



*Co-funded by the European Community Horizon 2020 Program*

Project Title:

# **ORganizational Behaviour improvement for Energy Efficient administrative public offices**



**OrbEEt**

**Grant Agreement No: 649753**

**Collaborative Project**

**OrbEEt Pilot Site in Bulgaria: Final Results**

## 1.1 OrbEEt pilot site in Bulgaria

Demonstration of OrbEEt framework performed from **01/04/2017 (M26) – 28/02/2018 (M36)**, considering the different periods for trials:

- **1<sup>st</sup> Trial: M23 - M28 (baseline: M21-M25 with OrbEEt trials starting in M26)**
- **2<sup>nd</sup> Trial: M29 - M34**

### **Total energy savings (Annual)**

Load Type	Actual (KWh)	Baseline (KWh)	Savings
Heating	6458	7815	17.36%
Lighting	845	1004	15.84%
Other	1754	1946	9.87%
<b>Total</b>	<b>9057</b>	<b>10765</b>	<b>15.87%</b>

*Table 1 Total Energy Savings - Pernik*

**Peak Demand Reduction:** For peak demand analysis, we take into account the week-days hour-period: 09:00 -13:00; following the analysis of a typical load curve in Bulgaria. The impact of OrbEEt framework during peak hours is depicted in the following table (analysis during peak hours):

Load Type	Actual (KWh)	Baseline (KWh)	Savings
Heating	2444	3125.99	21.82%
Lighting	372.32	451.78	17.59%
Other	876.89	972.92	9.87%
<b>Total</b>	<b>3692.21</b>	<b>4550.69</b>	<b>18.84%</b>

*Table 2 Peak Demand Savings - Pernik*

**CO2 Emissions Reduction:** For CO2 emission analysis, we take into account the typical generation mix of each country (source: ENTSOE). In Bulgaria, by taking also into account the CO2 ratio for gas consumption (heating load), we estimate the total impact in CO2 emission:

Load Type	Actual (Kg)	Baseline (Kg)	Savings
<b>Total</b>	<b>1843.46</b>	<b>2203.14</b>	<b>16.32 %</b>

*Table 3 Total CO2 Emissions Savings - Pernik*

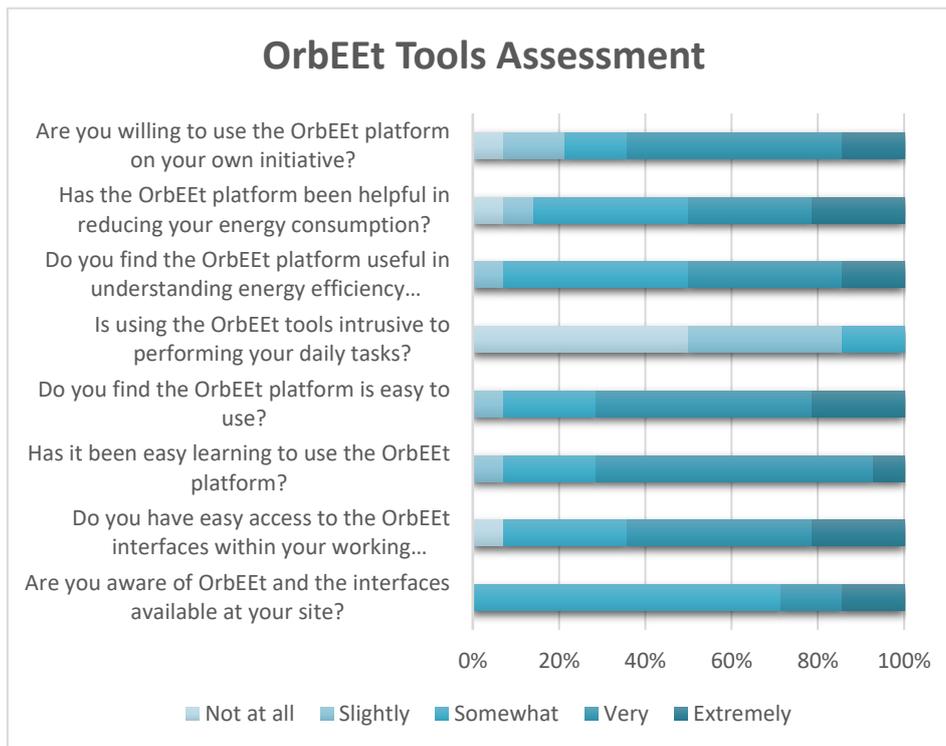
Some post-demonstration remarks for Pernik pilot site

- The impact of OrbEEt framework was affected by the type of business processes performed: higher consumption reduction occurred in the Accounting Office (early engaged in the

project, higher interest for the project, non-externals). This illustrates the value of consider process efficiency alongside energy consumption; a key concept behind OrbEEt.

- Building intrinsic characteristics affected the final impact more considerable than other sites; these included centralized heating, low energy circuits, and a lack of bi-switches affecting the potential of the framework. They show the need for pilot audit analysis for the best fitted demonstration of the OrbEEt framework
- The gender synthesis of end users was linked to with the potential of savings. This was reported as a potential restricting factor, though through interview it was elicited this may have been a proxy for IT-literacy, rather than a gender effect per se.
- The level of commitment was directly linked with the final results; (near) real time notifications were not the best way to interact with end users. This is reflected in both self-report data (below) and usage statistics (see D4.6).
- A further consequence of limited IT-literacy was non-familiarity with ICT and energy applications; participants preferred to receive summary notifications about their performance.

Towards evaluating the level of engagement of end users, we report a high level of engagement in project activities.



The engagement level is over 80% highlighting the potential of OrbEEt framework in the Bulgarian pilot site.

Along with the direct evaluation of OrbEEt platform in premises, we consider also the persistence of effects phase where no OrbEEt intervention applies and we evaluate the inherent impact of the framework to end users behaviour. The summary results are presented:

Load Type	Asparrena	Erlangen	BHOE	Pernik
Heating	19.50%	16.98%	21.44%	19.23%
Lighting	30.37%	20.42%	17.41%	15.76%



<b>Other</b>	7.14%	7.86%	7.12%	8.06%
<b>Total</b>	<b>21.28%</b>	<b>17.00%</b>	<b>18.97%</b>	<b>16.88%</b>

A more detailed presentation of impact assessment analysis and end users evaluation of OrbEEt platform in premises is reported in D4.6. In addition, the cost benefit analysis per pilot site is presented in the document. Finally, and towards the dissemination of OrbEEt impact, the pilot user stories were prepared at the end of the project; available in Annex I.