

Solar Book

*Solar Thermal Energy in Upper Austria,
The Number One Solar Region*



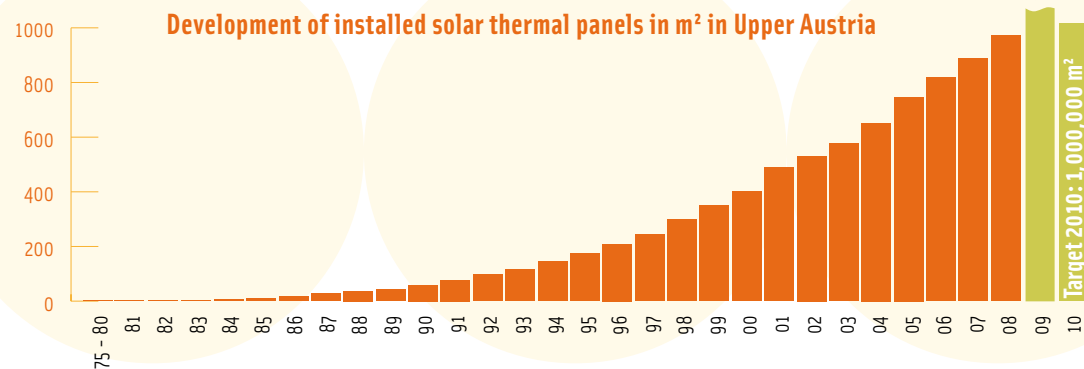


solar thermal

in Upper Austria



Oberösterreich: The Region/Federal State of Upper Austria
 Capital: Linz
 Population: 1.38 million inhabitants
 Area: 12,000 km²



Solar energy is free and available in unlimited quantities. The installation of a solar thermal system ensures independence, stable energy costs and is environmentally friendly.

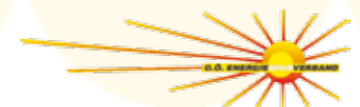
Solar thermal systems are utilised for producing domestic hot water and increasingly also in „solar combi-systems“ which support the space heating system and provide domestic hot water. In the future, solar process heat and solar cooling will also play a more prominent role.

The advantages of solar thermal energy are manifold:

- Solar thermal systems deliver clean, safe and renewable energy.
- The heat from the sun is free and does not produce any CO₂.
- Solar collectors have low maintenance costs and high durability.
- In „combi-systems“, the conventional heating system's service life will be extended and heating costs are lower.

In 2008, 93,000 m² of solar thermal panels were installed in Upper Austria, in total the collector surface in Upper Austria amounts to more than **1 million m²**, yielding an annual heat output of 335 million kWh and saving about 100,000 tons of CO₂.

Thus Upper Austria is the number one solar region in Austria and also has a leading position in Europe: 0.7 m² of collector surface per inhabitant compared to 0.135 m² in Germany or even 0.054 m² of average surface in the EU. The potential for the utilisation of solar thermal systems is by far not fully exploited yet – Upper Austria's goal is a total of **3 million m²** of solar panels by the year 2030.





Solar thermal systems in **SINGLE-FAMILY HOUSES**

Installing a solar system on a new home has almost become standard. Solar thermal systems are very well subsidised in Upper Austria: up to 3,800 € can be claimed for the installation of a new system in a private home.

The fields of application for solar thermal systems are varied:

- **Domestic hot water**
A well dimensioned solar thermal system can cover up to 70 % of the annual hot water demand. A household with four persons requires about 8 m² of solar collectors and a hot water storage tank of a minimum of 400 litres.
- **Contribution to space heating („solar combi-systems“)**
In spring and autumn, the solar system supplies the space heating for well insulated houses, in winter, it supports the main heating system. For a single-family house, about 16 – 20 m² of collector surface and a hot water storage tank with a capacity of 1,000 to 1,500 litres are recommended.
- **Heating the swimming pool**
For heating the swimming pool water, a so-called „solar absorber“ or the excess heat from the solar thermal system can be used.
- **Hot water for the washing machine and dish washer**
Appliances with a hot water connection or prefixed units can be run with solar thermally heated water, this saves electricity.
- **Basement rooms and garden showers in summer**
In summer, solar thermal energy can also be used for warming cold basement rooms or for heating water for a garden shower.





