

## **RES-e Regions: WP 4: Specific technology promotion**

### **Technology selection for Greater Copenhagen Region, Denmark: Photovoltaic Power Systems**

#### ***Background***

When awareness of renewable energy as a means to improve security of energy supply and to provide a cleaner environment started growing 30 years ago, focus was put on windpower, biogas, and biomass for reasons of natural resources and history. The technologies developed rapidly, and mature products reached the market long time ago. Also in Greater Copenhagen Region (GCR) a number of installations were established. However, GCR is a densely populated area with vulnerable landscapes, and the potential for increased electricity production capacity based on these technologies is limited.

On the other hand solar energy for electricity production was considered much too expensive, and until beginning of the 90ies only the universities devoted their time to PV activities. Then, encouraged by the continuous fall in prices of PV components and systems, enthusiastic people managed to establish the first pilot projects with gridconnected systems. Supported by the Danish parliament the first PV strategy was developed. Schemes for quality assurance of components, systems, and installers were elaborated, and a number of demonstration activities were subsidized. Especially the 1000-rooftop programme SOL1000 is worth mentioning.

From a local point of view the more active people and companies were unfortunately located outside GCR, and in proportion to the number of inhabitants GCR has very few PV installations.

#### ***Current situation***

The support from the state to renewable energy has been cut substantially since 2002. The PV business is small, and at the moment only few new installations are established. Most activities are concentrated on research and development. The two Danish module manufacturers reside in GCR.

However, in some cities new initiatives are taken to push the PV technology, recognizing that PV is the only applicable environmentally friendly technology for electricity production in urban areas. Also solar thermal energy is pushed. Thus the Copenhagen Municipality has joined an international network named "European Solar Cities Initiative", which works towards securing the energy supply and mitigating the risks of climate change. It is expected, that the SolarCity initiative and the RESe-project can create synergy by joining forces.

The total installed grid-connected PV capacity in GCR is 0.5 MWp in ~130 installations. The potential for development of the PV market is therefore enormous.

#### ***Barriers***

- Large investment cost – low or no subsidies – unprofitability

- Lack of a long term national strategy followed up by concrete targets and subsidy schemes.
- Uncertainty regarding net metering, which can be used until end 2006. Then?
- Shortage of PV modules due to large rooftop programmes in Germany and other countries, resulting in high prices and long delivery times (short term problem)
- Low interest and knowledge of architects on building integration of solar energy
- Generally little public concern about energy supply security and global climate changes
- Lack of knowledge amongst politicians about the advantages & added values of PV and about energy supply systems and security in the long perspective
- Old buildings with tile roofs in Copenhagen City – listing – difficult integration - aesthetics

### ***Opportunities***

- Large unexploited areas on rooftops and facades, suitable for PV installations
- Generally a very positive position on PV amongst people with knowledge of the technology
- Rising prices on electricity
- EU directive 2002/91/EC on the energy performance of buildings
- Improved mounting techniques and building components with PV integrated
- In the longer term lower prices on modules and components as production capacity grows
- Increased pressure to find alternatives to fossil fuels as the global climate changes
- New tariff structures

### ***Target Groups***

The rooftop programmes SOL300 and SOL1000 have shown, that when citizens get knowledge of grid-connected PV systems, they find the technology very appealing. It is like when they buy a small hobby green house, they like the feeling of being self-supportive, they like behaving environmentally sound - and the price is not that important. Only few citizens in GCR do really know about PV.

The politicians is of course a very important target group. They need much more information about all aspects of PV. They tend to look at the short-term profitability of energy systems rather than looking on the long term perspectives. Added values of PV are hardly known, for instance that owners of PV systems behave more energy saving after the acquisition.

Major companies building prestigious office buildings rarely know that spectacular PV façade cladding can be made at the same prices or cheaper than many traditionally used exclusive materials.

Architects and other consultants need to know more about the possibilities and constraints in building integrated PV.

Target main groups are:

- Interested citizens
- Major companies building prestigious office buildings
- Project developers and consultants
- Local politicians and decision makers
- Local utilities

### ***Actions needed***

The actions needed for decreasing the barriers and to stimulate the development in the region which could be implemented through this project are as follows:

- Information about the technologies available and existing PV installations
- Information about added values and the long term advantages of PV
- Establishment of a forum or platform for dialogue and project development etc. The forum should consist of members or representatives from the target groups and other key stakeholders such as local decision makers, consultants and technology suppliers etc.
- Pushing the politicians to adopt a long term PV strategy with concrete targets and subsidy schemes