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"Counting the sun" – a Dutch public awareness campai **PV** performance

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Introduction

Results

Performance ratio

The strong market expansion of photovoltaic (PV) technology is requiring reliable information on a.o. the performance of PV systems which is to be shared with the various actors in the market.

PV performance data is not readily available. Installers that have performance data at their disposal tend to be reluctant to share this information, due to legal and/or financial issues.

Luckily, private PV owners nowadays are increasingly sharing their monitoring data over the Internet, and these can be analyzed. However, the level of detail and measurement accuracy may prohibit a proper analysis.

Raise awareness

•among the general public on the power of PV •among PV owners on the power of monitoring \rightarrow organization of Dutch Solar Days, May 12-18, 2014 \rightarrow monitoring campaign "Tel de Zon" (Counting the Sun)

Method

Recruit participants

Social media, national television ("Kassa")



Irradiation

Total weekly irradiation: 41.9 kWh/m²

Geographical variation ~30%



Irradiation for the week per 4 digit Postcode



Average performance ratio 0.74 ± 0.10

NO geographical variation

Some 10% of participants indicated some form of shadow; analysis of these systems revealed a performance ratio of 0.70 ± 0.10 .





Instructions to participants: measure PV yield in week May 12-18 (Sunday-Sunday)

Set-up website for participants to enter system data and weekly yield

Set-up data analysis (Python)

Determine performance ratio

Calculate reference yield from system data and irradiation data from nearest meteorologial stations (30 in the country). Plane of array conversion using Olmo model [1].

Weekly yield: $Y_{week} = E_{week}/P_{installed}$ Performance ratio: $PR = Y_{week}/Y_{reference}$

→5000 systems, including



Total weekly yield: 531 MWh

Average weekly yield: $33.4 \text{ kWh/kWp} (\pm 25\%)$ Geographical variation correlates well with variation in irradiation



Based on the year of installation, the performance ratio is slowly increasing over the past 14 years.



systems from two installers

→16.2 MWp (2% of total Dutch capacity of 722 MWp [2])

 \rightarrow average system size 3.5 kWp

 \rightarrow spread over the whole of the country

References

[1] F.J. Olmo, J.Vida. I. Foyo, Y. Castro-Diez, L. Alados-Arboledas, Prediction of global irradiance on inclined surfaces. Energy 24 (1999) 689-704.

[2] CBS Statline, http://statline.cbs.nl/statweb/, last access date 30 June 2014.



Conclusion

• Campaign was huge success: media coverage!

• Most PV systems are performing well

• Quite a few systems suffer from shading

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