

# AUSTRIA

PHOTOVOLTAIC TECHNOLOGY STATUS AND PROSPECTS

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Fig. 1 - Currently the largest PV system in Austria is at Fronius company/Sattledt, 603 kW (photo Fa. Fronius).

## GENERAL FRAMEWORK AND NATIONAL PROGRAMME

More and more stakeholders in the energy business in Austria recognize PV as an attractive and sustainable way to generate electricity. However, wide public support for PV installations as well as for other "new renewables" (Austria has about 60 % electricity from large hydro) will not be achieved within the upcoming year. The main reason for this is a revised green-electricity act (GEA) which is expected to be published in its third revision in 2008. An additional 700 MW wind energy as well as 700 MW new bio energy power plants are targeted for the period until 2015, which might cover about half of the expected increase in electricity demand.

These "new RES" are supported since the beginning of this act mainly via long-term guaranteed feed-in tariffs to achieve the above mentioned political target quotas. The feed in tariffs are stated by the federal Ministry for Economics and financed by a supplementary charge on the net-price and a fixed price purchase obligation for electricity dealers (so far about 4,5 Eurocent/kWh).

Starting with 2008 up to 2015, each year another 21 MEUR might be dedicated for covering the feed in tariffs for the newly installed energy systems. While the main part is dedicated to biomass and a smaller part for wind, now 12 % seems to be reserved for PV; which is little higher than in the former act, but still leading only to a few MW installed PV per year.

An annual maximum of 2,52 MEUR from the federal budget can be expected for PV. The regional parliaments are requested to double this federal subsidy specifically for PV support, which on the one hand adds some money, but on the other hand, makes the support system even more complex. This was already one of the main barriers in the former act, as well.

Photovoltaic feed-in-tariffs for 2008 are foreseen to be 44 EUR Cents (< 5kW), 38 EUR Cents (< 10 kW) as well as 28 EUR Cents (>10kW).

Compared to the former regulation, the feed-in-tariffs are slightly reduced and the time frame remains the same (100 % of the source/size specific tariff in year 1 to 10, 75 % in year 11, 50 % in year 12). A decrement factor will be implemented (to reduce the source/size specific maximum tariffs each year about a few %).

It can be expected that this new regulation will lead to about 5-8 MW annually installed systems in Austria. Furthermore, no definitions for supporting special PV applications (e.g. Building Integrated PV as proposed in the federal "Austrian PV Technology Roadmap") niche markets, where Austrian companies could maybe reach a leading position, had been made.

National PV stakeholders questions the effectiveness of the support system mainly because of the complexity of the support system and the modest financial limits, which might not be able to significantly foster the Austrian PV market. Although the new revision of the GEA is still in the negotiation phase, a significant market stimulation aiming at establishing competitive Austrian PV industry will not be achievable.

Another initiative might exceed the effect of PV support within the GEA: The national ministry of environment is promoting a so called "10 000 Roofs PV Programme," which might support only small systems (private households) but could lead to another about 3-5 MW PV installations in Austria per year. The realisation of this broadly discussed initiative is still open as well.

## RESEARCH AND DEVELOPMENT

The national "PV Technology Roadmap," initiated by the Ministry of Innovation and Technology, mainly focusing on technology aspects was published and presented to the public by the Minister of State on the occasion of the National PV Congress in September 2007. This roadmap

was worked out in a wide discussion process amongst the main national PV stakeholders under the leadership of the mainly governmental research centre arsenal research. It aims at finding out the needs for establishing PV as significant source of electricity in Austria, as well as the possible future role of Austria's industry in the world wide PV market. Besides showing the potential for Austrian industry to contribute in many items to the value chain of the PV technology, significant employment in the short term perspective and considerable contribution to the national electricity demand (at least 20 % in 2050) are the main findings of this roadmap, which should attract decision makers.

Currently the Austrian PV research activities are mostly focused on national and international projects: The involved research organisations and companies are participating in various national and European projects, different tasks of the IEA-PVPS Programme, as well as in work concerning grid interconnection in the IEA ENARD Implementing Agreement. The RTD development and approach is widespread located and decentralised orientated. The new national programme "Energy of Tomorrow," (<http://www.energiesderzukunft.at/>) successfully launched in summer 2007, was initiated by the Ministry of Transport, Innovation and Technology and covers quite broad research items on energy technologies. Although PV research is addressed only in a small subpart of the programme, research in PV systems as well as in distributed generation with many aspects relevant for PV can be financed within this well designed activity.

