



Delft University of Technology

The Dutch PV Portal 2.0

Schepel, Veikko ; Tozzi, Arianna ; Ziar, H.; Isabella, O.; Zeman, M.

Publication date
2018

Citation (APA)
Schepel, V., Tozzi, A., Ziar, H., Isabella, O., & Zeman, M. (2018). *The Dutch PV Portal 2.0*. Poster session presented at EU PVSEC 2018, Brussels, Belgium.

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright
Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy
Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.

*This work is downloaded from Delft University of Technology.
For technical reasons the number of authors shown on this cover page is limited to a maximum of 10.*

The Dutch PV Portal 2.0

V. Schepel, A. Tozzi, H. Ziar, **O. Isabella***, M. Zeman

Photovoltaic Materials and Devices group, Delft University of Technology, the Netherlands (*Contact: o.isabella@tudelft.nl)



Veikko Schepel

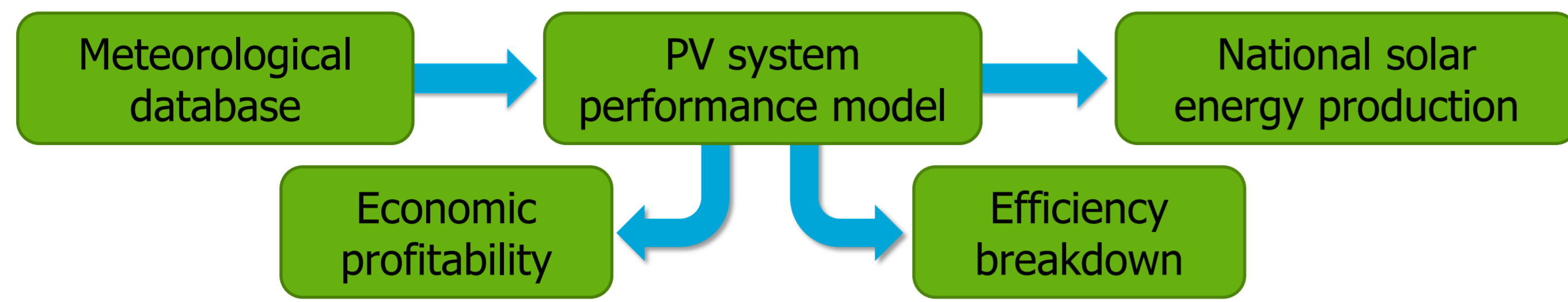


Olindo Isabella



Motivation and objective

- Publicly available, scientifically accurate information on photovoltaic (PV) energy is needed.
- Knowledge of PV research groups can be communicated to the public to this end.
- Websites can be a useful tool for such education.
- Development of a comprehensive, interactive PV website for the Netherlands.**

