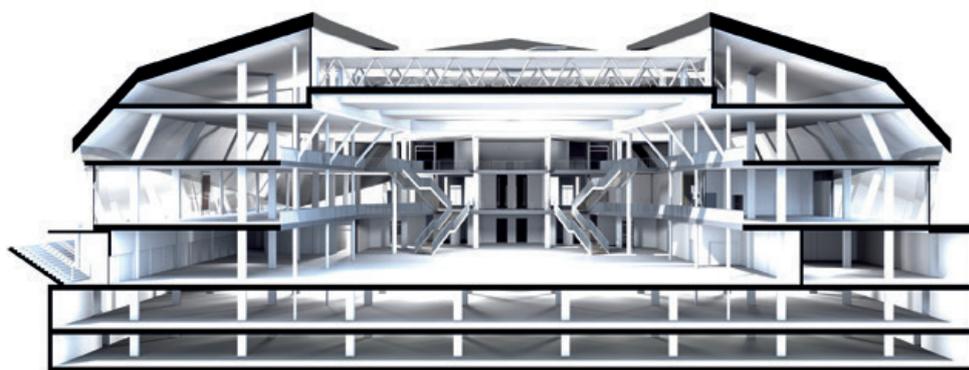


Green "Umwelt Arena" Spreitenbach



Name of project: **Umwelt Arena Spreitenbach**  
 Typology: Event and exhibition building  
 Location: Spreitenbach, Switzerland  
 Completion: August 2012  
 Energy concept: Plus energy house

Energy utilisation: Air, ground water, geothermal heat (geothermal heat collector), sun (thermal and electric) – photovoltaic system integrated in roof with 540,000 kWh output per year, biomass (green waste and wood), water/water absorption heat pump, water/water electric heat pump, air/water electric heat pump (heliothermal split type), various CHP plants, various woodchip heating systems, hybrid box heat pump/CHP plant, Kompogas green waste fermentation system

Heat storage & distribution: Thermoactive component system for cooling and heating via concrete ceilings (TABS): Geothermal heat collector, 2 x 70,000 l energy storage tanks, ventilation system

Vaillant products: **Micro-CHP ecoPOWER 1.0**

Building owner: **Umwelt Arena AG Spreitenbach**  
 Patronage: Kanton Aargau; with the support of W. Schmid Projekte AG, Spreitenbach/ CH  
[www.umweltarena.ch](http://www.umweltarena.ch)

Architect: **René Schmid Architekten AG, Zurich**  
[www.reneschmid.ch](http://www.reneschmid.ch)

Electrical engineer: Büchler & Partner AG, Zurich  
 Photovoltaics engineer: Basler & Hofmann, Zurich  
 Sanitary engineer: Alco Haustechnik AG, Zurich  
 Ventilation engineer: Biasca Engineering AG, Spreitenbach  
 Heating engineer: HLS Engineering GmbH, Zurich  
 Building physics: Zender + Kälin AG, Winterthur

Copyright: Plan: **rené schmid architekten ag / Gøran Keuchel**; Photos: Michael Egloff (top left), Bruno Helbling

**The good feeling of doing the right thing.**

The green **Umwelt Arena by René Schmid Architekten AG** was erected near Zurich in 2012 as a “plus energy house”. The sparkling architectural gem provides 11,000 square metres of space for events and exhibitions related to the environmental sector. In addition to a photovoltaic system integrated in the roof and other innovative building technology, **the ecoPOWER 1.0 micro CHP plant, which was installed as an exemplary Vaillant lighthouse project even prior to the official market launch, provides for maximum energy efficiency.**

#### **Sparkling architectural gem in Zurich's outer district**

Situated on an arterial road leading into Zurich, the green Umwelt Arena in Spreitenbach presents itself as a striking architectural gem in a series of large-scale structures. In the search for dynamism the architects created a 100 x 60 metre oval structure that is equivalent in type to a sports arena. Like reptile scales, specially formed photovoltaic panels form the insulating building shell, whose sparkling facets give the appearance of a crystal. Three upper levels and three underground levels constitute this special structure, with a three-level “Arena for Sustainability” at its core, providing room for up to 4000 spectators. In addition to the event hall, visitors can look forward to 45 innovative exhibitions on the themes of nature and life, energy and mobility, construction and renewable energies, as well as seminar rooms and a restaurant.

#### **Energy efficiency in the construction and operation of the building**

In keeping with its purpose, environmental consciousness is also reflected with respect to the energy consumption and construction details of the special structure. The photovoltaic system integrated in the roof, with an area of 5,300 square metres, generates around 540,000 kilowatt-hours of electricity per year. The solar modules are supported by a roof construction made of insulated wooden box girder elements, which are manufactured using digital production processes for high precision. The glass façades are triple glazed. In combination with the likewise highly insulated outer walls and the foundation slab, the new building achieves an average K value of 0.28 W/m<sup>2</sup>K. To save resources, the planners decided against the use of many facings or coatings. Instead, the raw construction materials, such as concrete, wood, steel and plaster, are visible. The economical and yet creative use of the material can also be seen in the details. The metal railings, for example, feature cut-out recesses on the inside. They are welded between an upper and a lower metal band, so that they can be used as railings in the outdoor area.

#### **High-quality building services engineering**

In contrast to the economical handling of the construction and details, a broad repertoire is used in the building services engineering. With the goal of showing visitors modern environmental technologies in all their diversity, six different types of heat pumps are installed in the building, for example. Systems for geothermal energy, waste heat, outdoor air and ground water, as well as split systems and reversible heat pumps contribute to the plus energy concept. Various combined heat and power systems, **including the ecoPOWER 1.0 micro-CHP from Vaillant**, as well as one woodchip and one pellet heating system, round out the range of heat producers. The heat is distributed by two systems. Concrete core cooling with thermoactive ceilings is used for heating and cooling in the base load. In addition, the supply air is pre-heated in case of low outdoor temperatures. Cooling is achieved by use of the ground water, a geothermal heat collector and an absorption refrigeration machine that uses solar energy and waste heat. Two water tanks, each with a capacity of 70 cubic metres, are used for cold and heat storage, respectively. The ventilation system for the arena also makes use of heat recovery. Due to the size of the building, various decentralised ventilation and partial air conditioning systems are used.

The hot water is supplied primarily by an 18 square metre solar thermal system with flat and vacuum tube collectors, as well as hybrid solar collectors. The photovoltaic roof consists of monocrystalline silicon modules, which ensure the maximum power yield and therefore guarantee the goal of a “plus energy house”. If one adds the extracted renewable heat to this yield, the Umwelt Arena produces almost one gigawatt of energy per year. That clearly exceeds the predicted annual consumption for heating, cooling, ventilation and lighting.

#### **CO<sub>2</sub>-neutral construction site**

The protection of resources plays an important role not only in the operation of the arena. For the building owner and architect it was self-evident that the impact of the construction itself on the environment should be as low as possible. The world's first CO<sub>2</sub>-neutral large-scale construction site used recycled steel for the construction, for example, and the 80,000 cubic metres of excavated earth were used as aggregate for the cement production. Part of the electric power for the construction site was generated by solar cells on the site containers as well as a windmill on the crane, while the construction vehicles ran on Kompogas or biodiesel.

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