

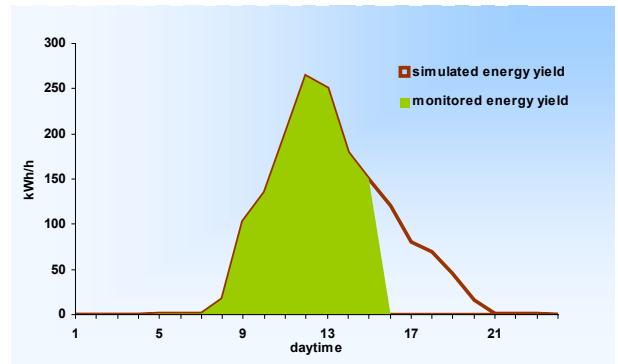
# Failure Detection Routine for Grid Connected PV Systems as Part of the PVSAT Service

## Motivation:

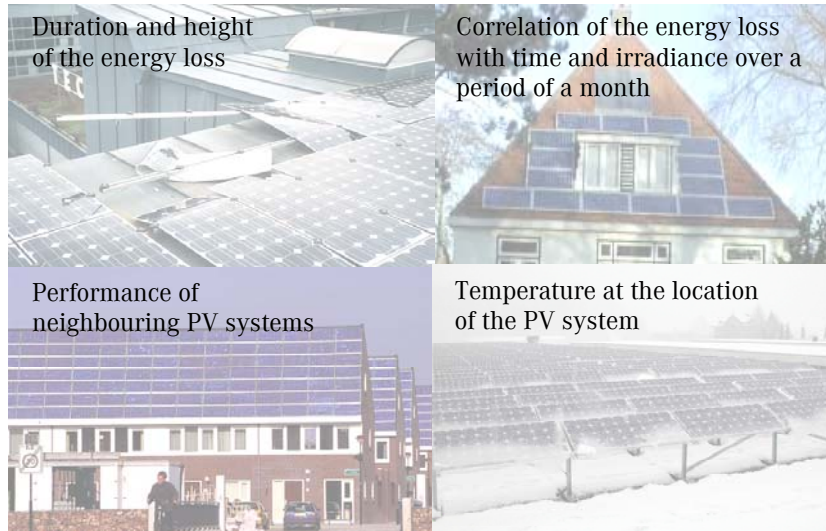
The purpose of PVSAT is to monitor the operation of PV systems and give specific informations to the client. Beside the total system outage it should also be able to detect less severe malfunctions. Lower energy yields than expected can be due to different reasons:

shading, snowcover, soiling, wrong inverter control, part time outages, string or module failure.

Due to the detailed information given by PVSAT, the maintenance effort is reduced und system outage time is minimised, which will improve the financial benefit.



Total blackout in the afternoon



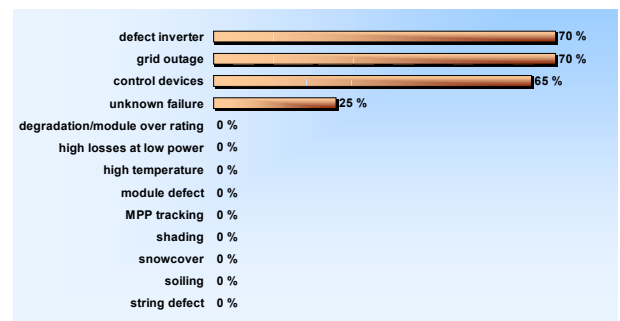
Analysed parameters in the failure detection routine

## Results:

Basing on the checkup of these parameters, the failure detection routine calculates probabilities for different reasons of energy losses. In case of a strong indication for a serious system failure, like e.g. a defect inverter or a string outfall, the operator of the PV system is informed instantly per email about the energy loss. For registered users further information about the performance of their PV system is available on the internet.

## Automated Analysis:

The failure detection routine analyses every day if the energy yield comes up to one's expectations. If this is not the case, an ingenious analysis automatically searches for the reason of the reduction in energy yield. This checkup explores not only the short and long term behaviour of the energy loss, but also compares with the performance of neighbouring PV systems and calculates the influence of the temperature.



Probabilities for different reasons of energy losses