iSERVcmb Best Practice

Electricity savings of 12% per year through replacement of inefficient components and use of natural cold sinks

Building number 17

Vienna – AT

Introduction

This report summarizes the results of Owner's participation to the iSERVcmb project with regard to its cooling system energy consumption. The report refers to the period from 2012 to 2013.

iSERV Achievements

Energy Savings
Electricity: 18.9 kWh/m^2

12%
Total building electrical consumption reduction since participation

Cost Savings
Electricity: 3.8 €/m^2

Emissions Reductions
Electricity: 7.9 kgCO_2/m^2

Investment to achieve savings
47.5 €/m^2

	Key Figures
Location	Vienna, Austria
Sector	Hospital
Construction Date	1945
Project Size	853 m^2
EPC	N/A
Sub-metering Level	Partly metered
Data Frequency	15'
Data Collection Protocol	Manufacturer on board data collection system
Data Sending Protocol	Manually extract & send data to an address
Nature of savings achieved	HVAC Equipment Replacement Use of natural cold sinks
No. HVAC Systems	1
HVAC Components	☐ Heat Generators ☒ Cold Generators ☐ All-in-One Systems ☐ Heat Pumps ☐ Air Handling Units ☐ Humidifiers ☐ Dehumidifiers ☐ Pumps ☐ Storage Systems ☐ Terminal Units ☐ Heat Recovery ☐ Heat Rejection

"Beside quality in medicine, health care and the management, the focus is also on environmental concerns. The participation to the iSERV project was a first step. Now we know, what we have to do to improve the performance of our systems."

Owner of the building number 17

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Building Profile

The analyzed building has been built in 1945 and has a conditioned net area of about 850 m². Beside the treatment rooms and the laboratories there are also premises for the management located in the building. The cooling is achieved by a central refrigerator plant. The thermal absorption in the rooms takes place by the use of cooling ceilings and fan coils. In the investigation period, the electrical energy consumption for cooling was about 156 kWh/m²a (climate-adjusted). Compared to other buildings with the same need, the electrical energy consumption for cooling is located in the upper field.

Building Management System installed

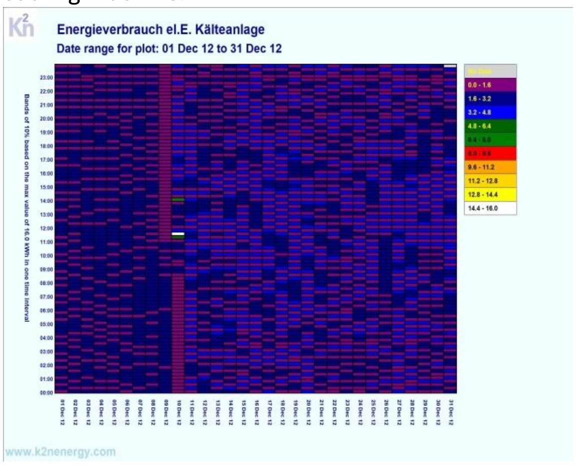
The electrical energy consumption is measured with two digital electricity meters and is read out every 15 minutes. The hospital is operating all-the-year from Monday to Sunday between 00:00 and 24:00.

Energetic analysis and optimization potential

The evaluation of the measurement data through the HERO database led to the following findings: the building is supported with coldness all-the-year. The months with the highest consumption are July and August. The average load in the investigated period amounts to 15 kW_{el} (installed net output: 150 kW_{el}). On individual weekdays the power peaks reach up to 101 kW_{el}. The average part-load efficiency of the refrigeration plant is 38% in the period considered. The weekly load profile shows that the most energy-intensive days are Wednesday to Friday. However, on the weekend there is less cooling energy needed. Generally this means that there are capacities on the weekends to activate components in order to balance the peak load of the following week. In 75% of all cases the value deviates from the mean value by 5%. Relating to the daily load profile the maximum is at 16:00. However, there is needed 30% less energy between 23:00 and 00:00.

To reduce the energy consumption the following measures are imaginable:

- Replacement of inefficient components: the follwing graph shows that the cooling machine is oversized and operates inefficiently. To optimise this system it would be necessary to replace some components or the cooling machine.



- Use of natural cold sinks: The cooling system in this building is not equiped with any free cooling function. With the installation of a direct connection between the external dry cooler and the fan coils, the cooling system could run without the cooling machine in the night.

www.iSERVcmb.info

how energy efficient are you really?

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