

Photovoltaics

LAUSANNE (Switzerland)

Photovoltaics (PV) is not really a new technology. Although its principles have been known for a long time, a number of difficulties have prevented it from broad market penetration. Aside from the development of new, more cost-effective technologies, possible solutions are either large-scale production or innovative programmes in urban areas that aim to make these new technologies available for more people. In 1995 the city of Lausanne, member of Energie-Cités, received the European solar price for its policy promoting solar energy and, in particular, for installing PV systems in the Olympic stadium.

THE CITY

Lausanne (127,000 inhabitants), county town of the Canton of Vaud and university town, is situated on the North shore of lake Lemman at the foot of the Jura and facing the Alps. The city has managed to preserve a vast green area on the shores of the lake. Its geographical situation makes of Lausanne the centre of the French-speaking Switzerland and a very visited place. The Romans founded the city of Lousonna and some vestiges still remain. There is a diversified industry : precision mechanics, chemistry and food. Lausanne is the headquarters of the Olympic International committee.

Climatic data :

Hours of sunshine per year : 1700h/a
Sun radiation : 1260kWh/ma
Annual mean temperature : 9,5°C



CONTEXT

Following the second oil crisis, the Municipality of Lausanne set up an economic and energy efficiency policy. In 1983 the Energy Service was created and joined up with the Direction de Services Industriels. Thanks to the "signature energy" method (relation between the power demand of a heating system installation and the outdoor temperature) The Municipality of Lausanne has carried out a complete review of its built heritage, about 150 buildings. More than 50 buildings underwent thermic rehabilitation and were connected to a remote management system. A model rehabilitating operation taken by a school complex led to an energy economy in the order of 60%, representing more than 700 MWh. Different measures of purification and management of the overall heritage have led to a reduction in thermic consumption of 19% between 1982 and 1995. This represents an annual economy of around 600,000 Euros.

Another project carried out by the Energy Service is the installation of a cogeneration unit in Elysée school by the end of 1993. The installation is composed by three modules of a total power of 1,050 kW_{th} and 480 kW_e. In order to raise public awareness of different energy issues, an information and exchange centre called "Contact énergie" was set up in the town. Every year three to four thematic expositions are held there.

EXPERIENCE IN LAUSANNE

The Municipality of Lausanne has been implementing for several years an active policy supporting solar energy. The first steps in solar energy, between 1989 and 1991, consisted of the realisation of a pilot project to preheat domestic hot water by a solar thermal collector of 45m², followed by a second one of 13m². Both installations had detailed instructions in order to have an efficient control of the different parameters.



At the same time, a test bed of PV panels was brought into service to test the different modules of the market. Three demonstration power stations of 5 and 10 kW_p were built : two in schools, with an educational goal, and the biggest one in town-centre, open to the public.

Concerning passive solar, in 1992 transparent isolation was applied, for the first time in Switzerland, in the blocks of flats of Valency park. This installation is often visited and a subject of great interest.



The political approach

Due to the positive results achieved, the municipality has required the examination of passive or active solar energy systems to integrate them in all the projects of construction or transformation of buildings. A development plan, including all the possible solar realisations in the buildings of the pension office (*Caisse de pension du personnel communal*), was approved and carried out by the local Council of Lausanne. A potential of 1 photovoltaic GW and a potential of 2,200m² of thermal collectors were displayed.

Due to the economic situation, it was decided to realise first and foremost the thermic potential of council buildings. As the municipality can't impose the

equipment of the buildings of the pension office, it will endeavour to favour the projects case by case.

PV installation in the Olympic stadium of Pontaise

At the beginning of 1992, the Energy Service prepared the global scheme of PV installation which was approved by the local Council in November 1992. The municipality settled some objectives for the surface to exploit :

- as vast as possible
- active urban area
- architecture contour adapted to lay PV panels
- the possibility of multiplying these installations in other buildings (stadiums) in Switzerland or abroad.

The Municipality of Lausanne took advantage of the renovation of the Olympic stadium and of the construction of a rehearsal room in the theatre Vidy to integrate PV plants of 65 and 21 kW_p respectively. The establishment of the specifications and submissions, as well as the examination of company offers took place in 1993. After an unexpected delay in rebuilding of the roofing's water tight concrete, the metallic structure was put up in Autumn 1994. After that, everything progressed rapidly and the first injection in the Lausanne's grid took place on 15th December. To guarantee the complete use of the electricity produced, the inverter injects directly the current into the city's distribution grid.

