ExcEED - European Energy Efficient building district Database:
from data to information to knowledge

ExcEED

EU Energy Efficient buildings platform: from data, to information, to knowledge

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723858.

BUILD UP

ExcEED

European Energy Efficient buildings database:

from data to information to knowledge

INTRO TO EXCEED PROJECT
&
PLATFORM BENEFITS

Roberto Lollini
ExcEED Coordinator
roberto.lollini@eurac.edu

eurac
research

WHY EXCEED BUILDINGS DATA PLATFORM?

What do we know from buildings?

...and what can we learn?

EXCEED

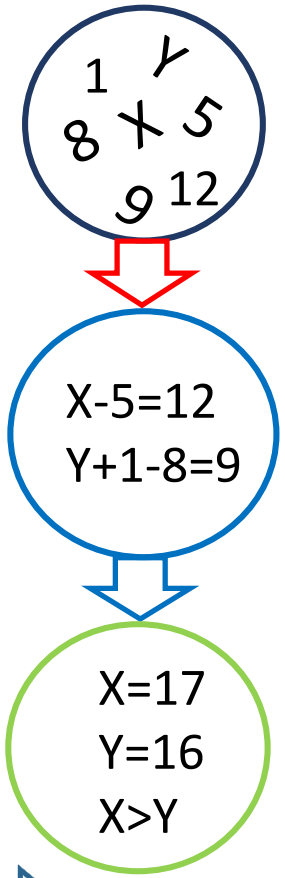
WHY EXCEED BUILDINGS DATA PLATFORM?

ExcEED GOAL

To create a European self-sustainable and dynamic platform to collect, post-process and publish measured and qualitative **data** on beyond the state-of-the-art buildings (but not only).

The advanced tools and KPIs associated to the platform enables the analysis of actual energy performance and environmental quality at the level of single building/district, geo-cluster of buildings, and European new or renovated building stock (**information**).

The analysis result in **knowledge** to inform owners and facility *managers* of a building stock or a single building, *designers*, and *policy makers*.



EXCEED

PARTNERS AND ROLES

Coordinator. Data management, development of KPIs, dashboard, geo-cluster tool, and IEQ survey.

Database and associated tools developer.

Communication. Knowledge on European building stock and policies.

KPIs for renewable energy production. Platform user, demonstrating practical benefits.

KPIs for heating systems. Hoval Italian headquarter as project demo-case.

EXCEED

EXCEED PLATFORM IS AIMED AT SUPPORTING THE BUILDINGS ENERGY MANAGEMENT

Learn more about your energy performance building with ExcEED!

ExcEED transforms data coming from energy monitoring system and surveys into useful information.

Free and useful tools are available in ExcEED!

- **Evaluate actual building energy performance** by using a **set of dedicated key performance indicators!**
- Classify, clusterise and benchmarking building stock data by displaying them on a map with the **Geoclustering tool!**
- Collect information from the buildings occupants and find out their satisfaction by the Indoor **Environmental Quality tool!**

EXCEED PLATFORM IS AIMED AT SUPPORTING THE BUILDINGS ENERGY MANAGEMENT

Benchmark your building energy performance to evaluate potential energy and cost savings!
The huger is the data amount, the higher the value!
The Platform is offering you a unique display of building performance for the different EU climatic zones.

Be part of the energy transition to a decarbonized Europe!
Benefit from the automated calculations and assessments provided by the ExcEED platform.

Join the ExcEED platform and community by uploading your building data NOW!

ExcEED

EXCEED PLATFORM IS AIMED AT SUPPORTING THE BUILDINGS ENERGY MANAGEMENT

ExcEED is free of use for those who upload data until September 2019 at least!

Join the ExcEED platform and community by uploading your building data NOW!

Visit us @ exceedproject.eu

@ExcEED_H2020

group: ExcEED - Knowledge sharing on buildings data

ExcEED

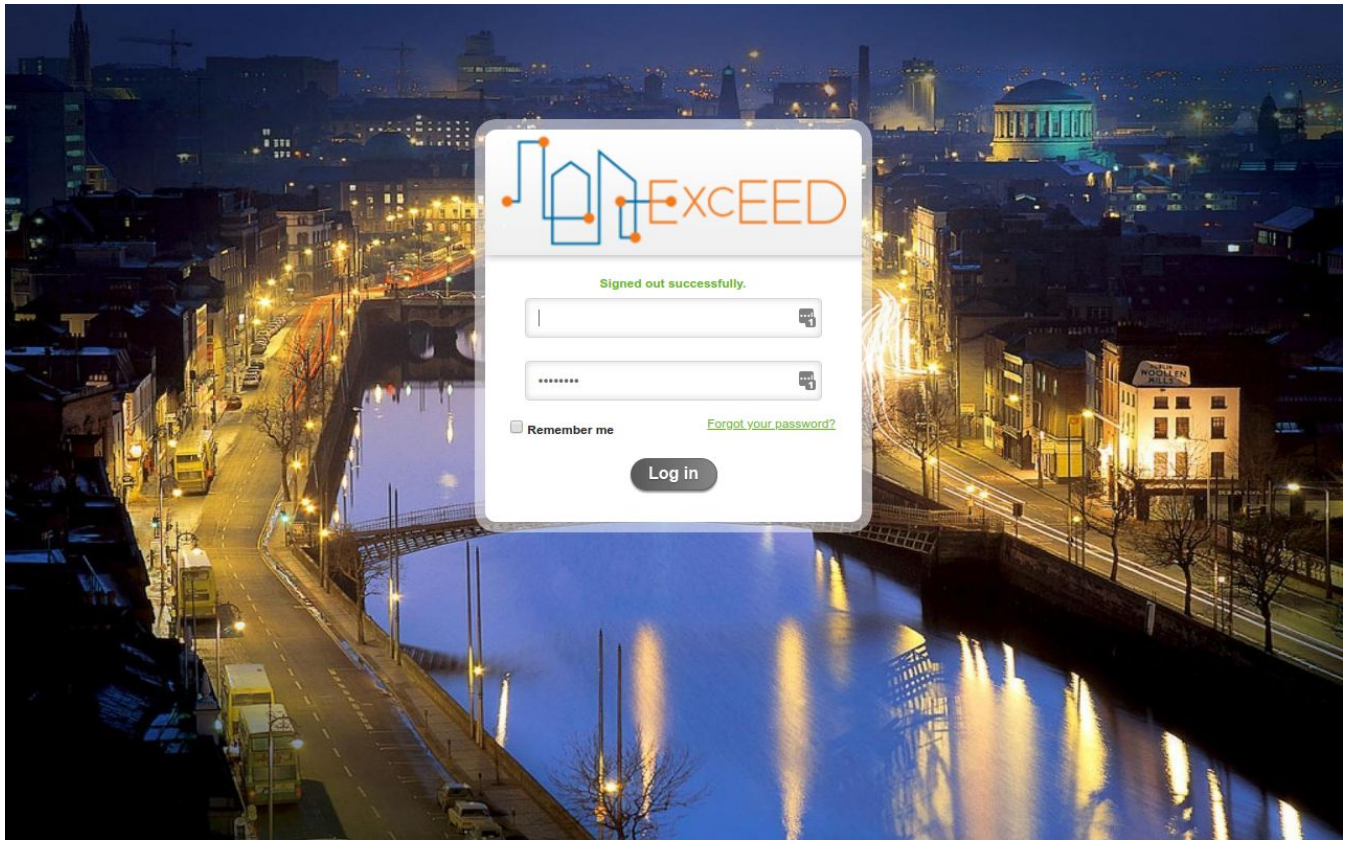
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723858.

HOW TO UPLOAD DATA IN EXCEED DASHBOARD

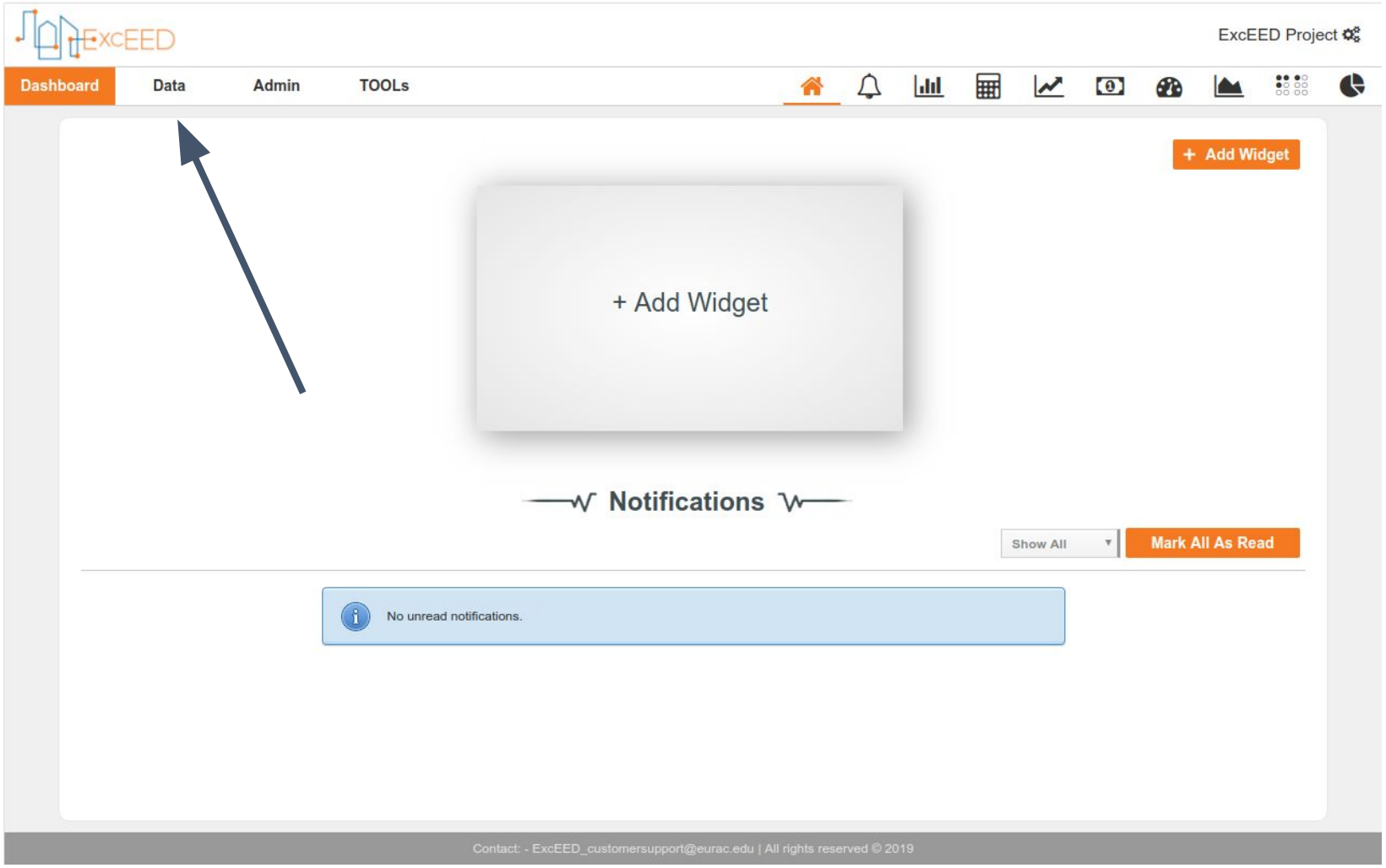
&

HOW TO VISUALIZE BUILDING KPIS

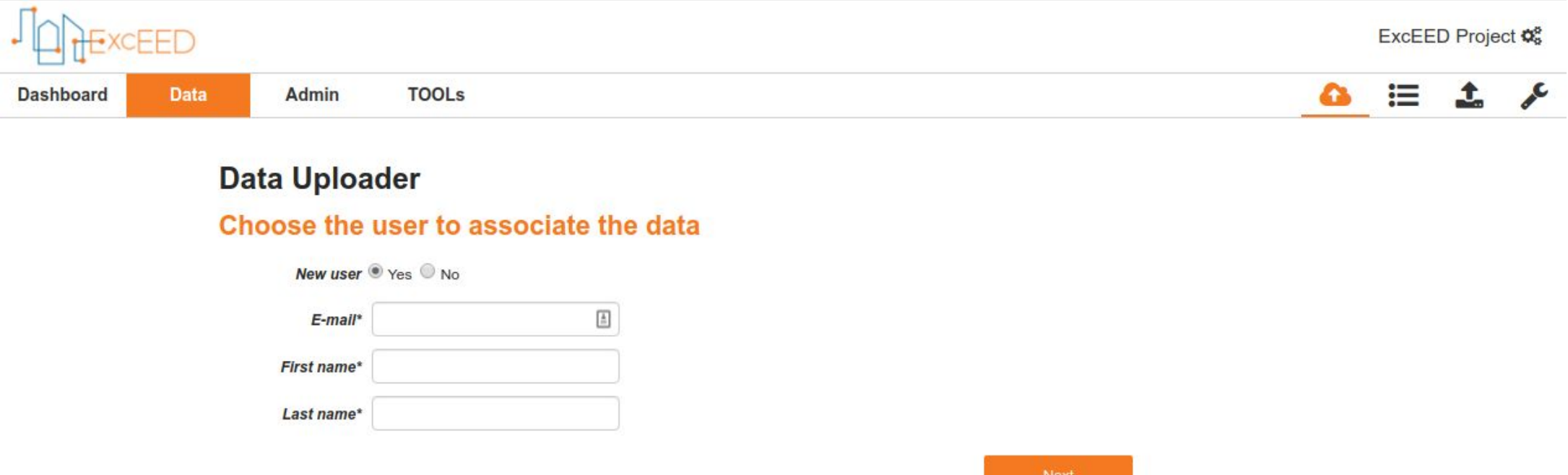
https://dashboard.exceedproject.eu



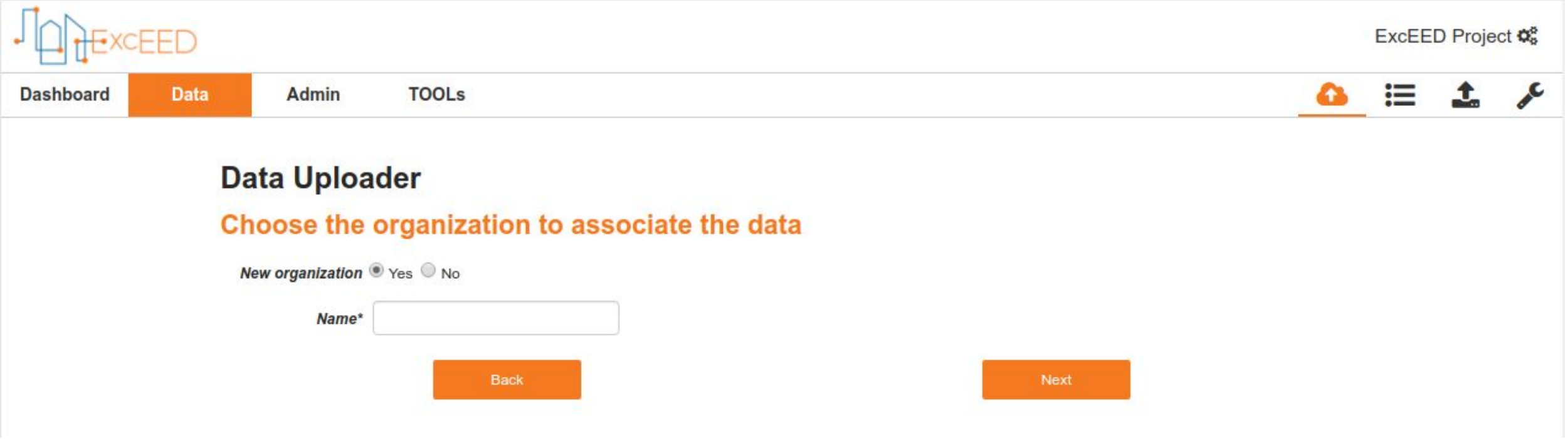
ExcEED


ExcEED
ExcEED Project
Dashboard
Data
Admin
TOOLs
+ Add Widget
+ Add Widget
Notifications
Show All
Mark All As Read
No unread notifications.
Contact: - ExcEED_customersupport@eurac.edu | All rights reserved © 2019

