

Working hand in hand for the benefit of the climate

Why we as a company like to do projects with research institutes

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7th International Conference Energy & Meteorology

Padova, 28 June 2023



Agenda

- What we do
- Our motivation for doing research projects
- Successful projects
- Lessons learned

Our vision



100 %
renewable energies

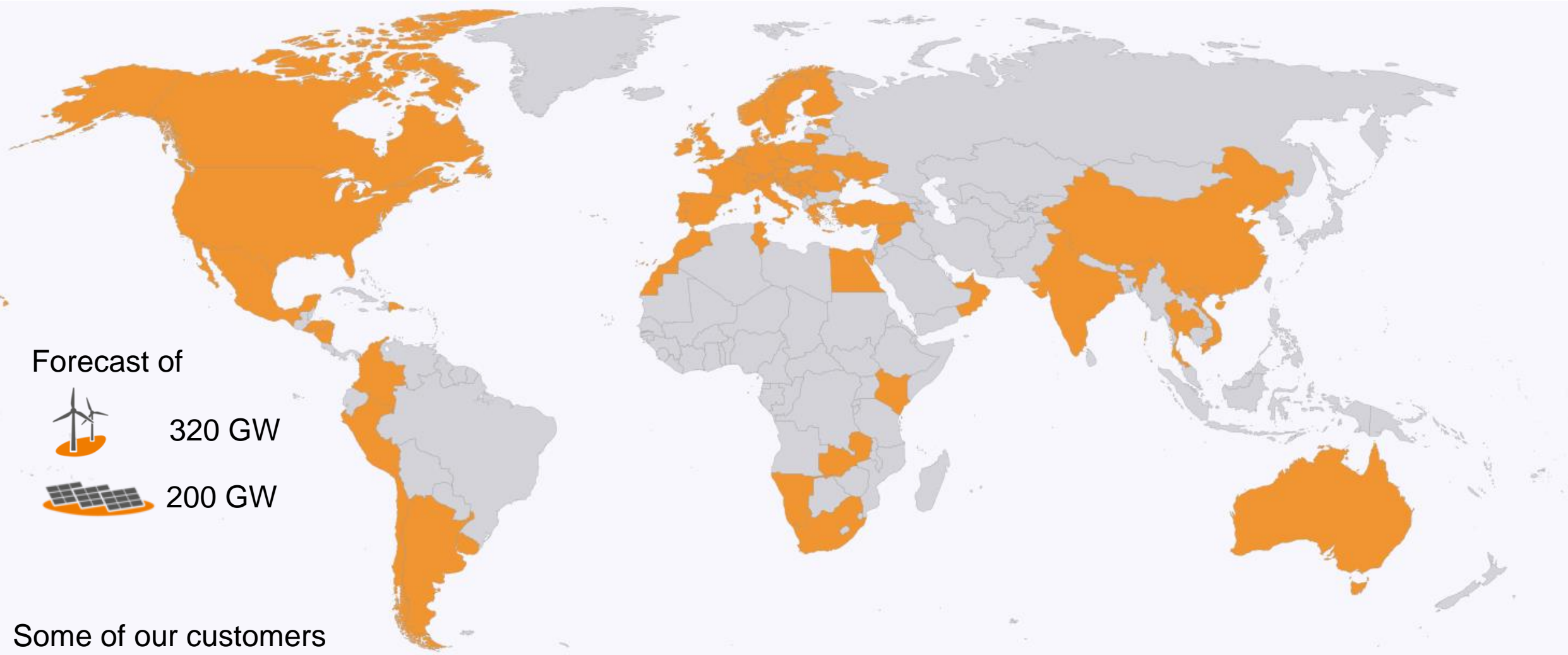
What we do

energy

We provide services for the integration of renewables into electrical grids and energy markets. To make sure that renewables are the solution, not the problem.

- Services:
 - wind and solar power predictions for grid operators, energy traders and plant operators worldwide
- R&D:
 - internal and external projects with partners from research and industry
- Consulting:
 - Capacity building with international partners

