



## Energy Efficiency Performance-Tracking Platform for Benchmarking Savings and Investments in Buildings

### Final report on data gathering and user operation



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Author:	<b>Department of the Vice Presidency and Digital Policies and Territory (GENCAT. Generalitat de Catalunya)</b>

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03	22.01/2024	Partner contributions	Stanislav Andreev Stoyan Danov Oriol Escursell
04	30.01.2024	Final version	Miriam Huget

**Peer reviewed by:**

Partner	Reviewer
CIMNE (Subcontractor)	Mike Barker

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## Table of contents

<b>1</b>	<b>Executive summary .....</b>	<b>9</b>
<b>2</b>	<b>Background .....</b>	<b>10</b>
<b>3</b>	<b>Introduction .....</b>	<b>11</b>
3.1	Pilots' targets	12
<b>4</b>	<b>Spanish PILOT.....</b>	<b>13</b>
4.1	Description of the Pilot	13
	4.1.1 Description of Pilot Leader	13
	4.1.2 Catalan pilot objectives	14
4.2	Users' identification and registration process	15
	4.2.1 Hierarchical structure of the Generalitat de Catalunya (GENCAT)	15
	4.2.2 Users' identification and registration strategy	16
	4.2.3 Number of users registered during the testing phase.	19
	4.2.4 Challenges and difficulties faced during the user identification and registration	19
4.3	Building registration process	20
	4.3.1 Data sources	20
	4.3.2 Buildings registration during the testing phase	21
	4.3.3 Challenges and difficulties faced during buildings registration	22
4.4	Energy Efficiency Measures (EEM) registration process	22
	4.4.1 Energy Saving and Efficiency Plans for buildings and equipment of Catalonia	22
	4.4.2 Gathering Energy Measures investments and potential savings	23
	4.4.3 Pilot results obtained	24
	4.4.4 Challenges and difficulties faced during in EEMs registration	27
4.5	Energy consumption registration process	27
	4.5.1 Energy consumption registration process	27
	4.5.2 Challenges and difficulties faced during energy consumption registry	28



4.5.3	Spanish Pilot Energy Consumption data registered	28
<b>5</b>	<b>BULGARIAN PILOT .....</b>	<b>30</b>
5.1	Description of the Pilot	30
	5.1.1 Description of Pilot Leader	30
	5.1.2 Bulgarian Pilot objectives	31
5.2.	Users' identification and registration	31
	5.2.1. Hierarchical structure of the Bulgarian Pilot	32
	5.2.2. Users' identification strategy	33
	5.2.3. Users' registration	35
	5.2.4. Challenges and difficulties faced during users' identification and registration	35
	5.2.5. Users registered in EN-TRACK	36
5.3.	Buildings registration process	36
	5.3.1. Data sources	37
	5.3.2. Building data gathering	37
	5.3.3. Challenges and difficulties faced during building data registration	37
5.4.	Energy Efficiency Measures (EEM) registration process	37
	5.4.1. Results /Summary of EEM registered	38
	5.4.2. Challenges and difficulties faced during EEMs registration process	40
5.5.	Energy consumption registration process	40
	5.5.1. Templates	41
	5.5.2. Challenges and difficulties faced during energy consumption registration	43
5.6.	Energy Efficiency Certificates (EPC)	43
	5.6.1. Energy Efficiency Certificates (EPC) registration	43
<b>6</b>	<b>User Engagement Strategy .....</b>	<b>44</b>
	6.1.1 User continuous engagement	44
	6.1.2 Communication channels	44
	6.1.3 Topics and messages	45
	6.1.4 Catalan PILOT	45
	6.1.5. Bulgarian PILOT	48



## 7 Conclusions..... 50

### List of figures

Figure 1 EN-TRACK. View the list of organisations.....	16
Figure 2 Users registration strategy.....	17
Figure 3 View of the registered users in the EN-TRACK platform.....	19
Figure 4 Building data registration scheme .....	20
Figure 5 Building data gathering and registration by phases.....	21
Figure 6 View of the data of the GENCAT buildings entered in the EN-TRACK platform.....	22
Figure 7 Energy Savings and Efficiency Plan for public buildings GENCAT .....	23
Figure 8 Scheme of users' engagement to gather energy efficiency measures data on EN-TRACK .....	24
Figure 9 EN-TRACK view: register of energy efficiency measures .....	25
Figure 10 View of the list of measures introduced in EN-TRACK by the energy managers of GENCAT .....	26
Figure 11 Energy Efficiency Measures benchmarking view. GENCAT .....	26
Figure 12 Building data view: list of UPODs .....	28
Figure 13 EN-TRACK view: list of the different energy meters indicating the building, the type as well as the period of available data .....	29
Figure 14 Consumption Data of the building Borsa de Barcelona .....	29
Figure 15 EN-TRACK view. list of municipalities of Bulgaria entered in the system .....	33
Figure 16 View of the registered users in the EN-TRACK platform.....	36
Figure 17 View of the energy savings of the actions taken .....	38
Figure 18 View of the measures available in the platform .....	39
Figure 19 View of one measure available in the platform .....	40
Figure 20 Template used for energy data gathering.....	41
Figure 21 Step 1 - Description of the process for uploading data to the platform.....	42
Figure 22 Step 2 - Description of the process for uploading data to the platform.....	42
Figure 23 Guidance for the registration of the EPC in the platform .....	43
Figure 24 View I of the Teams Group.....	46
Figure 25 View II of the Teams Group.....	46
Figure 26 View of one video.....	47



## List of tables

Table 1 Number of entities enrolled in EN-TRACK .....	18
Table 2 Positions held by users registered. Catalan Pilot .....	19
Table 3 Channels of Communication .....	45
Table 4 Examples of topics for users messages .....	45

## Abbreviations and Acronyms

Acronym	Description
BO	Building Operator
BOF	Building Owners Forum
CA	Consortium Agreement
DoA	Description of Action (annex I of the Grant Agreement)
EC	European Commission
EEM	Energy Efficiency Measure
EPC	Energy Performance Certificate
FIF	Financial Institutions Forum
GA	Grant Agreement
GFA	Gross Floor Area
GPG	Management of Patrimonial Database of Generalitat
PC	Project Coordinator
PMC	Project Management Committee
PO	Project Officer
PS	Project Secretariat
QM	Quality Management
SC	Scientific Coordinator
SH	Stakeholders
TMT	Technical Management Team



Acronym	Description
TL	Task Leader
ToC	Table of Contents
UI	User Interface
UPOD	Utility Point of Delivery
WP	Work Package
WPL	Work Package Leader





# 1 Executive summary

The aim of this report is to explain how the testing in operation phase has been carried out in two pilots, one in Spain and one in Bulgaria. These pilots present notable differences in terms of scope and leadership, technical issues and strategies adopted. These differences are explained below.

The scope of the pilot in Spain has been buildings and data from the Government of Catalonia (*Generalitat de Catalunya*), a large, regional level, public organization, made up of multiple departments and entities, that manages more than 4.000 public buildings, and applies unified sustainability and energy efficiency criteria. In contrast, the pilot in Bulgaria involves data gathered from smaller, local level, municipalities, covering a variety of local public organizations, which tend to have their own, individual, specific and diverse, energy efficiency targets.

The Spanish pilot, has been led by the organization itself, *Generalitat de Catalunya*, through the technical team of the Energy Institute of Catalonia (ICAEN). In contrast, the Bulgarian pilot has been led by EnEffect, a non-profit organization that supports municipalities in meeting the country's energy objectives. Both leaders have had to supervise the data gathering with the support of CIMNE as technical developer team of the platform EN-TRACK.

Because of these differences, as well as differing technical issues, such as data collection and management strategies, or user profiles, this report devotes a chapter to each pilot in order to go deeper in each case (Chapter 2 and Chapter 3). The following issues are addressed in both chapters:

1. Identification and registration of users
2. Identification and registration of buildings
3. Recording and monitoring: energy consumption
4. Register of energy efficiency measures
5. Registration of energy certificates and audits

The strategy followed in each pilot was different and was developed to adapt the testing to the pilot-specific operational functionalities. These strategies relate to successfully identifying potential users and to the task of gathering, enter and upload new data into the system. The descriptions of the strategies documented elaborate on the difficulties and challenges encountered during the testing phase for each of the issues in the list above.

Finally, in chapter 4, documents another important aspect covered during the pilot phase: continuous user engagement. To ensure successful implementation of the pilot and testing of the platform, it has been necessary to cooperate firstly with end users, mainly building owners or building energy managers, and secondly with financial institutions. To do so, key aspects such as user engagement strategy and communications channels have been evaluated and are defined in this concluding chapter.



## 2 Background

EN-TRACK, which stands for Energy Efficiency Performance-Tracking Platform for Benchmarking Savings and Investments in Buildings, is a critical and timely project that seeks to address several key barriers holding back greater investments in building energy efficiency. The core objectives of the project, which is funded through the European Union (EU) Horizon 2020 research and innovation programme under grant agreement number 885395, are to:

- Enable massive gathering of data on the before-and-after performance of energy efficiency measures in buildings.
- Create a continuous data collection process through structured engagement with stakeholders.
- Adopt standard data descriptions that align with current international standards and existing data platforms, notably the Building Energy Data Exchange Specification ([BEDES](#)) the De-Risking Energy Efficiency Platform ([DEEP](#))
- Create a self-sustaining solution that continues to be viable after the completion of the project in 2023.

There is a data gap which creates risks and barriers to investments in building efficiency upgrades and EN-TRACK has an ambitious objective to build a platform with knowledge on the performance of thousands of public and private buildings and the efficiency measures implemented.

EN-TRACK aims to be a 'one-stop-shop' for insights on the energy, financial and other performance of buildings. To achieve the aims of the project the platform must be useful and appealing to Financial Institutions (FI). One critical step is to identify functionalities and outputs definition by the FI to match their current needs.



### 3 Introduction

This report describes the testing in operation phase of EN-TRACK's functionalities in real operation, as well as the engagement actions and activities to ensure continuity in user data input. The testing phase involved two 2 specific pilots: Spanish-Pilot (Spain) and Bulgarian-Pilot (Bulgaria), lead by the Catalan Institute of Energy (ICAEN) and by EnEffect respectively.

Both pilots present significant differences:

- **Spanish Pilot:** The Pilot in Spain has focused on a single large public entity with more than 4,000 buildings under its responsibility. This entity is the regional government, the Government of Catalonia (*Generalitat de Catalunya*), that is made up of 14 departments and public entities or companies. The leadership of the pilot has been carried out by ICAEN, the subsidiary public entity responsible for indicating common energy management guidelines for all public buildings belonging to the *Generalitat de Catalunya* (GENCAT).
- **Bulgarian Pilot:** The Bulgaria Pilot has operated with several municipalities at the local level. The total number of buildings for which information has been imported in the Bulgarian pilot is also around 4,000. The leadership has been carried out by EnEffect, a non-profit organization that supports Bulgarian municipalities in meeting their energy efficiency goals.

Each of these pilots has followed the most appropriate strategy to test each of the functionalities, as well as to request the participation of the end users. The main functionalities that have been evaluated during the pilot phase have been the following:

1	<b>Brief description of the Pilot</b>	Description of the Pilot's most important characteristics
2	<b>Identification and registration of users</b>	Description of the strategy followed to identify users and register them on the platform.
3	<b>Identification and registration of buildings</b>	Description of the identification of the building databases and how the data is entered into the platform
4	<b>Recording and monitoring: energy consumption</b>	Description of the process followed to increase the energy consumption and the difficulties encountered.
5	<b>Register of energy efficiency measures</b>	Description of the different strategies followed to introduce energy efficiency measures.
6	<b>Registration of energy certificates and audits</b>	Description of the process followed to increase the energy consumption and the difficulties encountered

Testing the platform with two different pilots has enhanced the ability to identify areas for improvement by comparing experiences and results between the two. Working in this way makes it easier to gain insights about, for example, how users have been registered and how the data is collected and uploaded into the platform. It also facilitates the user feedback collection which has contributed valuable ideas for the improvement of the EN-TRACK platform.



The report has three main sections: the first two devoted to describing each pilot, and the third one is devoted to the user engagement strategy.

### 3.1 Pilots' targets

The targets to be achieved during the testing operation phase were the following:

	Spain - Catalan	Bulgaria
Leader	ICAEN	EnEffect
Number of Buildings introduced in the platform	4,000	> 500
Projects	<b>30 projects fully tested financing pre-qualification jointly with e-Quad for Spanish Pilot and 10 projects for Bulgarian Pilot (deeply analysed in Deliverable D4.4 Final Report on EN-TRACK service testing)</b>	
Number of EEMM introduced in the platform	4,500	
Number of Organisation registered. Initial target.	14 General Departments and their associated Public Organisations and entities (about 503)	More than 25 Municipalities
Number of BO registered	40 for financing pre-qualification <b>(deeply analysed in Deliverable D4.4 Final Report on EN-TRACK service testing)</b>	
Number of Users	> 150	
Exchange data with DEEP	✓	✓

Another important target to reach is the number of **projects** to be registered on the platform, where “project” is defined as the implementation of one or a set of energy efficiency measures in a building that have associated energy and financial savings, as well as an investment. The expected value is **40** projects in total. A selection of these projects will be used to test the financing pre-qualification through interoperability with the eQuad platform. The pre-qualification testing face is described in more detail in deliverable *D4.4 Final Report on EN-TRACK service testing*.



