SUCCESS STORY SCALA WETZIKON (CH)

Retrofit in the limelight – small investments enhance energy efficiency and room comfort.

High time for a change

The Scala in Wetzikon (Switzerland) is a vibrant meeting place for artists and cultural professionals located in an inn that was built in 1583. In addition to the event location, the Scala also includes a bar and a restaurant. A variety of circumstances made energy-efficient operation and maintaining a comfortable room climate difficult. In winter, for example, room temperatures were often low due to an outdated ventilation system and defective volumetric flow controllers. Furthermore, the no longer intact run-around coil heat recovery system and a defective valve prevented efficient heat recovery. Manual readjustment of the ventilation system was frequently necessary, which led to uncoordinated and inefficient settings. The solution? A minimally invasive retrofit of the HVAC systems in the building with intelligent components from Belimo, which preserved the historic building while equipping it with suitable, efficient, and intelligent ventilation control.

BUILDING TYPE
Event facilities

PROJECT
RetroFIT+

TRADES
Ventilation, cooling, heating

PRODUCTS
VAV actuators, Belimo Energy Valve™, sensors

BELIMO

Retrofit where it makes sense.

As part of this retrofit project, an intelligent control regulates the ventilation and heating system. The automation of the existing system was implemented with only a small number of components. Various components from Belimo were integrated for optimum control, including room sensors from Belimo for CO_2 measurement.

The event calendar at the Scala was also integrated into the system control in order to optimally coordinate the ventilation and heating with upcoming events. Visitors in the main hall were then always greeted with an optimum room climate.

The technical integration was challenging, due to the various types of communication used in the ventilation system. The analogue field devices were replaced by bus-capable components wherever possible. In order to limit the amount of cable replacement as much as possible, multiple communicative components were put to use: passive sensors and field devices with MP-Bus, Modbus, and Loxone Link. The use of existing infrastructure and the implementation of new, high-performance solutions made it possible to install the system successfully within a tight timeframe.

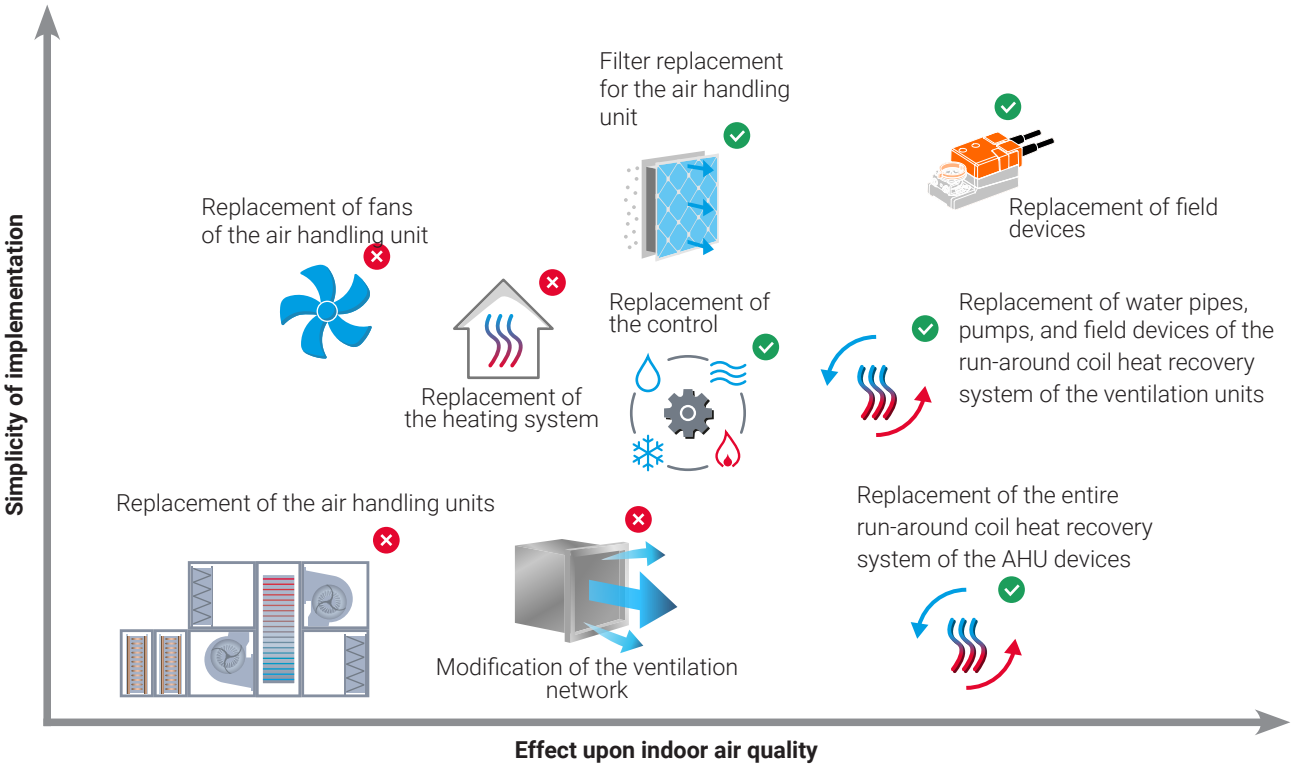
The air volume is controlled using Fan Optimiser programming, which optimises the fan speed based on demand and the damper settings. In order to be able to ensure optimum comfort, Belimo sensors were installed in the extract air ducts for the bistro and bar, and in the entire extract air of the gallery and main hall, which measure the temperature, humidity, and air quality.