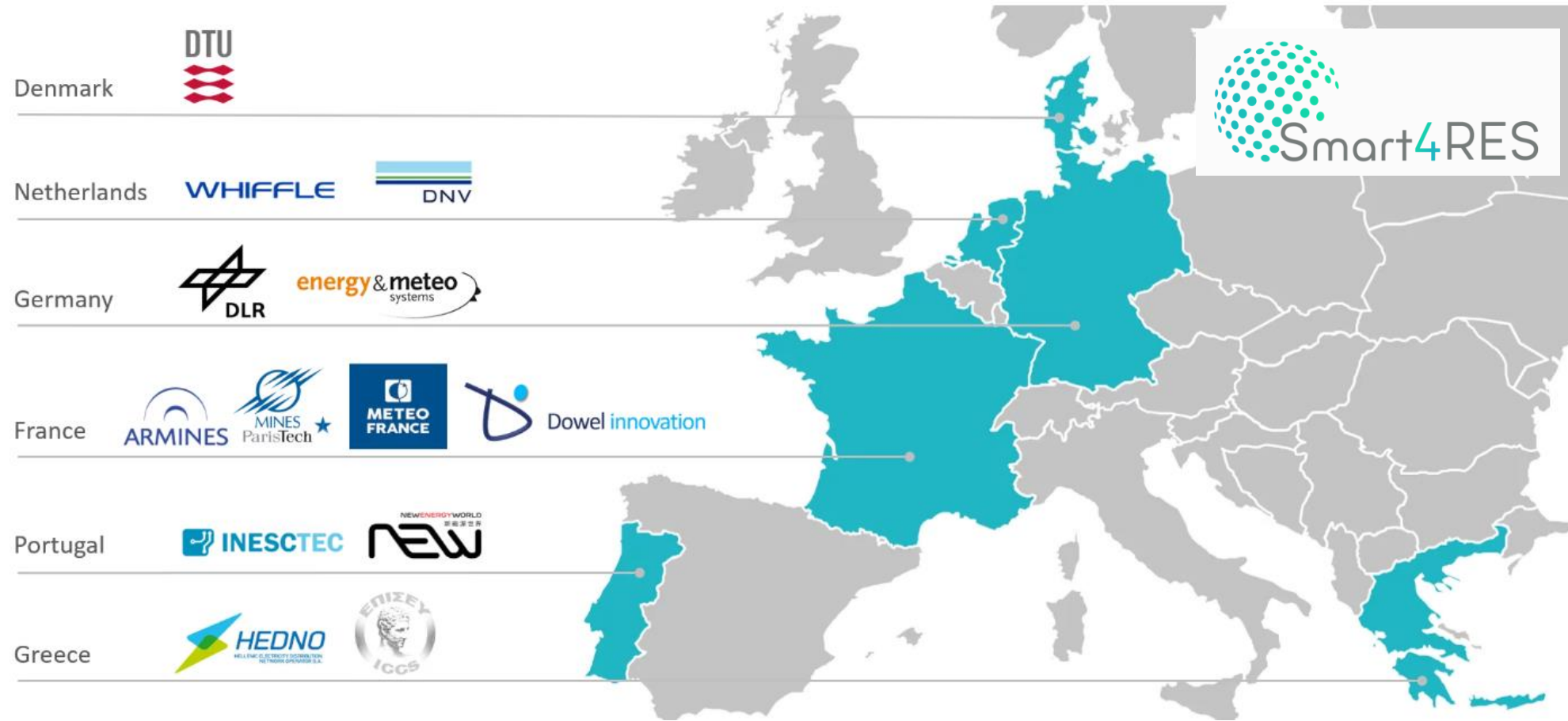
International activities



Motivation for research projects

- We need innovation and new technologies to improve our services
- We have R&D team with scientific background
- Internal projects mainly aim at evolutionary steps forward
- Projects with external partners offer the chance for a big leap forward!
- Reasons
 - Cooperation with dedicated research institutes from energy meteorology
 - Well-defined project plan
 - Extra budget
- Our goal is product development and enhancement, not writing papers!