Solar thermal systems in **APARTMENT BUILDINGS**

Solar thermal systems are particularly suitable for supplying hot water in apartment buildings. Larger, centralised solar thermal systems are a very economical solution, as the construction costs decrease with size. In addition to domestic hot water preparation, solar thermal space heating is a very interesting option.

Energy Performance Contracting is a novel way to realise large scale solar thermal systems without investment costs for the building owner. A „contractor“- a specialised company - plans, installs, finances and operates the solar thermal plant, the building owner or user obtains solar energy at a fixed price.

Since 2008, new apartment buildings in Upper Austria are eligible to building subsidies only if a solar thermal system is installed. The subsidised loan can increase by 20 € per m² if a solar thermal system is implemented (also applicable in case Energy Performance Contracting is applied). On top, the installation of a solar thermal system in residential homes and buildings with more than three flats and terraced houses is subsidised with additional 200 € / m² collector surface (flat-plate collectors).

Criteria for obtaining a subsidy:

- *The collector surface (aperture surface) has to amount to a minimum of 2.5 m² per flat.*
- *In assisted living facilities, a maximum of 1.5 m² collector surface per inhabitant are subsidised.*
- *Only collectors with a „Solar Keymark“ certificate can be installed. Solar Keymark is the European certification scheme.*
- *A solar heat meter has to be installed.*





Solar thermal systems in
HOTELS AND RESTAURANTS

The demand for hot water in hotels, restaurants and on camping sites is usually highest when the sun is out. Thus, solar thermal systems make a lot of sense - both from an economic and from an environmental perspective - in these sectors. Solar thermal systems are not only used for hot water generation but also for making a contribution to space heating and for preheating water for indoor and outdoor swimming pools - especially the latter being an economically interesting option. In addition, there are new technologies for solar cooling.

The size of the solar thermal system depends on the average hot water consumption per guest (60° C):

Hotel ****	ca. 70 l / day
Hotel ***	ca. 50 l / day
Bed & Breakfast, Hotel *	ca. 30 l / day
Youth hostel	ca. 25 l / day
Holiday home	ca. 10 l / day

Large scale installations for hot water with an annual solar contribution level of about 35 to 50 % are highly economical. Unglazed plastic absorbers which are used for heating water in outdoor swimming pools break even after only 3 to 5 years.

More than 100 hotels and restaurants in Upper Austria already generate their hot water with the sun's help. Solar thermal systems make an important contribution to climate protection, and these businesses offer their guests a concrete measure for reducing their carbon footprints.

The installation of a commercial solar thermal system is particularly well subsidised by the regional and national governments, with up to 44 % of the investment costs.





**Solar thermal systems in
BUSINESS AND INDUSTRY**

The possibilities for using solar thermal systems in business and industry are varied: apart from creating hot water and contributing to space heating, there is a considerable potential of solar thermal in the area of low temperature process heat („solar process heat“). This is heat required for technical processes in industry and business that is supplied by solar thermal systems. Processes like drying, washing, bleaching, dyeing, pasteurising as well as the pre-heating of boiler feed water or solar cooling are especially relevant. These are required in a variety of business sectors, such as the food processing industry, the textile industry, the chemical and pharmaceutical industry or also the service industry (e.g. laundries).

