

Category  
Select category ...

Sub criterion?  
No

Cancel Save

Enter criterion name here, not the same as category or type name

Enter criterion description here.....

International green standard that is referenced by the element

Enter the reference address of the green criterion, the website address the information came from e.g <http://www.grasp-egpp.eu/>

Detailed description of the specific green nature of the criterion.

Select category field where this criterion is grouped

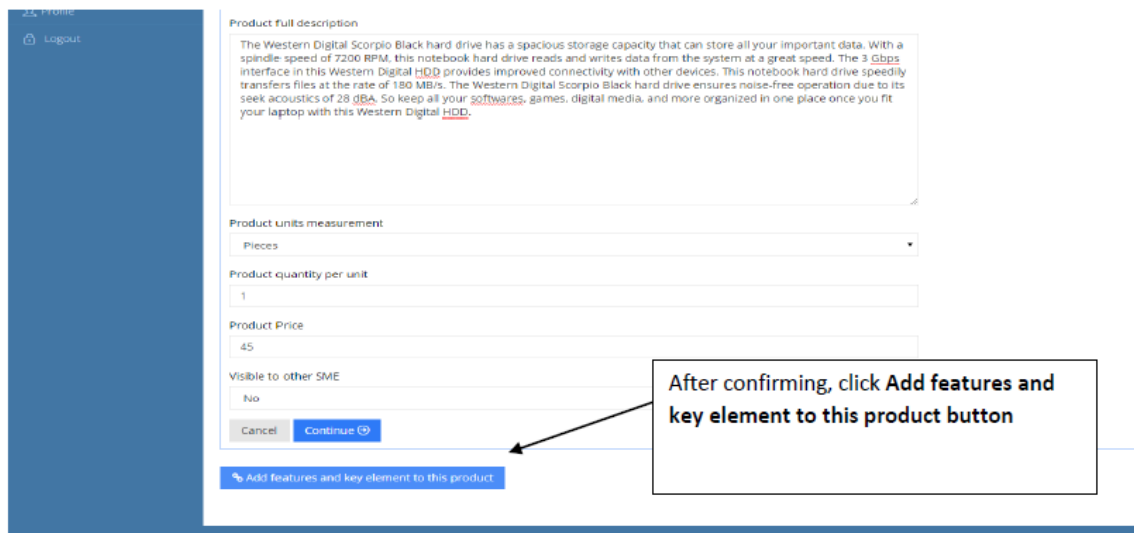
A green key element can be sub criterion to an existing key element, if yes select the appropriate here.

## ➤ Managing Products

To manage products Admin has to go under **Database data**, and select Product. To **edit** an existing product he has to click the **edit button** next to the product details row, provide the required information and click **Save** to save the changes.

To search for a product Admin can use the search box on the top right table. He can search by using the criteria category, brand name, model or product name

Before Admin **deletes** a product, he needs to take some steps. First he needs to check if that key product is not needed any more. He needs to check if no **tenders** are attached to the product he is deleting.



Product full description

The Western Digital Scorpio Black hard drive has a spacious storage capacity that can store all your important data. With a spindle speed of 7200 RPM, this notebook hard drive reads and writes data from the system at a great speed. The 3 Gbps interface in this Western Digital HDD provides improved connectivity with other devices. This notebook hard drive speedily transfers files at the rate of 180 MB/s. The Western Digital Scorpio Black hard drive ensures noise-free operation due to its seek acoustics of 28 dBA. So keep all your softwares, games, digital media, and more organized in one place once you fit your laptop with this Western Digital HDD.

Product units measurement  
Pieces

Product quantity per unit  
1

Product Price  
45

Visible to other SME  
No

Cancel Continue

Add features and key element to this product

After confirming, click Add features and key element to this product button

Product feature name, e.g. Low power consumption

Product feature value, e.g. With 5400 RPM-equivalent power consumption there is no compromise in battery life.

Scroll down to see add key element form.  
Select the value of the desired key element and click ok button.  
You can attach as many key elements as you need; you still can add or remove them on edit product details form.

After you are done, click save and Add another product button.

## ➤ Adding a product into the DBA

To add a Product, Admin has to click under "Database data," and select Add Product. The Add product form will be shown. He has to fill in the details required and click "save" to insert the new product into the database. After he submits the form a button will be shown, to add key element and feature details to that product. He has to insert feature name and value, and click the "submit" button. He has to

select key element value and click “ok”; in the end he has to click “save” and add another product button to add another product.

### ➤ **Managing /backup GRASP Databases**

To backup grasp databases, Admin should go on Download / Backup, and then click on the buttons placed on each category. If Admin would like to import the exported tables or migrate to another server, he can use this tool.

He can use phpMyAdmin tool to export or backup GRASP DBA, or he can setup a crown job in order to backup GRASP databases periodically.

### ➤ **Managing PA accounts / data**

To add/ manage PA accounts, Admin has to select Manage PA. To edit an existing PA he has to click the edit button next to the “PA details” row, provide the required information and click Save to save the changes.

He cannot delete a PA, but if he wants to ban an account he has just to click the “Ban” button next to the “PA details” row

To approve a PA account, he needs to verify first if it is a legitimate according to his country's legislation, and then, if everything is ok he can click the “approve” button to activate this account.

### ➤ **Managing PA organization data**

On this section Admin can manage PA Organization type data. It is essential to fill these data before allowing PA to sign up as this is related to their profile.

To view organization data, he has to click Organization tab to see organization list, to edit he has to click edit button next to the organization details row he wants to manage.

To add an organization he has to click Add organization tab and fill in the add organization form and click save.

#### ➤ **Managing SME accounts / data**

To add manage SME accounts, Admin has to go and select Manage SME. To **edit** an existing SME he has to click the **edit button** next to the SME details row, provide the required information and click **Save** to save the changes.

He cannot **delete** an SME, but if he wants to ban an account he has just to click the Ban button next to the SME details row

To approve an SME account, he needs to verify first if it is a legitimate SME according to his country's legislation, and then if everything is ok, he can click approve button to activate his account.

#### ➤ **Managing SME Business data**

On this section Admin has to manage SME Business type data. It is essential to fill this data before allowing SME to sign up as this is related to their profile.

To view business data, ha has to click SME Business tab to see business list, to edit he has to click edit button next to the business details row he wants to manage.

To add a business type he has to click Add Business tab and fill in the add business form and click save.

#### 2.2.1.2 PA Functionalities

##### ➤ **Editing PA details**

PA can edit his profile, also he can add more information like: a) Organization information, b) Personal information, c) Specify Operating field, e) Add Green certification, and manage his GRASP account.

##### ➤ **Editing products**

PA cannot edit products. He can view product details and compare products.

##### ➤ **Comparing products**

PA can use live search page to search for products and then comparing them.

##### ➤ **Publishing a tender**

PA can use e-GPP tool to publish a tender.

##### ➤ **Accessing e-GPP toolkit**


PA can access e-GPP by clicking on the e-GPP link on the menu. He does not have to login again on the e-GPP to access its features. He can use e-GPP to create tender tips, by clicking create new tip.

##### ➤ **Signing up for a GRASP PA account**

To sign up for a GRASP PA account is very simple. PA has to click registration or sign up on the menu and follow the instruction below.

[+1 456 6717](#) | [info@grasp.com](mailto:info@grasp.com)
[Log In](#) | [Registration](#)

---


[Home](#) | [About US](#) | [FAQ](#) | [Blog](#) | [Contact](#) | [Q](#)

---

Home > GRASP > [Create new account](#)

- > Login
- > Restore Password
- > Register
- > Home

### Sign Up for a GRASP account

Enter your Organization information below:

Are you an PA or SME? Select PA account type from the selection option.

Organization Name Enter organization name here e.g. Athens's Municipality

VAT# here... Enter VAT # here e.g. G123654788E

your company registration number# here... Some companies have registration number if you have one enter it, otherwise live it empty

Select country... Select your country e.g. Greece

Enter your account details below:

full name... Enter full name which will be used on your account

Email... Enter e-mail address will be used on your profile

Password... Enter your desired password

Re-type Your Password Retype your password again to make sure it was entered correctly, and click sign up

☐ I agree to the Terms of Service and Privacy Policy

Cancel
Sign Up

### ➤ Using product list page

On the Product List page PA can **view** or **compare** product details. He can also **Print, export to pdf, excel or csv** the table of the products. He can use the live search at the top of the table where he can search by any word in the products table.

If he wants to search more product details he should use **Search for products page**.

### ➤ Using Search for products page

He can use live instant search **to search for products**. He can write in the search box the name of the product, or any other word related to product details and automatically the product that much his search criteria will be shown below.

### ➤ **Comparing products criteria**

**To compare product criteria**, PA has to search for a product he is interested, click product name to see product details, on the product details page click compare button. The system automatically will display a comparison table with all products related to his search.

### ➤ **Using environmental answers page**

PA can answer environmental questions by using this section. He can click the **edit** icon on the left of the question, below the question will be shown the form where to enter his answer. He can write his **comment** on the text area provided, select **yes** or **no**, and then click the **ok** button.

He can **delete** his answer if there is anything wrong and add it again later.

### ➤ **Using the PA organization info**

PA is required to enter his **organization information** as required on the profile page, organization information section. He should enter Organization name, official contact email address, and official contact person; in this section he can also provide a different **e-mail** address to be contacted. He should enter contact details in this section, too; also a short description of his organization's activity.

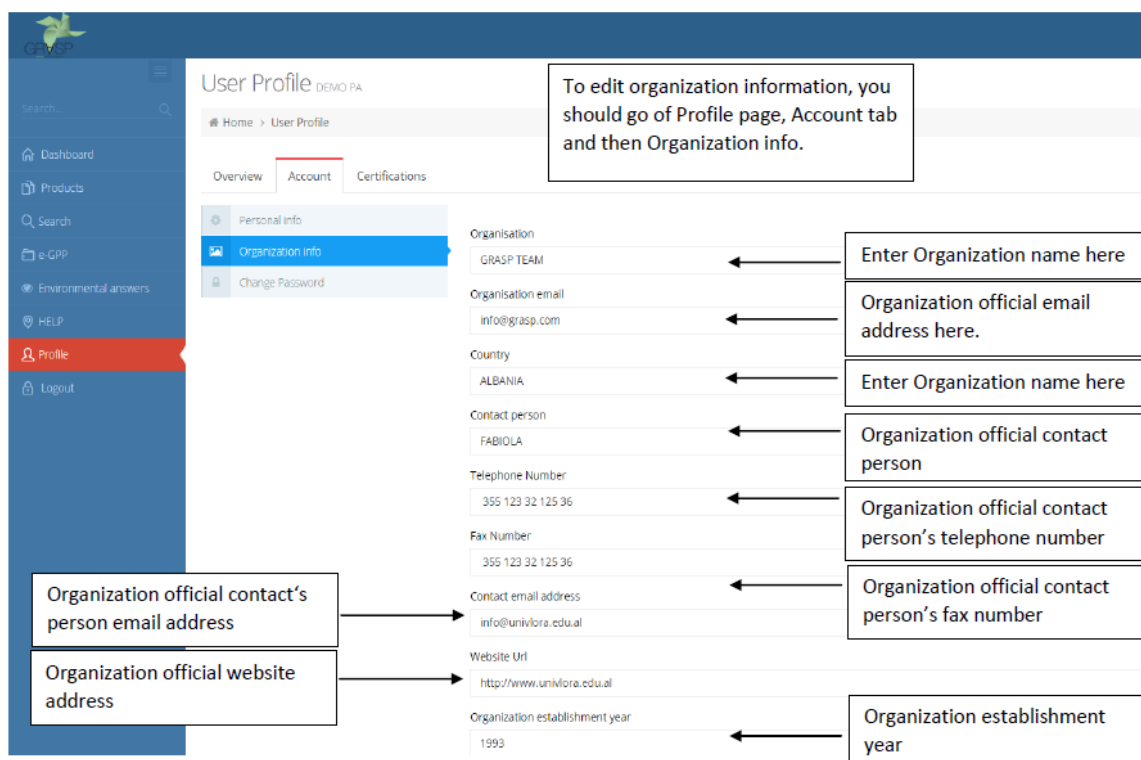
Very important is to enter the **VAT registration certificate** as it is vital for the **GRASP administrator**, in order to activate his account.

### ➤ **Selecting Operation field**

PA can select operation field from the selection option in the organization section.

## ➤ Editing personal info

**PA can edit only full name from personal information. He cannot edit user-name or e-mail address as this identifies his account. If he does not want to use his user profile e-mail he can add a different e-mail address in the organization section in the "SME email" field.**



**User Profile** DEMO PA

Home > User Profile

Overview Account Certifications

Personal info Organization info Change Password

Organisation

GRASP TEAM

Organisation email

info@grasp.com

Country

ALBANIA

Contact person

FABIOLA

Telephone Number

355 123 32 125 36

Fax Number

355 123 32 125 36

Contact email address

info@univlora.edu.al

Website Url

http://www.univlora.edu.al

Organization establishment year

1993

To edit organization information, you should go of Profile page, Account tab and then Organization info.

Enter Organization name here

Organization official email address here.

Enter Organization name here

Organization official contact person

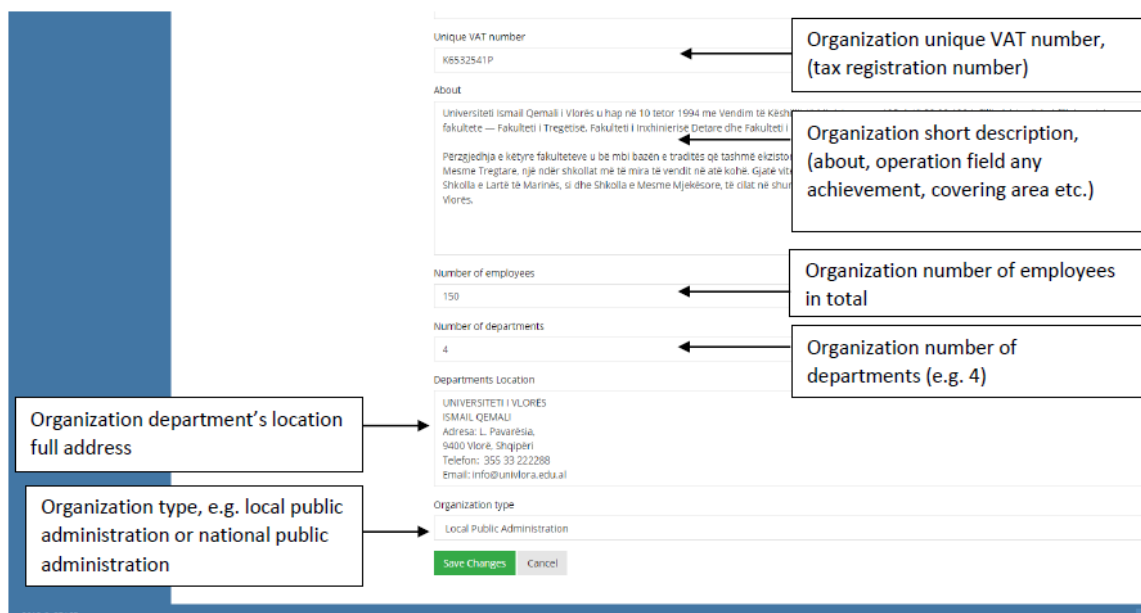
Organization official contact person's telephone number

Organization official contact person's fax number

Organization official contact's person email address

Organization official website address

Organization establishment year

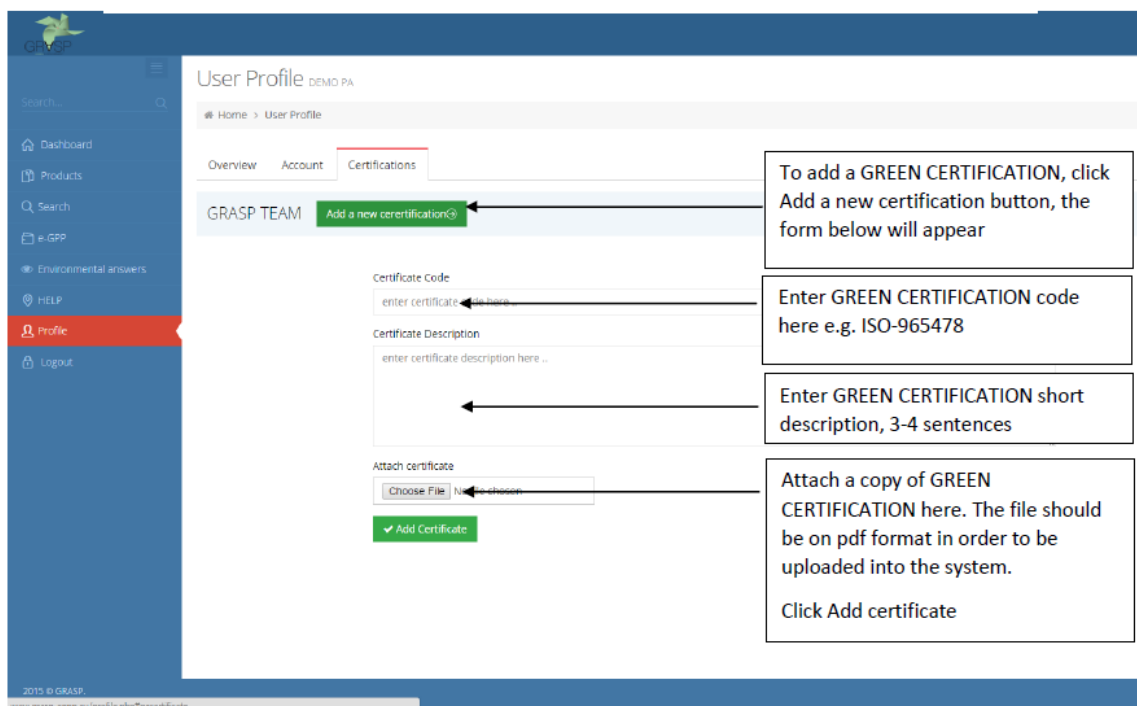


### ➤ Managing the password

**PA can change or update his password any time he likes. He has to provide the old password, enter the new password in the new password field, and click “change password” button.**

### ➤ Managing certifications

If PA owns **certifications**, he can upload them on the **profile page, certification** section. He has to click “**Add certification**” button. In the form provided he has to enter **certification code** (e.g. ISO123654), **certification description** (e.g. 4-5 sentences summarizing your certification) and attach **certification document**. The Attached document should be in **.pdf** file format. He can add as many certifications as he has.



**User Profile** DEMO PA

Home > User Profile

Overview Account **Certifications**

GRASP TEAM [Add a new certification\(s\)](#)

Certificate Code  
enter certificate code here

Certificate Description  
enter certificate description here ..

Attach certificate  
Choose File No file chosen

[Add Certificate](#)

To add a GREEN CERTIFICATION, click Add a new certification button, the form below will appear

Enter GREEN CERTIFICATION code here e.g. ISO-965478

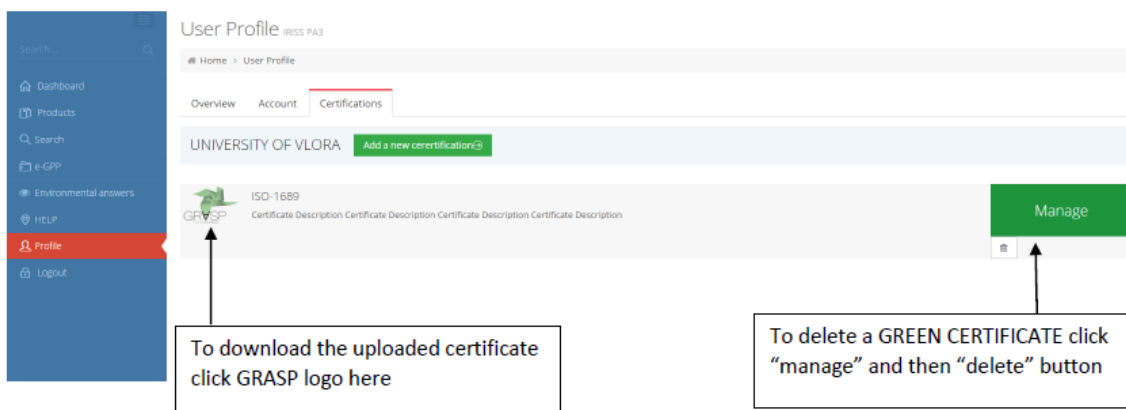
Enter GREEN CERTIFICATION short description, 3-4 sentences

Attach a copy of GREEN CERTIFICATION here. The file should be on pdf format in order to be uploaded into the system.

Click Add certificate

2015 © GRASP.  
www.grasp-europe.eu/profile.php?acc=certificates

To **remove** a certification from his account, PA has to click the **manage** button and confirm the removal.




**User Profile** MISS PA3

Home > User Profile

Overview Account **Certifications**

UNIVERSITY OF VLORA [Add a new certification\(s\)](#)

GRASP	ISO-1689	Certificate Description	Certificate Description	Certificate Description	Certificate Description
	ISO-1689	Certificate Description	Certificate Description	Certificate Description	Certificate Description

[Manage](#)

To download the uploaded certificate click GRASP logo here

To delete a GREEN CERTIFICATE click "manage" and then "delete" button

### 2.2.1.3 Functionalities Regarding the SMEs Users

#### ➤ **Editing SME details?**

SME can edit his profile, also he can add more information like: a) Organization information, b) Attach a VAT certificate, c) Specify Operating field, d) Select Affiliated Industrial, e) Add Green certification, and manage his GRASP account.

#### ➤ **Editing products?**

SME can edit, view or delete a product if its details aren't correct. SME is required to enter his products including their green criteria. He can also use live search to see what products other SMEs have entered.

#### ➤ **Adding, editing or deleting e product TYPE?**

SME can add a type any time he likes, even if he is not inserting a product. He can also delete a type as long as it is not attached to any product.

#### ➤ **Searching for a tender?**

PA use GRASP DBA to manage their e-procurement data, and the continuously publish tenders on this site. He can use Search for tender's page in order to search for any open tenders.

#### ➤ **Adding product details and attaching green criteria later**

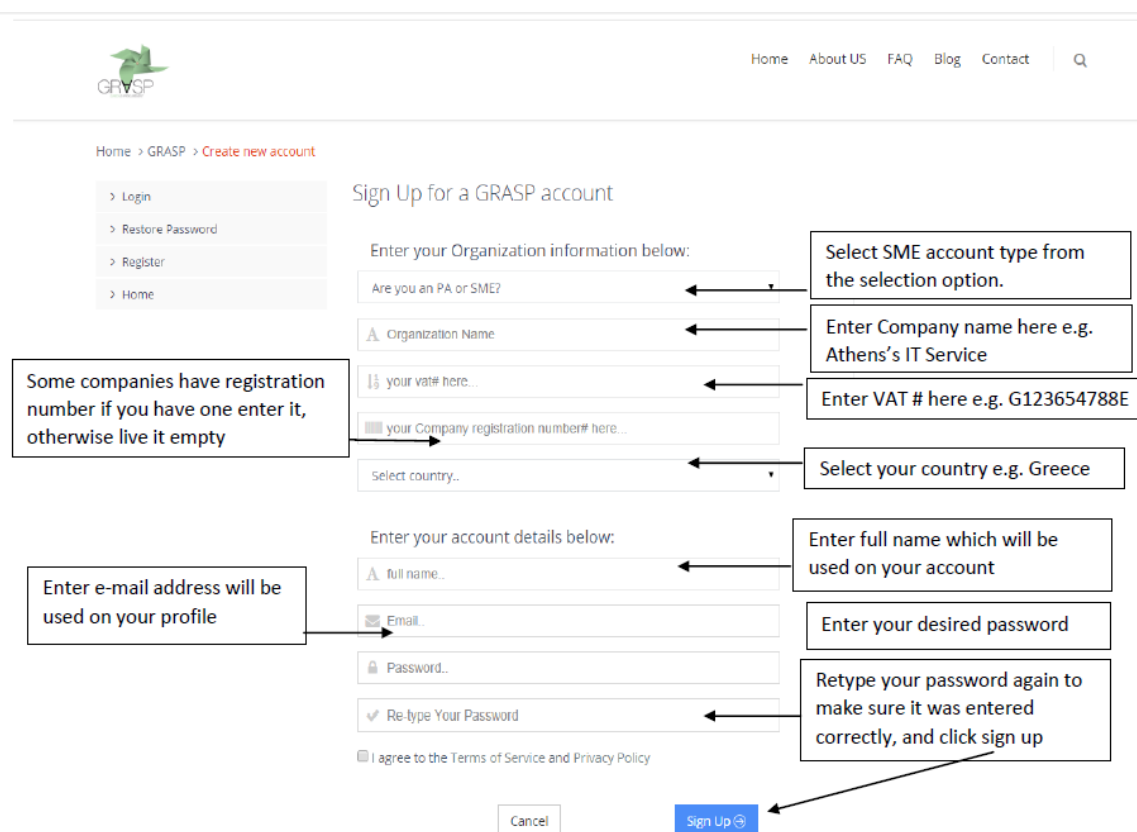
SME can add product details and attach green criteria later. He can click on the product list page, search the product he wants to continue editing and then just click edit button.

### ➤ Deleting e product

SME can delete any product inserted by him, he can delete also green criteria attached to it.

### ➤ Signing up for a GRASP SME account

To sign up for a GRASP account is very simple. SME has to click registration or sign up on the menu and follow the instruction below.



The screenshot shows the 'Sign Up for a GRASP account' page. The page has a header with the GRASP logo and navigation links: Home, About US, FAQ, Blog, Contact, and a search icon. Below the header, there's a breadcrumb trail: Home > GRASP > Create new account. On the left, there's a sidebar with links: > Login, > Restore Password, > Register, and > Home. The main content area is titled 'Sign Up for a GRASP account' and is divided into two sections: 'Enter your Organization information below:' and 'Enter your account details below:'. The 'Organization information' section includes fields for 'Are you an PA or SME?', 'Organization Name', 'your vat# here...', 'your Company registration number# here...', and 'Select country..'. The 'Account details' section includes fields for 'full name..', 'Email..', 'Password..', and 'Re-type Your Password'. There are checkboxes for 'I agree to the Terms of Service and Privacy Policy', a 'Cancel' button, and a 'Sign Up' button. Annotations with arrows point to various fields and buttons, providing instructions: 'Select SME account type from the selection option.' points to the 'Are you an PA or SME?' field; 'Enter Company name here e.g. Athens's IT Service' points to the 'Organization Name' field; 'Enter VAT # here e.g. G123654788E' points to the 'your vat# here...' field; 'Some companies have registration number if you have one enter it, otherwise live it empty' points to the 'your Company registration number# here...' field; 'Select your country e.g. Greece' points to the 'Select country..' field; 'Enter full name which will be used on your account' points to the 'full name..' field; 'Enter e-mail address will be used on your profile' points to the 'Email..' field; 'Enter your desired password' points to the 'Password..' field; 'Retype your password again to make sure it was entered correctly, and click sign up' points to the 'Re-type Your Password' field and the 'Sign Up' button.

### ➤ Using product list page

On the Product List page SME can **edit**, **delete** or **view** product details. He can also **Print**, **export to pdf**, **excel** or **csv** the table of the products. He can use the live search at the top of the table where he can search by any word in the products table.

On the product list page he can search only for product entered by him. If he wants to search more product details he should use **Search for products page**.

➤ **Using Add product page**

To add a product, SME has to fill in all the fields listed on the page. He has to select the **product category** first and the **product type** will be filtered automatically if it exists. If there is no type to select related to the product he is inserting, he has to add that type by clicking the **blue button** on the right of the type select option.

In the **Short description** field SME may enter 3 to 4 sentences that summarizes the product. In the **Tender description** field he has to enter the **Green criteria** of the product and eco labels. In the **Product full description** field he can enter product full description by including as much information related to that product as he can.

After you fill in all the required fields, he will be shown **add green criteria** form. He can attach related green criteria by clicking corresponding button.