Successful projects: European R&D project Smart4RES



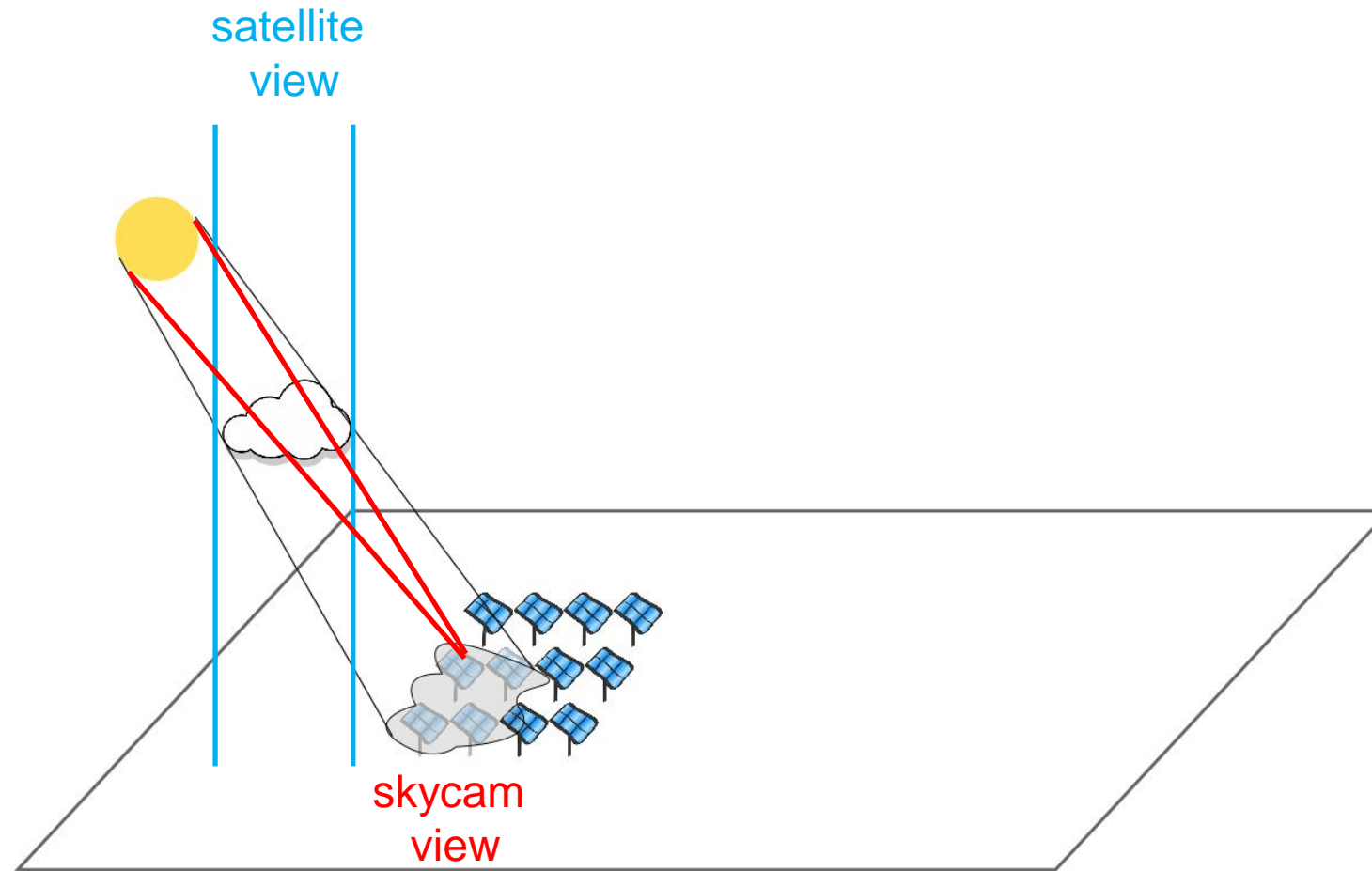
more information: smart4res.eu

Critical situation of solar power forecasting: broken clouds

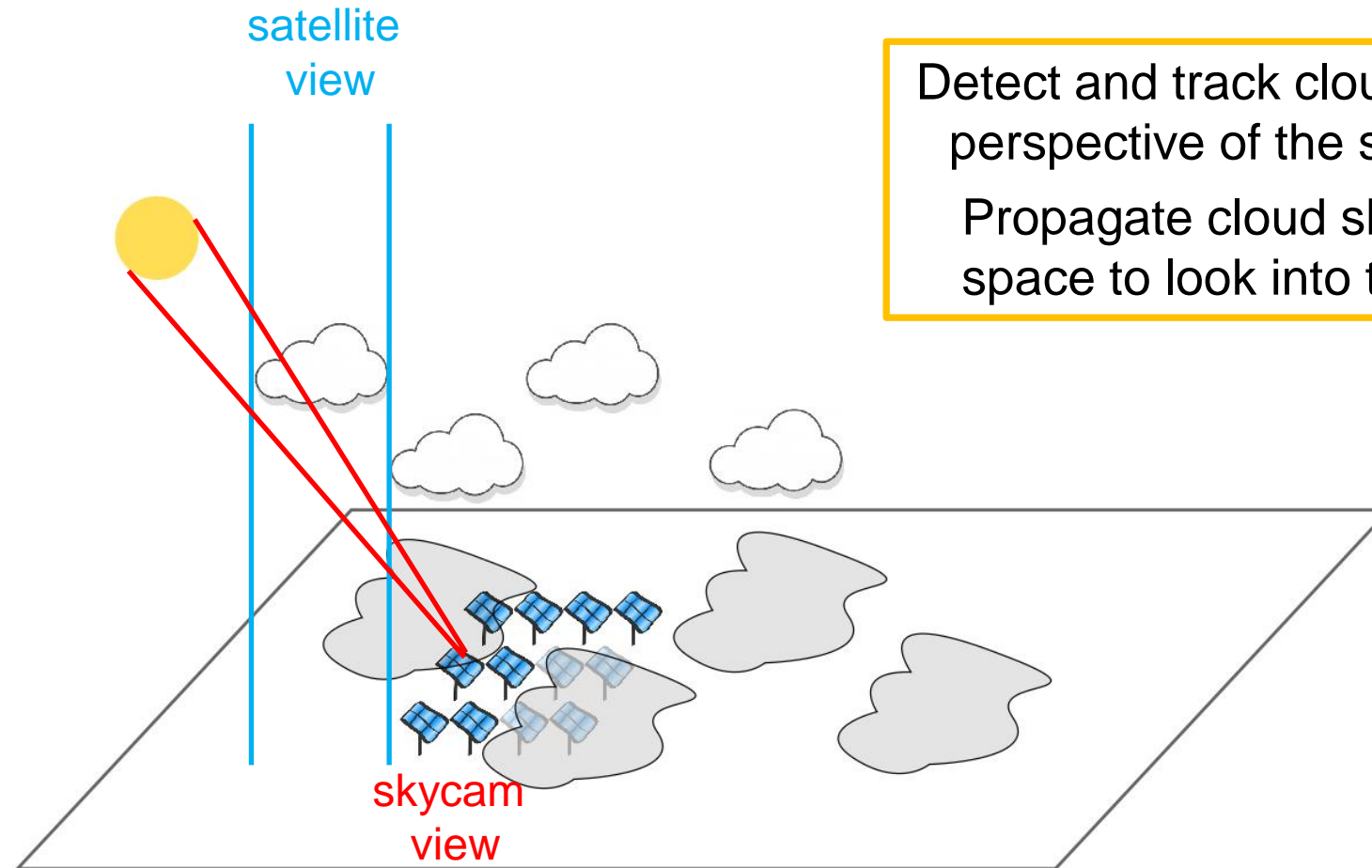


© energy & meteo systems

Nowcasting of irradiation based on SkyCam and satellite data