## 4 Spanish PILOT

### 4.1 Description of the Pilot

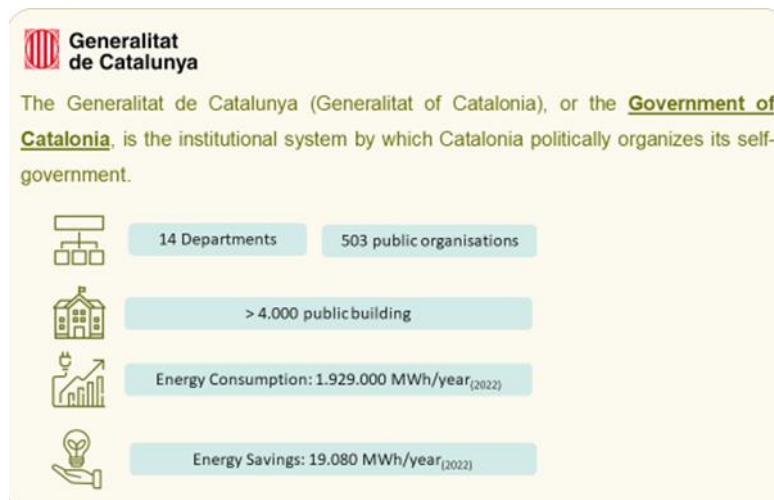
The EN-TRACK tool is primarily intended for public institutions to assist them in the management of their buildings. In the case of the Spanish Pilot, the public administration that has been taken as a reference is GENCAT<sup>1</sup>. This Pilot has been led by ICAEN<sup>2</sup> since it is the public entity in charge of to define guidelines for the management and monitoring of all public buildings of the GENCAT.

Place - Location	Catalonia (Spain)
Leader	ICAEN - GENCAT
Target Audience	GENCAT Departments and public institutions
Monitored Buildings	More than 4.000 Buildings

#### 4.1.1 Description of Pilot Leader

- **Who is GENCAT?**

It is the public administration that represents the central government of Catalonia.



**Generalitat de Catalunya**

The Generalitat de Catalunya (Generalitat of Catalonia), or the **Government of Catalonia**, is the institutional system by which Catalonia politically organizes its self-government.

- 14 Departments
- 503 public organisations
- > 4.000 public building
- Energy Consumption: 1.929.000 MWh/year<sub>(2022)</sub>
- Energy Savings: 19.080 MWh/year<sub>(2022)</sub>

<sup>1</sup> Generalitat de Catalunya: <https://web.gencat.cat/en/inici/index.html>

<sup>2</sup> ICAEN. Institut Català d'Energia: <https://icaen.gencat.cat/ca/inici/>



- **Who is ICAEN?**

ICAEN is a public-law entity ascribed within the **Department of Climate Action, Food and Rural Agenda of the Catalan Government** and its mission is to promote the energy transition through a decarbonized, democratic, inclusive model based on energy efficiency and renewable generation. Moreover, one of ICAEN's main roles is to design and manage the *Energy Efficiency and Saving Plan for Public Buildings of the Generalitat de Catalunya*.

**Main Actions:**

- *Promotion of energy efficiency and renewable energies in all economic sectors and the citizens of Catalonia*
- *Development of global support and advisory programs in energy matters for industry, the construction sector, the transport sector, etc.*
- *Elaboration of Energy Statistics and the Catalan Energy Outlook*
- *Preparation of legislation, regulation, and normative.*
- ***Design, Management and coordination of the Plan of energy efficiency and energy savings for the buildings of the Generalitat de Catalunya***
- ***Management of the Energy Efficiency Certification public registration***
- ***Dissemination and training***
- *Collaboration with local administrations in the development and implementation of their Sustainable Energy Action Plans within the framework of the Pact of Mayors*
- *Development of cooperation actions and projects at national and international levels.*

#### 4.1.2 Catalan pilot objectives

The objective of the Catalan Pilot is to test a tool that allows the building energy managers of public buildings of GENCAT to manage the energy consumption, as well as the energy efficiency measures that have been implemented in an agile and simple way.

In addition, thanks to the EN-TRACK platform, it will be possible to calculate the savings obtained after the implementation of the energy efficiency measures, and thus to monitor annual energy savings and progress towards the goals set by the Catalan government.

The steps taken by ICAEN to identify and register users, introduce buildings data, consumption and other fields through the EN-TRACK Platform are described in the following chapter sections.

1. User identification and registration
2. Identification and registration of buildings
3. Recording and monitoring: energy consumption
4. Register of energy efficiency measures
5. Registration of energy certificates and audits



## 4.2 User identification and registration process

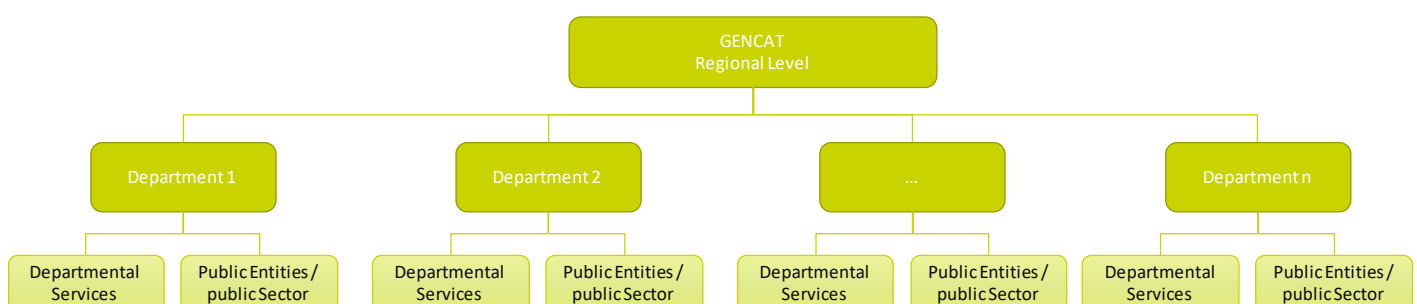
To talk about the strategy followed to identify, register and involve users during the testing phase of the platform, first, it is necessary to describe the hierarchical structure of GENCAT in terms of departments and public entities.

### 4.2.1 Hierarchical structure of GENCAT

GENCAT is currently structured into 14 Departments. Each department is made up, on the one hand of its own services and technical units, and on the other hand, of the public entities or companies registered to each department accordingly to the different services they offer. In total, GENCAT is made up of 498 public entities.

The table below summarises the hierarchical structure of GENCAT.

GENCAT Departments			Number of public entities
1	VPD	Department of Territory	93
2	SLT	Department of Health	91
3	REU	Department of Research and Universities	71
4	ACC	Department of Climate Action, Food and Rural Agenda	51
5	EMT	Department of Business and employment	49
6	CLT	Department of Culture	44
7	ECO	Department of Economy and Finance	34
8	PRE	Department of the Presidency	31
9	DSO	Department of Social Rights	10
10	XGO	Department of External Action and Open Government	11
11	JUS	Department of Justice	6
12	EDU	Department of Education	3
13	INT	Department of the Interior	3
14	IFE	Department of Equality and Feminism	1
<b>TOTAL</b>			<b>498</b>



This data can be loaded and processed automatically from a list created for this purpose. The results are displayed in the Structure view on the platform as shown in the following figure.



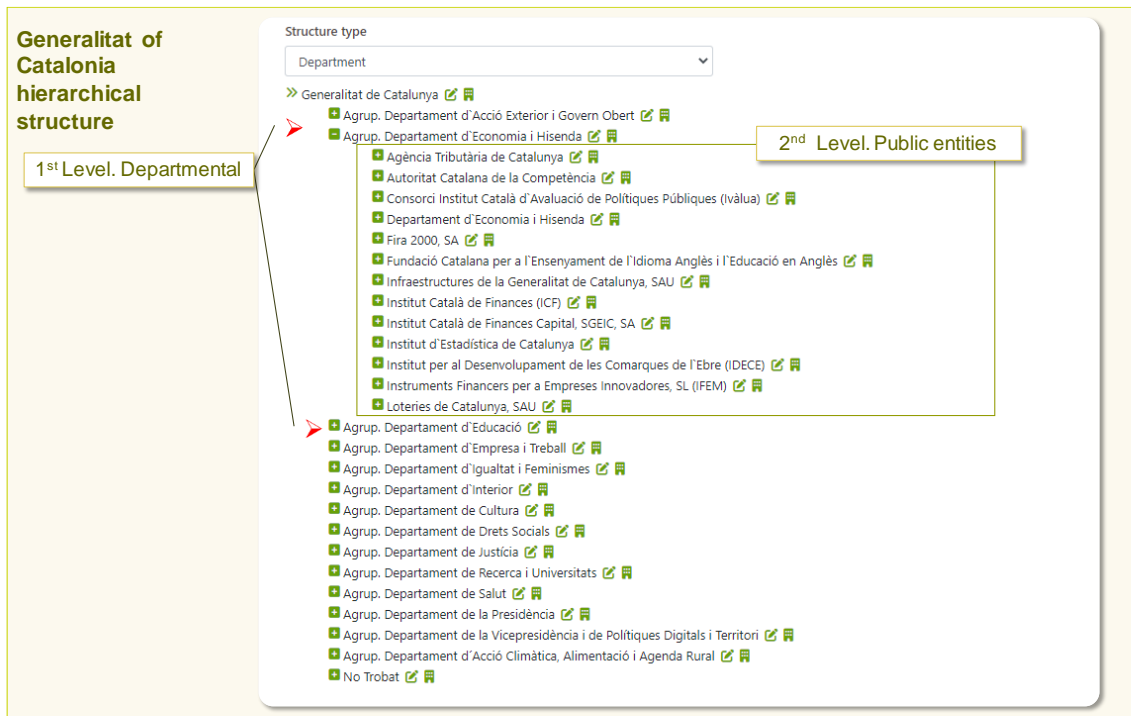
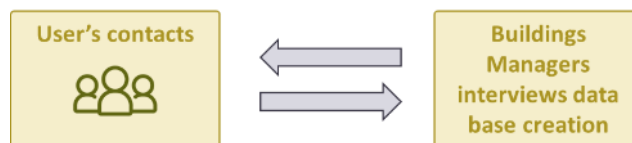


Figure 1 EN-TRACK. View the list of organisations.

#### 4.2.2 User identification and registration strategy

Once the hierarchical structure has been created through the platform, it is time to identify and register users. Given that GENCAT is a very large administration with different departments and associated entities, the task of identifying and getting to know those who will actually use the platform in practice has been challenging. For this reason, ICAEN has had to come up with its own strategy to obtain the contact data of the building energy managers and others who need to be registered in the system (name, position, etc.). To do so, they have contacted them via different communication channels, mainly by phone and by an e-mail invitation, but also short, one to one, interviews.



The objective of this strategy was the elaboration of a database of building energy managers and other relevant contacts, comprising of data such as name, surname, position, and other useful information such as which specific institution or entity they work for.

The information collected enables ICAEN to register new users at the corresponding level within each organization according to its hierarchical structure, as well as to assign them one or more buildings.







The strategy followed by ICAEN has 4 main steps.

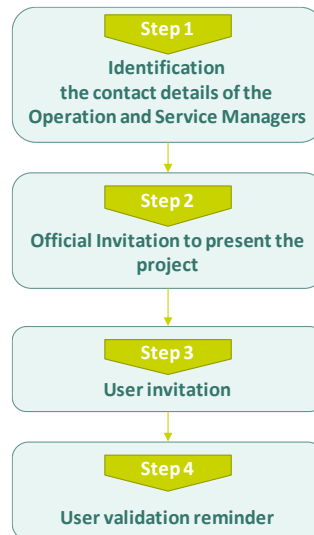


Figure 2 Users registration strategy

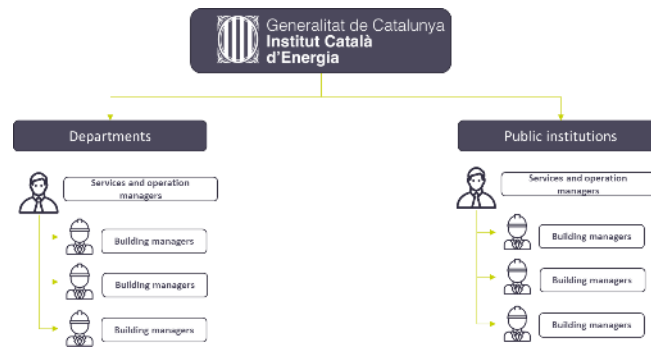
### **STEP 1: Identification the contact details of the Operation and Service Managers**

- Creation of an Excel file with basic information of each department or public institution (Name, address, phone, information telephone number, general e-mail address, etc.)
- Establish contact through a phone call to identify the contact details of the operations or services management in order to send them an official invitation to participate in the EN-TRACK Pilot.

### **STEP 2: Official invitation to present the project**

- Following this, an official invitation letter was sent to the Service or Operation Managers to introduce the project and to request contact people or building managers for each agency.





### **STEP 3: User invitation**

- As soon as the Operations Managers reported the names of the building managers, the database was updated, and they were invited through a registration to the platform.

### **STEP 4: User validation and reminder**

- A validation reminder was sent to those users who didn't validate their invitation.

