

April 2008: Reference Report

SAUTER Austria - Power Tower, Linz

The world's first high-rise office block with the characteristics of a passive building is nearing completion in Linz, Austria. Providing it with an efficient building automation system is an ambitious undertaking, because there are no connections for gas or district heating. The Austrian subsidiary of the international SAUTER Group was awarded this attractive assignment by the Upper Austrian energy utility, Energie AG Oberösterreich, for their new Group Headquarters. SAUTER is numbered among the leading manufacturers and providers of energy-efficient solutions in the building management and system integration sector. After 30 months of construction work, this 'milestone in energy efficiency' is due to be opened in August 2008. Rudi Anschober, Head of the Upper Austrian Environment and Energy Administration, also views the construction of the Power Tower by Energie AG as an unparalleled example of how the firm is implementing its sustainability philosophy.

The client's wishes

A new era is dawning as regards energy efficiency in large office buildings, and Energie AG Oberösterreich is setting high standards here. The energy utility specified a requirement for the construction of the Power Tower: this building was to be exemplary in terms of sustainable and efficient energy usage. However, Energie AG has other objectives besides the groundbreaking developments that it is implementing with SAUTER. Energie AG also believes that it has a responsibility to use the building to provide economic impetus for the Linz region, and at the same time it aims to minimise the ecological pollution caused by the Tower. The company's very name creates a commitment: any company with the word 'energy' in its name, and which uses energy in its core business, is more or less obliged to take a careful approach to resources. Accordingly, Energie AG's new group headquarters should consume no fossil-based energy at all in order to operate its heating and cooling systems. The Power Tower will be the world's first office complex with the characteristics of a passive building.

It is equally important to the client that the future occupants of the building should feel comfortable and at home. In today's world, where lifestyle can easily be combined with sustainability, aesthetic appeal no longer has to exclude environmental protection and comfort. Those working in the Power Tower can enjoy comfort with a good conscience, while hoping that more people will be able to spend time in buildings of this sort as time goes on.

The challenge

Operating a high-rise building with neither gas nor district heating is a huge challenge for any project manager. The objective here is to select a futuristic style of construction, for the building as a whole and for the details. The Power Tower sets an example for subsequent projects, not only in Austria but beyond its borders as well. Energy is to be obtained from the earth and the groundwater. The planners' concept also includes the sun as a key source of natural

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energy. Part of the Power Tower's facade will become a solar power station. However, the client does not want the building to cause a dramatic change to the Linz cityscape. The tower will be clearly visible from afar, but will blend harmoniously into the cityscape as a visible example of sustainable building design.

The solution – saving about 300 tonnes of CO₂ per year

Compared to a conventional high-rise building of similar dimensions, the Power Tower saves emissions of about 300 tonnes of CO₂ per year. There is no air-conditioning system at all. Various factors contribute to this excellent ecological and economical situation. For example, one factor that cannot be overlooked is the multi-functional design of the facade. With three layers, 60 per cent of it is made of glass and 40 per cent of materials that provide good insulation. The materials ensure a very low heat requirement for heating purposes (thermal insulation coefficient, $U_{total} < 0.8 \text{ W/m}^2$) and the cooling requirement is also uniformly low because the incidence of solar heat is reduced by 90 per cent. An entirely new solar protection system is integrated into the glazing. This offers optimal permeability for daylight, reducing the use of artificial light and the resultant generation of heat that is usual in buildings of this sort. Special louvres allow daylight to reach the interior of the rooms while providing maximum protection against the sun and ensuring a clear view of the world outside.

Of course, more measures than are apparent at first glance are needed to meet the energy requirements in a building of this size. The Power Tower's heat pump system is equipped with geothermal sensors measuring 6,900 metres in length, and it can operate in three different modes according to requirements:

- Heat can be drawn from underground when heating is required
- Heat can be dissipated underground when cooling is required
- The building can be cooled by reverse operation of the heat pump units

Utilisation of the heat given off from the computer centre offers another opportunity to recover energy. This thermal power amounts to about 330kW, which in turn covers about 40 per cent of the heat requirement for the entire building.

A host of intelligent features, all optimally co-ordinated, turn this Power Tower into an eco-tower.

The advantages - Linz benefits too

The Power Tower's central position is another impressive advantage of this building. The client's overall concept also provides for energy efficiency in terms of access to transport services. The Power Tower is ideally linked to public transport services via the nearby rail station. Employees and visitors alike will be able to reach the building easily by train and bus. This will eliminate additional noise and exhaust gas for the city of Linz.

The roof edges will be greened, adding a colourful note to the top of the building and improving air quality. Those seeking more greenery can relax in the Municipal Garden. This park is close to the Power Tower, so employees and visitors can enjoy natural surroundings without making long journeys that would pollute the environment.

Economic factors naturally played a major part in the planning of the Power Tower. One of the client's long-term aims was to save money with this building. There is a general conviction that the investments will pay off. As the Power Tower is the first building of its kind, no comparative figures are available. The management of Energie AG is already looking forward to presenting the first consumption figures for the building to the public in a few years' time. But it is not only the financial figures that are important. The statistics showing the usage of natural resources will be just as significant. Linz's urban planners will also be waiting excitedly for these results. One thing is already clear: the Power Tower's advanced use of energy is doing far more than creating a new sense of environmental awareness. Energy-efficient construction is worthwhile for everyone involved, including the city of Linz. A classic win-win situation is developing here.

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Fact Sheet - SAUTER Austria: Power Tower, Linz

The Power Tower

Location:	Böhmerwaldstrasse, New Station District, Linz, Austria
Start of construction:	March 2006, foundation stone laid: 8 th May 2006
Opening:	September 2008
Client/building owner:	Energie AG Oberösterreich, Linz, Austria, www.energieag.at
Architect:	Weber & Hofer AG, Zurich, Switzerland www.weber-hofer.ch
Building automation:	SAUTER Austria, www.sauter-controls.at
Function:	office/administrative building, client centre
Workstations:	approx. 600
Characteristic:	passive building
Height:	74 metres, 19 storeys
Gross volume of space:	122,700 m ³
Gross area of storeys:	34,400 m ²
Usable area:	approx. 3,000m ² of office area
Photovoltaic plant:	42,000 KW/h of solar power per annum
Photovoltaic panels:	approx. 700 m ²
Geothermal sensors:	46 in total, to depths of 150 metres

SAUTER Group

- A medium-sized, family-owned company headquartered in Basle, Switzerland
- Established in 1910, building on almost 100 years of tradition and experience
- Employs a workforce of about 1,900. Present throughout the world and following a course of sustained expansion.
- Complete building management solutions from one single source. Focus: maximum energy efficiency to give customers measurable added value, and to play an active part in protecting the environment. Safeguarding investments and ensuring reliable operation throughout a building's life-cycle.
- One of the technology leaders in the building automation and system integration sector
- Member of eu.bac

More SAUTER reference projects:

- Berlin Main Rail Station
- Allianz Arena, Munich
- Royal Opera, London
- Federation Tower, Moscow (under construction)

You will find a selection of worldwide references at www.sauter-controls.com, under 'EnergyEfficient Environments'.