GRASP

Dashboard  
Database Data  
Category  
Type  
Key Element  
Products  
Add Product  
Best Practice  
Download / Backup  
Manage PA  
Manage SME  
Config Settings  
HELP  
Profile  
Logout

2015 © GRASP - eProcurement System

[Add Product](#) [Save and Add another Product](#)

### Add Product form

Product Name  
enter product name here.. **Product name, e.g. WD Caviar Blue 500GB**

Category  
Select category ... **Product category, e.g. Portable Computer**

Type  
Select type ... **Product type, e.g. HDD (Hard Disk Drive) 500GB**

Product Brand name  
enter product brand name here.. **Product brand name, e.g. Western Digital**

Product model number  
enter product model number here.. **Product model #, e.g. Scorpio Black**

Product full description  
enter product most common/known - technical specs and gre... **Product full description, e.g. The Western Digital Scorpio Black hard drive has a spacious storage capacity that can store all your important data. With a spindle speed of 7200 RPM, provides improved connectivity with other devices. ....**

Product units measurement  
Pieces **Product measurement #, e.g. pieces**

Product quantity per unit  
enter product model number here.. **Product price, e.g. 45 (currency is euro)**

Product Price  
enter product price here.. **If you want your product to be visible**

visible to other SME  
No **After you filled all required information click continue**

Cancel Continue

GRASP - eProcurement System

Home > ADMIN > Products add page

[Add Product](#) [Save and Add another Product](#)

[Add Features and key element to this product](#)

### Add product feature

Product Feature Name... **Product feature name, e.g. Low power consumption**

Product feature value ... **Product feature value, e.g. With 5400 RPM-equivalent power consumption there is no compromise in battery life.**

Cancel Continue

### ➤ **Adding product type**

First SME has to select a **category** and then have a look at the type selection options, if his type is shown than there is no need to enter it, otherwise he has to click the blue button next to the type select options and fill in the required fields on the modal window.

SME is required to enter **type name, type description** (a summary of the type), **type tender description** (green elements of the type, eco labels). If the type he is entering is **subtype** of an existing type than he has to select the recursive select option filed, if not he has not to select anything and then he has to click submit to save the details.

### ➤ **Using product type page**

On this page all **product types** entered by the SME are listed. To **edit** a type, he has to click the **edit button** on the right of the selected type. He can also **delete** a type here as long as it is not attached to any product. If a type is attached to a product he should **delete the product** first and then he can delete the type.

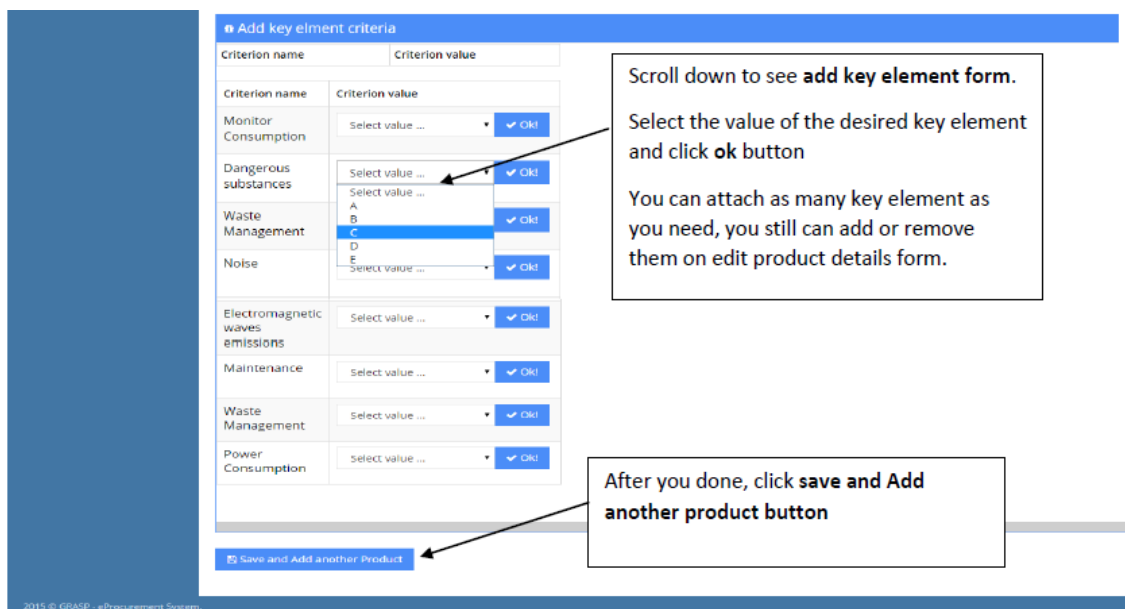
### ➤ **Adding green criteria to a product**

SME can add **green criteria** to a product after he **inserts** a product or when he **edits** a product.

First he has to specify a **value 1 to 5** for the green criteria he wants to attach and then click **ok** button.

Each **Product** can be rated from A to E with respect to each **CRITERION**, where: **A=very low; B=low; C=medium; D=high; E=very high**

SME can also delete a green criterion by clicking **delete** button next to each criterion.



**Add key element criteria**

Criterion name	Criterion value
Monitor Consumption	Select value ... <input type="button" value="Ok!"/>
Dangerous substances	Select value ... <input type="button" value="Ok!"/>
Waste Management	A B C <input checked="" type="radio"/> D E Select value ... <input type="button" value="Ok!"/>
Noise	Select value ... <input type="button" value="Ok!"/>
Electromagnetic waves emissions	Select value ... <input type="button" value="Ok!"/>
Maintenance	Select value ... <input type="button" value="Ok!"/>
Waste Management	Select value ... <input type="button" value="Ok!"/>
Power Consumption	Select value ... <input type="button" value="Ok!"/>

2015 © GRASP - eProcurement System

### ➤ Using Search for product page

To search for products is very simple and easy. SME can type any words related to **product name** or product green description, as he types any products that contain that word will be shown below the search box.

SME can **click** the desired product name to see its details and its green criteria. On this page he can search for any product that exists in the **GRASP** database.

### ➤ Using search for tenders page

SME can search for any tenders by using search for tender's page. He can type any word in the **search box** and if there are any tenders matching his search criteria will be shown below the search box.

SME can **click** the tender name to see its details, like opening and closing date, organization and tender details.

➤ **Using environmental answers page?**

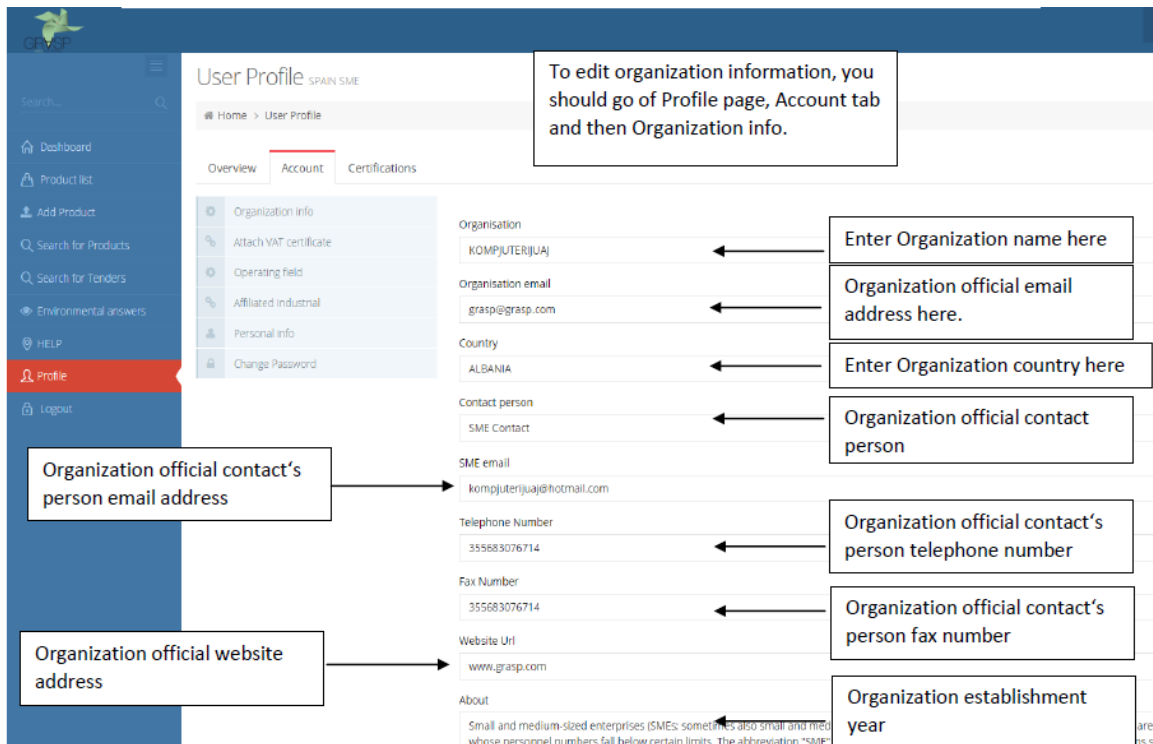
SME can answer environmental questions by using this section. He can click the **edit** icon on the left of the question, below the question will be shown the form where to enter his answer. He has to write his **comment** on the text area provided and select **yes** or **no** and then click **ok** button.

He can **delete** his answer if there is anything wrong and add it again letter.

➤ **Using SME organization info**

SME is required to enter his **organization information** as required on the profile page, organization information section. He should enter Organization name, official contact email address, and official contact person, on this section he can provide also a different e-mail address to be contacted. This information is vital for his organization as it will be shown to the interested **PA** for selecting potential SME. He should enter contact details on this section too, also a short description of his organizations activity.

Very important is to enter the **VAT registration certificate** as it is vital for the **GRASP administrator**, in order to activate his account.



**User Profile** SPAIN SME

Home > User Profile

Overview **Account** Certifications

Organization Info

Attach VAT certificate

Operating field

Affiliated industrial

Personal info

Change Password

Organisation

KOMPJUTERIJUAJ

Organisation email

grasp@grasp.com

Country

ALBANIA

Contact person

SME Contact

SME email

kompluterijuaaj@hotmail.com

Telephone Number

355683076714

Fax Number

355683076714

Website Url

www.grasp.com

About

Small and medium-sized enterprises (SMEs) sometimes also small and medium-sized enterprises whose personnel numbers fall below certain limits. The abbreviation "SME" is used.

To edit organization information, you should go of Profile page, Account tab and then Organization info.

Enter Organization name here

Organization official email address here.

Enter Organization country here

Organization official contact person

Organization official contact's person email address

Organization official contact's person telephone number

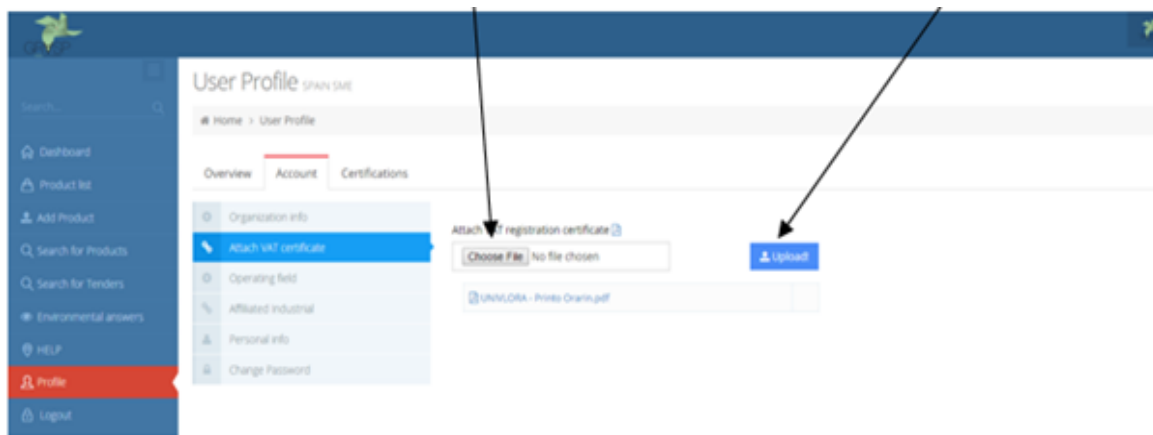
Organization official contact's person fax number

Organization establishment year

Organization official website address

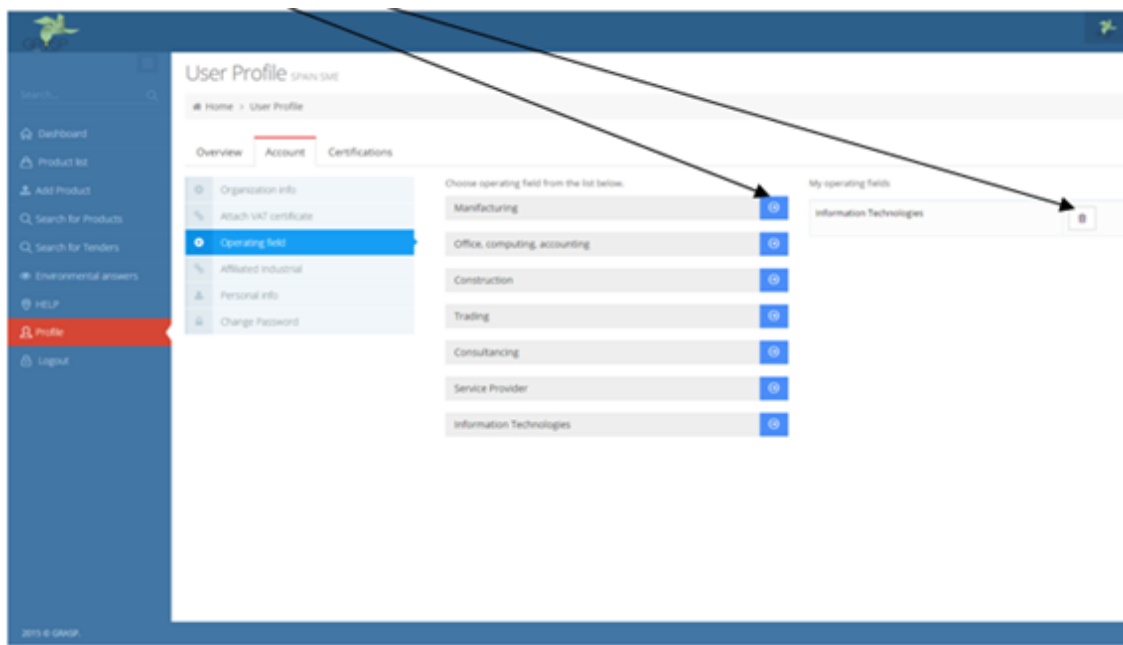
### ➤ Attaching a VAT certificate

SME can attach a VAT certificate on the profile page, on the account section. Certificate should be in .pdf format. He has to **select** the certificate from his computer and click **upload** to upload it to the server. He can change it any time if the certificate expires or is renewed. To replace his certificate, he has to delete the existing one and then upload a new one.



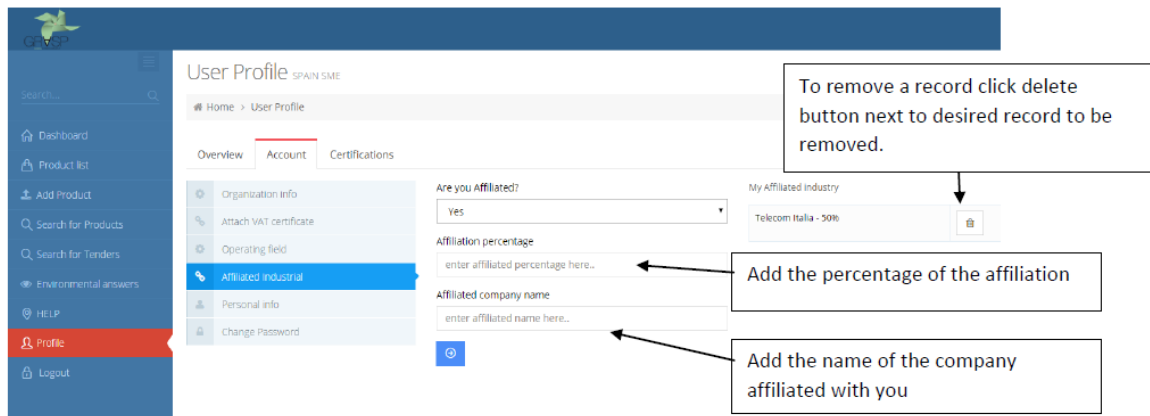
### ➤ Adding operating field

To add operating field, SME should be on the profile page, add operating field section. He has to **click** the blue button next to the desired operating field and it will be added. He can delete them by clicking **delete** button next to it, if he changes operating field and add new one.



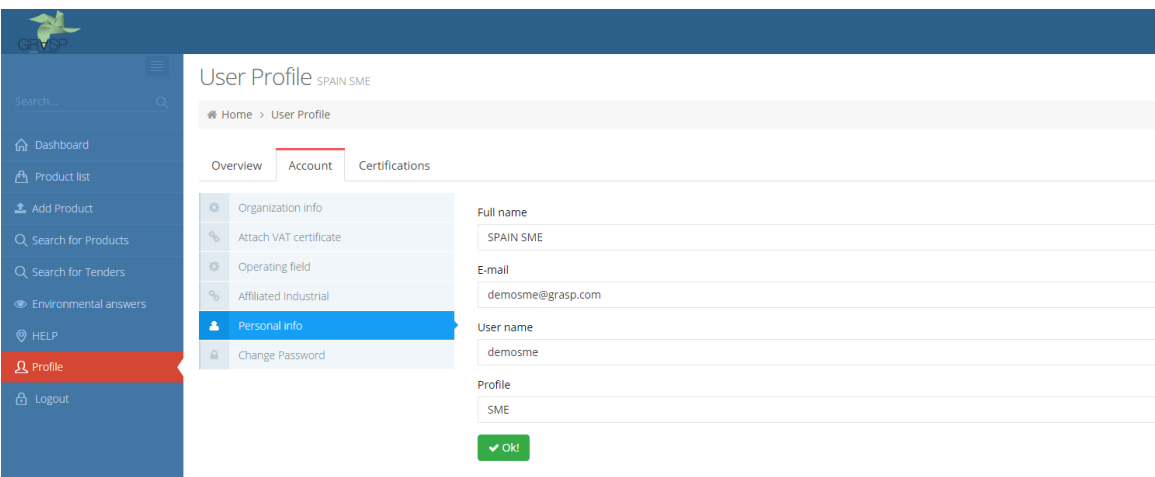
## ➤ Affiliating industrial

SME can add as many affiliations he has. Available affiliation will be listed on his profile page on the account section. To add an affiliation profile to his account, SME has to select Yes from list and enter details on the form shown.



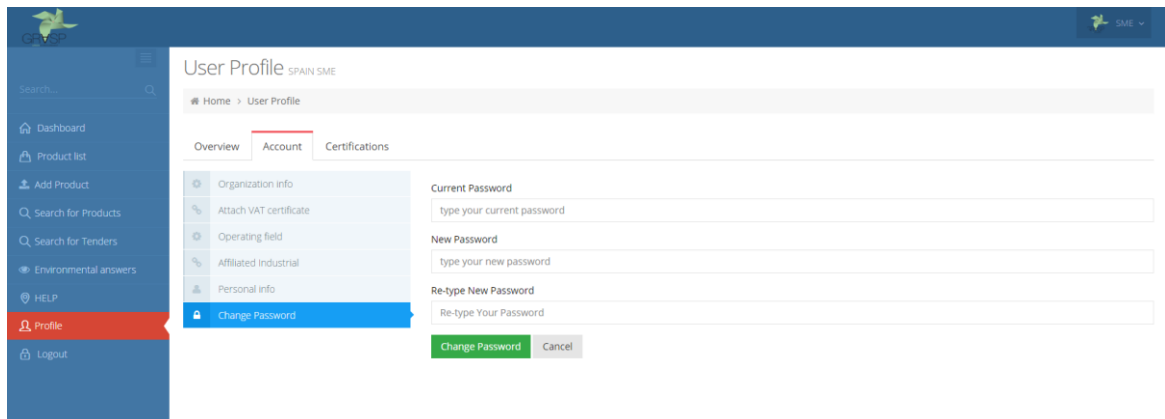
## ➤ Editing personal info

SME can edit only full name from personal information. He cannot edit user-name or e-mail address as this identifies his account. If he does not want to use his user profile e-mail he can add a different e-mail address on the organization section on the SME email field.



## ➤ Managing password

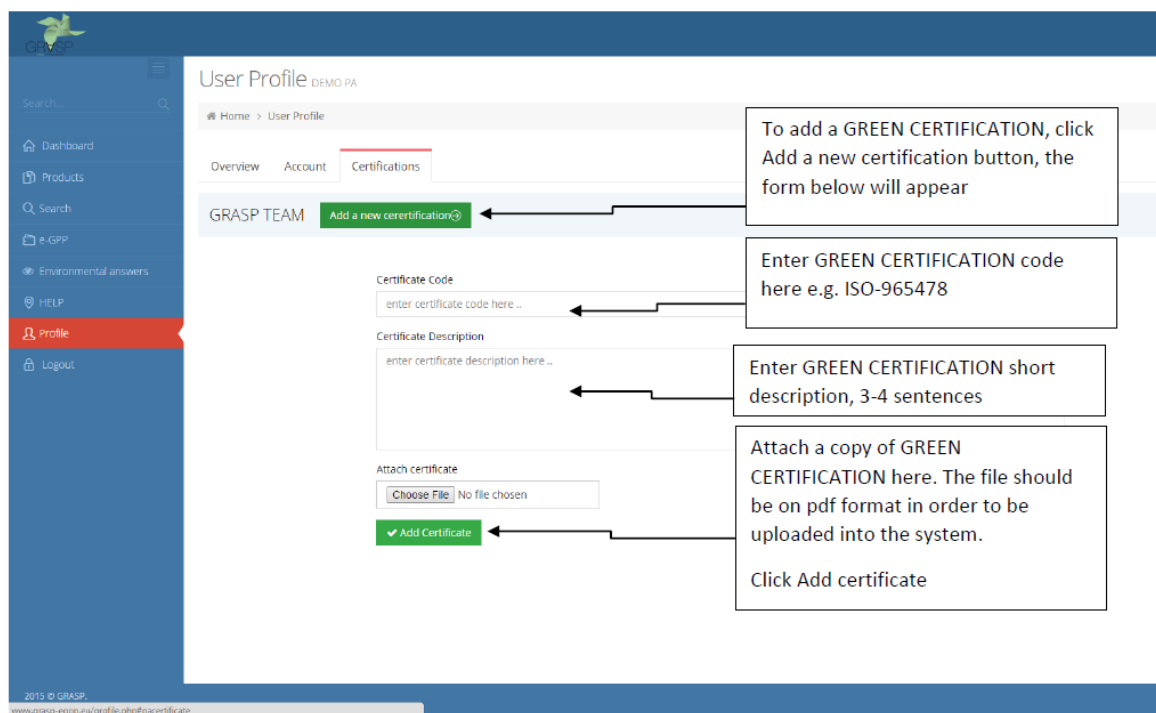
SME can change or update his password any time he likes. He has to provide the **old password** and enter the **new password** on the new password field and click change password button.



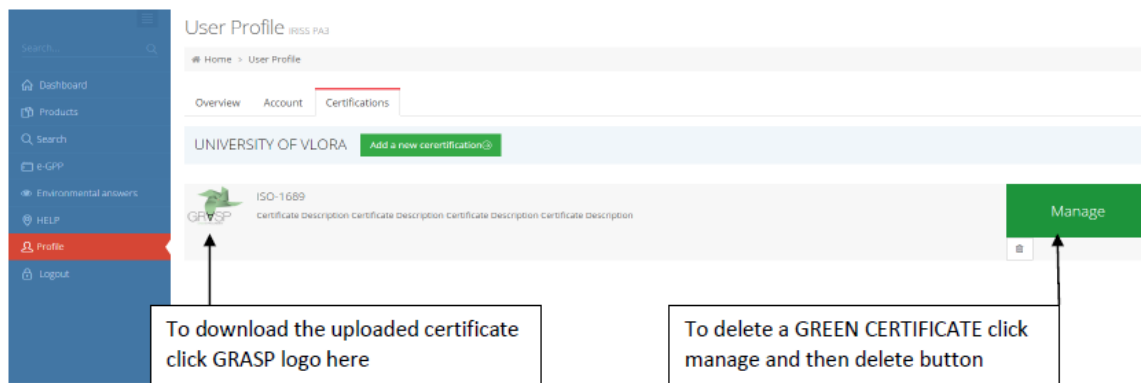
The screenshot shows the 'User Profile' page for a 'SPAIN SME'. The left sidebar contains navigation links: Dashboard, Product list, Add Product, Search for Products, Search for Tenders, Environmental answers, HELP, Profile (highlighted), and Logout. The main content area has tabs for Overview, Account, and Certifications. Under the 'Account' tab, there is a list of options: Organization info, Attach VAT certificate, Operating field, Affiliated Industrial, Personal info, and Change Password (highlighted). The 'Change Password' form includes three input fields: 'Current Password' (with placeholder 'type your current password'), 'New Password' (with placeholder 'type your new password'), and 'Re-type New Password' (with placeholder 'Re-type Your Password'). At the bottom of the form are two buttons: 'Change Password' (green) and 'Cancel' (grey).

## ➤ Managing certifications

***If SME own certifications he can upload them on the profile page, certification section. He can click Add certification button. In the form provided he has to enter certification code (e.g. ISO123654), certification description (e.g. 4-5 sentences summarizing your certification.) and attach certification document. The Attached document should be on .pdf file format. SME can add as many certifications as he has.***



To **remove** a certification from his account, SME has to click **manage** button and confirm the removal.



## 2.2.2 Participation in GRASPINNO

GRASP's databases, developed during GRASP project, will be upgraded and parameterized for the needs of GRASPINNO. More specifically, the databases will be enriched by adding all types of

available knowledge regarding the predefined fields of renewable energy and energy efficiency. At the same time, new PAs and SMEs users will be added. The SMEs will add their products and services with all the related information about them. In this way they will disseminate their products and services related to the fields of renewable energy and energy efficiency, emphasizing in the green criteria. The possibility of adding new features in the databases architecture will be examined in case this will facilitate others tools function.

## 2.3 TRANSNATIONAL MEDITERRANEAN NETWORK (TMN)

### 2.3.1 Description and functionalities

The goal of the Transnational Mediterranean Network website (designated TMN hereafter) is to provide a platform where members can showcase their business (posting information, news and documents).

The TMN website offers the following main functionalities:

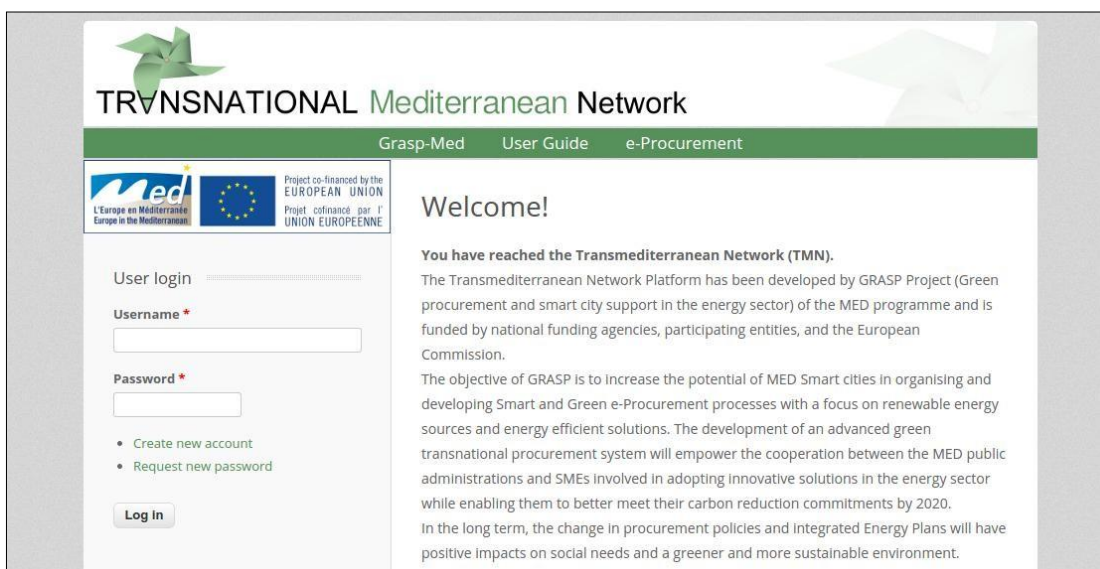
- Register as a member of the TMN
- List/search all members by multiple criteria
- View miscellaneous details of each member
- View news and documents posted by other members and upload your own
- Contact members though an embedded form in the member's profile
- Access Grasp-MED and eProcurement websites.

### 2.3.1.1 TMN User's Guide

#### **Access to the TMN portal**

##### ➤ **Login**

To log into the site, go to <http://grasp-tmn.eu> and enter your username and password on the left sidebar. You will be redirected to the main page of the Transnational Mediterranean Network website.



##### ➤ **Registration**

To access the website you'll need a user account, in order to create a new one, click on "Create new account" located on the left sidebar of the home screen. Once the new page loads, fill in all required fields (marked with a red asterisk), read the Terms of Service and mark the checkbox, then hit "Create new account". You will receive an email with a link to complete the registration process.