Nowcasting of irradiation based on SkyCam and satellite data



Detect and track clouds from the perspective of the solar plant.
Propagate cloud shadows in space to look into the future!

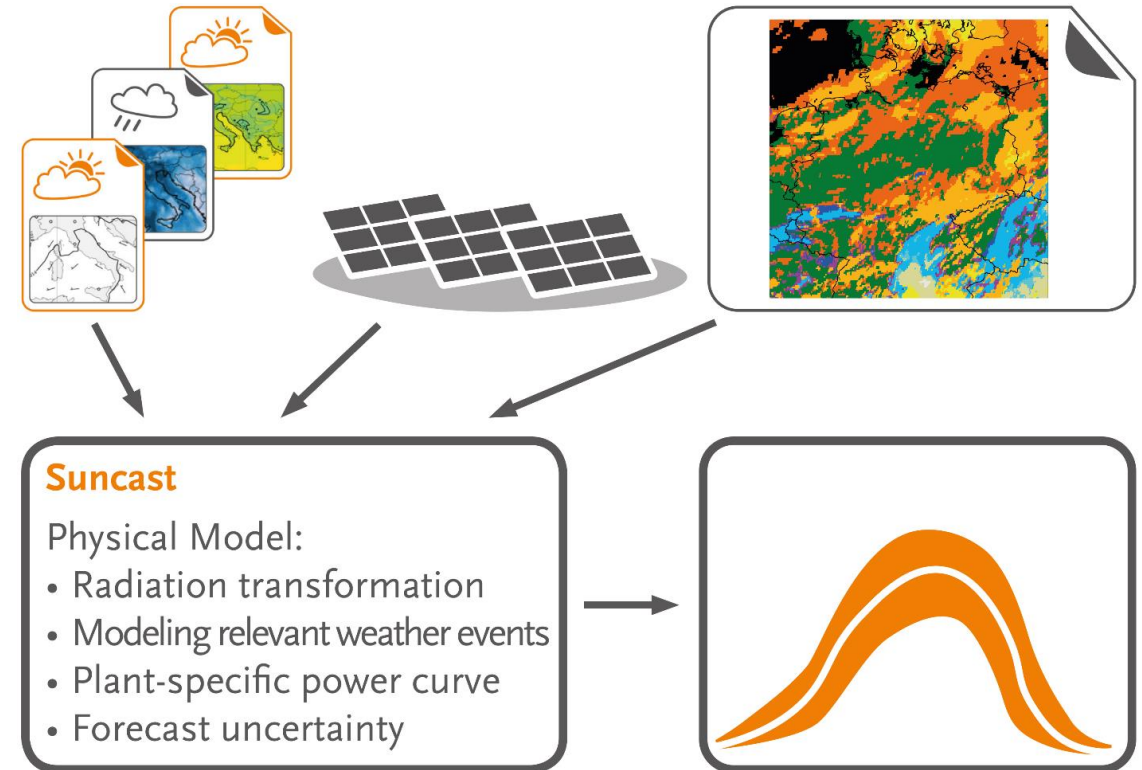
Successful projects: European R&D project Smart4RES

