

Solar Energy System of the Month:

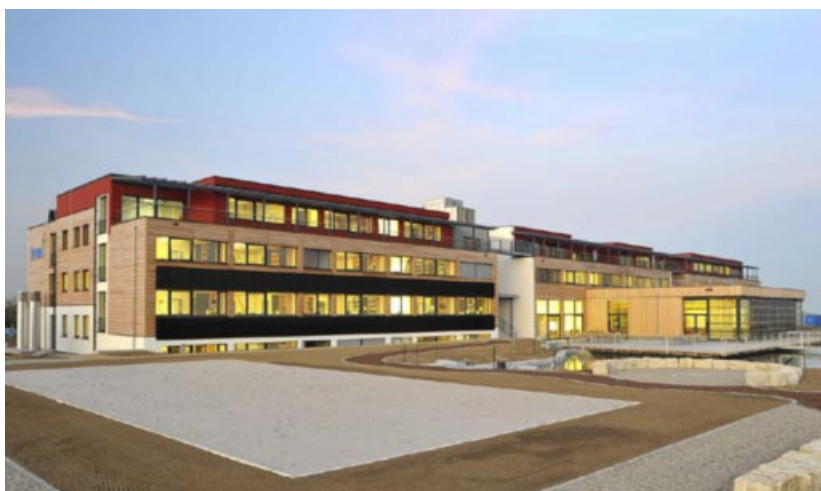
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Solar Architecture: juwi headquarters featuring the world's most energy-efficient office building

In July 2008 the juwi group relocated its offices to a new building in Wörrstadt, Germany, specially designed by and for a company completely committed to clean energy. The timber office complex comprises three building elements and seven penthouse stories, stands out for its extraordinary energy engineering and accommodates around 300 employees. Its modular design means that it can later be expanded to accommodate 600 people. The green-minded company used natural materials to build - approximately 2,000 cubic meters of certified spruce. The new building creates the perfect atmosphere for top-quality performance by combining a range of spaces for productive work activity, constructive communication as well as creativity, relaxation and replenishment, including a dining hall with high-quality fair-trade and locally produced products; children's daycare for 25 "junior staff"; a prayer and meditation room; indoor gym equipment and an outdoor soccer field and beach volleyball court.

Solar Energy System of the Month as [PDF-Dokument](#)



juwi-headquarters in Wörrstadt: an outstanding office building that combines energy efficiency and Renewables. Source: juwi/Mosler

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The building was constructed by GriffnerHaus, a renowned company that designs and builds timber and glass buildings at the cutting edge of domestic and corporate culture. Renowned Freiburg-based expert Martin Ufheil of solares bauen GmbH and Matthias Kiene of CEA GbR in Alzey were in charge of the building's energy design. Solarserver.com presents the innovative and exemplary energy concept and its components as "Solar Energy System of the Month" in December 2008.

Building for the future: Comfort and energy conservation

Inside and out, the building is designed to conserve energy. The insulation meets the passive house standard. To name just a few examples, low-energy laptops are used instead of PCs, there is minimal need for cooling servers and solar thermal energy is used to heat water. Shading elements keep the building cool in summer. Since renewably sourced energy is juwi's business, it goes without saying that the company integrated cutting-edge, far-sighted technology into our new headquarters: Photovoltaic installations on the building and carport roofs produce solar electricity. Bio and solar energy supply the office complex with environmentally friendly heating from a so-called energy compartment. The compartment contains a wood pellet heating system, a solar thermal station and three Stirling "Sunmachines".



Left: The energy compartment containing a wood pellet heating system, a solar thermal station and three Stirling "Sunmachines". Right: Delivery of wood pellets

A modern circulation system provides low-energy air-conditioning that is distributed through a floor piping network. Efficiency is also the keyword for the building's water system. In case of fire, the water contained in a closed-loop system for cooling is directed to the sprinkler system. Pressure-assisted toilets reduce the amount of water to about one liter per flush. The waste management is also sustainable. Organic waste, such as vegetable peels and food leftovers, are fermented with the sewage waste in a small biogas plant.

Altogether, the measures listed above slash energy costs drastically. juwi's goal is to consume no more than 200,000 kilowatt-hours annually for electricity, heating and cooling. In monetary terms that means that the annual utility costs will be around two euros per square meter. By comparison, owners of single-family homes in Germany can currently expect to pay around 20 euros per square meter every year for energy. So the energy costs in juwi's new building are 10 times cheaper than in a typical building.

Solar power in all its facets: the office building doubles as a photovoltaic power station

During the planning and designing of the new company headquarters, utmost priority was given to a holistic energy system. Photovoltaics play a central role. Every variety of building-integrated photovoltaics comes into play in various module and cell technologies. The main building is equipped with a rooftop installation mounted at a 5° angle. It prevents

penetration and the roof's weatherproof properties remain unaffected. The main south-side façade has an integrated, vertically mounted PV system. The cafeteria also has a rooftop installation with solar modules mounted at an angle of 10°. The cafeteria façade is made entirely of custom-designed triple glazed glass/glass and insulation glass modules, in which crystalline solar cells are integrated. The solar cell shadowing gives the cafeteria a distinctive solar ambience. In the deck area the south-facing terraces were canopied with glass and solar glass modules. The PV covering protects against the elements and creates unique shadowing from the integrated crystalline solar cells. Solar carports in the parking lot in front of the building will be futuristic fueling stations. The PV installation provides the cars parked under them protection from the sun and elements. Specific parking spaces will be reserved for electric cars that can recharge their batteries using PV-generated electricity.

