DIGISOLAR

SunPeek

Performance Monitoring for Solar Thermal

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AEE INTEC

Robust, standards backed performance verification and monitoring for operation solar thermal plants

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SunPeek Philosophy

Performance Verification

„Does the solar plant perform as expected?"

Performance Monitoring

„Does performance change over time?"

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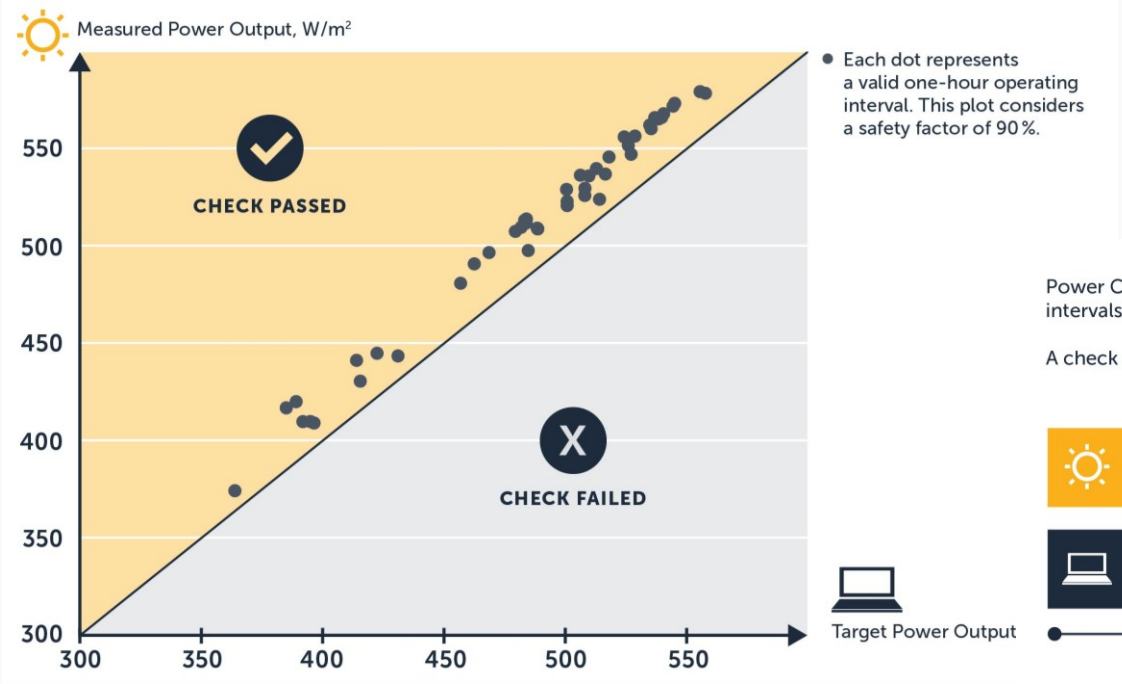
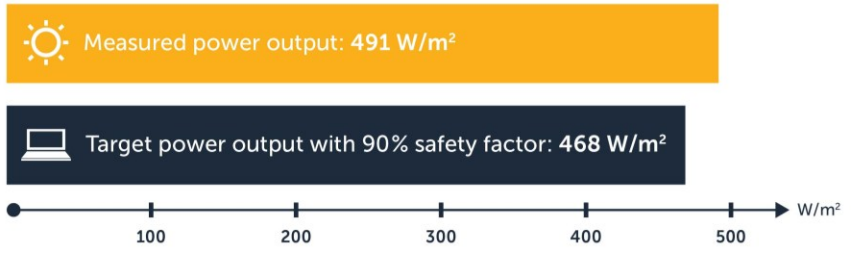
How does it work?



Power Check is fulfilled if measured power output during valid operating intervals is greater than target power output including safety margin.

A check requires at least 20 hours with stable plant operation.