[Create new account](#)
[Log in](#)
[Request new password](#)

**Username \***

Spaces are allowed; punctuation is not allowed except for periods, hyphens, apostrophes, and underscores.

**E-mail address \***

A valid e-mail address. All e-mails from the system will be sent to this address. The e-mail address is not made public and will only be used if you wish to receive a new password or wish to receive certain news or notifications by e-mail.

**Contact Person**

**Name \***

**Surname \***

**Position \***

**Email \***

**Phone**

## ➤ Password recovery

[Create new account](#)
[Log in](#)
[Request new password](#)

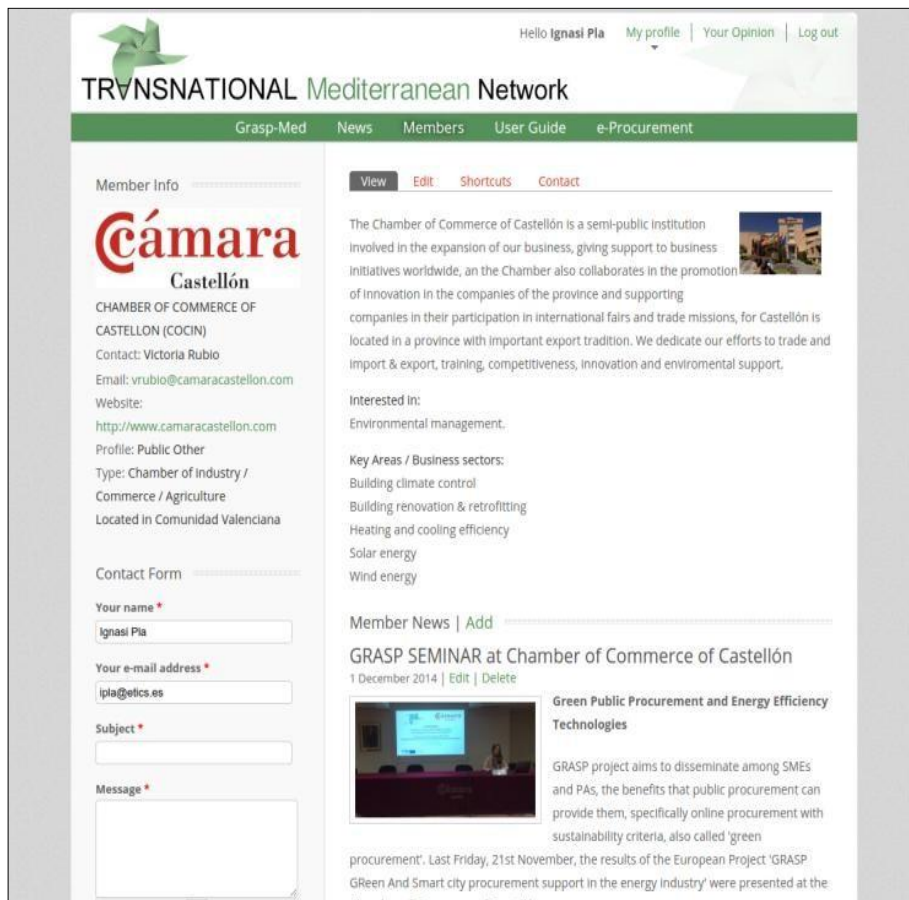
**Username or e-mail address \***

**E-mail new password**

In the event that you forget your password, you may open the tab titled "Request your password" in the login form. Once you enter your username or email and click the button, you will receive an email with instructions to set a new one.

## ➤ Changing your profile information

You may access your profile at any time by clicking on “My profile” at the top-right corner of the page. Once there, you may click on the “edit” tab to modify your profile's information or change your password.



The screenshot shows a user profile page on the TRVNSNATIONAL Mediterranean Network. The user is logged in as Ignasi Pla. The profile is for the Chamber of Commerce of Castellón (COCIN). The page includes a contact form, member information, and a list of member news.

**Member Info**

**Cámara Castellón**  
CHAMBER OF COMMERCE OF CASTELLÓN (COCIN)  
Contact: Victoria Rubio  
Email: [vrubio@camaracastellon.com](mailto:vrubio@camaracastellon.com)  
Website: <http://www.camaracastellon.com>  
Profile: Public Other  
Type: Chamber of Industry / Commerce / Agriculture  
Located in Comunidad Valenciana

**Contact Form**

Your name \*

Your e-mail address \*

Subject \*

Message \*

**Member News** | Add

**GRASP SEMINAR at Chamber of Commerce of Castellón**  
1 December 2014 | Edit | Delete

**Green Public Procurement and Energy Efficiency Technologies**

GRASP project aims to disseminate among SMEs and PAs, the benefits that public procurement can provide them, specifically online procurement with sustainability criteria, also called 'green procurement'. Last Friday, 21st November, the results of the European Project 'GRASP Green And Smart city procurement support in the energy industry' were presented at the Chamber of Commerce of Castellón.

Hello Ignasi Pla
My profile
Your Opinion
Log out

Grasp-Med
News
Members
User Guide
e-Procurement

### Search Members

Simple search | Advanced search

Organization Name

Contact Person

Nature: - Any - Profile: - Any -

Key Areas / Business sectors

- Building climate control
- Building renovation & retrofitting
- Geothermal energy
- Heating and cooling efficiency
- IT equipment
- Public Lighting
- Solar energy
- Wind energy

\* You may multiselect by holding control while clicking

Apply Reset

### Latest members

Vassiliki Mpelogianni

Student

Located in Peloponnisos

Member since: 19/1/2015

Lazaros Avgeris

ceo at Energy Greece

Located in Dytiki Ellada

Member since: 19/1/2015

View Edit Shortcuts Contact

Username \*

VictoriaRubio

Spaces are allowed; punctuation is not allowed except for periods, hyphens, apostrophes, and underscores.

E-mail address \*

vrubio@camaracastellon.com

A valid e-mail address. All e-mails from the system will be sent to this address. The e-mail address is not made public and will only be used if you wish to receive a new password or wish to receive certain news or notifications by e-mail.

Password

Confirm password

To change the current user password, enter the new password in both fields.

Status

☐ Blocked

☒ Active

Roles

☒ authenticated user

☐ manager

☐ administrator

Contact Person

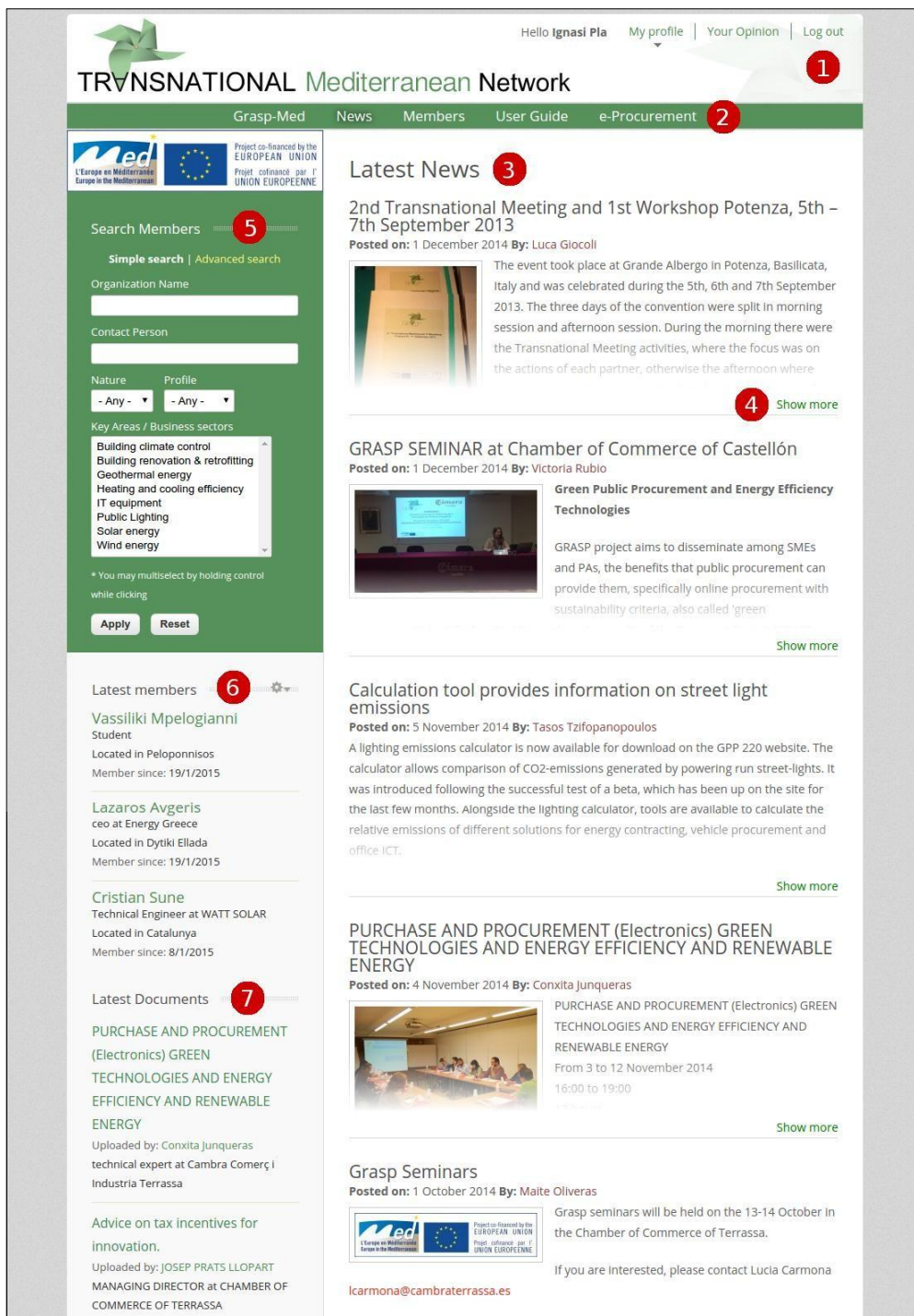
Name \*

Victoria

Surname \*

## Overview of the TMN website

### ➤ Home page



Hello Ignasi Pla | My profile | Your Opinion | Log out

# TRANSNATIONAL Mediterranean Network

Grasp-Med | News | Members | User Guide | e-Procurement

Project co-financed by the EUROPEAN UNION  
 L'Europe en Méditerranée  
 Project cofinanced par l'UNION EUROPEENNE

Search Members  
 Simple search | Advanced search

Organization Name  
 Contact Person  
 Nature Profile  
 - Any - - Any -  
 Key Areas / Business sectors  
 Building climate control  
 Building renovation & retrofitting  
 Geothermal energy  
 Heating and cooling efficiency  
 IT equipment  
 Public Lighting  
 Solar energy  
 Wind energy  
 \* You may multiselect by holding control while clicking  
 Apply Reset

## Latest News

### 2nd Transnational Meeting and 1st Workshop Potenza, 5th – 7th September 2013

Posted on: 1 December 2014 By: Luca Giocoli

The event took place at Grande Albergo in Potenza, Basilicata, Italy and was celebrated during the 5th, 6th and 7th September 2013. The three days of the convention were split in morning session and afternoon session. During the morning there were the Transnational Meeting activities, where the focus was on the actions of each partner, otherwise the afternoon where

Show more

### GRASP SEMINAR at Chamber of Commerce of Castellón

Posted on: 1 December 2014 By: Victoria Rubio

#### Green Public Procurement and Energy Efficiency Technologies

GRASP project aims to disseminate among SMEs and PAs, the benefits that public procurement can provide them, specifically online procurement with sustainability criteria, also called 'green

Show more

### Calculation tool provides information on street light emissions

Posted on: 5 November 2014 By: Tasos Tzifopopoulos

A lighting emissions calculator is now available for download on the GPP 220 website. The calculator allows comparison of CO2-emissions generated by powering run street-lights. It was introduced following the successful test of a beta, which has been up on the site for the last few months. Alongside the lighting calculator, tools are available to calculate the relative emissions of different solutions for energy contracting, vehicle procurement and office ICT.

Show more

### PURCHASE AND PROCUREMENT (Electronics) GREEN TECHNOLOGIES AND ENERGY EFFICIENCY AND RENEWABLE ENERGY

Posted on: 4 November 2014 By: Conxita Junqueras

PURCHASE AND PROCUREMENT (Electronics) GREEN TECHNOLOGIES AND ENERGY EFFICIENCY AND RENEWABLE ENERGY  
 From 3 to 12 November 2014  
 16:00 to 19:00

Show more

### Grasp Seminars

Posted on: 1 October 2014 By: Maite Oliveras

Grasp seminars will be held on the 13-14 October in the Chamber of Commerce of Terrassa.

If you are interested, please contact Lucia Carmona

lcarmona@cambraterrassa.es

## Latest members

**Vassiliki Mpelogianni**  
 Student  
 Located in Peloponnisos  
 Member since: 19/1/2015

**Lazaros Avgeris**  
 ceo at Energy Greece  
 Located in Dytiki Ellada  
 Member since: 19/1/2015

**Cristian Sune**  
 Technical Engineer at WATT SOLAR  
 Located in Catalunya  
 Member since: 8/1/2015

## Latest Documents

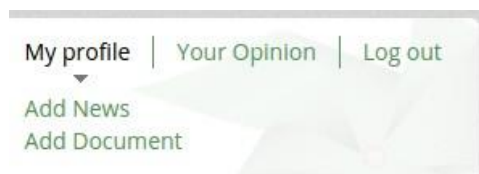
### PURCHASE AND PROCUREMENT (Electronics) GREEN TECHNOLOGIES AND ENERGY EFFICIENCY AND RENEWABLE ENERGY

Uploaded by: Conxita Junqueras  
 technical expert at Cambra Comerç i Industria Terrassa

### Advice on tax incentives for innovation.

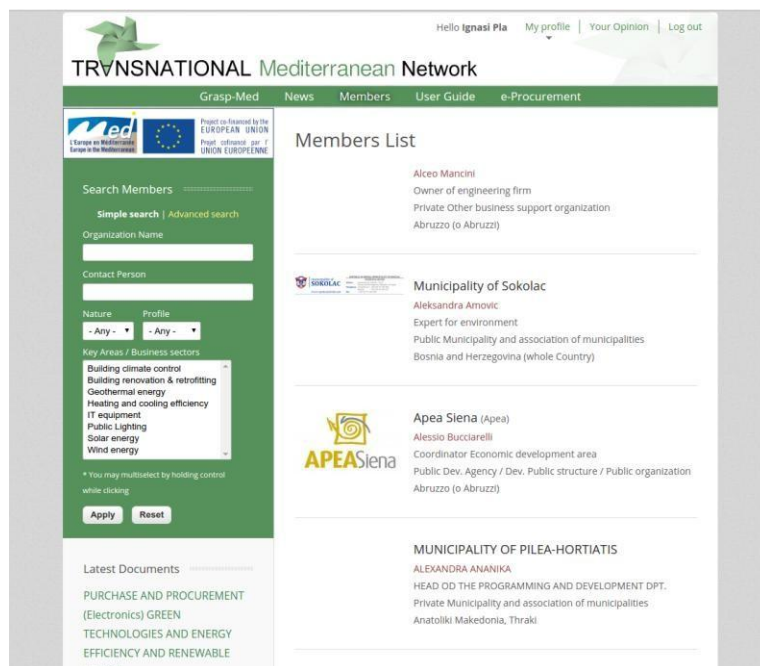
Uploaded by: JOSEP PRATS LLOPART  
 MANAGING DIRECTOR at CHAMBER OF COMMERCE OF TERRASSA

- **Top menu:** Here you can quickly access your profile page, add news or documents (will show when hovering over "My Profile"), or log out.
- **Main Menu:** The navigation menu for the various sections of the web. From here you can go to GRASP's public website (Grasp-Med), the news section (home page), see the members list, consult this manual or access e- Procurement.
- **News:** This section lists the news created by members (newest first). You may click on it's author to view his profile.
- **Show More:** Some news may be long, in those cases they're partially hidden and a "Show more" button is displayed, when clicked the entire content shows up.
- **Members Search:** Through this block you may set filters to search for members and organizations registered on the platform. Clicking on "Advanced Search" displays more fields to refine your search. In order to clean up the filters hit the "Reset" button.
- **Latest members:** This block lists the 5 newest members. You may click on their name to view their profile.
- **Latest documents:** Displays the latest documents that users have added to their profile. To view any of them, click the document title.
- **Footer Area:** In this area you will find both the general menu and your user menu, along with access to the terms and conditions page.



## ➤ Members list

To access the member's list, click on the "Members" link on the top menu or perform a search through the block on the left sidebar.



Here you can see the complete list of members registered in this site. The information includes: name of the person and organization, position held, location, logo and personal photo.

It is possible that some of these are not displayed, because not all fields are mandatory.

For more information about an organization/member click either the picture or the name.

Through the green block on the left sidebar, you may set filters to limit this list to those that fulfill a certain criteria.

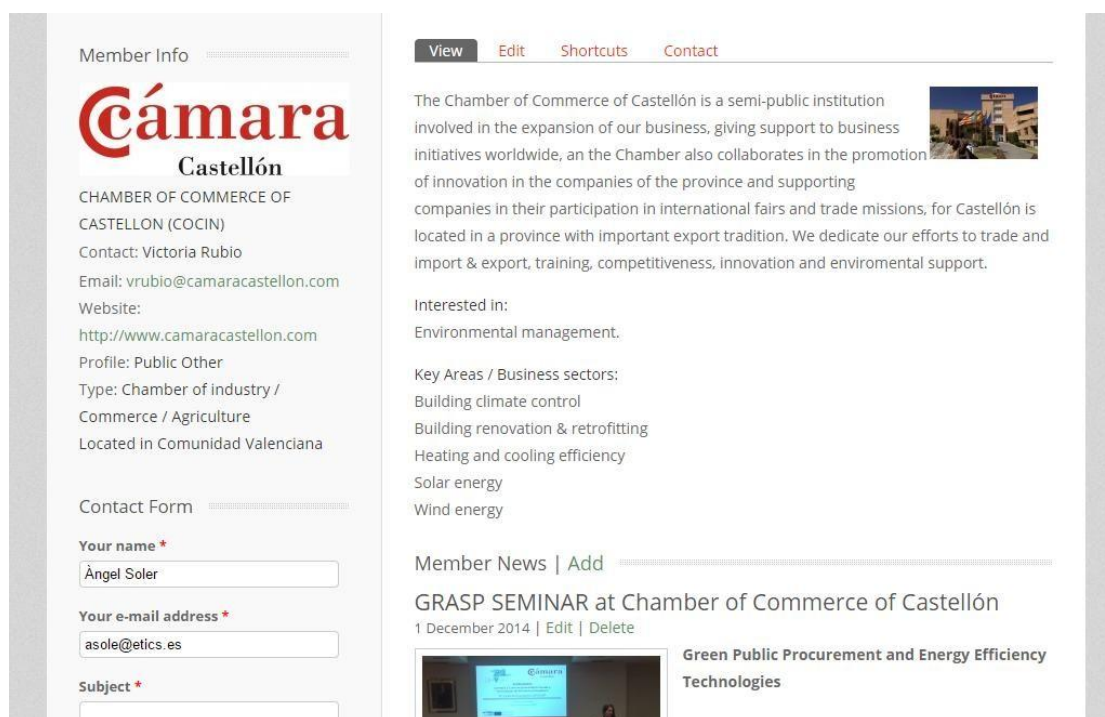
Organization name and Contact person will search members that contain the inputted text inside those fields.

More filters are available if you click on "Advanced Search".

As stated before, in order to clean up the filters hit the "Reset" button.

### ➤ Member profile

Whether you click on a member's name or access "My profile" you'll be directed to this member's profile page.



The screenshot shows a member profile page for 'Cámara Castellón'. The left sidebar contains 'Member Info' with the organization's name, address, contact details, and a 'Contact Form' with fields for name, email, and subject. The main content area has tabs for 'View', 'Edit', 'Shortcuts', and 'Contact'. It features an introduction paragraph, a photo of the building, a list of interests (Environmental management), and key areas (Building climate control, etc.). Below this is a 'Member News' section with a post about a seminar.

In here you will encounter basic information of that member and his company on the left sidebar. You'll also find a list of documents that this member has uploaded and a contact form to easily send him a message.

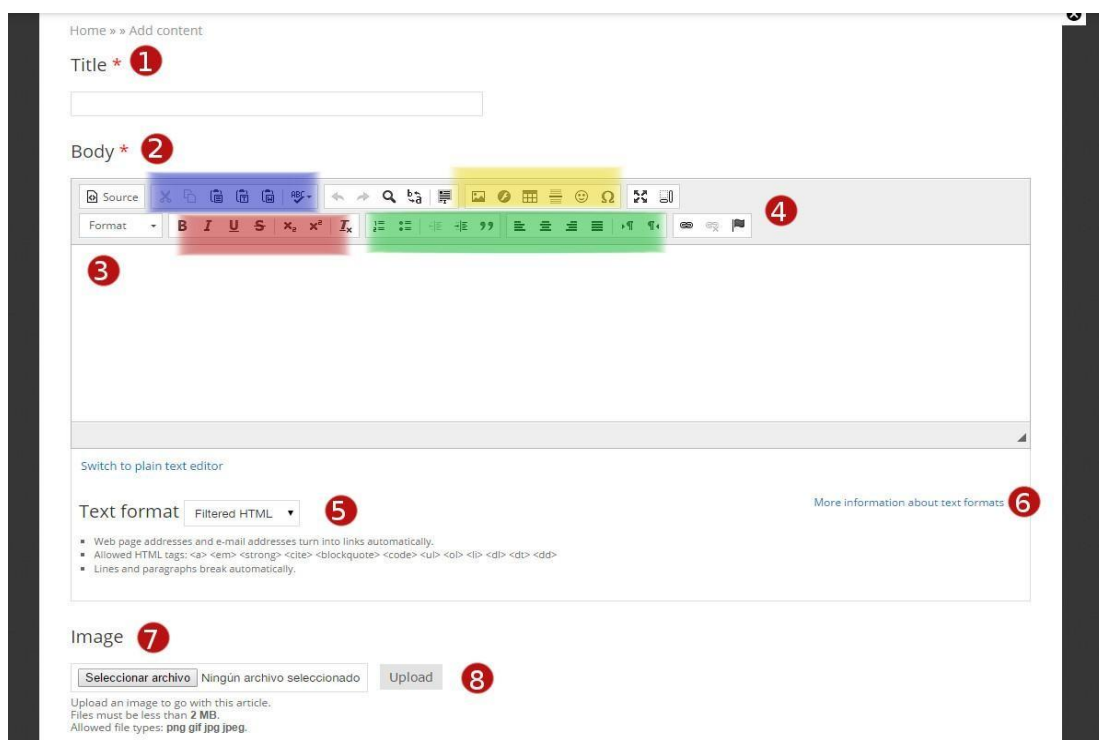
In the central area an introduction (and a photo if applicable) is displayed, followed by a list of interests and Key areas this member associates with.

Further down you'll find a list of this member's news at the center.

Provided that you are looking at your own profile, you'll also be able to see contextual links to modify your information or manage both the News list and Documents list (neither will show up if no content has been uploaded yet).

### ➤ Adding News

In order to add news to your profile, click either "Add News" on the user menu or "Add" next to "Member News" when viewing your profile.



The screenshot shows a web form titled "Home » » Add content". It contains the following elements:

- 1**: Title input field.
- 2**: Body input field, which is a rich text editor.
- 3**: The rich text editor toolbar, which includes buttons for bold, italic, underline, strikethrough, text color, background color, bulleted list, numbered list, link, unlink, and other formatting options.
- 4**: A small icon in the top right corner of the rich text editor toolbar.
- 5**: Text format dropdown menu, currently set to "Filtered HTML".
- 6**: A link labeled "More information about text formats".
- 7**: Image input field, labeled "Image".
- 8**: Upload button for the image.

Below the image input field, there is a note: "Upload an image to go with this article. Files must be less than 2 MB. Allowed file types: png gif jpg jpeg."

This'll present you a form where you can set:

**1) Title:** The title of your article here.

**2) Body:** The full text of your news. Here you'll find a rich text editor, enabling you to input text and give it format, links, etc.

3) **Content area:** You may type directly into the content area (3) or paste text copied from another editor (like notepad or word), it is recommended that you use the buttons in the blue area (4) or Ctrl + Alt + V to avoid messing the format, as this will make sure that incompatible styles are not imported.

#### 4) **Toolbar:**

**Blue area:** Here you'll find buttons to import content from other editors or from your clipboard.

**Red area:** In this area you may style your content. Options like bold, italic, underlined...

**Green area:** Buttons grouped in this area enable you to set the alignment of the text and indent.

**Yellow area:** Finally, here you'll find buttons to include links and external images, embed flash, insert emoticons or special characters.

5) **Text format:** You may choose between 2 types of text entry. For more information click on the link next to [number 6](#).

**Filtered HTML:** The default setting, enables you to format text (bold, underlined, etc..) and displays the toolbar (4).

**Plain text:** Choose this output in case you'd like the text to be shown bare, without format.

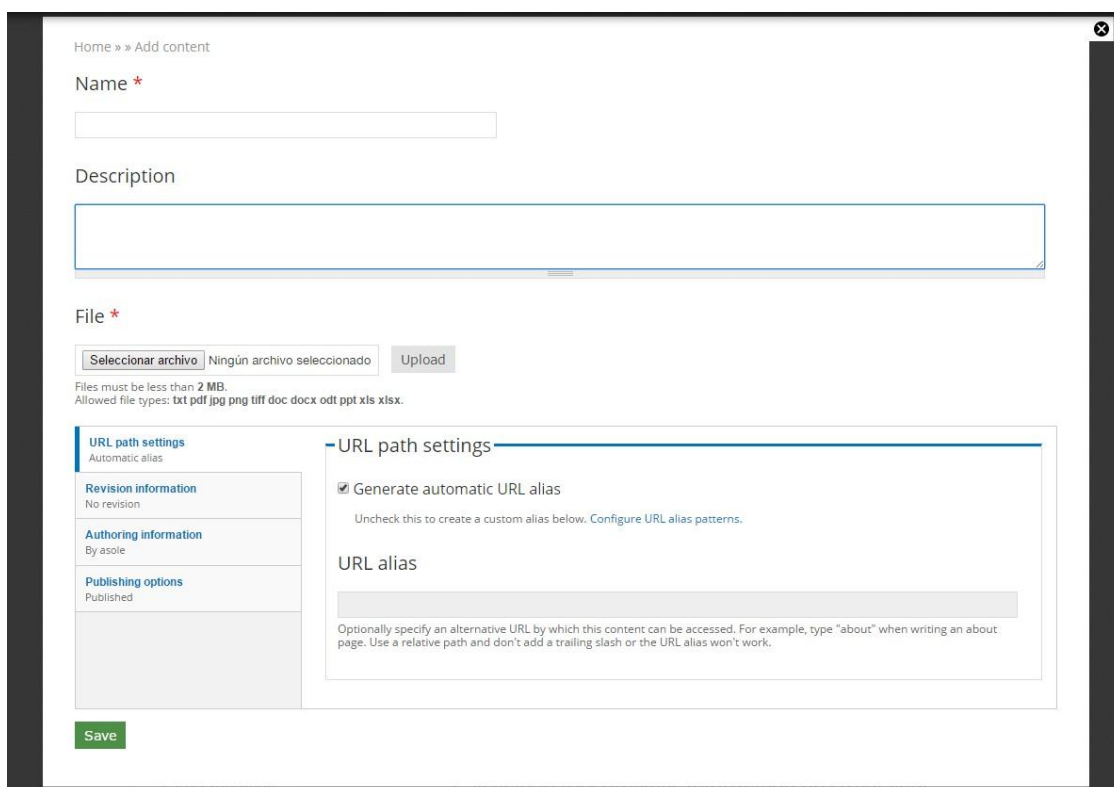
7) **Image:** In order to add a representative image to your news, you may click "Select Image" which will open a file browser. Find your preferred picture and click OK. You may click "[Upload](#)" (8) to upload the image right away while you keep filling the info or it'll be automatically uploaded once you hit "Save".

9) **Save:** Once you're done filling out the fields, hit “Save” to publish the news. You may leave, and thus cancel, by clicking on any other link outside the form.

Save

### ➤ Adding documents

Similarly to News, In order to add Documents to your profile, click either "Add Document" on the user menu or “Add” next to “Documentation” when viewing your profile.



