



How to boost project bankability with more accurate solar resource datasets for Finland

Sigbjørn Grini

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improve
everyday life**

Norconsult is a leading interdisciplinary consulting company combining engineering, architecture and digitalization

**We combine inter-
disciplinary knowledge
with local presence**

Approximately 7 200 employees across more than 140 offices in Norway, Sweden, Denmark, Iceland, Finland and Poland

**Founded
in 1929**

Listed on Oslo Børs 10 November 2023 (ticker NORCO)
Approximately 80% of the employees are shareholders

Strong Brands within Norconsult

Nordic Office of Architecture

Nordic Office of Architecture is one of the leading architectural practices in the Nordics, with 400+ architects and studios in Norway, Denmark and Iceland as well as clients and projects around the world.

Norconsult Digital

Norconsult Digital provides comprehensive digitalisation solutions, including advanced AI competence to stakeholders in real estate and infrastructure, blending 30 years of expertise across industries with advanced technology offerings.

technogarden Part of Norconsult

Technogarden is a consulting and recruitment company that supplies engineers, technical specialists and IT consultants within industry, energy, buildings, telecoms and transport.

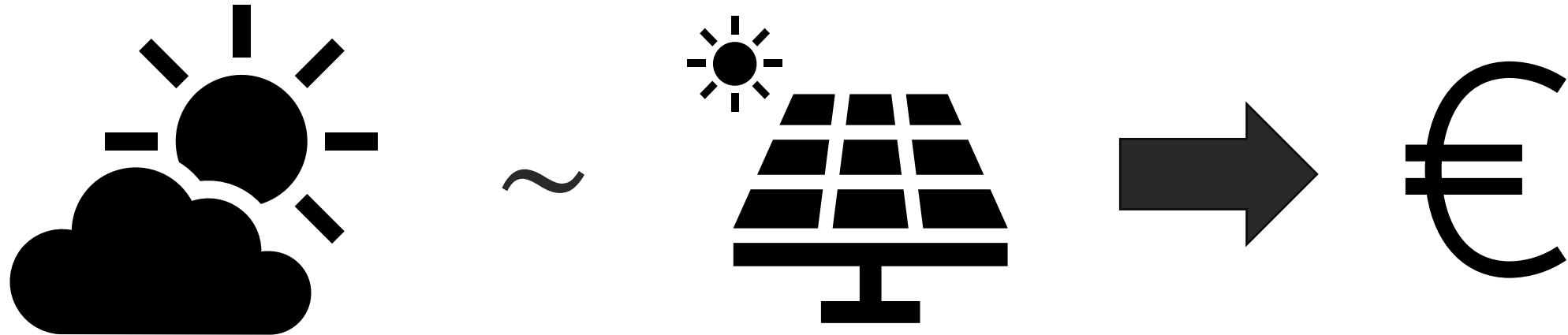
KJELLER VINDTEKNIKK Part of Norconsult

Kjeller Vindteknikk has more than 20 years of experience working with wind energy and is one of the leading consultancy companies in wind power and wind engineering in the Nordics.

Metier

Metier is a renowned consultancy that specialises in project management, business development, digitalisation and educational programs. The company has 250 employees.

Why is solar resource is important?