On a European level, the ongoing initiatives to increase the coherence of European PV RTD programming (PV-ERA-NET) are actively supported by the Austrian Ministry of Transport, Innovation and Technology.

Research highlight of photovoltaics in Austria are:

- Organic Solar Cells based on thin plastic films have been intensively investigated during the last 10 years, at the Kepler University of Linz, lead to the foundation of a local branch of an U.S. PV company in Linz.
- Grid-interconnection, not exclusively related to PV but more to Distributed Generation from RES in general ("smart electricity networks"), is the main focus of several national and EU financed projects, which are jointly carried out by research institutions, industry and network operators.
- Research on PV inverter specification (MPP, islanding, efficiency aspects...) is done at arsenal research attracting worldwide inverter manufacturers for collaboration.
- Cost reduction and optimization of new solutions for building integrated PV are addressed within several EU projects.
- At the University of Salzburg, a new initiative was started in 2006 to develop thin film solar cells, based on sulfosalt solarcells.
- Socio-economic research concerning the integration of PV is internationally well positioned at the Technical University of Vienna.

- A large Austrian glass industry has intensified its activities in PV, mainly for addressing architectural building design.
- In the area of system technology, the activities for quality assurance, certification and testing of PV modules were extended; arsenal research as an Austrian research and testing institution is officially accredited to qualify crystalline silicon PV modules according to the EN/IEC 61215 standard as well as PV inverters.
- A national PV Technology platform is currently under discussion to be established during 2008.

#### IMPLEMENTATION & MARKET DEVELOPMENT

Approximately 25 MW of PV power had been installed in Austria by the end of 2006. There are no figures available for 2007 yet, but it is expected that currently not more than 27 MW are totally installed in Austria.

The annual growth rate in 2006 totalled 1,5 MW; the lowest in many years.

Despite its weak home market, Austria has some internationally well positioned manufacturers nearly exclusively involved in foreign trade; mainly focusing on the neighbouring large German market. The largest Austrian PV System was installed in 2007, on the premises of the inverter producer Fronius at its new headquarters in Sattledt/Upper Austria. The system size is about 600 kW and is part of a concept for a fully environmentally logistic system for Fronius International. It received the "Energy Globe Award" in 2007.

The main applications for PV in Austria are grid connected distributed systems, representing more than 90 % of the total capacity. Grid-connected centralised systems in form of PV-Power plants play a minor role with about 1,2 MW installed. Building integration is an important issue and some remarkable installations were realised.

Beside on-grid applications off-grid systems are widely used to provide electricity to technical systems or for domestic use in Alpine shelters or households lying far away from the grid. Some provincial governments have built PV-demonstration plants on municipal buildings in order to create public awareness for PV.

#### INDUSTRY STATUS

Despite the unclear and unsatisfactory situation with an insignificant national market for PV, the Austrian PV industry could still expand their activities during 2007 focussing on the export of their products predominately to the booming German and other International markets. In Austria, about 1 500 employees in the PV business seems to be a success, but rely heavily on the development outside the borders of the country.

**SOLON-Hilber Technology:** A subsidiary of the German SOLON manufacturer produces solar trackers and solar modules in Tyrol, close to Innsbruck; started in 2003. Currently more than 180 employees are working in this company.



Fig. 2 - PV at Roundabout Lustenau, Vorarlberg, Austria (photo Stromaufwärts).

**Ertex Solar:** A new subsidiary company of the traditional company Ertl Glass (known for e.g. safety glass or insulation glass production, etc...), specialised on production and distributing building integrated PV modules. The company uses a new and innovative laminated glass production technology.

**Kioto Photovoltaic** produces PV modules since 2004. The company is closely linked to GREENoneTEC, Europe's market leader in solar thermal collectors.

**SED** manufactures modules specially designed for integration into PV-roof tiles. The custom laminates produced are directly stuck into standard format tiles made of recycled plastic and can easily replace conventional roofing materials.