In addition to this, the approach to contacting users has been carried out in different iterations, prioritising departments and entities with the highest energy expenditure. In an initial phase, those entities and departments with an annual cost of more than €200,000/year were contacted. In a second phase, those with consumption between €200,000/year and over €100,000/year were contacted as well. And finally, all entities and departments with an annual consumption of less than €100,000/year were left for a third phase.

Iteration	Energy Consumption Criteria - 2021-	Number of Entities/departments enrolled	% total cost of Generalitat of Catalonia 2021
1st	More than 200,000 €/year.	81	97.8%
2nd	More than 100,000 €/year	19	1.3 %
3rd	Less than 100,000 €/year	72	0.9 %

*Table 1 Number of entities enrolled in EN-TRACK*

In the first round that was carried out, ICAEN obtained the contacts of 58 public institutions who confirmed their interest in participating in the testing operation phase of EN-TRACK. Afterwards, the existing database has been updated and extended throughout the phase of testing in operation with new user data.

Regarding the roles and categories, the following table shows the position held by the people contacted. Basically, registered users are responsible for infrastructure and maintenance areas, general services and some more specific in energy management.

#### **Most frequent positions**

Infrastructures and General Services Area, Maintenance Unit
Head of Infrastructure and Maintenance
Head of the Promotion and Commercial Management area
Head of the Asset Management Area
Head of General Services



Head of the Infrastructure and Heritage Service
Head of Infrastructures and Services
Director of Projects
Director of Engineering and General Services
Infrastructure and PRL Director
Energy Manager
IT Manager
Head of the Technical Office
Responsible for quality and environment

Table 2 Positions held by users registered. Catalan Pilot

#### 4.2.3 Number of users registered during the testing phase.

Currently there are 105 GENCAT building managers and administrators registered in EN-TRACK.

The screenshot shows the EN-TRACK platform interface. At the top, there is a navigation bar with 'Building Performance' and 'Energy Efficiency Measures'. Below it, a main menu contains 'My buildings', 'My EEMs', 'Supplies', and 'Energy Performance Certificate'. The 'Users' section is active, displaying a list of registered users. The list has columns for Username, Name, Email, Role, Organizations, and Created. The roles listed are 'BUILDING\_ADMINISTRATOR' for various organizations including 'Institut de Seguretat Pública de Catalunya', 'Escola d' Administració Pública de Catalunya', 'Departament de la Presidència', 'Departament de Cultura', 'Institut Cartogràfic i Geològic de Catalunya', and 'Departament de Justícia'.

Figure 3 View of the registered users in the EN-TRACK platform

#### 4.2.4 Challenges and difficulties faced during the user identification and registration

The whole process presented several obstacles, such as:

1. Lack of an initial common database of contacts of building managers and energy managers.
2. Each department or public entity has its own organisational structure, and responsibilities vary, making it difficult to find the right people in each case, because functions are different for each organisation and the relevant responsibilities are not always well identified internally.



3. In some cases, building managers are part of a subcontracted, external company. Hence, the building energy manager is not always a member of staff and the relevant contacts within the external company may change frequently.
4. On several occasions, it has been necessary to start contacting with the service or operations manager to identify the contact who will use the platform. This has required several calls and e-mails to find the right contact.

### 4.3 Building registration process

The central core of the platform is the database of the buildings: the users or entities, the energy consumption and the energy efficiency measures, and the energy certificates or audits, must all be linked to a particular building.

#### 4.3.1 Data sources

The data of the Buildings is uploaded automatically, mainly from the Asset Register of the Properties of the Government of Catalonia (from now on **GENCAT Building Database**) and specific excel templates.

- **The GENCAT Building Database** is an internal database managed by GENCAT. It contains the building official information of all departments and almost all buildings that belong to the rest of public entities or organisations. This database is updated periodically and this will facilitate the updating of the data on the platform.
- **Specific excel templates:** For those buildings that are not registered yet in the official building database, ICAEN prepared an EXCEL template with the requested fields in EN-TRACK. ICAEN asked the buildings managers to fill in the data in the Excel file in order to upload directly to EN-TRACK during the testing phase.
- **Cadastre:** in the pilot case, some information of the buildings comes from the public data base of the cadastre.

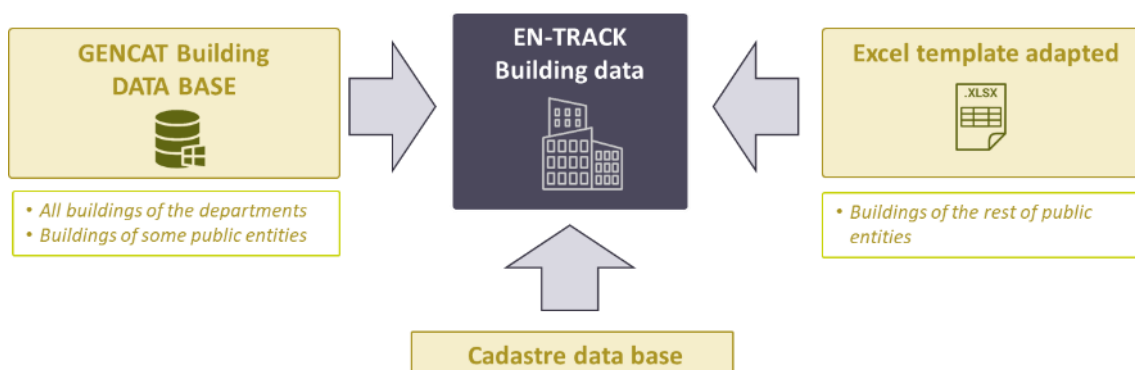


Figure 4 Building data registration scheme



### 4.3.2 Buildings registration during the testing phase

The initial data upload for the registration of the buildings of the Catalan Pilot was done directly in EN-TRACK by CIMNE during the testing phase, and was supervised and reviewed by ICAEN. The buildings registration was done prior to the users registration.

Two main steps were followed to enter the data of the buildings:

1. **Phase 1:** an initial loading was carried out automatically with the data from the GENCAT official building database.
2. **Phase 2:** several partial uploads have subsequently been carried out to include additional information, not included in the initial database. This additional input was provided using data from the updated building database and the Excel templates prepared by ICAEN and filled in by energy managers.

According to Catalan regulations, it is foreseen that in the near future all building data will be registered in the GENCAT official database. This includes both those that depend directly on the departments and those managed and belonging to the public entities and companies of GENCAT. Therefore, when the EN-TRACK platform is fully operational, all data will be uploaded through this updated database, without the need for the templates used in the pilot phase. In any case, users can modify and update the building data directly from the platform at any moment.

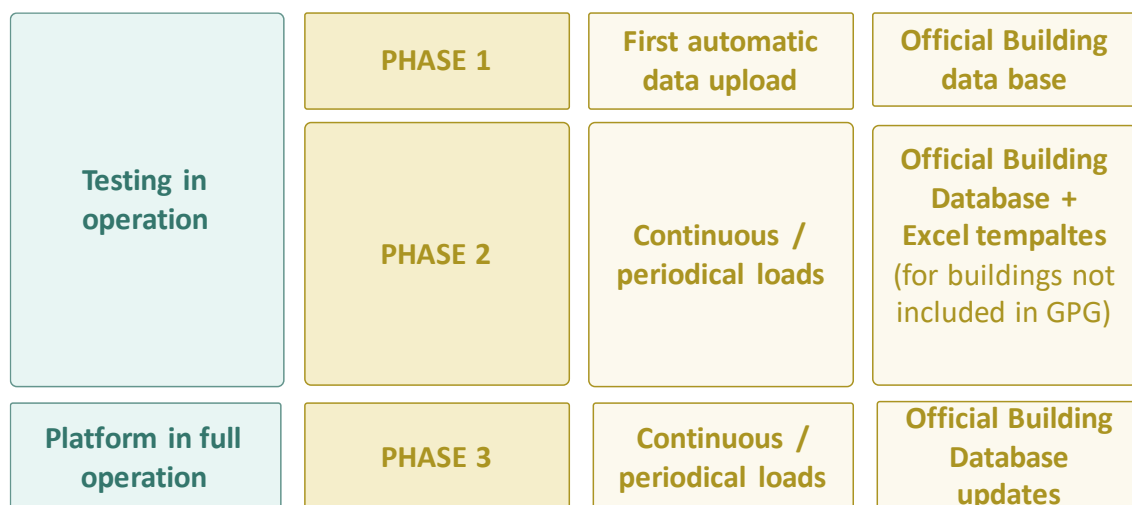
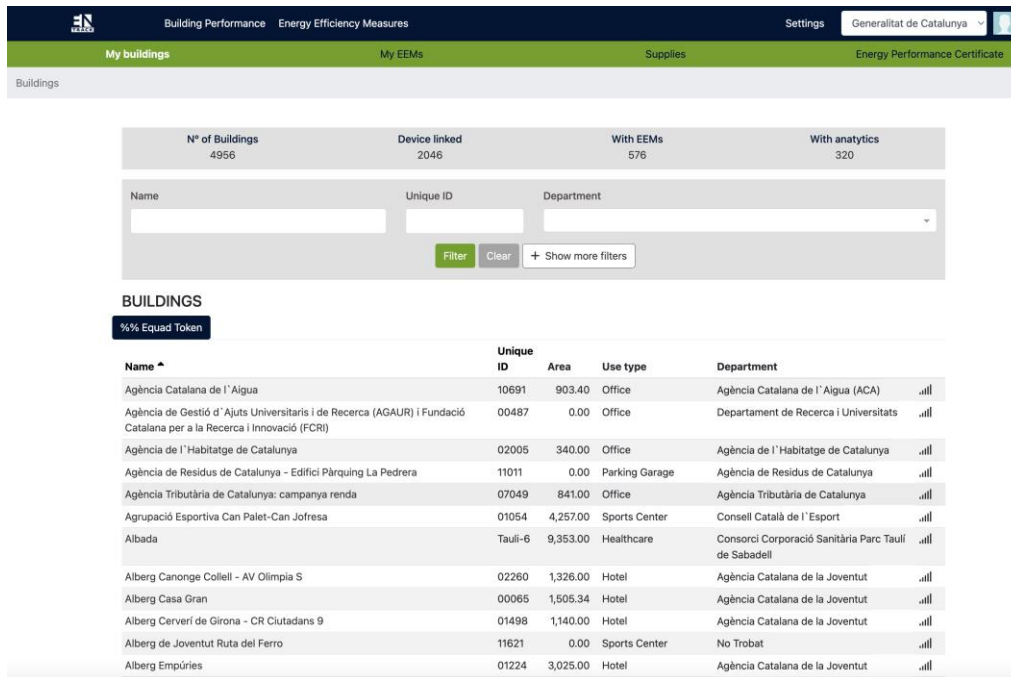


Figure 5 Building data gathering and registration by phases





Name	Unique ID	Area	Use type	Department
Agència Catalana de l' Aigua	10691	903.40	Office	Agència Catalana de l' Aigua (ACA)
Agència de Gestió d' Ajuts Universitaris i de Recerca (AGAUR) i Fundació Catalana per a la Recerca i Innovació (FCRI)	00487	0.00	Office	Departament de Recerca i Universitats
Agència de l' Habitatge de Catalunya	02005	340.00	Office	Agència de l' Habitatge de Catalunya
Agència de Residus de Catalunya - Edifici Pàrquing La Pedrera	11011	0.00	Parking Garage	Agència de Residus de Catalunya
Agència Tributària de Catalunya: campanya renda	07049	841.00	Office	Agència Tributària de Catalunya
Agrupació Esportiva Can Palet-Can Jofresa	01054	4,257.00	Sports Center	Consell Català de l' Esport
Albada	Tauil-6	9,353.00	Healthcare	Consorci Corporació Sanitària Parc Tauil de Sabadell
Alberg Canonge Collell - AV Olimpia 5	02260	1,326.00	Hotel	Agència Catalana de la Joventut
Alberg Casa Gran	00065	1,505.34	Hotel	Agència Catalana de la Joventut
Alberg Cerverí de Girona - CR Ciutadans 9	01498	1,140.00	Hotel	Agència Catalana de la Joventut
Alberg de Joventut Ruta del Ferro	11621	0.00	Sports Center	No Trobat
Alberg Empúries	01224	3,025.00	Hotel	Agència Catalana de la Joventut

Figure 6 View of the data of the GENCAT buildings entered in the EN-TRACK platform

### 4.3.3 Challenges and difficulties faced during buildings registration

The Catalan government does have a patrimonial database (GPG) that records most of the buildings owned by public entities and the government. The database will have registered most of the buildings by the end of January 2024. In coordination with the people in charge of the GPG a tailored extraction was created to ensure that all the necessary fields of information to feed the EN-TRACK platform were obtained. However, the GPG database is not completed yet, some major building owners are still updating it. Consequently, during this test phase, an Excel template had to be used to upload the basic information for the missing buildings. This approach is not as good as database-based input because in an Excel template some information may be missing. It is also harder to correct because it does not have a usable UI to make amendments. This Excel template also raised the challenge of continuously tracking the manual buildings to ensure that they were not duplicated in updates from the patrimonial database.

## 4.4 Energy Efficiency Measures (EEM) registration process

The process of registering energy efficiency measures (EEM) is laborious and demanding, as it is usually necessary to search for information from different sources or to ask different departments areas, as described in the deliverable [D3.2 Current building data management practices report](#).

### 4.4.1 Energy Saving and Efficiency Plans for buildings and equipment of Catalonia

In the case of GENCAT, the process of collecting the list of energy efficiency measures implemented has been a mandatory task for departmental energy managers since 2018.



