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Düsseldorf Airport relies on smart data for its energy management

Düsseldorf Airport, the third largest airport in Germany, has been using MeteoViva Climate since 2012 and has reduced the energy costs of its Central Building East by about 40 percent. In view of these sustained savings and the fact that the technology had been running reliably in a complex environment, the airport decided to deploy it in Terminal A in 2017. Simultaneously, the airport operator is testing MeteoViva Campus, an extension to MeteoViva Climate specifically designed for airports and multi-building environments. The new solution is designed to help the company further integrate its energy management.

Project

With over 23.5 million passengers in 2016, Düsseldorf is the third largest airport in Germany. It is not only the place where many business and leisure travelers from the Rhine-Ruhr region start and end their trips, but it has also become an important hub, as reflected in as many as two million transit passengers. Using resources efficiently has become an important issue in all areas of the airport with a view to preserving its national and international competitiveness. This also applies to the energy used in all of its buildings. MeteoViva Climate is currently used for energy-efficient air conditioning, cooling and heating in two buildings: the 99,000 sq. ft. Central Building East and the neighboring 484,000 sq. ft. Terminal A.

Properties

Central Building East and Terminal A

Customer

Düsseldorf Airport

City

Düsseldorf

Building Size

total of 583,000 sq. ft.

Equipment

District heating, radiant ceiling panels, radiators, air-handling units
46 zones, 520 data points, BMS with BACnet connection

Savings

HVAC energy costs reduced by 40 percent in Central Building East



„MeteoViva Climate helped us cut energy costs for our Central Building East (Zentralgebäude Ost) by 40 percent, although the building was already equipped with modern air-conditioning technology.“

Ralf Mober,
Head of Supply Technology (RVV),
Flughafen Düsseldorf GmbH



Assignment

The six-story Central Building East houses the airport ground services and offices. A large part of the building is used by a major airline for flight coordination and preparation. It also serves as a basis for other airport service providers, all subject to the daily flight operation schedules. The adjacent Terminal A includes gates and waiting areas for passengers, passport and security checks, as well as shops, cafés and restaurants. In both buildings, the equipment runs almost continuously, resulting in high energy costs.

Implementation

A custom model was developed for each building, describing their respective thermodynamic characteristics and used to perform the on-going simulations.

A total of 520 data points used for measuring and control by MeteoViva Climate were identified for both buildings. These also provide the information necessary to calibrate each model. Most of the required sensors and actuators were already in place, accelerating the installation. In addition, thanks to a scheduled software revision, the BMS provider was able to implement the digital interface to MeteoViva Climate as part of its normal intervention, facilitating the overall installation.

Conclusion

Since the installation of MeteoViva Climate in 2012, the Central Building East energy costs have been reduced by 40 percent as compared to the building's baseline. Thanks low installation costs, the project delivered a payback of only three months.

A full year evaluation for Terminal A, where MeteoViva Climate was put in operation in 2017, is not available as of this report. However, interim results clearly suggest that the projected annual energy savings will be achieved.

District heat is used for space and water heating, while air handling units supply fresh air. In addition, the Central Building East is equipped with radiant ceiling panels.

MeteoViva's mission is to reduce the buildings' energy consumption significantly by optimizing the operation of the Heating Ventilation and Air Conditioning (HVAC) systems, while maintaining a high level of comfort, including indoor air quality.

To help further reduce energy consumption in the Central Building East, the staged controls of the air handling units were converted to Variable Frequency Drives (VFD). These allow for a more granular control, and a more efficient operation of the ventilation systems by MeteoViva Climate. The customer attached great importance to stability and reliability of the installation from the very beginning. MVC was designed for a non-disruptive installation, adding to the infrastructure rather than modifying it. As a result, MeteoViva went in production seamlessly, operations were never disrupted, and no additional maintenance costs were incurred.

Finally, Düsseldorf Airport decided to test the new MeteoViva Campus approach and work with MeteoViva to develop it further. The goal is to manage energy resources and flows to approach self-sufficiency, and minimize generation costs for heating, air-conditioning and electricity.