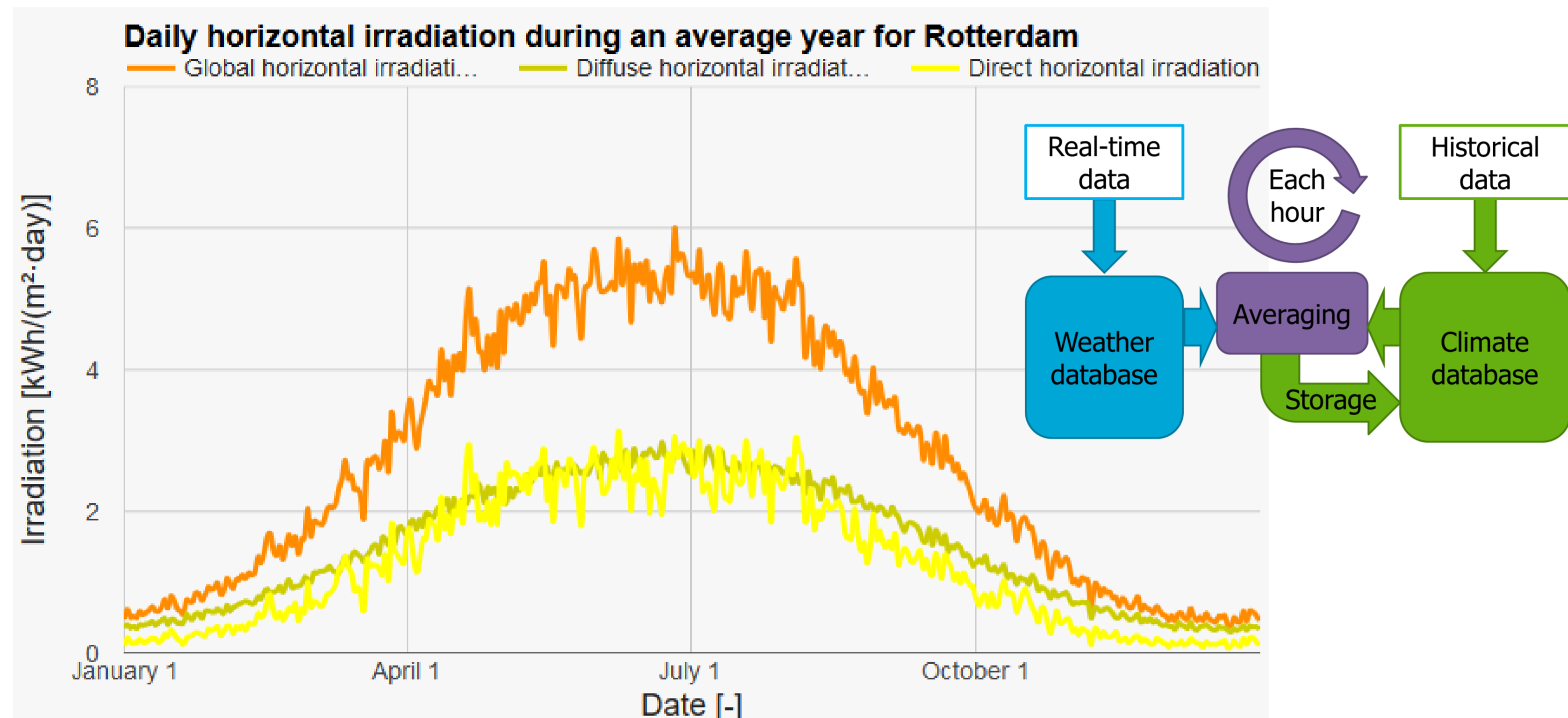


Take-aways

- The Dutch PV Portal (PVP) 2.0 website showcases the potential of photovoltaic energy generation in the Netherlands.
- The website incorporates innovative features
 - Dynamic climate database;
 - Visualization of real-time PV system efficiency losses;
 - Dynamic calculation of soiling losses;
 - Optimal inverter sizing selection;
 - Estimation of the Dutch national solar energy production.
- The website methodology can be applied to create a similar portal for other countries of interest.
- In a future release of the website, all portal components will be improved and expanded upon.

Meteorological database

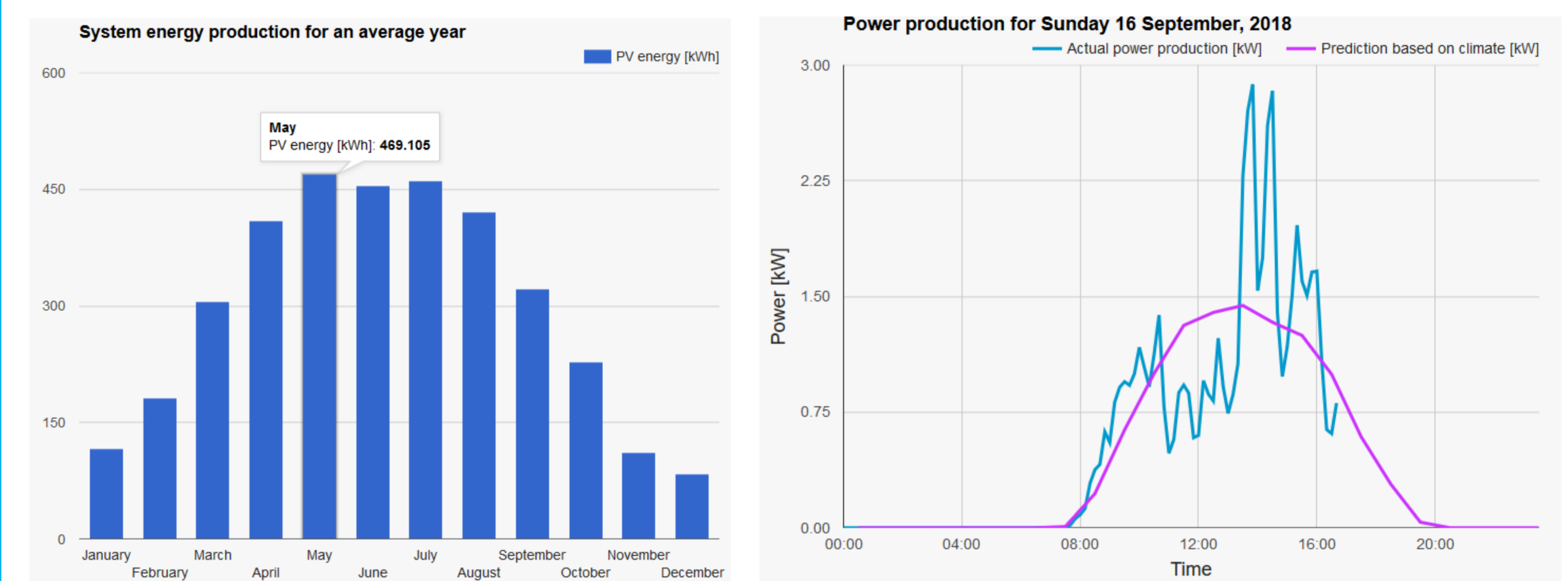
- Every 10 min., meteo data from 46 Dutch weather stations are stored in a database.
- A second database stores climate data for each weather station.
- The climate data are updated dynamically with real-time weather data.
- All data are freely accessible to website visitors.



