CLEVAIR
Powered by Smart Plants

ClevAir Case Study

GNP AREAL

2,000 square meter office building in Sandefjord area, Norway

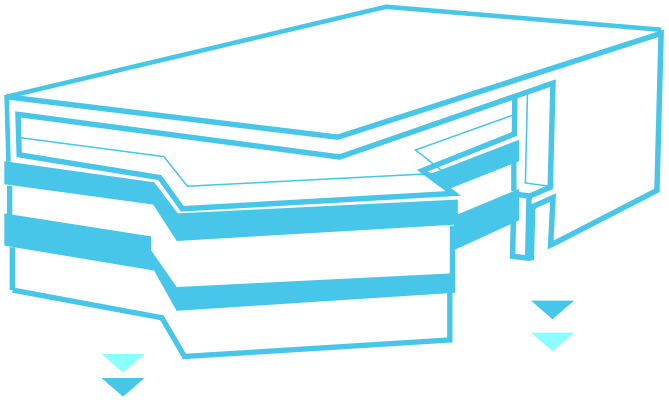
www.clevair.io

The customer

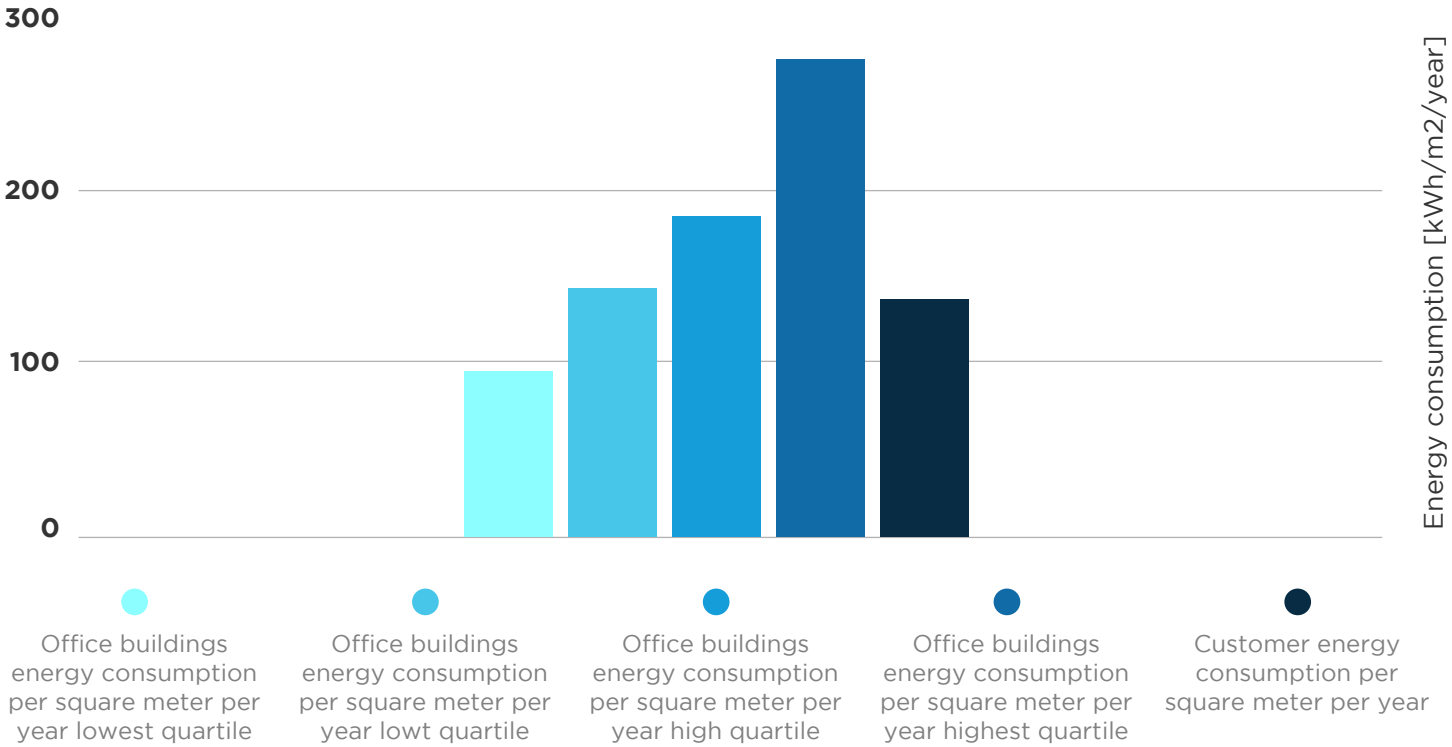
GNP Areal contacted us to gauge the possibilities of optimizing the energy consumption of their building. As a company, their portfolio is wide-ranging; they have invested in various industries with a special focus on energy, real estate, and technology. Even though they have offices spread across Scandinavia, they decided to task us with optimizing their 2,000 square meter office building in Sandefjord area, Norway.