A first government agreement was signed in 2017 defining the **Energy Saving and Efficiency Plan for buildings and equipment of the Government of Catalonia 2018-2022**. This agreement established the objectives of GENCAT to reduce energy consumption and promote energy efficiency investments in public buildings. The same plan also established the obligation of the departments to report once a year to ICAEN on the measures that each department and public entity had taken to reduce energy consumption.

The new plan for the period 2023-2027 was recently approved. The **Energy Saving and Efficiency Plan for buildings and equipment of the Government of Catalonia 2023-2027** defines the savings targets to be achieved:

1. 16.43% reducing energy consumption from public buildings by 2027.
2. 302.8 M€ approximate investment in energy consumption.

Furthermore, the plan indicates that the measures must be reported through a common online energy management platform for the whole public sector.

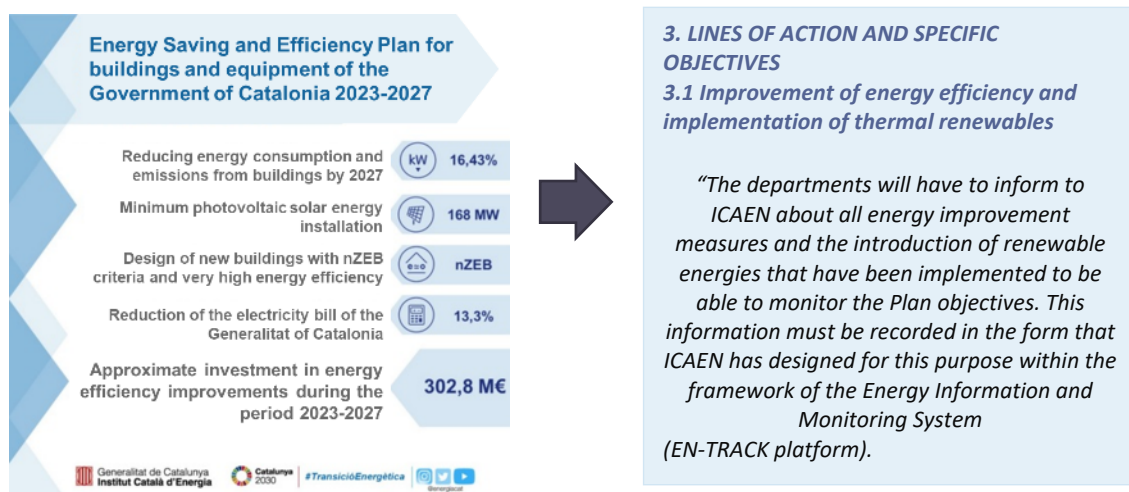


Figure 7 Energy Savings and Efficiency Plan for public buildings GENCAT

Based on the information provided by the departments, ICAEN prepares an annual results report. This report documents the measures implemented during the past year, the investments made, the savings achieved and the evaluation of these results in relation to the fulfilment of the expected annual objectives.

#### 4.4.2 Gathering Energy Measures investments and potential savings

Based on the **Energy Saving and Efficiency Plan for buildings and equipment of the Government of Catalonia 2023-2027** named above, ICAEN contacts all building managers once a year (usually at the beginning of the year) to collect all information on the measures that have been implemented during the previous year. The managers have one month to complete this information.



### User engagement for Energy Efficiency Measures data gathering

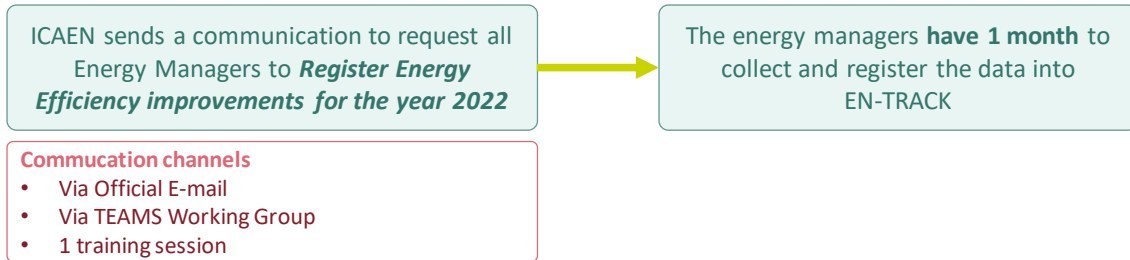


Figure 8 Scheme of users' engagement to gather energy efficiency measures data on EN-TRACK

Prior to using EN-TRACK, data collection of EEM was done through an Excel template created by ICAEN. However, the energy efficiency managers of the buildings did not always fill the data correctly and there tended to be a lack of information. This fact made it difficult for ICAEN to carry out the review of work.

Currently, thanks to the EN-TRACK platform, this barrier has been overcome by creating a properly organised database with more than 242 measures duly described and categorised.

#### The generic building:

In some cases, the GENCAT building managers have mentioned that although they have information related to the energy measures, such as the technical project and the invoice, they have been unable to introduce the measure and assign it to a specific building because the building has not yet been registered. To solve this problem, the element of *Generic Building* has been created in EN-TRACK for each organisation body. In this way, it was possible to register the EEM regardless of whether the building is created or not into the system. Then, as soon as the building manager has more details about the building and can create it, he can easily assign the EEM to this building easily through the platform.

### Energy Efficiency Measures gathering and registering data



#### 4.4.3 Pilot results obtained

The EEM data collection functionality improved how ICAEN collects the information and the quality of the information itself. The table below shows the evolution of the data collection of the years that EN-TRACK has been implemented compared to the previous method using an excel file.





Report Delivery	Data collection period	How it has been entered in EN-TRACK?	Total Measures registered	Total Investment (M€)	Average saving (GWh/year)
2020	2019	Through excel file	395	9.88	9.9
2021	2020	Directly EN-TRACK	473	6.69	20.7
2022	2021	Directly EN-TRACK	683	14.64	22.06
2023	2022	Directly EN-TRACK	637	10.06	19.08
2024	2023	Directly EN-TRACK	*	*	*

\*2023 Data will be available in April 2024.

The table results clearly show the improvement obtained recording more actions and collecting the investments. The information quality has also been improved by using the EN-TRACK platform. The system simplifies the process of recording the EEM actions, which in turn means higher willingness to report and reduces the amount of errors. The higher quality of the data has an impact on the amount of post-processing required savings time for both the energy managers recording the data and the ICAEN workforce that processes it. The combination of data collection and the high quality of the data has been a success achieved by the EN-TRACK project regarding the management of a large building portfolio such as that of GENCAT.

Figure 9 EN-TRACK view: register of energy efficiency measures



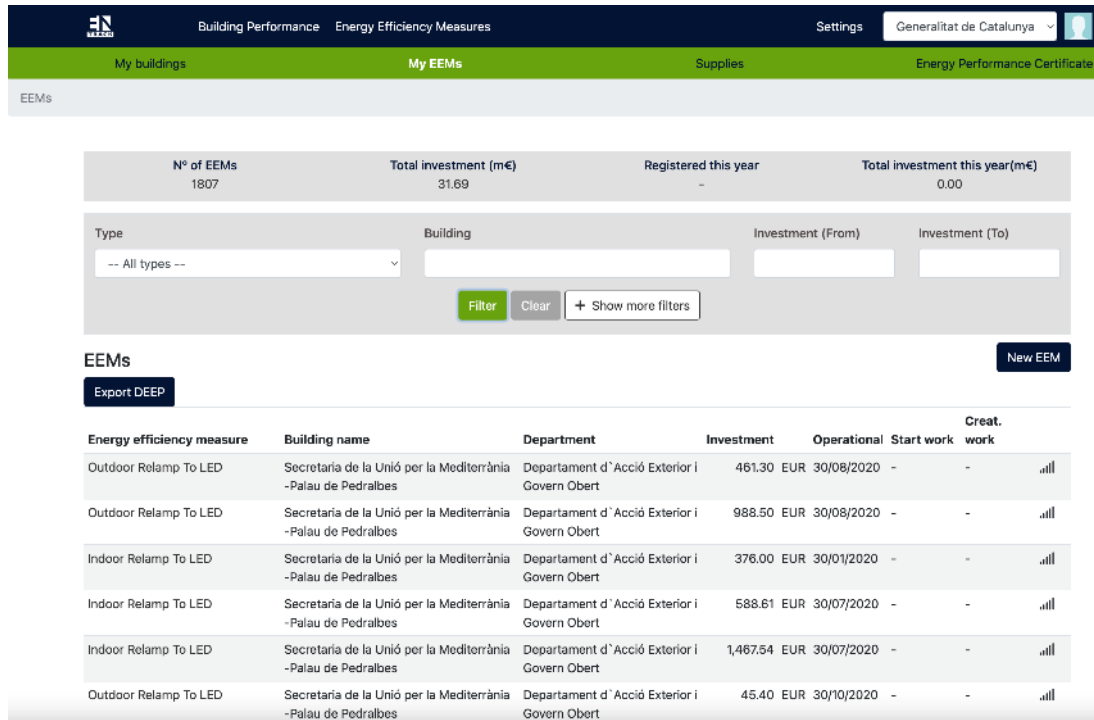


Figure 10 View of the list of measures introduced in EN-TRACK by the energy managers of GENCAT

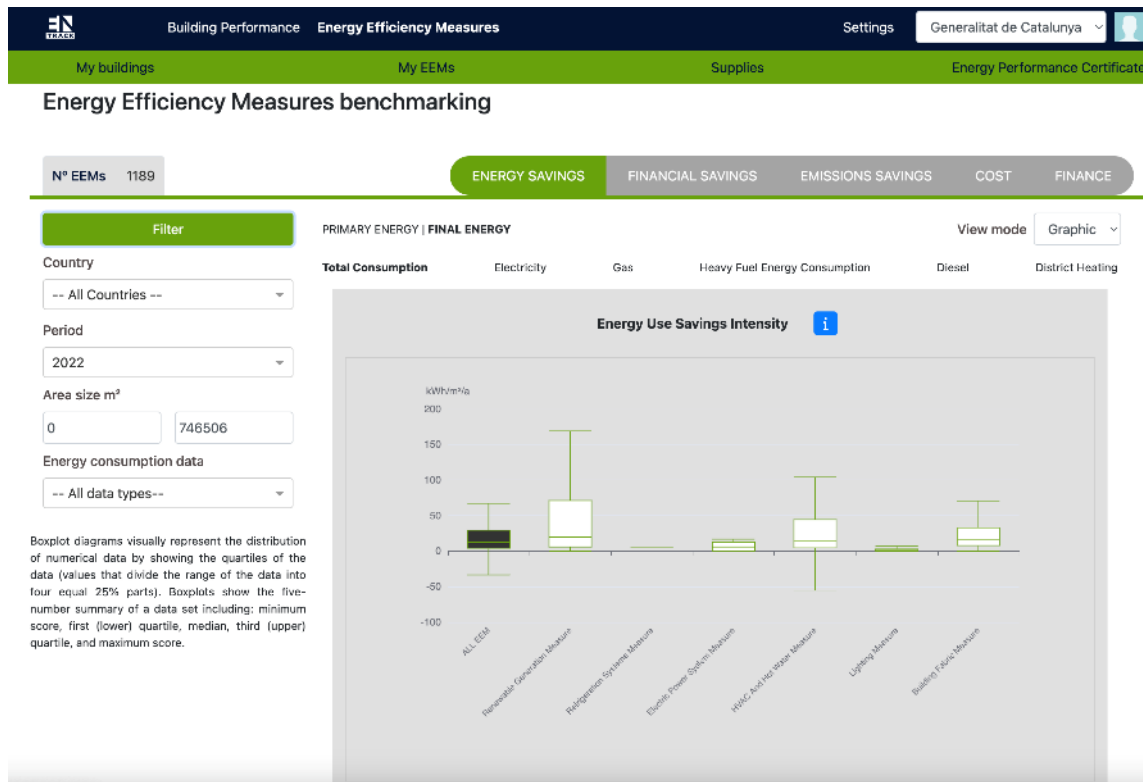


Figure 11 Energy Efficiency Measures benchmarking view. GENCAT



#### 4.4.4 Challenges and difficulties faced during in EEM registration

The collection and recording of energy efficiency measures data by energy managers is one of the most complex tasks carried out throughout the testing phase. This is especially true in the case of the preliminary work that must be carried out to gather all the information prior to data entry.

The most frequent challenges are listed below:

1. **Hours invested by the energy managers:** although the tool facilitates the introduction of energy measures and the accounting of costs and potential savings, the building managers have had to spend a significant amount of time collecting all the data and information, such as invoices, technical descriptions, maintenance contracts, etc.
2. **The information is not sufficiently accurate:** as already mentioned in deliverables [D3.2 Current building data management practices report](#) and [D3.3 Protocols for data gathering](#), in many cases the information available to the building managers is not sufficiently detailed to fully complete the data input requirements of the platform. Therefore, assumptions have to be made. For example, it is often difficult to identify specific energy efficiency related expenditure within the large total building expenditure budget managed by any one Department,
3. **Differences between departments.** Throughout the testing process it has been observed that some departments and public entities that are positively participative whereas other have not submitted the required data.

### 4.5 Energy consumption registration process

#### 4.5.1 Energy consumption registration process

In the case of the Spanish Pilot, the process of registration and introduction of energy consumption of electricity and gas is automatic through the consumption and invoice files sent by the energy companies. In the case of electricity, information is also collected from smart meters. Furthermore, about 30% of the departments and public entities use the same aggregate purchase contract, and it facilitates the uploading data to the platform.