Home » » Add content

Name \*

Description

File \*

Seleccionar archivo Ningún archivo seleccionado Upload

Files must be less than 2 MB.  
Allowed file types: txt pdf jpg png tiff doc docx odt ppt xls xlsx.

URL path settings  
Automatic alias

Revision information  
No revision

Authoring information  
By asole

Publishing options  
Published

URL path settings

☒ Generate automatic URL alias  
Uncheck this to create a custom alias below. [Configure URL alias patterns.](#)

URL alias

Optionally specify an alternative URL by which this content can be accessed. For example, type "about" when writing an about page. Use a relative path and don't add a trailing slash or the URL alias won't work.

Save

Here you'll find:

1) **Name:** Enter the name (title) you want to appear in the lists.

2) **Description:** Here you may write a brief summary of your document.

3) **File:** Again, as with the image field in News, click "Select File" to locate the file on your computer and click on OK. Then click the "Upload" button to the right.

4) **Save:** Finally, in order to publish this document, click on the "Save" button.

#### ➤ **Final words**

Should you ever desire to provide feedback, ask any question or cancel your account, please use the "Feedback" button at the right of the page. This'll take you to a generic form with which you may send an email to the appointed administrator of the TMN website.

### 2.3.2 Participation in GRASPINNO

In the frame of GRASPINNO, the update and the upgrade of the TMN, developed during GRASP project, will be examined. The platform of TMN could be upgraded in order to host more members and offer them a wider range of functionalities.

## 2.4 LIFE CYCLE COST (LCC) TOOL

The purpose of this tool was to help the user to understand how to interpret correctly the results of a green tender under an economic point of view.

For the LCC tool, there are three main uses that help the user to make specific evaluations of different products. First, the user can easily see the absolute value of the LCC of the green product. This can be seen whether there are two products or a single product. Second, the user can evaluate the difference between the cost of keeping an existing product versus substituting it with a new product. In this case, price doesn't need to be considered because it is a comparison of two products from different time periods with different performances whose prices depend on the circumstantial and temporary nature of the market. In such cases, examining price is not useful. Third, the user can evaluate the LCC of two similar products with comparable performance. This allows for a more informed decision to be made and is the main purpose of this tool. This use shows easily the differences between a lowest price evaluation and a Life Cycle Cost evaluation.

As with any similar tool, there are some limitations that must be noted. One of these is that this tool can only compare two products at a time. This may prove tedious if comparing multiple products, but it maintains its simplicity. If we take the example of retrofitting buildings, this tool could be used to compare the different windows that might be used, then the type of walls that would be constructed, and in this way would split the different aspects of the renovation into different areas and thus into different comparisons. **This may become less suitable if, as a general refurbishment of a building, there are many different areas of a project without homogeneous products to test. In this case, to do a more simple but less precise calculation is preferable: the whole retrofitting may be considered as a single product with its own energy and maintenance specifications. Doing an analysis of**

**this type would give an overall perspective of the project without comparing each individual product/work.**

Considering the many uses of this tool, it seems clear that the benefits outweigh the limitations. This tool is helpful in the cited situations and can be used in a vast variety of circumstances.

### **2.4.1 Description and functionalities**

The LCC tool is contained within a Microsoft Excel document with six sheets. The first two sheets are related to the final report for the GRASP project. In particular, the first table deals with the partner (with the pilots highlighted in red), the public administration that did the test, and the sector that it involved. The second table gives a few details about each test done by the involved partners. The final three sheets are relevant to this tool; **sheet 3 ("LCC") is the tool itself**. This is a semiautomatic tool that helps in the calculation of Life Cycle Costs (LCC), and its use will be explained in the next section. The fourth sheet ("Assessment") contains the relative costs based on the price of the products and then on their LCC to show the difference between making a decision based solely on price as opposed to a decision made based on more complete criteria. The price difference is the simple difference between prices, taking into account the number of products to be purchased, with red and negative numbers meaning the green product (column E of sheet 3) costs more than the other product. The LCC difference is the difference between the LCC of the two products, red and negative numbers again meaning that the LCC of the green product is higher than the LCC of the other product. This page is used to show that, often (but not always), the

product with the lowest price will cost more over its lifetime than the product with better green criteria. The fifth sheet ("CO<sub>2</sub> – Countries") contains a list of countries and the amount of CO<sub>2</sub> emitted for each kWh of energy created. This is used in the assessment on sheet 3 which will be explained in section 3. The sixth sheet ("Conversion tables") is a support tool to calculate LCC in presence of goods or services that consume thermal energy using a specific fuel (energy efficiency operations).

## Sheet 1:

Partner (Pilots in red)	PA	Number/kind of SMEs
PP2 Province of Perugia	Province of Perugia	10 SMEs/IT sector
PP3 IRISS	Malta Government	10 SMEs/IT sector, server
PP10 SIEEP	Municipality of Saint-Florent	10 Companies/P. Lighting
PP4 CC I Terassa	Municipality of Rubi	10 SMEs/RES
PP5 PABBC (with Atlantis)	Municipalities of Trivigno, Vaglio di Basilicata; Brindisi di Montagna	✓
PP6 Municipality of Spata-Artemis	Municipality of Spata	10 SMEs En. Ef. Build
PP8 Atlantis (with PABBC)	✓	10 SMEs Renewable Energy
PP9 CCI of Castellon	CCI of Castellon	10 SMEs/Solar Panels' sector
PP11 Hortiatis-Pilea	Municipality of H-P	10 SMEs/IT sector
PP12 UniVlora	University of Vlora	5 SMEs/IT sector
PP13 RAIS	City of East Sarajevo	10 SMEs En. Ef. Build

## Sheet 2:

PP	Kind of Tender	Procedures	Award Criteria	N of SME	Subject	Total/Unit Cost
Perugia A	Secret bid	Open	Lowest P	172	7 Desktop PCs	4060/580
Perugia B	Secret bid	Open	Lowest P	172	6 LCD Monitors	498/83
IRISS	Secret bid	Reserved	Lowest P satisfying the administrative & technical criteria	3	Supply & Delivery of IT equipment	5940/1485
SIEEP	Secret bid	Reserved	Lowest P + technical specifications	2	Public Lighting	18.200/650
Terassa	Secret bid	Open	Lowest P + technical specifications	10	Fluorescents LED	1960/70
PABBC	Auction	Open	Lowest P + technical specifications	10	Photovoltaic	1.492.272/1.492.272
Spata-Artemis A	Secret bid	Open	Lowest P + technical specifications	10	Replacement of conventional Municipal Street Lamps with new LED bulbs	290/10
Spata-Artemis B	Secret bid	Open	Lowest P + technical specifications	2	Replacement of the existing boiler with a new one	5.675/5675
Atlantis	Auction	Open	Lowest P + technical specifications	10	Photovoltaic	1.492.272/1.492.272
Castellon	Auction	Open	Lowest P + technical specifications	10	Thermal solar plant	4.975/995
Hortiatis-Pilea	Secret bid	Open	Lowest P + technical specifications	10	Printers	3.000/600
UniVlora	Auction	Reserved	Lowest P + technical specifications	5	7 Projectors	2.920/365
RAIS	Secret bid	Open	Lowest P + technical specifications	10	Facade	412.410,51/412.410,51

### Sheet 3:

Pilots testing\_4\_emptytobeuploaded.xlsx - LibreOffice Calc

	B	C	D	E	F
1					
2					
3					
4	<b>Price</b>			<b>Lowest Price</b>	<b>Environment-friendly Price</b>
5	Price per product [Euro/product]	0.00	€	0.00	€
6	Lifetime [years]	0.00	y	0.00	y
7	Comparable number of replacements	#DIV/0!	n	1.00	n
8	Total Cost [€]	#DIV/0!	€	0.00	€
9	<b>Duration</b>				
10	Lifetime [years]	0	y	0	y
11	Average yearly time usage [hours/year]	0	h/y	0	h/y
12	Total usage time [hours]	0	h	0	h
13	Number of purchases	0	n	0	n
14	Total [hours]	0	h	0	h
15	<b>Maintenance</b>				
16	Number of years [years]	0	y	0	y
17	Units per year [work hour, kwp, page...]	0.00	n	0.00	n
18	Cost per unit [€]	0.00	€	0.00	€
19	Total [€]	0	€	0	€
20	<b>Energy costs</b>				
21	Price of energy [€/Kwhe €/Kwht]	0.00	€	0.00	€
22	Energy consumption [Watt e/t]	0	W	0	W
23	Lifetime energy consumption [kWh e/t]	0.00	kWh e/t	0.00	kWh e/t
24	Total energy cost [€]	0.00	€	0.00	€
25	<b>Emissions</b>				
26	Kg of CO2/kWh	0.000	kg	0.000	kg
27	Total of CO2 avoided [ton]	0.000	t	0.000	t
28	Economic value of CO2 [€/ton]	0	€	0	€
29	Total economic value of avoided CO2	0.0	€	0.0	€
30	<b>Total life cycle costs</b>	#DIV/0!	€	0.00	€
31					
32					
33					
34					

LCC Assessment CO2 - Countries Conversion tables  
 Foglio 1 di 4 PageStyle\_LCC Somma=0 120%

### Sheet 4:

PP	Lowest Price	Environment-friendly Price	Price Difference	LCC (Difference)	Avoided CO2 (ton)
Test	0.00	0.00	0.00 EUR	0.00 EUR	0.000

## Sheet 5:

CO <sub>2</sub> -emissions	kg CO <sub>2</sub> /kWh
EU-27 average	0.386
Belgium	0.254
Bulgaria	0.458
Czech Republic	0.630
Denmark	0.329
Germany	0.503
Estonia	0.990
Ireland	0.573
Greece	0.904
Spain	0.430
France	0.924
Italy	0.405
Cyprus	0.673
Latvia	0.150
Lithuania	0.168
Luxembourg	0.334
Hungary	0.357
Malta	0.905
Netherlands	0.433
Austria	0.161
Poland	0.810
Portugal	0.506
Romania	0.584
Slovenia	0.345
Slovakia	0.292
Finland	0.178
Sweden	0.436
United Kingdom	0.503
Iceland	
Norway	0.005
Montenegro	
Croatia	
FYR Macedonia	
Turkey	
Albania	
Bosnia and Herzegovina	

Source: EEA, 2011: CO<sub>2</sub> (g) per kWh in 2009

<http://www.eea.europa.eu/data-and-maps/figures/co2-electricity-g-per-kwh>

## Sheet 6:

	theoretical work	efficiency	real work
Lowest Price	0	100.00%	0.00
Sustainable Price	0	100.00%	0.00

fuel	kw/mc, kw/kg, kw/ l	Price	€/kwh	Kg CO2/kwh
Natural Gas	9.40	0.000	0.0000	0.200
diesel	10.10	0.000	0.0000	0.265
fuel oil	10.52	0.000	0.0000	0.275
lpg	7.00	0.000	0.0000	0.234
wood	3.80	0.000	0.0000	0
pellet	4.50	0.000	0.0000	0

As regards **the core of the tool (sheet 3)**, the following list is the explanation of each cell that will be modified according to the products being compared. In column C, there are 10 yellow cells to be modified, and in column E there are 5.

- Cell C5/E5: Purchase price per product – the cost of each individual unit
- Cell C6/E6: Lifetime – the projected lifetime of the product
- Cell C11: Average usage time per year – how much time (the number of hours) the product will be used throughout the year (a light bulb, for example, might be used for 8 hours a day for 260 days per year for 2080 hours per year)
- Cell C13: Number of purchases – the amount of the product to be purchased
- Cell C17/E17: Number of units per year – this number is based on how the maintenance for the product is measured (for example, work hours for lighting, kWp for a photovoltaic plant, number of pages used in a printer, etc.)

- Cell C18/E18: Cost per unit – the cost for each maintenance unit used in C17 (€5/hour or €3/kWp, €0.50/page, etc.)
- Cell C21: Price of energy – the price of energy in the area of interest (kWhe or kWht)
- Cell C22/E22: Energy consumption/production – how much energy each individual unit consumes or produces (such as renewable sources, and in which case if it produces energy, this value must be negative)
- Cell C26: kg CO<sub>2</sub>/kWh – a quantity taken from the table given on sheet 5 of the tool of how much CO<sub>2</sub> is emitted to generate one kWh (varies by country)
- Cell C28: Economic value of CO<sub>2</sub> – economic value (in €) of one ton of CO<sub>2</sub> as found at .

### ➤ **Guidelines by case**

**Absolute cost** – Calculating the absolute cost of a product can be done with either two products or one product. If using two products, fill in the columns C and E according to the guidelines set out above using these products' specifications. When this has been done, set the economic value of CO<sub>2</sub> to 0 in the first column (cell C28). The absolute price for the green product will be the number shown next to "Total life cycle costs" at the bottom of the table in the second column (cell E30). To find the absolute LCC of the lowest price product, fill in both columns C and E with its same specifications and set the economic value of CO<sub>2</sub> to 0. The absolute cost of the lowest price product will be always the "Total life cycle costs" on the table (cell E30).

**Evaluation of a substitute** – The evaluation of a substitute is largely a matter of examining the savings produced by the new

product. To do this, fill in column C with the specifications of the existing product and column E with the possible substitute. To examine the savings, set the prices of each product to zero (cells C5 and E5). The prices, as previously noted, are not useful in this case because they come from two different time periods. Due to inflation and other cost fluctuations, the price comparison is not helpful and may lead to unrealistic conclusions. Instead, we can examine the energy savings of the new product with respect to the old one, which is the more valuable evaluation. Understanding this calculation, it is simple to examine the effects of making a substitution.

**Comparison between two products** – The case that the tool was built for is a comparison between two similar products: one with a lowest price and the other with a sustainable price. To complete this assessment, fill in the Lowest Price column (column C) and the Sustainable Price column (column E) with the specifications of the two products. Once these specifications have been entered, the LCC are seen at the bottom of the table and the relative costs (for both price and LCC) are shown on the “Assessments” sheet (sheet 4). Having completed the evaluation, the winning product can then be compared to others to choose the best option based on the LCC. This is designed also to show that the misunderstanding that green products are more expensive is often false, especially in long-term projects.

Working with different partners’ specific case, some small difficulties arose that were confronted and resolved. As a result of this, the tool has become more generalized and the partners now have a better instrument to use for their evaluations.

## 2.4.2 Participation in GRASPINNO

As regards green e-procurement in EE/RES for energy refurbishment of public buildings, the EU legislation indicates the procedures that Member State (MS) are obliged to implement to carry out an Energy refurbishment in buildings.

The directive 2010/31/EU concerning the energy performance of buildings aims to introduce in MS national legal systems a general common framework for a methodology for calculating the energy performance of buildings and the minimum requirements for components are introduced for all replacements and renovations, although for major renovations, the holistic calculation methodology is the preferred method with performance calculations based on component requirements allowed as a complement or alternatively. Those requirements should be set with a view to achieving the cost-optimal balance between the investments involved and the energy costs saved throughout the lifecycle of the building.

The methodology shall be laid down taking into consideration at least the following aspects: (a) the following actual thermal characteristics of the building including its internal partitions: (i) thermal capacity; (ii) insulation; (iii) passive heating; (iv) cooling elements; and (v) thermal bridges; (b) heating installation and hot water supply, including their insulation characteristics; (c) air-conditioning installations; (d) natural and mechanical ventilation which may include air-tightness; (e) built-in lighting installation (mainly in the non-residential sector); (f) the design, positioning and orientation of the building, including outdoor climate; (g) passive solar systems and

solar protection; (h) indoor climatic conditions, including the designed indoor climate; (i) internal loads.

The positive influence of the following aspects shall, where relevant in the calculation, be taken into account:

- (a) local solar exposure conditions, active solar systems and other heating and electricity systems based on energy from renewable sources;
- (b) electricity produced by cogeneration;
- (c) district or block heating and cooling systems;
- (d) natural lighting.

The directive imposes member States for existing buildings to take the necessary measures to ensure that when buildings undergo major renovation, the energy performance of the building or the renovated part thereof is upgraded in order to meet minimum energy performance requirements. Thus, Member States are called, for the purpose of optimising the energy use of technical building systems, to set system requirements in respect of the overall energy performance, the proper installation, and the appropriate dimensioning, adjustment and control of the technical building systems (covering at least the following: (a) heating systems; (b) hot water systems; (c) air-conditioning systems; (d) large ventilation systems; or a combination of such systems (art 7)

Secondly, all UE States, in accordance with the directive have laid down a system of certification of the energy performance of buildings (art 11). The energy performance certificate shall include the energy performance of a building and reference values such as minimum

energy performance requirements in order to make it possible for owners or tenants of the building or building unit to compare and assess its energy performance. From such audit certificates recommendations for the cost-optimal or cost-effective improvement of the energy performance of a building or building unit are defined. Further, beside some measures the Member State are obliged to implement Control systems to check the correctness of performance certification by means of Inspection of heating systems (art.14) and Inspection of air-conditioning systems (art.15).

From data and results coming from all these reports and audit system Member State and, thus, GRASPINNO partners will be able to apply the indicated methodology addressed to identify cost-optimal levels of energy performance requirements for buildings and building elements.

In other words, in order to prepare the GPP tender, Partner are called to identify the Energy efficiency class to be achieved , starting from a current class (conducting an energy audit to certificate it..). On the base of it, the first planning of the EE intervention can be done, defining the part of the building that should be improved firstly (with more impact in terms of EE results) and finally the products that can be used... Last, but not least, remember that this approach has been also highlighted in the Application Form as follows:

- Audits of pilot sites, identification of their needs using KPIs (Key Performance Indicators)
- Definition of optimum desired refurbishment green solutions
- Preparation of a green tender based on green e-procurement specs/criteria, using the unified eGPP platform

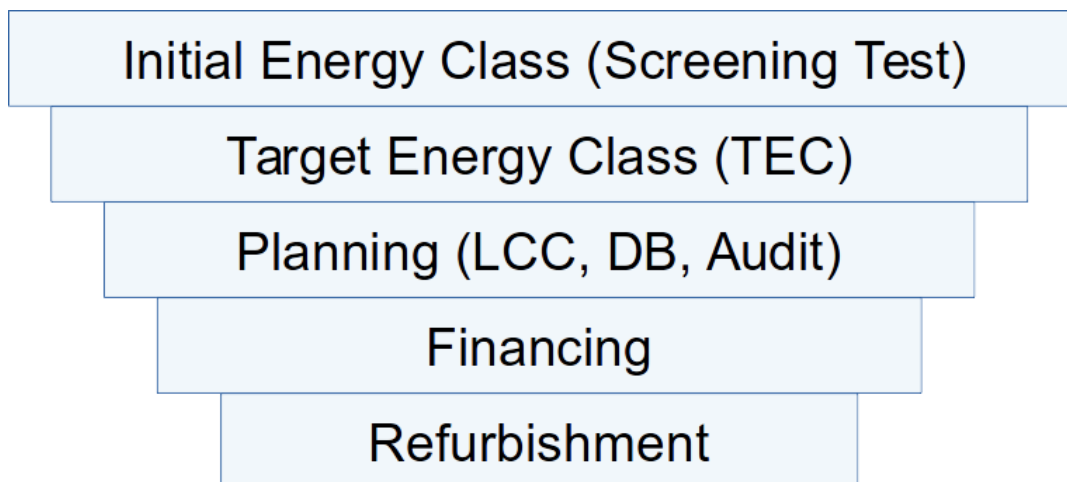
Considering what written above the use of LCC for the EE of buildings is part of a specific path that includes:

- a Screening Test or a pre-audit to individuate the Initial Energy Class for selecting only building with an high potential of energy saving.
- a Target Energy Class that indicates the performance that a Public Body wants to reach after the Refurbishment.
- a Planning phase where tools and methodology will be used to define a project
- a Financial step in which the Public Body chooses the financial tools (Public Grants, own resources or PPP)
- the refurbishment of the selected building/s

In other words, LCC tool may be used during the planning to assess the profitability of green procurement in EE/RES for energy refurbishment of public buildings in two different circumstances:

- 1) before the tender as support instrument to guide the refurbishment and individuate less expensive parts and products.
- 2) after a tender selecting company/companies to check the result in terms of performance (a third part monitoring) or as a part of a complete audit activity (please, keep into account that audit has very precise regulations). This option should be verified during the project progress.

➤ **GRASPINNO Procedures for EE of buildings**



Under a practical point of view, as mentioned in the introduction (point 2.4) LCC works better when the comparison concerning similar products. In case of building retrofitting where the intervention include different dis-homogeneous parts and products to run LCC the intervention has to be considered as a whole. GRASP LCC guidelines for Green Public Procurement already contained useful EE building examples reported below:

**Case: Terassa**

	Lowest Price		Environment-friendly Price	
Price				
Price per product [Euro/product]	15,95	€	70,00	€
Lifetime [years]	1,14	y	5,70	y
Comparable number of replacements [n]	5,00	n	1,00	n
Total Cost [€]	2.233,00	€	1.960,00	€
Duration				
Lifetime [years]	6	y	6	y
Average yearly time usage [hours/year]	3.168	h/y	3.168	h/y
Total usage time [hours]	18058	h	18058	h
Number of purchases [n]	28	n	28	n

Total [hours]	505613	h	505613	h
<b>Maintenance</b>				
Number of years [years]	6	y	6	y
Units per year [work hour, kwp, page...]	24,56	n	4,91	n
Cost per unit [€]	20,99	€	20,99	€
Total [€]	2939	€	588	€
<b>Energy costs</b>				
Price of energy [€/Kwhe €/Kwht]	0,12	€	0,12	€
Energy consumption [Watt e/t]	36	W	18	W
Lifetime energy consumption [kWh e/t]	18.202,06	kWh e/t	9.101,03	kWh e/t
Total energy cost [€]	2.184,25	€	1.092,12	€
<b>Emissions</b>				
Kg of CO2/kWh	0,430	kg	0,430	kg
Total of CO2 avoided [ton]	0,000	t	3,913	t
Economic value of CO2 [€/ton]	7,29	€	7,29	€
Total economic value of avoided CO2 [€]	0,0	€	28,5	€
<b>Total life cycle costs</b>	<b>7.355,82</b>	<b>€</b>	<b>3.611,10</b>	<b>€</b>

The Terassa case (the simplest one) tested indoor (office) lighting; the sustainable product was a fluorescent LED. This test is a good example of the usefulness of the LCC tool. The lowest-price product was clearly less expensive considering the initial purchase price (less than a quarter of the cost), but in the end, the sustainable LCC was less than half the LCC of the lowest-price option. There is not always such a dramatic difference as seen in this test, but it is typical that the lowest-price option will be more expensive in the end than the sustainable price.

As noted in the previous case, the cost of labor depends on the country. For Spain, at the time of this analysis the cost was €20.99/hour, in France it was €35.47/hour, and in Italy it was €28.44/hour.

### Case: RAIS (natural gas)

	Lowest Price		Environment-friendly Price	
<b>Price</b>				
Price per product [Euro/product]	0,00	€	0,00	€
Lifetime [years]	1,00	y	25,00	y
Comparable number of replacements [n]	25,00	n	1,00	n
Total Cost [€]	0,00	€	0,00	€
<b>Duration</b>				
Lifetime [years]	25	y	25	y
Average yearly time usage [hours/year]	1.000	h/y	1.000	h/y
Total usage time [hours]	25000	h	25000	h
Number of purchases [n]	1	n	1	n
Total [hours]	25000	h	25000	h
<b>Maintenance</b>				
Number of years [years]	25	y	25	y
Units per year [work hour, kwp, page...]	0,00	n	0,00	n
Cost per unit [€]	0,00	€	0,00	€
Total [€]	0	€	0	€
<b>Energy costs</b>				
Price of energy [€/l]	0,57	€	0,57	€
Energy Consumption [KW or Watt e/t, m3 l...]	26741	W	10899	W
Lifetime energy consumption [kWh e/t, m3, l...]	668.534,50	kWh e/t	272.466,00	kWh e/t
Total energy costs [€]	383.070,27	€	156.123,02	€
<b>Emissions</b>				
Kg of CO2 per kWh, m3, l or kg	0,200	kg	0,200	kg
Total of CO2 avoided [ton]	0,000	t	79,214	t
Economic value of CO2 [€/ton]	7,02	€	7,02	€
Total economic value of avoided CO2 [€]	0,0	€	556,1	€
<b>Total life cycle costs</b>	<b>383.070,27</b>	<b>€</b>	<b>155.566,94</b>	<b>€</b>

RAIS case is a very problematic but interesting test. It is a building retrofitting operation that uses different forms of energy sources. In particular, this is an improvement of the thermal efficiency of the exterior walls of the building but this example can apply also to a roof

or other parts such as windows, doors, but it contains a change of the energy sources to warm the building up too. Because the energy performance of the existing building was improved, this case applies substitution, which is one of three different examples of usage; thus, the companies, participating in the tender, can be selected by the lowest price criterion.

As previously written it is very complicated because there are three different sources to be considered (natural gas, fuel oil, and electricity). This aspect implies three different LCC sheets to calculate the overall cost. Unfortunately, the previous format cannot be used because the data on installed power and the efficiency of the plants and an estimation of the time usage is missing. For this reason, the file was adapted to allow the study of this case. If the aforementioned data had been provided, then the experiment could have been formatted with the previous format used for the other tests and its tables conversion sheet. Including these last modifications we should be able to deal with energy efficiency operation as well.

The first table describes the changes in the consumption of natural gas. Passing from the unaltered to improved building in regards to the energy consumption, the use of natural gas is less than half for the improved building. Beyond the energy saving due to the reduction of fuel consumption, the operation allows to reduce CO<sub>2</sub> emissions.

### Case: RAIS (electricity)

	Lowest Price		Environment-friendly Price	
<b>Price</b>				
Price per product [Euro/product]	0,00	€	0,00	€
Lifetime [years]	25,00	y	25,00	y
Comparable number of replacements [n]	1,00	n	1,00	n
Total Cost [€]	0,00	€	0,00	€
<b>Duration</b>				
Lifetime [years]	25	y	25	y
Average yearly time usage [hours/year]	1.000	h/y	1.000	h/y
Total usage time [hours]	25000	h	25000	h
Number of purchases [n]	1	n	1	n
Total [hours]	25000	h	25000	h
<b>Maintenance</b>				
Number of years [years]	25	y	25	y
Units per year [work hour, kwp, page...]	0,00	n	0,00	n
Cost per unit [€]	0,00	€	0,00	€
Total [€]	0	€	0	€
<b>Energy costs</b>				
Price of energy [€/l]	0,04	€	0,04	€
Energy Consumption [KW or Watt e/t, m3 l...]	166146	W	300514	W
Lifetime energy consumption [kWh e/t, m3, l...]	4.153.650,75	kWh e/t	7.512.846,50	kWh e/t
Total energy costs [€]	147.039,24	€	265.954,77	€
<b>Emissions</b>				
Kg of CO2 per kWh, m3, l or kg	0,386	kg	0,386	kg
Total of CO2 avoided [ton]	0,000	t	-1296,895	t
Economic value of CO2 [€/ton]	7,02	€	7,02	€
Total economic value of avoided CO2 [€]	0,0	€	-9.104,2	€
<b>Total life cycle costs</b>	<b>147.039,24</b>	<b>€</b>	<b>275.058,97</b>	<b>€</b>

The second table shows the difference in electricity before and after the modification. In this case the consumption of energy is higher in the improved buildings.

### Case RAIS (fuel oil)

	Lowest Price		Environment-friendly Price	
<b>Price</b>				
Price per product [Euro/product]	0,00	€	0,00	€
Lifetime [years]	25,00	y	25,00	y
Comparable number of replacements [n]	1,00	n	1,00	n
Total Cost [€]	0,00	€	0,00	€
<b>Duration</b>				
Lifetime [years]	25	y	25	y
Average yearly time usage [hours/year]	1.000	h/y	1.000	h/y
Total usage time [hours]	25000	h	25000	h
Number of purchases [n]	1	n	1	n
Total [hours]	25000	h	25000	h
<b>Maintenance</b>				
Number of years [years]	25	y	25	y
Units per year [work hour, kwp, page...]	0,00	n	0,00	n
Cost per unit [€]	0,00	€	0,00	€
Total [€]	0	€	0	€
<b>Energy costs</b>				
Price of energy [€/l]	1,04	€	1,04	€
Energy Consumption [KW or Watt e/t, m3 l...]	13764	W	0	W
Lifetime energy consumption [kWh e/t, m3, l...]	344.087,66	kWh e/t	0,00	kWh e/t
Total energy costs [€]	357.162,99	€	0,00	€
<b>Emissions</b>				
Kg of CO2 per kWh, m3, l or kg	0,275	kg	0,275	kg
Total of CO2 avoided [ton]	0,000	t	94,624	t
Economic value of CO2 [€/ton]	7,02	€	7,02	€
Total economic value of avoided CO2 [€]	0,0	€	664,3	€
<b>Total life cycle costs</b>	<b>357.162,99</b>	<b>€</b>	<b>-664,26</b>	<b>€</b>

The third table describes the usage of fuel oil, which is the last source of energy. Energy consumption originated by this source of energy, is

zero for the improved building, while before the consumption was substantially higher (13764 W).