ExcEED

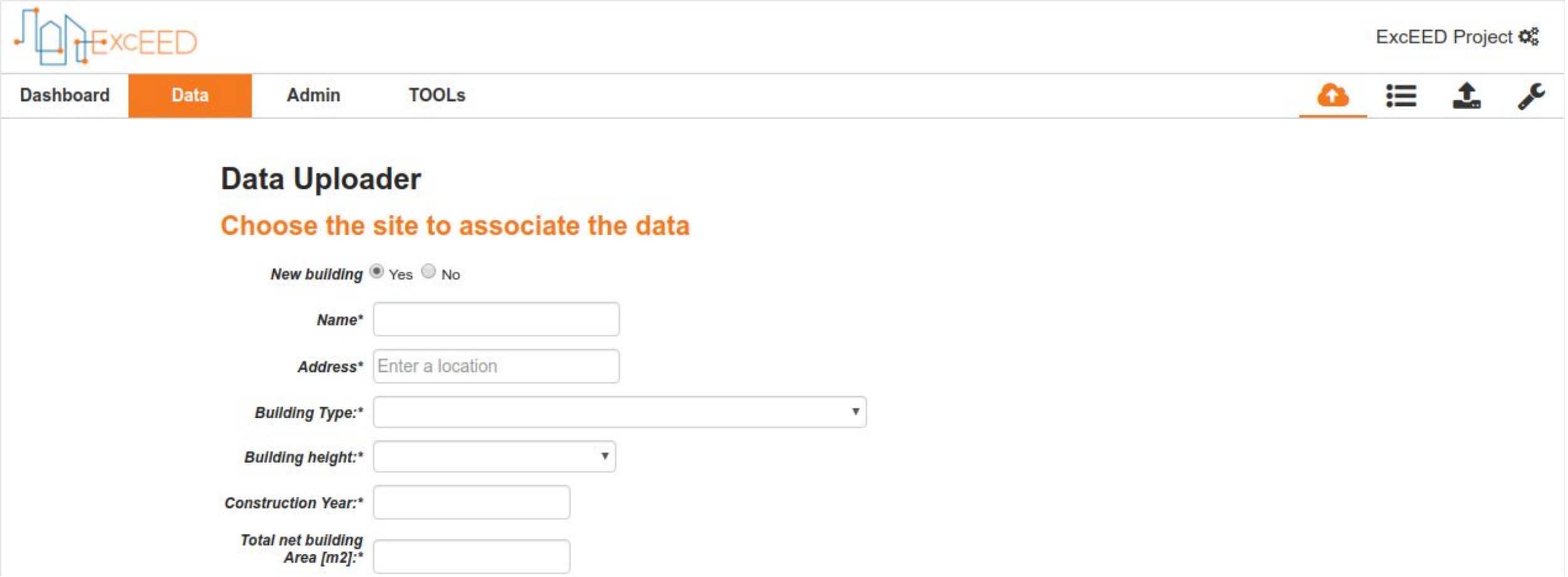


- New or existing user
- Ability to add a colleague to the platform



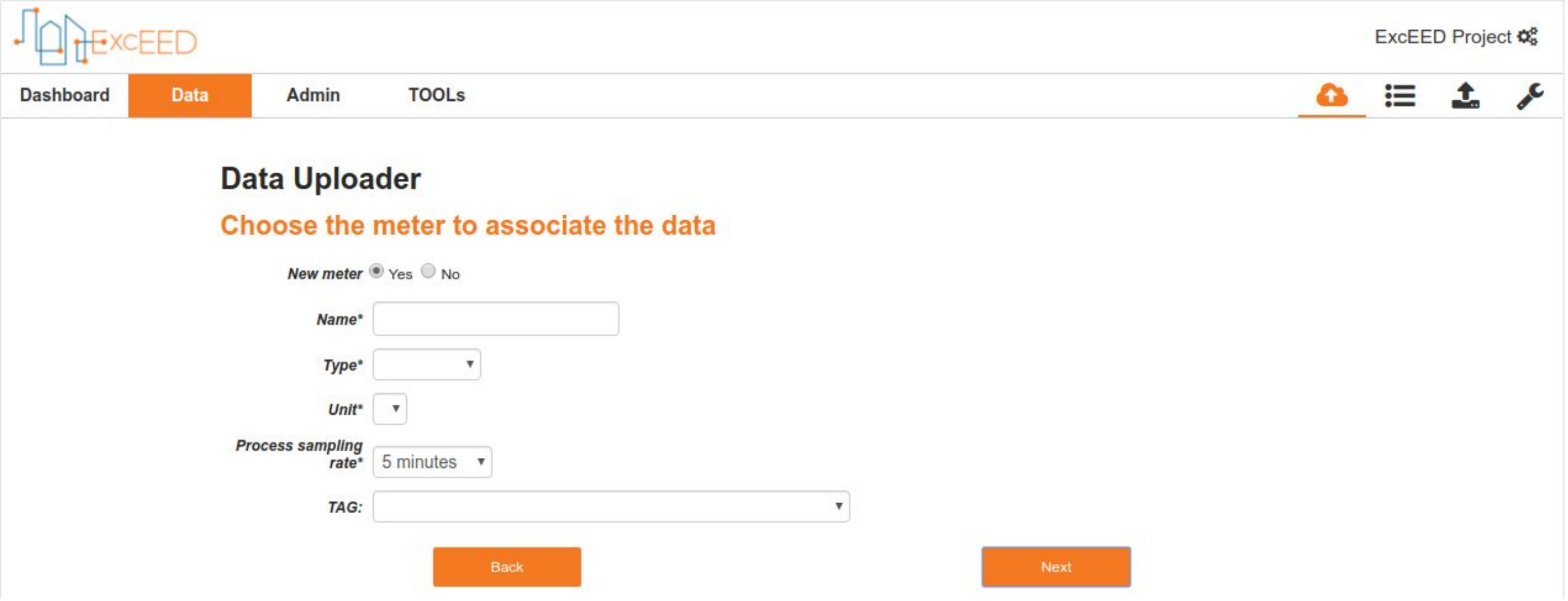
- Ability to create or select an existing organization
- The organization is the first level of the tree hierarchy

ExcEED



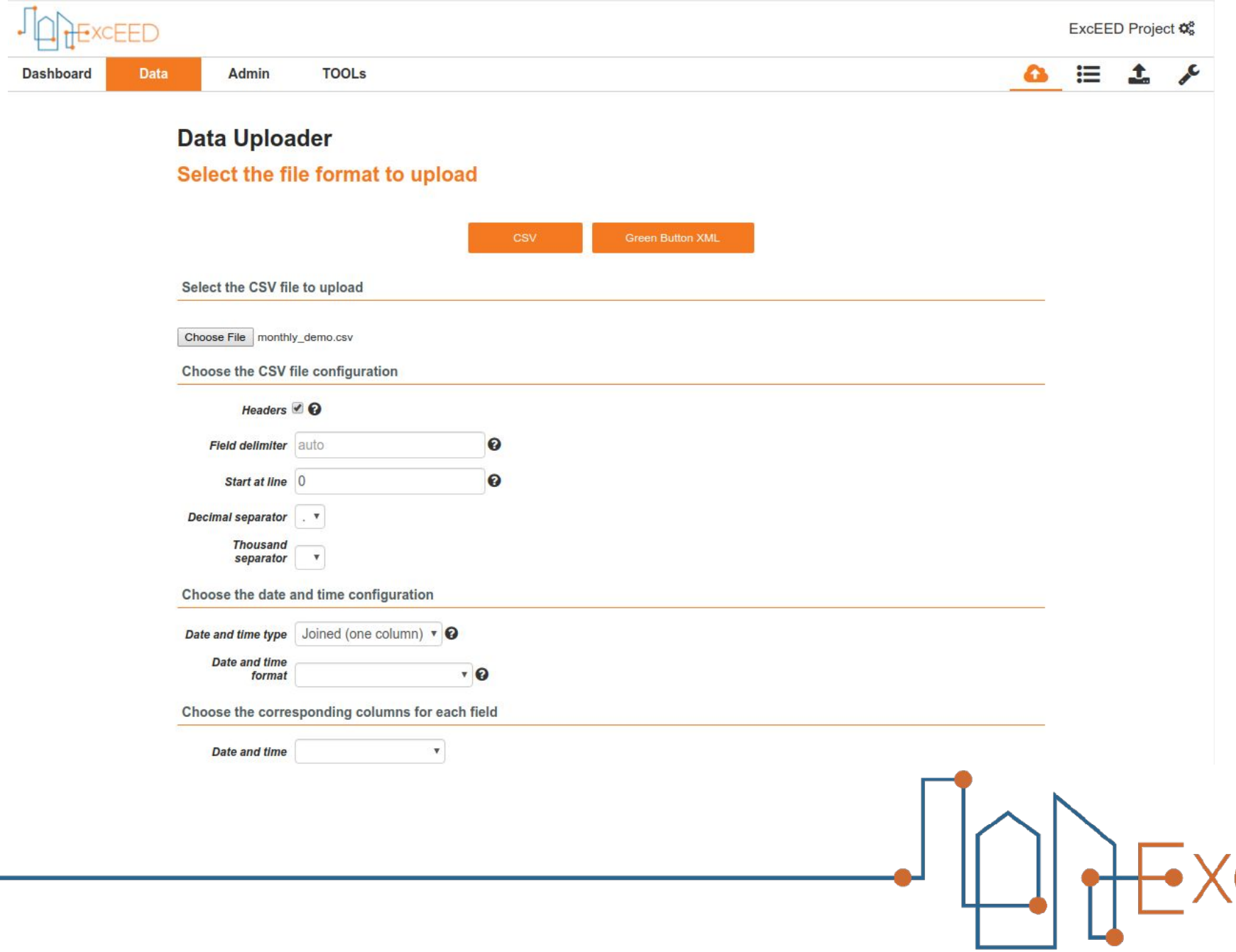
- Ability to create or select an existing site/building
- The site/building is the second level in the hierarchy
- Relevant metadata can be added in this step

ExcEED

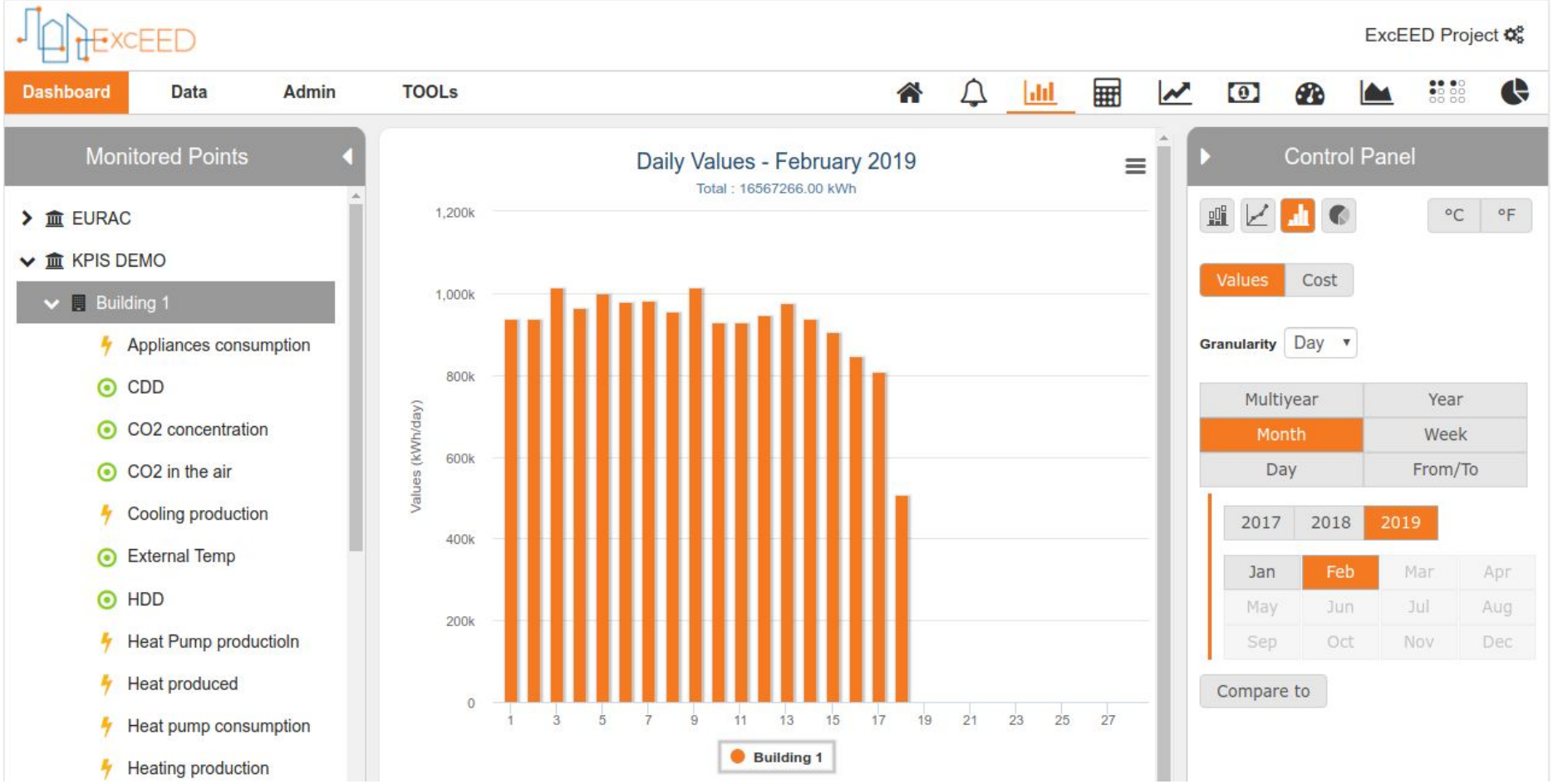


- Ability to add or select an existing meter
- The meter is the third level in the hierarchy
- Meter options: Electrical, Gas, Water, Numeric
- The meter can be TAGGED for the system to understand its meaning

