TECHNOLOGY PAVILION

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With the Technology Pavilion in Poing, Messe München highlights the great potential inherent in intelligent architecture and technology.

ARCHITECTURAL PRINCIPLES

A striking characteristic is the compact architecture of the building. The architects deliberately abstained from designing too many different angles and extensions in order to achieve a favorable ratio of the building volume to its outer surface. This reduces heat emissions. The large conference and meeting hall behind the Southwest façade is a single-storey structure, while the adjoining rooms accommodating the engineering and administrative teams, offices and toilet facilities towards the northeast are arranged over two storeys.

The orientation of the high entrance hall towards the southwest and of the light-flooded cafeteria towards the southeast leads to a maximum utilization of the directly incident sunlight. The rotatable slats in the double façade allow for an immediate response to weather changes, and the energy supply can be controlled by the sun.

ENERGETIC OVERALL CONCEPT

The architects and engineers have developed an overall energetic concept which is centrally controlled via a multitude of sensors in order to supply the pavilion with heat.

Apart from passive construction measures for the utilization of solar energy, a combined system composed of thermal solar collectors on the roof, a long-term heat accumulator (aquifer) as well as two ground water pumps for the coverage during peak-load periods ensures that the Technology Pavilion is sufficiently supplied with heat.

The vacuum tube collectors used on the roof are highly efficient. The gained thermal energy is used for hot water requirements and is available to the heating circuit.

Excess heat is conducted to an external aquifer storage system. This is a long-term heat accumulator in the form of an extremely well insulated, double-shell water tank located below the ground surface. Its capacity amounts to 100 cubic metres of water. On sunny days, the excess heat energy is conducted to the tank using water as a medium (loading operation).

When the storage system is fully loaded, the water reaches a temperature of approximately 50 degrees Celsius. During wintertime, this process is inverted: hot water is withdrawn to warm up a floor heating. After cooling down, the heating water is redirected to the storage system.

Thus, the water in the aquifer storage system cools down again to a minimum of 25 degrees Celsius.

If the energy demand exceeds the heat energy provided by the solar collectors and the long-term accumulator is discharged, two ground water heat pumps will be connected in addition. During summertime, the available ground water with its relatively constant temperature is used to cool the building (changeover system). In addition to free ventilation via the double façade and the central building control system, there is a possibility to ensure the air quality of the pavilion by means of ventilation and air-conditioning systems depending on the utilization of the rooms.

For this purpose, HVAC systems with heat recovery have already been installed for the café, the toilet facilities, the kitchen area and the conference area. The systems are also connected to the changeover system and thus can be used for heating and cooling.

Cooling in the much more sophisticated HVAC device of the conference area is supported through adiabatic evaporative cooling using ground water. According to the principle of adiabatic evaporative cooling, the air cools down by taking up moisture. This effect is taken advantage of by spraying finely atomized water into the air. The system, however, does not moisten the air but the exhaust air. The cooling effect achieved there is conducted to the outside air through a plate heat exchanger. The cooled outside air is subsequently conducted into the building.
ASPECTS OF THE BUILDING STRUCTURE

The architects avail themselves of three basic construction measures and materials:

1. **Transparent glass façades** towards the southeast and the southwest let sunlight and thus thermal energy penetrate the building.

2. **Heat-accumulating, massive walls** inside the building help store and distribute the captured solar energy.

3. **High-efficiency insulations** below the floor, in the walls and in the roof structure contribute to a substantial reduction of heat losses from the building.

### BASIC DATA:
- **1st prize in the architectural competition on 28 July 1998**
- **Start of construction:** June 1999
- **Completion:** May 2000
- **Floor space:** 35 x 20 metres
- **Height:** 7.20 metres

### TECHNOLOGY
- Double façade with rotatable slats
- Vacuum tube collectors
- Aquifer storage system
- Two ground water heat pumps
- Adiabatic evaporation cooling
- Solar façade made of cellulose combs
- Cistern for rain water utilization

### ARCHITECTS
Kaup Scholz Jesse + Partner, Munich

### ENGINEERS, HEATING, VENTILATION, AIR-CONDITIONING, REFRIGERATION
Schmidt Reuter Partner, Munich

### ENGINEERS, STRUCTURAL DESIGN
Ingenieurbüro Tischner, Dachau

### UTILIZATION
- Entrance building of the Building Centre in Poing with conference rooms and cafeteria
- Demonstration project for energy-saving, environmentally compatible building

### ADDRESS / CONTACT:
Bauzentrum Poing
Senator-Gerauer-Straße 25
85586 Poing / Grub
Tel.: (+49 89) 99 02 07-60/61
Fax: (+49 89) 99 02 07-62

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