Introduction to different data sources

Numerical weather models

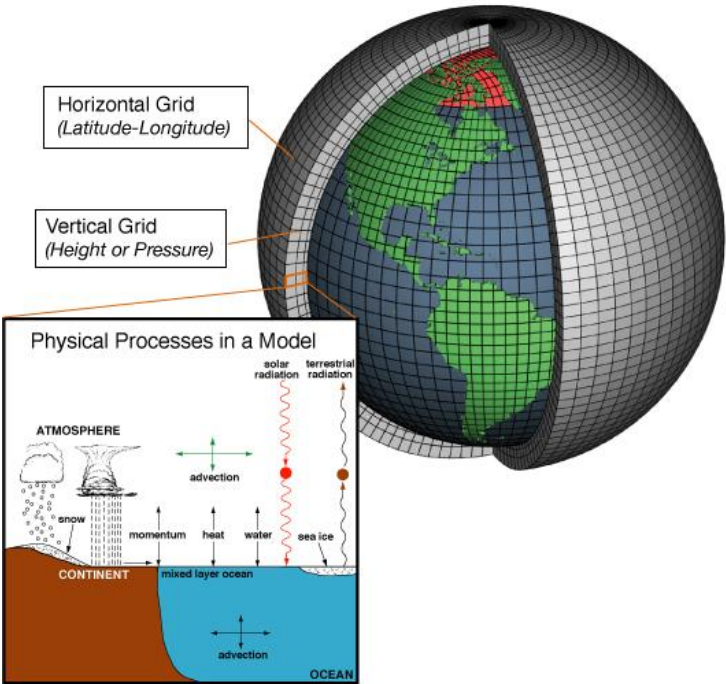


Photo credit: NOAA

Satellite-based



