Energy Projects NIEUWLAND

REMU

1 MW of solar power in a single residential district

In the Waterkwartier district of the Amersfoort Nieuwland expansion area REMU is introducing solar power on a large scale in a residential district. It is the largest project of its kind in the world.

An obvious way to obtain solar power is to use roofs. If this is done on a large scale, however, the question is what social and architectural consequences this has for the district as a whole. How can solar panels be integrated structurally and architecturally into the design of the houses? What demands does large-scale solar energy make on the urban development structure of a district? How do residents experience the use of solar energy on a large scale? The so-called 1 MW PV project is intended to provide an answer to such questions. The project consists of the installation of more than 12,000 m² of solar panels on 500 houses and a number of public utility buildings in the Waterkwartier district of Amersfoort-Nieuwland. It is expected that these panels will be capable of generating 1,000,000 kWh annually, which is equivalent to the average electricity consumption of more than 300 households.

tuinstad Nieuwland Amersfoort
duurzaam wonen

1 MegaWatt PV Project

Objectives

With the 1 MW PV project REMU is seeking to achieve the following objectives:

- To illustrate the impact of using solar power at district level.
- To reduce costs by applying solar power on a large scale.
- To illustrate possible management constructions and conditions.
- To acquire know-how and experience regarding electrical engineering and architectural aspects.
- To increase the acceptance of solar-power applications by local authorities, urban development specialists, project developers, housing associations, architects, contractors and residents.
- To contribute to the REMU objective of generating at least 3.2 percent of electricity supplied in the year 2000 by sustainable means.

Planning

The 1 MW PV project is an initiative of REMU and has been developed in collaboration with Novem, the Amersfoort local authority, Overeem and the BOOM environmental research and design agency. The selected project location was Waterkwartier and after the first exploration of possibilities it was decided to aim for an installed capacity of 1 megaWatt. Based on an average of twenty square metres of solar panels per house and a peak capacity of 100 Watts per square metre, this would require some 500 houses. In 1994 this was set out in a specification. The urban development of the district was structured in line with this target level.
The land was parcelled out in such a way as to render as many roof surfaces as possible suitable for installation of solar panels. The specification also stated that all designers and project developers involved should co-operate in the implementation of the solar power project.

Implementation

As is the case with the whole of the Nieuwland district, the Waterkwartier district is being developed by Overeem on behalf of the Amersfoort local authority.
REMU commissioned the simultaneous use of solar power in this area, i.e. the 1 MW PV project. REMU participates in project team meetings organised by Overeem. In addition, REMU consults with individual project implementers concerning the structural integration of solar panels and on management and maintenance aspects. To this end a core team has been assembled, consisting of people from REMU, Novem and the Ecofys research and consultancy agency. The complete project comprises eight sectors on which a total of nine developers are working. Construction of the first sector started in November 1997 and the last sector will be completed before the year 2000. Sale of the houses progressed quickly and in general the interested parties responded favourably to the use of solar energy. A proportion of the buyers deliberately chose a house with solar panels on the roof for environmental reasons.

Solar panels

Almost eighty percent of the solar panels were purchased from Shell Solar Energy in Helmond. A little over fifteen percent were purchased from BP Solar in Middlesex (UK). Solar panels were also supplied by Colt International in Cuijk for movable sunblinds and for integration in the walls and by RBB in Montfoort for roof tiles. Almost 75 percent of the solar panels were ordered after a European tender.

Part	Developer(s)	Architect(s)	Description
K1	Bouwfonds woningbouw b.v., Amersfoort; Heilijgers projectontwikkeling, Amersfoort; Schoonderbeek b.v., Amersfoort	Loof en Van Stigt, Amsterdam	51 owner-occupied houses with 34 m^2 of panels and 48 owner- occupied houses with an average of 30 m^2
K2	Van Zwol Projectontwikkeling, Amersfoort	Van Straalen, Zeist	38 owner-occupied houses with 20 m^2 of panels and 2 solar gates with 47 m^2
K3	Van Hoogevest ontwikkeling, Amersfoort	Galis BNA, Delft	32 owner-occupied houses with 21 m^2 of panels
K4	Van Hoogevest ontwikkeling, Amersfoort; Van Bekkum b.v., Hooglanderveen	Duinker / Van der Torre, Amsterdam	32 owner-occupied houses with 21 m^2 of panels
N2	Mabon VSOM, Utrecht in collaboration with Achtgoed wonen en bouwen, Amersfoort; Schoonderbeek b.v., Amersfoort	De Jong, Hoogveld, De Kat, Utrecht	125 houses with an average of 20 m^2 of panels
N3	Achtgoed wonen en bouwen, Amersfoort en Schoonderbeek, Amersfoort	Atelier Z: Zavrel, Rotterdam	24 owner-occupied houses each with 8 m^2 of panels on the external walls and 21 rental flats with a total of 150 m^2 of panels
N4	Schoonderbeek, Amersfoort; Achtgoed wonen en bouwen, Amersfoort	Claus en Kaan, Rotterdam	119 rental and owner-occupied houses with an average of 22 m^2 of panels
O	SRO	POD/Meulenbelt Weerstra, Drachten	a sports hall with 530 m^2 of solar panels and 65 m^2 of solar collectors,
	Schoonderbeek, Amersfoort	Van den Berg Architecten, Utrecht	10 duel-purpose school/residential units with a total of 270 m^2
	SRO	CITA, Utrecht	a day nursery with 71 m^2 panels