Processes with the biggest potential for solar thermal applications:

Industry sector	Process	Temperature level (°C)
Food and beverage Industry	Drying	30 – 90
	Washing	40 – 80
	Pasteurising	80 – 110
	Cooking	95 – 105
	Heat treatment	40 – 60
Textile Industry	Washing	40 – 80
	Bleaching	60 – 100
	Dyeing	100 – 160
Engineering Industry	Cleaning	40 – 80
	Drying	30 – 90
Chemical and pharmaceutical Industry	Cooking	95 – 105
	Distilling	110 – 300
	Various chemical processes	120 – 180
All sectors	Preheating of boiler feed water	30 – 100
	Space heating for industrial premises	30 – 80

On top of the subsidy from the national government, commercial solar thermal systems are also subsidised by the regional government of Upper Austria, thus a subsidy of up to 44 % can be claimed.





Solar thermal systems in PUBLIC BUILDINGS

Upper Austria and its municipalities count on solar energy: a great number of public buildings are equipped with a solar thermal system. Especially in establishments with a high and regular demand for hot water, like for example in nursing homes, hospitals, sports centres or boarding schools, the use of solar thermal installations is a very economical option. According to the Upper Austrian legislation, solar thermal energy and other renewable energy sources have to be given priority for generating hot water and space heating in the construction or refurbishment of public buildings.

Until 2008, the Upper Austrian regional government had installed 26 solar thermal systems with a total surface of 1,308 m² on its own buildings, more projects are planned. A pioneering pilot project was realised with the solar cooling system for the new regional administrative office in the town of Rohrbach.

Examples for solar thermal systems on regional and municipal buildings:

- **Assisted living facility Christkindl**, 150 m² solar thermal system: about 100 people are attended to near the famous „Christmas Post Office“ in Christkindl.
- **Vocational College 8 in Linz**, 70 m²: the solar thermal system is integrated in the façade and supplies the adjacent boarding school. At the college, electrical, mechanical and plumbing professionals are trained, among them „green energy installers“.
- **Regional administrative office in Rohrbach**, 124 m²: this innovative project features a solar cooling system.
- **Road maintenance depot in Pregarten**, 10 m²: the solar thermal system supplies hot water for the showers for the maintenance crew.
- **Secondary school in Pernau**, 120 m²: generates hot water and heats the gym, the school also has an educational focus on environmental topics.
- **Municipal hall in Kirchdorf**, 80 m²: the demand for hot water is very high as the building is used as a sports venue, for physical education and for events.
- **Sports club in Frankenburg**, 148 m²: supplies the premises of the sports club with hot water and also feeds excess heat into the adjoining municipal swimming pool of Frankenburg. The two types of use complement each other perfectly.
- **Camping site in Vichtenstein**, 93 m²: supplies hot water for the camping site which is run by the municipality.
- **Kindergarten Ahorn in Bad Ischl**, 30 m²: supplies the low energy building of the kindergarten which consists of 5 play groups.

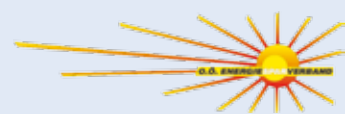


SOLAR RESEARCH

Technical innovation is of pivotal importance for the market development of solar thermal energy, but also for the competitive capacity of the businesses in this field.

OÖ. ENERGIESPARVERBAND

The O.Ö. Energiesparverband (Upper Austrian Energy Agency) initiates, coordinates and supports energy research projects at regional, national and European levels.



ASIC

The research and development institute Austria Solar Innovation Center (ASIC) is specialised in solar energy and is substantially supported by the regional government of Upper Austria. It was founded in the year 2000, current research fields are for example new collector developments, solar thermal large scale plants, solar cooling or thermal storage. Since March 2009, the ASIC is also an accredited certification body for solar thermal collectors and the „Solar Keymark“ certification scheme.



ETP

With the „Energy Technology Programme“, the regional government of Upper Austria/Department of Economy supports innovative projects aimed at increasing energy efficiency and the use of renewable energy. In total, 23 solar thermal projects were subsidised with almost 2 million Euros by this programme over the past few years. These projects have, among others, dealt with the topics product development, optimised production processes or thermal storage.