Already used in our solar power prediction:

- Multiple NWP data
- Satellite images
- Real-time power data

Here we investigated the benefit of additional data streams:

- SkyImager network (Eye2Sky)
- Lightning information



Successful projects: European R&D project Smart4RES

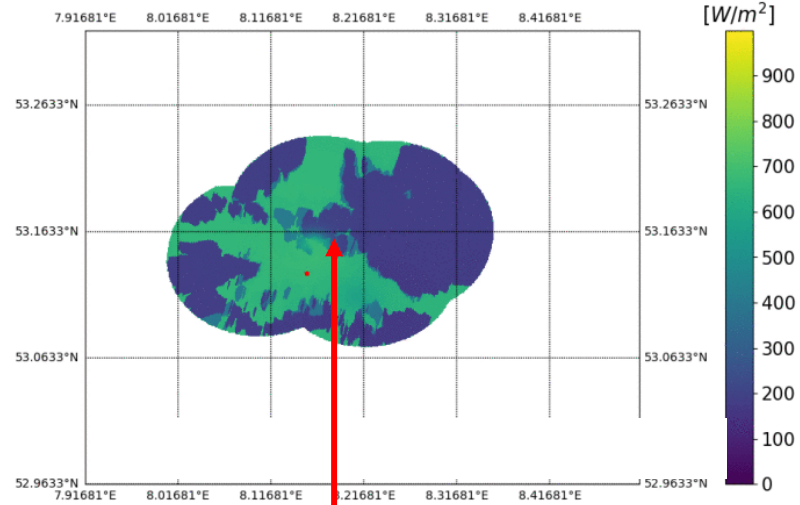
- Idea: Use network of Skycams (Eye2Sky) to improve shortest term prediction of solar power
- irradiance maps (ghi and dni)
- temporal resolution 30s
- 800 x 800 pixel (40 x 40 km)
- reprocessed and provided by DLR



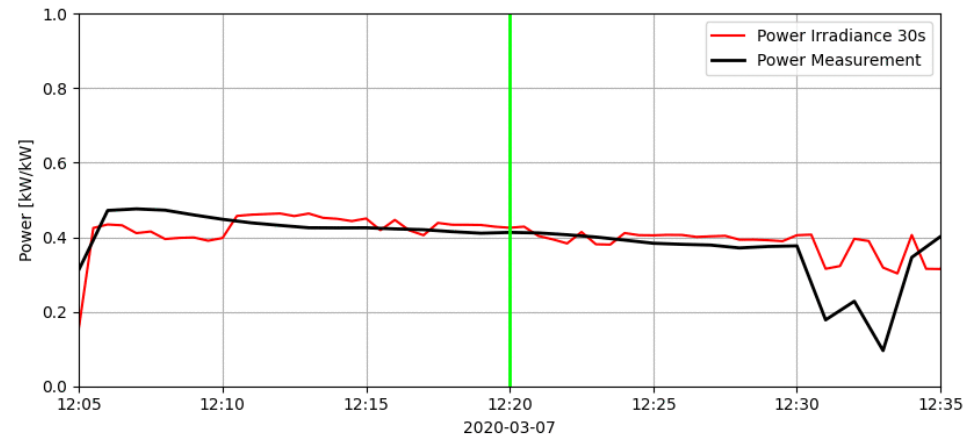
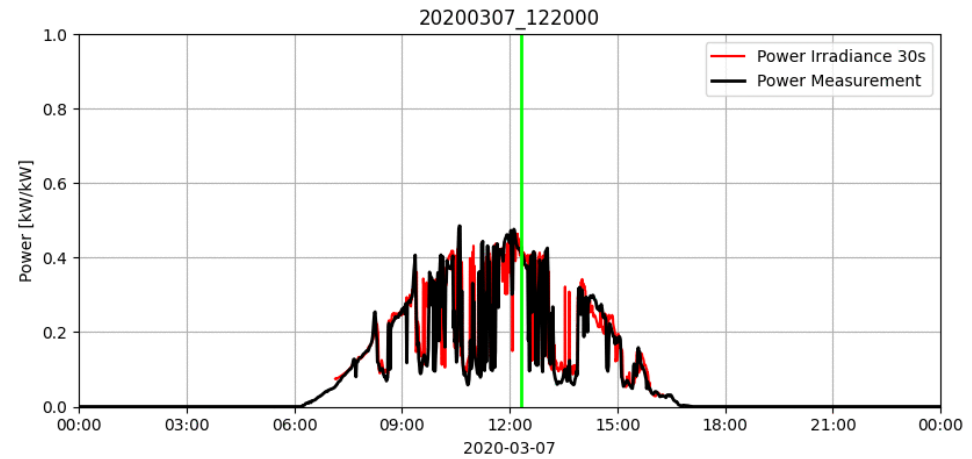
www.dlr.de