The final assessment is the sum of the total LCC of all three different energy sources.

In conclusion, this tool may be adapted also in complicated refurbishment operations. The important thing is the coverage of the most LCC issues: Price, Duration, Maintenance, Energy Cost, Emission. In GRASP the only missing component was waste disposal, but considering the many different methods of computing this (depending on materials, location, and other factors), it was not included in the tool.

Of course, considering that LCC for building refurbishment, as described in this document, may be part of a complex structured path, an integration process with other tools, methodologies is suggested. As minimum target, LCC should be integrated with preliminary information about the initial energy class and the Target Energy Class (TEC) in order to have precise suggestions on the parts to select and products to use. It should very useful to address a Green Tender towards more specific project details.

Moreover, a software with a graphic interface to increase the usability is needed. The tool has to be used through guided choices.

As maximum target it could become a part of a complete energy audit tool.

### 3. CO-EFFICIENT

#### 3.1 LIVING LABS

Living Labs present a specific trend in open innovation approaches. In Living Lab approach, external ideas are resources in innovation process. The aim of the Living Lab approach is to support innovation process with a usable product or service as a result of the innovation process. Different stakeholders are involved in the Living Lab, from researchers, developers and end-users with the goal to co-create innovative products and services in a real-world environment.

The Living Lab concept is based on a systematic user co-creation approach integrating research and innovation processes (bringing together users, R&D institutions, producers, service providers and all relevant stakeholders in focused and integrated development process). These are integrated through the co-creation, exploration, experimentation and evaluation of innovative ideas, scenarios, concepts and related technological artefacts in real life use cases. Such use cases involve user communities, not only as observed subjects but also as a source of creation. This approach allows all involved stakeholders to concurrently consider both the global performance of a product or service and its potential adoption by users. This consideration may be made at the earlier stage of research and development and through all elements of the product life-cycle, from design up to recycling.

### 3.1.1 Description and functionalities

In CO-EFFICIENT project the partnership opted for Business Model Canvas approach. Living Lab set-up methodology consisted of 6 phases that supported the formation of two Living Labs - Transport optimization (eServices) Living Lab and Energy efficiency Living Lab based on following phases:



**Image 3.1** Living Lab Business Model Canvas approach

#### 1. Connect

- Find people and organizations with positive innovation attitude
- Find complementary skilled people to cover the diversity of innovation process
- Form knowledge base of stakeholder's competencies and expertise
- Use web portal to share information
- Use social networks to enable formation of sub networks

- Prepare and sign the Memorandum of understanding (MOU) to define and understand the obligations of the involved stakeholders

## **2. Plan**

- Push stakeholder to define a problem/opportunity (User Driven definition)
- Define strategy, goals, objectives and expectations
- Define performance indicators for LL process evaluation
- Define time frame
- Determine commitments and leadership, resources
- Plan how to establish trust among network members and engage them
- Identify and form knowledge base of best practice cases

## **3. Communicate and support**

- Define network sponsorship/financing
- Determine role of meetings, workshops and seminars
- Define key knowledge and information input
- Define external expertise needed
- Determine required ICT support
- Use dissemination activities (conferences, newsletters) to extend partnership network and share experiences

## **4. Act and manage**

- Conduct workshop to engage stakeholders in the process of finding the solution
- Develop or use an existing solution
- Present the solution process to stakeholders
- Perform on-site training of stakeholders
- Run one or more User Driven, Open Innovation pilots

- Test the solution's compliance with defined goals and objectives
- Measure performance indicators
- Review responsibilities and commitments of stakeholders

## 5. Deploy

- Deploy developed solutions
- Communicate and share knowledge
- Improve
- Evaluate the process based on performance indicators, goals and objectives
- Push stakeholders to generate ideas for improvement of the process
- Evaluate contribution and consolidate network of stakeholders
- Expand network of stakeholders based on identified knowledge gaps
- Consolidate knowledge database
- Summarize the results

In phase 1, stakeholders were connected in a network with a clear insight and role to play in the Living Lab. In phase 2, plan of the Living Lab including objectives, activities, roles, agreements, responsibilities, cost/profit issues and risk management was agreed among partners. This was done via Memorandum of Understanding (MoU) which defined roles and responsibilities of participants. As the Living Lab was established and financed within project, there were no financial issues. The MoU was kept rather simple not to drive away stakeholders. For those participants there were not interested to participate in Living Lab but were willing to test proposed solutions, Declaration of Participation (DoP) was used. The DoP specified the

scope, responsibilities, right and data protection (very important) for those participating in testing of solutions.

Inputs, schedules and dissemination activities were defined in phase 3, followed by the process of solution development and continuous improvement of the user driven innovation process defined in the Living Lab in phase 4. The deployment of the solution, presented in phase 5, aims at sharing knowledge in participating regions and gaining sustainability of the Living Lab which is continuously improved in phase 6, with the aim to support user-driven open innovation process in continuous activities.

### **CO-EFFICIENT living Lab practical implementation sequential**

1. **Desktop research** on existing methodologies, approaches, and tools for energy efficiency improvement and use of renewable resources in production and operations
2. **Identification of key stakeholders**, associations, clusters (and SMEs) and identification of **key added values** for each participant
3. **Definition** of the strategy, aims, and objectives of the living lab;
4. **Definition of terms of collaboration, ownership of resulting tools, rules for use and further modifications**
5. Via workshops, conferences, in-company visits, one-on-one meetings, **consultations and interviews** involving key stakeholders and SMEs
6. **Identification of areas with large unused capacities** within the energy assemblies installed in SMEs; identification of typical areas with potentials for improved maintenance

and management, identification of areas for instalment of renewable resources

7. **Joint development** of analytical tool and indicators for improved energy efficiency and use of renewable resources in production processes (SMEs closely collaborate in the process)
8. **Testing** of the beta version of the analytical tool on a panel of 50 SMEs to test its quality and relevance;
9. **Design** of final version of analytical tool
10. **Individual consultations** and advice to SMEs in Living Labs on improving energy efficiency and use of renewable resources

### 3.1.2 Participation in GRASPINNO

In GRASPINNO the above described concept of Living Lab will be applied to pilot implementation as to integrate research and innovation processes, create a user-centred open innovation ecosystem based on systematic co-creation approach, promote and strengthen transnational cooperation and networking amongst clusters/networks/networks of networks of GEM eco-innovation.

Through Living Lab approach public sector (as well as other stakeholders) are involved not only as observed subjects but also as a source of creation. While innovation has to generally face resistances from the users or at least it has to define how to overcome potential resistances, experiential learning, implemented in Living Labs, is considered one of the most powerful teaching and learning tools to overcome them and facilitate the change of people behaviours. Involving public sector as co-creators and final users will

instigate experimental learning leading to higher degree of involvement and acceptance.

In order to implement the Living Lab approach in pilot actions an informal “forum” or “cluster” of stakeholders (mainly organisations from public sector however, SMEs, R&Ds, policy makers and other interested stakeholders will be involved if interested) will be organized. This “forum” takes over the structure of Living Lab implementing pilot activities with or without formalisation in terms of legal commitments, formalisation of procedures and management. Nevertheless the work in Living Lab is structured and led by project partners in order to follow joint methodological approach for pilot implementation. More precisely one Living Lab structure per partner country is mobilized, bringing together all organisations involved in pilot implementation as well as other organisations (interested to observe but not participate in pilot implementation). The activities of Living Lab structures follow the phases of Living Lab where some activities are open to all participants while other activities (individual consultations and individual support with implementation of the pilot actions) are given only to organisations participating in pilot activities.

The national Living Lab structures will follow joint methodology and will exchange experiences while adapting to the national/regional specifics. The Living Lab structure is kept informal and open to all interested parties.

### 3.2 CO-EFFICIENT ANALYTICAL TOOL

The analytical tool is meant to support SMEs in improving energy efficiency and in using renewable energy sources in key production

processes. The analytical tool gives reference values about energy efficiency in identified key areas. The mentioned tool also provides reference values in key areas with the potential for increased use of renewable energy sources, to SMEs. With help of external experts, SMEs participated in identifying and addressing their main weaknesses regarding energy efficiency and the use of renewable energy sources in their business processes. Results of these processes were used to define the tool.

The analytical tool is free to use for all companies that decide to check where they stand in terms of energy efficiency compared to other companies. The main advantages of using the analytical tool are:

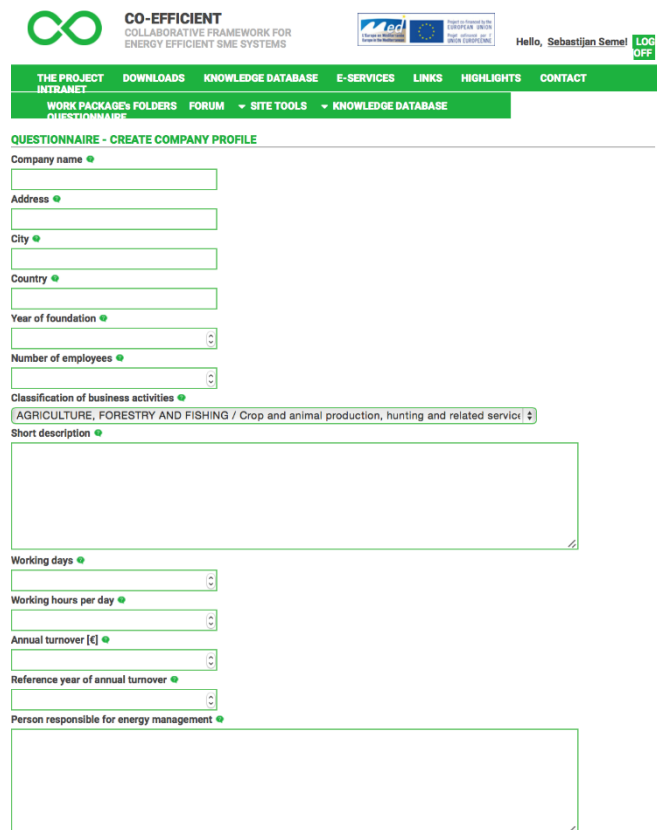
- Identification of key production processes and operations that could be improved in terms of energy efficiency.
- Introduction of renewable energy sources into production processes.
- Provision of reference values for energy efficiency in identified key areas.
- Display of best practices and solutions.
- Company obtains basic information, where it stands in terms of energy efficiency compared to other companies.
- SMEs are also offered consultations by external experts in identifying their main weaknesses.

### **3.2.1 Description and functionalities**


In this section structure of CO-EFFICIENT Analytical tool is presented together with user guidelines.


## ➤ User Guide


At first, the company name has to be entered. Afterwards different input data has to be entered. For example address, year of foundation, number of employees, business sector, working days, working hours per day, annual turnover, standards in company, energy management, energy education, energy actions and barriers for the installation of renewable energy systems. Figure 2 and 3 show the web interface of the analytical tool about the company profile.





**Image 3.2** Web interface of the analytical tool - Company profile


Standard in company 

ISO9001 

Standard remarks 

Energy management 

Energy education 

Energy actions 

Barriers for the installation of renewable energy system 

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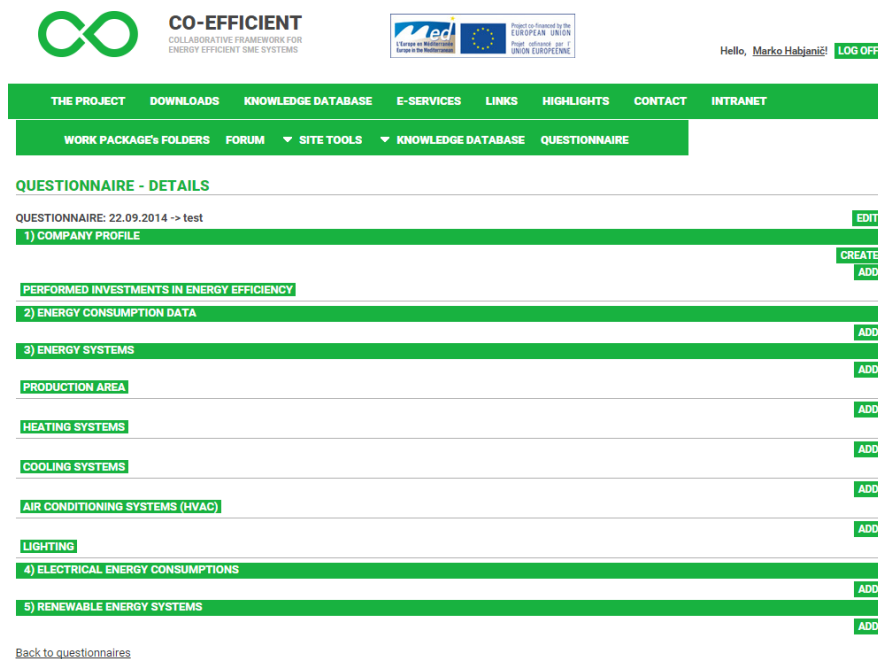
**Image 3.3** Web interface of the analytical tool - Company profile


After the company profile is created, different data about energy consumption, energy systems, electrical energy consumption and renewable energy systems have to be recorded. The field about energy systems is furthermore divided in the following sections:



- Production area.
- Heating systems.

- Cooling systems.
- Air conditioning systems (HVAC).
- Lighting.

Images 3.2 – 3.11 show the graphical user interface, which is intended to enter the required data.




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 COLLABORATIVE FRAMEWORK FOR  
 ENERGY EFFICIENT SME SYSTEMS



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**QUESTIONNAIRE - DETAILS**

QUESTIONNAIRE: 22.09.2014 -> test [EDIT](#)

**1) COMPANY PROFILE** [CREATE](#)

**PERFORMED INVESTMENTS IN ENERGY EFFICIENCY** [ADD](#)

**2) ENERGY CONSUMPTION DATA** [ADD](#)

**3) ENERGY SYSTEMS** [ADD](#)

**PRODUCTION AREA** [ADD](#)

**HEATING SYSTEMS** [ADD](#)

**COOLING SYSTEMS** [ADD](#)

**AIR CONDITIONING SYSTEMS (HVAC)** [ADD](#)


**LIGHTING** [ADD](#)

**4) ELECTRICAL ENERGY CONSUMPTIONS** [ADD](#)


**5) RENEWABLE ENERGY SYSTEMS** [ADD](#)

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**Image 3.4** Questionnaire details



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### QUESTIONNAIRE - CREATE ENERGY CONSUMPTION ANALYSIS


Year 


Fuel type 

Location type 

Remarks 


Fuel consumption 

Unit 


Fuel costs [€/year] 

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**Image 3.5** Data entry fields for Energy consumption



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### QUESTIONNAIRE - CREATE PRODUCTION AREA

Area type 


Overall surface [m2] 

Overall volume [m3] 


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**Image 3.6** Questionnaire about the production area


### QUESTIONNAIRE - CREATE HEAT PRODUCTION SYSTEM

Energy type 


Electricity ▼


Generator type 

Electric Heater ▼

Location type 

Administrative building ▼

Power [kW] 

Distribution of heat 

Radiators ▼

Year of installation 

Daily hours of work [h] 

Remarks 

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**Image 3.7** Data entry field for heat production systems



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#### QUESTIONNAIRE - CREATE AIR CON PRODUCTION SYSTEM

Manage type

Manual

System type

Classic

Power [kW]

Air flow

Device type

Year of installation

Daily hours of work [h]

Remarks

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**Image 3.8** Questions about HVAC systems





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### QUESTIONNAIRE - CREATE LIGHTING SYSTEM


Device type 

Fluorescent Lamps 

Location type 

Administrative building 

Electrical power [kW] 

Daily hours of work [h] 

Remarks 

[Create](#)

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**Image 3.9** Data about lightning systems






### QUESTIONNAIRE - CREATE PROCESS ANALYSIS

Power range [kW] 

1-10 kW ▼

Number of engines 


Engine type 

Electric powered ▼


Location type 


Administrative building ▼


Remarks 

Engine installation period 

Less than 5 years ▼


Working hours per day 

Working days per week 



Working months per year 

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**Image 3.10** Data entry fields about electrical energy consumption



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### QUESTIONNAIRE - CREATE RENEWABLE ENERGY ANALYSIS


Type of renewable energy system 

Solar

Remarks 

Energy production per year [kWh] 

Power [kW] 

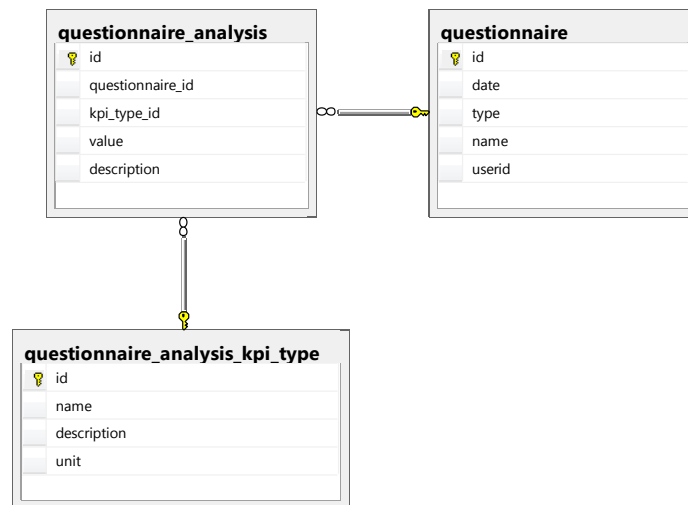
Type of installation 

Roof

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**Image 3.11** Renewable energy systems

By entering all the necessary data into the data fields the knowledge database is updated with information about the company and with KPIs, which are used in the following calculation of the energy efficiency of the company (Image 3.12 ). 25 different energy efficiency indicators for the analytical tool were selected. These indicators give SMEs a picture of their energy situation in the company.



**Image 3.12** Calculation of KPIs

Display of the results is shown in below. Results are shown in form of energy indexes, also the total range of each KPI can be determined (maximum and minimum). An automatic output of the analytical tool is also a certificate, which is given to a company whose KPIs values fall into in the green field of each energy index. At the bottom of the web page a display of best practices and solutions from the knowledge database is added (figure 19). Based on the gathered experience and knowledge best practices and solutions are suggested with respect to companies' profile, calculated KPIs and energy efficiency of the company. There is also a possibility of exporting the analysis report into pdf format that can be printed.



Report date: 16.03.2015 00:45:09

## KPI ANALYSIS

QUESTIONNAIRE: 16.09.2014 -> Hostel Tresor

### PERFORMANCE INDICATORS

KPI01	Energy consumption of the company per year	(min: 26.534,000 ; max: 350.925.756,978)	758.868,500 kWh
KPI02	Energy costs per year	(min: 3.716,333 ; max: 2.211.849,000)	53.046,000 €
KPI03	Energy consumption per employee	(min: 1.311,790 ; max: 1.169.752,523)	50.591,233 kWh
KPI04	Energy cost per employee	(min: 128,159 ; max: 52.538,333)	3.536,400 €
KPI05	Energy consumption in relation to the annual turnover of income	(min: 0,015 ; max: 1,194)	1,194 kWh/€ income
KPI06	Energy cost in relation to the annual turnover of income	(min: 0,001 ; max: 0,083)	0,083 € costs/€ income
KPI07	Energy consumption for the administrative part	(min: 19.635,000 ; max: 146.700,000)	n/a
KPI08	Energy cost for the administrative part	(min: 1.519,500 ; max: 19.500,000)	n/a
KPI09	Energy consumption for the technological part	(min: 10.290,000 ; max: 4.115.000,000)	758.868,500 kWh
KPI10	Energy cost for the technological part	(min: 3.900,000 ; max: 1.225.000,000)	53.046,000 €
KPI11	Energy consumption per square meter	(min: 25,056 ; max: 1.021,302)	100,379 kWh/m <sup>2</sup>
KPI12	Energy cost per square meter	(min: 3,113 ; max: 46,535)	7,017 €/m <sup>2</sup>
KPI13	Energy consumption per volume	(min: 5,011 ; max: 185,691)	38,039 kWh/m <sup>3</sup>
KPI14	Energy cost per volume	(min: 0,834 ; max: 9,307)	2,659 €/m <sup>3</sup>

### PERFORMANCE ANALYSIS

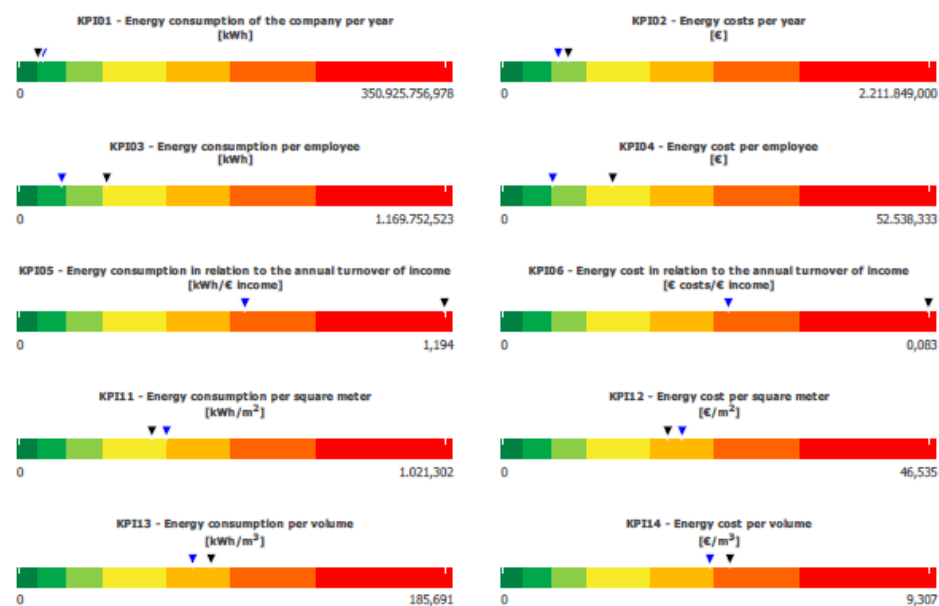


Image 3.13 Display of results

#### BEST PRACTICE & SOLUTIONS

##### BEST PRACTICE

03.11.2014 -> Renovation of Protected Building into an Energy Efficient Business-Commerce Object  
 24.07.2014 -> Recovery of the heat of the sewage network in a hotel in Bordeaux  
 24.07.2014 -> Objective CO2 - eco-driving training  
 24.07.2014 -> Energy self-sufficient office building  
 24.07.2014 -> SPAIN: Carbon Footprint Registration  
 15.07.2014 -> 5 tips to help manufacturers go green and save green

##### SOLUTIONS

17.11.2014 -> New generation of high temperature heat pump  
 03.11.2014 -> ENERGY SENTINEL  
 24.07.2014 -> CAT Britain's major centre for environmental inspiration and courses  
 24.07.2014 -> MicroBioOil  
 15.07.2014 -> SolarWindow

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**Image 3.14** Best practices and solutions

### ➤ CO-EFFICIENT KPIs

KPI	Description
<b>KPI01</b> - Energy consumption of the company per year.	The indicator shows the total final energy consumption for a period of one year.
<b>KPI02</b> - Energy costs per year	The indicator represents the cost of total final energy consumption for a period of one year.
<b>KPI03</b> - Energy consumption per employee	The indicator shows the total final energy consumption in the company in relation to the number of employees. This indicator enables the company to control power consumption by changing the number of employees.
<b>KPI04</b> - Energy cost per employee	The indicator shows the final energy consumption costs per employee. This indicator enables the company to control energy costs by changing the number of employees.

KPI	Description
<b>KPI05</b> - Energy consumption in relation to the annual turnover of income	The indicator shows the ratio of energy consumption and the company's revenues within their business activities.
<b>KPI06</b> - Energy cost in relation to the annual turnover of income	The indicator shows the ratio of energy costs and revenues of the company. In this way, the company can keep control of energy consumption in business processes.
<b>KPI07</b> - Energy consumption for the administrative part	The indicator shows the necessary amount of final energy in the context of basic needs for the operation of the business.
<b>KPI08</b> - Energy cost for the administrative part	The indicator shows the energy costs in the context of basic needs for the operation of the business. In this way, the basic minimum costs for the operation of business can be determined.
<b>KPI09</b> - Energy consumption for the technological part	The indicator shows the energy consumption for the execution of technological processes and technological work activities. In this way, the company can define the purchase amount of final energy with suppliers.
<b>KPI10</b> - Energy cost for the technological part	The indicator shows the energy costs in technological processes (technological part of the activities). Indicator enables the optimization of consumption and therefore more competitive product price.
<b>KPI11</b> - Energy consumption per square meter	The indicator shows the final energy consumption per unit of surface area. This indicator represents the basic indicator, which

KPI	Description
	is primarily linked to the heating surface area.
<b>KPI12</b> - Energy cost per square meter	The indicator shows the final energy costs per unit of surface area. This indicator enables the company to control the costs in the context of increasing or decreasing the production capacities.
<b>KPI13</b> - Energy consumption per volume	The indicator shows the required final energy in relation to the volume of the production areas.
<b>KPI14</b> - Energy cost per volume	The indicator shows the costs of final energy consumption in relation to the volume of production areas. By monitoring this indicator, the company can optimize the actual need according to size of production facilities.
<b>KPI15</b> - Energy consumption for the technological part - preparation of heat	The indicator shows the actual final energy needed for the preparation of heat in the technological part of production.
<b>KPI16</b> - Energy cost for the technological part - preparation of heat	The indicator shows the energy costs required for the technological part of the production. Monitoring the indicator enables the optimization of energy consumption for the preparation of heat in the technological part of business (particularly for the optimization of heat generators in technological part).
<b>KPI17</b> - Energy consumption for the technological part - preparation of domestic hot water	The indicator shows the energy consumption for the preparation of hot water in technological processes. The purpose of this indicator is the determination of structure of energy consumption for an individual technological part of business.

KPI	Description
<b>KPI18</b> - Energy cost for the technological part - preparation of domestic hot water	The indicator shows the energy costs for the preparation of hot water in technological processes. This indicator enables the cost analysis of individual technological part of business in the context of energy consumption.
<b>KPI19</b> - Energy consumption for cooling	The indicator shows the energy consumption for the whole cooling process in the company. It enables you to specify the share of energy consumption and the possibility for optimizing the use of energy for cooling.
<b>KPI20</b> - Energy cost for cooling	The indicator shows the energy costs for cooling. This indicator enables the energy cost analysis for cooling in the company.
<b>KPI21</b> - Energy consumption for ventilation	The indicator shows the final energy consumption for ventilation.
<b>KPI22</b> - Energy cost for ventilation	The indicator shows the final energy costs for ventilation. This indicator enables the cost analysis and the possibility of modernization of ventilation system.
<b>KPI23</b> - Energy consumption for lighting	The indicator shows the final energy consumption for lighting in the company. This indicator shows the share of energy consumption, which entitles the optimization of lighting system by using lighting that is more efficient or a good management mode.
<b>KPI24</b> - Energy cost for lighting	The indicator shows the energy costs for lighting. This indicator allows you to specify payback periods in case of the optimization requirements and technological modernization of lighting.

KPI	Description
<b>KPI125</b> - The share of renewable sources in relation to total energy consumption	The indicator shows the share of energy consumption from renewable sources in relation to total final energy consumption. In this way, the company shows sustainable orientation and awareness for the efficient use of energy.

### 3.2.2 Participation in GRASPINNO

CO-EFFICIENT Analytical tool can be integrated to GRASPINNO as additional independent feature giving users possibility to calculate their current energy efficiency prior to any type of investment.