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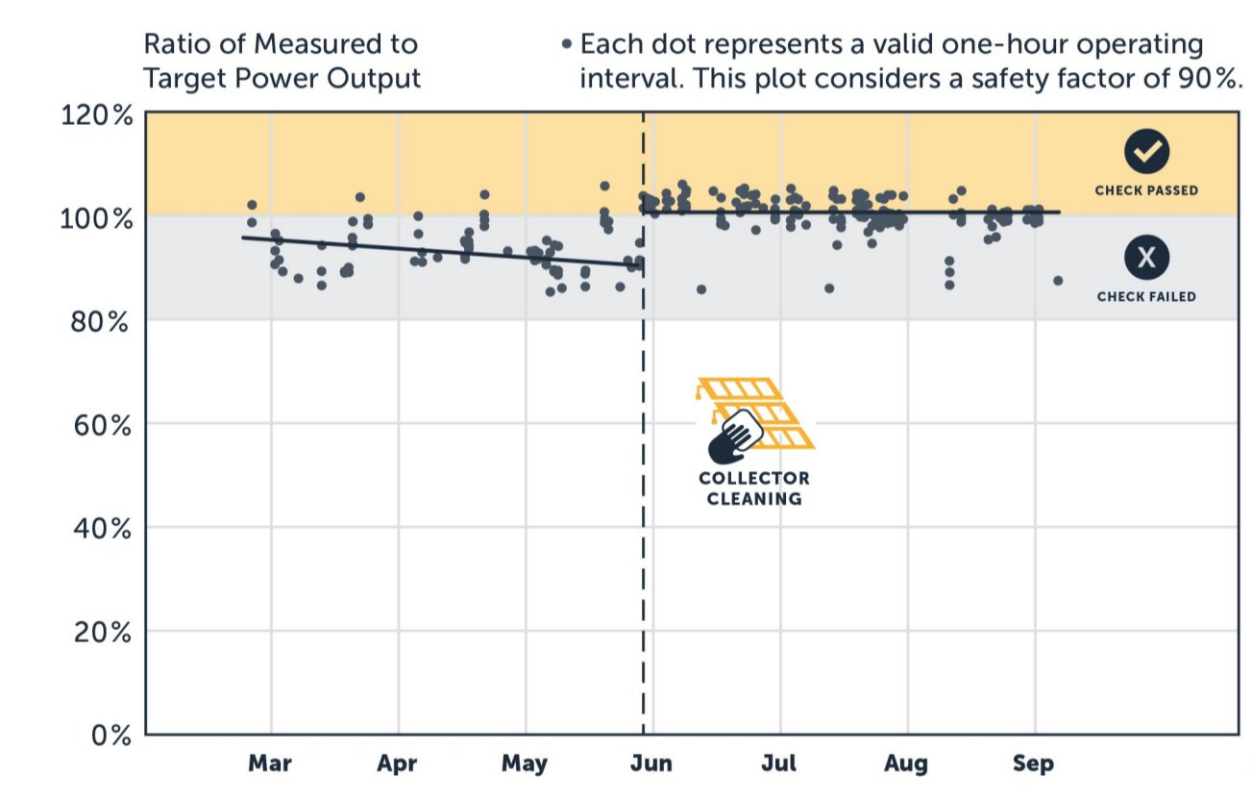
SunPeek for ongoing Monitoring