The building's PV at a glance: Total area: approx. 2,000 m² / Total output: approx. 210 kW_{peak} / Annual yield: approx. 220,000 kilowatt-hours.



PV rooftop installation and a façade made entirely of custom-designed triple glazed glass/glass and insulation glass modules.

Solar power backup system

In case of a power outage a stand-by battery Sunny Backup System by the SMA Technologie company will kick in to power the building. The PV installations maintain a self-sustaining supply to this stand-alone system and provide power to other electric devices or to charge the battery. So during a power failure parts of the building can still continue to be supplied with power independently over the course of several days. A unique aspect of this constellation is the fact that the PV-supplied backup system continues to power the sprinkler system and emergency power lighting even during a mains failure.



Sunny Backup: multiple inverters and a large set of batteries enable sufficient solar electric supply for a few days.



Solar carports will be the fueling station of tomorrow.

No emissions: Energy and technology in juwi's Wörrstadt headquarters

The building's entire energy requirement (heating, cooling, hot water and electricity) is generated completely renewably. The electricity design is essentially based on the interplay of several technical facilities that operate independently of one another. Besides energy production, the way energy is used and its conservation are central to the overall design.

Top-notch heating insulation

The building uses 80% less primary energy than the amount designated in Germany's regulations for energy saving in buildings and building systems (ENEV 2007). Its thermal insulation is based on the more rigorous specifications required by the passive house standard.

Energy-efficient ventilation technology

The ventilation system contains several air handlers with heat exchangers for heat and humidity recovery. It is switched on only on workdays during heating periods (when the outdoor temperature drops below 8 °C).

Light management

A daylight gauge on the roof uses photocells to determine the degree of cloudiness and position of the sun. It sends this data to an embedded processor that automatically computes the ideal balance of artificial and natural lighting. This, in conjunction with timed lighting control for automatic switching on and off, can save more than 70% energy.

Intelligent consumption; Little power, lots of comfort

juwi has taken a few the steps to ensure that electric power consumption is reduced to a minimum. For example Laptops and flat-screen monitors instead of conventional PCs; energy-optimized lighting; automatic lighting control according to daylight conditions. An optimization unit ensures constant control of power usage and prevents power drain and consumption beyond a maximum level. A closed-loop re-cooling unit is used to cool the building. Fire regulations require a sprinkler tank anyway, so that is also used for day and nighttime storage. The tank is filled at night (cooled) and during the day serves as a cooling reservoir to keep the building naturally air-conditioned. Equipment in the offices themselves is kept to a minimum and only machines certified as having the highest energy efficiency rating (A++) are used.



The ventilation system operates only when heating is truly necessary. Outside the heating season the ventilation system is shut down and windows are used for air circulation and natural ventilation.

The cafeteria kitchen is outfitted with an eye to the future, with as many devices as possible that can run on liquid gas (later biogas). Hot water connections are available for machines wherever possible (e.g. dishwashers). Refrigerated areas are kept to a minimum.

Energy sourcing for the future: All electricity from renewable sources in Wörrstadt municipality

All power consumed in the municipality of Wörrstadt is to be renewably sourced by 2017. This target will be reached in cooperation with the villages and administrations, commercial businesses and associations, and local residents. The juwi group's showcase projects near company headquarters will boost Wörrstadt municipality's renewable energy share from 5% now to more than 40% in 2009. In the years beyond that, continued development of renewable energy along with significant increases to energy efficiency and electricity conservation will ensure that the 100% target can be reached by 2017.

Showcase projects near company headquarters

With a balanced mix of renewables, a secure, clean energy supply system that is entirely independent of imports and stable in price can be in place within just a few years. Alongside energy conservation and efficient consumption, juwi's efforts to spread the use of renewables are key elements to implementing this strategy.

The juwi group is planning several showcase projects nearby its company headquarters that serve as examples in each of its three main areas of business - wind, solar and bioenergy.



Picture: new solar electric power plant near the community of Waldalgesheim (Rhineland-Palatinate).

Wind energy

The juwi group is installing five Enercon E-82 wind turbines - altogether 10 megawatts of capacity - in Wörrstadt. They will be finished by the end of 2009 and will generate around 30 million kilowatt-hours of electricity annually.

Solar energy

juwi recently began building a large-scale freestanding PV plant on 15 hectares of former farming land in Wörrstadt. The system will be completed by the end of 2008 and produce approximately 6 million kilowatt-hours of solar electricity per year.

Bioenergy

The juwi group's third showcase project in Wörrstadt is a bioenergy plant with at least 500 kilowatts of capacity. It is due for completion by the end of 2009 and will produce heat and electricity.

juwi's new building in Wörrstadt at a glance:

Land area/ office space:	Approx. 30,000 m ² / approx. 8,500 m ²
Building measurements:	100m X 20-30m X 12m
Number of workplaces:	300 / extendible to 600
Building design:	Timber building by GriffnerHaus AG
Energy design:	Self-supply of heating, cooling and electricity
Energy consumption:	Approx. 200,000 kWh per year
Opened for business:	July 2008

Material and pictures: juwi Holding AG. Solarserver editor: Rolf Hug

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