

OrbEEt in Erlangen



Initial Analysis & Baseline Definition



1 Selection of pilot offices, pilot audits & business process analysis as part of project foundations

Installation & Deployment

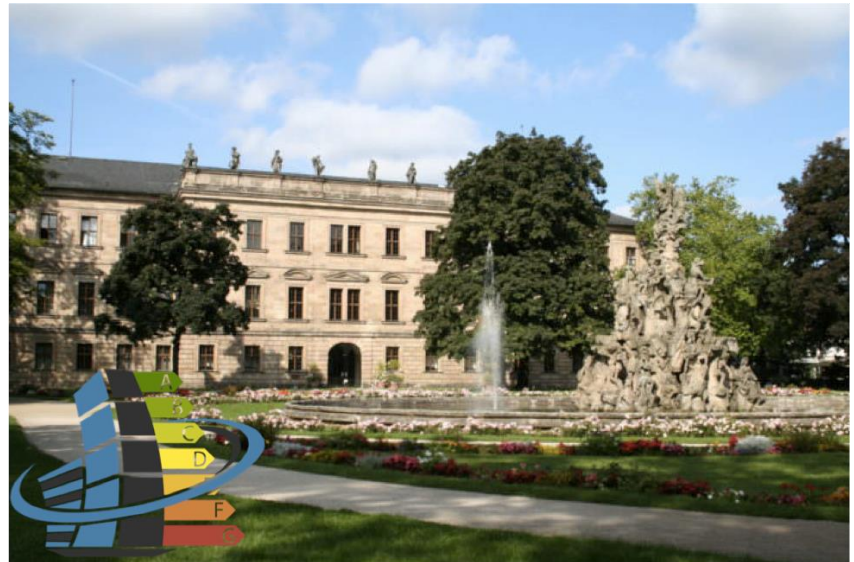


2 Installation of metering & sensors, software deployment and In-office Displays

Final Results & Significant Insights



3 A 12-month demonstration of OrbEEt framework, insights, impact assessment analysis and end users evaluation



The Friedrich-Alexander-University Erlangen- Nurnberg is one of Germany’s largest universities with currently 26.000 students, 260 chairs and 24 clinics. It is firmly rooted in the Nuremberg Metropolitan area, which has a strong focus on technology and environment.

The Friedrich- Alexander-University Erlangen-Nurnberg has selected the IZPH will department for the demonstration of OrbEEt framework taking into account the different business activities and the potential for active end users enrollment in the project.

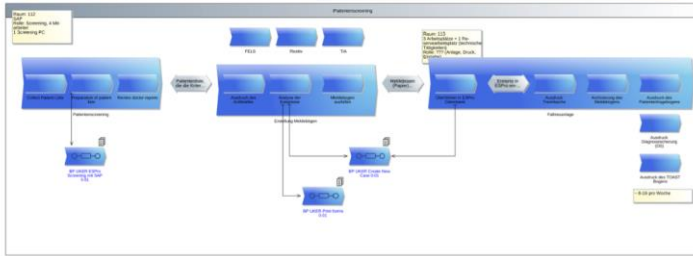
Initial Analysis & Baseline Definition



Erlangen Pilot Premises

Seven pilot zones set were selected to set the demo environment for the German pilot site, spanning from single office to multi office zones, specific vs. generic vs. meeting room use, senior vs. junior personnel, spatial orientation etc...

We highlight the selection of meeting room as a lighthouse zone with a fully-fledged OrbEEt deployment towards the demonstration of project activities to external personnel getting engaged in project demo activities.



Business process & Organizational Activities

Beyond the selection of the pilot zones to set the demo environment of the project, a detailed audit analysis was performed to estimate the usage profiles in premises.

Heating is the most consuming load counting for ~80.00% of total energy consumption. Lighting is the 2nd most consuming load with a consumption of ~15% with the remaining 5% allocated to targeted plug devices in premises.

The business processes were also defined for the key personnel (12) and external visitors (15). Several micro activities (21) were identified to further select the list of 7 skeleton business activities of the project.