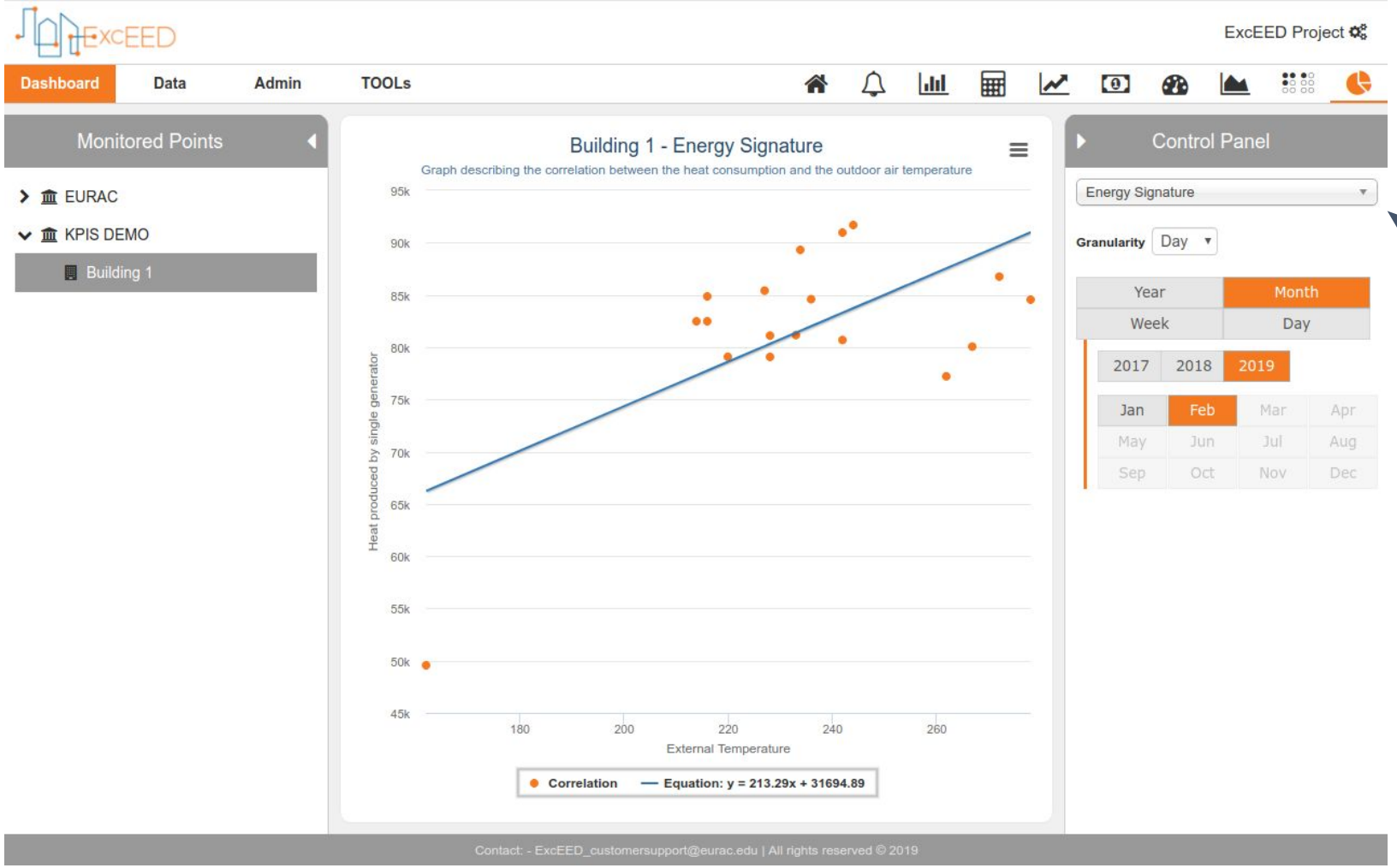
ExcEED


ExcEED
ExcEED Project
Dashboard
Data
Admin
TOOLs
Data Uploader
Select the file format to upload
CSV
Green Button XML
Select the CSV file to upload
Choose File
monthly_demo.csv
Choose the CSV file configuration
Headers
Field delimiter
auto
Start at line
0
Decimal separator
.
Thousand separator
Choose the date and time configuration
Date and time type
Joined (one column)
Date and time format
Choose the corresponding columns for each field
Date and time

ExcEED



- Check uploaded data
- Get basic insights on data
- Ability to compare different time series



Building selection

KPI selection

- KPIs based on uploaded data
- Ability to navigate in the time series in different granularities

Visit us @ exceedproject.eu

@ExcEED_H2020

group: ExcEED - Knowledge sharing on buildings data

ExcEED

Building KPIs and Geocluster tool

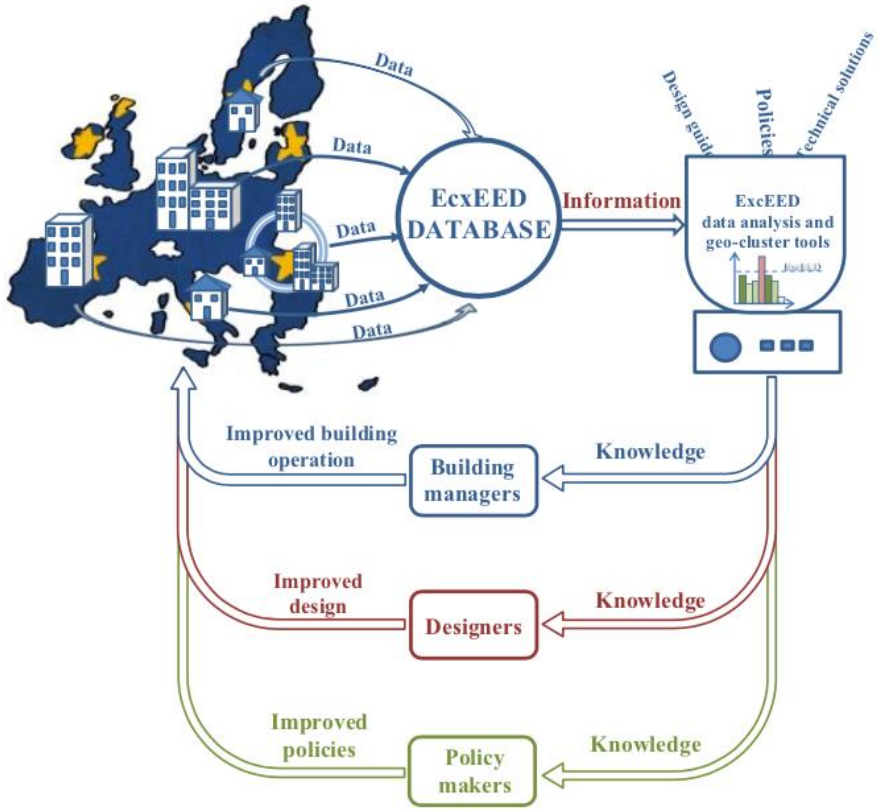
EXCEED Platform

MAIN COMPONENTS:

- Database to collect data from building monitoring systems.
- Dashboard to visualize building performances through suitable *Key Performance Indicators.*

- Geo-cluster tool to classify, cluster and benchmark your building with all buildings available in the Exceed database.
- Indoor Environmental Quality survey to get feedback from building users.

AIM: Provide knowledge and useful information to support decision makers and to improve building operation



EXCEED

EXCEED Platform

Key Performance Indicators (KPIs)

- Early stage of Exceed project more than 40 KPIs, available in:
  - https://zenodo.org/record/1034125#.XPUj7C2B3-Y
  - http://kpidb.eurac.edu

- Dashboard: 26 KPIs related both on Energy and Indoor Environmental Quality aspects for Energy and Efficient Buildings.

eurac research KPI Database

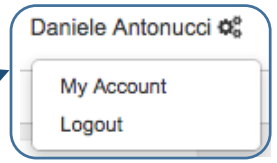
The tool is a repository of KPIs for buildings/district and cities collected from European projects, standards and scientific papers

AIM: Provide knowledge and useful information to support decision makers and to improve building operation

EXCEED

EXCEED Platform

Account setting

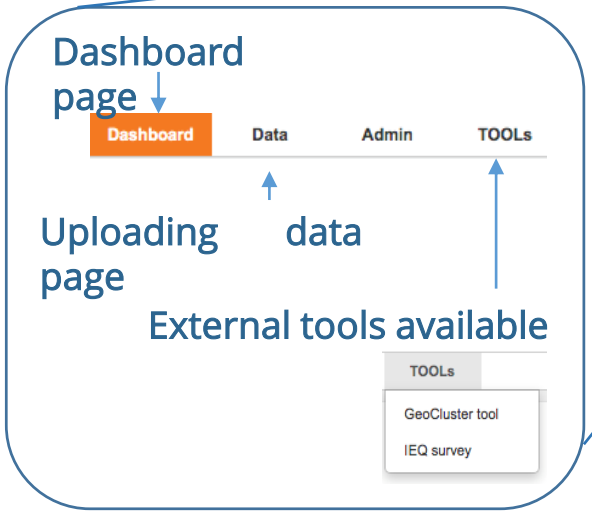


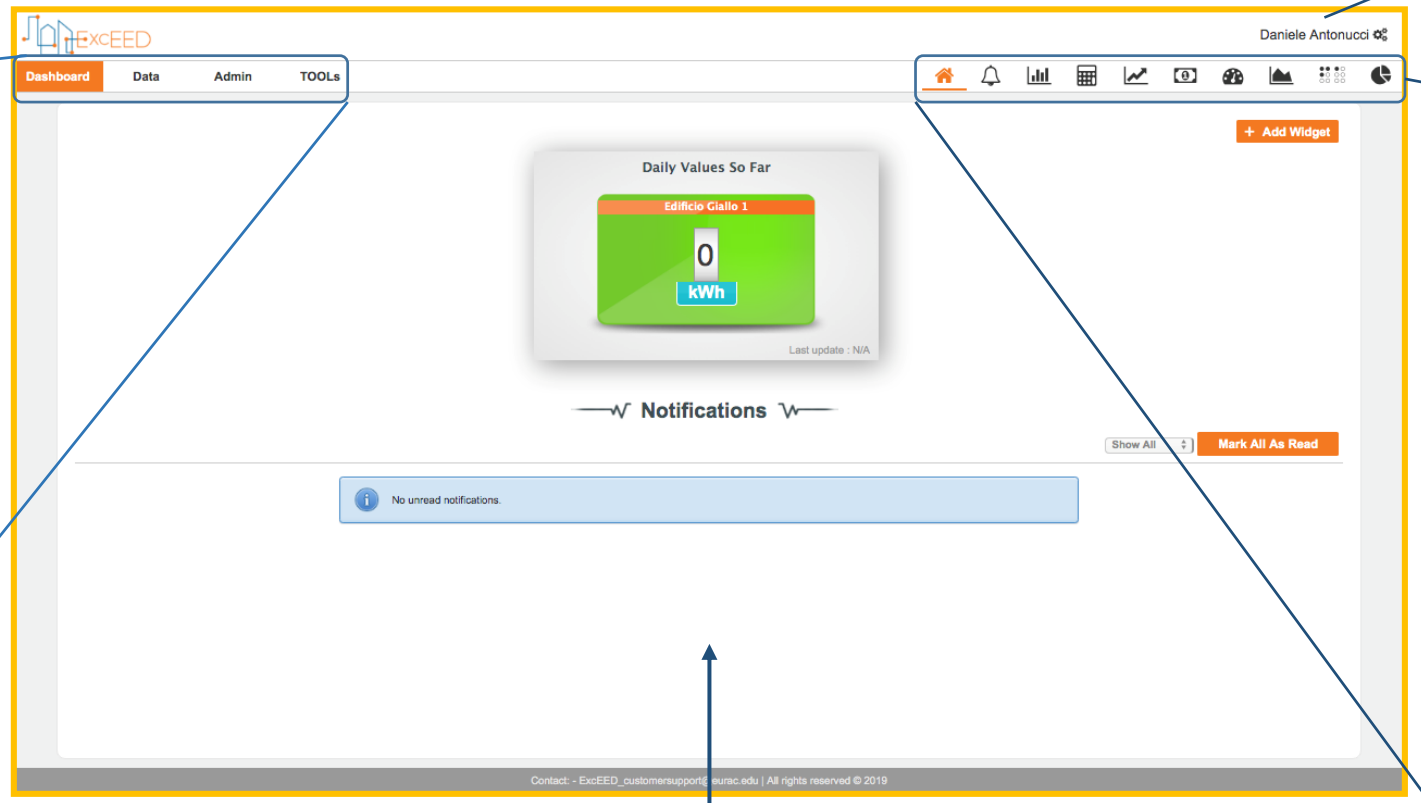
Dashboard page

Uploading page

data

External tools available





- Home page
- Alert & notification
- Breakdown
- Formula composer
- Sentinel trends
- Tariffs
- Live
- Raw data
- Operations Analyser
- KPIs