Photo credit: NASA

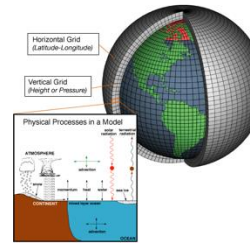
Measurements

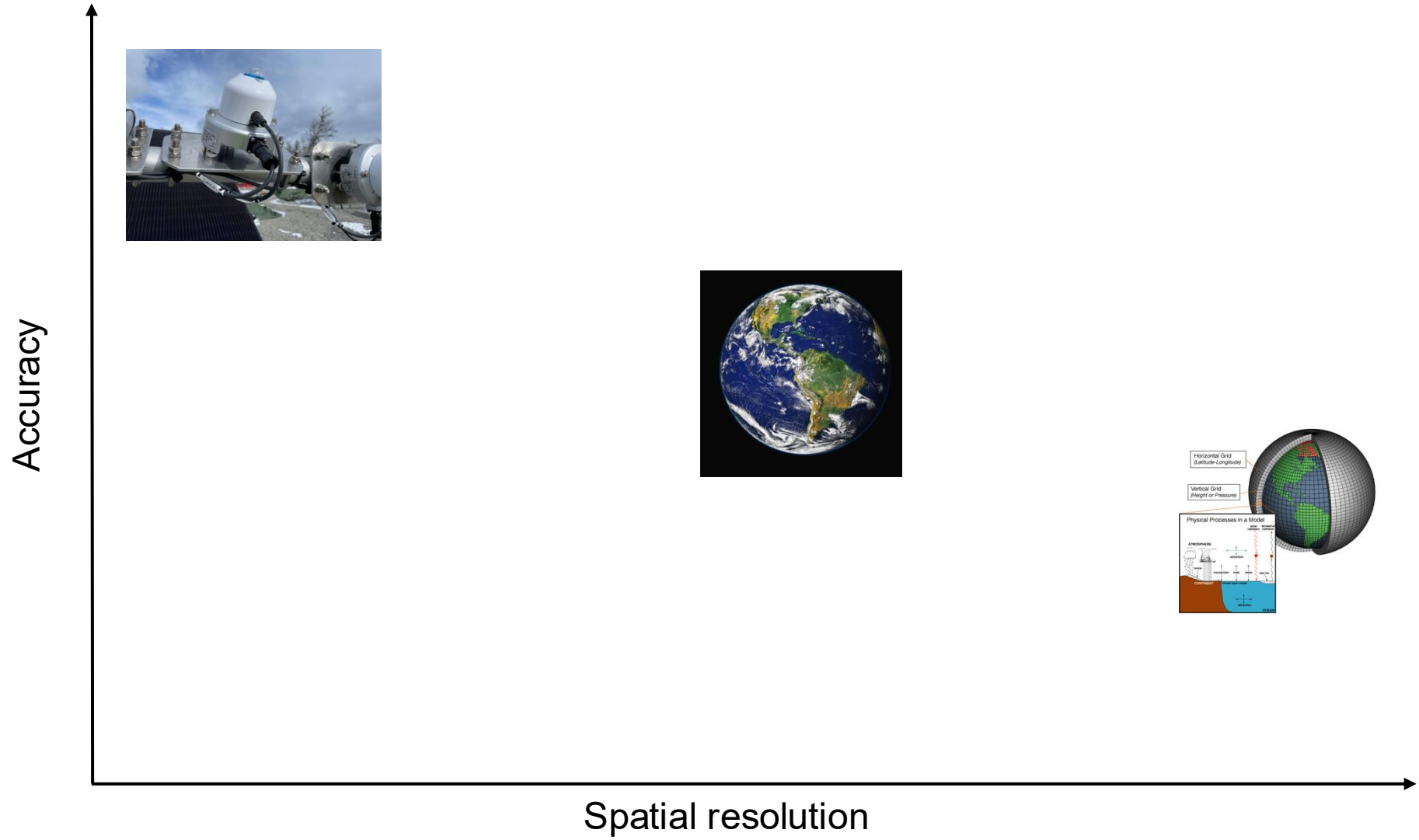


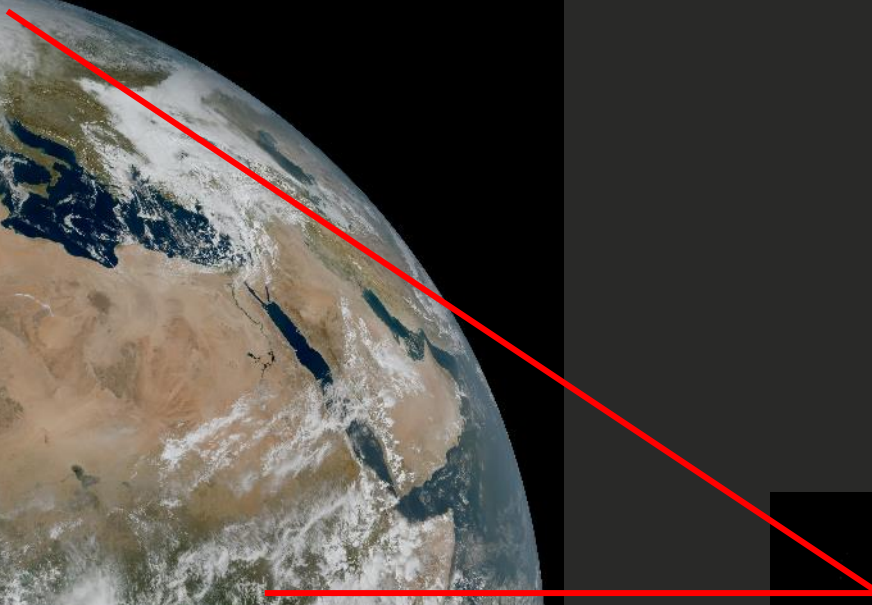