The ventilation in the kitchen can now be controlled in three stages via a manual circuit. The air volume of the volumetric flow controllers is individually adjustable for efficient operation, and the fan is controlled according to the respective damper setting.

A variety of room sensors record temperature, humidity, and air quality. In the event of poor air quality, the ventilation is switched on automatically and the volumetric flow controllers from Belimo are regulated to the required setpoint of the volumetric flow. The air volume can also be modified manually as needed.

"The collaboration with Belimo was terrific. I'm already familiar with the products, and I received help whenever I had questions."

Patrick Martin
Building Automation Expert,
Hustech Installations AG



Comparison of the simplicity of the implementation and effect on energy consumption / indoor air quality in the Scala in Wetzikon (green, implemented measures; red, measures not implemented).

Energy recovery is carried out by the circulation network, which is connected to three air handling units (AHUs). It extracts the heat from two AHUs (extract air from kitchen and restaurant) and guides it to the supply air AHU. The two circulation pumps were replaced by one pump and two Belimo Energy Valves. These monitor the transport of heat and control it in optimum fashion. A temperature sensor was installed for frost protection. The pump control is triggered by a 0...10 V signal, depending on the available heat recovery volume.

Picture 1 shows the various measures implemented to improve the ventilation and heating system. Replacement of the field devices, filters, and water pipes was particularly simple to implement, which led to considerable improvements. More complex measures such as the complete replacement of the run-around coil heat recovery system of the AHUs was more complicated, but decisive for both efficiency and air quality.

Results that speak for themselves.