THERMIE

Ownership

To allow investigation of the effects of the various forms of ownership and management, approximately half the installations will remain the property of REMU. Agreements have been made with the developers concerned, which among other things set out the arrangements made concerning accessibility of the installations and liability for any damage. A right of superficies (building right) has been established in respect of the plots. It has also been stipulated that the solar panels should remain unshaded. The residents will be remunerated by REMU for the use of their roofs. Twenty percent of the energy generated on their roof will be paid for at the normal domestic consumer tariff. The other half of the solar-power installations will become the property of the residents. Agreements have been concluded for this purpose with the developers concerned (Mabon, Achtgoed and Schoonderbeek), in which the legal and financial arrangements are set out. The solar power generated will be fed to the REMU mains and the residents will receive in return the normal domestic user tariff.

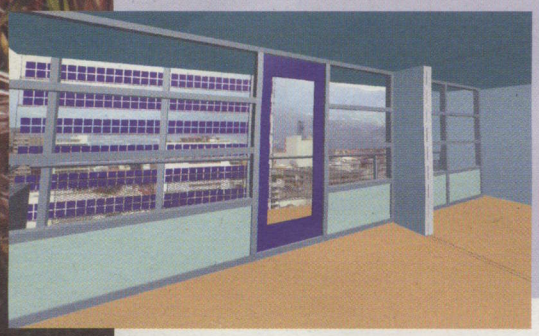
Monitoring

The solar power installations will all be monitored at the overall level, i.e. a record will be kept remotely for all installations of the amount of solar power generated daily. This system can also monitor the operation of the installations and immediately reveal any failures. Approximately fifteen installations will be monitored in detail in order to provide more information on the efficiency of the installations and to allow investigation of the effects of the various integration methods on the production of electricity. Finally a social monitoring programme will be established in order to ascertain how the residents experience this form of utilisation of solar energy.

For further information

The 1 MW PV project has already provided a wealth of know-how and experience that can also be useful in other solar-energy projects. REMU has set up a Nieuwland Communication project group, in which consultation takes place with all the parties involved on dissemination of that know-how and experience. Various communication means have been developed:

- On behalf of REMU and Novem, Ecofys has compiled a manual on the use of solar panels in residential construction. The manual contains information on structural, architectural and electrical-engineering aspects and provides information on tasks, responsibilities and management matters. Many of the parties involved in the 1 MW PV project used this manual. The manual, which can be important for other initiatives, can be purchased from REMU.
- Much information on the 1 MW PV project is publicised by means of folders and video material and through articles in trade journals.
- The project is presented at national and international solar-energy conferences and workshops are organised.
- The so-called Information Centre for Sustainable Energy is established in one of the balanced energy houses constructed by REMU. Here information is provided on the 1 MW PV project and on sustainable energy in general.



You can obtain further information on the 1 MW PV project and other projects with which REMU is seeking to stimulate the use of sustainable energy from:

NV REMU Information department
Phone: 0031 (0)35 6094497
Fax: 0031 (0)35 6094477
Internet: www.remu.nl

Naturally you are also very welcome to visit the Sustainable Energy Information Centre, which is located at Nieuwlandseweg 42 in Amersfoort. The centre is open from Tuesday to Friday from 1.00 pm to 5.00 pm and on Saturdays from 10.00 am to 2.00 pm. Admission is free. For information on tours please call REMU, Eemland region, Information department, phone 0031 (0)35 6094497.

photo's: Jan van IJken, Studio Hagens, Robert Jan Stokman

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