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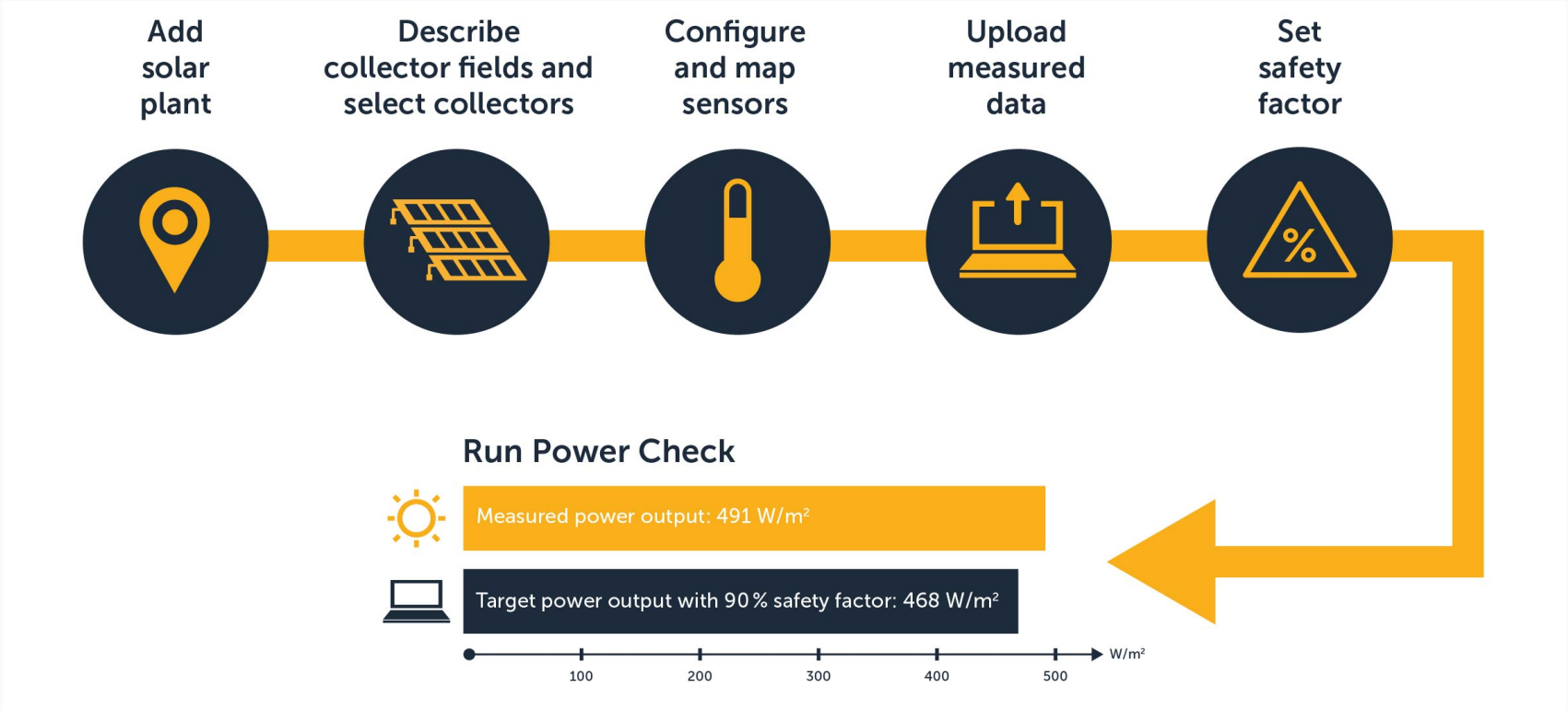
Steps to SunPeek Power Check



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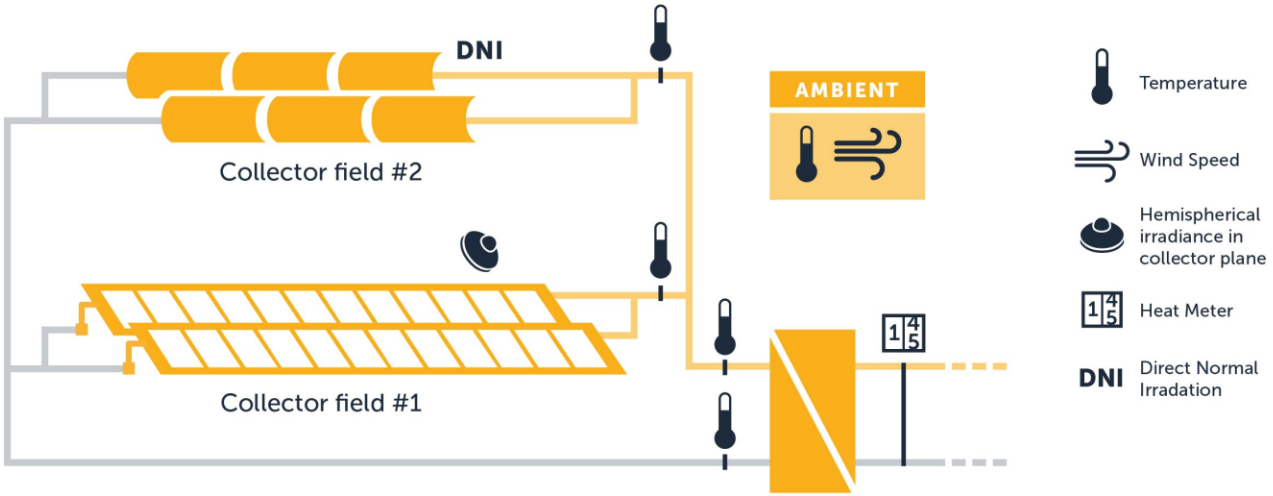
Power Check: Required Data - Case example

Which sensors do you need to run the Power Check?