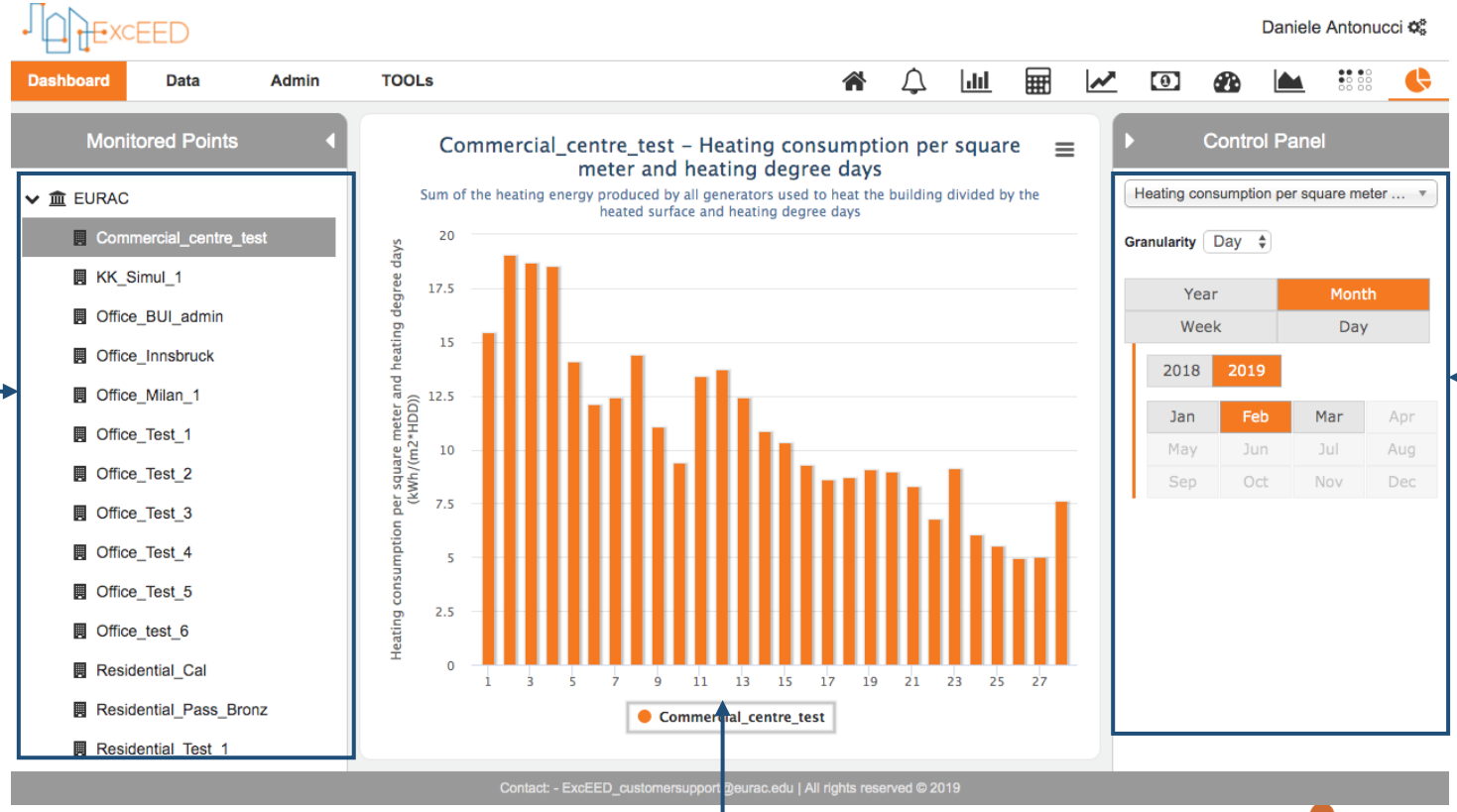
Customizable Homepage

https://dashboard.exceedproject.eu/

EXCEED

EXCEED Platform

KPIs visualization:



Buildings list of your company

Possibility to visualize the KPIs in different time-steps

Visualization of KPIs using different types of graph: Bar-pot, Time-series plot, box-plot, scatter plot, etc.

ExcEED

EXCEED Platform

GEO-CLUSTER TOOL and BENCHMARKING

The geo-cluster web-based tool is able to easily select, cluster and display geo-clustered information highlighting common spatial patterns and regions per groups of KPIs .

Why the geo-cluster tool?

- Geo-clustered data are extremely valuable to highlight trans-national similarities and provide useful information to policy makers and legislative bodies.

Why Benchmark your building?

- Benchmarks are extremely important in building sector because they represent the standard level that needs to be improved. Only through benchmarking it is possible to give an answer to fundamental questions like **"how is the system/building performing?"**

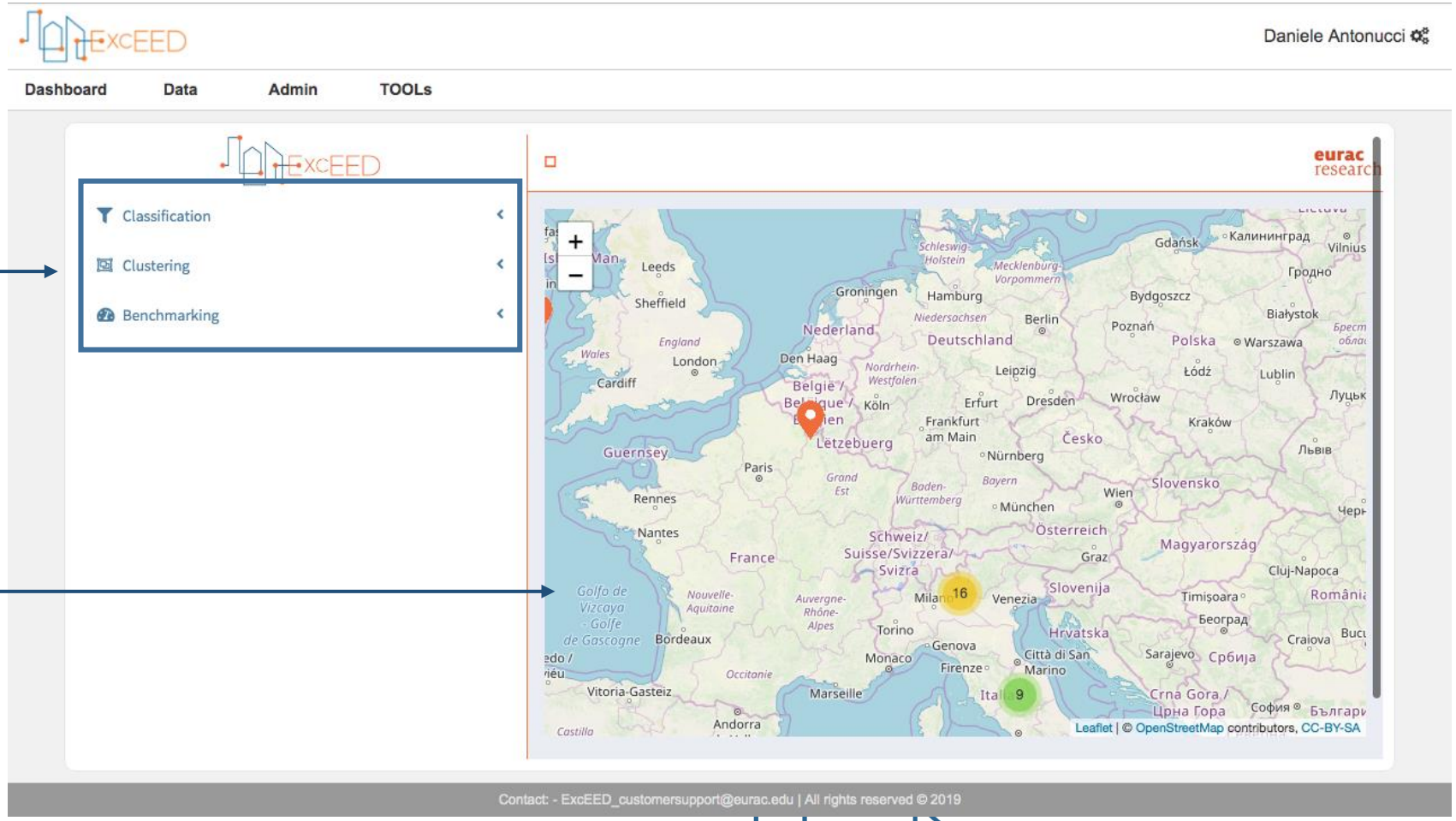
EXCEED

EXCEED Platform

GEO-CLUSTER TOOL: Home Page

Three type of analysis:
- **Classification**
- **Clustering**
- **Benchmarking**

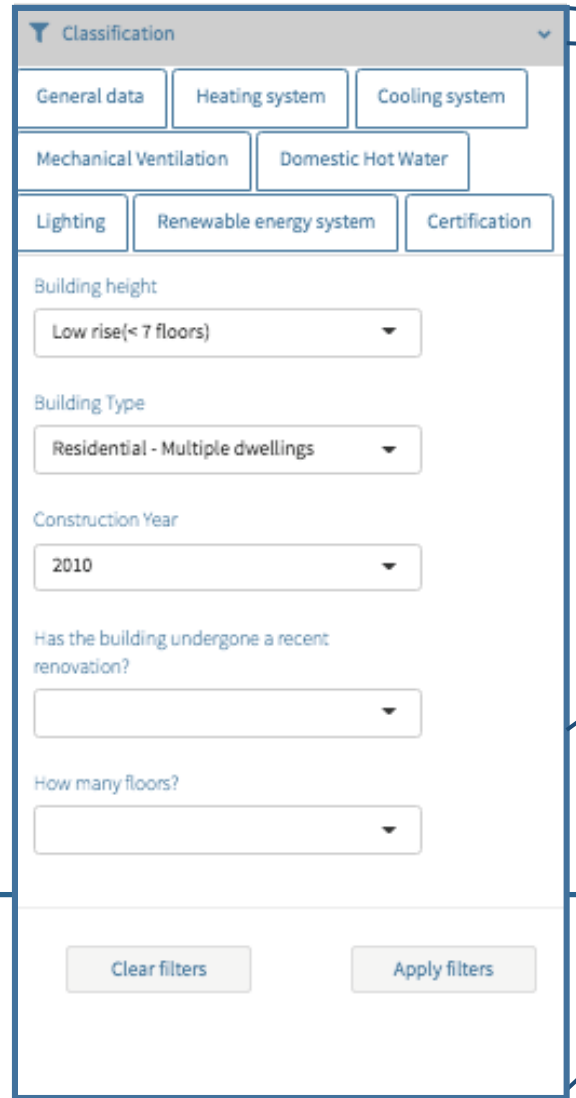
Map of all buildings available in the database:
- Only **your** buildings are **labeled**.
- Other buildings are displayed within **macro-regions**