In order to link the energy consumption to a specific building it is necessary to identify the Utility Point of Delivery (UPOD). The UPOD data appears in the files sent by the company and in the invoices. If everything is correct and each building can be related to its UPOD, there is no difficulties to upload the data automatically.



The screenshot displays the EN-TRACK platform interface. At the top, there's a navigation bar with 'Building Performance' and 'Energy Efficiency Measures'. Below it, the user is logged in as 'My Buildings' and 'My UPODs'. The main content area shows details for a building named 'BORSA DE BARCELONA' located at 'C/ Gràcia, passeig 08007 Barcelona (Barcelona)'. The 'Building info' section includes organization ID, opening/closing hours, use type, and construction year. The 'Location info' section includes climate zone, coordinates, address, and cadastral references. The 'Building spaces info' section allows selecting a building space and shows a list of UPODs with their names and energy types. A 'New Utility Point Of Delivery (UPOD)' button is present in the UPOD list.

Figure 12 Building data view: list of UPODs

However, in some cases its identification is not always a trivial task due to certain discrepancies between the building location and the company's meter location data. These discrepancies have led to additional work on the part of ICAEN and the energy managers who need time to identify the UPOD corresponding to the buildings. In total there were about 80 UPODs that could not be linked to their corresponding building.

To solve this problem, CIMNE and ICAEN have designed a tool to facilitate the work of identifying the UPOD of each building.

To date, there is no database that links each UPOD (CUPS in Catalan) with the building. The data in the utility company databases or invoice data, such as the postal address, do not coincide in many cases with the data of the building. This is because the energy company has identified the UPOD at a postal address close to where the meter is physically located, whereas the postal address of the building connected to that meter is a different one. This means additional work to be able to collect the data and to be able to link buildings to UPOD.

#### 4.5.2 Challenges and difficulties faced during energy consumption registry

**The main challenge, the association of buildings and UPODs** due to the large number of buildings and differences in registration, has been described above. Some buildings were easily identified due to previous work carried, and here the association was direct. For the remaining buildings a range of approaches were taken to simplify the process ending up with a list of UPODs and possible buildings that energy managers had to manually associate for their own organisations.

#### 4.5.3 Spanish Pilot Energy Consumption data registered

Through the platform you can see different views of the energy consumption data.



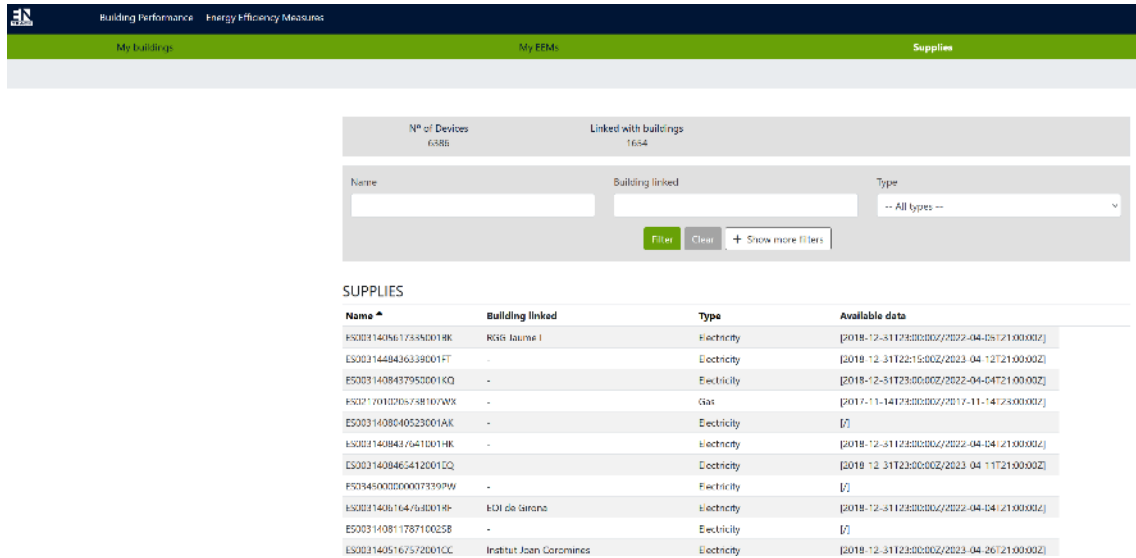


Figure 13 EN-TRACK view: list of the different energy meters indicating the building, the type as well as the period of available data

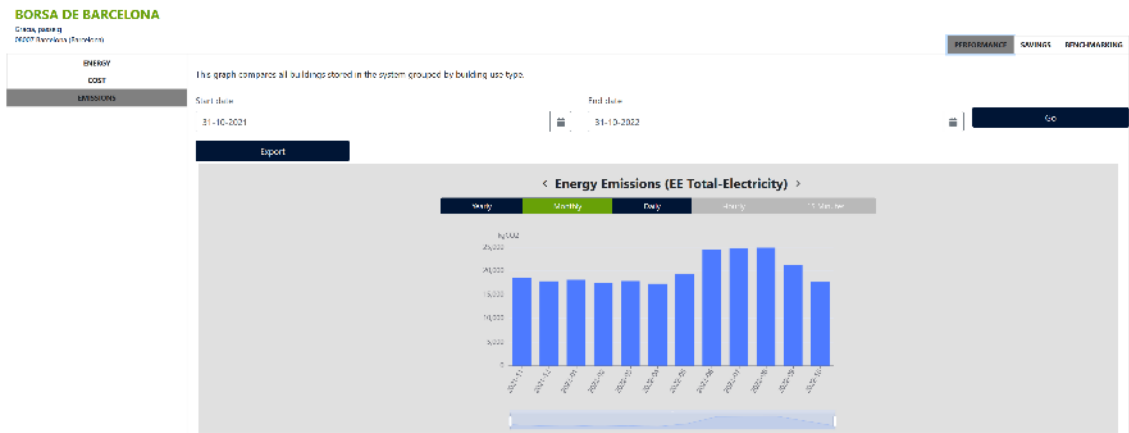


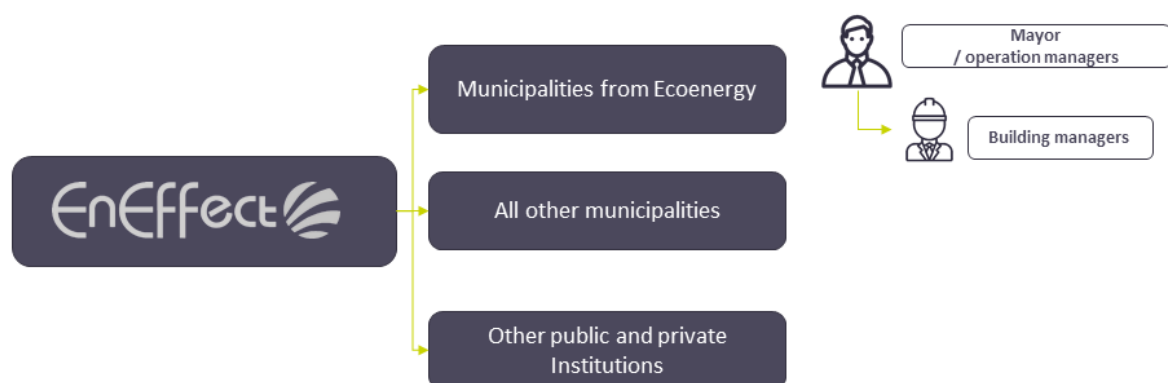
Figure 14 Example: consumption data of the building “Borsa de Barcelona”



## 5 BULGARIAN PILOT

### 5.1 Description of the Pilot

The Bulgarian pilot is based on the idea that an external company with expertise in energy management provides support to the municipalities. The support agreements can be established at different levels and scopes so that the support and dedication of the specialised company is adjusted to best fit the needs of each municipality. For example, throughout the pilot it has been seen that there are municipalities that need EnEffect to support them in the introduction of the data, the creation of the users and other issues, while in other cases this work can be done jointly by both parties or only by the building managers of each municipality.



The initial target of the Bulgarian Pilot was around 500 buildings and more than 25 different Municipalities must be registered. Finally, more than 4,000 buildings have been registered in EN-TRACK.

Place - Location	Bulgaria
Leader	EnEffect
Target Audience	Bulgarian Municipalities
Monitored Buildings	More than 4000 Buildings

#### 5.1.1 Description of Pilot Leader

- **Who is EnEffect**





**EnEffect Consult** is a legal entity, 100% owned by Foundation Center for Energy EnEffect (<https://www.eneffect.bg/>), a non-profit organization founded in 1992 in Sofia, Bulgaria, in response to the urgent need for energy conservation in all spheres of public life, which actively participates in research and investment projects to improve energy efficiency to **support the efforts of Bulgarian central and local authorities and the private sector for sustainable energy development.**

Since 1997, EnEffect has acted as the secretariat of the Municipal Energy Efficiency Network EcoEnergy (<https://www.ecoenergy-bg.net/>), offering expert support to regional and local authorities to implement sustainable energy policies and practices. As part of the international EEE consortium (Econorm - EnEffect - Elana), **EnEffect manages the Bulgarian Energy Efficiency and Renewables Fund** (<https://www.bgeef.com/en/>), established with the support of the Global Environment Facility, the World Bank and the Bulgarian government.

EnEffect Consult itself has over 25 years of experience in energy audits of buildings, industrial plants and street lighting systems. In addition to energy audits compliant with national legislation and various funding programmes, the company offers consultancy services and internal audits for the implementation of energy management systems in accordance with BDS EN ISO 50001:2018.

### 5.1.2 Bulgarian Pilot objectives

The aim of the Bulgarian pilot project is mainly to provide a useful tool to support municipal energy teams in the management of the building stock. On the one hand, EN-TRACK will provide rich and diverse data that will allow them to more accurately assess the state of the building stock and make informed decisions on the necessary investments. On the other hand, it will also facilitate the day-to-day management of the building stock based on tracking the actual consumption in the facilities and verifying savings from implemented energy efficiency measures. The platform will also support the municipalities in the process of municipal energy planning, performance reporting, and meeting legal requirements for energy management.

The steps taken by EnEffect to identify and register users, introduce buildings data, consumption and other fields through the EN-TRACK Platform are described in the following chapter sections.

1. Users' identification and registration
2. Identification and registration of buildings
3. Recording and monitoring: energy consumption
4. Register of energy efficiency measures
5. Registration of energy certificates and audits

### 5.2. User identification and registration

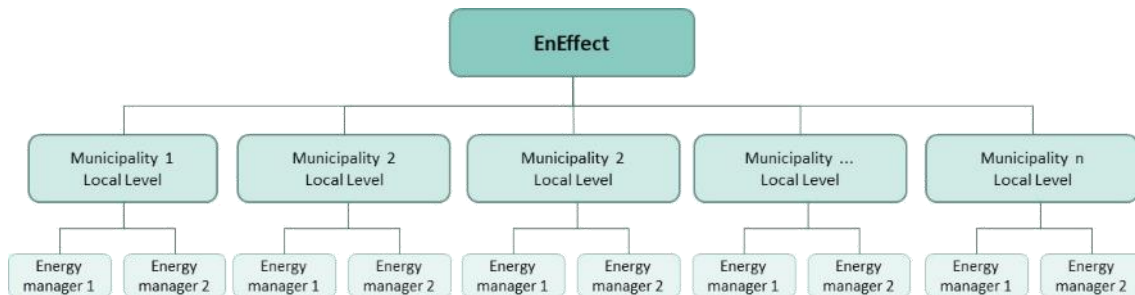
The work of identification of users in the case of Bulgaria is more open than in the Catalan Pilot to enable adaptation to the individual circumstances of each municipality.

EnEffect has been responsible for contacting the municipalities through face-to-face meetings, training courses, conferences or phone calls to make the project known among municipalities technicians and to offer them the opportunity to participate in the Pilot.



### 5.2.1. Hierarchical structure of the Bulgarian Pilot

The leader of the pilot, EnEffect, has the role of **Organisation Administrator** and manages the profiles of all organisations, in that case, the Bulgarian municipalities. At this stage the pilot user, basically the energy managers of the municipalities, prefer to use the role of **Building Administrator** and have access to all functionalities of the platform.



