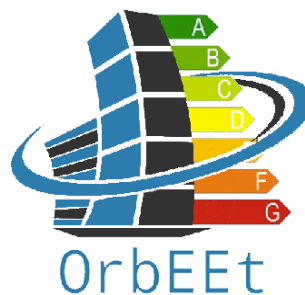




Co-funded by the European Community Horizon 2020 Program

Project Title:

ORganizational Behaviour improvement for Energy Efficient administrative public offices



OrbEET

Grant Agreement No: 649753

Collaborative Project

Public Summary

Deliverable No.	D2.2 Pilot Validation & Equipment Installation Plan for Pilots
Workpackage	WP2 Pilot Audits & Organizational Modelling
Task	T2.3 Pilot Validation & Equipment Installation
Lead beneficiary	BALKANIKA



1. PUBLISHABLE PUBLIC SUMMARY

Deliverable 2.2 Pilot validations & Equipment Installation Plan for Pilots explains all of the actions related to pilot's validation and the installation of the equipment needed to monitor the energy consumption in the pilot buildings in real time. It aims at validating the pilot sites and create a detailed plan for equipment installation following the established OrbEEt scope of framework

For achieving awareness and behavioural change of the workforce within the OrbEEt framework it is crucial that the energy consumption can be measured and monitored in a real time basis and on level of single energy consumer. That is why an energy monitoring system must be created and the equipment comprising it must be chosen legitimately and installed properly for the intended output to happen as expected.

In general, proposed energy measurement and monitoring system includes smart power meters, sensor for room environment conditions, system gateway, heat cost allocator and a display to review the information.

In wall micro switches will be installed to operate with the existing switches and appliances. Using the Z-Wave wireless communication, these devices will turn the existing switches into smart switches. This will make possible the power consumption for lighting in every room and for each lighting appliance to be monitored and managed in real time.

Plug in power meters will serve for the monitoring of the power, consumed by equipment, used in the everyday work of the occupants. These power meters do not need special installation and will be just plugged in to the existing schuko wall plugs, turning them into smart plugs, able to measure and transmit the energy consumed by the different appliances – computers, displays, printers, copy machines, coffee machines and everything else that might be in operation in the pilot premises.

The sensors for room environment monitoring are capable of capturing and transmitting information for different parameters of the surrounding conditions like temperature, humidity, motion, etc. Via these devices the facility managers and occupants will be able to monitor the quality of the environment on a real time basis and thus become aware of how this quality depends on their own behaviour and how the parameters correlate with the energy consumption

The system gateway, will be used, on the one side for power consumptions data acquisition, as well as rooms environment parameters, in the pilot's premises, and on the other side, through the Z-wave daughter card - for permanently transmission of the collected data - to the cloud based project's database for the future utilization.

The electronic heat cost allocators Siemens WHE 50 are especially suited for basic plants that require no complex data evaluations or no very fast readout. All heat cost allocators are supplied with mounting plates, specialized for different types of radiators.

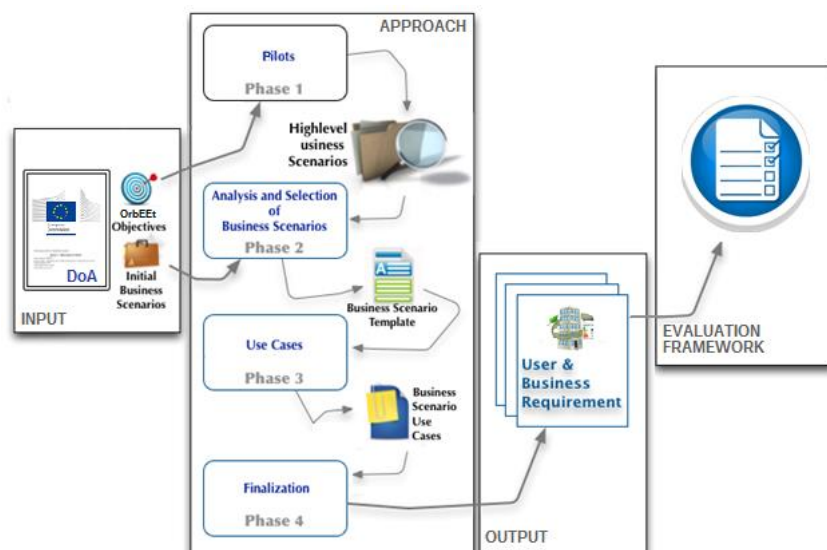
Plug in Aeotec Repeater has been designed to improve the reliability and performance of your Z-Wave network. It will receive weak Z-Wave communications, and then rebroadcast them at full strength.

Table of the selected equipment

Device Type	Proposed Z-wave Device	Indicative Cost
Smart-Plug	FIBARO Wall Plug (Schuko) 2500 W maximum capacity	€ 65.00

Smart Switch	AEON LABS MICRO SMART ENERGY SWITCH Reference: AEO_MSES-053 2300 W maximum capacity - Single switch	€ 50.00
	PHILIO RELAY SWITCH Reference: PHI_PAN04-144 1500 W X 2 maximum capacity - Double switch	€ 50.00
	AEON LABS CLAMP POWER METER Reference: AEO-PM-HEM1 60A, 100A and 200A clamp sizes	€ 60.00 - € 100 (three phase)
Multisensor	Z-Wave Aeon Labs Multisensor 6 - Gen5	€ 70.00
Gateway	Raspberry Pi 2 Model B 1GB	€ 40.00
	Z-Wave.me RaZberry PI GPIO Daughter Card - Gen5	€ 60.00
(Optional) Range extender	Z-Wave Aeon Labs Extender	€ 30.00

In OrbEEt project a methodology aimed especially at the extraction of End users and Business requirements consists of four basic steps the last one being the Evaluation framework.



The evaluation process requires the establishment of a series of pilot tests that will be performed in a sequence of loops, according to a user-centric design approach (iterative process) in parallel with individual R&D work in order to establish a continuous monitoring and evaluation framework. Three main pillars of the evaluation framework can be defined in order to evaluate the fulfillment of the project objectives regarding the user and business requirements:

- **Technical assessment of the OrbEEt framework**

- **Impact analysis assessment of the OrbEEt framework**
- **User acceptance assessment of the OrbEEt framework**

The main objective of the OrbEEt evaluation activities is to perform the assessment of the OrbEEt framework, considering the following evaluation criteria:

Evaluation Criteria ID	Evaluation Criteria Name	Evaluation Criteria Description
EC-1	Tool Performance	The OrbEEt framework technical performance criterion calculates the monitoring accuracy, granularity and reliability of the system, and user interface easiness and responsiveness.
EC-2	Energy Efficiency	The Energy Efficiency criterion calculates the decrease of the energy consumption considering several Energy and Environmental related KPIs which will help to depict high granularity and real-time information about the energy performance at various operational spatio-temporal levels.
EC-3	Environmental	The Environmental criterion calculates the decrease of the CO2 emission to depict high granularity and real-time information about the environmental impact at various operational spatio-temporal levels.
EC-4	Business	The aim of this criterion is to improve and optimize the business parameters highlighting the related impact of occupants and processes on energy consumption.
EC-5	User Comfort Preferences	This criterion calculates the human preference in terms of thermal and visual comfort parameters.
EC-6	User Engagement	It calculates the user engagement of the OrbEEt end users towards the Energy Efficiency Behavioural Change