PV system performance model

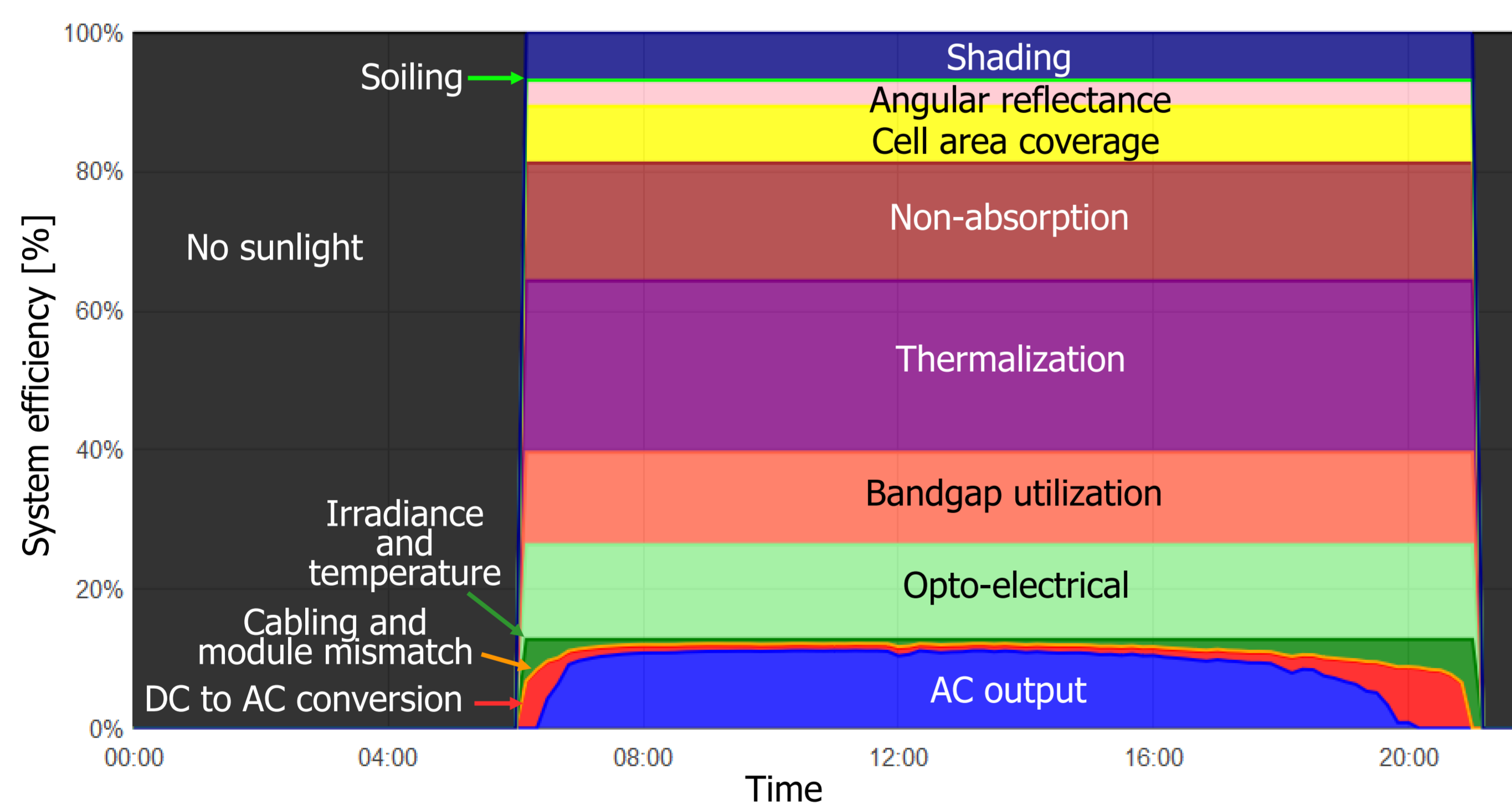
- Website users can design PV systems for any location in the Netherlands.
- System performance calculated with meteorological data in 'chain of efficiencies' model:

$$\eta_{System}(t) = \eta_{PV}(t) \cdot \eta_{MPPT}(t) \cdot \eta_{Other}(t) \cdot \eta_{Inverter}(t)$$
- Two innovative features:
 - Dynamic calculation of soiling losses;
 - Optimal inverter size selection based on system tilt and azimuth.



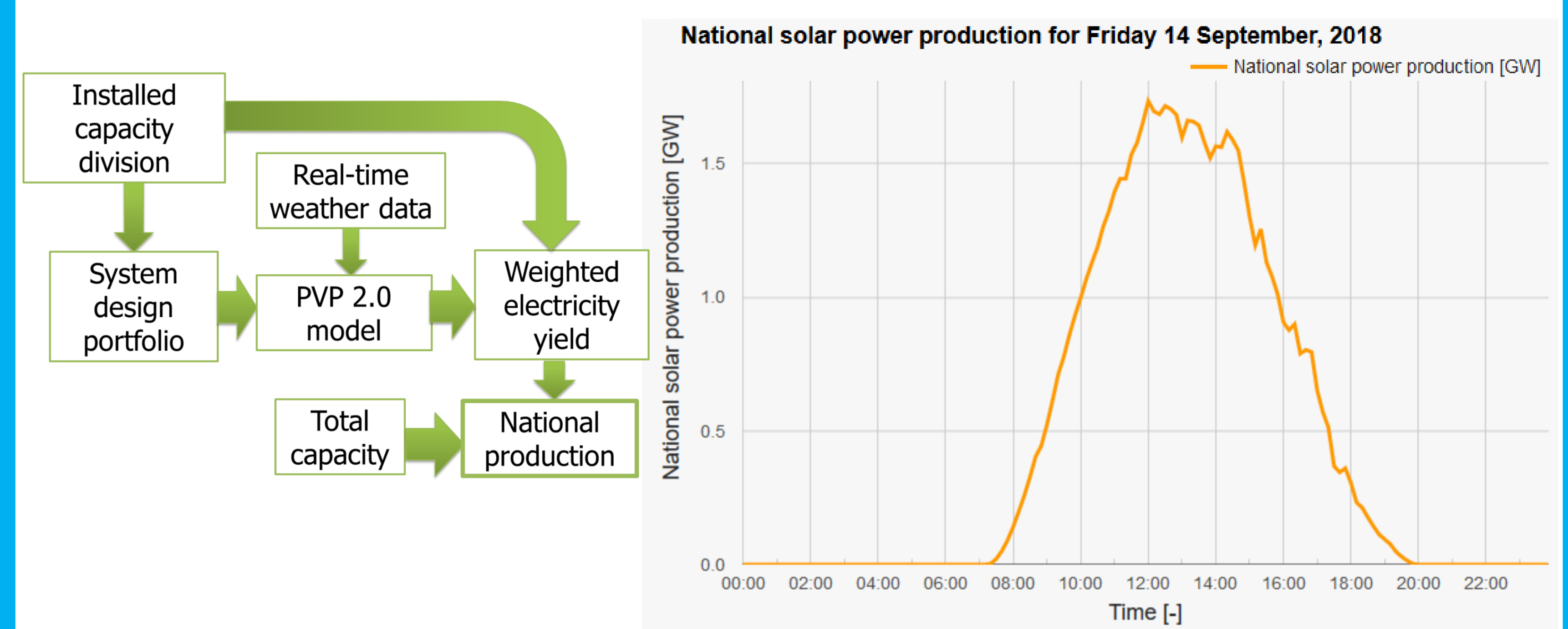
System efficiency breakdown

- Real-time PV system losses are visualized in a chart.



