

# NEWS

CASCADE – ICT for Energy Efficient Airports

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## Project completed!

CASCADE project ended officially on 31 March 2015. During 42 months, 9 project partners from 4 European countries have experienced a successful cooperation in the field of buildings ICT and energy management at airports.

## Final review meeting

The European Commission has validated the results of the CASCADE project during the final review meeting on last 6 May 2015. The results were evaluated as impressive and the project partners are committed to replicate the solution to other airports facilities.

## Acknowledgement

The CASCADE consortium says thank you to all partners and stakeholders who have supported us during the project. We would like to especially thank our Project Advisory Committee members for their support.

## Project results

The CASCADE project has developed an innovative solution that incorporates existing Building Automation/Building Management Systems (BAS/BMS) with an automated Fault Detection and Diagnostics (FDD) system for Heating, Ventilating and Air Conditioning Systems (HVAC) linked to an ISO 50001 based Energy Action Plan. The solution has been implemented, tested and validated at two large European airports: Rome-Fiumicino and Milan-Malpensa.

The CASCADE software toolkit extracts data from BMS/BAS, continuously analyses these data with FDD algorithms and transforms the results of FDD into actionable energy management information over a web-based portal. The Energy Management Action System explicitly associates energy management personnel at airports with energy management actions required to maintain both comfort conditions and optimal energy efficiencies.

Furthermore, ontology model of the airports are used as a central repository for the storage of airport energy systems static data and to ensure a seamless data transfer between heterogenic systems.

The CASCADE solution has identified large energy savings potentials up to 20% at both airport pilots. For the Terminal 1 at Fiumicino airport, it amounts to 363 MWh electricity, 691 MWh heat and 527 MWh chilled water savings per year or to about 90 k€/y and 230 Tons of CO<sub>2</sub>.

At the Malpensa airport, energy saving potentials in the operation of the air handling units providing the Satellite A with fresh air conditioned air amounting to 126 MWh electricity, 309 MWh heat and 262 MWh chilled water have been discovered by the means of CASCADE. These results show the high potential of this technology which can be easily replicated to other building types like hospitals, building offices, schools and university campus for example.

## Benefits for airports and other complex buildings:

- Integration with existing BAS/BMS systems
- Extraction of additional information from existing data to support Energy Management and O&M
- Quick, continuous and automated Identification of energy saving potentials. Client support for detailed energy analysis and for the implementation of Energy Conservation Measures.
- Personal training on FDD and ISO 50001 Energy Management Systems
- Versatile solution customizable to client needs
- Short return on invest (<2 years)

## CASCADE solution snapshots:

Below are shown some exemplary figures and snapshots from the CASCADE solution. The CASCADE Consortium offers webinars and tutorials for interested customers.

Figure 1: Identification of simultaneous heating and cooling in large air handling units (AHU). The diagram shows a strong overlap of heating mode (red dots) and cooling mode (blue dots) during the heating season due to suboptimal control strategy.