**PVT Austria**, the first manufacturer of PV modules in Austria produces standard and tailored modules from imported crystalline silicon cells. The company successfully increased their output; taking advantage of the German PV boom.

**Blue Chip Energy GmbH** will start production of silicon solar cells in the energy autarkic municipality of Güssing (Burgenland) in 2008, expected to finally employ 140.

Another thin film factory is about to start in early 2009 in Austria.

Besides PV-Module and cell production, various other companies are manufacturing components for modules and BOS-components like batteries, inverters, cell-wiring or mounting systems:

**FRONIUS INTERNATIONAL** has been engaged in solar-electronics and is Europe's second largest manufacturer of inverters for grid connected PV systems.

**SIEMENS AUSTRIA**, located in Vienna: large-scale manufacturing and development of string-inverters in the range of 1,5 kW to 4,6 kW for grid connected applications.

**ISOVOLTA AG** is the world market leader for flexible composite materials used for encapsulation of solar cells. The ICOSOLAR back sheet laminates are available in various colours and are used by many module manufacturers in the world.

**PLANSEE-WERKE** in Tyrol is manufacturing metallic base materials for thin film solar cells.

Altogether, the Austrian PV industry is expected to employ significantly more than 1 500 people in 2008.

#### MARKET DEVELOPMENT

The Ministry of Environment, engaged in climate protection started a large programme of initiatives to reduce CO<sub>2</sub> emissions ("Klima:active") in 2004; through addressing and fostering various technology sectors like biomass-heating, solar thermal systems, heat-pumps, low energy buildings, environmental benign transport and others. It is currently preparing a programme for photovoltaics, concentrating on awareness raising, education and information about the potential and possible future contribution of PV to the general energy supply.

The National Photovoltaic Association has further expanded their activities by creating a national network for dissemination of PV information and initiating awareness raising activities. By fostering the political contacts and intensive political lobbying work for PV, the association is aiming at changing the legislative framework conditions for PV by introducing stable and supportive PV market incentives preferably based on feed in tariffs.

At the end of 2007, more than 100 companies and persons involved into the PV business were Association members; which is about four times as much as of end 2005.

The annual National Photovoltaic Conference 2007 (a two days event) was jointly organised by arsenal research and the national PV association with support from the Ministry of Transport, Innovation and Technology and had again been a great success; with more than 200 experts participating. Besides technical presentations, an "industry forum" was part of the Conference where most relevant national market players (module producing companies, BOS producing companies, research experts etc.) informed the audience on their latest developments.

The Austrian research and testing centre "arsenal research" (known as an internationally accredited PV module test institute according IEC 61215 and testing of PV inverters) has continued in 2007 the "Certified PV Training" with another two trainings for installers and planners in order to improve the quality of the installed systems. The promising feedback and the growing interest will lead to a minimum of four courses in 2008.

#### FUTURE OUTLOOK

- Waiting for the effects on the new support scheme, the situation of PV remains unsatisfactory; mainly due to the complex and insignificant subsidies. If no significant and stable support mechanisms, (which can provide long and promising perspective for a national PV industry development) are introduced, the market will remain limited; relying on regional incentives which will only partly support the market.
- Potential PV niche markets, where Austria could take a lead position, have to be developed; in order not to fully lose the linkage to the booming international market. Some new initiatives and considerations at regional governments seem to be promising.
- PV research and development will be more and more concentrated on international projects and networks, following the dynamic know-how and learning process of the world-wide PV development progress. Specifically the direct links to the new members of the European Union in Central and Eastern Europe in energy related items are to be mentioned (e.g. EU-Interreg Initiatives), where PV plays more and more an important role.
- The level of the public know-how about the potential and perspectives of PV is continuously growing. Several renewable energy education courses are already implemented, some new are currently under development. All of them include PV as essential part of the future energy strategy. For example, at the technical University in Vienna, a post graduate education on renewable energy was introduced with PV as an important energy option included in the curriculum. The importance of proper education for installers and planners of PV systems will increase; depending on the market situation; the training is already available and can be extended easily.
- It can be expected that the National PV Association and other important PV stakeholders will further significantly promote the topic in Austria. The still quite small PV industry, currently taking advantage of the strong German market is very much interested in creating a home market for PV, and is further waiting for an improvement in the economic framework conditions.