## 4. SIENA CARBON FREE

### 4.1 FINAL STUDIES

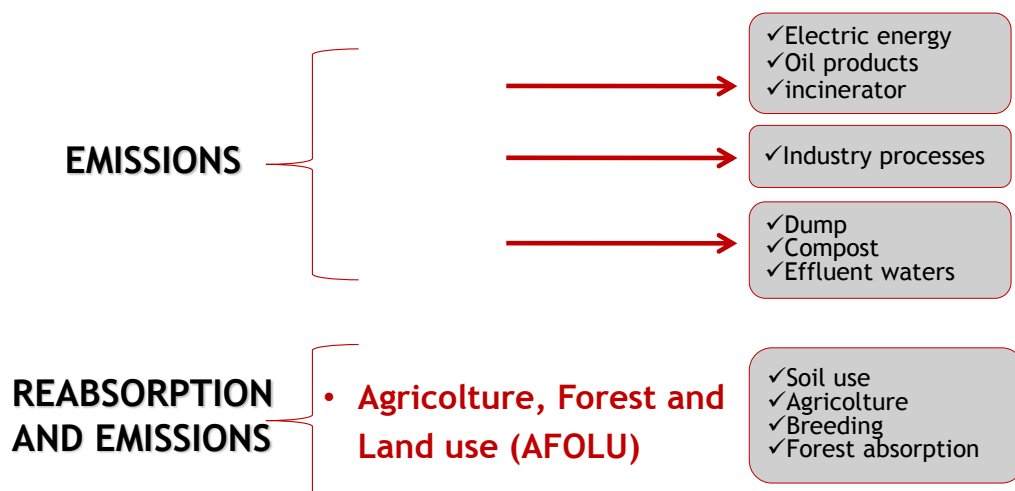
Environmental sustainability analysis on all Sienese territory by a first calculation of green house gases (GHG) balance was held since 2001 (SPINECO Project). In the following years, it was thought to adopt an instrument able to annually estimate GHG emissions and reabsorptions to plan a reduction policy of CO<sub>2</sub> emissions. Goal: Feasibility Plan was prepared to reset CO<sub>2</sub> emissions in 2015.

The Province of Siena has enabled the project **“2015 Siena Carbon Free”** with the goal to be the first wide area with zero emissions by 2015. The project covers the annual calculation and the **ISO 14064/1 certification** of the CO<sub>2</sub> release and resorption balance (made by the University of Siena according to the IPCC approach).

The Province of Siena obtained the first certified balance in 2008 - according to the ISO 14064-1 norm – first province in Italy (based on data referred to the year 2006). The standard specifies the principles and requirements for the quantification and reporting of greenhouse gases emissions and their removal. It involves requirements concerning the design, development, management, reporting communication and verification of greenhouse gases inventory . The certification is held annually, issued by RINA Services SpA for the 2006 to 2013 Balances.

Since 2007 it is active the calculation of greenhouse gases Balance in collaboration with the University of Siena - Department of Chemistry - and the Italian Naval Register s.p.a- (now RINA Services s.p.a.).The

calculation is performed in accordance with the Guidelines for National Greenhouse Gas Inventories established by the IPCC (Intergovernmental Panel on Climate Change). The examined areas are:

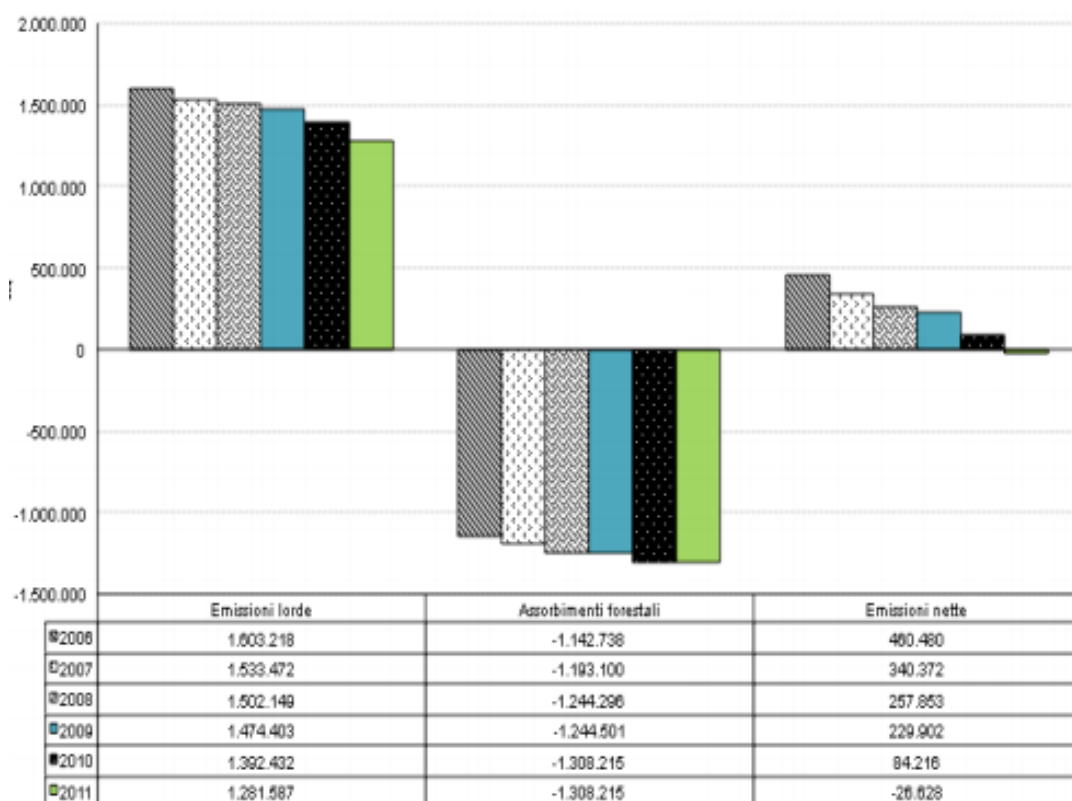


Yearly calculations of the GHG emissions and reabsorptions balance reducing CO<sub>2</sub> emissions, according to Kyoto Agreement, are related to:

- **CO<sub>2</sub> Carbon dioxide**
- **CH<sub>4</sub> Methane**
- **N<sub>2</sub>O Nitrogen oxide**

The analyzed greenhouse gases emissions are converted into equivalent CO<sub>2</sub> in accordance with the conversion factors or global warming potential. Thanks to this system it is possible to measure the CO<sub>2</sub> emitted annually in the province of Siena and how much of it is absorbed back. The data examined are referred to the previous two years, this for physiological reasons due to the collecting and

processing data by the sources. **In 2011 the Net Emission CO<sub>2</sub> Balance was negative for the first time ever: forest areas reabsorption exceeded GHG emissions in the whole territory and Siena became the first vast area In Europe with a certified negative carbon balance.** The goal has been reached four years in advance on the planned 2015.



**Image 4.1** CO<sub>2</sub> Reabsorption share 2006-2011 and over

Many projects, ISO Certification, transparency and credibility to the GHG inventories, the Administrative guide through actions (renewable energy source production, heating and lighting, transport, forest development and fire prevention) and, last but not the least, involving people (information and sensitization, environmental

education in schools and training for workers, recognition) are the causes that leads to reach the goal.

Siena Carbon Free 2015 project involves local administrators, stakeholders, companies, associations and citizens; every citizen has to be involved in daily actions to reduce CO<sub>2</sub> emissions. The communication activity is founded on education about energy saving, energy efficiency and RES energy.

Monitoring, through IPCC directions, makes possible its application to various territorial levels, in different living conditions of communities.

It also concerns a whole series of actions, such as: programming with the a Provincial Energy Plan, the provision of incentives for energy efficiency and energy supplying from renewable sources, the design of RES systems for the structures and information on the subject.

Alongside these initiatives, an important ordinary activity is pursued with the controls on the heating systems and the fire prevention assistance.

Hereinafter a description of the most important initiatives:

#### ➤ **Control actions**

In order to achieve and keep the ambitious target to zero the CO<sub>2</sub> emissions by 2015 it is essential to control those events on the territory that can lead to environmental pollution such as heating systems and forest fires.

### **Heating systems**

The Province of Siena signed a Memorandum of Understanding together with the City of Siena, the Chamber of Commerce of Siena, associations of craftsmen and consumer organizations to make more effective and efficient the audits to perform on heating systems. It was crucial to facilitate citizens in the fulfillment of legal obligations, to give the operators and owners of the plants a set of predetermined rules and guarantees, then conforming the practices concerning the controls on the heating systems lower than 35 KWh for which a self-certification can be used. This Protocol also expects the commitment of the Province to enable an information and awareness campaign called clean and safe boilers. All the technical and administrative activity was delegated to the Energy, Environment and Sustainable Development Agency (APEA) that receives the practices of self-certification for the systems of less than 35 kWh, the tests on the self-certified plants, the search for evasion and the controls on plants greater than or equal to 35 kWh.

### **The wood fire fighting activities**

The Province of Siena regularly carried out the fire fighting activity in collaboration with the State Forestry Corps and voluntary associations. The Provincial Operations Centre set to coordinate the forest fire fighting throughout the province had the task of coordinating the activities of prevention, management and shutdown, during the high risk period, from June 15 to September 15, as required by the Wood Fire Fighting Operational Plan in the Province of Siena.

This important activity is strictly necessary for the reduction of CO<sub>2</sub> emissions into the atmosphere since the forest surface actually absorbs these emissions.

➤ **The energy efficiency and RES in building**

See it in the next paragraph (4.2)

➤ **“Terre di Siena Carbon Free 2015” brand**

It was to promote initiatives to reduce GHG with this set of actions for development and diffusion of:

- New RES plants installation
- Best practices to reduce energy consumptions
- Energy efficiency in buildings
- Productions of items/services low intensity of CO<sub>2</sub>
- Information and sensitization for best practices

The brand can be required by

- Companies
- Public and Private Authorities

The BRAND OFFICE will control the




- possibility to give the brand itself
- subjects actions after the brand acquired



**Image 4.2** The logo

### ➤ **Participation in international events and awards**

The Province of Siena took part in the International Liveable Communities Awards event, sponsored by the United Nations Program for Environment (UNEP), held in Seoul October 26 to 31, 2012, to compete to a range of awards for sustainable communities. With the 2015 Siena Carbon Free project, the Province of Siena was admitted to all the awards categories: Whole city, for the global project concerning landscape, art, participation, environment, lifestyle, planning; Project for the innovativeness of the project itself and Bursary, a cash prize of £ 10,000. The delegation from Siena was part of the 77 delegations, for a total of 450 delegates from 26 countries around the world, selected out of 338 submitted projects, which met in Seoul in South Korea, in the district of Songpa, for the important international competition, born in 1997 as a window to show projects and programs in its capacity as territory of sustainable communities. The Province of Siena won two major awards: a Silver Award for the Project category and a Bronze Award for Whole City.

	<b>ISO 14001</b> <b>ENVIRONMENTAL CERTIFICATION</b> since 2003
	<b>EMAS Registration</b> since 2006
	<b>ISO 14064</b> <b>BALANCE GREEN HOUSE GAS</b> since 2008 (first certification on data 2006)
<b>ISO 50001 - ENERGY CERTIFICATION</b>	

**Image 4.3** Certifications of the Province

## 4.2 PROCUREMENT DOCUMENTS

The project “Siena Carbon Free” doesn't contain procurement documents but it includes some preliminary actions required for the Green Public Procurement in EE/RES for energy refurbishment of public buildings.

### **The energy efficiency and RES in building**

The Province of Siena and some of the most populated municipalities performed a series of energy audits on their real estate making a series of analyses through APEA:

- Monitoring data on consumption of energy and water
- Analysis on the efficiency of energy conversion and on the use of energy resources
- Planning to implement the use of energy efficiency
- Best conditions for supplies
- Consumption markers to compare

- Specific operations: regulation of electrical systems, improving the energy efficiency of the heating systems, supply from renewable sources to upgrade the buildings' energy efficiency

Feasibility studies were performed through APEA for the installation of **photovoltaic panels in some school buildings**.

It was then opened the call for energy audits to enhance the energy efficiency of **municipal buildings**. Funds were provided to support the deployment of diagnostic and design procedures for the **energy retraining** of public buildings in the municipalities around Siena. The funds amount to € 200,000 and a communal participation of 10% was provided for a maximum of € 20,000 per municipality. Projects were financed for 220,000.

Funds have been allocated for **small size photovoltaic systems** in order to install panels:

- Allocated funds € 2,200,000
- Investment volume € 21.85 million
- kWp installed 4,340
- MWh / year produced 5423
- Questions no. 692
- CO2 reduction = 2,982 t / year.

A **survey of the energy potential was carried out on the sites owned by the municipality of the province** (cover of buildings, disused quarries and dump sites, properties ...) for the purpose of energy recovery, installation of equipment for the production of FER renewable energy, production and use of biodiesel and / or other biomass fuels produced in the province. The survey performed by

APEA brought to the cognitive framework:

## CENSIMENTO POTENZIALITA' ENERGETICHE SITI PUBBLICI

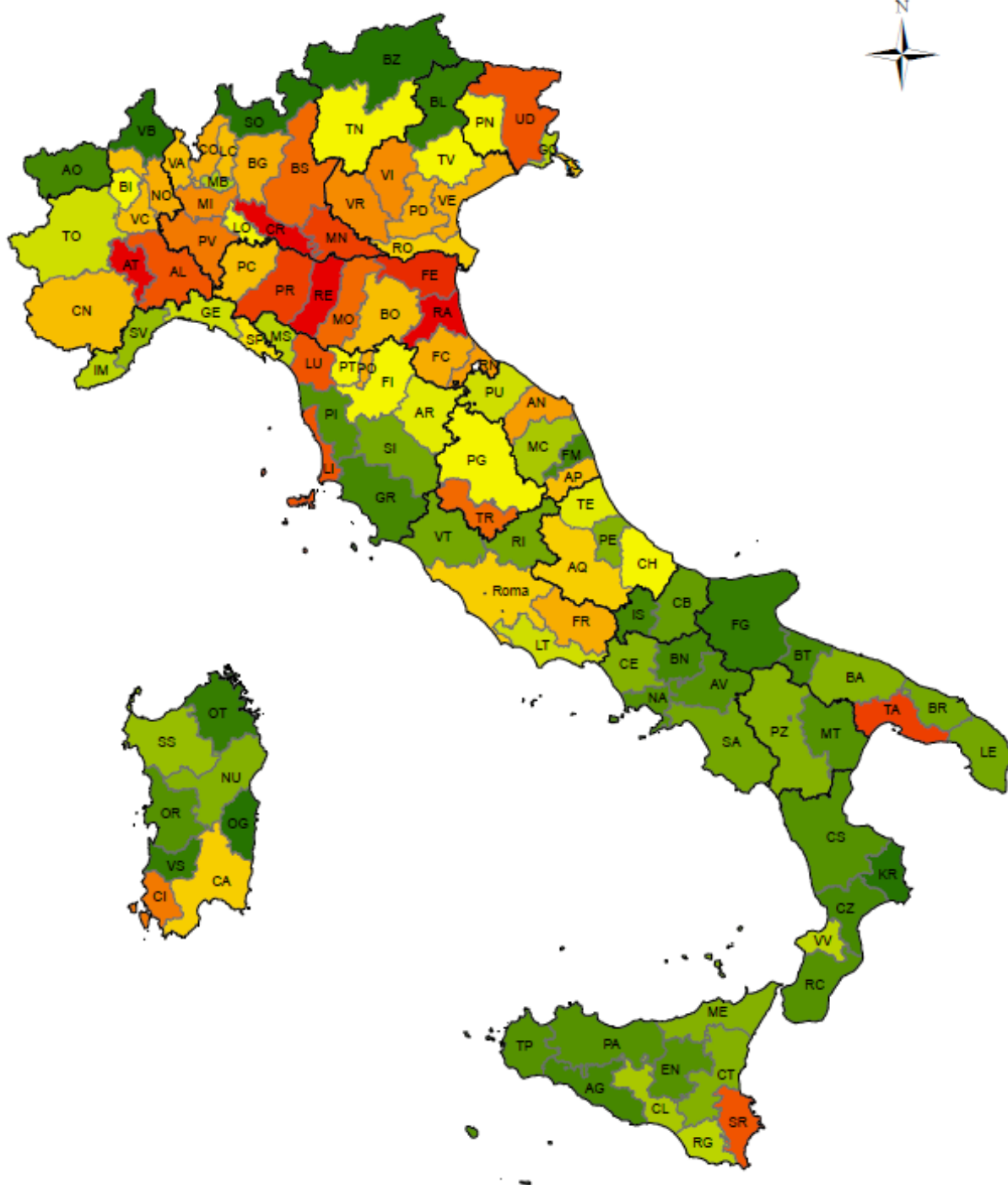
Zone di intervento	Potenza installabile (kWp)
Aree/Terreni	2336
Scuole	1333
Impianti Sportivi	1548
Altro	1441
<b>Totale Potenza in kWp</b>	<b>6658</b>

### 4.3 PARTICIPATION IN GRASPINNO

The application of the IPCC methodology for Greenhouse gas emissions Inventory at the province level already foreshadows the enormous potential of the availability of informations on municipal level. The “picture” of the whole Italian territory offers the possibility of comparisons and construction of policies that a smaller scale territory makes it impossible.

The Siena Province Carbon Free Certification indicates the political virtuous process that Siena have undertaken; having pursued the goal of equalization between emissions and absorption is still an important achievement but, as we see in the map, Siena is not the province of Italy with the minimum level of energy emissions in the atmosphere. That is a clear signal that much more effort has to be put on, many things have be done in the direction that the maps of the issues of energy consumption components also indicate. That is just a simple marker of the potential that this tool could have; in fact, it has important implications in terms of economies of scale: the used

methodology provides for the availability of data at municipal level of the Italian provinces. The need to implement a synthesis and a scoring model requires to work with large quantity of data coming out from different sources; **once identified the province taking part in the analysis, it will be pursued availability of all data related to the necessary VARIABLES for ALL the municipalities in the same province. It means that the participation of several municipalities in the SEAP drafting does not necessarily imply more work compared to the need to provide data for a single local administration of a province.** The tool, expanded to the use of many municipalities, identify exactly at this stage the possibility of switching from a simple descriptive local condition about energy consumption and greenhouse gas emissions to a concrete process, able to generate government decisions and actions. **The awareness about the opportunity to extend this approach to all the partners (not only Italian ones) and the level of economies of scales that can be created should stimulate the involvement of as many municipalities as possible.**



The implementation through adequate models of the *IPCC methodology for Greenhouse Gas Inventories* can become the basis to extend the possibility of building strategies tool for local management, as a sort of “compass” to orient future policy decisions.

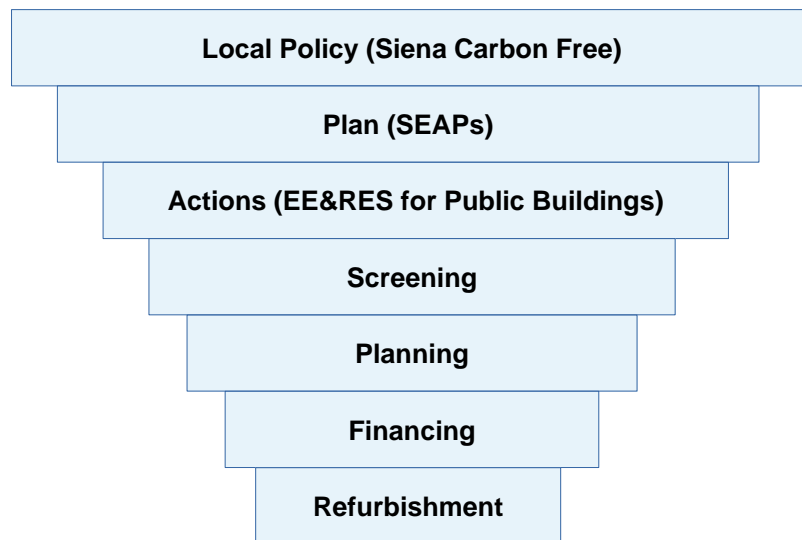
Participation in GRASPINNO is strongly influenced by this opening opportunity: since SEAP has been so far a simple tool at voluntary membership with a little impact on the emissions reduction, **managing the IPCC Guidelines to make them enforceable**, even at the **municipal level** and contribute to assign contents of real political action, **is a crucial challenge**.

Integrate present SEAP monitoring with

- explanatory analysis of the factors, making up the energy consumption and the emissions themselves
- qualifying test to identify buildings and structures at risk
- discriminating process on the potential interventions to realize
- predicting evaluation on the conditions in front of us during the planning phase

.... means consolidating a path of research and action towards a genuine tool of government, an operational guideline through energy conservation, energy efficiency of buildings and company, real development of renewable without the intervention of incentives, development of sustainable mobility initiatives.

The general idea of the project is to follow the development goals indicated in the inverted pyramid below, in which the policy is the general preliminary work that flows into detailed plans (SEAP) but take on a compulsory commitment, not a simple analysis, till to identify concrete recommendations.

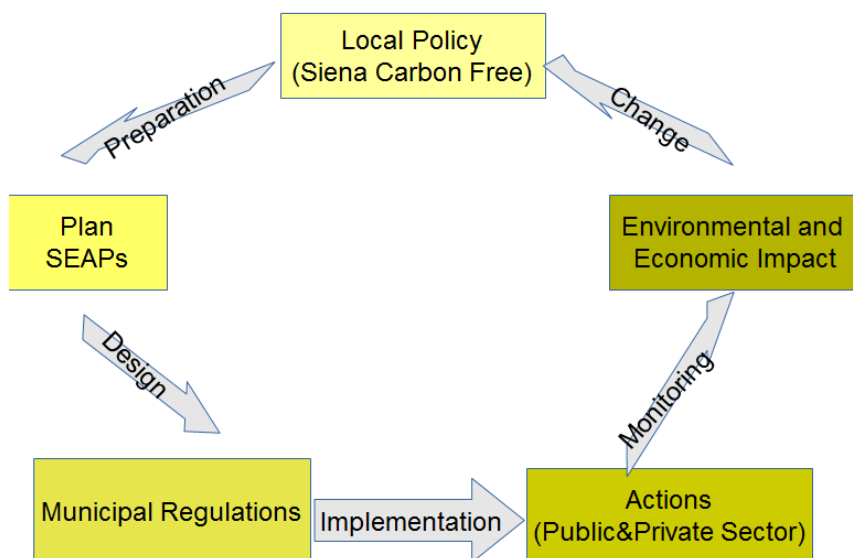


**Image 4.4** TSL Path and GRASPINNO

In this sense, it seems much more consistent to have introduced Siena Carbon Free as a local policy; this goal, now an achieved and consolidated goal, come back as interesting once again due to the fact that introduces not a sequential vision but a new circular pattern which:

- represents the start point with its inertial stirred to a greater attitude of attention to environmental issues that, even in a territory of Italy at maximum quality of life, found out so many difficulties to be understood
- opens a phase of renewed SEAP preparation and content and extends its application to municipalities so far unaware of its potential; as regards this aspect, the importance of the use of GPP in the SEAP, as introduced in the previous GRASP project, has to be emphasized; GPP has to become an integrated protocol to achieve the goals of reducing energy consumption and climate-changing emissions

- accompanies the draft of municipal planning instruments and their application
- stimulates the planning of the most effective actions and more efficient maintenance and retrofitting to realize both in relation to the public or private sector
- re-submit to a new monitoring phase the effects of actions in relation to the environmental and economic impacts that have been determined and facilitates the calibration of the processes, adapting once again the programming tools in a kind of perpetual change.



**Image 4.5** GRASPINNO Virtuous Cycle

The experience of the Covenant of Mayor, launched in EU, involved over 2,000 local authorities in Italy. It should therefore be enhanced, not left to simple descriptive tool.

The created propelling force and the diversity and quality of the commissioning projects could achieve unexpected results, in the presence of innovative financing solutions.

For offices, schools and public lighting is essential to promote the application of adequate Energy Contracts with Warranted Result in face of investments on efficiency, taking advantages from all possible sources of possible financial funds and moving towards the public-private partnership in order to bypass

budget constrains and improve energy efficiency of public buildings.

Last but not least, a series of SEAP recommendations have to be introduced as suggest by the activities carried out in the previous GRASP project. The introduction of GPP in the planned activity couldn't be enough to transform the plan in real actions and activities. Every SEAP has to transformed from a voluntary plan to a cogent road map even if the recent legislation on the procurement in some countries can help this change, making GPP compulsory for EE/RES in buildings. Anyway, this support remains marginal because public sector contributes about 4-6% of the total energy consumption and GHG emissions in a municipality. For instance, in GRASP, Tuscan local governance tools have been proposed to increase the role of PA in reducing environmental effects.

In the following table this approach has been showed: in the left column there are actions and interventions foreseen in a specific SEAP, in the right one there are governance tools, according to the Tuscan Regional Law 65/2014, to be used to go beyond the voluntary provisions of the SEAP. In order to clearly draw the outlines of the process the governance tools are described briefly:

- **“Piano Strutturale Comunale” (PSC – Municipal Structural Plan)** and **“Piano strutturale intercomunale” (PSI – Intermunicipal Structural Plan)**, have no a cogent function but they show critical aspects and address the strategies to solve them.
- **“Piano operativo comunale” (POC – Municipal Operational Plan)**, **“Regolamento edilizio comunale” (REC – Municipal Building Regulation)** and **“Piani Attuativi Comunali” (PAC – Municipal implementation Plans)** have a cogent function, putting in practice the address described in the preordained governance tool, PSC or PSI, introducing rules, measures and regulations.

Hereinafter a table with some possible recommendations concerning the building sector. It should be stressed that the application of recommendations in SEAPs could be extended to several sectors.

<b>INTERVENTIONS</b>	<b><i>Territorial governance tools that can be used</i></b>
<b><i>BUILDINGS</i></b>	
Insulation of external walls and roofing, substitution of doors, windows and heat generator	<i>PSC, knowledge framework and sustainable development strategies; POC and REC, sustainable building</i>
Real estate registry containing Energy information	<i>PSC, knowledge framework and sustainable development strategies;</i>
Substitution of old boilers with new ones having higher energy saving performance	<i>POC and REC, sustainable building</i>

Energy audit of public buildings	<i>PSC, knowledge framework and sustainable development strategies;</i>
Re-qualification of indoor lighting plants in municipal building	<i>POC and REC, sustainable building</i>
Energy Certification	<i>POC and REC, sustainable building</i>
Obbligation to install RES on refurbished and new buildings	<i>PSC, knowledge framework and sustainable development strategies; POC and REC, sustainable building</i>
Update Building Regulation (improvement of energy performance of buildings)	<i>REC, sustainable building</i>
Photovoltaic plants on roofings	<i>POC and REC, sustainable building</i>
Energy audit and thermographic surveys	<i>POC and REC, sustainable building</i>

## 5. PEEBPE

### 5.1 FINAL STUDIES

During the PEEBPE project ([www.peebpe.eu](http://www.peebpe.eu)), 25 public buildings in the Western Macedonia Region, Greece and 25 public buildings at the Pelagonia Region, the former Yugoslav Republic of Macedonia were submitted to detailed energy audit, with in-situ measurements. 50 Energy Efficiency Certificates (EEC) and proposals for their energy upgrade were derived. However, for two buildings (Primary School and Kindergarten) in Prespes, a final study and the tender were prepared. The proposed applied measures included: External Thermal Isolation, Thermal zones determination, heat pumps use, etc. Finally, the refurbishment of the building took place and the final, official EEC of the buildings categorize them at class B+.

The key for the success of the PEEBPE project was the Preliminary Work. Preliminary energy audit of the two buildings took place before proposal submission and three months before the official start date. Results of the preliminary work were the adjustment of the measurements and energy audit procedures to the special characteristics of the area's buildings and the better programming of the energy audits of the remaining buildings. The early energy audits of the two buildings in Prespes contributed to the better planning of the energy upgrade studies-procurement.

A representative building from the 25 of the Greek area is the Primary school of Agios Germanos-Prespes Municipality (Image 5.1).



**Image 5.1** The primary school in Agios Germanos - Prespes.

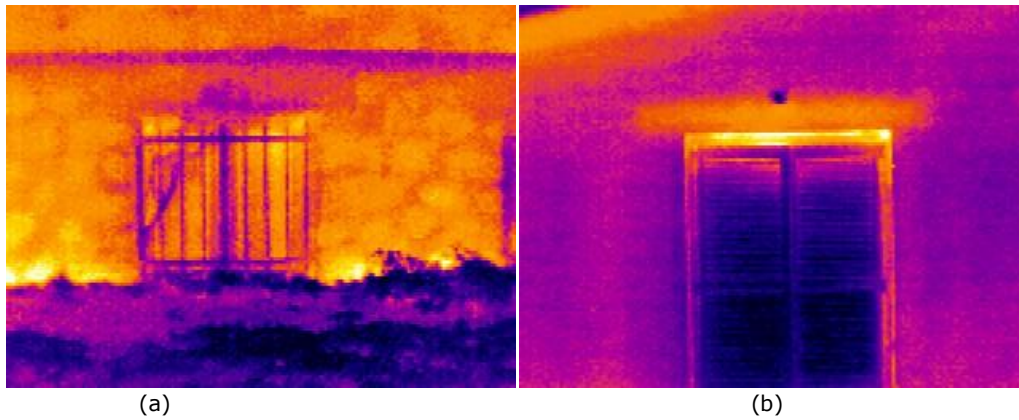
The public buildings of the Greek side are much smaller than those in FYROM, but they have been damaged and rebuilt or expanded at least once. These special characteristics have played an important role at the energy audit procedure and duration of the public buildings, even at the determination of the required equipment.

