

# THERMAL SOLAR ENERGY

# GRAZ (Austria)

Although the quality of the equipment and the efficiency of thermal solar systems has improved significantly over the last years, this kind of energy production has not achieved yet an important share of the market. Nevertheless, remarkable initiatives could emerge thanks to policies designed and implemented at local level. In Graz, thermal solar energy is given a high priority in a municipal energy plan concerned with ecological aspects.

## GENERAL ASPECTS

Graz, the capital of the Steiermark region, has 245,000 inhabitants and lies on the River Mur in the South-east of Austria. Mechanical engineering and the car industry are the main economic sectors in the city. Titles such as "Ökostadt 2000" or "Öko High Tech Zentrum" are evidence of the interest shown by the Municipality in the correct enforcement of an energy policy focussing on environmental protection.

### Climatic data:

|                          |                            |
|--------------------------|----------------------------|
| Hours of sun per year:   | 1,924                      |
| Solar radiation:         | 1,147 kWh/m <sup>2</sup> a |
| Annual mean temperature: | 9.8 °C                     |



## CONTEXT

The communal energy plan (KEK) of the Municipality of Graz is based on a municipal initiative. The project, subtitled "A programme to stimulate the economy and protect the environment" is supported by the Graz Stadtwerke, the Land of Steiermark, the Energy Association of the Land of Steiermark and the Federal Ministry of the Economy. One of the four KEK teams works on "thermal energy programming" and "renewable energy" aspects.

As regard thermal solar installations, the plan provides that an additional 24,000 m<sup>2</sup> of collectors would be installed over the period from 1996 to 2000 by concluding assistance and support agreements. This would mean a 400% increase in comparison with 1994.

There is also a project to install 200,000 m<sup>2</sup> of solar collectors by 2010. This surface area would allow to generate 76 GWh of solar heat and therefore to cover 19% of households' energy requirements in terms of domestic hot water by 2010. It is to be noted that a large number of solar systems have already been installed by the users themselves, as payback for those installed by professional installers is still limited due to the energy prices applied in Austria.

# EXPERIENCE OF GRAZ

The Municipality of Graz, in association with the Graz Stadtwerke and other institutions, designed the *Communal Energy Plan (KEK)*. One of the objective of this plan is to involve as many local and regional players as possible in the energy policy. As a first step, more than 100 institutions were invited to take part in the Graz energy concept and 76 accepted to collaborate. The promotion of thermal solar installations is part of the energy concept and is one of the seven points of the KEK detailing the action programmes implementing the energy policy in Graz.

## Solar initiative: a KEK issue

The action programme "solar initiative" is a wide-ranging programme aimed at promoting the dissemination of solar collectors and developing the direct utilisation of solar energy. Solar initiative actions include the following:

- Modular systems for building solar installations with assistance provided by teams specialising in "build-it yourself" activities.
- Information and advance training for specialised installers.
- Specific marketing action aimed at target groups and focussing on solar energy utilisation.
- Creation of a Solar Technology Centre.
- Support to school projects related to solar energy.
- Adaptation and widening of the scope of solar energy promotion.
- Demonstration system with long-term solar energy accumulation.
- Compulsory prescription of solar hot water production in new buildings (request).



As regard self-installation of solar collectors, the Energiereferat (municipal energy department) in collaboration with "Arge Erneuerbare Energie" (Gleisdorf) proposes workshops where users can learn how to install solar collectors. The objective is to increase the number of solar installations sold and to make them easier to install with the help of the professionals concerned.

In order to reach the target of 200,000 m<sup>2</sup> of solar collectors by 2010, 80 million Eur have been invested. The grant awarded by the Municipality of Graz and the land of Steiermark amounts to 35 Eur per m<sup>2</sup> of solar collector installed.

## Information / Public relations

A marketing strategy for the whole energy concept is to be developed by the Environmental Protection Department and the energy agency of Graz in co-ordination with the traffic planning department, the scientific and economic departments of the Municipality of Graz and the Graz Stadtwerke. Thermal solar energy is part of this action. By developing a social-oriented and participative market strategy, the Municipality of Graz intends to raise public

awareness and influence behavioural patterns by providing information, advice, co-ordination and customised services.

A campaign was conducted featuring well-known inhabitants in the city participating in “build-it yourself” programmes (key-word: “VIP building groups”). The Municipality of Graz wishes to set an example by using thermal solar energy in public buildings. A programme for the promotion of solar collectors is widely disseminated in schools, universities and adult training institutions.

### **Players involved**

The Municipality of Graz created – with the support of the European Commission - a *Communal Energy Agency* called Grazer Energie Agentur. The agency is responsible for planning and financing any measures in favour of a rational use of energy and should become self-financing in the medium term. Regional distributors of installations operating with renewable energy will receive subsidies and energy imports should progressively be replaced by local labour and know-how.

### **Difficulties encountered**

In terms of a more sustainable and efficient energy use, the main difficulties encountered in Graz are linked to a lack of information and the fact that the market of potential customers is not well defined. Financial problems and competition from other priority investments are typical obstacles to the development of solar installations. One of main problems that the investor-user has to face is the distinction made between owner and user which slows down the implementation of renewable energy projects.

### **Achievements**

Up to the present, solar systems have been installed on two public buildings owned by the Municipality, a new students’ hall, an outdoor swimming pool and various professional or private buildings.

#### Vinzenz-Muchitschgasse students’ hall

This hall belonging to the Municipality was equipped with a solar system for producing domestic hot water. The system includes 15 m<sup>2</sup> of solar collectors and a storage tank with a capacity of 800 litres. The installation was commissioned by mid-1993 and now covers 70% of the energy requirements in terms of domestic hot water. Works planning and supervision were looked after by the energy office of the Municipality of Graz in collaboration with the *Renewable Energy Commission*.



#### Bilderland Company, Graz operating unit

The film processing department of the company needs 180 m<sup>3</sup> of hot water per working week for production purposes. A solar installation composed of 1,080 m<sup>2</sup> of solar collectors and a storage tank with a capacity of 175 m<sup>3</sup> coupled to a thermal exchanger for heat recovery now covers 88% of the energy needs for producing hot water.

### Stukitz outdoor swimming pool

In 1993, the Graz Stadtwerke built a solar installation to heat the outdoor pools. The installation covers a surface area of 500 m<sup>2</sup> and produces around 170,000 kWh of heat per annum.

## EVALUATION AND PERSPECTIVES

The fact that 76 institutions took part in the municipal energy policy of Graz clearly demonstrates that the municipality is much concerned with co-ordinating on a wide scale the different aspects of its energy policy at all stages, from the planning stage through the implementation process. The *Communal energy concept of the Municipality of Graz* is based on a voluntary commitment to reduce by half CO<sub>2</sub> emissions by 2010 taking the 1987 values as references. On the other hand, it can be also be defined as an economic support programme.

Among the various possible uses of renewable energy sources, solar energy for space heating and producing hot water is gaining momentum. The objective consisting in making of thermal solar installations in new buildings a legal requirement implies the prior amendment of the legislation. Solar energy is recognised as an alternative source of energy not only by the Municipality but also by private individuals. Solar energy promotion, provision of advice and informative events contributed to the 440 private systems covering a total surface area of 5,900 m<sup>2</sup> that could be found in the city in 1997. The target of 40 times more collectors in terms of surface area covered by 2010 is within the realms of possibility.

In Graz, nearly all the possibilities that a municipality could use to push forward solar installations have been exploited. To implement even more ambitious actions, the Municipality will now need to convince the Land and the Federal State to agree with its energy supply concept.

## FOR FURTHER INFORMATION

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