Successful projects: European R&D project Smart4RES

Data from SkyCam fit well with measured production

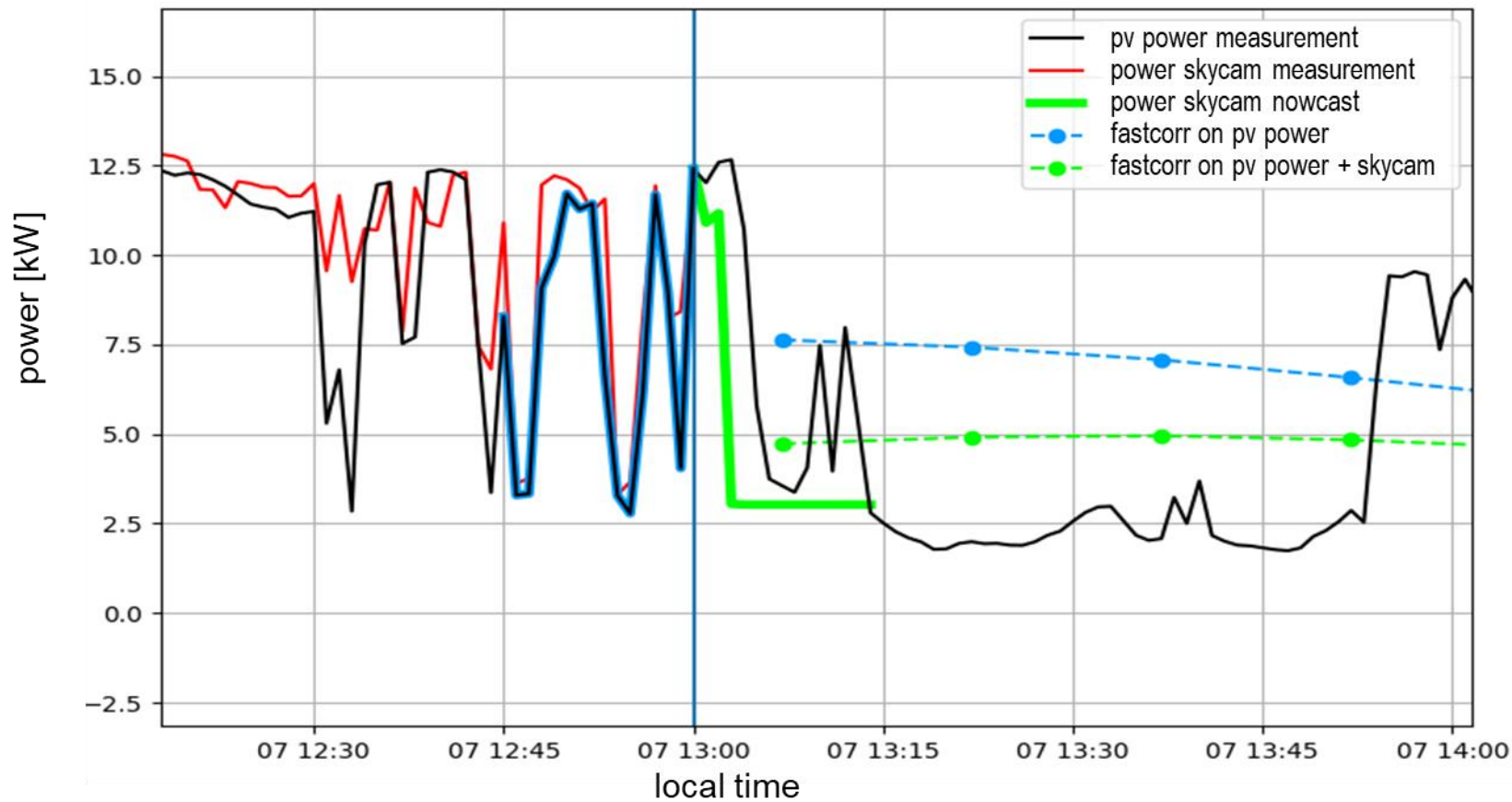


location of PV plant



Successful projects: European R&D project Smart4RES

Integration of SkyCam Nowcast into shortest-term solar prediction



Successful projects: National project WindRamp

- Research project with partners from Germany
- Mission: Enhance offshore wind power forecasts to reduce imbalances for grid operators and energy traders
- Focus on ramp events: hard to forecast, can create massive errors
- Integration of LIDAR and SCADA measurements into shortest-term predictions



Successful projects: National project WindRamp

Idea similar to SkyCam: Horizontal laser (lidar) to take snapshot of incoming wind field

