

# OrbEEt in Innsbruck



## 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



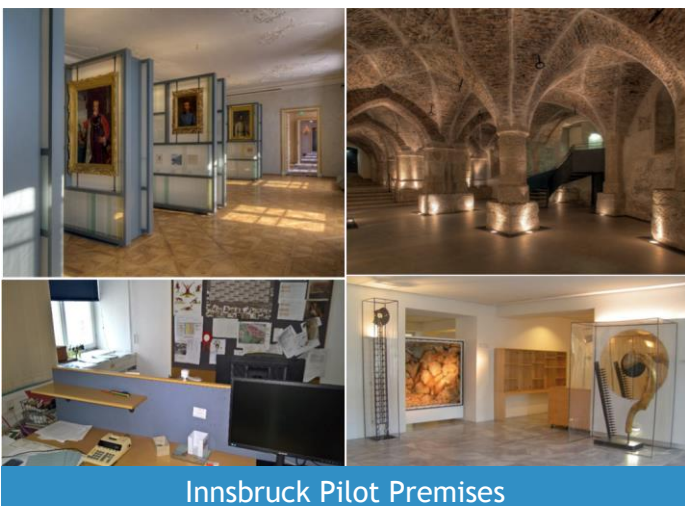
- 3 A 12-month demonstration of OrbEEt framework, insights, impact assessment analysis and end users evaluation



The Imperial Palace Innsbruck, located in the centre of Innsbruck, serves as a demon site for the project. It was built in the 15<sup>th</sup> century and is a 5-storey building with a total floor space of 26,300 m<sup>2</sup> and a total cubic volume of around 110,000 m<sup>3</sup>.

The Imperial Palace Innsbruck is one of the most significant cultural heritage sites in Innsbruck and Tyro with more than 100,000 visitors (adults, children and pupils) visiting the Museum on an annual basis; standing as the best building selection for the demonstration and dissemination of OrbEEt.

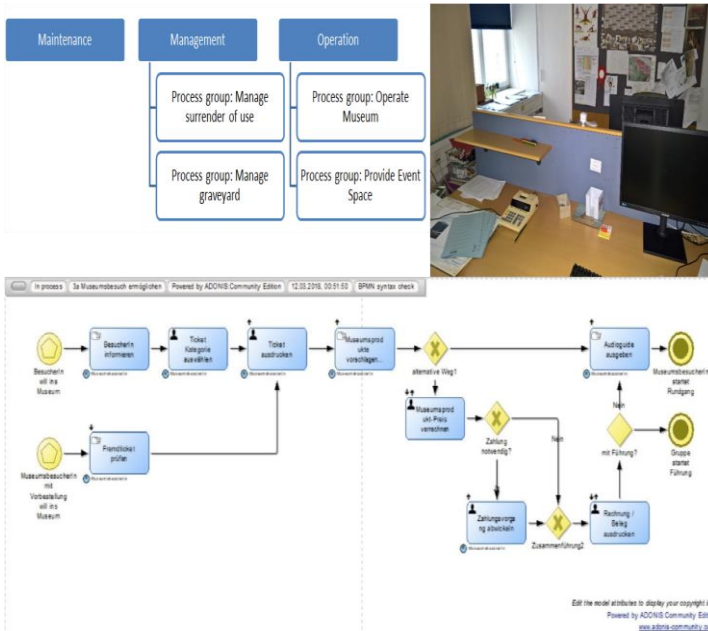
## Initial Analysis & Baseline Definition



Innsbruck Pilot Premises

Four pilot zones were selected for the project: Museum & Events areas and Office pilot zones. The former are standing as the dissemination pilot for the project with more than 300 to 350 visitors per day.

On the other hand, the office rooms were selected as the main demo environment for the validation of the proposed framework; by combining energy & context information with the business processes in premises.



Business process & Organizational Activities

Preliminary energy audits were performed at the early phase of the project to estimate the potential impact of OrbEEt in premises.