Inspection

As a best practice, we always begin by comparing our customer's performance metrics with the market standards. Upon reception of this information from GNP Areal, we compared the building's statistics with the Scandinavian benchmark. The results indicated that the building was already performing really well. It lied in the middle of the second quartile of the most energy-efficient buildings, with a consumption of 138 kWh/m2/year.



Comparison of the customer energy consumption with the Scandinavian office building statistics



Diagnosis

Although the potential for even more savings seemed low, we accepted the challenge. After a closer look at the customer's infrastructure, we found out that we didn't need any costly adapters. This lowered installation costs.

1 **We then set up our ClevAir box which included:**

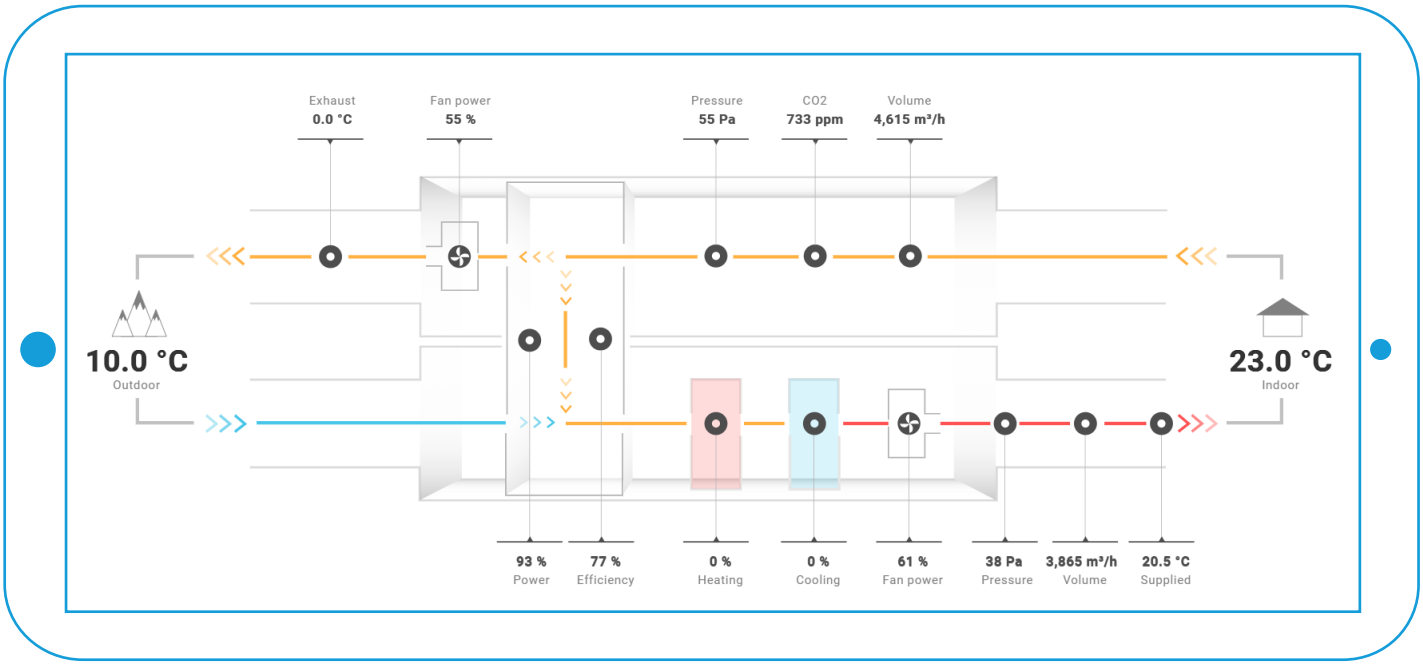
- Siemens IoT unit with ClevAir software
- 4G router for direct and secure communication
- Electric cabinet
- Power supply