Solar cooling – Pilot projects

Solar cooling is a relatively new field which is expected to gain considerable importance over the coming years, especially for non-residential buildings. The energy produced by the solar thermal system is converted by a chiller into cooling energy. In many cases, the solar thermal system serves three purposes: hot water generation, contribution to space heating and cooling. In the new office building of the regional government in Rohrbach, one of the first solar cooling plants was installed: the solar thermal system with 124 m² surface area, two buffer storage tanks with 4,000 litres each and a 30 kW absorption cooling system provide air conditioning in summer.





THE SOLAR THERMAL INDUSTRY IN UPPER AUSTRIA

Over the last few years, the production of solar collectors has grown into an important economic sector. Several of Europe's leading producers of solar collectors are located in Upper Austria. More than 10 % of all solar collectors installed in Europe in 2007 were produced by Upper Austrian companies! In total, Upper Austria's solar thermal industry with its about 500 employees produced more than 300,000 m² of solar collectors in the year 2008 – and the trend points upwards! The export ratio of these companies amounts to over 70 %, the total turnover is in excess of 100 million Euros per year.

The producers of solar collectors work together in the **Oekoenergie-Cluster** (OEC / Eco Energy Cluster), the network of the sustainable energy sector in Upper Austria which is managed by the O.Ö. Energiesparverband on behalf of the regional government of Upper Austria.



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SOLution Solartechnik GmbH
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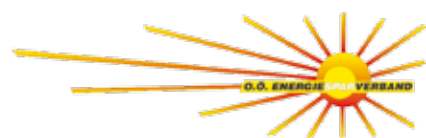


SUBSIDIES FOR SOLAR THERMAL SYSTEMS IN UPPER AUSTRIA

	Single-family house	Apartment building	Businesses
Base amount	1.100 €		
Subsidy	75 €/m ² flat plate collector 100 €/m ² flat plate collector with Solar Keymark 110 €/m ² vacuum collector 140 €/m ² vacuum collector with Solar Keymark	200 €/m ² flat plate collector 240 €/m ² vacuum collector Solar Keymark is a requirement for the subsidy	Maximum 30 % of investment costs from the national government, plus maximum 20 % from the regional government
Minimum size	4 m ² flat plate collector 3 m ² vacuum collector	2.5 m ² per flat	5,000 € minimum investment
Obligatory solar heat meter	yes	yes	no
Max. subsidy	3.800 €	max. 50 % of the costs	max. 44 %

Solar Keymark

The Solar Keymark is the European quality seal. Through the certification process, the quality delivered by the producer is well documented for users and consumers. Throughout Europe, the Solar Keymark is increasingly used as a requirement for public support programmes.



Energy Advice

With the O.Ö. Energiesparverband's free energy advice service, private households and municipalities get extensive information on solar thermal and other energy related topics as well as assistance on building and refurbishing. The advice is independent of any products or companies and can be booked by calling the energy hotline. The O.Ö. Energiesparverband also offers energy advice for companies where independent experts consult businesses on site. 75 % of the consulting costs are covered by the Upper Austrian and the national governments, the remaining 25 % of the costs for the businesses range from 100 to 300 €.

Solar Contracting

In a Solar Contracting scheme, the contractor, also called an „Energy Service Company“ (ESCO) takes over the responsibility for the planning, financing, installation, maintenance and operation of the solar thermal system. The contractor's investment is refinanced by selling heat at a fixed price as agreed by a contract. In addition to the subsidy for the actual solar thermal system, companies and public institutions in Upper Austria are eligible to a subsidy through the Energy Contracting Programme (ECP) which is managed by the O.Ö. Energiesparverband on behalf of the Upper Austrian government.



The O.Ö. Energiesparverband is the energy agency of Upper Austria set up by the regional government in 1991. The O.Ö. Energiesparverband is a key institution for independent energy advice in Upper Austria. The agency promotes energy efficiency, renewable energy sources and innovative energy technologies. The main target groups are private households, municipalities and companies. The O.Ö. Energiesparverband manages the Oekoenergie-Cluster (OEC / Eco Energy Cluster) and cooperates with national as well as international energy institutions.



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