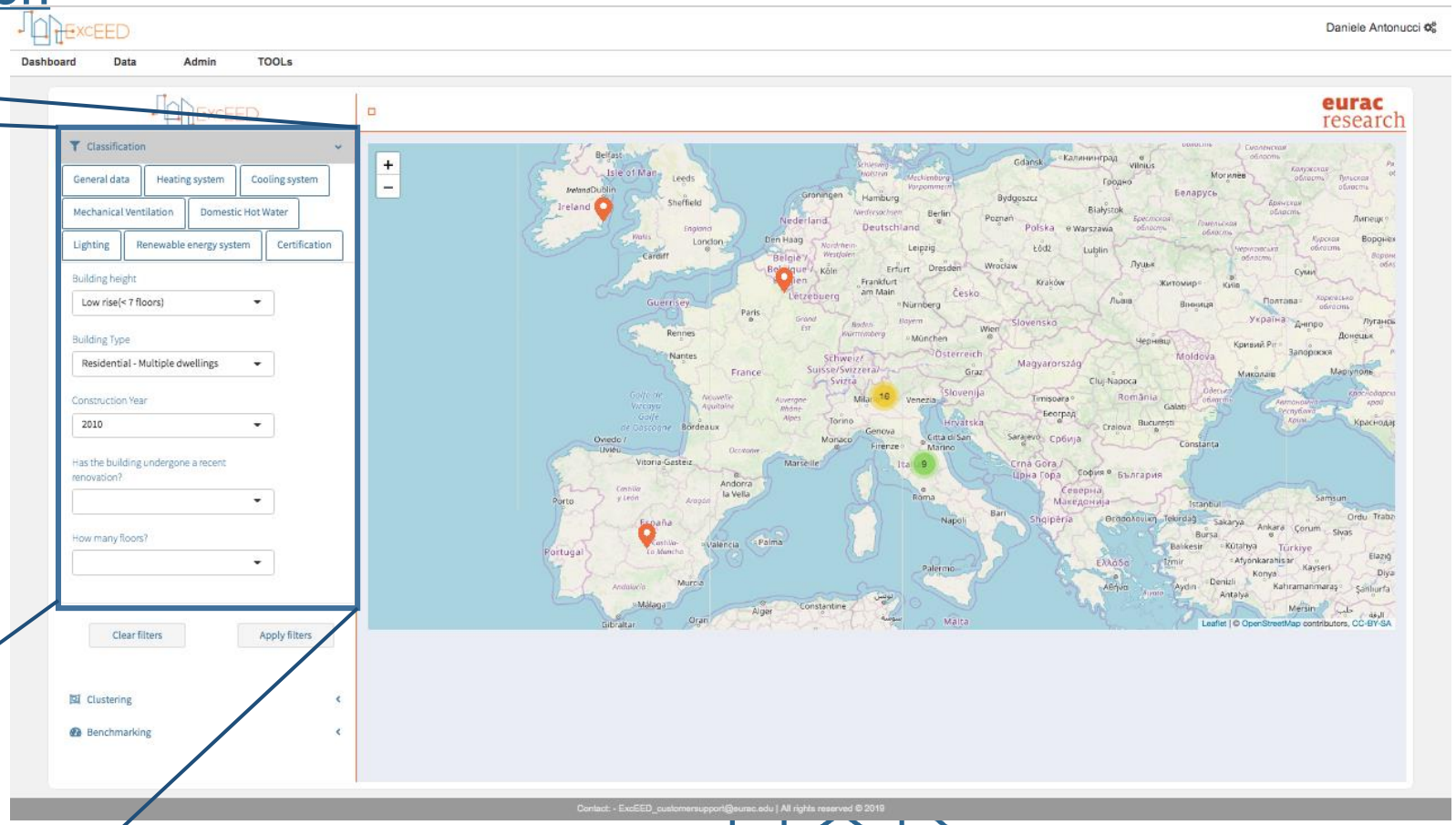


ExcEED

EXCEED Platform

GEO-CLUSTER TOOL: Classification



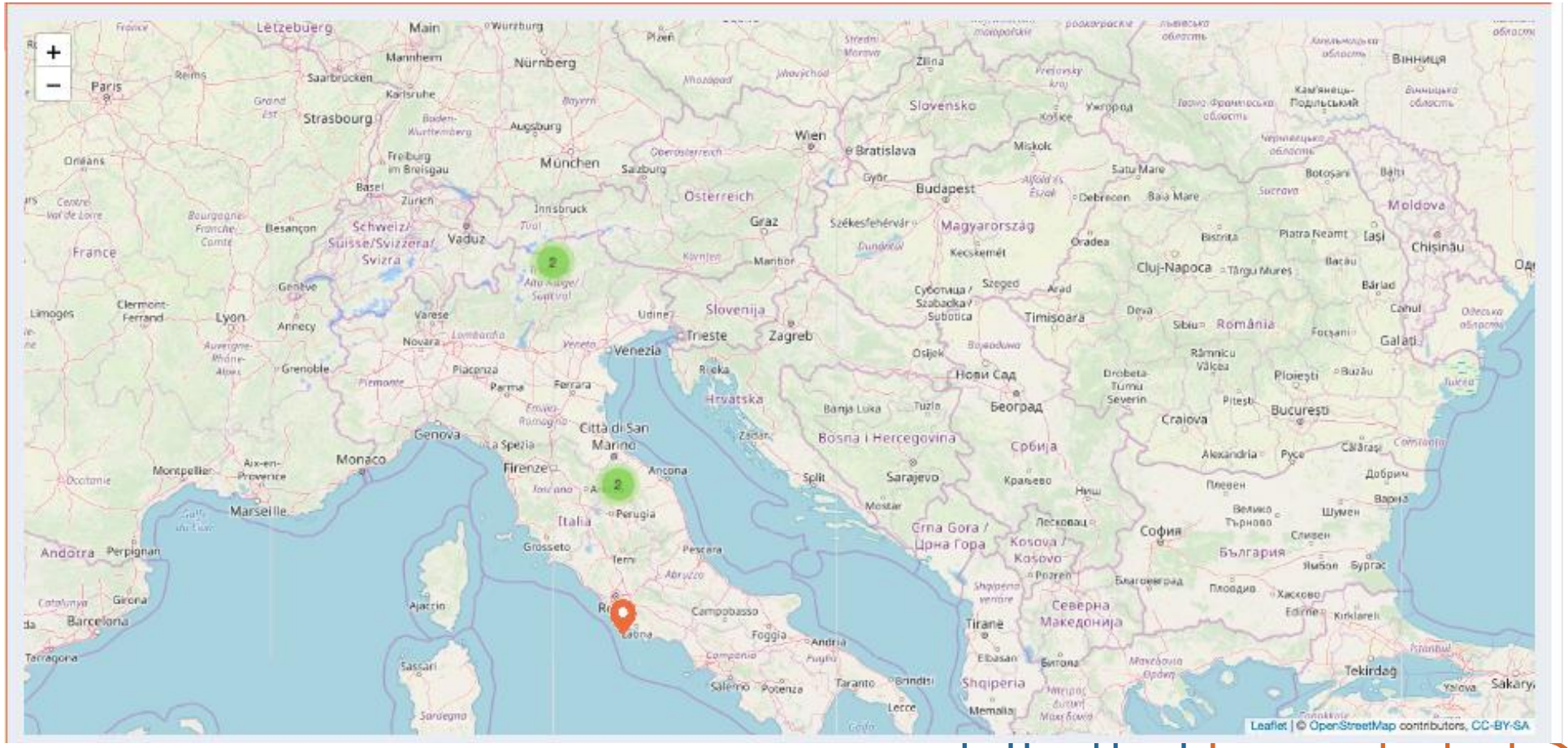


ExcEED

EXCEED Platform

GEO-CLUSTER TOOL: Classification

Filtering results



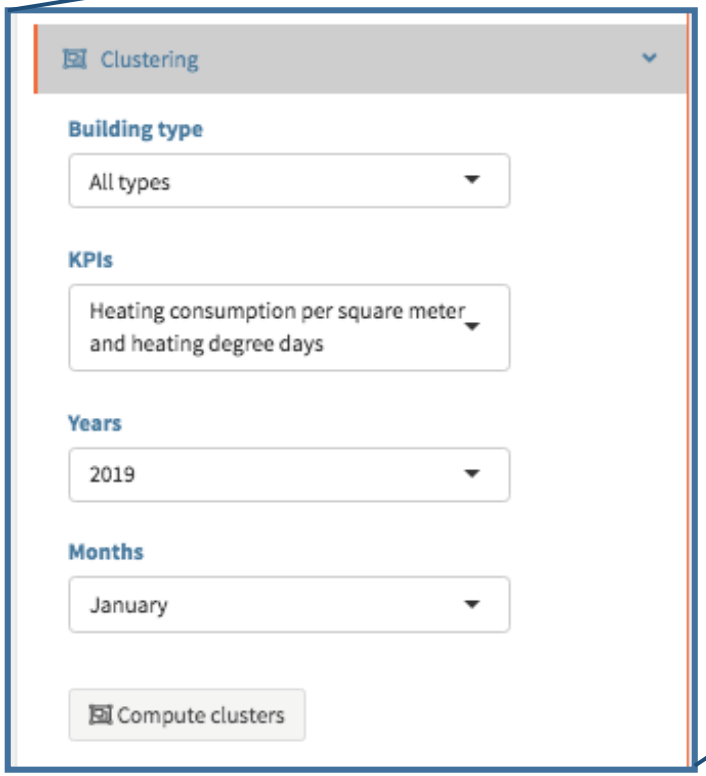
EXCEED Platform

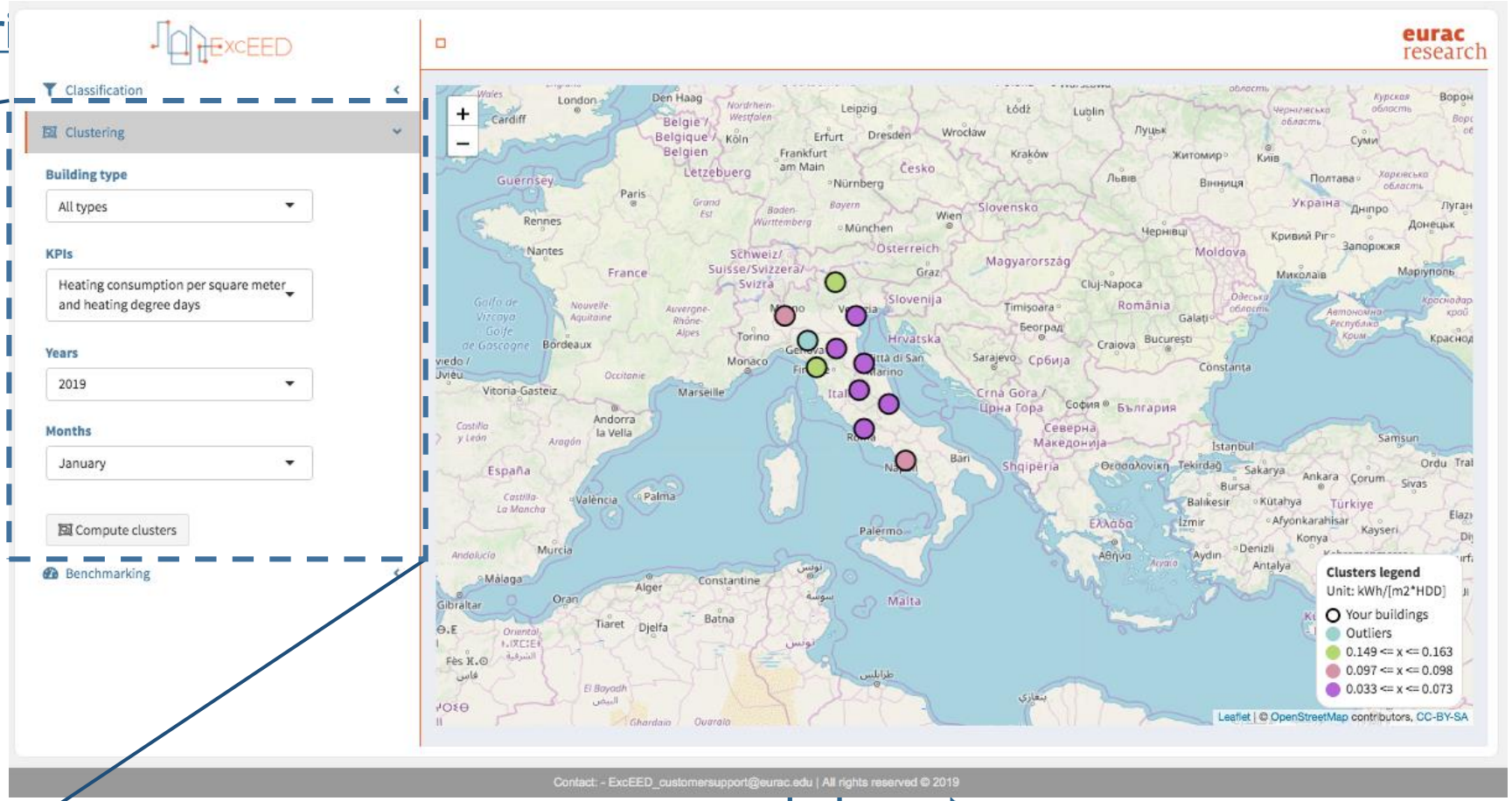
GEO-CLUSTER TOOL: Clustering – What is?

- **Clustering** is a process of partitioning a set of data (or objects) in a set of meaningful sub-classes, called clusters.
- **Cluster**: a collection of data objects that are “similar” to one another and thus can be treated collectively as one group.
- **Geo-Clustering analysis of buildings performance:** Based on data of specific KPIs , the buildings are clustered in groups having similar feature. The resulting clusters are localized on the map.

EXCEED Platform

GEO-CLUSTER TOOL: Cluster

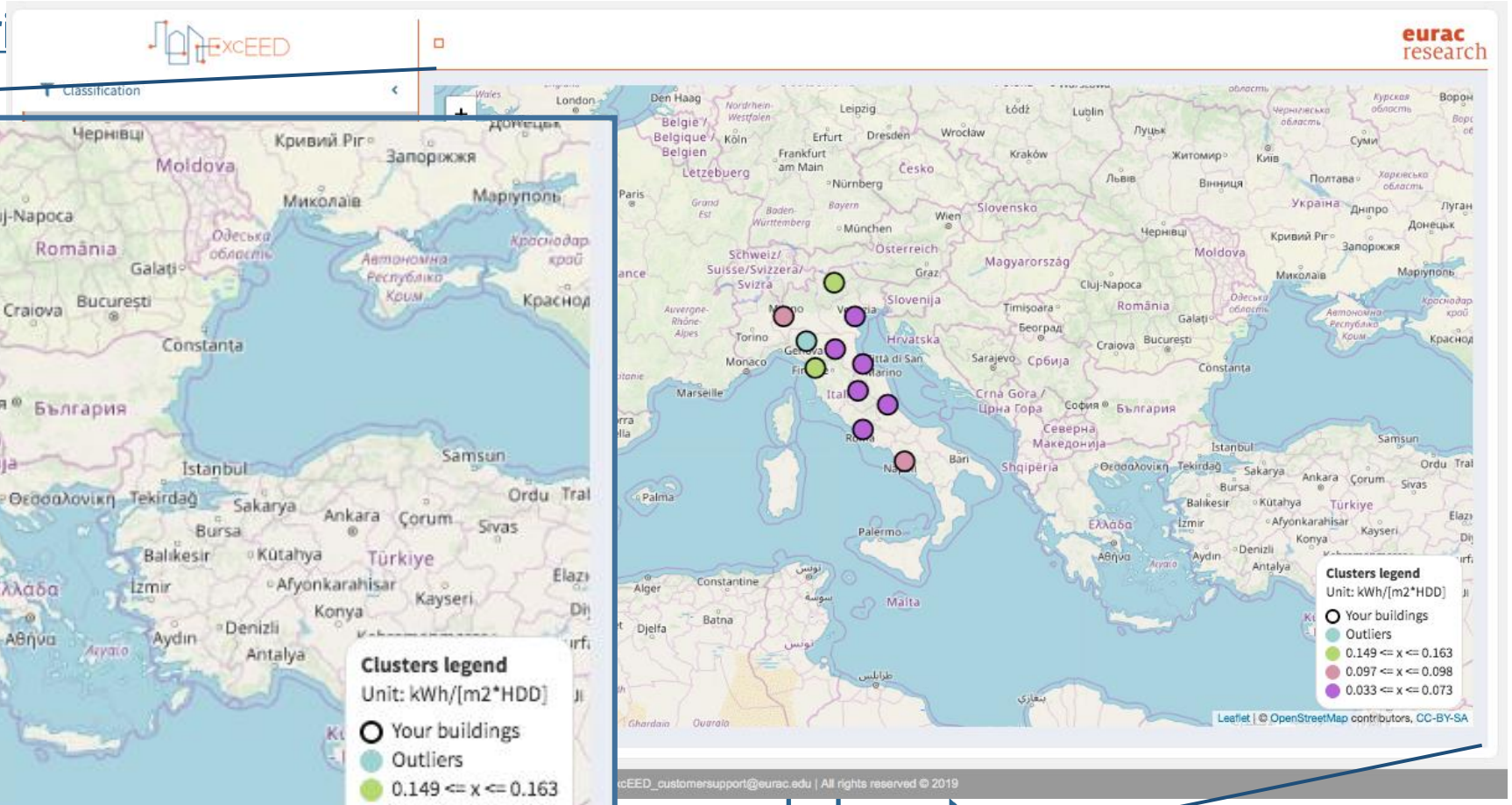




ExCEED

EXCEED Platform

GEO-CLUSTER TOOL: Cluster



EXCEED

EXCEED Platform

GEO-CLUSTER TOOL: Benchmarking - What does the benchmarking do?