2 **Installation was performed by the customer that required:**

- Placing the electric cabinet
- Plugging in power supply
- connecting the RJ45 plug to the current controller

3 **It was imperative to talk to the controller and begin collecting data. As the first data arrived, we set up the ClevAir dashboard which included:**

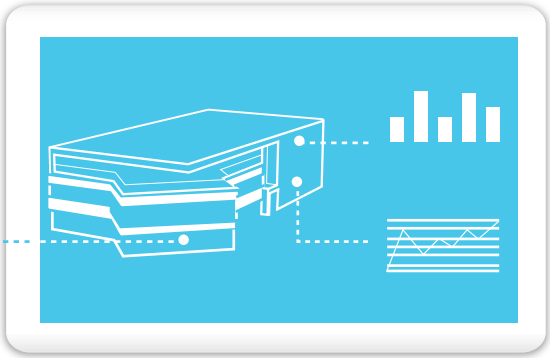
- Visualization of the data
- Forwarding all errors and alerts from the AHU to the email



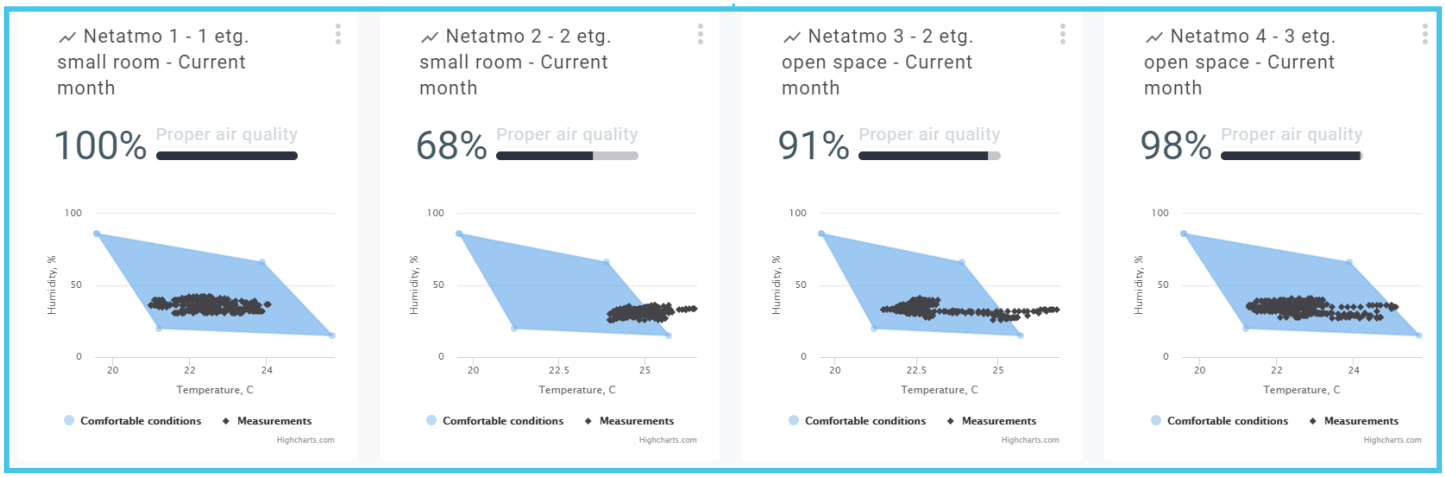
At this time, an issue was identified. ClevAir noticed the presence of cold and warm zones in the building. We delivered temporary wireless sensors and connected data to the same dashboard, in a bid to know more about the issue. The collected data helped us and the customer to better understand the severity of the problem.