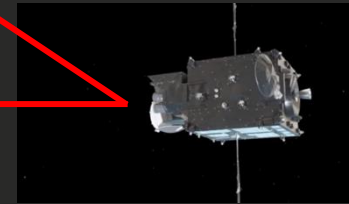
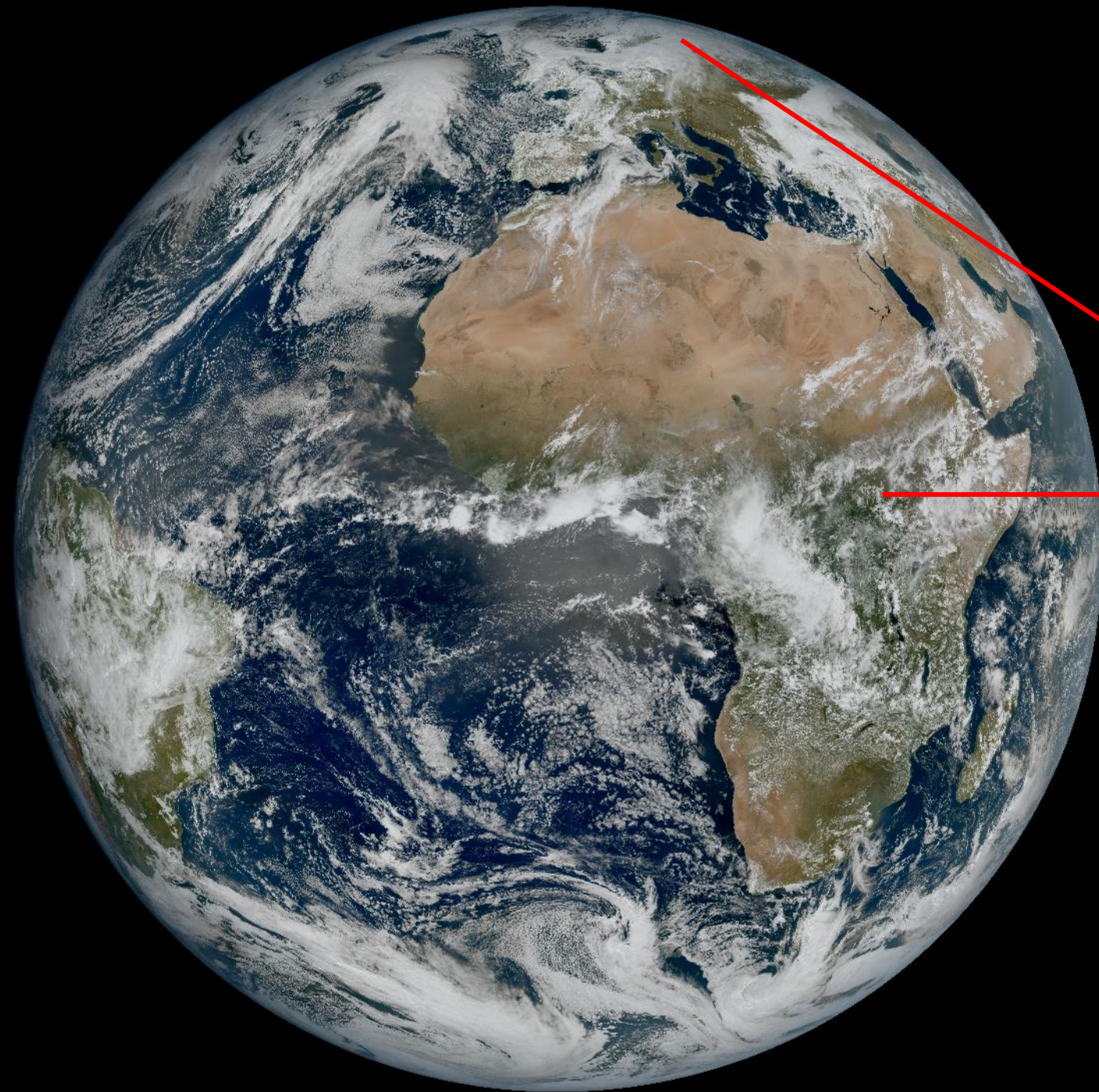
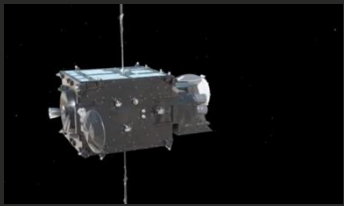
Photo credit: Norconsult