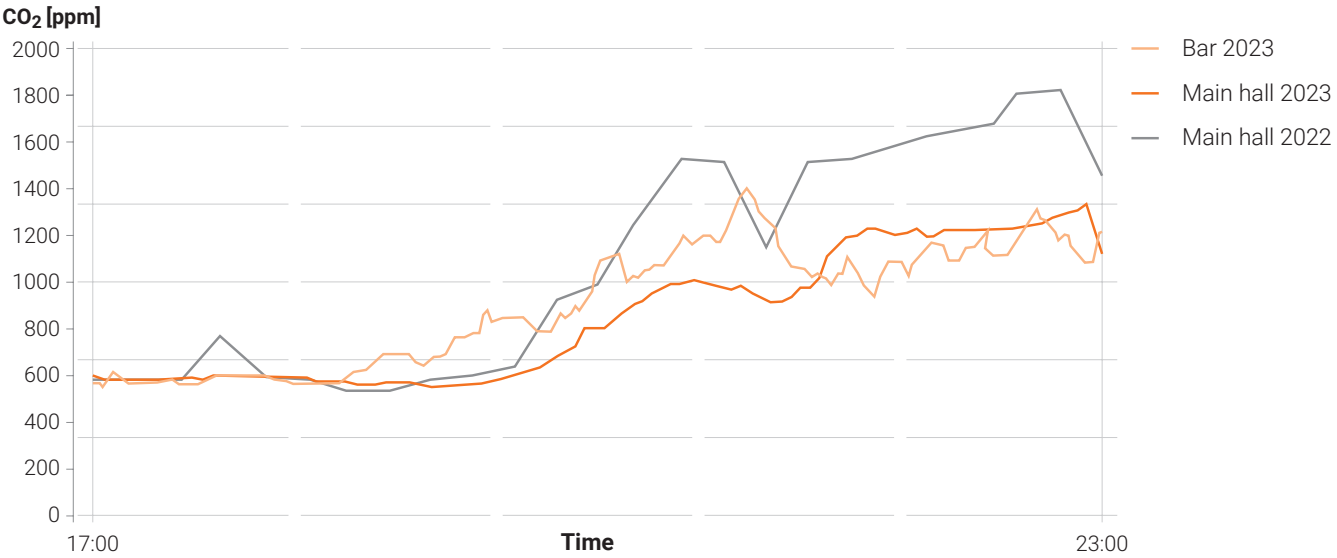
Thanks to the measures implemented, air quality was improved from 1,800 ppm (parts per million) to 1,200 ppm, representing an improvement of 30%. The degree of heat recovery increased by 50%, which resulted in significant energy savings.

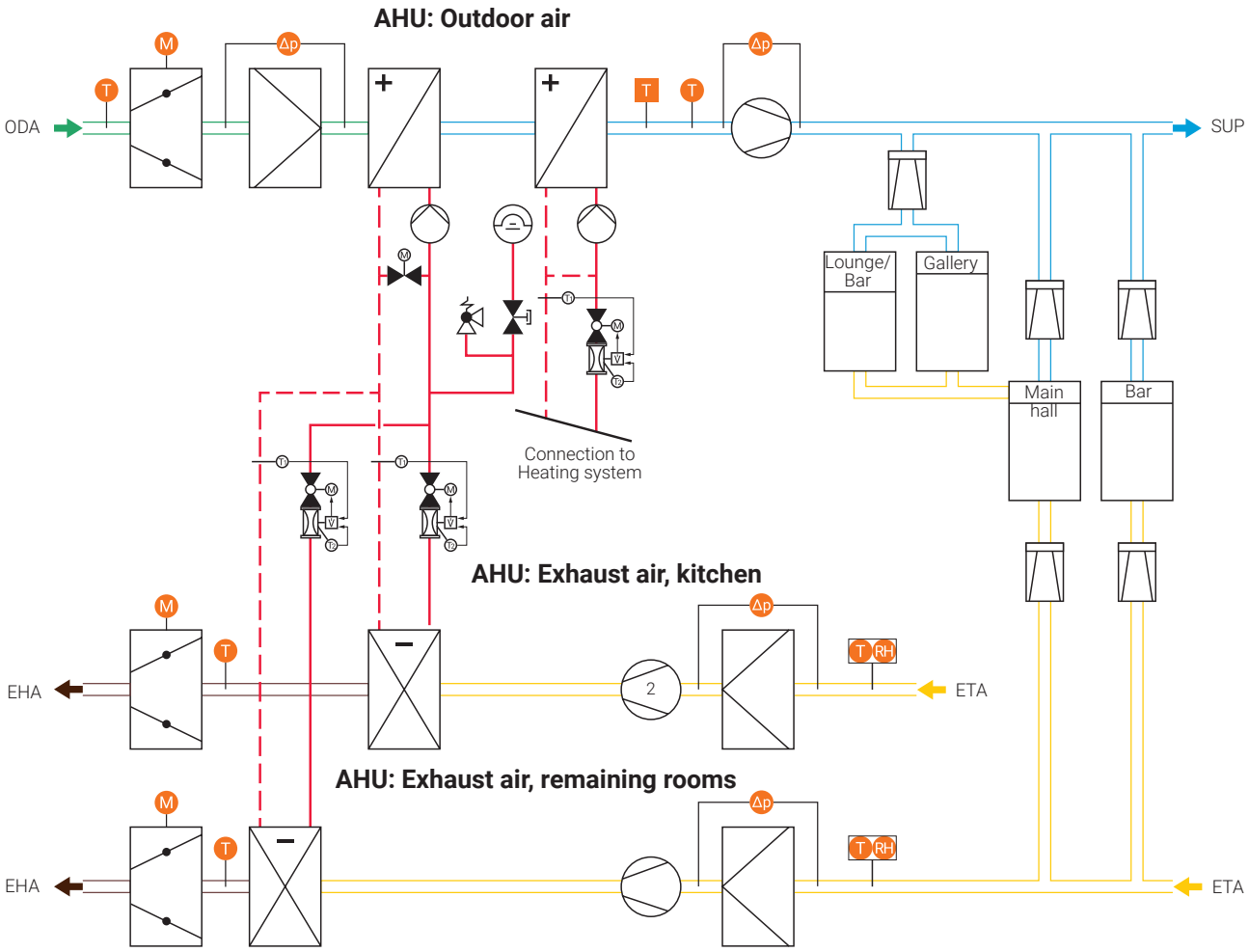
This RetroFIT+ project is an impressive example of how historic buildings can be modernised both efficiently and sustainably. The integration of modern components from Belimo and the intelligent control have not only improved indoor air quality considerably, they have also led to significant energy savings. The successful implementation of the retrofit measures underscores the commitment from Belimo to tailored and innovative solutions which offer true added value.