The users' hierarchy for the Bulgarian pilot from lowest to highest permissions is as follows:

#### 1. BUILDING\_USER

*This type of user is granted with access to check building data and the analytics results.*

#### 2. BUILDING\_ADMINISTRATOR

*On top of the above, this type of user is granted with permissions to manage building data and update it if necessary. For the Bulgarian pilot this is the top access each organization/municipality will be granted at this stage and is currently preferred by the pilot users.*

#### 3. ORGANISATION\_ADMINISTRATOR

*This type of user is granted with access to all buildings of the respective organisation and can also manage (change/create/delete) the building user and building administrator profiles and the organisation details. In the case of Bulgarian pilot this role is be given to EnEffect Consult who will be responsible for user management.*





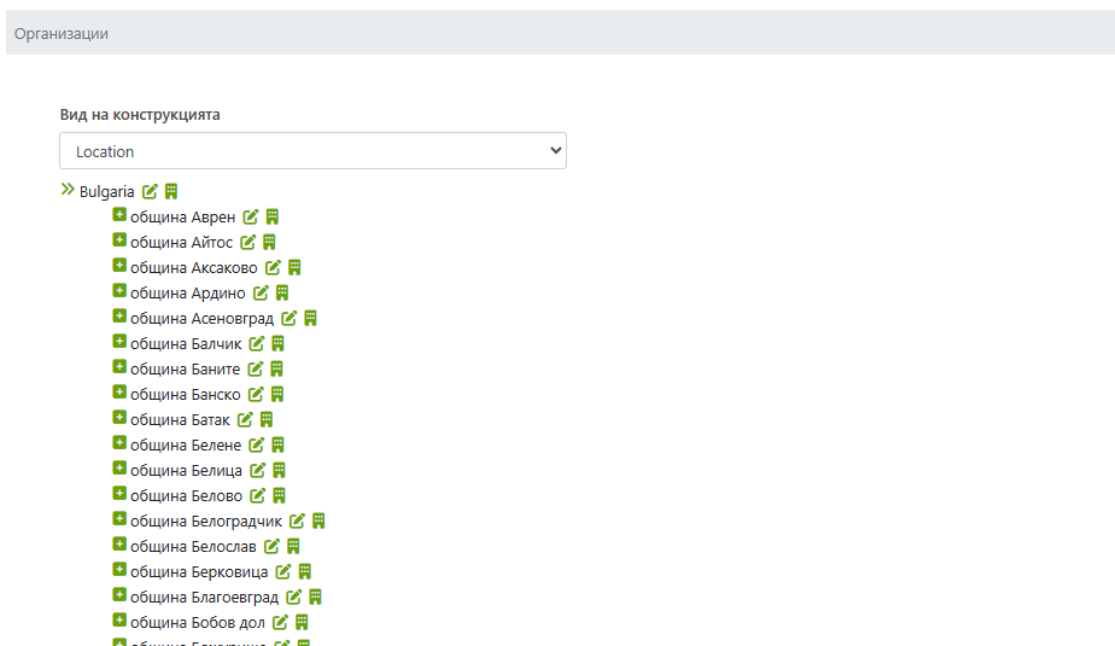


Figure 15 EN-TRACK view. list of municipalities of Bulgaria entered in the system

### 5.2.2. User identification strategy

The strategy applied by EnEffect to identify and attract Pilot users and future users is as follows:

#### **STEP 1: Municipalities from EcoEnergy**

- The starting point has been the list of municipalities, members of the Municipal Energy Efficiency Network EcoEnergy, considering that they are the forerunners in managing their energy and applying ambitious EE policies. EnEffect, who coordinates the activities of the network and acts as the Secretariat, contacted their members to present the EN-TRACK project as well as the Platform. Information about EN-TRACK was regularly published in the monthly newsletter of EcoEnergy.

**Първи уебинар и среща със заинтересованите страни по проект EN-Track**



На 20 май се проведе първият уебинар по проекта EN-TRACK по програма „Хоризонт 2020“, който се стреми към създаването на обоевропейска база данни за състоянието на сградния фонд. В това първо представяне, координаторът на проекта Стоян Данов, от екипа на CIMNE BEE Group – Международният център за числени методи в инженерството – очерта основните дейности и цели на проекта. Участие в семинара взе и Стивън Фоукс - международно признат експерт по енергийна ефективност, и автор на инструментът за застрахователи, разработен за Групата на финансови институции за енергийна ефективност (EEFIG), понастоящем и старши съветник към Investor Confidence Project. Той обсъди необходимите параметри за разширяване на базата данни в разработването на платформата на EN-TRACK, като сподели опит от работата си с EEFIG от 2016 насам и актуалното развитие в европейската управленска структура на групата.

Седмица по-късно, на 27 май, в град Габрово се проведе и първа среща със заинтересовани страни по проекта с цел обсъждане на функционалностите, които биха били от полза както на публичните власти, така и на собствениците на жилищни сгради. Експерти от общинската администрация определиха като такива лесното идентифициране на подходящи финансови инструменти за финансиране на проекти за ЕЕ в общинския сграден фонд, както и възможността за съпоставяне на сградните характеристики с други общини в България, и за мониторинг и верификация на мерките за енергийна ефективност. Това бе изтъкнато като водещ критерий и според собствениците на апартаменти в жилищни сгради, които споделиха, че без енергиен одит е трудно събирането на данни за общото потребление на дадена сграда.

Проектът EN-TRACK се изпълнява съгласно споразумение за безвъзмездна помощ по програмата за научни изследвания и иновации на Европейския съюз „Хоризонт 2020“. В него участват 7 организации от 5 държави – Испания, България, Италия, Дания и Обединеното кралство.

Можете да гледате запис от уебинара [ТУК](#).

Можете да се присъедините, като попълните кратък формуляр на уебсайта на проекта [ТУК](#).

За повече информация - посетете [en-track.eu](http://en-track.eu).

<http://www.ecoenergy-bg.net/en>



This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 885395



## **STEP 2: Municipalities using the Municipal Energy Information System**

- Next, in addition to the EcoEnergy members, municipalities that are currently using the Municipal Energy Information System (<https://municipalenergy.net/>) were contacted, as they already have aggregated data for their building energy consumption that can easily be processed and uploaded to the EN-TRACK platform.

## **STEP 3: Events and meetings**

- On top of the first two steps, EnEffect Consult's active participation in numerous public events targeting local and national authorities (such as the national roundtables on sustainable energy financing under SMAFIN and BeSMART projects, the discussion meetings Mayors Talk, and the national nZEB days), and the organised BOF, helped to establish contacts with other municipalities interested in energy management tools. During these events, the organisations that expressed their interest in the platform were later directly approached and potential participation in the EN-TRACK initiative was discussed. Most of them agreed on following the development of the tool and join at some stage. Finally, the municipalities that were contacted before the testing phase (during BOF and other events) were kept updated on the platform development.

## **STEP 4: Expert identification**

- Based on the list and the stated interest of the municipalities the EnEffect team contacted them directly (via phone calls or e-mails) to identify the expert who will be responsible for managing the profile to be created. One of the main advantages we communicated with them was the fact that general information for their buildings, provided by Sustainable Energy Development Agency (see section 5.3.1) will be available for them in the platform.



Information about the contacted municipalities during each step was summarised in an Excel workbook.

All municipalities approached through the monthly bulletin of EcoEnergy					
These two columns are with municipalities we have been in close contract		Here will provide a list with the municipalities participating in BOF, workshops, and other events where EN-TRACK was presented in more details			
List of Bulgarian municipalities	Municipalities members of EcoEnergy (directly approached)	Municipalities using the online platform of EcoEnergy (directly approached)	Other directly approached municipalities	Municipalities intending to register to EN-TRACK	Municipalities that will follow up the development of the platform and might register in future
Burgas	Burgas	Burgas		Burgas	
Dobrich	Dobrich	Dobrich			Dobrich
Gabrovo	Gabrovo	Gabrovo		Gabrovo	
Lom	Lom	Lom		Lom	
Mizia			Mizia		Mizia
Pavlikeni	Pavlikeni	Pavlikeni		Pavlikeni	
Bansko	Bansko				Bansko
Berkovitsa	Berkovitsa	Berkovitsa			Berkovitsa
Botevgrad	Botevgrad	Botevgrad			Botevgrad
Etopole	Etopole	Etopole			Etopole
Krushari	Krushari				Krushari
Kula	Kula	Kula		Kula	
Kyustendil	Kyustendil				Kyustendil

Number of municipalities enrolled in the project

Selection criteria	Number of municipalities
<b>Members of EcoEnergy</b>	18
<b>Municipalities registered to Municipal Energy Information System (excl. EcoEnergy members)</b>	7
<b>Municipalities contacted before the opening of the testing phase</b>	9
<b>Municipalities contacted on events during the testing face and approached afterwards</b>	17
<b><u>Total number of municipalities enrolled:</u></b>	<u>51</u>

### 5.2.3. Users' registration

The registration process is quick and simple. Once a representative of a municipality states his interest, EnEffect creates a profile and confirmation e-mail is sent to the user. At least one user per municipality has to be created.

The first municipality to join the platform was Gabrovo and with the support of EnEffect their profile was completed and later shown as an example in all its sessions with other municipal representatives.

### 5.2.4. Challenges and difficulties faced during users' identification and registration

- Some of the contacts were reluctant to participate in the pilot and prefer to wait until the platform is in full operation.
- Technical issues: for example, the registration email did not arrive correctly to the users. Usually, they get activation e-mail in a SPAM folder or don't get it at all. This leads to additional communication, usually including a couple of phone calls



and e-mails. The issue is now solved as they are initially instructed to check their SPAM folder in a few hours after the registration is done.

- Energy data not always available: leading to long process of data collection or potential users just give up and are not interested in putting that much effort.

### 5.2.5. Users registered in EN-TRACK

Потребителско име ^	Име	Електронна поща	Функция	Организации	Създаден	Променен	Вал
			BUILDING_ADMINISTRATOR	община Габрово	02/10/23 15:33	-	
			BUILDING_ADMINISTRATOR	община Ардино община Костенец община Троян	20/09/23 14:34	20/09/23 14:49	
			ORGANIZATION_ADMINISTRATOR	община Плевен	20/09/23 21:30	23/11/23 10:49	
			ORGANIZATION_ADMINISTRATOR	Валчик	27/06/23 16:07	25/11/23 13:25	
			BUILDING_ADMINISTRATOR	община Вършец	20/10/23 11:37	-	
			BUILDING_ADMINISTRATOR	община Сивлеград252-Administrative община Сивлеград219-Administrative община Сивлеград220-School община Сивлеград217-School община Сивлеград268-Commercial activities (incl. restaurants) община Сивлеград213-School община Сивлеград212-School община Сивлеград219-School община Сивлеград211-Art and culture община Сивлеград210-Art and culture община Сивлеград214-School община Сивлеград216-School община Сивлеград21-Sport община Сивлеград215-School община Сивлеград	30/10/23 10:42	-	
			BUILDING_ADMINISTRATOR	община Девняк	23/11/23 13:12	-	
			BUILDING_ADMINISTRATOR	община Габрово	07/12/23 10:35	-	
			BUILDING_ADMINISTRATOR	община Вуршец	15/12/23 13:22	15/12/23 14:53	
			BUILDING_ADMINISTRATOR	община Вуршец	15/12/23 13:27	-	
			BUILDING_ADMINISTRATOR	община Санданов	15/12/23 14:19	-	

Показване на резултати от 1 до 11 на 11

Figure 16 View of the registered users in the EN-TRACK platform

### 5.3. Buildings registration process

The building registration process during the testing phase had 2 stages:

1. EnEffect provided CIMNE with an Excel file with general data about 4000 buildings. The data includes parameters like GFA, annual energy consumption, energy class, address, etc. CIMNE then uploaded the data into the EN-TRACK platform and, with the support of EnEffect, checked that the information was correctly displayed.
2. Once the building data is ready in the platform the users from each municipality could then update, remove, supplement or change it.



### 5.3.1. Data sources

According to the national methodology for energy certification of buildings, each EPC issued should be accompanied by a detailed report and an Excel summary. This summary shall contain information about the building based on which the quality of the EPC issued is assessed. In addition, the summary shall serve to establish a national register of building information. The information in the summary is therefore sufficient to feed EN-TRACK with the data needed for the specific building.

### 5.3.2. Building data gathering

- The data of the buildings for the Bulgarian Pilot have been uploaded from an excel file customised by EnEffect based on data requested from the Sustainable Energy Development Agency that includes all buildings with EPCs for the period 2016-2022.
- This data base contains the basic information of the buildings required in EN-TRACK.
- Once registered, the user can manage and supplement the information with monthly energy consumption, specific building data and if needed update the information for the implemented or forthcoming energy efficiency measures.

### 5.3.3. Challenges and difficulties faced during building data registration

- Aligning the building typology taxonomy of EN-TRACK with those used in the Bulgarian building performance certification in order to be understandable to the Bulgarian users.
- Detecting and cleaning wrong/unreal values introduced from the energy audit database.
- Tackling the issue of missing building names in the energy audit database, where only the "building typology" and "municipality" is available. This required assignment of composed names using the information in both "building typology" and "municipality" fields. After registering, users have to specify the real names of the buildings editing the already entered (i.e. Hall Orlovets, Cultural House Emanuil Monolov, etc.).

## 5.4. Energy Efficiency Measures (EEM) registration process

As already mentioned above, based on the systematised data provided by the Sustainable Energy Development Agency for about 4,000 energy audits, information on recommended energy saving measures is available. The information contains both the expected energy savings and the required investments, and in view of the national legislation which obliges building owners to implement the measures recommended in the energy audit, most of these measures have been implemented or are in the process of implementation.



The task for future users is to review the information available for each measure and, once it has been implemented, to update the information on the investment required. Thanks to the platform, they will in turn be able to track and evaluate the actual energy savings of the actions taken.