The benchmarking helps:

1. To know the performance of the **overall buildings** with the same intended use.

2. Compare the **energy and IEQ performances** of your building with:

   A. All buildings having the same function;
   B. itself in two different years;
   C. your other building.

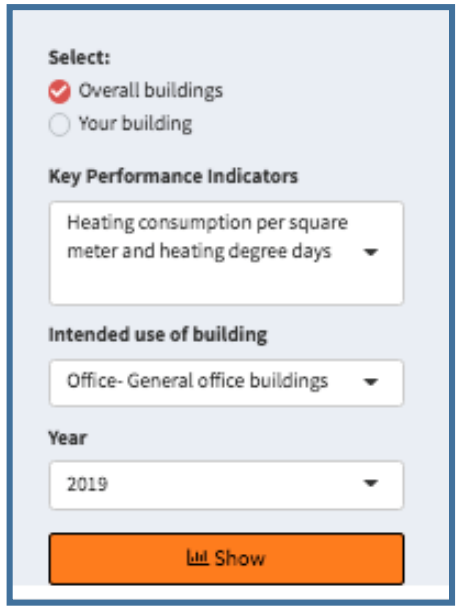
All the analysis are based on the selection of the KPIs defined in the project

EXCEED

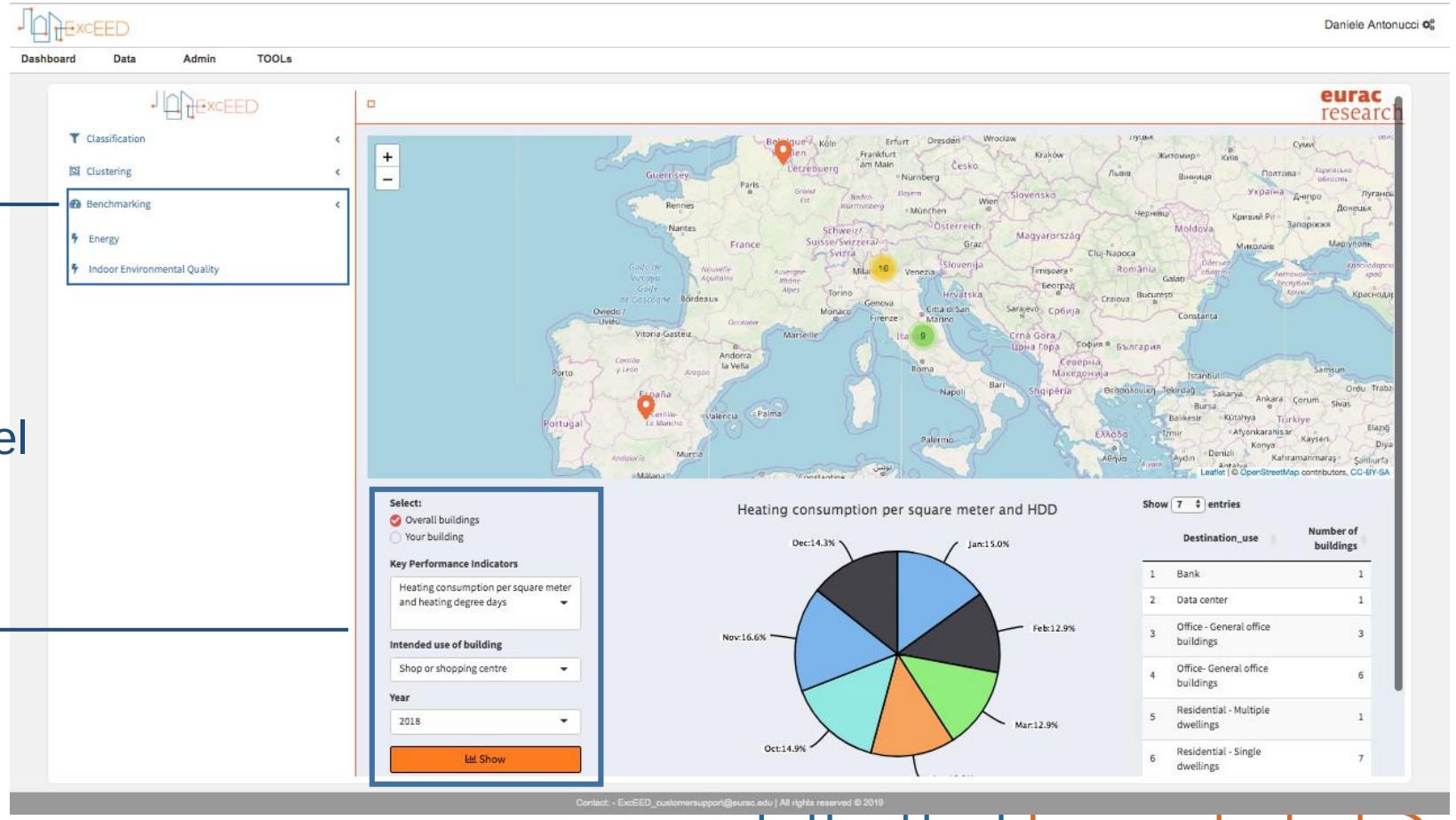
EXCEED Platform

GEO-CLUSTER TOOL: Benchmarking

Type of analysis



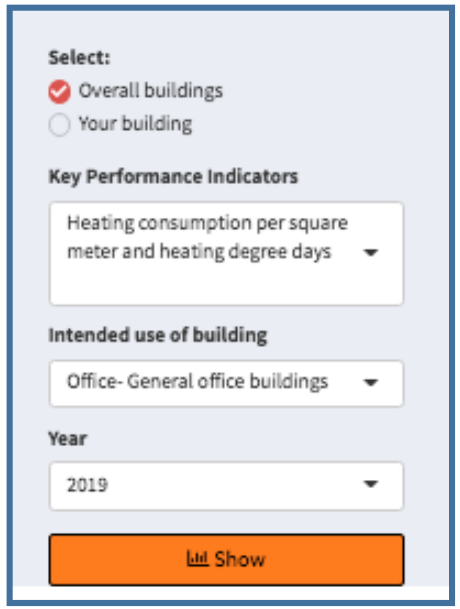
Inputs Panel



EXCEED Platform

GEO-CLUSTER TOOL: Benchmarking – Energy – Overall buildings

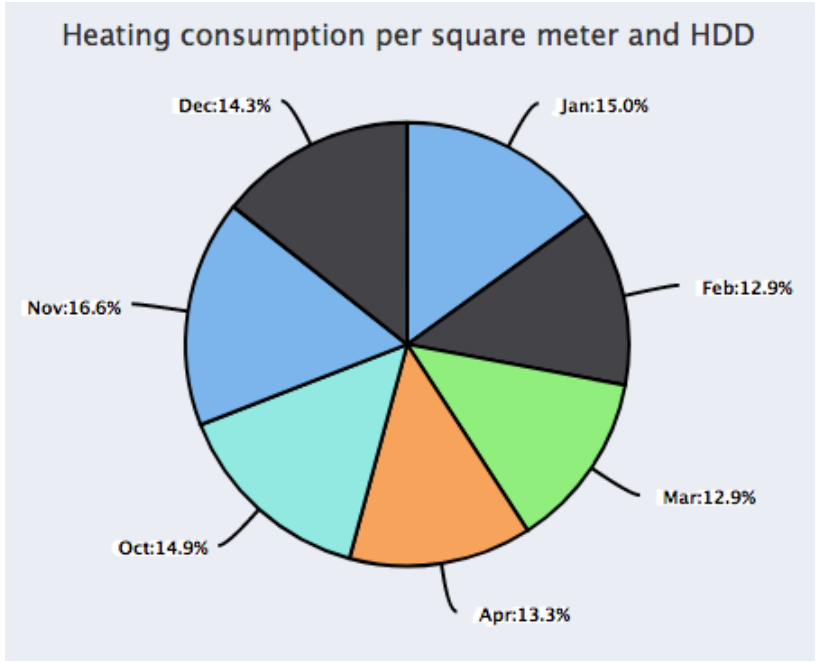
List of inputs required



KPIs: select one of the energy Key Performance Indicators available.

Intended use of buildings: select the intended use of the building that you want to analyze.

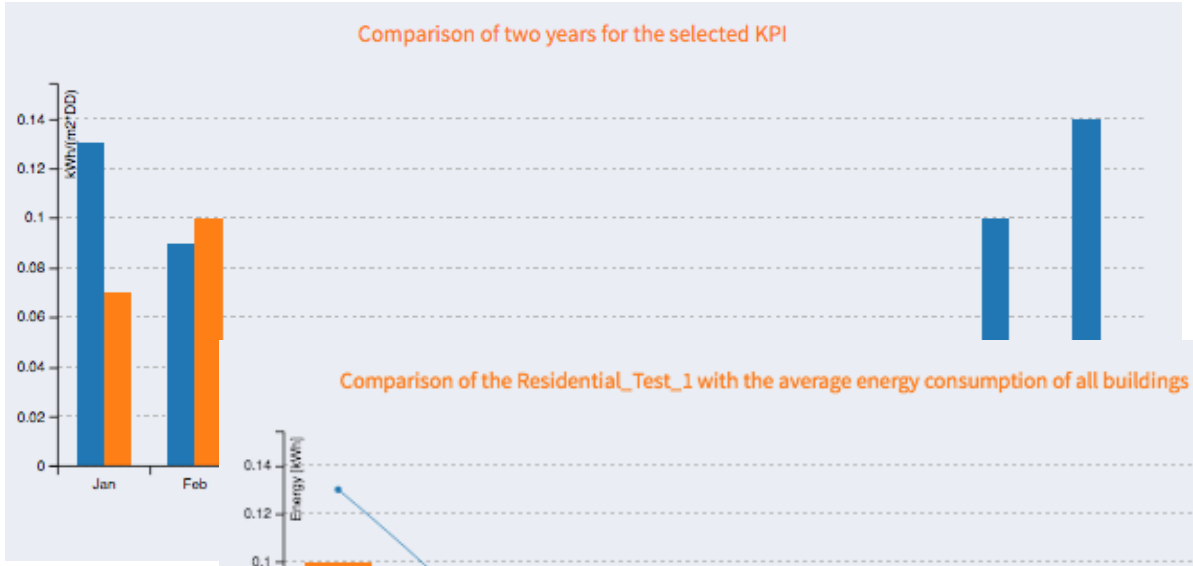
Year: Select the year on which you want to perform the analysis.

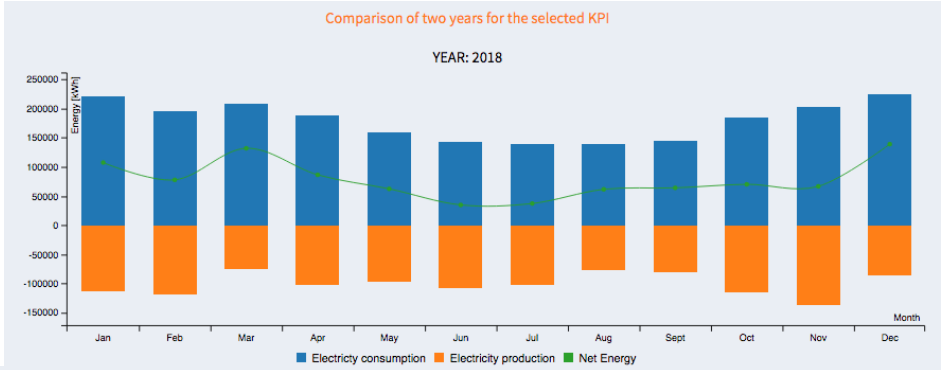


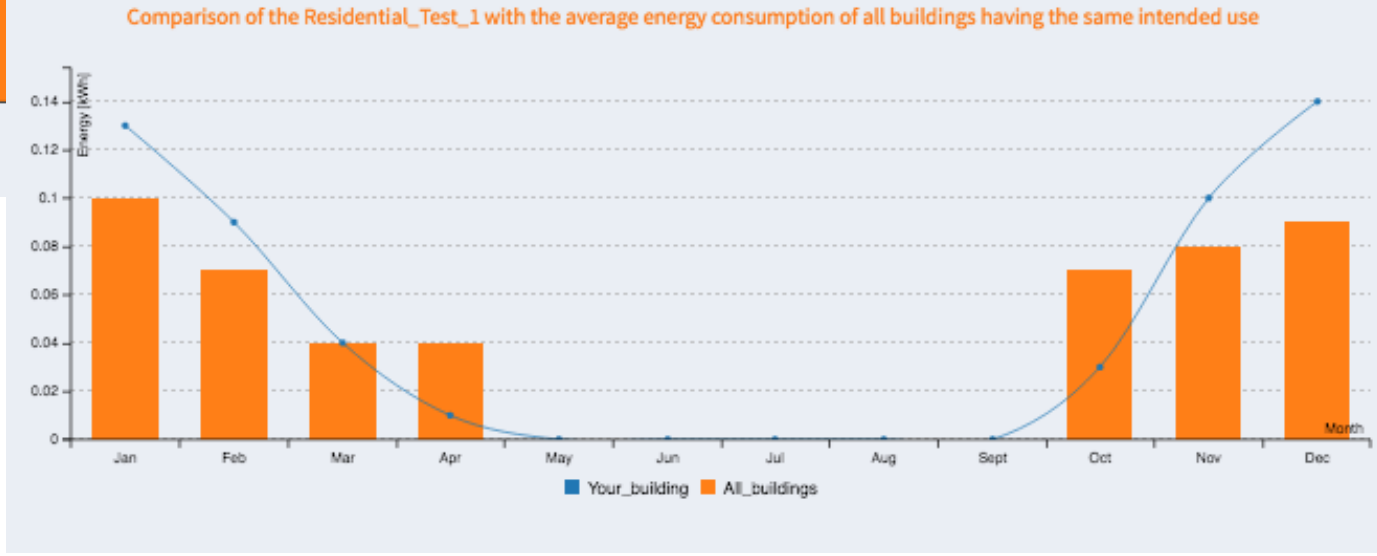
The pie-chart shows the distribution in percentage of the energy consumption of all buildings having the same intended use for a selected year on monthly level.

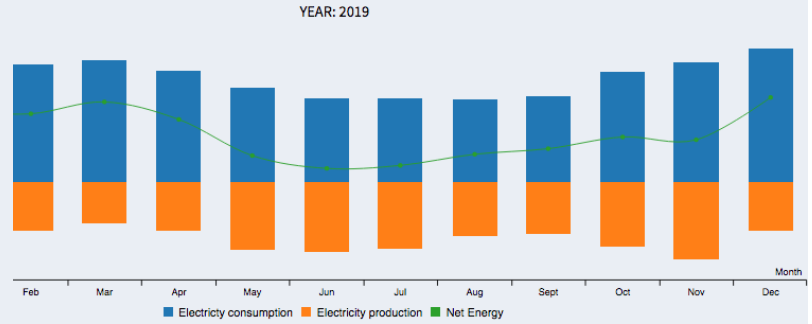
EXCEED Platform

GEO-CLUSTER TOOL: Benchmarking – Energy Visualization





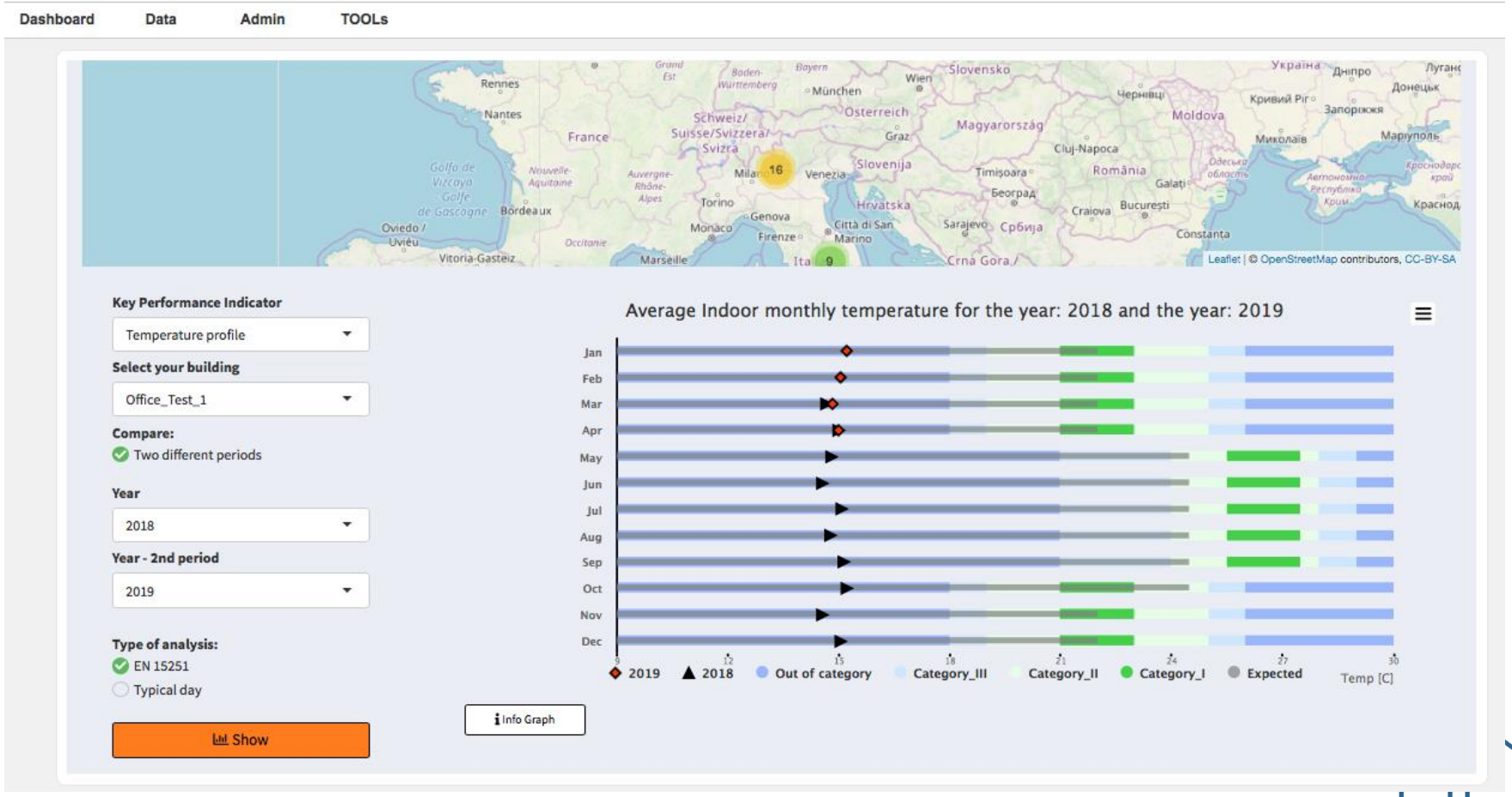




EXCEED

EXCEED Platform

GEO-CLUSTER TOOL: Benchmarking – IEQ – Temperature profile



Visualization of indoor monthly temperature with categories of recommended temperature ranges defined by the standard EN 15251.

