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PV installation at Økern Nursing home

Dr. Igor Sartori

Senior Researcher

SINTEF Byggforsk

Contact: igor.sartori@sintef.no



Deep renovation of building

- ❑ Energy demand before: ca. **360 kWh/m²y**
- ❑ Energy demand after renovation: **120 kWh/m²y** (low energy class I, NS 3701)
 - ❖ 66 district heating, 54 electricity
- ❑ Building Integrated PhotoVoltaic (BIPV) system, **on flat roof**
 - ❖ Energy generated: **10 kWh/m²y** , normalized per sqm floor area
 - ❖ 8% of energy demand; 15% of primary energy (EU conversion factors prEN 15603)
 - ❖ Capacity installed: 130 kW_p (kW peak)



Photovoltaic Solar Electricity Potential in European Countries

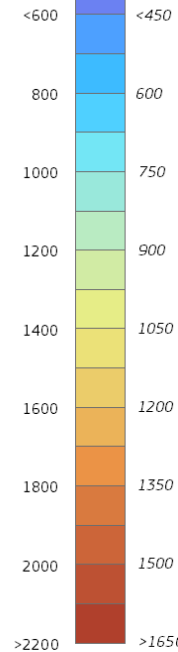


Oslo

Global irradiation
horizontal
ca. 850 kWh/kW_p

Global irradiation
optimal tilt (~40°)
ca. 1 000 kWh/kW_p

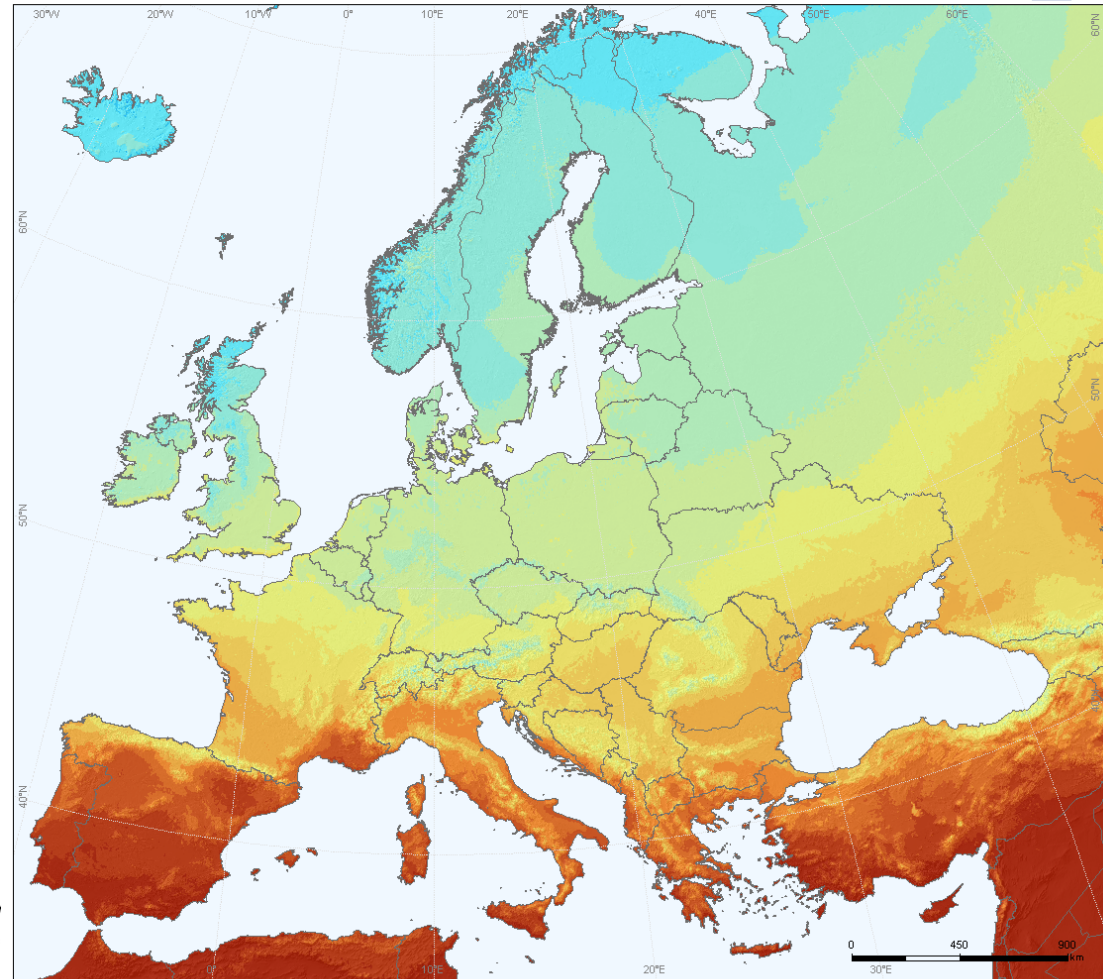
Global irradiation*
[kWh/m²]