Габрово - Дом на хумора

**EEM selection type**  
Building Fabric Measure

**Improvement measure**

EEM Types  
- Building Fabric Measure

Type description  
Building Fabric Measure

Economic investment ⓘ

Investment Currency  
BGN

Start work date ⓘ

Start operational date ⓘ

% of element or zone affected ⓘ

Comments and notes

Figure 17 View of the energy savings of the actions taken

#### 5.4.1. Results /Summary of EEM registered

Stepping on the national database, information for over 16,000 measures is already available in the platform:



Брой на мерките за енергийна ефективност	Общо инвестиции (млн. евро)	Регистрирани през тази година	Общо инвестиции през тази година (млн. евро)
16280	1 343,48	-	0,00

Вид	Сграда	Инвестиции (от)	Инвестиции (до)
-- Всички видове --	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="button" value="Филтриране"/> <input type="button" value="Изчистете"/> <input type="button" value="+ Показване на повече филтри"/>			

**ECM** [Нова ECM](#)

[Експортиране към DEEP](#)

Енергоспестяваща мярка	Наименование на сградата	Отдел/клон	Инвестиция:	Оперативен	Започни работа	Създай работа
Изоляция на стени кухни	община Крумовград:186-Multifamily residential	община Крумовград	159 617,00 BGN	07/03/2016	-	-
Мерки по покриви и тавани	община Крумовград:186-Multifamily residential	община Крумовград	24 546,00 BGN	07/03/2016	-	-
Мярки за под	община Крумовград:186-Multifamily residential	община Крумовград	20 975,00 BGN	07/03/2016	-	-
Мярка по сградната обвивка	община Крумовград:186-Multifamily residential	община Крумовград	81 388,00 BGN	07/03/2016	-	-
Мярки за под	община Крумовград:173-Multifamily residential	община Крумовград	16 562,00 BGN	07/03/2016	-	-
Мерки по покриви и тавани	община Крумовград:173-Multifamily residential	община Крумовград	92 477,00 BGN	07/03/2016	-	-
Мярка по сградната обвивка	община Крумовград:173-Multifamily residential	община Крумовград	73 810,00 BGN	07/03/2016	-	-
Изоляция на стени кухни	община Крумовград:173-Multifamily residential	община Крумовград	97 779,00 BGN	07/03/2016	-	-
Мярка по сградната обвивка	община Крумовград:71-Kindergarten	община Крумовград	21 743,00 BGN	07/01/2016	-	-
Подмяна на разпределителната система за отопление и охлаждане	община Крумовград:71-Kindergarten	община Крумовград	53 000,00 BGN	07/01/2016	-	-
Мярка за управление на отоплението и охлаждането	община Крумовград:71-Kindergarten	община Крумовград	3 500,00 BGN	07/01/2016	-	-
Изоляция на стени кухни	община Крумовград:71-Kindergarten	община Крумовград	78 231,00 BGN	07/01/2016	-	-
Мерки по покриви и тавани	община Крумовград:71-Kindergarten	община Крумовград	52 365,00 BGN	07/01/2016	-	-
Производство на топлинна енергия - Подмяна на горивна база	община Крумовград:71-Kindergarten	община Крумовград	18 000,00 BGN	07/01/2016	-	-
Мярка по сградната обвивка	община Крумовград:27-Multifamily residential	община Крумовград	63 396,00 BGN	19/05/2016	-	-
Мярки за под	община Крумовград:27-Multifamily residential	община Крумовград	30 366,00 BGN	19/05/2016	-	-
Изоляция на стени кухни	община Крумовград:27-Multifamily residential	община Крумовград	69 216,00 BGN	19/05/2016	-	-
Изоляция на стени кухни	община Крумовград:72-School	община Крумовград	238 512,00 BGN	25/04/2018	-	-
Мерки по покриви и тавани	община Крумовград:72-School	община Крумовград	247 410,00 BGN	25/04/2018	-	-
Мярки за под	община Крумовград:72-School	община Крумовград	97 764,00 BGN	25/04/2018	-	-

Показване на резултати от 1 до 20 на 16280

Figure 18 View of the measures available in the platform



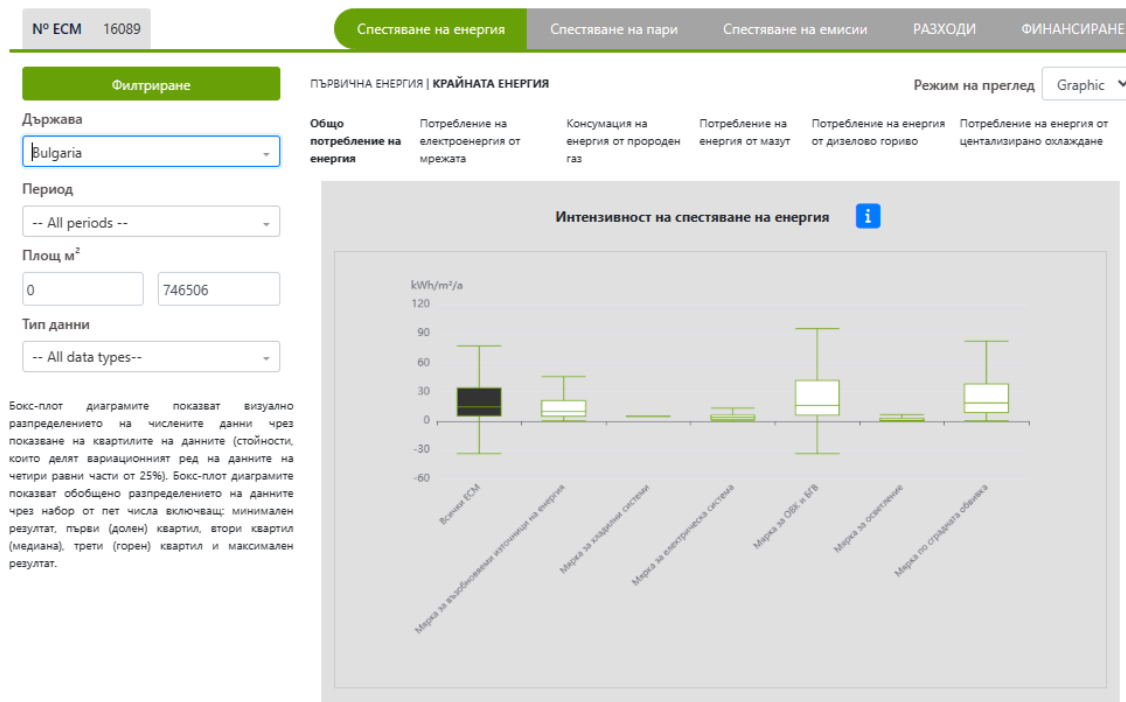


Figure 19 View of one measure available in the platform

#### 5.4.2. Challenges and difficulties faced during EEMs registration process

The main challenge in implementing the measures in EN-TRACK was the different taxonomy in Spain and Bulgaria. The platform offers up to 4 different levels of detail of the measures introduced, whereas in Bulgaria such data is missing. The task of energy managers using the platform is to add the necessary details and specify the measures. For example, if a measure is planned to improve the efficiency of hot water production, they should specify whether the source is replaced, the management is improved, the pipes are insulated, etc. This naturally means extra effort for the users and to reduce their workload, the EnEffect team actively supports them in this process.

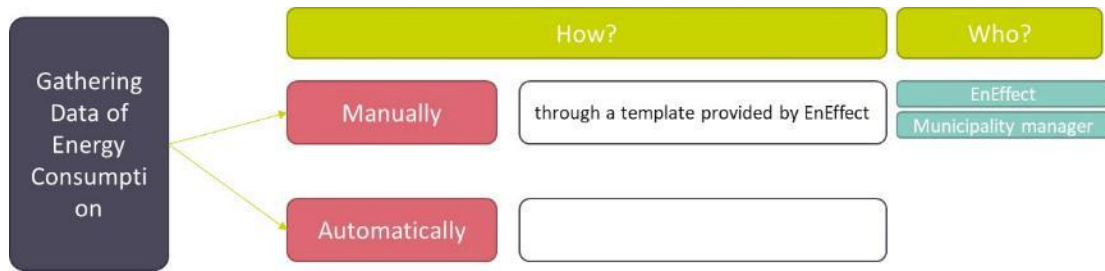
#### 5.5. Energy consumption registration process

Energy consumption data is available in the invoices issued by the respective suppliers and is collected on a monthly basis. Most often, invoices are provided on paper or in portable document format (.pdf), which makes the process of systematising the data labour-intensive. In many municipalities, the information is not systematised and therefore municipal experts must dedicate many hours in order to provide the information in suitable form for automatic upload in the platform. EnEffect, as an organisation that supports local authorities to use energy more sustainably, has information on the consumption of over 200 buildings in around 20 municipalities. It is this information that has been used to demonstrate the operation of the platform and its functionalities.

At this stage, automatic data collection is not possible in Bulgaria, as most municipal sites do not have smart meters, and even if they did, it is not possible to obtain the data automatically. However, EN-TRACK is prepared for automatic data entry enabling future development when smart metering is rolled out in the country.







**5.5.1. Templates**

The templates used for energy data gathering used by EnEffect are shown below. As the information is already available, it can easily be transferred to the EN-TRACK template and uploaded to the platform.

ГОДИНА:		ОБЕКТ:											
Вид енергоносител/гориво (избор от падащото меню)	Мерна единица / избор от падащото меню	Януари	Февруари	Март	Април	Май	Юни	Юли	Август	Септември	Октомври	Ноември	Декември
Електроенергия													
Закупена зелена енергия													
Промислен газ/ол и дизел													
Мазут													
Природен газ													
Пропан-бутан													
Черни каменни въглища													
Лигнитни/кафяви каменни въглища													
	лв.												
	лв.												
	лв.												

\* Всички цени се попълват с вкл. ДДС

Figure 20 Template used for energy data gathering

Industrial gas oil and diesel
Purchased green energy
Fuel oil
Natural gas
Propane-Butane
Black coal
Lignite/brown coal

A detailed description of the process for uploading data to the platform is given in *Deliverable 6.2. Training material package for using EN-TRACK by building owners and contractors.*



Bulgaria > община Габрово  
**ГАБРОВО - ДОМ НА ХУМОРА**

-  
 - (-)

---

**Информация за сградата**

Организация #Id: 40732-1810  
 Часове на отваряне/затваряне: -/  
 Начин на използване: Други  
 Година на построяване: -

**Информация за местоположението**

Климатична зона: -  
 Координати (дължина, ширина): -, -  
 Адрес: -, - - - Gabrovo (-)

Кадастрални идентификатори:

**Информация за зоните в сградата**

Изберете зона в сградата

- o Building

Зона в сградата:

Зони  Идентификатор за Доставка на Енергия (ИДЕ)

ЕСМ (Енергоспестяващи мерки)  Елементи

Нова точка за доставка на комунални услуги

**Име** ^

- 1810-EnergyConsumptionGridElectricity - Електрическа енергия
- 1810-EnergyConsumptionDistrictHeating - Централизирано отопление

Показване на резултати от 1 до 2 на 2

Then choose the energy carrier data you want to [upload](#)

First click [here](#)

Figure 21 Step 1 - Description of the process for uploading data to the platform

SummarySource  ManualSource

Ръчно въвеждане на данни

First choose Manual Source

Then press this [button](#)

Name: -1810-EnergyConsumptionGridElectricity	Source: SummarySource
Tariff: -	Contracted Power: -
Address: -	Postal Code: -
City: -	Province: -

Start date:

End date:

Напред

Експортирай

Figure 22 Step 2 - Description of the process for uploading data to the platform

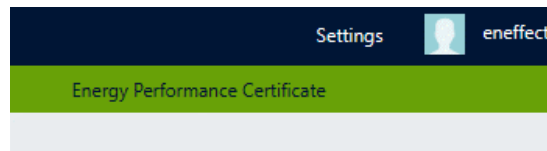


### 5.5.2. Challenges and difficulties faced during energy consumption registration

The main challenge for both the EnEffect team and potential users of the platform is the lack of ability to automatically generate consumption data, as is being done in the Catalan pilot. Thus, the process is time consuming and future improvement actions are needed. One of the proposals to be tested in the future is to prepare a clause, when signing a contract with a new energy supplier, obliging the supplier to provide the data in Excel according to the EN-TRACK template.

### 5.6. Energy Efficiency Certificates (EPC)

According to the national legislation and building assessment methodology, each EPC issued in Bulgaria is accompanied by an Excel file that summarises the key data for the site. Since the content of this file is strictly regulated and does not allow changes, the developers of EN-TRACK made it possible to upload it to the platform, which makes it easier for users to enter information about the specific building. In the Bulgarian version of EN-TRACK there is an additional button.



#### 5.6.1. Energy Efficiency Certificates (EPC) registration

Detailed guidance for the registration of the EPC in the platform is presented in *Deliverable 6.2. Training material package for using EN-TRACK by building owners and contractors*.

The following steps are needed to upload the MS Excel summary (Resume):

 A series of screenshots illustrating the EPC registration process. 
   
Step 1: A screenshot of the main menu with a callout box pointing to a button labeled 'Step 1: Click here'.
   
Step 2: A screenshot of the 'Сертификат за енергийни характеристики' page with a callout box pointing to a button labeled 'Step 2: Choose New certificate'.
   
Step 3: A screenshot of the 'Нов сертификат за енергийни характеристики - Неизвестна сграда' page. A callout box points to the 'Избор на сграда' dropdown menu, and another callout box points to the 'Изберете файл' button, labeled 'Step 3: Click to choose file'.
   
Step 4: A callout box points to the 'Изберете файл' button, labeled 'Step 4: Upload the file'.
   
Additional text: 'When a new window opens you can either choose to import a certificate for a new building (not existing in the platform) or choose an existing building from the list in the left. Then:'

Figure 23 Guidance for the registration of the EPC in the platform



## 6 User Engagement Strategy

The engagement strategy addresses the challenge of keeping users engaged and committed to platform during the testing operation phase.