IMPROVE YOUR BUILDING PERFORMACE!

SAVE YOUR MONEY

REDUCE CO_2 EMISSIONS

JOIN ExcEED!

IT'S FREE!!

ExcEED

Visit us @ exceedproject.eu

@ExcEED_H2020

group: ExcEED - Knowledge sharing on buildings data

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723858

ExcEED

Hoval

Verantwortung für Energie und Umwelt

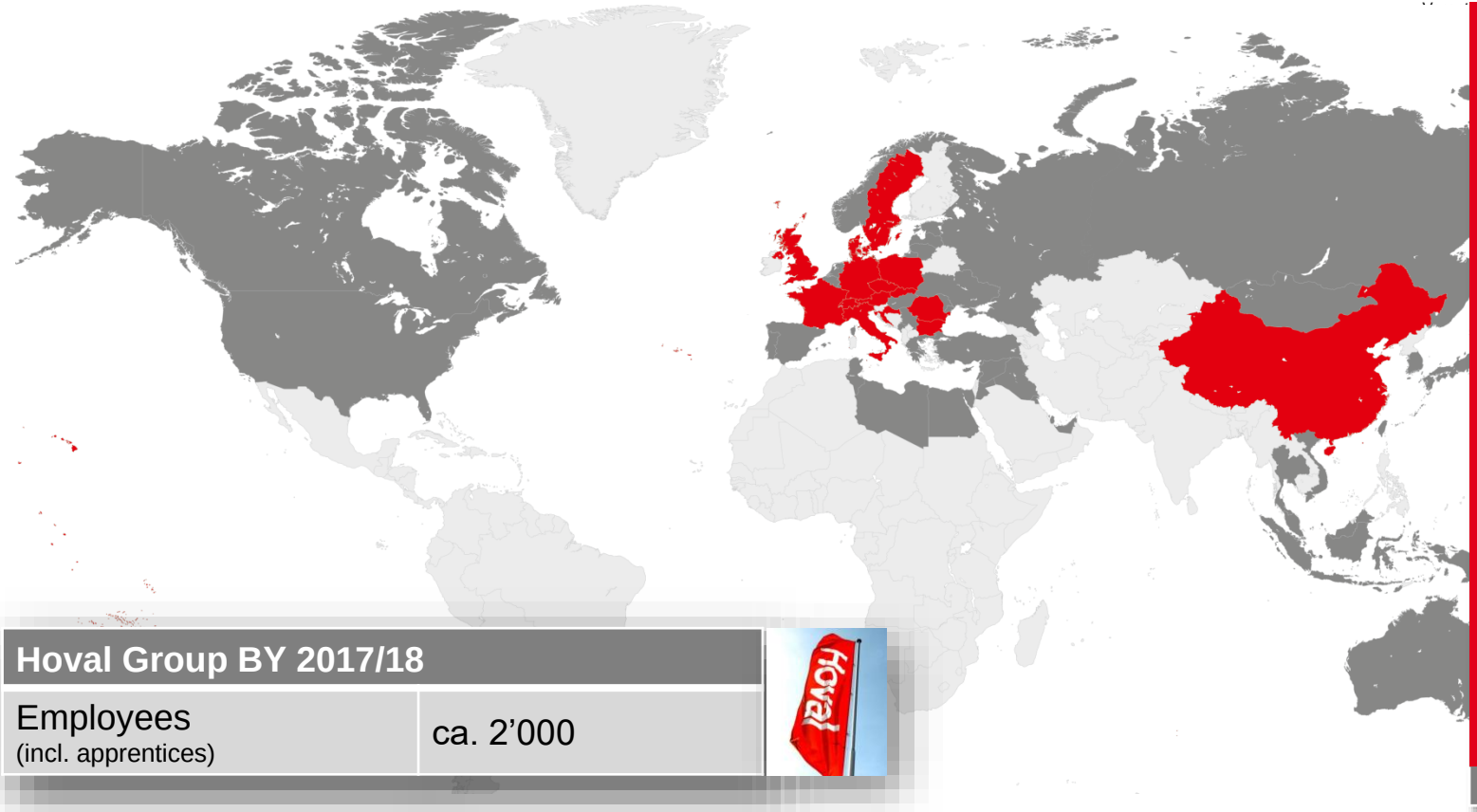
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723858.

Index

Verantwortung für Energie und Umwelt

- The Hoval company
- Welcome to CasaHoval
- Heating and Cooling System
- ExcEED Demo Case Objectives
- What to measure in a NzE-Building
- Hot to make data available to third party platforms

Hoval Group – Worldwide



Group Companies

- Liechtestein (HQ) *
- Switzerland
- Austria *
- Great Britain *
- Germany *
- Italy
- Poland
- China *
- Czech Republic
- Slovakia *
- Romania
- France
- Croatia
- Bulgaria
- Singapur
- Denmark
- Sweden *

* Production facilities

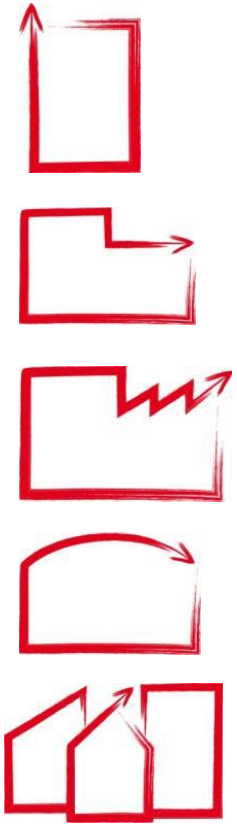
+ 50 partners worldwide

Hoval Group BY 2017/18	
Employees (incl. apprentices)	ca. 2’000

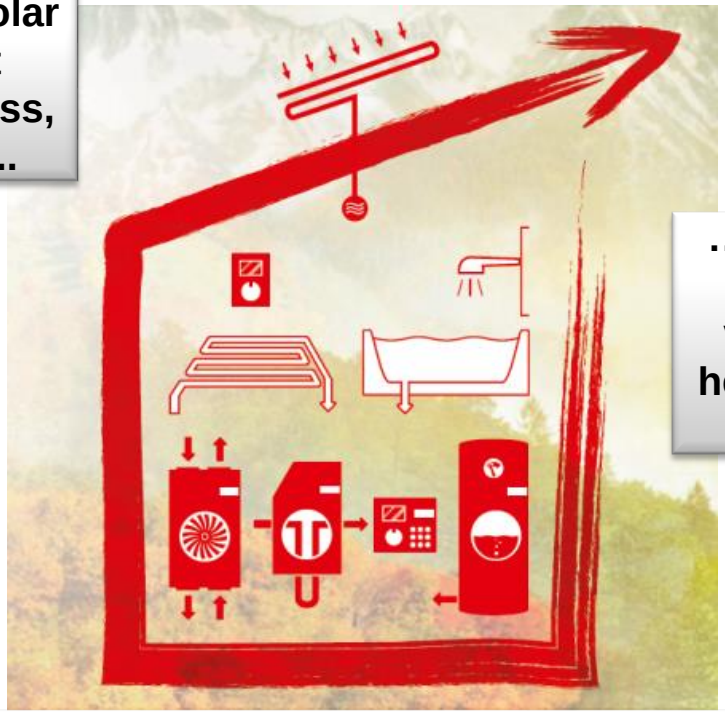
System engineering from a single source

Hoval

Verantwortung für Energie und Umwelt



Systems for solar power, heat pumps, biomass, oil and gas ...



… supplemented by residential ventilation with heat and humidity recovery …

…can be combined and jointly controlled with the Hoval control equipment.

Top references worldwide

Vatican

Cathedral Milan

Wembley Stadium

Buckingham Palace

Säntis, Schwägalp

Burj Khalifa

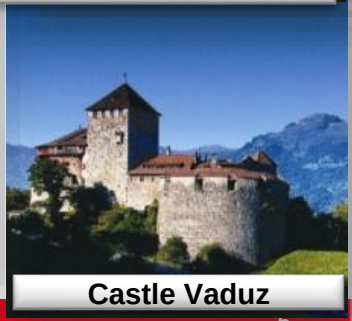
Hotel Pangu, Beijing

National Theatre, Prag

Windsor Castle

Palm Island (Dubai)

Forbidden City (China)

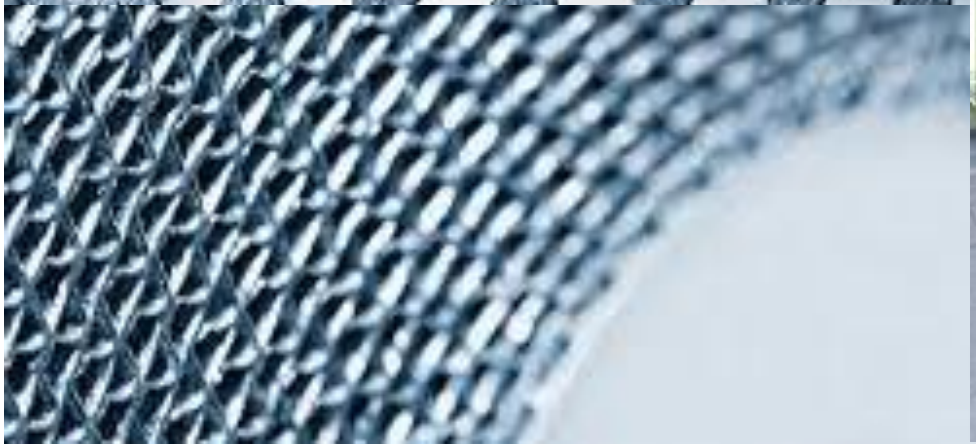

Castle Vaduz

Welcome to CasaHoval (www.edificiefficienti.it)

65% less of energy compared to traditional buildings

Verantwortung für Energie und Umwelt

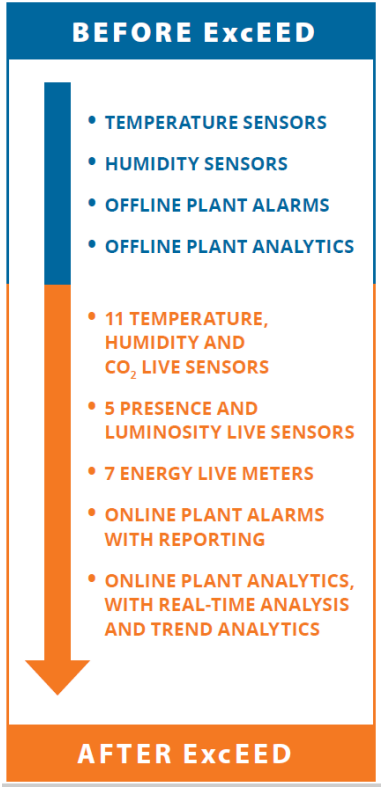
- 49% of CO_2 produced annually thanks to
- high-tech heating and cooling system



ExcEED Demo Case – Objectives

Verantwortung für Energie und Umwelt

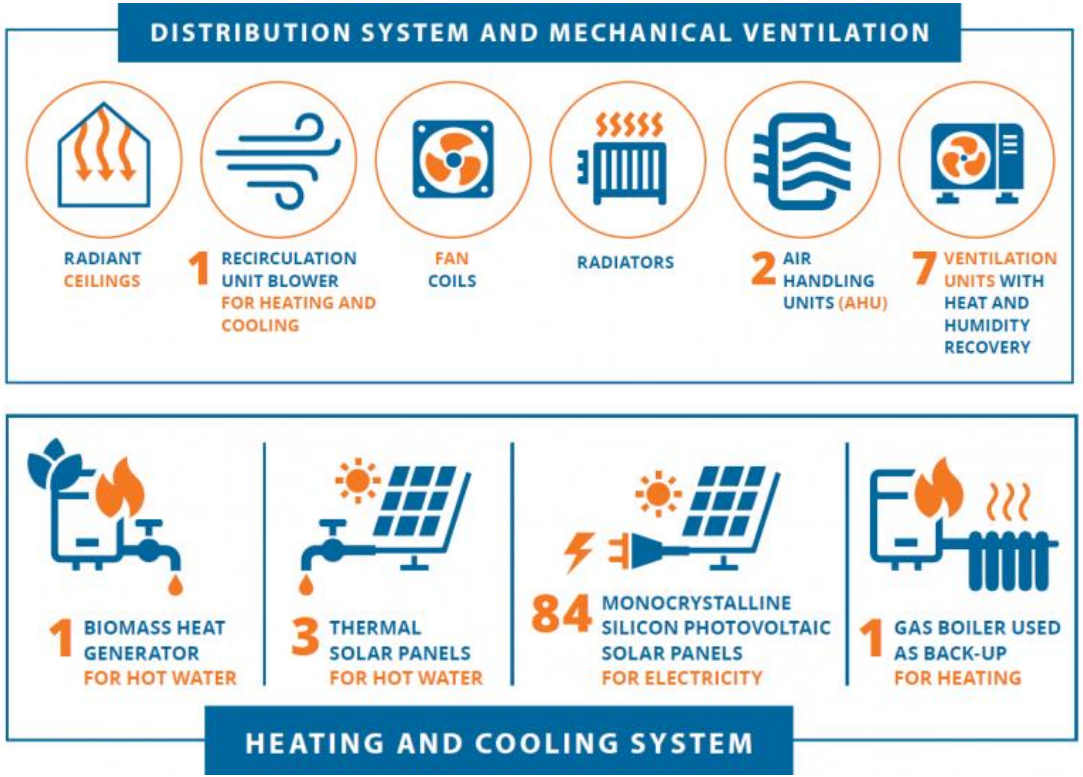
- Gather data, including plant and environmental data
- Measure our KPIs and compare them to similar buildings
- Show results and data trends from the past years