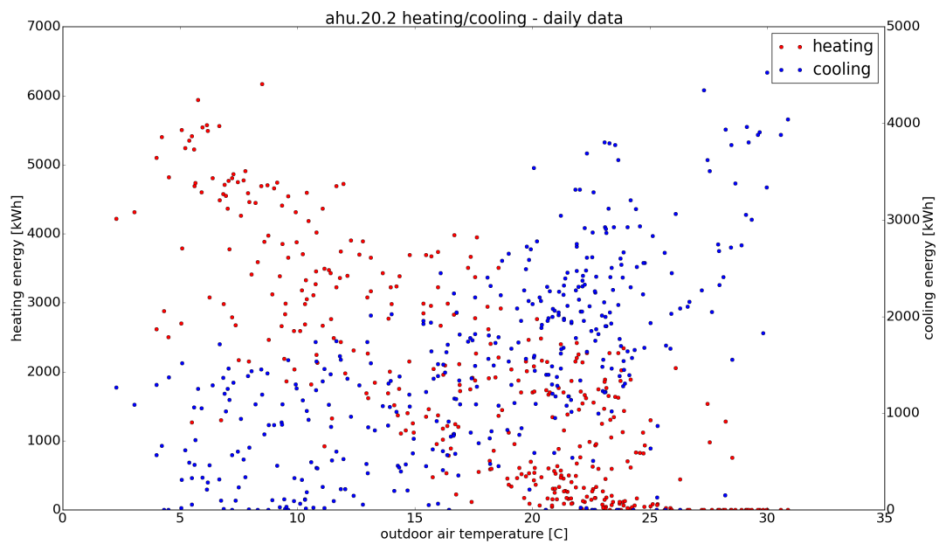


Figure 2 System visualization and fault message for airport energy teams. Over the web interface, energy and maintenance teams can visualize data on plant schematics and access fault detection and diagnostics messages.

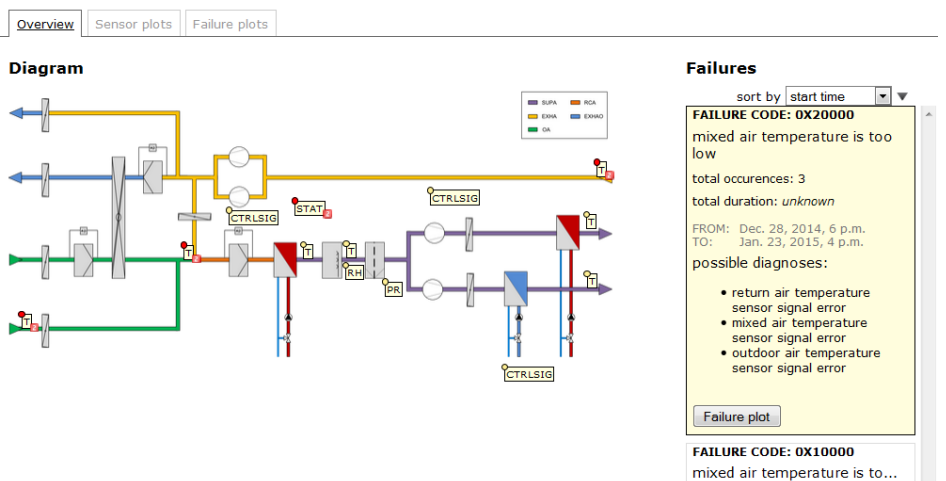


Figure 3: List of improvement opportunities in the ISO 50001 based Energy Action Plan. Improvement opportunities related to identified faults are managed in the Energy Management platform.

Improvement Opportunities

Open Closed

Category/System	Summary	Source	Start	Target
Performance Manageme...	Perform Energy Audits	IO Playbook	-	-
HVAC	AHU-01 Allow the cooling coil and heating coils va...		-	-
HVAC	AHU-01 Check the set-values of the relative humid...		-	-
HVAC	AHU-01 Modify the heating and cooling coil control...		-	-
HVAC	AHU-02 Check the control valve and the control par...		-	-
HVAC	AHU-02 Check the pressure set-values and the press...		-	-
HVAC	AHU-02 Check the signals of the dampers.		-	-
HVAC	AHU-02 Make sure that the cooling coil and heating...		-	-
HVAC	AHU-02 Modify the heating and cooling coil control...		-	-
HVAC	AHU-03 Check the pressure sensor and the set-value...		-	-
HVAC	AHU-03 Make sure that the cooling coil and heating...		-	-
HVAC	AHU-03 Modify the heating and cooling coil control...		-	-
HVAC	AHU-04 Check the humidifier pump.		-	-
HVAC	AHU-04 Check the pressure set-values of the fans.		-	-
HVAC	AHU-04 Make sure that the cooling coil and heating...		-	-

Figure 4: Data acquisition system at Fiumicino airport. Advanced Data Logging Systems for the measurement of energy flows, temperature, pressure and humidity have been developed by CASCADE and installed at the airport pilots.