More specifically, since most of the in-situ measurements require cold weather (at least 10 degrees Celsius between the ambient and the building heated rooms), all 50 buildings had to be measured in two-winter periods, regardless of their size and in-homogeneities. Thus, the equipment that can be used in practice during the energy audits at the 50 public buildings includes:

- Photography camera with video capture option.
- IR camera with an option of concurrent image saving of IR and real pictures under the same name.
- Distance-meter.

- Thermal conductance measurements device (i.e. Hukseflux TRSys 01)
- Notebook with installed interface of the IR camera and the thermal conductance measurement device.
- GPS device
- Laser mini temperature meter.
- Humidity meter
- Light meter (Lux)
- Digital waste gas analyzer.

Since no plans exist for most of the buildings, the energy audit procedure includes architectural measurements in order to develop the plans of the buildings. Then, the IR camera is used to detect thermal bridges that cannot be defined by the architect plans. The building is scanned with the IR camera from the outside. It is recommended to scan the building from the inside too. For example, the Primary School of Agios Germanos was build using stone in 1922. The two floors were destroyed in 1946-49 and it was rebuilt using small, compact, solid brick in 1955. It was expanded to include toilettes in 1974 using armed concrete and another brick arrangement. Thus, for this school, at least three thermal conductance measurements sets are needed. The exact in-situ thermal conductance measurements procedure, the duration and the interpretation of the measurements are very demanding tasks. For example the selection of the position of the sensors on the material under study must fulfill certain conditions. The duration of the measurements can last from 3 hours up to 3 days, depending on the measured material, its thickness and the heat flow conditions through the material.

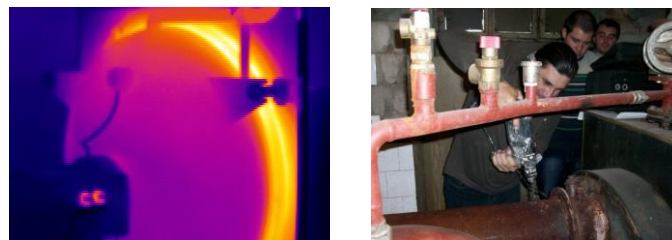


**Image 5.2** IR pictures of Agios Germanos school and Kindergarten.



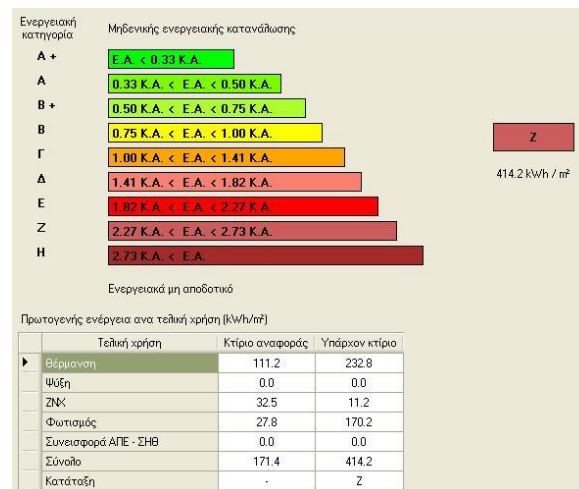
**Image 5.3** Thermal flow measurement sensors in action.

Next, the heating system efficiency is estimated by the digital waste gas analyzer, the IR-camera scanning of the heating unit and the grid. In Image 5.4, IR shots by a typical heating unit and the procedure for the application of the waste gas analyzer are shown.



**Image 5.4** Heating system efficiency estimation measurements.

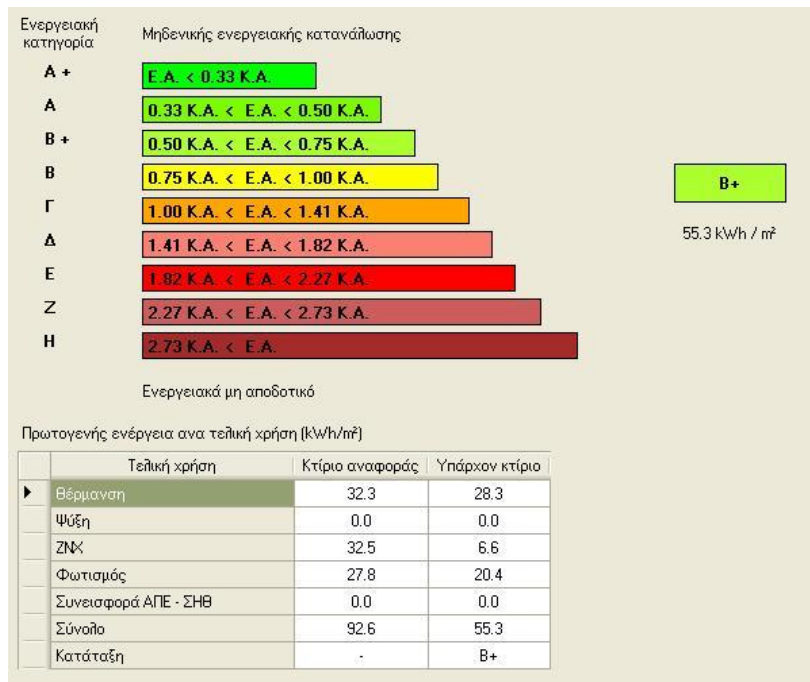
The EEC of the Primary school of Agios Germanos is shown in Image 5.5.



**Image 5.5** The EECs of the Primary school in Agios Germanos-Prespes-Greece, before energy upgrade.

The following interventions can upgrade this school from Z class to B+, as shown at the EEC of the same building, after the application of the interventions. These interventions were determined in an important degree by the available budget for this task.

- Installation of external thermal insulation – thickness 10cm.
- Redesign and construction of the heating network.
- Heat pump water-air.
- Installation of a smart heating management system (developed by the Technological Educational Institute of Western Macedonia)
- Replacement of illuminants with type led.
- Building energy management system (KNX).



**Image 5.6** The EECs of the Primary school in Agios Germanos-Prespes-Greece after the interventions.

Photographs from the construction are shown below:





**Image 5.7** Photographs from the construction procedure.

## 5.2 PROCUREMENT DOCUMENTS

The procurement documents did not include green specifications, since at that time the e-GPP tool was under development. Therefore the procurement documents included:

- The technical description
- The technical specifications
- The detailed measurements
- The study budget
- The study price list
- The detailed electromechanical study price list.
- The list of the obligations of the subcontractor
- The procurement procedure
- The form of the economical proposal
- The timeline programming form
- The safety and health plan

In the following pictures parts of the procurement documents are shown:



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΝΟΜΟΣ ΗΛΕΪΔΑΣ  
ΔΗΜΟΣ ΠΡΕΒΕΖΑΣ

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ  
ΝΟΜΟΣ ΗΛΕΪΔΑΣ  
ΔΗΜΟΣ ΠΡΕΒΕΖΑΣ

Εργ: ΕΝΕΡΓΕΙΑΚΗ ΑΝΑΒΑΘΜΙΣΗ ΔΗΜΟΤΙΚΩΝ ΚΤΙΡΙΩΝ

ΠΡΟΫΠΟΛΟΓΙΣΜΟΣ ΜΕΛΕΤΗΣ

Α/Α	Είδος Έργων	Α.Τ.	Τιμή Αποτίμησης	Τιμή ΕΤΕΚ	Αν. Μην.	Παύση	Τιμή Μηνιαία Εργασίας	Μηνιαίο Αποτίμηση	Ολική Αποτίμηση
1	Εργασίες	1	1.00	1.00	1.00	1.00	1.00	1.00	1.00
2	Εργασίες	2	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3	Εργασίες	3	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4	Εργασίες	4	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5	Εργασίες	5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
6	Εργασίες	6	1.00	1.00	1.00	1.00	1.00	1.00	1.00
7	Εργασίες	7	1.00	1.00	1.00	1.00	1.00	1.00	1.00
8	Εργασίες	8	1.00	1.00	1.00	1.00	1.00	1.00	1.00
9	Εργασίες	9	1.00	1.00	1.00	1.00	1.00	1.00	1.00
10	Εργασίες	10	1.00	1.00	1.00	1.00	1.00	1.00	1.00
11	Εργασίες	11	1.00	1.00	1.00	1.00	1.00	1.00	1.00
12	Εργασίες	12	1.00	1.00	1.00	1.00	1.00	1.00	1.00
13	Εργασίες	13	1.00	1.00	1.00	1.00	1.00	1.00	1.00
14	Εργασίες	14	1.00	1.00	1.00	1.00	1.00	1.00	1.00
15	Εργασίες	15	1.00	1.00	1.00	1.00	1.00	1.00	1.00
16	Εργασίες	16	1.00	1.00	1.00	1.00	1.00	1.00	1.00
17	Εργασίες	17	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18	Εργασίες	18	1.00	1.00	1.00	1.00	1.00	1.00	1.00
19	Εργασίες	19	1.00	1.00	1.00	1.00	1.00	1.00	1.00
20	Εργασίες	20	1.00	1.00	1.00	1.00	1.00	1.00	1.00
21	Εργασίες	21	1.00	1.00	1.00	1.00	1.00	1.00	1.00
22	Εργασίες	22	1.00	1.00	1.00	1.00	1.00	1.00	1.00
23	Εργασίες	23	1.00	1.00	1.00	1.00	1.00	1.00	1.00
24	Εργασίες	24	1.00	1.00	1.00	1.00	1.00	1.00	1.00
25	Εργασίες	25	1.00	1.00	1.00	1.00	1.00	1.00	1.00
26	Εργασίες	26	1.00	1.00	1.00	1.00	1.00	1.00	1.00
27	Εργασίες	27	1.00	1.00	1.00	1.00	1.00	1.00	1.00
28	Εργασίες	28	1.00	1.00	1.00	1.00	1.00	1.00	1.00
29	Εργασίες	29	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30	Εργασίες	30	1.00	1.00	1.00	1.00	1.00	1.00	1.00
31	Εργασίες	31	1.00	1.00	1.00	1.00	1.00	1.00	1.00
32	Εργασίες	32	1.00	1.00	1.00	1.00	1.00	1.00	1.00
33	Εργασίες	33	1.00	1.00	1.00	1.00	1.00	1.00	1.00
34	Εργασίες	34	1.00	1.00	1.00	1.00	1.00	1.00	1.00
35	Εργασίες	35	1.00	1.00	1.00	1.00	1.00	1.00	1.00
36	Εργασίες	36	1.00	1.00	1.00	1.00	1.00	1.00	1.00
37	Εργασίες	37	1.00	1.00	1.00	1.00	1.00	1.00	1.00
38	Εργασίες	38	1.00	1.00	1.00	1.00	1.00	1.00	1.00
39	Εργασίες	39	1.00	1.00	1.00	1.00	1.00	1.00	1.00
40	Εργασίες	40	1.00	1.00	1.00	1.00	1.00	1.00	1.00
41	Εργασίες	41	1.00	1.00	1.00	1.00	1.00	1.00	1.00
42	Εργασίες	42	1.00	1.00	1.00	1.00	1.00	1.00	1.00
43	Εργασίες	43	1.00	1.00	1.00	1.00	1.00	1.00	1.00
44	Εργασίες	44	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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46	Εργασίες	46	1.00	1.00	1.00	1.00	1.00	1.00	1.00
47	Εργασίες	47	1.00	1.00	1.00	1.00	1.00	1.00	1.00
48	Εργασίες	48	1.00	1.00	1.00	1.00	1.00	1.00	1.00
49	Εργασίες	49	1.00	1.00	1.00	1.00	1.00	1.00	1.00
50	Εργασίες	50	1.00	1.00	1.00	1.00	1.00	1.00	1.00
51	Εργασίες	51	1.00	1.00	1.00	1.00	1.00	1.00	1.00
52	Εργασίες	52	1.00	1.00	1.00	1.00	1.00	1.00	1.00
53	Εργασίες	53	1.00	1.00	1.00	1.00	1.00	1.00	1.00
54	Εργασίες	54	1.00	1.00	1.00	1.00	1.00	1.00	1.00
55	Εργασίες	55	1.00	1.00	1.00	1.00	1.00	1.00	1.00
56	Εργασίες	56	1.00	1.00	1.00	1.00	1.00	1.00	1.00
57	Εργασίες	57	1.00	1.00	1.00	1.00	1.00	1.00	1.00
58	Εργασίες	58	1.00	1.00	1.00	1.00	1.00	1.00	1.00
59	Εργασίες	59	1.00	1.00	1.00	1.00	1.00	1.00	1.00
60	Εργασίες	60	1.00	1.00	1.00	1.00	1.00	1.00	1.00
61	Εργασίες	61	1.00	1.00	1.00	1.00	1.00	1.00	1.00
62	Εργασίες	62	1.00	1.00	1.00	1.00	1.00	1.00	1.00
63	Εργασίες	63	1.00	1.00	1.00	1.00	1.00	1.00	1.00
64	Εργασίες	64	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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66	Εργασίες	66	1.00	1.00	1.00	1.00	1.00	1.00	1.00
67	Εργασίες	67	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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69	Εργασίες	69	1.00	1.00	1.00	1.00	1.00	1.00	1.00
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71	Εργασίες	71	1.00	1.00	1.00	1.00	1.00	1.00	1.00
72	Εργασίες	72	1.00	1.00	1.00	1.00	1.00	1.00	1.00
73	Εργασίες	73	1.00	1.00	1.00	1.00	1.00	1.00	1.00
74	Εργασίες	74	1.00	1.00	1.00	1.00	1.00	1.00	1.00
75	Εργασίες	75	1.00	1.00	1.00	1.00	1.00	1.00	1.00
76	Εργασίες	76	1.00	1.00	1.00	1.00	1.00	1.00	1.00
77	Εργασίες	77	1.00	1.00	1.00	1.00	1.00	1.00	1.00
78	Εργασίες	78	1.00	1.00	1.00	1.00	1.00	1.00	1.00
79	Εργασίες	79	1.00	1.00	1.00	1.00	1.00	1.00	1.00
80	Εργασίες	80	1.00	1.00	1.00	1.00	1.00	1.00	1.00
81	Εργασίες	81	1.00	1.00	1.00	1.00	1.00	1.00	1.00
82	Εργασίες	82	1.00	1.00	1.00	1.00	1.00	1.00	1.00
83	Εργασίες	83	1.00	1.00	1.00	1.00	1.00	1.00	1.00
84	Εργασίες	84	1.00	1.00	1.00	1.00	1.00	1.00	1.00
85	Εργασίες	85	1.00	1.00	1.00	1.00	1.00	1.00	1.00
86	Εργασίες	86	1.00	1.00	1.00	1.00	1.00	1.00	1.00
87	Εργασίες	87	1.00	1.00	1.00	1.00	1.00	1.00	1.00
88	Εργασίες	88	1.00	1.00	1.00	1.00	1.00	1.00	1.00
89	Εργασίες	89	1.00	1.00	1.00	1.00	1.00	1.00	1.00
90	Εργασίες	90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
91	Εργασίες	91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
92	Εργασίες	92	1.00	1.00	1.00	1.00	1.00	1.00	1.00
93	Εργασίες	93	1.00	1.00	1.00	1.00	1.00	1.00	1.00
94	Εργασίες	94	1.00	1.00	1.00	1.00	1.00	1.00	1.00
95	Εργασίες	95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
96	Εργασίες	96	1.00	1.00	1.00	1.00	1.00	1.00	1.00
97	Εργασίες	97	1.00	1.00	1.00	1.00	1.00	1.00	1.00
98	Εργασίες	98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
99	Εργασίες	99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
100	Εργασίες	100	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Τεχνικό Μέγεθος: Σελίδα 15

ΕΥΡΩ (Αριθμητικό) :12.96  
(Ολοκλήρωση) :ΔΩΔΕΚΑ ΚΑΙ ΕΝΕΗΝΗΤΑ ΕΞΙ ΛΕΠΤΑ

Α.Τ. :4.11  
Αρθρο:ΑΤΗ Ν9767.3 Σωληνώσεις από πολυπροπυλένιο 3ης γενιάς (PP-R30), ενδεικτικό τύπου FASER, ονομ. διαμέτρου DN25 Κωδικός αναθεώρησης: H/M B 100%

Σωληνώσεις από πολυπροπυλένιο RANDON (PP-R30), τρίτης γενιάς, ενδεικτικό τύπου FASER, κατά DIN 8077-76, SKZ A 314 και SYOK, ελατ. διαμέτρου Φ32mm / ονομ. πίεσης PN 25 κτμ με όλα τα απαραίτητα μικροβιολογικά συνδέσμους και εγκαταστάσεις. Περιλαμβάνονται η προμήθεια, μεταφορά και εγκατάσταση καθώς και οι δοκιμές για παράδοση σε πλήρη και κανονική λειτουργία.

Τιμή ανά τρέχον μέτρο (m).

ΕΥΡΩ (Αριθμητικό) :13.96  
(Ολοκλήρωση) :ΔΕΚΑ ΤΡΙΑ ΚΑΙ ΕΝΕΗΝΗΤΑ ΕΞΙ ΛΕΠΤΑ

Α.Τ. :4.12  
Αρθρο:ΑΤΗ Ν9767.6 Σωληνώσεις από πολυπροπυλένιο 3ης γενιάς (PP-R30), ενδεικτικό τύπου FASER, ονομ. διαμέτρου DN50 Κωδικός αναθεώρησης: H/M B 100%

Σωληνώσεις από πολυπροπυλένιο RANDON (PP-R30), τρίτης γενιάς, ενδεικτικό τύπου FASER, κατά DIN 8077-76, SKZ A 314 και SYOK, ελατ. διαμέτρου Φ32mm / ονομ. πίεσης PN 25 κτμ με όλα τα απαραίτητα μικροβιολογικά συνδέσμους και εγκαταστάσεις. Περιλαμβάνονται η προμήθεια, μεταφορά και εγκατάσταση καθώς και οι δοκιμές για παράδοση σε πλήρη και κανονική λειτουργία.

Τιμή ανά τρέχον μέτρο (m).

ΕΥΡΩ (Αριθμητικό) :21.43  
(Ολοκλήρωση) :ΕΙΚΟΣΙ ΕΝΑ ΚΑΙ ΣΑΡΑΝΤΑ ΤΡΙΑ ΛΕΠΤΑ

Α.Τ. :4.13  
Αρθρο:ΑΤΗ Ν9967.2 Σωληνέες διανομής Κωδικός αναθεώρησης: H/M B 100%

Οριζόντιες σωληνέες 4" διαμέτρου για το δίκτυο θέρμανσης ενδοκαπτείας από αμιαντοκλωστή για την εξυπηρέτηση 14 κυκλοσφαιρών, σύμφωνα με τις προδιαγραφές, με τα απαραίτητα άγκιστρα στερεώσεως, με τα απαραίτητα υλικά και μικροβιολογικά για πλήρη εγκατάσταση, σύνδεση προς τα δίκτυα και παράδοση σε λειτουργία. (1 τεμ)

Τιμή ανά τεμάχιο (τεμ)

ΕΥΡΩ (Αριθμητικό) :500.00  
(Ολοκλήρωση) :ΤΡΙΑΚΟΣΙΑ

Ομάδα Ε: Επιστρώσεις, επιστρώσεις

Α.Τ. :5.01  
Αρθρο:ΟΙΚ Α173.16.02 Επιστρώσεις με πλάκες τοιμάτων, πλινθιάς άνω των 30 cm Κωδικός αναθεώρησης: ΑΤΟΕ 7316 100%

Επιστρώσεις με πλακόν τοιμάτων πλινθιάς άνω των 30 cm και πάχους 3 έως 5 cm, κατά ΕΛΟΤ ΕΝ 1336, με αρμούς αλάτους έως 5 mm, και υποστρώματος πάχους 2 cm, από τσιμεντοσφαιρικό τσιμεντοκονία των 350 kg τοιμήνιου και 6,04 m³ σφάτεως, με τα υλικά, πλάκες, τσιμεντοκονίαμα κλπ επί τόπου και την εργασία πλήρους κατασκευής.

Επιστρώσεις με πλάκες τοιμήνιου πλινθιάς άνω των 30 cm.

Τεχνικό Μέγεθος: Σελίδα 17

Τιμή ανά τετραγωνικό μέτρο (m²).

ΕΥΡΩ (Αριθμητικό) :13.50  
(Ολοκλήρωση) :ΔΕΚΑ ΤΡΙΑ ΚΑΙ ΠΕΝΗΝΤΑ ΛΕΠΤΑ

Α.Τ. :5.02  
Αρθρο:ΟΙΚ Α75.31.01 Ποδές παροχέων από μάρμαρο μαλακό, πάχους 2 cm Κωδικός αναθεώρηση

### 5.3 PARTICIPATION IN GRASPINNO

The Regional Authority of Grevena has approved funding and has assigned to TEIWM to investigate the energy upgrade possibilities of 24 schools at the Grevena Prefecture and to prepare the final studies for their refurbishment. In at least five (5) of the 24 school buildings, the personnel of TEIWM will also use the e-GPP tool in an advisory way in order to prepare a green tender via the TIP/TDT documents that derive from it.

Moreover, in planned projects on energy upgrade of public buildings, the synergy with GRASP project is declared by the commitment to proceed to preparation of green tenders.

## 6. BIOFOSS

### 6.1 FINAL STUDIES

During the BIOFOSS project ([www.biofoss-project.eu](http://www.biofoss-project.eu)), three main outputs are derived:

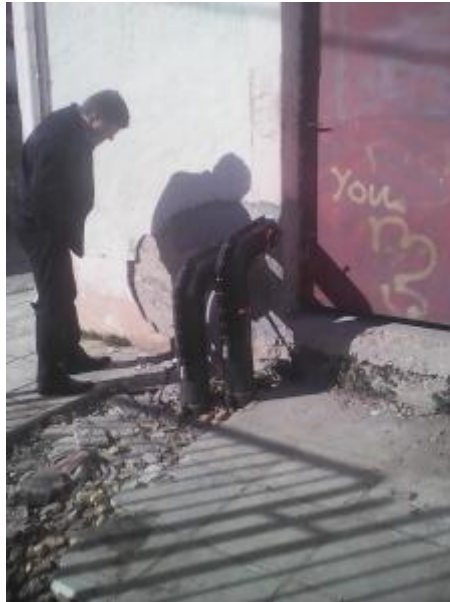
- 1) **The final study for the installation of a biomass unit for the district heating needs of the Amyntaio region (Amyntaio, Filotas, Levaia).** This study will contribute decisively in the gradual substitution of the thermal energy that is now supplied by the Public Power Corporation lignite unit of Amyntaion/Filota with the thermal unit by biomass unit (up to 40 MWth).
- 2) **Small biomass district heating system for public buildings:** The interventions at the Highschool and Elementary School of Lechovo will demonstrate the operation of a small biomass district heating unit for two public buildings. The tender was prepared without taking into account green criteria. The following are the photographs of the schools before the interventions:



**Image 6.1** Elementary school and Highschool of Lechovo

According to the energy efficiency studies, the expected operational cost savings can reach 60 %.

The photographs during the constructions follow:



**Image 6.2** The pipes from the biomass boiler enter the gymnasium.



**Image 6.3** The piles from the biomass boiler enter the primary school of Lechovo.



**Image 6.4** The four pipes going out of the boiler building.



**Image 6.5** The container that hosts the biomass unit equipment.





**Image 6.6** The equipment inside the container.

### 3) **Energy profiling and potential of installing biomass district heating systems:**

In order to assist to the task of the energy profiling of the buildings of the cross-border region at Amyntaio region, visits and questionnaires surveys were carried out for each village of Amyntaio municipality. The following deliverables are produced from the above research:

Deliverable - Identification of barriers for household use of biomass.

Deliverable - Guide for biomass use for house hold and public building heating purposes.

From the above results and the energy profiling of local buildings, the preliminary studies for installing biomass-based district heating systems at 22 villages are produced.

A small example of the design of the district heating of each village is shown at Image 6.7 below:

## ΠΑΡΑΔΕΙΓΜΑ ΟΙΚΙΣΜΟΥ ΒΑΛΤΟΝΕΡΩΝ

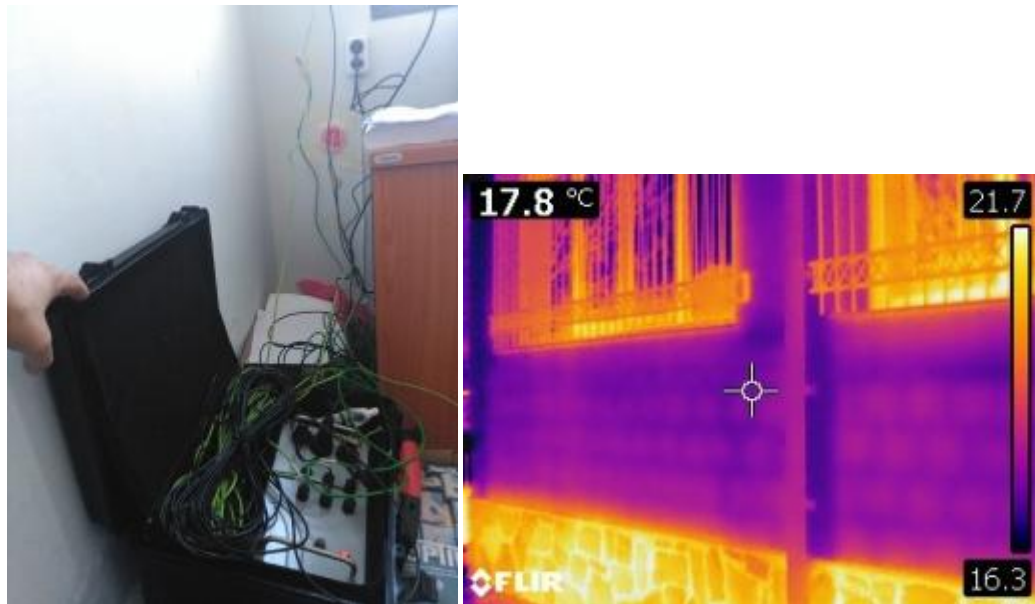
### ΕΚΤΙΜΗΣΗ ΠΡΟΫΠΟΛΟΓΙΣΜΟΥ

ΠΡΟΤΕΙΝΕΤΑΙ ΔΙΚΤΥΟ 3730m



**Image 6.7** The design of the biomass district heating system of a village in Amyntaio area.

Finally, 15 buildings were audited in terms of energy efficiency, after obtaining their architectural plans. They all have their own complete electronic file and booklet of the current energy efficiency status and the proposed interventions for energy upgrade. Some photographs from the measurements follow:



**Image 6.8** Measurements from the energy audit procedure at 15 public buildings at the Amyntaio area.

## 6.2 PROCUREMENT DOCUMENTS

The procurement documents did not include green specifications, since at that time the e-GPP tool was under development. Therefore the procurement documents included:

- The proposals evaluation criteria (At this document, the e-GPP tool could be useful for the utilization of Green Criteria also)
- The list of the obligations of the subcontractor
- The technical description
- The detailed quantities measurements
- The technical specifications
- The study budget
- The procurement procedure
- The timeline programming form
- The economical proposal form



## 6.3 PARTICIPATION IN GRASPINNO

In planned projects on energy upgrade of public buildings, the synergy with GRASP project is declared by the commitment to proceed to preparation of green tenders. One of them includes the construction of a biomass district heating system for a group of public buildings.

Moreover, the Regional Authority of Grevena has approved funding and has assigned to TEIWM to investigate the energy upgrade possibilities of 24 schools at the Grevena Prefecture and to prepare the final studies for their refurbishment. In at least five (5) of the 24 school buildings, the personnel of TEIWM will also use the e-GPP tool in an advisory way in order to prepare a green tender via the TIP/TDT documents that derive from it.