The required sensors depend on the system hydraulics.
This is one possible measurement setup.



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New Features

New functionality for the DigiSolar Suite, integrated via SunPeek

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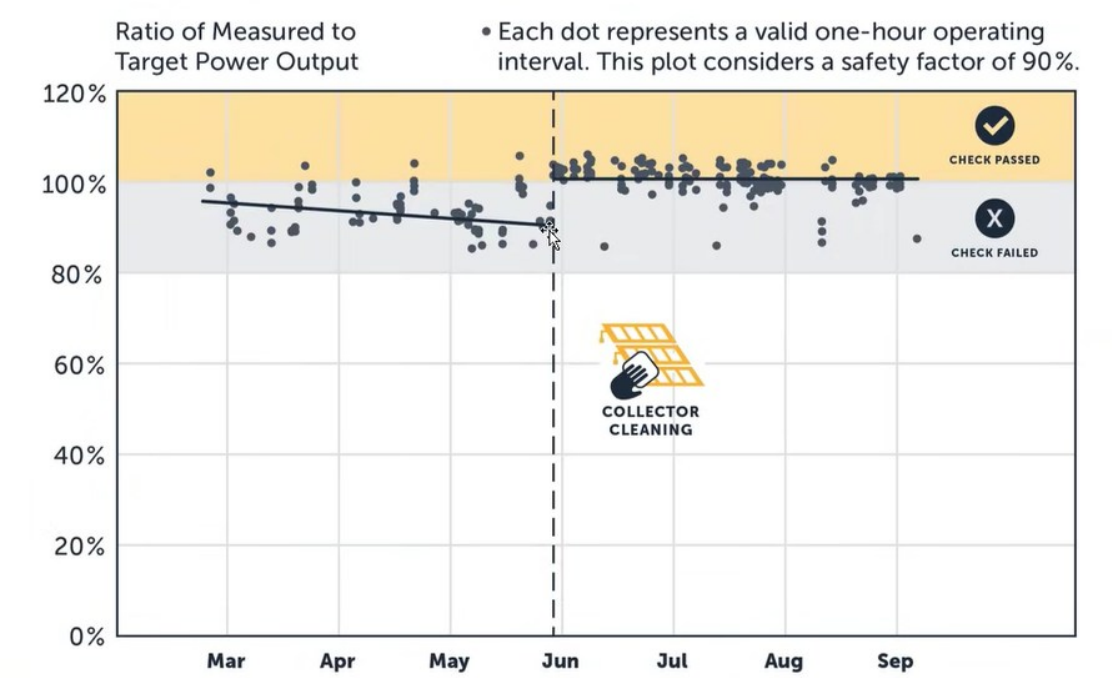
Detection of Performance Anomalies



- Gradual degradation of performance can be hard to spot
- Can be cause by e.g. collector soiling, insulation degradation etc.
- Explicit detection methods will be added during DigiSolar
- Detection of certain short-term anomalies (e.g. tracking drift for tracked collectors) will also be added