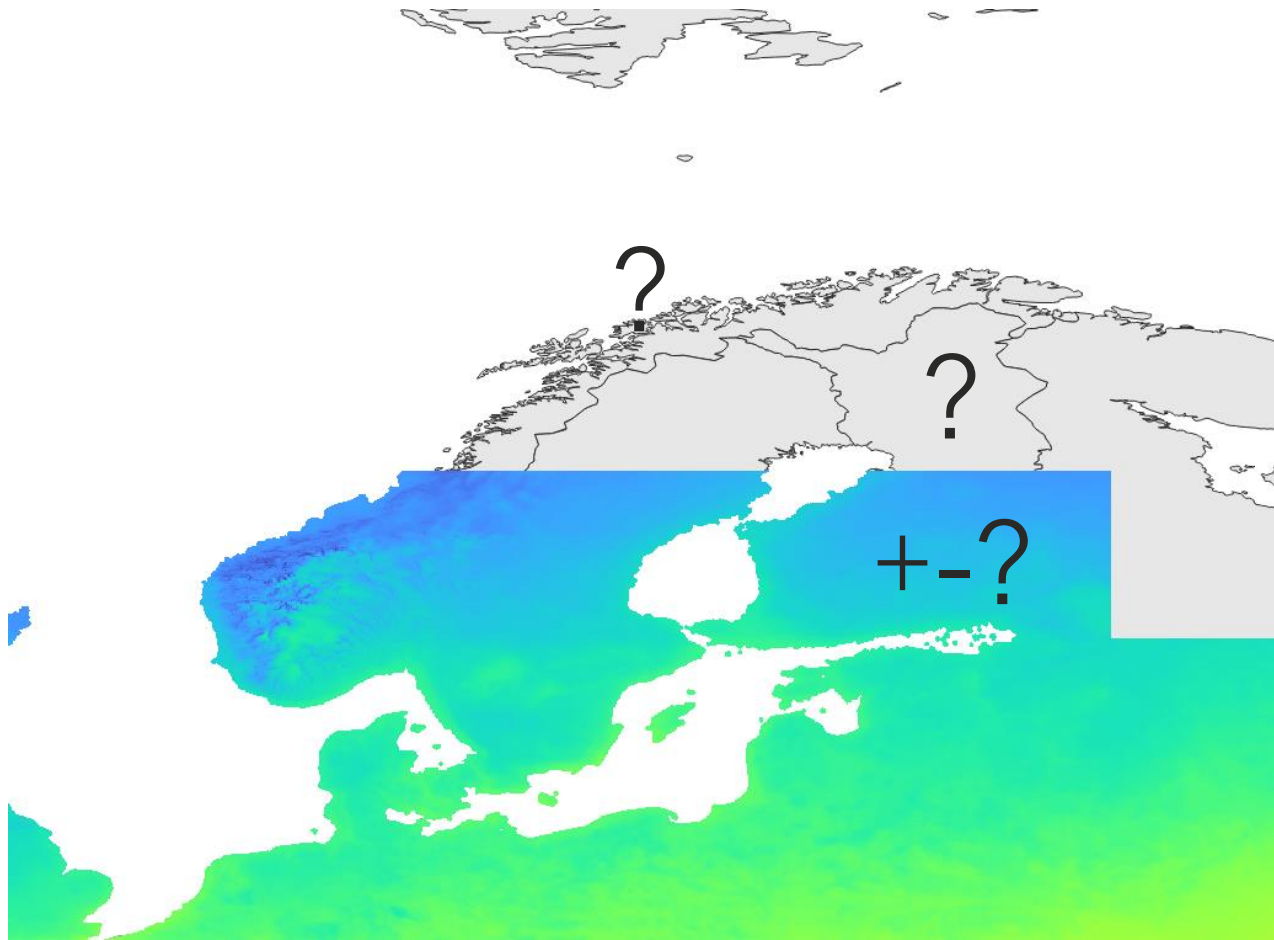
Accuracy

Spatial resolution









Datalayer from: <https://globalsolaratlas.info/>



[Rooftop solar could generate 30 TWh of electricity in Norway – pv magazine International](#)

Rooftop solar could generate 30 TWh of electricity in Norway

A Norwegian research team has published Norway's first full solar map, which calculates that deploying solar cells on top of existing roofs could generate up to 20% of the country's current electricity needs.