Solar electricity**
[kWh/kW_{peak}]

* Yearly sum of global irradiation incident on optimally-inclined south-oriented photovoltaic modules

**Yearly sum of solar electricity generated by optimally-inclined 1kW_p system with a performance ratio of 0.75



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PVGIS <http://re.jrc.ec.europa.eu/pvgis/>

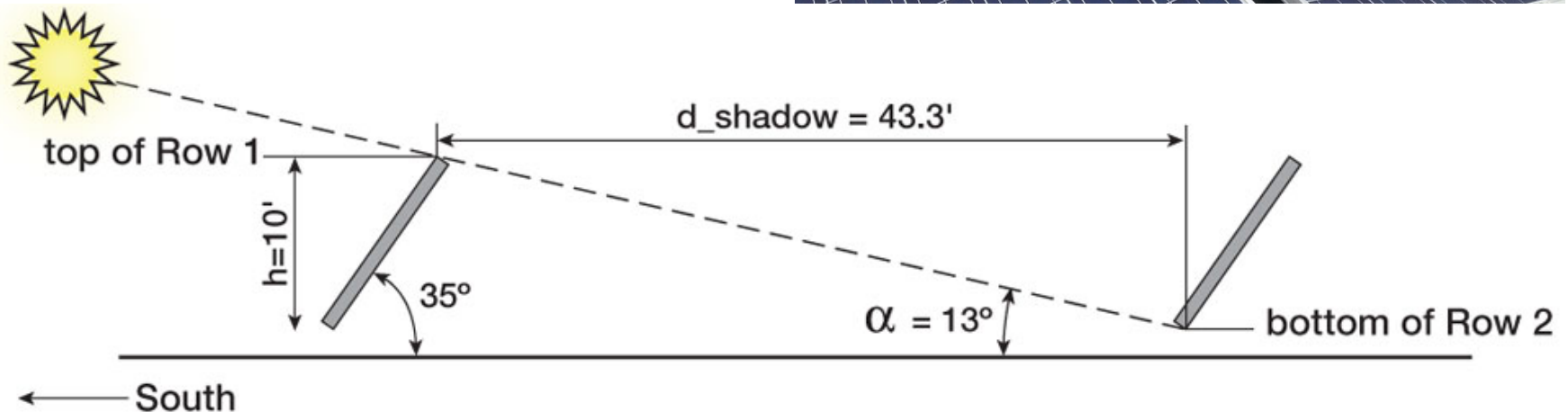
Authors: Thomas Huld, Irene Pineda-Pascua
EC - Joint Research Centre
In collaboration with: CM SAF, www.cmsaf.eu

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BIPV on flat roof

Optimal tilt ($\sim 40^\circ$) $\rightarrow$ inter-row shading
Rows need to be far apart

Low tilt ($\sim 10\text{-}20^\circ$) allows tighter packing
Overall yield higher
South/North or East/West nearly the same



Simulation

- Software "Pvsyst"
- PV module: Polycrystalline, efficiency ca.15%
- 500 modules; 825 m² module area; 130 kW_p
- Orientation: East/West $\pm 5^\circ$; Tilt: 10° (20°)
- Generation, considering system losses: snow coverage 50-70% in winter, inverter losses etc. = **98.6 MWh/y** (in Typical Metereological Year)
- **10.5 kWh/m²y** – per sqm floor area