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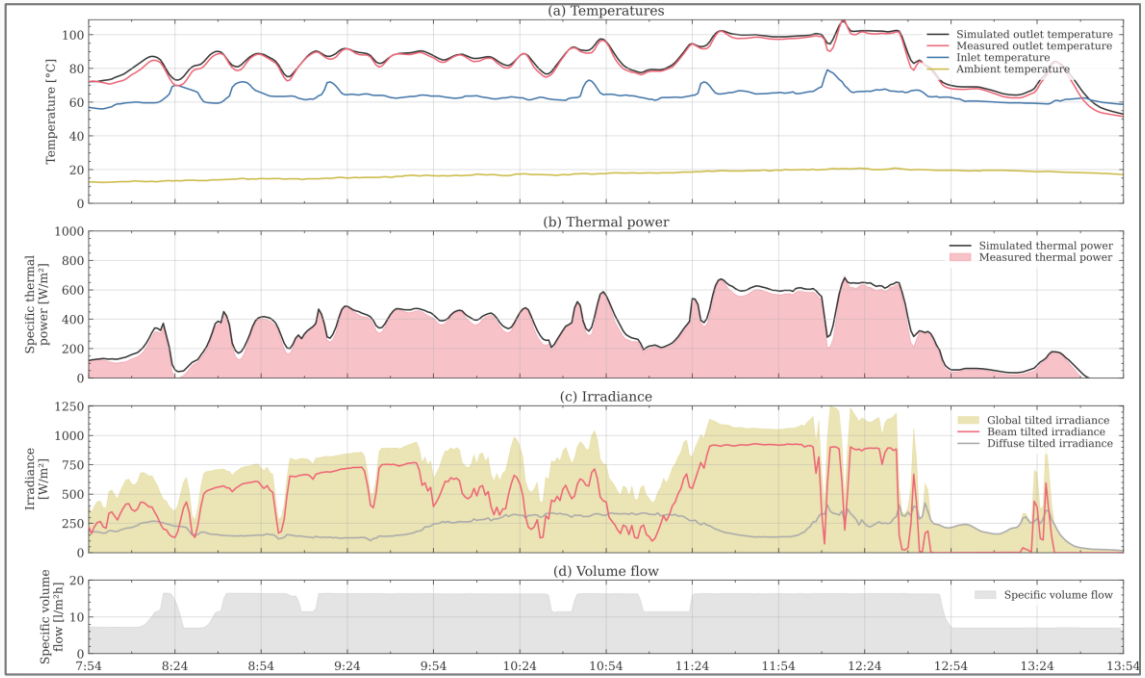
SunPeek: D-CAT Method



- Integration into SunPeek in DigiSolar
- Dynamic model of the collector array
- Can be used in periods where ISO methods find few valid intervals due to stable operation filtering criteria
- Potential to spot performance issues sooner
- Future extension: yield forecasting based on actual condition of array.

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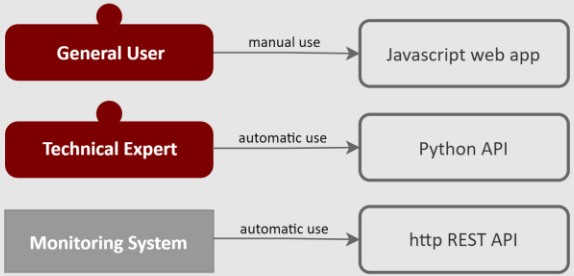
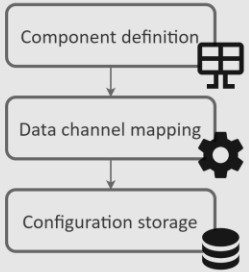
Analysis Process

Triggering SunPeek Data Ingestion and Analysis



Plant Configuration *[manual, one-off]*

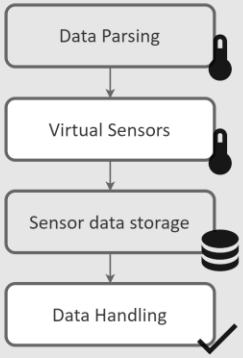


Define location and main components: collectors, collector fields, etc.
Define settings like collector area, tilt and azimuth angles, row spacing.

Map data channel names to components.
Define sensor settings and physical units.

Plant configuration stored in SQL database.

Data Ingestion *[automatic]*



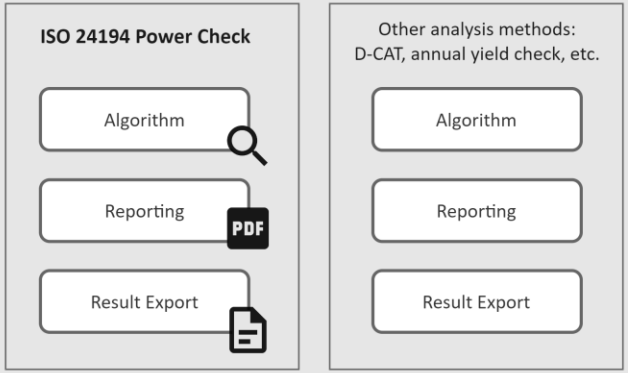
Parse raw input data to time series.
Attach configuration info: Physical units, type of error checks

Calculated time series data.
Allows introducing custom data models.