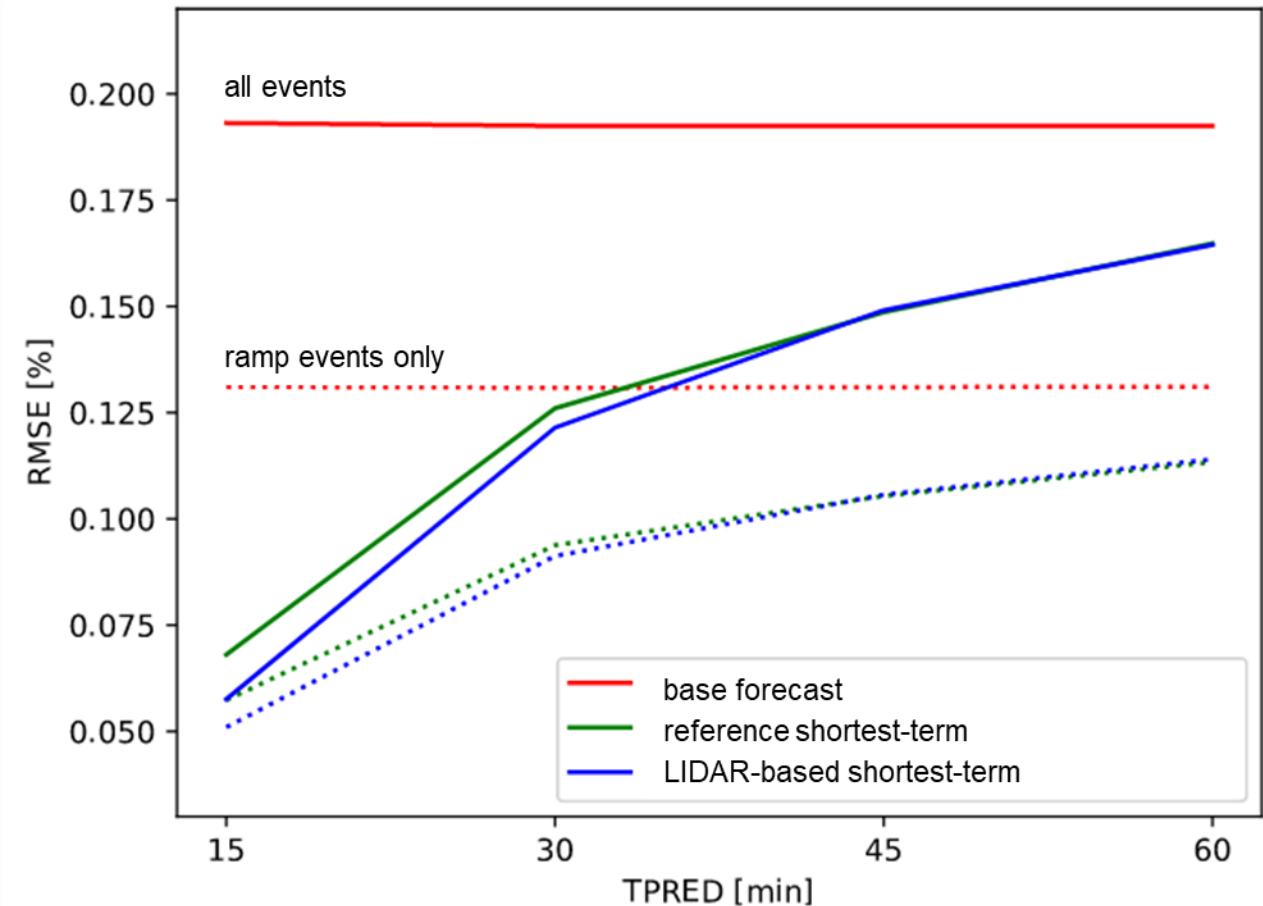


| | 100S | 200S | 400S |
|--------------------------------|---|--------|-------|
| Typical wind measurement range | 3km | 6km | 10km |
| Maximum range | 14.7km | 14.7km | 15km+ |
| Scanner rotation speed | Up to 30°/s | | |
| Accumulation time | From 0.1s to 10s | | |
| Data transfer | Ethernet/LAN | | |
| Data format | Export in NetCDF by graphic interface or to FTP server | | |
| API type | REST web API | | |
| API functionalities | Lidar configuration and monitoring; status/activities/logs monitoring; data download (JSON stream and NetCDF files) | | |
| Weight | 232kg (without options) | | |
| Temperature range | -30°C to +45°C (-22° to 113 F°) | | |
| Power consumption | 500W to 1.600W | | |

Successful projects: National project WindRamp

Results so far:

- LIDAR based wind power forecasts do perform better in the short term, especially for ramp events, even with small laser
- Our prime minister (Chancellor Scholz) knows what a ramp event is ...



Successful projects: National project WindRamp



<https://www.bundeskanzler.de/bk-de/mediathek/mint-grusswort-bundeskanzler-2195978>

Why have these projects been successful?