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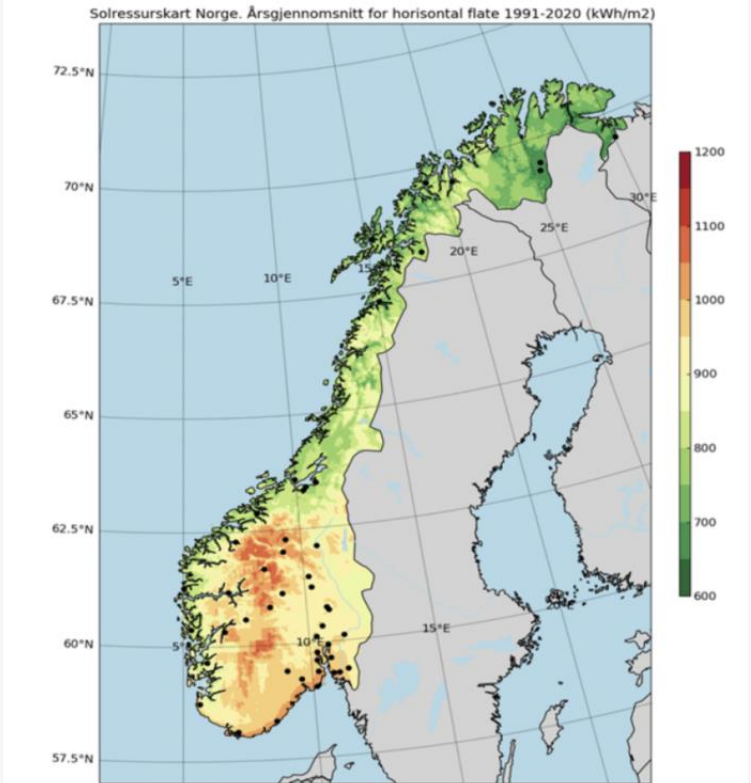
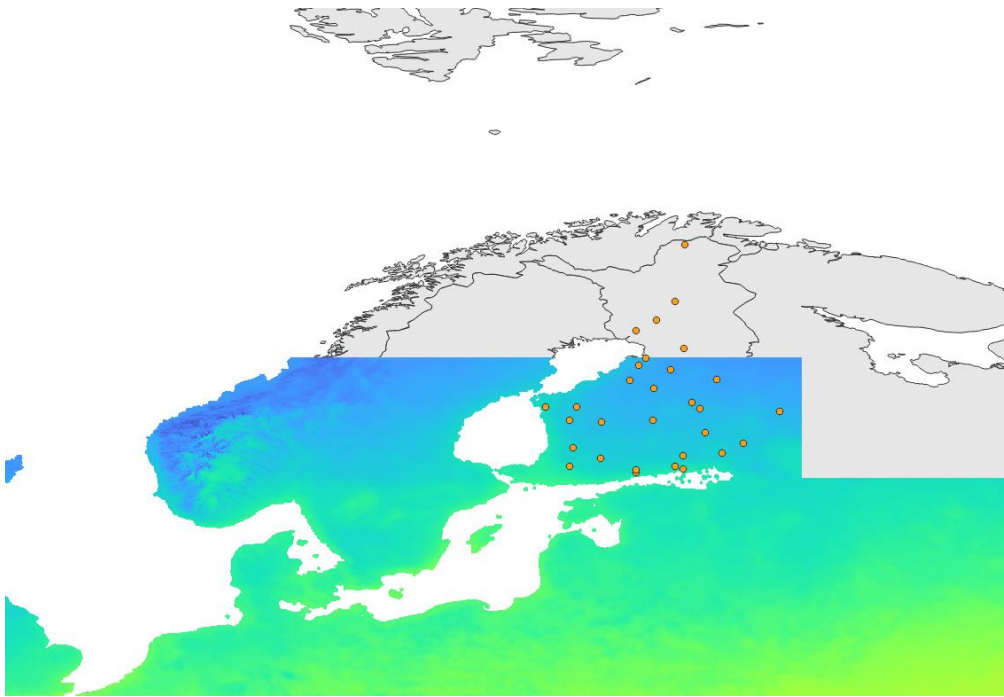


Image: Norwegian Meteorological Institute

Data sources for making a Finnish version

▶ 30 FMI stations

▶ 4 KVT-measured stations

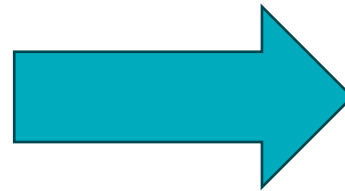
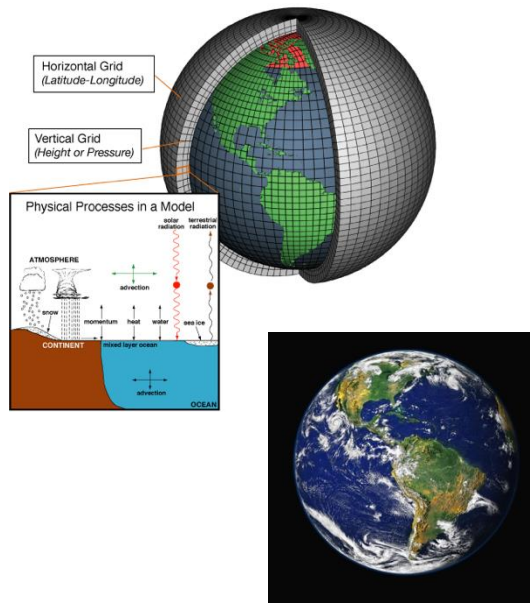


Datalayer from: <https://globalsolaratlas.info/>



Etusivu - Ilmatieteen laitos





Rooftop solar could generate 30 TWh of electricity in Norway

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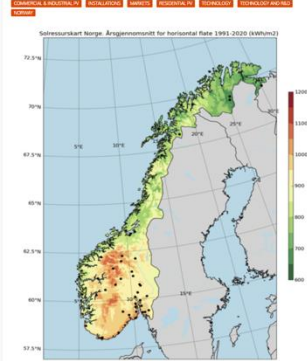