Time series sensor data stored in Parquet storage.
Includes both measured and virtual sensors.

Run on-the-fly gross error checks on time series data.
Provide quality-checked data as pandas Series.

Data Analysis *[automatic]*



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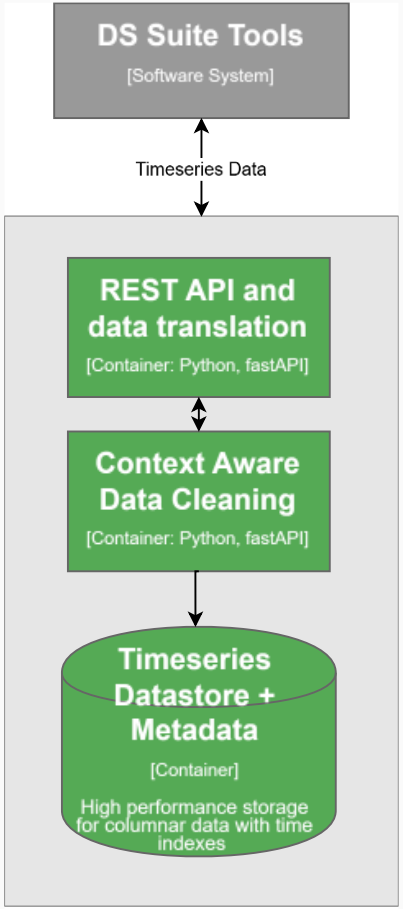
Data Management

- Existing robust context aware data processing and error checking architecture will be moved to new component built in DigiSolar
- All tools in the suite will benefit from this this data handling through central data ingestion and storage component



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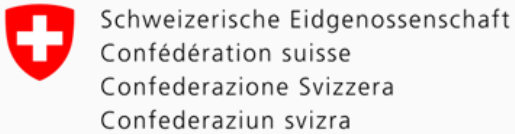

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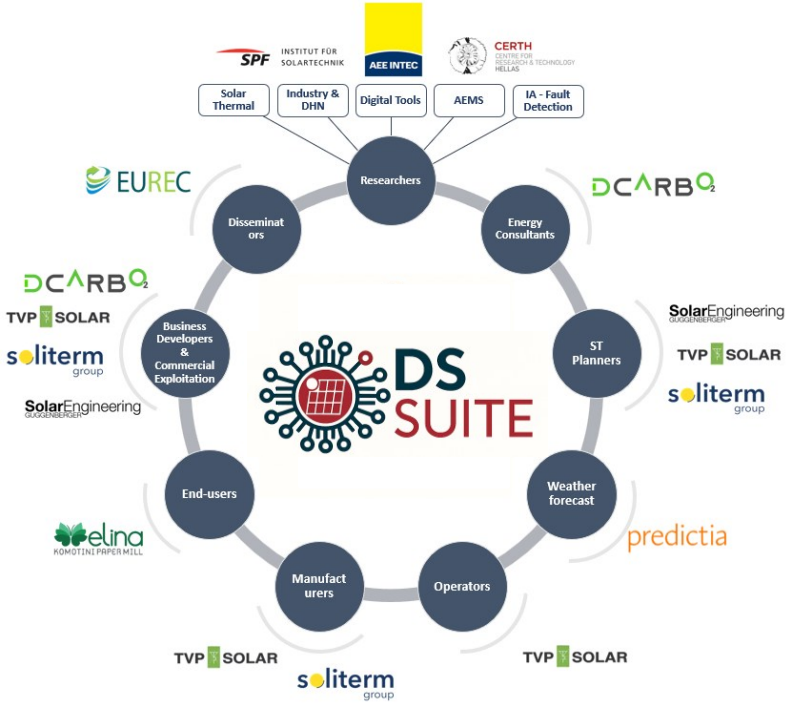
Thank you



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