This section describes the different channels of communication, and the proposed communication messages, that contribute to this strategy.

### 6.1.1 User continuous engagement

One of the challenges throughout the development of the operation test is to maintain user interest in the platform and to get them to use it regularly. The efforts are focused on ensuring that active users introduce and check their data on an ongoing basis. This is also linked with the Help Desk (D6.5).

The risks that prevent the achievement of a successful engagement will be also identified as well as the possible corrective measures. This engagement strategy is divided into two different phases. The first phase identifies the channels of communication and topics for the template messages that the users will receive. The second phase involves testing with a select group of real users. The outcomes of the users interactions with the platform will be explained in the deliverable “D6.7. Final report on stakeholder engagement and capacity building. Findings and recommendations”.

### 6.1.2 Communication channels

There are different communication channels through which the leaders of each pilot communicate with the user and vice versa. The main ones are described in the table below.

Channels	Description	Purposes – what kind of messages for users and SH...
<b>E-mail</b>	Main channel of communication with registered users. All messages will be sent based on the e-mail address provided.	<ul style="list-style-type: none"> <li>• Registration invitation and welcome.</li> <li>• Reminders</li> <li>• System alerts</li> <li>• Etc.</li> </ul>
<b>Newsletter</b>	<p>A periodic newsletter will be published to inform the latest system news, functions and features.</p> <p>The newsletter will be sent to the users registered in newsletter data base and will be uploaded in the website</p>	<p>Audience. General public. for all those registered in Newsletters (users or not).</p> <p>Main messages are the new functionalities and other topics in relation to Energy Efficiency and Investment of measures and projects.</p>
<b>Web</b>	This traditional channel of communication is the main gateway to publicise the platform, register and request more information.	<p>The purpose is to publish all the new advances of the platform.</p> <p>Facilitate the access to the platform and the helpdesk and to provide information to new visitors.</p>
<b>Helpdesk</b>	This service is a specific communication channel to solve doubts and technical incidences that have been reported by the user. It is also a way to collect the user's feedback in case something does not work correctly or could be improved.	<p>The Helpdesk could be supported with different tools:</p> <p>Via web - Via chat - Via FAQs...</p> <p>Via Cloud App such as TEAMS</p>



<b>Social Media</b>	<p>The social media (Twitter, LinkedIn, others) are mainly intended to notify news in a very synthesised way but aiming to have a great impact on the users and the followers.</p> <p>They are also a mean to share and to perceive feedback from users and to analyse whether further action is needed to promote the platform.</p>	<p>Scope. Only followers</p> <p>The messages must be short but impressive.</p>
---------------------	--	--

Table 3 Channels of Communication

### 6.1.3 Topics and messages

During the testing phases the users have received different messages that have been listed in the following table.

Examples of Topics
<ul style="list-style-type: none"> <li>• 1st invitations- registration welcome</li> <li>• Reminders (in case they don't enter to the link sent)</li> <li>• Functionalities available</li> <li>• Updates and News functionalities.</li> <li>• Once new data is upload (e.g. You can check...)</li> <li>• Inform new data uploaded</li> <li>• When a new Building or Organization have been created</li> <li>• Missing information...</li> <li>• News and FIF /BOF</li> <li>• Recommendations, advices, warnings...</li> <li>• Ensure the continuously use of the platform</li> <li>• ...</li> </ul>

Table 4 Examples of topics for users messages

### 6.1.4 Catalan PILOT

User engagement of the Catalan pilot has been led by ICAEN.

<b>Users</b>	Building Managers Operation and Service Managers
--------------	---

Channels of communication	Purposes
<b>e-Mail</b>	The e-mail has been the main channel of communication by ICAEN. The purpose is to inform the most relevant information about the EN-TRACK new functionalities
<b>Microsoft TEAMS Group</b>	<ul style="list-style-type: none"> <li>- Information sharing</li> <li>- Trainings</li> <li>- Virtual meetings</li> </ul>
<b>Videos</b>	ICAEN shared the video links of trainings and virtual meetings to support the energy managers.

### TEAMS Group



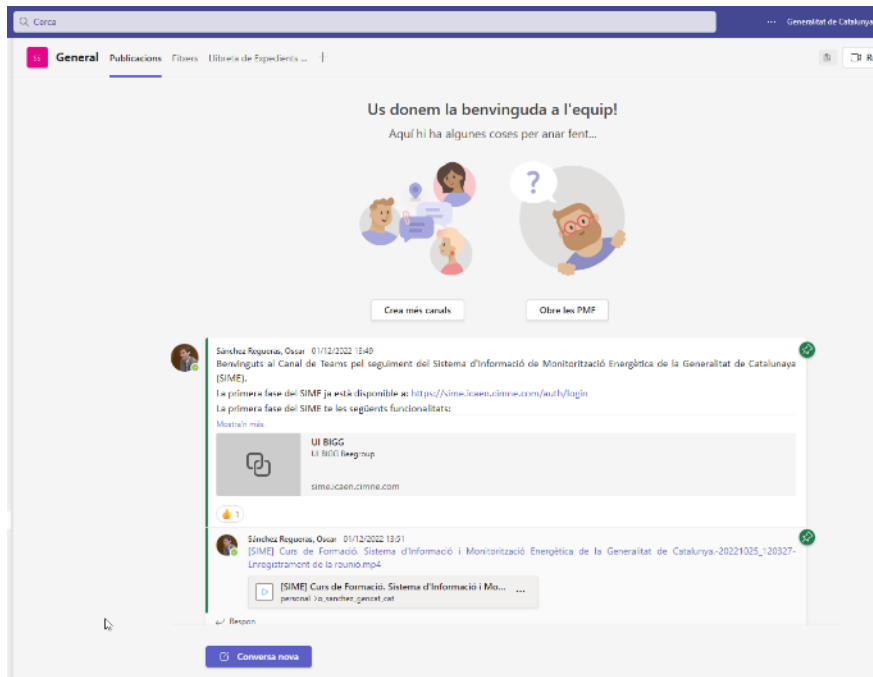


Figure 24 View I of the Teams Group

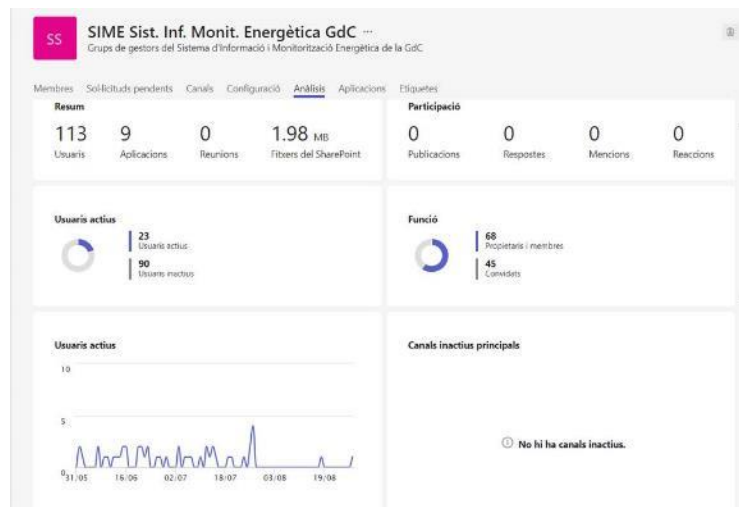


Figure 25 View II of the Teams Group



## Videos



Figure 26 View of one video

## Trainings

Throughout the project ICAEN carried out 2 training meetings in order engage the building managers to use the platform.

	Date	Title	Topics	Deliverables
1 <sup>st</sup>	29/09/2021	Development of the Information System and Energy Monitoring of the Generalitat de Catalunya. 1st meeting	<ul style="list-style-type: none"> <li>• Presentation of the objectives and current status in the development of the monitoring system</li> <li>• Validation functionalities proposal (survey)</li> <li>• Identification of available energy information (survey)</li> </ul>	D.3.1.
2 <sup>nd</sup>	25/10/2022	Training Course. Energy Information and Monitoring System of the Generalitat of Catalonia.	<ul style="list-style-type: none"> <li>• Organizational structure of the Generalitat and the public sector</li> <li>• Linking of building data (GPG DG Heritage) and cadastre</li> <li>• Registration and management of the energy improvement and sustainability measures you carry out in your buildings.</li> </ul>	D.4.2



### 6.1.5. Bulgarian PILOT

The users' engagement of the Bulgarian pilot has been led by EnEffect. Targeted users and the main channels of communication are presented below.

<b>Users</b>	Municipal experts Municipal management
--------------	---

Channels of communication	Purposes
<b>Public events</b>	The first step to reach a maximum number of stakeholders was to present the project and the platform at national events related to sustainable energy management and energy efficiency. It was there that new contacts were made with potential users of the platform.
<b>BOF</b>	Key to attracting stakeholder interest was holding forums where small groups could present the platform and get feedback from users.
<b>e-Mail/phone</b>	Based on the above two, the EnEffect team was able to expand the scope of municipalities it works with directly. The contacts gathered in this way were contacted directly by phone or email, and they received timely information on the development of the platform.
<b>Trainings (workshops/webinars)</b>	Information events and trainings were organized for the already identified users of the platform as well as for potential new users in order to explain the use of the platform and to make them aware of the benefits provided by EN-TRAC.

List of engagement activities for Bulgarian stakeholders is presented hereafter:

<b><u>Public events</u></b>			
<b>Event</b>	<b>Date</b>	<b>Discretion</b>	<b>Participants</b>
EE-EU Regulations & Funding	27/04/21	Presenting the project	50
Sustainable Energy Investment Forum	19/05/2021	Presenting the project	150
Climate and Energy Days, hybrid event by Gabrovo municipality	06/24/2021	Presenting the project	105
Supporting nZEB deployment in Europe	21/10/21	Presenting the project	40
nZEB in Smolyan	24/09/21	Presenting EN-TRACK and BOF	18
Consultancy meeting about municipal energy management	16/11/2021	Presenting EN-TRACK and BOF	20
XIV National Conference Of the Association of the Bulgarian Energy Agencies	29/11/2021	Presenting the project	200
Municipal energy managers training	22/11/2021	Presenting the project	15
Sustainable Energy Investment Forum	16/03/2022	Presenting the project	130





Roundtable on Low-Carbon Transition Policies of the Bulgarian Energy Sector	28/04/22	Slide presentation of EN-TRACK, FB post and website publication	100
Mayors Talk conference	7-8/07/2022	Slide presentation of EN-TRACK	80
XXV National Conference of the Municipal Network for Energy Efficiency EcoEnergy	28/02/2023	Slide presentation of EN-TRACK	137(62 in person, 75 online)
3rd SMAFIN National Roundtable for financing of energy efficiency	01/03/23	Slide presentation of EN-TRACK	145 (73 in person, 72 online)
<b><i>Trainings (workshops/webinars)</i></b>			
<b>Event</b>	<b>Date</b>	<b>Discretion</b>	<b>Participants</b>
QualDepc webinar	02/04/2021	Presentation of EN-TRACK at QualDepc webinar and user feedback	30
ENERGY EFFICIENCY AND RES - short course for municipal specialists	15/02/22	Slide presentation of EN-TRACK	20
Training for HOAs	12/04/22	Presenting EN-TRACK to building owners participating in the training	50
Structuring of data for municipal energy management	04/08/22	EN-TRACK visibility throughout the training	10
Workshop for municipal energy managers	05/12/23	Workshop/training	25
National Conference of the Bulgarian Energy Agencies	29/11/2023	Workshop/training	40
Training for municipal experts	09/10/23	Workshop/training	14



## 7 Conclusions

The testing in operation phase of the EN-TRACK system functionalities in real operation has been successfully carried out through two pilots, one in Spain and the other in Bulgaria. The pilots have presented some differences in terms of scope and technical issues, such as data collection and management strategies, or user profiles. However, both pilots have addressed the same issues related to user identification and registration, building registration, energy consumption registration, energy efficiency measures registration, and energy certificates and audits registration.

The different strategies followed by each pilot have been elaborated to respond to the differing testing in operation functionalities of each pilot. These strategies have served to identify potential users, as well as to gather, enter, and upload new data into the system. The difficulties and challenges encountered during the testing phase for each of the issues mentioned above have also been described and highlighted.

One of the most important aspects covered during the pilot phase has been the continuous user engagement. To ensure a successful implementation of the pilot and testing of the platform, it has been necessary to cooperate directly with end-users, mainly building owners or building energy managers, and secondly with financial institutions. To do so, key aspects such as user engagement strategy and communications channels have been evaluated and defined throughout the report.

The findings have significant implications for energy efficiency and investment in buildings. The EN-TRACK system has demonstrated its potential to provide valuable information and insights to building owners and energy managers, enabling them to make informed decisions about energy efficiency measures and investments. The EN-TRACK system functionalities have also shown to be useful for financial institutions, providing them with reliable data to assess the energy performance of buildings and make informed decisions about financing energy efficiency projects.

Overall, the EN-TRACK pilot projects have been successful in achieving its objectives of developing and testing a user-friendly and efficient energy efficiency performance-tracking platform for benchmarking savings and investments in buildings. The outcomes have the potential to contribute significantly to the EU's energy efficiency and climate goals, and it is hoped that the EN-TRACK system will be widely adopted and used in the future.