Heat consumption is the most consuming load (58.97%) with lighting to be the 2<sup>nd</sup> most important load in pilot premises (33.08%). Several electrical devices at the pilot zones (7.95%), computers & printers, were considered for the demo activities

The business processes were also prescribed for the key personnel (30) and external visitors (20). Several micro activities (35) were identified to further select the list of 10 core activities to set the business framework.

## Installation & Deployment



The configuration of local network was the most important task at the early phase of the project. Due to security restrictions a 2<sup>nd</sup> wireless network was established in premises.

In the **second phase**, the installation of hardware took place from M19 to M22. Due to the size of the pilot, several gateways were mounted further combined with the numerous sensing and metering components deployed in pilot premises.

Given the big size of the Imperial palace of Innsbruck, the number of hardware devices installed are:

**9 Z-wave Gateway, 21 Smart plugs, 19 Clamp-on Power Meter, 5 Heat cost allocators, 20 Multi sensors & 4 Smart TV**

The cost of equipment for the demonstration was 2,640€ with extra O&M costs as a subcontracted electrician was responsible to perform this task. The trend analysis indicates that the equipment cost may be reduced at 2,031€ for a large-scale demonstration.

The **third phase** of installation was about the configuration of sensors & metering units and further the deployment of In-Office Displays. The configuration of the software was performed for the 45 active users to access the different services tested on site.

Following the installation & deployment of the solution, the **maintenance of OrbEEt** was the main task, to eliminate any potential faults and ensure the high reliability level of the service during the demonstration period.

## Final Results & Significant Insights

Following a 12-month demonstration of OrbEEt framework, the engagement of end users in different project activities leads to significant energy savings (18.97%).

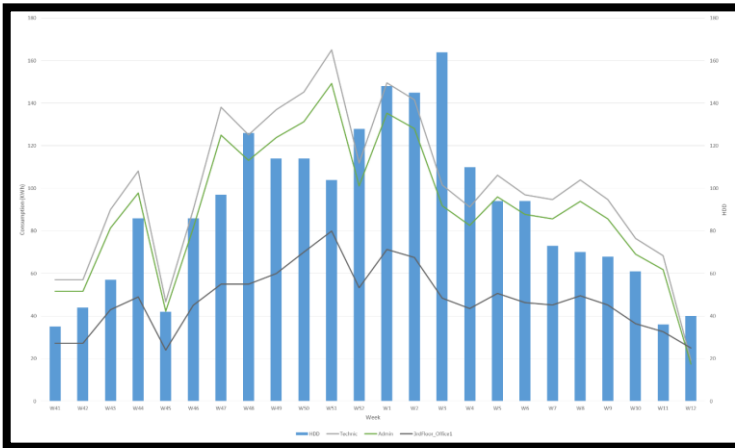
The savings on heating in BHOE premises was one of the main goals of the project; considering also the size of the pilot. The active enrolment of end users, enhanced with the knowledge about thermal comfort and considering the availability of individual control over thermostat leads to significant savings on heat consumption.

We highlight also the savings in lights consumption; the availability of bi-switches was a main factor towards achieving significant electricity savings by triggering end users to reduce their consumption.

By comparing the performance of the different zones in premises; special remark about the impact of OrbEEt in technicians zone. The users are familiar with the domain and show high interest to adapt their behavioural profile to succeed in terms of energy efficiency.

The promotion of the OrbEEt framework through the dissemination of activities was performed during the project period, most significant the presentation of the overall framework, the tools and final results in the 6<sup>th</sup> European Congress on Use, Management and Conservation of historical buildings

hosted by Burghauptmannschaft initiative in Vienna.



The reduction of CO<sub>2</sub> emissions & peak demand was one of the main targets for BHOE.

The reduction of peak demand 20.00% & CO<sub>2</sub> emissions is 21.45%

OrbEEt framework seems to be an approach to go further for BHOE. The structure implemented in the Imperial Palace Innsbruck will be transferred to other approx. 110 historic buildings, further enhanced with the simulation tool to evaluate the impact of business processes.

<http://orbeet.eu/>

[http:// hofburg-innsbruck.at/](http://hofburg-innsbruck.at/)