

Measurement Results of »Umwelttarif RWE Energie«

The Fraunhofer Institute for Solar Energy Systems ISE accompanies the »Umwelttarif RWE Energie«. In the following, results of PV installations using ASE modules are reported.



Fig. 1: PV system in Mülheim a.d. Ruhr

General data and system technology

The installations are built in a modular way. Each sub-generator with about 5 kW_p is connected to one inverter with the same nominal power. Such a 5 kW_p kit is assembled of 18 modules most of the type ASE-300-DG-FT (285 W_p) and an inverter sunways 5.01. All systems have been designed as multiples of this kit.

Table 1: Technical system data with ASE cells

location	power kW _p	module	inverter
Alfhausen	30,78	ASE-300-DG-FT	sunways 5.01
Bad Neuenahr	30,78	ASE-300-DG-FT	sunways 5.01
Bingen	61,56	ASE-300-DG-FT	sunways 5.01
Mainaschaff*	21,00	ASE-200-DG-UR	sunways 5.01
Mülheim a.d. Ruhr	16,20	ASE-300-DG-FT	SMA SWR 1500

*building integrated

Solar irradiation and yield

Figure 2 shows the solar irradiation on the module plane and the yield of the systems for 1999. The evaluation shows the differing irradiation values of the individual plant locations and the direct influence on the yield of the system.

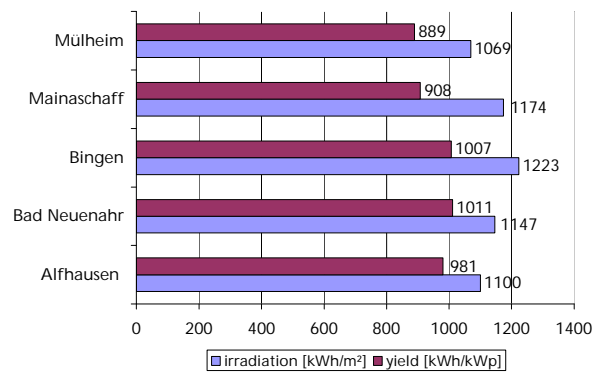


Fig. 2: Solar irradiation and yield 1999

Figure 3 shows the annual yield of all systems from the »Umwelttarif« compared to the systems with ASE-300-DG-FT modules. The results show, that plants with ASE modules are about 15 % above the average.

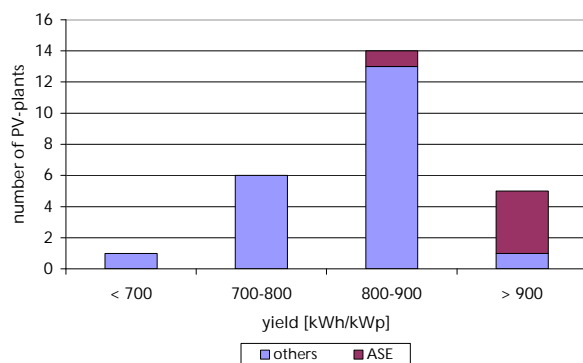


Fig. 3: Comparison of system yields in 1999

Performance Ratio

For systems with ASE modules the average Performance Ratio – an internationally accepted measure for the system quality – is 84 %. Here ASE plants are about 10 % above the general average. This is an extraordinary result. With Performance Ratios of 75 % and more, PV systems are regarded to have a good quality.

Figure 4 shows a comparison of the Performance Ratio of plants with ASE cells with those of the other systems from the »Umwelttarif«.

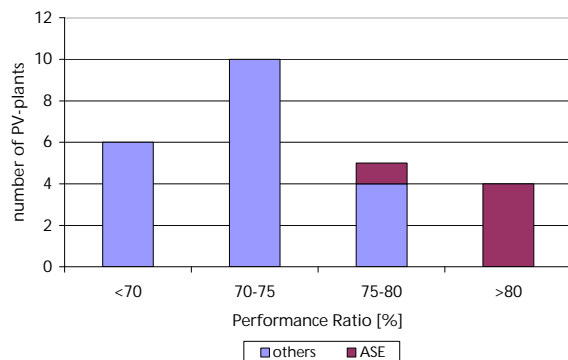


Fig. 4: Comparison of the Performance Ratio of PV plants in the »Umwelttarif« of RWE Energie in 1999.

Table 2: Performance Ratio of PV plants with ASE cells in 1999

location	Performance Ratio
Alfhausen	88,4 %
Bad Neuenahr	88,1 %
Bingen	82,3 %
Mülheim a.d. Ruhr	83,2 %
Mainaschaff*	77,4 %
average	83,9 %

*building integrated

What are the reasons for very high yields?

1. Modules of the type ASE-300-DG-FT do reach the nominal power given on the data-sheets also under real operation conditions. Our measurements carried out on-site confirm this.
2. For the inverter annual efficiencies of 94 % were measured. Also for very low irradiation levels the installed inverters of sunways show high efficiencies.



Fig. 5: Commissioning of the PV system Alfhausen

Assessment

Those PV systems with ASE cells have been examined at on-site measurements by Fraunhofer ISE show extraordinary high system efficiencies. Concerning the reliability of the systems the technical concept also turned out to be good.

With a Performance Ratio of 88 % the PV systems in Alfhausen and Bad Neuenahr reached the highest values ever measured by us.

References

www.umweltplus.de