FLEXUM Open Call

Authors:

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1 Title

Flexibility services provision by University of Murcia premises (FLEXUM)

2 Company/Organisation

Odin Solutions SL (ODINS)

3 Short Description

3.1 Challenge

The University of Murcia has power peaks larger than the 4MW. Approximately a 35% of that peak could be well related to the conditioning, what would represent a value larger than 1MW. This is obviously an approximate calculation, and more importantly, it is subjective to the possibility of acting over the majority of buildings on campus, but still, it is a promising value for the demonstration purpose.

These peaks have a substantial economic impact as such power peaks for a consumer like the University of Murcia result on larger energy bills and on a high extra cost of the maintenance of the micro-grid of medium voltage of the campus.

On the other hand, these peaks can also interfere in the normal operation of the grid given its size and can generate network congestions under certain circumstances.

3.2 Proposed solution

FLEXUM will design, implement and evaluate a flexibility service provision (FSP) to achieve demand adjustments and responses for alleviating the network congestions at medium and low voltage network levels in the Spanish scenario located in Murcia (Espinardo). Using both already existing and new sensing/actuating equipment, the solution will use the shiftable loads and the controllable loads of the UMU infrastructure mainly composed by connected HVACs and electric vehicle chargers to provide demand responses and flexibility capacity. Using the UMU infrastructure, ODINS will be able to act as a Flexibility Services Provider (FSP) to develop and demonstrate flexibility services.

The main project results will be a FSP component, a flexibility engine and demand-response services based on a novel IoT platform developed in H2020 PHOENIX project. The engine will use artificial intelligent algorithms to quantify flexibility and will also design and suggest flexibility strategies for final consumers using a simple friendly dashboard. The flexibility engine included in the IoT platform will be compatible with communication protocols of DSOs and TSOs. We will implement a FSP component in the IoT platform to enable the bidirectional communications of congestion signals and demand events from the OMIE local market platform. Moreover, the FSP component will be design with high interoperability to be compatible with other grid systems.

This project will develop flexibility services and demand responses for the main buildings of the university with existing energy meters, sensors and actuators, so automatized demand response operations could be implemented to alleviate peaks on the local grid network. This will stay on campus and will allow on the long term to plan actuations that modify the demand. This will serve as an exemplary exercise for other large consumers in the region of Murcia and the whole country. Also, it will facilitate open data that stakeholders such

as energy utilities, or ESCOs could use to prepare for the new scenario where energy flexibility and demand responses are the norm.

3.3 Expected results

The ambition of FLEXUM is to offer to OneNet a series of beyond state-of-the-art developments to provide the following innovative advances:

1. Optimization of operation of UMU infrastructure to maximize flexibility.

2. Intelligent operations to improve the thermal inertia of multiple UMU buildings.

3. Development of smart plans for contracting flexibility.

4. Forecasting engines to anticipate to flexibility requests.

This project will develop a flexibility demonstrator to experiment demand adjustments and responses for alleviate the network congestions at medium and low voltage network levels in the Spanish scenario located in Murcia.

4 Figures

4.1 Test scenario (global view)

Figure 1 – Main test environment (UMU Campus)

4.2 Test scenario (individual buildings)

Figure 2 – Chemistry Faculty

Figure 3 – General Lecture Room and Mathematics Faculty

Figure 4 – General Library and Documentation Faculty

Figure 5 – Psychology Faculty

Figure 6 – Veterinary Faculty

Figure 7 – Work Sciences Faculty

Figure 8 – Pleiades Building

4.3 Preliminary tests (previous real tests)

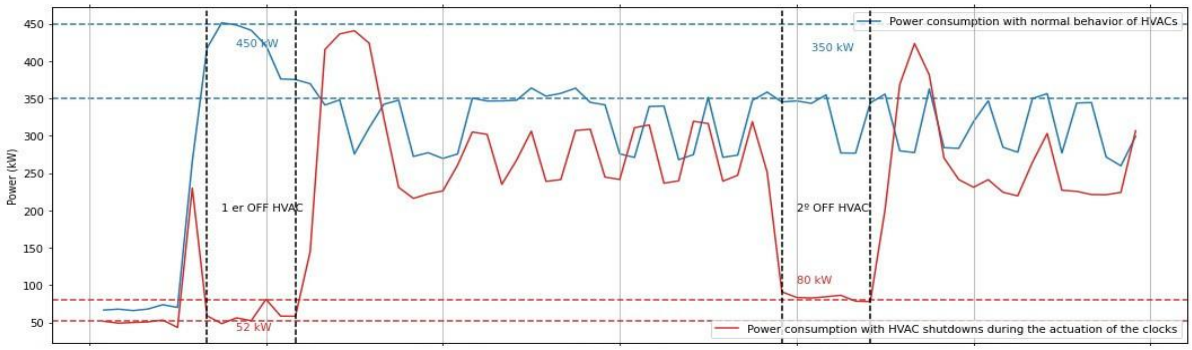

Figure 9 – General Lecture Building and Mathematics Faculty

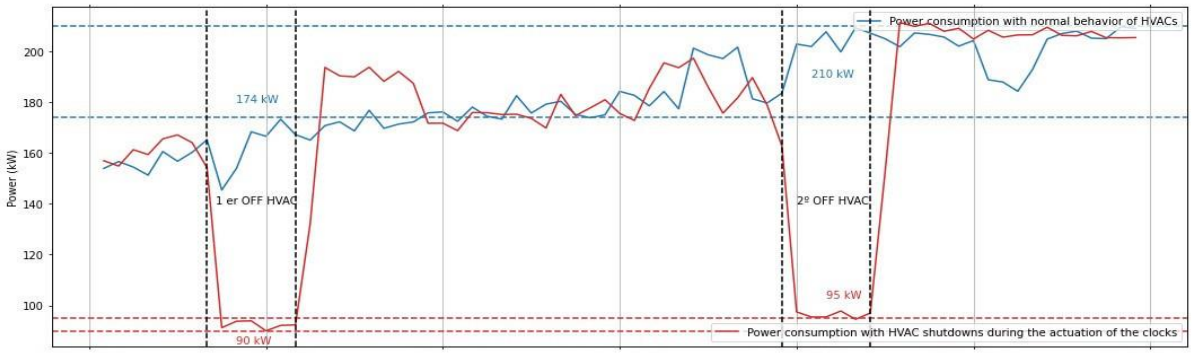

Figure 10 – General Library and Documentation Faculty

5 Company’s logo