The air handling unit before the retrofit measures.

The air handling unit was equipped with various Belimo components.

Air quality measurements during a concert with around 150 visitors, before and after the retrofit.





Principle diagram of the ventilation system with three AHUs.

Evaluation.

The results achieved are gratifying for an existing system. It was only towards the end of the concert that the values rose somewhat over the 1,000 ppm limit. For concert halls and theatres, it is recommended that CO_2 concentrations be kept under 1,000 ppm (parts per million) to ensure good air quality and thus optimum conditions for the public and the artists. Here is a breakdown of the recommended values:

- Less than 800 ppm: Optimum range for fresh air. A CO_2 value of less than 800 ppm is considered to be excellent air quality, where people feel comfortable and can concentrate.
- 800 to 1,000 ppm: Acceptable for event spaces. This is generally considered to be good air quality, although the value should not exceed 1,000 ppm to avoid fatigue or concentration problems.
- Above 1,000 ppm: The upper limit for recommended CO_2 concentration is set at 1,000 ppm in many countries. Values above this may cause fatigue, difficulty concentrating and general discomfort.
- Above 1,500 ppm: Poor air quality, which often leads to fatigue and reduced performance and is an indication of inadequate ventilation.

All inclusive.

Belimo is the global market leader in the development, production, and sales of field devices for the energy-efficient control of heating, ventilation, and air-conditioning systems. Damper actuators, control valves, sensors, and meters represent our core business.

Always focusing on customer value, we deliver more than only products. We offer you the complete product range of actuator and sensor solutions for the regulation and control of HVAC systems from a single source. At the same time, we rely on tested Swiss quality with a five-year warranty. Our worldwide representatives in over 80 countries guarantee short delivery times and comprehensive support through the entire product life. Belimo does indeed include everything.

The "small" Belimo devices have a big impact on comfort, energy efficiency, safety, installation and maintenance.

In short: Small devices, big impact.

- 5-year warranty
- On site around the globe
- Complete product range
- Tested quality
- Short delivery times
- Comprehensive support

EN – 11.2024 – Subject to technical modifications

BELIMO Automation AG
Brunnenbachstrasse 1, 8340 Hinwil, Switzerland
+41 43 843 61 11, info@belimo.ch, www.belimo.com

BELIMO