Image: Norwegian Meteorological Institute



Solar resource assessment

Results from model training

Model 1 – South of 65 degrees

Model 2 – North of 65 degrees

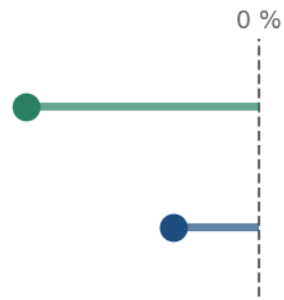


● Before

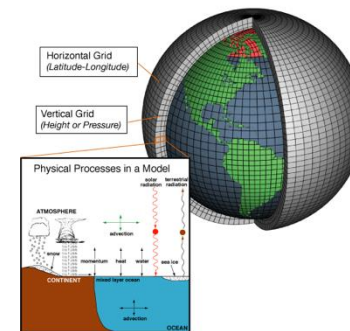
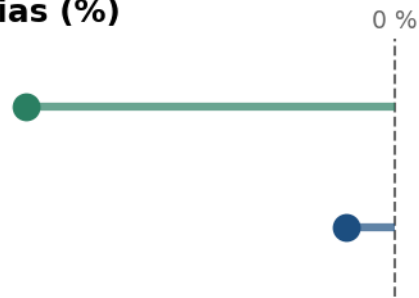
● After

Latitude < 65 degrees

Bias (%)



Bias (%)

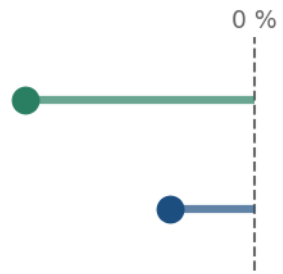


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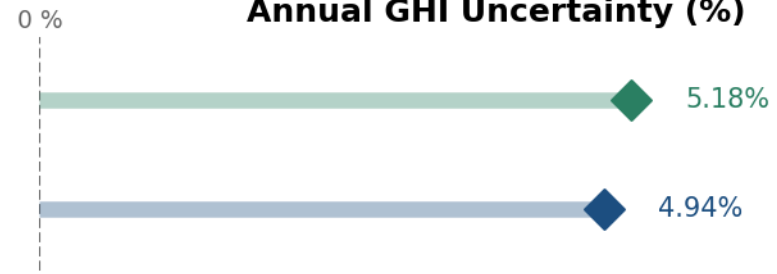
● After

Latitude < 65 degrees

Bias (%)

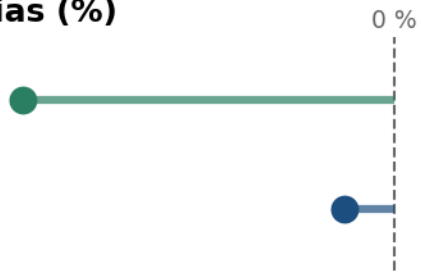


Annual GHI Uncertainty (%)

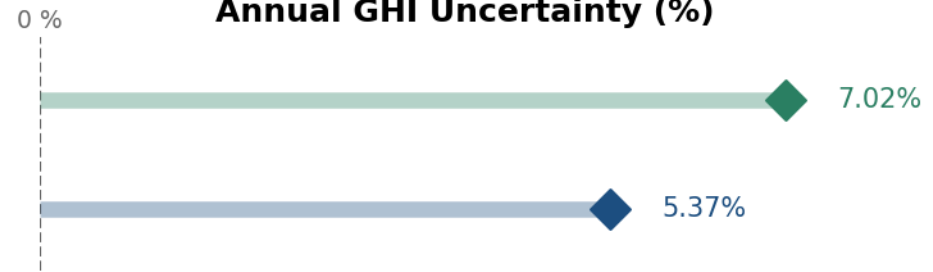


Latitude > 65 degrees

Bias (%)

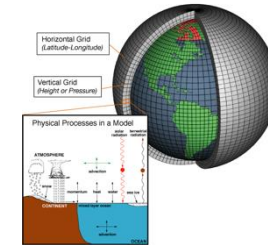


Annual GHI Uncertainty (%)



Conclusions

- ▶ Solar resource is proportional to production
- ▶ Up to 65 degrees north (Oulu)
 - ▶ Satellite-based
- ▶ Further north
 - ▶ NWP based
- ▶ Data from measurements indicate a negative bias for most locations in Finland
- ▶ Kjeller data specifically tailored to Finnish sites
 - ▶ Reduces bias and uncertainty
- ▶ Lowest uncertainty
 - ▶ Measurement campaigns





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