- Inspiring discussions
- Strong commitment of all partners
- Very good results overall
- Specific progress for us
 - Gain of knowledge
 - Potential improvement of products
- Good organization by coordinator
- Low administrative overhead for us
- Meeting nice people in nice places!
- Involvement of federal government not strictly necessary



Final Conference Smart4RES, Paris 2023

Lessons learned for co-operations with research institutes

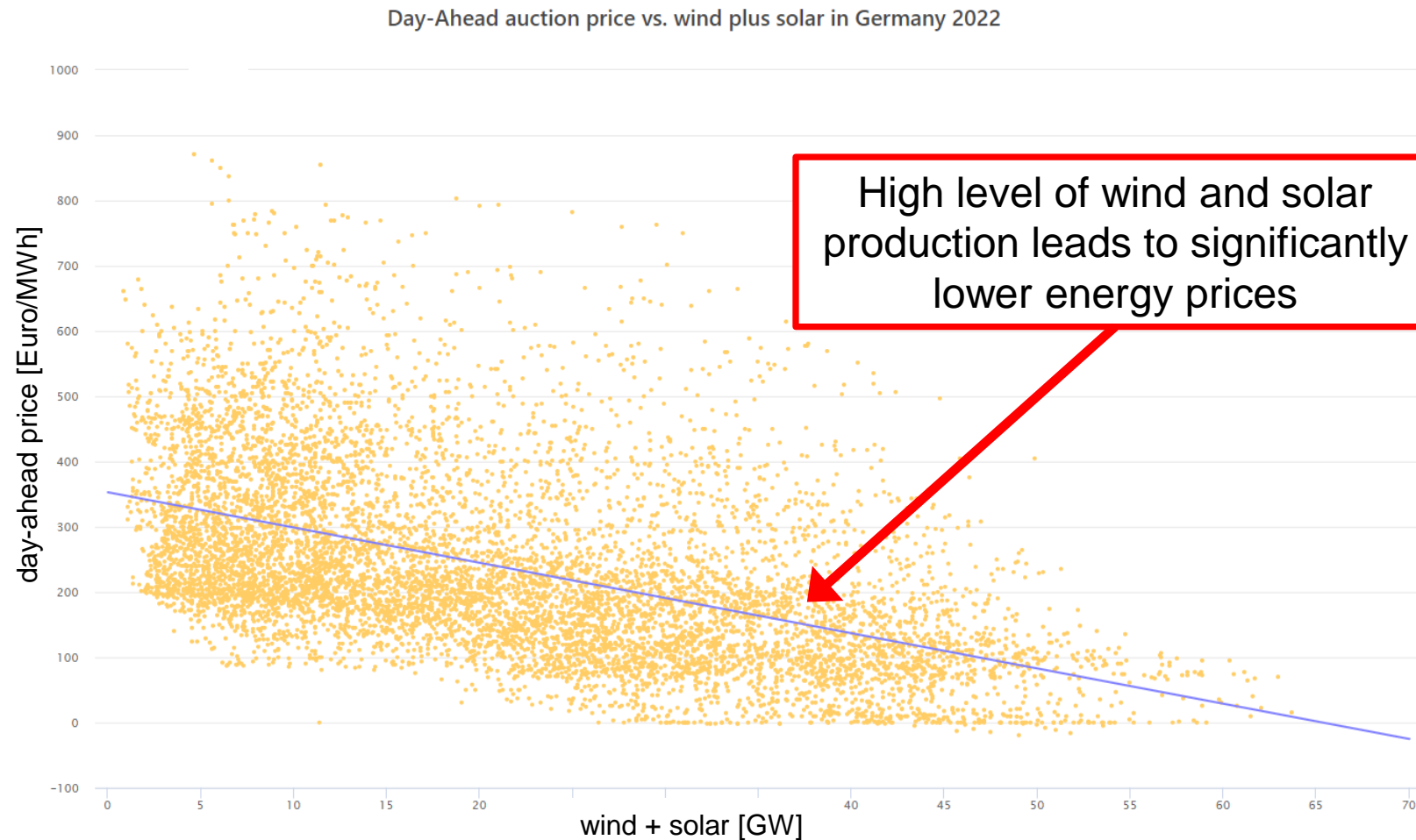
- Very good project idea
- Experienced coordinator
- Equal level of competence and expertise between partners
- Clear separation of tasks in project work
- No conflict of interest in commercially exploitable topics
- Operational perspective and options after project

**Towards climate-resilient energy systems:
The clock is ticking. We need to bring the best
minds and ideas together to achieve this goal.**

Thank you for your attention!

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What a difference renewables make



Energy-Charts.info - last update: 30.12.2022, 20:18 MEZ

source:

Energy-Charts 

energy-charts.info