## 7. PEPPOL/ePRIOR GUIDANCE AND CONSOLIDATION

### 7.1. PEPPOL OPEN PLATFORM

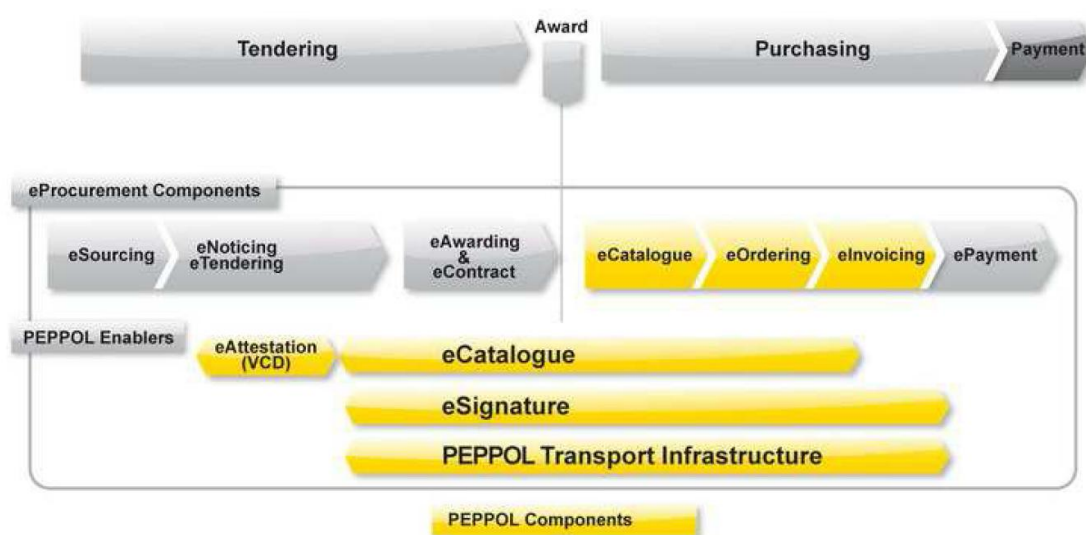
PEPPOL, “Pan-European Public Procurement On-Line”, is an initiative that was launched in May 2008 within the framework of the European Program for Innovation and Competition (CIP) by the European Commission and the PEPPOL Consortium members.

The PEPPOL consortium was comprised of seventeen partners (mostly leading public eProcurement agencies) within 11 countries: Austria, Denmark, Finland, France, Germany, Greece, Italy, Norway, Portugal, Sweden, and the United Kingdom. PEPPOL’s aim was to simplify the electronic procurement across the borders by developing technology standards that could be implemented across all governments within Europe. The overall objective was to enable businesses to communicate electronically with any European government institution in the procurement process, increasing efficiency and reducing costs.

Through agreement on specifications for cross-border procurement processes, the PEPPOL project has contributed to the development of a pan-European, standards-based IT infrastructure. PEPPOL has not replaced, but built upon, the existing strengths of national eProcurement systems by using information and communication technologies to enable them to connect with each other.

### 7.1.1 Description and functionalities

According to the “i2010 e-Government Action Plan”<sup>1</sup>, the high-level take-up of public e-Procurement is highly desirable for Europe. Its widespread usage could result in savings in total procurement costs of around 5% and reductions in transaction costs of 10% or more. As a final effect, this could lead to savings of tens of billions of euro annually and easier access to public procurement markets for SMEs.



**Image 7.0.1** Graphic describing key PEPPOL components and how they are incorporated in the procurement process. PEPPOL facilitates the pre-award and post-award procurement process with standardised components by focusing on the most complex eProcurement elements (marked yellow in the graphic above).

The Pan-European Public Procurement Online (PEPPOL) is a large scale pilot focusing on cross-border e-procurement, enabling European businesses to easily deal electronically with any European public sector buyers in their procurement processes. PEPPOL aims to

<sup>1</sup> i2010 government Action Plan, 2006, European Commission

support governments, businesses and SMEs to adopt e-invoicing and e-procurement solutions that work seamlessly across Europe. At the heart of PEPPOL is an electronic transport infrastructure allowing governments and companies to connect their IT systems and reliably exchange data and business documents. PEPPOL's most prominent feature is that it enables trading partners to exchange standards-based electronic documents over the PEPPOL network, promoting interoperability across Europe, digital economy and the European single-market. It is also worth noting that through the "Single market act II"<sup>2</sup> the European Commission has initiated a process for making e-invoicing the standard invoicing mode for public procurement. PEPPOL is not an e-Procurement platform but instead provides an open and expandable transport network, some centralised directory and validation services, and a set of specifications for organisations or their service providers to adopt in order to exchange electronic information/documents seamlessly – within or across industries, regions, or borders. PEPPOL's success is based on a modular building block approach, where organisations can grow their PEPPOL usage together with their expanding capabilities in e-procurement. For example, businesses and government agencies can start with e-invoicing, and later extend to e-catalogues and e-orders.

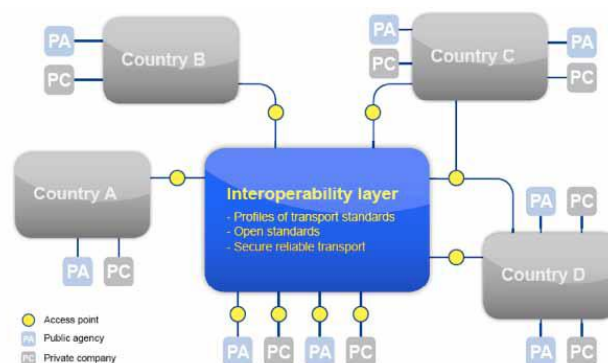
PEPPOL is based on three major pillars:

- The network (PEPPOL Transport Infrastructure).
- The document specifications (PEPPOL Business interoperability Specifications -BIS).
- The legal framework that defines the network governance (PEPPOL Transport Infrastructure Agreements).

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<sup>2</sup> Single Market Act II, 2012, European Commission

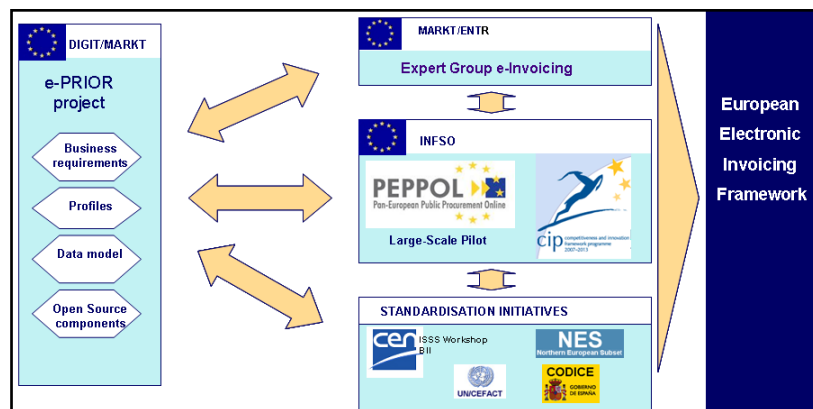
PEPPOL enables access to its network through Access Points, which exchange standardised electronic documents based on the PEPPOL BIS. A key feature of the PEPPOL network (based on a 4-corner model), is the freedom for suppliers to engage with an Access Point provider of their choice, to send and receive electronic documents with any organization in the PEPPOL network through one single source, eliminating complex relationships with buyers, their service providers and related obligations. The network is governed by the PEPPOL Transport Infrastructure Agreements establishing a many-to-many legal framework instead of the traditional bilateral agreements entered into between service providers. The documents are routed through Access Points and the Receiver's capabilities can be discovered by using the PEPPOL Service Metadata Publisher (SMP) services.



**Image 7.0.2** PEPPOL open 4 corner model. Access to the PEPPOL network is open to any contracting authority and economic operator in Europe. Communication takes place between two Access Points, respectively for the sender and the recipient organisation.

PEPPOL has also developed the Business Interoperability Specifications (BIS) for common e-Procurement processes such as e-Catalogue, e-Orders, e-Despatch Advices and e-Invoices to standardize electronic documents exchanged and validated through

an open and secure network, between sending and receiving Access Points for public sector buyers and their suppliers across Europe. PEPPOL has not developed new standards but has used the CEN BII results to develop implementation guidelines, known as PEPPOL BIS, that can be embedded in e-Procurement and e-Invoicing systems, to support interoperability across Europe. The PEPPOL BIS are formal requirements to ensure pan European interoperability of procurement documents, such as e-Invoices.



**Image 7.0.3** Having in mind the objective of Pan European Interoperability, the e-PRIOR project has taken active and continuous participation in EU standardization efforts such as the Expert Group on e-Invoicing of DG-MARKT, the PEPPOL project and the CEN/ISSS Workshop on 'Business Interoperability Interfaces on public procurement in Europe' (a.k.a. WS/BIII)

## 7.2 e-PRIOR SUPPLIER PORTAL

It was launched in September 2010 and hosted an e-Request module allowing Suppliers to process all electronic service requests issued by the Commission. It is the e-Procurement solution of the European Commission and enables the communication between the Public Administration and Suppliers of any size. The e-PRIOR tool, is an open-source eProcurement platform, to help suppliers to connect to

the PEPPOL network and deploy eProcurement services while reducing the cost of your investment. e-PRIOR is the solution used by the European Commission, the European Union Agencies and Institutions, and their suppliers.

The next challenge of the European Commission is to stimulate the take-up of cross border electronic procurement by Member States' administrations by using e-PRIOR as a 'bridge' to facilitate and accelerate European Public Administrations' connection to PEPPOL.

Together, the PEPPOL and e-PRIOR projects represent a significant opportunity for Europe to boost the use of eProcurement. This project will enable public administrations to get connected to PEPPOL easily, making use of the tried and tested e-PRIOR platform (which embeds a PEPPOL gateway).

### **7.2.1 Description and functionalities**

e-PRIOR (electronic Procurement, Invoicing and Ordering) is the acronym of the service oriented platform developed by DIGIT to enable the exchange of business documents between Public Authorities and their Suppliers. This is an information system that implements the emerging standards in the e-Procurement area. Furthermore, in addition to the proprietary system developed for the DIGIT infrastructure, an open-source version of this platform is also available to the Member States (i.e. Open e-PRIOR).

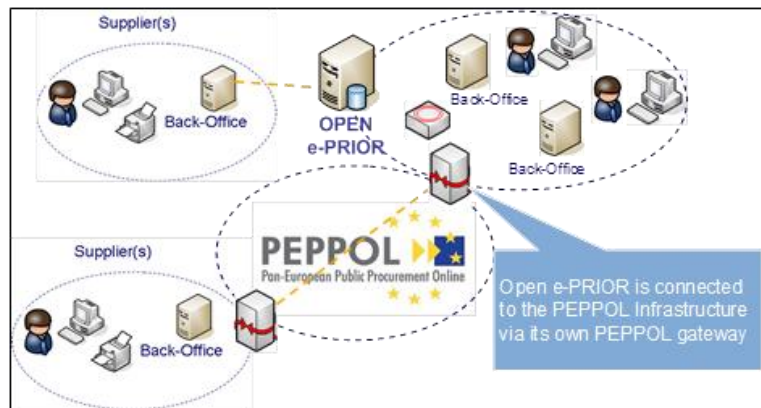
E-prior open-source e-Procurement solution covers the whole post-awarding cycle of e-procurement: e-Catalogue, e-Ordering, e-Fulfilment and e-Invoicing. Since March 2014, e-PRIOR has also provided an e-Submission module as part of the pre-award cycle, with tools allowing economic operators to prepare and submit tenders

for a published call for tender, and contracting authorities to receive and handle such electronic tenders.

Open e-PRIOR, in particular, is an enterprise e-Procurement application aiming at making available, via electronic means, several services related to the post-awarding stages of public procurement (i.e. e-Catalogues, e-Ordering and e-Invoicing); offering at the same time the same functionalities as e-PRIOR and its own PEPPOL Gateway.

When used jointly, the PEPPOL and e-PRIOR systems become key enablers of end-to-end trusted information exchange and semantic interoperability. Open e-PRIOR enables Public Authorities to execute their procurement processes electronically. To make this possible, the Suppliers of the Public Authority use the electronic services of Open e-PRIOR, via machine-to-machine interactions.

Open e-PRIOR plays the role of intermediary between the external world and the back-office applications of the Public Authority. Open e-PRIOR is designed to interoperate and connect with a large number of applications of heterogeneous nature by exchanging e-documents enclosed within the body of an e-message. To be interoperable, these documents must be capable of being automatically and unambiguously processed. Therefore, every exchanged document must respect a set of pre-agreed standards. Open e-PRIOR implements a number of profiles of the CEN/ISSS WS/BII. In current open e-PRIOR versions, partial support for the LIME profile (Send documents only) between lightweight clients and PEPPOL Access Points has been also added.



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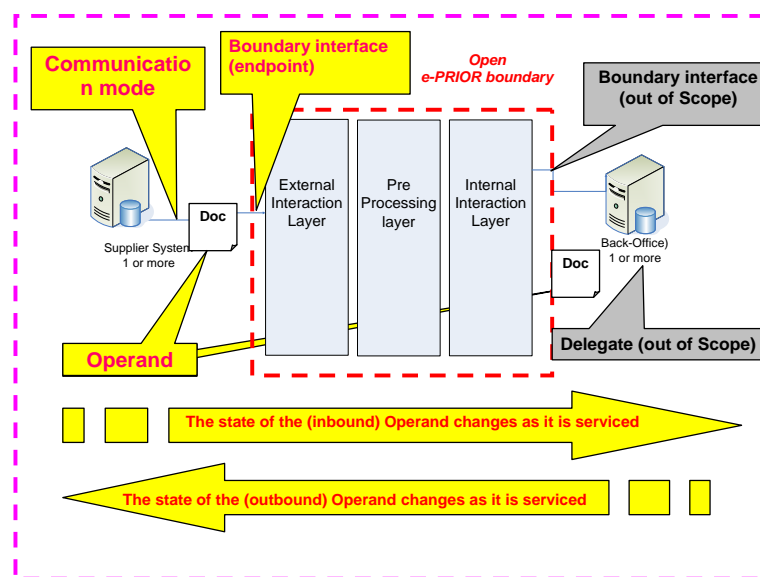
**Image 7.0.1** Open e-PRIOR and PEPPOL integration. Open e-PRIOR is designed to interoperate with a large number of applications of heterogeneous nature. Open e-PRIOR is connected to the PEPPOL infrastructure via its own PEPPOL gateway. This enables the Public Authority to exchange electronic documents via the PEPPOL infrastructure.

The key architectural problem which Open e-PRIOR aims at solving is the interoperability between the internal systems of the Public Authorities and the broad collection of systems used by their Suppliers. The business purpose is the exchange of information related to specific post-awarding business processes. The Open e-PRIOR platform is composed by a set of cooperating layers, each of which deals with the tasks described below:

External Interaction Layer, implements the end-points which interact with the Suppliers' Information Systems. Additionally, the PEPPOL connector of Open e-PRIOR will connect its Gateway to this layer.

- Pre-Processing Layer, implements the application of a number of business rules on the documents to be exchanged.
- Internal Interaction Layer, implements the end-points which interact with the Back-Offices of the Public Authorities.

Each layer uses the functions implemented by the other. This separation of responsibilities among layers provides the flexibility and robustness required by a system positioned right in-between the back-office of the Public Authorities and the Information System(s) of the Supplier. The figure below depicts the high-level conceptual architecture of Open e-PRIOR.



**Image 7.0.2** High level architecture of the Open e-PRIOR system. System Operand, Boundary and Communication mode.

## 7.2. PARTICIPATION IN GRASPINNO

GRASPINNO may investigate the possibility of integrating in its system a gateway giving easy access to the digital infrastructures provided by PEPPOL/e-PRIOR. By exploiting PEPPOL's and e-PRIOR's facilitation of e-commerce and cross-border electronic public procurement, GRASPINNO's impact will be significantly improved. GRASPINNO also aims to incorporate the experience gained from developing e-procurement platforms such as PEPPOL, e-PRIOR, as well as incorporate elements inspired by their actual system-architecture.

Furthermore, GRASPINNO draws inspiration in its development from EU's "i2010 e-Government Action Plan" as well as its "Single market act II". GRASPINNO sets out to fulfil the goals envisioned in the aforementioned plans for high-level take-up of cross-border e-Procurement services, eliminating barriers to the single market due to fragmentation and lack of interoperability. The aforementioned goals have also been the reason behind the development of the complementary tools that are PEPPOL and e-PRIOR.

However, PEPPOL can't be used as a platform on which GRASPINNO Partners can realize their e-procurement processes. PEPPOL enables only access to its standards-based IT transport infrastructure through access points, and provides services for eProcurement with standardised electronic document formats. It is a European project that defines specifications at EU level in e-procurement.

PEPPOL can be useful only partially in an eventual platform on which GRASPINNO Partners can realize their e-procurement processes.

Peppol enables only access to its standards-based IT transport infrastructure through access points. It is a European project that defines specifications at EU level in e-procurement. In case partners are willing to use PEPPOL, they should verify if their current national and regional e-procurement systems need to be modified to interoperate with PEPPOL Standards. Further, Graspinno Public authorities (buyers) should decide to implement an Access Point for their organisation or engaged it with a particular service provider who wishes to become a PEPPOL Access Point Provider.

It should be stressed, however, that, **in case of absence of a national local e-platform, the PEPPOL-ePRIOR system could be USED as done, for instance, by national and federal governments of Belgium.**

That said, for public sector authorities PEPPOL is enable to reduce the complexity of administrative procedures and provides opportunities for greater supplier competition, lowering sourcing costs.

In the pre-award phase, PEPPOL supports the public tender process with:

- validation of eSignatures based on electronic certificates issued by authorities
- Virtual Company Dossier to submit standardised company information (evidence, certificates and attestations)
- eCatalogue to submit offers about goods and services in a standardised format

In the post-award process, PEPPOL covers:

- eCatalogue to exchange information about goods and services offered under the contract
- eOrders and eInvoicing providing the buyer and suppliers with defined procedures to share common business information
- Transport Infrastructure (PEPPOL network), the foundation of all PEPPOL post-award services, based on common, national IT compatible standards and interconnecting eProcurement communities

In this way, PEPPOL can solve specific problems relating to the creation, verification and acceptance of e-signatures accompanying e-procurement documents, to enable cross border signature validation. On the other hand, for suppliers PEPPOL can facilitates access to public sector authorities across Europe taking advantage of PEPPOL Access Points, entering into only one agreement to reach all the buyers in the PEPPOL network.

As e-prior and PEPPOL are complementary and every supplier connected to the PEPPOL network is automatically connected to e-PRIOR, the above considerations should be taken into account. For the private sector involved in Graspinno pilots, e-PRIOR will serve as a learning tool for private companies to develop their own eProcurement commercial solutions, based on European standards.

Towards European Public Administration, e-prior open platform can provide them to **switch to invoicing or eProcurement**, or a system integrator working on an eProcurement approach for a European administration. Last, it allows sharing of practical experience and lessons learned.

## 8. BEST PRACTICES IDENTIFIED BY OTHER RELATED PROJECTS

Great experience and best practice were identified by PEEBPE, BIOFOSS projects and energy audit of at least 50 more public buildings in the Region of West Macedonia. Projects for energy upgrade of public buildings or else for refurbishment of public buildings with priority their energy savings, consist of the following steps:

- a) Energy audit of the public building which aims in issuing an unofficial Energy Efficiency Certificate together with proposals for its energy upgrade and observations on possible problems on the operation of the building. This step is very important for the sustainability of the project. Therefore it should be based as much as possible in measurements, in order to be accurate and reliable. The official Energy Efficiency Certificate of the building should be issued after the refurbishment of the building.
- b) Development of the call for tender / procurement documents, which are accompanied by certain techno-economic criteria-specifications that aim at the best energy upgrade interventions that could be applied at the certain building.
- c) Implementation of the energy upgrades interventions, supervision of the works and operation monitoring.

All these stages require funding by the public building owners (municipalities or other public organizations). Experience showed that the greatest difficulty is found at the first two stages, which,

however, are mandatory before the desired third step is accomplished.

These difficulties come up due to the following reasons:

a) Both steps require technical skills and special equipment by the respective engineers, which are not found among the personnel of the municipalities. And that is reasonable since they are newly-introduced skills and equipment that the technical personnel is not obliged to acquire. Moreover, the municipalities do not have the necessary budget to take over the education of their personnel on these issues.

b) Therefore, external experts have to handle these first two steps. The problem again is the lack of available economic sources by the municipalities to cover the expenses of external expertise. In order to prove that this is an important obstacle, the following example is presented: Only the first step (Issuance of the energy efficiency certificate) for a typical public building of 5.000 m<sup>2</sup> costs at least 1 €/m<sup>2</sup>. If the second step is considered also, the cost for both steps for an efficient energy upgrade of such a building can reach up to 20.000 €.

c) In view of the commitment to transform public buildings after 2019 to almost-zero emission buildings, the inclusion of new energy efficient technologies, such as heat pumps, Building Automation Systems (BAS) devices, monitoring devices, etc, in the call for tender documents becomes necessary. However, it is extremely difficult, due to old specifications of the relevant laws. New materials database and consequently e-procurement procedures are necessary (GRASP) more than ever.

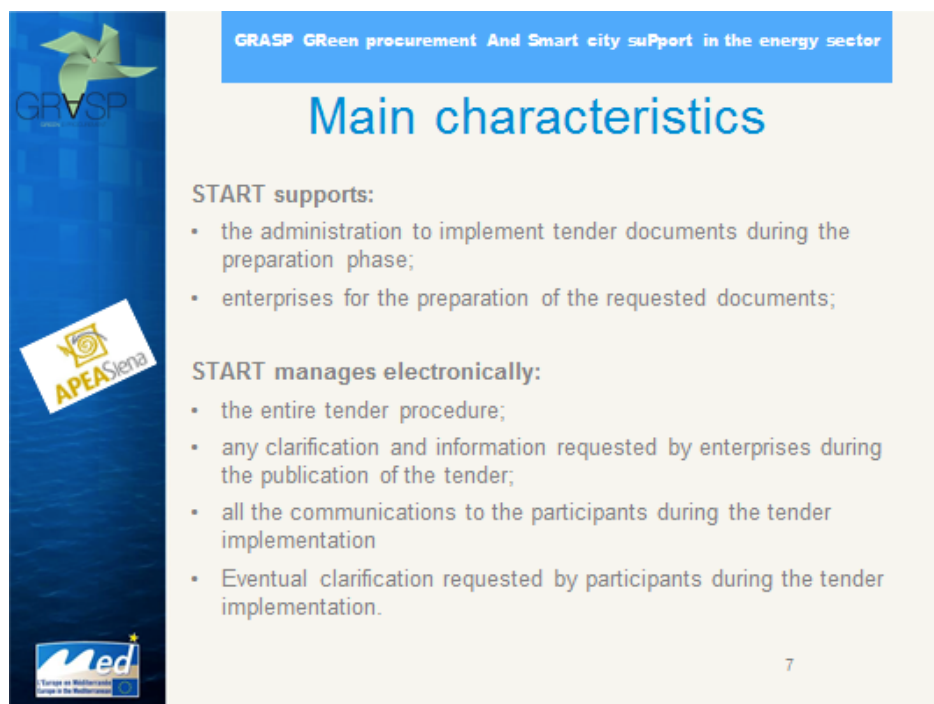
Moreover, important experience was gained by PEPPOL and ePRIOR results. For GRASP (Green procurement and smart city support) and START (Sistema Telematico Acquisti Regionale della Toscana) projects, an advanced green transnational procurement system has been developed, empowering cooperation between MED public administrations and SMEs.

GRASP and START have proved that the existence of a common procurement model featuring e-procurement (embodying services such as e-tendering, online auctions, e-marketplaces/catalogues, e-Evaluation, e-awarding e-Contracting, e-Ordering, e-Invoicing, e-Payment etc.) taking also into account "green" extensions of products/services, can lead in a reduction of both direct and indirect costs. Such a model can also promote the adoption of innovative solutions in the energy sector. The procedures of the model should cover all phases of the supply cycle and of the transaction, integrating at the same time solutions that automate, monitor and control the processes of green procurement in the best possible way for the public bodies and the suppliers. The model should, also, adhere to the following:

1. Existence of a website that provides general information and on-line forms for a tender.
2. Searchable databases and complete online forms.
3. Two-way communication with the respective suppliers and safe introduction of suppliers' confidential data.
4. Sharing of certified data with other services, with the condition that there is consent from the part of suppliers.

The public procurement policy should aim at the creation of a transparent and competitive environment that will allow the supply of

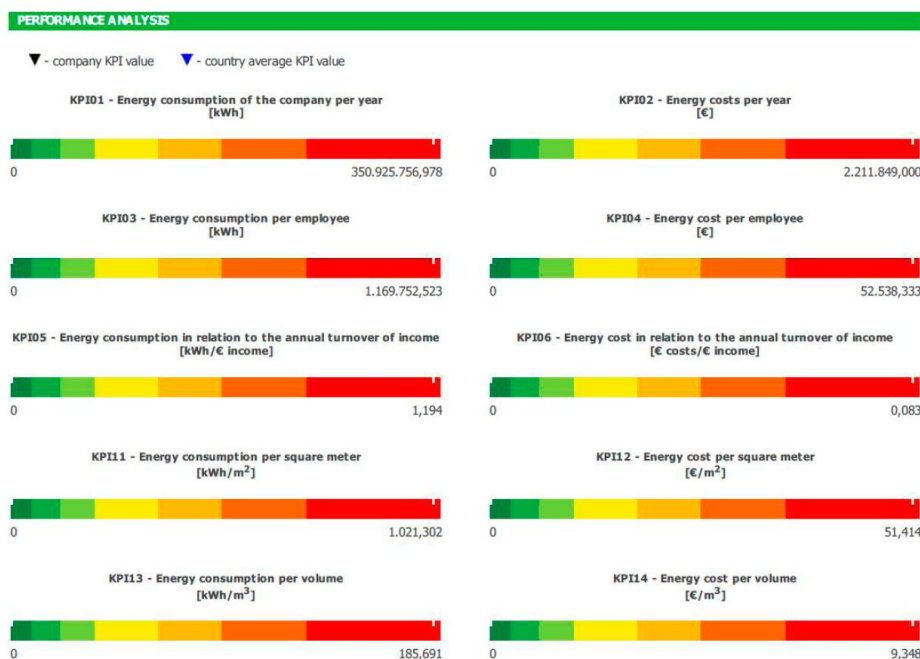
goods and services, on behalf of public bodies, in a way which ensures the best economic terms. In this context, the adoption, in practice, of electronic public procurement systems contributes in a greater transparency to the public money expenses, in the creation of an integrated market, in the open access to bidding information, in the faster processing and evaluation of tenders, in the reduction of bureaucracy and costs for the acquisition/supply of products/services. This means that if an e-procurement system is generalized, it can be saved up to 5% of the public expenditure and up to 50-80% of transaction costs for both the buyers (Public Sector) and their suppliers.



**Image 8.1** GRASP-START main features and characteristics

CO-EFFICIENT and PEEBPE, projects have also shown that the capacity of SMEs to enter the green energy market can be strengthened by networking; capitalizing on their knowledge; and alerting local authorities to the need for reducing energy consumption

in public buildings. This effort was supported by Living Labs that have been used to integrate innovation processes, create a user-centered open innovation ecosystem, and ultimately strengthen transnational cooperation and networking amongst existing clusters/networks-of-networks of GEM eco-innovation. The effort has been also supported through targeted dissemination of the state-of-the-art and know-how in the field of innovative energy refurbishment. The analytical tool that was developed from the CO-EFFICIENT program, aiming at improving Energy efficiency on SME level, has integrated a lot of the best practices that have been previously identified and analysed in the industry<sup>3</sup> (e.g. Renovation of protected buildings, heat recovery, CO<sub>2</sub> emission reduction, Energy self-sufficient buildings etc.)



**Image 8.2** Performance analysis of SME with respect to its energy consumption. The analysis provides KPIs with the intention of improving energy efficiency and to promote the use of renewable energy.

<sup>3</sup>Collaborative framework for energy EFFICIENT SME systems (CO-EFFICIENT), WP 5, Output 5.6: eHandbook, 2015

PEPPOL and e-PRIOR highlight the importance of the high-level take-up of public e-Procurement for Europe. Its widespread usage could result in savings of tens of billions of euro annually and easier access to public procurement markets for SMEs. e-PRIOR uses the standardised electronic procurement documents, based on the Business Profiles defined by CEN's workshop on Business Interoperability Interfaces for Public Procurement in Europe. e-PRIOR also supports the integration of multiple suppliers with possibly multiple back-offices of a contracting authority and is connected to the PEPPOL infrastructure. Open e-PRIOR interoperates with a large number of applications of heterogeneous nature by exchanging e-documents enclosed within the body of an e-message. PEPPOL supports governments, businesses and SMEs to adopt e-invoicing and e-procurement solutions that work seamlessly across Europe, thus promoting interoperability across Europe. Any supplier connected to PEPPOL has a connection to all contracting authorities which implement Open e-PRIOR and vice-versa.