iSERVcmb Best Practice

Electricity savings of 5% per year through the use of a natural cold sink and improving the HVAC control

Building number 6

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 2011 to 2013.

iSERV Achievements

Energy Savings
Electricity: 3.1 kWh/m²

5%
Total building electrical consumption reduction since participation

Cost Savings
Electricity: 0.6 €/m²

Emissions Reductions
Electricity: 1.3 $kgCO_2/m^2$

Investment to achieve savings
6.3 €/m²

"Sustain. Protect. Experience. These are the guiding principles of our Environmental Responsibility Strategy. Our focus lies on integrating environmental sustainability throughout our business, including architecture and construction, hotel operations, and procurement. The goals include: further reduction of energy and water consumption; an increase in local and organic foods through co-operation with local farmers, growers and seafood purveyors; sourcing environmentally preferred products; creating green construction standards for our hotel developers; engaging and inspiring employees and guests in conservation efforts; addressing environmental challenges through innovative conservation initiatives including rainforest protection and water conservation."

Owner of the building number 6

	Key Figures
Location	Vienna, Austria
Sector	Hotel
Construction Date	2011
Project Size	10,969m²
EPC	N/A
Sub-metering Level	Partly metered
Data Frequency	Daily
Data Collection Protocol	Meters and sensors attached to BMS
Data Sending Protocol	Manually extract & send data to an address
Nature of savings achieved	Use of a natural cold sink Improved HVAC Control
No. HVAC Systems	7
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

Building Profile

The analyzed building is a 5-star luxury hotel in the City of Vienna. The reception, the ballroom, the restaurant, the kitchen and offices are located in the ground floor. Guest rooms are located on the upper floors. Furthermore the hotel has a wellness and fitness area. The total conditioned useful area is about 11.000 m². The air-conditioning in the rooms is provided by two central refrigeration plants, a central heating system and a decentralized ventilation system. In the investigation period, the electrical energy consumption for cooling was 67 kWh/m²a (climate-adjusted). Compared to other buildings with the same need, the electrical energy consumption for cooling ranges is in the upper third.

Building Management System installed

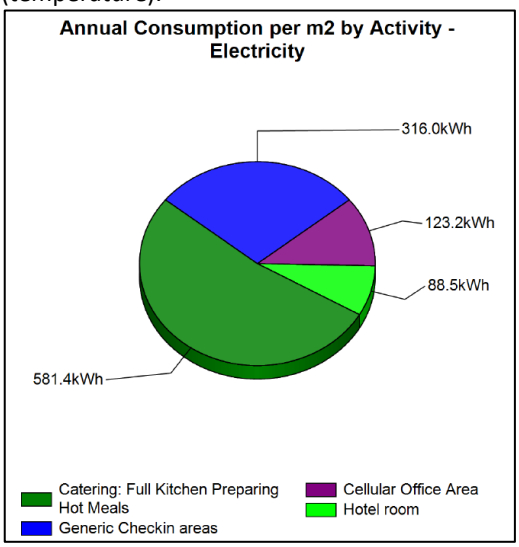
The building has a central management system by which the machines for room conditioning are monitored and controlled. The relevant data for the project has been read out from this management system (measurement interval: 24 hours). The hotel is operating around the clock.

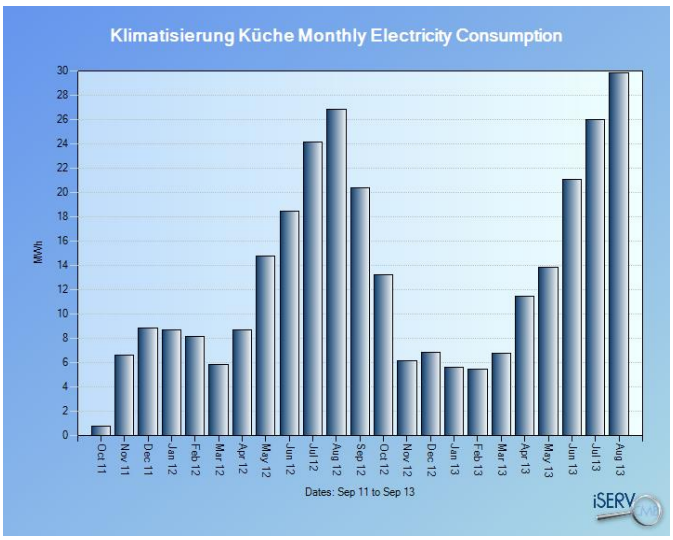
Energetic analysis and optimization potential

The evaluation of the measurement data through the HERO database led to the following findings: the building is supplied with coldness all-the-year. The months with the highest consumption are June, July and August. The average effort in the investigated period amounts to 45 kW_{el} (installed net output: 220 kW_{el}). On individual weekdays the power peaks reach up to 781 kW_{el}. The average part-load efficiency of the refrigeration plants is 42% in the considered period. The weekly load profile of the refrigeration plant shows that Friday is the most energy-intensive day in the week. In 75% of all cases the value deviates from the mean value by up to 65%.

To reduce the energy consumption, the following measures are imaginable:

- Use of natural cold sinks: The cooling system in this building is not equipped 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.
- Improving the HVAC control: As shown in the following graphs, the specific energy consumption in the kitchen is the highest. So the next step would be to check if the set points are adjusted correctly (temperature).





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how energy efficient are you really?