Installation & Deployment



Given the size of the Erlangen's pilot site and the selection of building zones, the number of hardware devices installed is:

- Two Z-wave Gateway, 14 Smart plugs, 9 Smart switches, 9 Heat cost allocators, 7 Multi sensors & In Office Displays

The cost of equipment for the demonstration was 1,980€ with extra costs required for the O&M activities. A market analysis indicates that the equipment cost may be reduced at 1,523€ for a large-scale demonstration; a potential for investment in the technology.

The security and privacy of data is a hot topic in Germany; thus extra effort was required at the early phase of the project to configure the solution based on specific pilot needs & requirements.

In the **second phase**, the installation of hardware took place from M18 to M21. Due to the size of the pilot and the selection of zones, a hierarchical topology was adopted towards the installation of equipment in pilot premises.

Following the deployment of the WSN in premises, the configuration of sensors & metering units and further the placement of In-Office Displays was the **next step**. The personalization of the software was performed with 30 active accounts set for the end users.

As an in parallel activity, the engagement of end users to the OrBEET services and tools was ensured through targeted awareness & training workshops in premises.

Final Results & Significant Insights

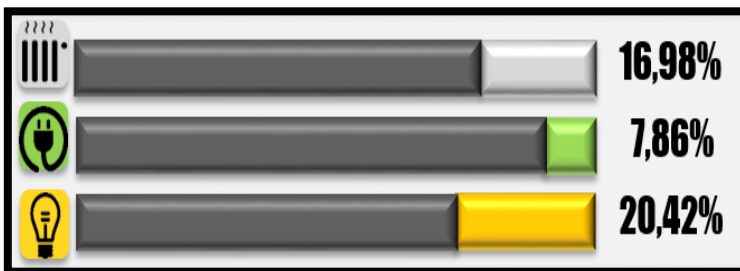
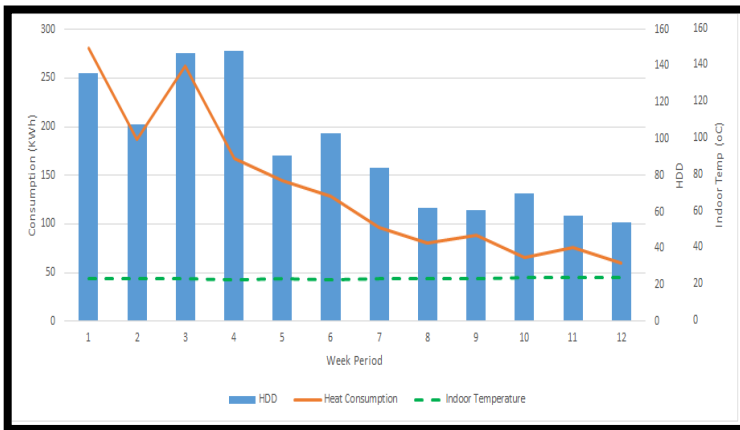
Following a 12-month full demonstration of OrbEEt framework, active engagement of end users in all applications (in office displays, intranet portal and game app) is reported, leading to significant energy savings - **17.00%**


The high expertise of the key personnel in ICT technologies facilitated the demonstration and evaluation of OrbEEt solution in premises; leading to high acceptance levels (>80%) for the final solution.

The heat consumption savings are significant in the German pilot site premises reaching an amount of 17 %. The extreme weather conditions during the demo period was a bottleneck to achieve even higher savings.

On the other hand, lights savings are even higher reported at 20.42%. The deployment of a real time notifications framework directly impacts the amount of savings achieved as the end users are keen to accept the triggers and modify their personal behaviour. As an add-on impact, we quantify the level of savings on other load types (e.g. plug devices - 7.86 %) as a post demonstration of OrbEEt holistic approach.

Due to the character& role of the demo site, there were targeted dissemination activities performed during the validation period focusing mainly on the detail presentation of final project results to the FAU board.



The reduction of CO2 emissions & Peak demand was one of the main targets for the German site. 

The reduction of peak demand was ~20.0% & CO2 emissions reduction close to 15.0%.

The research focus of the IZPH is driven by its previous research in the field of Technology Assessment & simulation-based outcome research. It is a future task for the IZPH department to evaluate the potential for further extension of the deployment of OrbEEt in other departments.

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