Our final steps

After collating data for two weeks, we identified the optimization opportunities. As ClevAir not only collects data but also allows us to take control over the Air Handling Unit (AHU), we deployed new logic on it to better control:



- Airflow
- Temperature



This enabled us to change customer building into a self-operating one, with real-time control. Currently, we have achieved the following functionalities:

- Automatically decrease/increase the intensity of ventilation depending on thenumber of people in the building.
- Control the temperature of the building based on various factors including weather forecast, cooling, and heat exchanger efficiency etc.
- Checking the weather forecast every morning and adjusting the ventilation for the entire day accordingly. for example: letting the cooling operate freely if a warm day is forecasted, or keep high efficiency on heat exchanger if the forecast shows a cold afternoon.

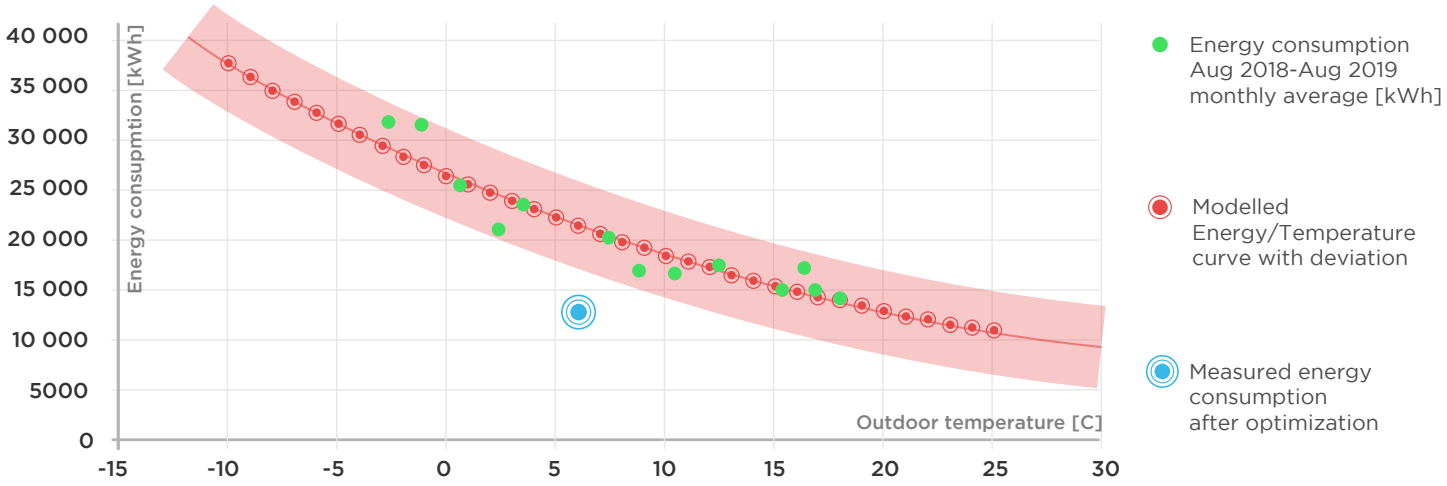
Above features coupled with:

- Remote set-point adjustments and insights into the ventilation status
- Normal working hours and calendar adjustment
- Forwarding notifications to the email address

allowed us to transform the normal ventilation into a smart, self-driving system, which not only kept the air quality in optimum range, but also enhanced energy efficiency.

Results

After collecting the data for the entire month of October 2019, we were able to compare the energy consumption after optimization with the model:



Energy consumption in the entire month was 13925 kWh. The Energy/Temperature curve for measuring outdoor temperatures showed consumption to be 21 530 kWh.

This meant that our optimization reduced energy consumption by 7 605 kWh; which is 35.3% of the entire building energy consumption.

We also compared the peak consumptions of the months of October 2018 and October 2019:

	October 2018	October 2019
Maximum energy consumption peak	64,8 kWh	49,0 kWh
Average outdoor temperature	7,4 Celsius	5,6 Celsius
Minimum outdoor temperature	-2,2 Celsius	-2,9 Celsius

Although in October 2019, both the minimum and average outdoor temperatures are low, the peak energy consumption is significantly lower.All the data on energy consumption and temperature was sourced by a third party.We aim to keep collecting data, and soon expect to have a complete set for the next few months. We are also looking forward to verifying our initial estimations and delivering a full savings report to our customer. Once the initial savings are confirmed, the ROI of our solution can then be calculated.