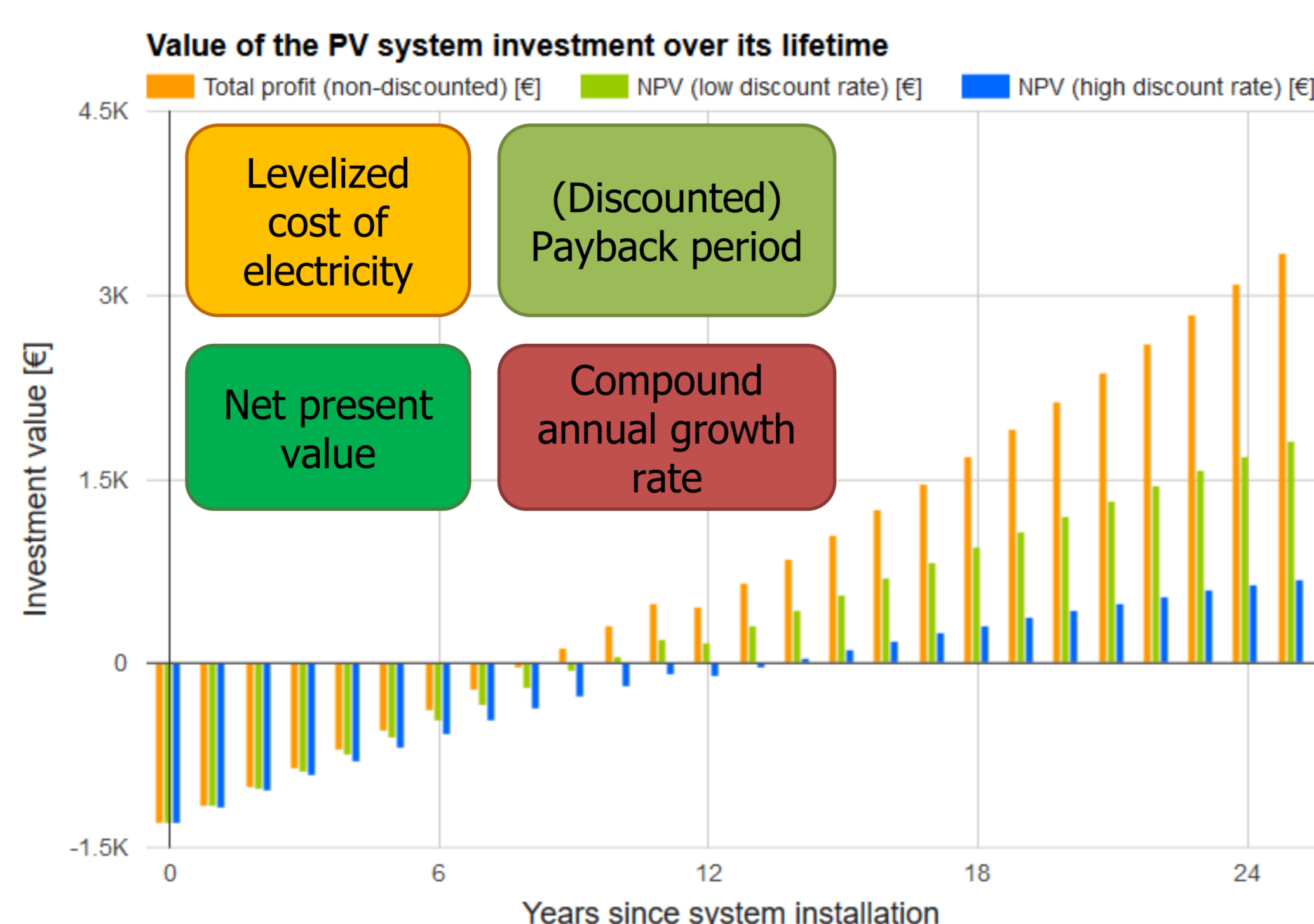
National solar energy production

- Creation of a portfolio of 475 PV systems, representing Dutch installed capacity characteristics.
- Every 10 minutes, the national power production is calculated via this portfolio simulation.



Economic profitability

- Economic profitability of user-designed systems is calculated.
- The model evaluates the profitability under three discount rate scenarios.
- Current Dutch government subsidies support residential and commercial profitability of PV.



Additional features

- A simulated 6.9 MW_p case study tracks since 2014 energy generation and CO₂ emissions avoided.
- PV technologies and systems modelling are explained in the Dutch PV Portal 2.0 model.

