

iSERVcmb Best Practice

Electricity savings of 5% per year by adjusting the operation of the A/C equipment and small investments.

UP-Porto 34

34 – PT

Introduction

This report summarizes the results of UP-Porto34 Museum participation to the iSERVcmb project with regard to its HVAC system energy consumption. The report refers to available data from the year of 2013.



iSERV Achievements

Energy Savings

Electricity: 11.8 kWh/m².year

8.3%

HVAC electrical consumption reduction

Cost Savings

Electricity: 2 €/m².year

Emissions Reductions

Electricity: 1.7 kgCO₂/m².year

Investment to achieve savings

1.8 €/m².year



	Key Figures
Location	Porto, PT
Sector	Museum
Construction Date	1999
Project Size	7,537 m ²
EPC	N/A
Sub-metering Level	Party Metered
Data Frequency	Hourly
Data Collection Protocol	Meters and sensors attached to BMS
Data Sending Protocol	Automatically extract data & manually send to an email address
Nature of Savings achieved	Improved Operating Schedule Improved HVAC Control
No. HVAC Systems	30
HVAC Components	<input type="checkbox"/> Heat Generators <input checked="" type="checkbox"/> Cold Generators <input type="checkbox"/> All-in-One Systems <input type="checkbox"/> Heat Pumps <input checked="" type="checkbox"/> Air Handling Units <input checked="" type="checkbox"/> Pumps <input checked="" type="checkbox"/> Terminal Units <input type="checkbox"/> Heat Recovery <input type="checkbox"/> Heat Rejection

Building Profile

UP-Porto 34 is a building, which main activity is museum. The total conditioned gross internal area is 7537 m², with five stories, located in Porto, PT. The air distribution in all floors is achieved by 29 AHU's with heating, cooling and filtration and local fan coils for the offices. The exposition rooms have controlled temperature and humidity ratio with vapor humidifiers, 24 hours a day, if in use. Cooling to the first 5 floors is provided by 2 chillers and ice storage during the day, while at night the same 2 chillers are used to fill the ice storage and a third chiller is used to maintain the conditions in the exposition rooms. The total Nominal Cooling Capacity of the chiller is of 277.5 kW.

Building Management System installed

The building systems are controlled by a BMS, and the system operates on an optimized stop and start. The BMS was also used for data collection in this case study. The building was considered occupied 09:00 to 19:00, Monday to Sunday.

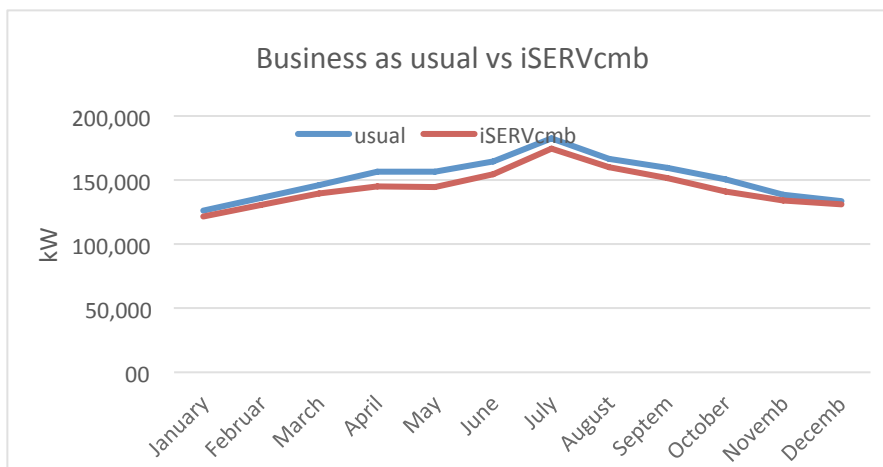
Savings of 89 MWh/year in energy consumption

The data provided starts at January 2013 and includes electricity energy consumption. Energy saving opportunities have been identified in several HVAC systems with a total estimated savings of 91 MWh on the analysed period. It is believed that with more detailed monitoring, more ECO's would be found.

This energy conservation opportunities are mostly related to system control and VSD Pumps.

The difference in the annual consumption is represented in the figure on the right and includes Chiller, AHU's and Water Pumps control improvement as well as turning off equipment when not needed. The estimated result of this measures could represent a reduction of 9% in the HVAC systems, without major investments. The reduction of the HVAC annual building energy use can be reduced to 125 kWh/m².year. The savings estimated in this report represent 5 % of the building total consumption.

The annual electrical savings achieved in the building are estimated in 89,000 kWh/year on the HVAC systems. This translates to annual electricity savings from the HVAC alone of approximately EUR 15,150/year, with an investment of proximately 13,200 € in the first year.



www.iSERVcmb.info

Contact

Jose Luis Alexandre
UPorto
FEUP/Mechanical Department
Portugal
jla@fe.up.pt



how energy efficient are you really?

The sole responsibility for the content of this case study lies with the authors. It does not reflect the opinion of the European Union. Neither the EACI nor the European Commission are responsible for any use that may be made of the information contained therein.

