iSERVcmb Best Practice

Electricity savings of 13% per year through replacement of inefficient components, reduction of heat loads, and instruction of users

Building number 3

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 2014.

iSERV Achievements

Energy Savings
Electricity: 14.6 kWh/m²

13%
Total building electrical consumption reduction since participation

Cost Savings
Electricity: 2.9 €/m²

Emissions Reductions
Electricity: 6.1 kg CO_2/m²

Investment to achieve savings
17.6 €/m²

	Key Figures
Location	Vienna, Austria
Sector	Office
Construction Date	1905
Project Size	466 m²
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 Reduction of heat loads Training of users
No. HVAC Systems	12
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

"The meaningful use of energy is not only a central issue for our society but also a significant factor in view of the provided efficiency of technical systems. For your requirements we work out special solutions and are happy to provide information about sustainable planning approaches. Therefore we offer special services in the fields of energy and environment."

Owner of the building number 3

Building Profile

The analyzed building is an office block in Vienna with a net area of around 466 m² and has been built in 1905. The offices in the basement, the ground floor and the second floor have been analyzed. The room conditioning in the individual rooms is provided via single-split and multi-split units. The electrical energy consumption for cooling in the investigated period was 114 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

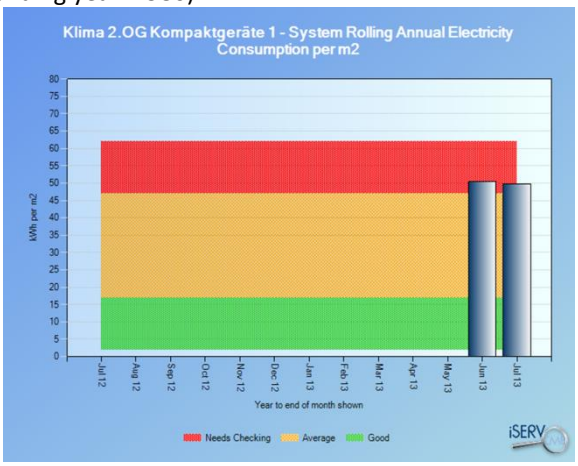
The electrical energy consumption is measured with two digital electricity meters and is entered into a database every 15 minutes. The offices are used from Monday to Friday between 08:00 and 17:00. The server room is chilled 24 hours a day and 7 days a week.

Energetic analysis and optimization potential

The evaluation of the measurement data through the HERO database led to the following findings: the building is cooled all-season. The months with the highest consumption are June to August. The average load in the investigated period amounts to 6 kW_{el} (installed net output: 28 kW_{el}). On single weekdays the power peaks reach up to 26 kW_{el}. The average part-load efficiency of the refrigeration plant reaches 58% in the considered period. The weekly load profile of the refrigeration plant shows that the most energy-intensive days are Monday to Thursday. However, on the weekend there is less cooling energy needed. In 75% of all cases the value deviates from the mean value by up to 40%. Relating to the daily load profile, the maximum is at 10:00. However, up to 50% less energy is needed for cooling purposes between 18:00 and 06:00.

To reduce the energy consumption, the following measures might be taken:

- Replacement of the single-split units: as shown in the following graph, the specific energy consumption of the single-split units in this building is relativly high. The only possibility to optimise the performance of such systems is to replace the units (building year: 1980).



- Reduction of heat loads: The second step would be to identify the head loads. That means that it would be necessary to go through the house and identify the most relevant “heat generators”, evaluate them and find measures to reduce them (for example: better shading elements).
- Instruction of users: The most important measure is the instruction of the users. Everybody in the building should know, how the cooling system can be operated as efficiently as possible (example: switch off the system when you go home).

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AUSTRIAN ENERGY AGENCY

how energy efficient are you really?