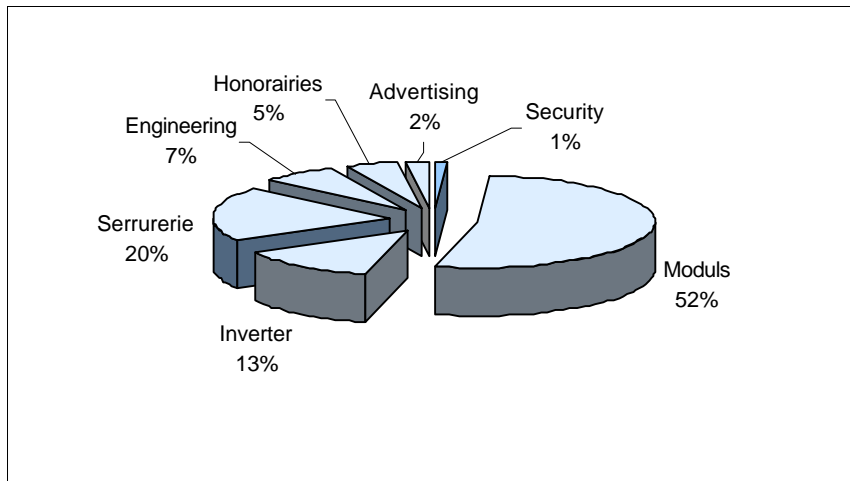


Rated power	65	kW _p
PV surface	600	m ²
Number of PV panels	1,296	
Annual mean electricity production	65,000	kWh/a
Metallic frame	21,500	kg
Electricity cables	4,000	m

The installation of the Olympic stadium also includes a thermal collectors part of 48 m² to heat water for the showers, 20% of the needs are covered by these collectors.

Financial aspects

The total cost of the PV installation in the Olympic stadium adds up to 639,317 euros, a quarter of which was taken care of by the programme “pilot projects and demonstration” of the Federal Energy Office. The distribution of this amount figures in the following graphic:



With this investment the costs of electricity production add up to 0,55 euro/kWh, which is a price comparable to other installations in Europe. The current price of electricity for the private sector is 0,17 euro/kWh.

Other promotion activities

The Municipality of Lausanne supports projects and grants private installations through a special fund. By means of expositions and documents for the general public, the population becomes aware of the different production aspects of domestic hot water, PV electricity and solar architecture.

You have access to the documents, the information on subsidy programmes and the number of installations that have been subsidized on internet (see address below). They are regularly updated. For example at the end of 1999 the number has been: 42 heat pumps (~ 305,000 euros), 70 electric scooters (178,000 euros), 250 photovoltaic kits (61,000 euros).

EVALUATION AND OUTLOOK

In 1995, the Municipality of Lausanne was awarded with the *Swiss price* and the *Solar energy European price* for the promotion of its solar energy policy and for its pioneer PV installation in the Olympic stadium. This year has seen the outcome of the efforts in the promotion of photovoltaics. At the end of 1999, the PV plants installed totalled 205 kWp which, related to the number of inhabitants, corresponds to 1,6 W/inhabitant. Eleven installations to preheat domestic hot water cover a surface of 330 m².

Regarding information and public awareness raising, an exposition on solar energy (permanent on the Internet site) was presented during the Summer in the "Contact Energie" centre. Videos, documents, panels, examples of realisations, material, indicative prices and subsidies are available to the public.

In spite of the present reduction of public expenditure, the Municipality of Lausanne has implemented an anti-cyclic policy, maintaining, up to 1997, the level of investment high. This has allowed to obtain interesting results. In the absence of new measures encouraging renewable energy in Switzerland, the following years will consist especially of managing the acquired knowledge, putting off the sizeable projects for better times.

FURTHER INFORMATION

Ville de Lausanne

Direction des Services Industriels

Service de l'énergie

Georges OHANA

Route de Genève

Case Postale 312

CH-1000 LAUSANNE 09

Tel.: +41 21 315 87 41

Fax: +41 21 315 80 15

E-mail : georges.ohana@lausanne.ch

<http://www.lausanne.ch/energie>

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