ExcEED Demo Case – What to measure

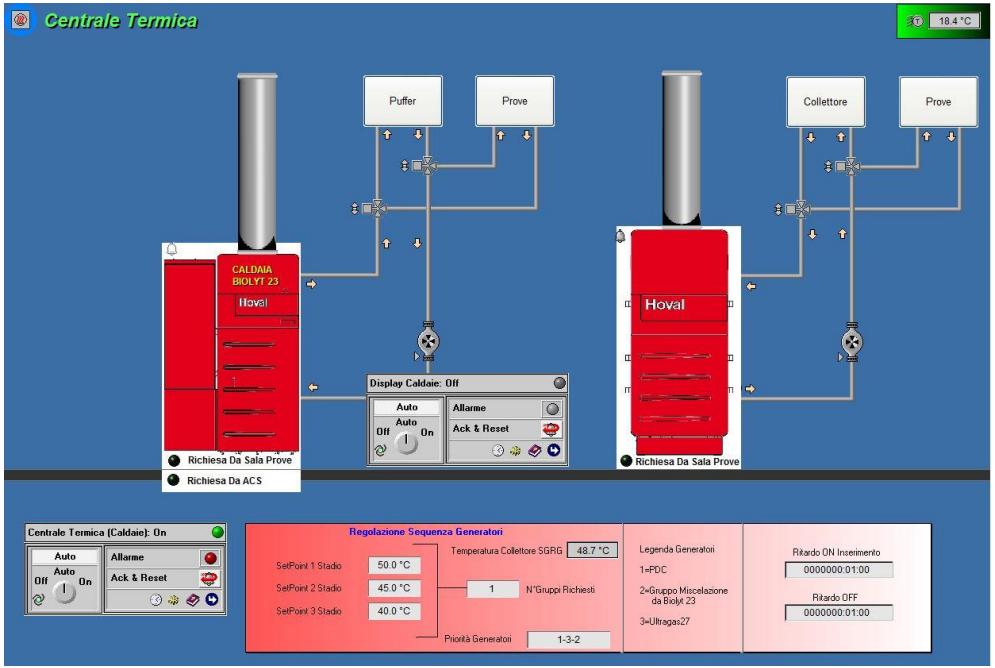
Hoval

Verantwortung für Energie und Umwelt



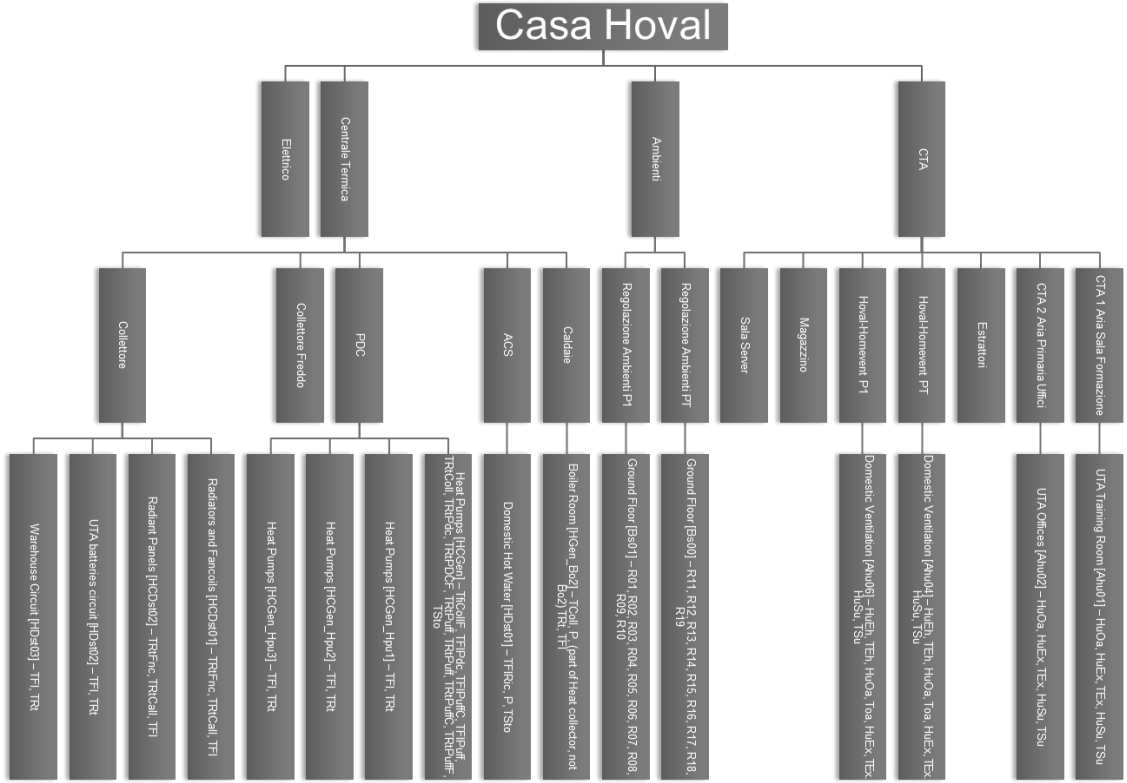
ExcEED Demo Case – Existing system

Verantwortung für Energie und Umwelt



ExcEED Demo Case – Existing system

Verantwortung für Energie und Umwelt



ExcEED Demo Case – Ambiental sensors installed

Hoval

Verantwortung für Energie und Umwelt

ExcEED Demo Case – Ambiental sensors installed

Hoval

Verantwortung für Energie und Umwelt

Figure 3 First floor air quality sensors, and external air quality sensor

ExcEED Demo Case – Ambiental sensors installed

Hoval

'erantwortung für Energie und Umwelt

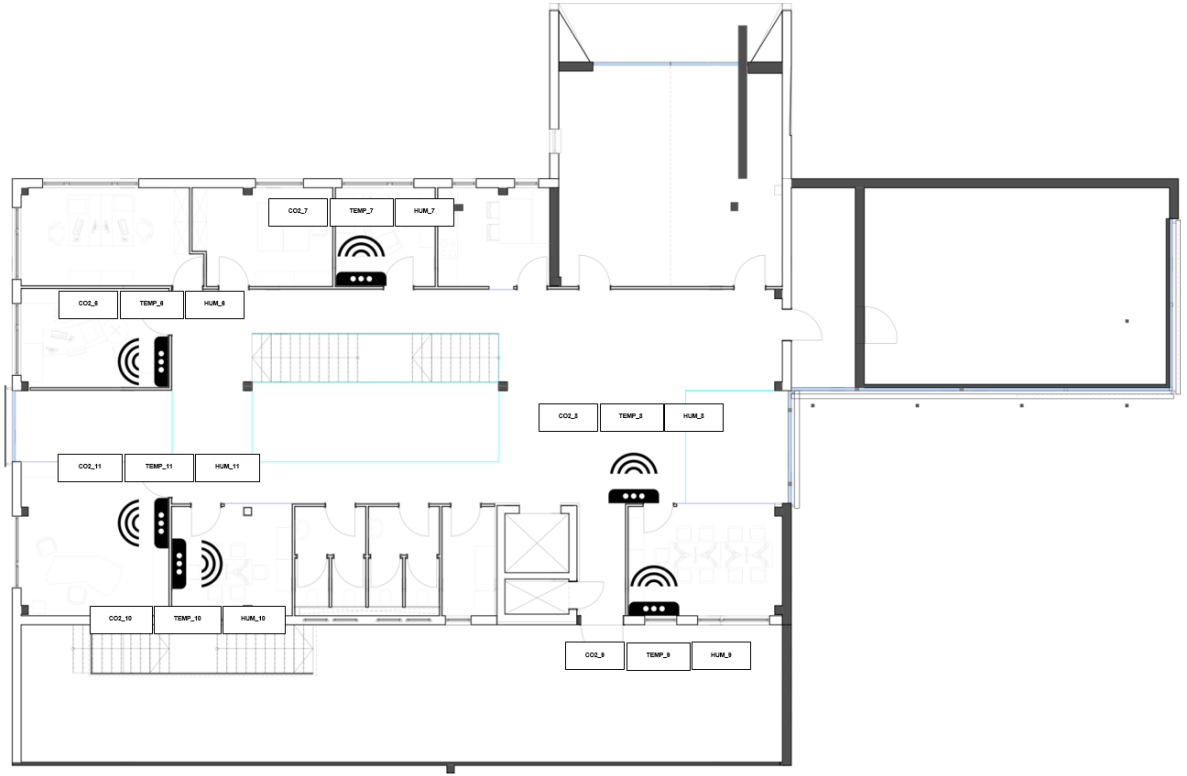


Figure 4 Second floor air quality sensors

ExcEED Demo Case – Send data to third party platforms

Hoval

Verantwortung für Energie und Umwelt

EnOcean
MBUS
Modbus

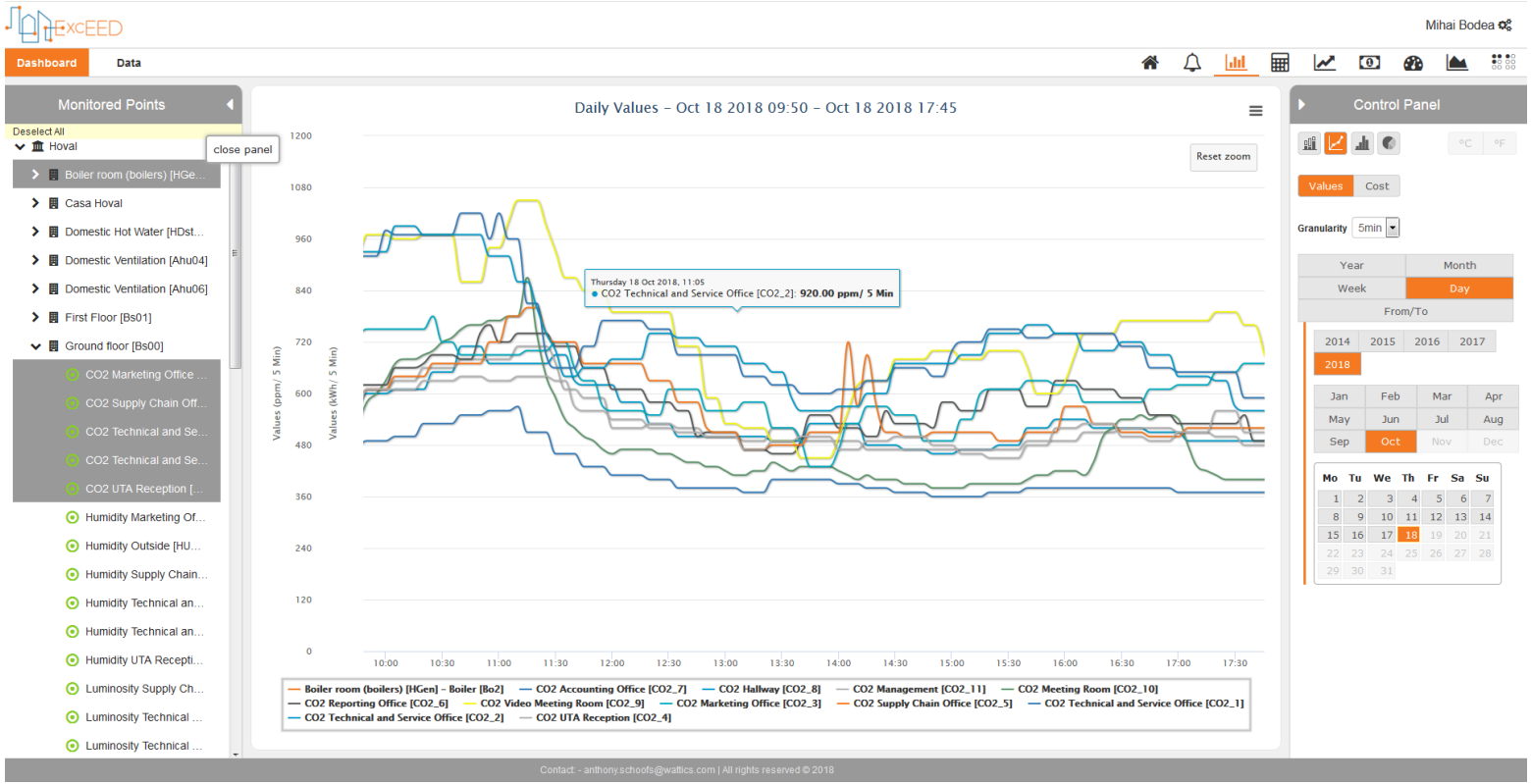
OPC UA

REST API
FTP UPLOAD

ExcEED Demo Case – Send data to third party platforms

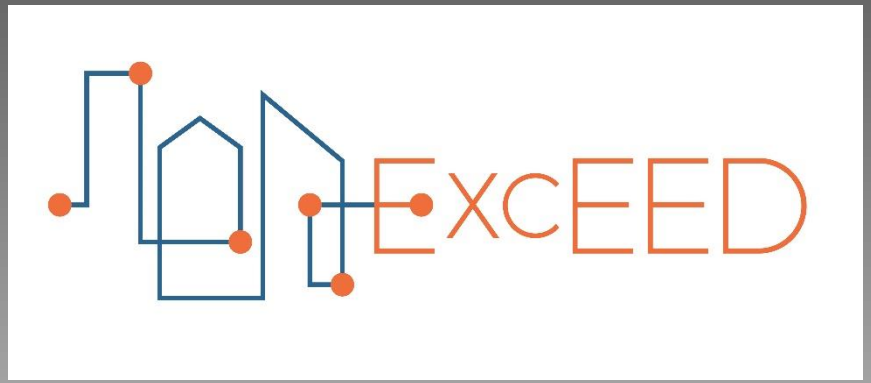
Hoval

Verantwortung für Energie und Umwelt



Thank you for your attention

Mihai Boodea – mihai.bodea@hoval.com



Hoval

© Hoval / Jun-19

Questions & Answers