



Solar@Sea

TKI Wind op Zee

Utrecht, 13 februari 2020

Wim Soppe –TNO-Solliance

TNO innovation
for life

umec

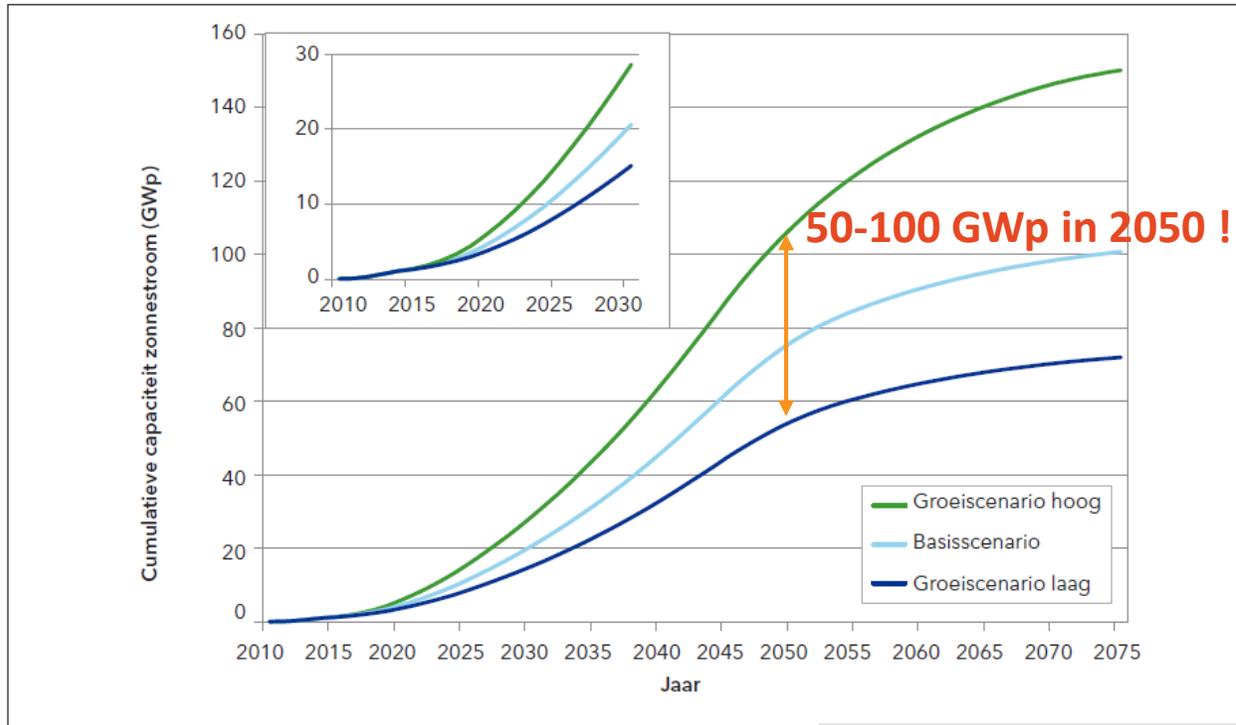
TU/e EINDHOVEN
UNIVERSITY OF
TECHNOLOGY



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PV growth scenario for the Netherlands



Where to install this PV capacity?

Groeiscenario's zonnestroom tot 2030 (kader) en 2075

Nationaal Actieplan Zonnestroom 2016

Geïnstalleerd vermogen	Totaal	Zonneparken bedrijven	Daken bedrijven	Daken woningen
2017	2.911 megawattpiek	98 megawattpiek	1.131 megawattpiek	1.682 megawattpiek
2018	4.414 megawattpiek	444 megawattpiek	1.662 megawattpiek	2.307 megawattpiek

Area availability for PV

Limits to the growth
of land based PV

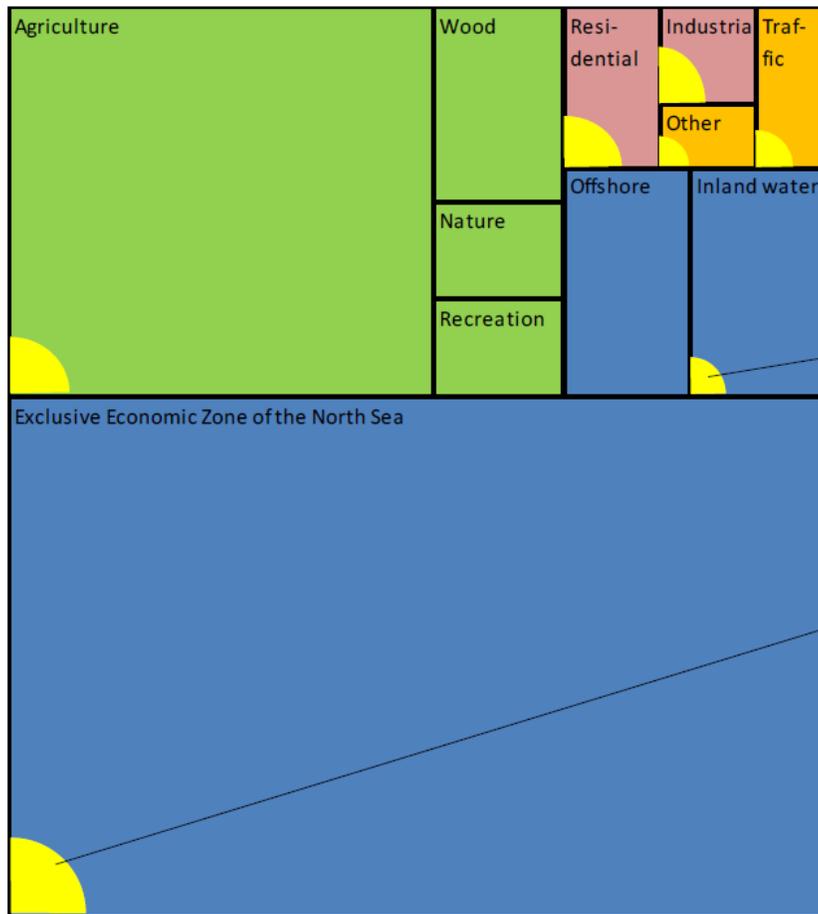


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PV roadmap to 2050

(Nationaal Consortium Zon op Water)

PV oppervlak in Nederland (2050)



24 GWp

45 GWp



8.4 MWp plant Tynaarlo

Large potential of PV on water
Now: inland water area
Future: off-shore!



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PV on Sea: Pilot projects De Slufter (near Rotterdam)



**Rigid constructions,
Rigid PV panels**



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Solar@Sea concept: Soft materials, Flexible PV



PV module

floater

stabilizer



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Demo Weperpolder

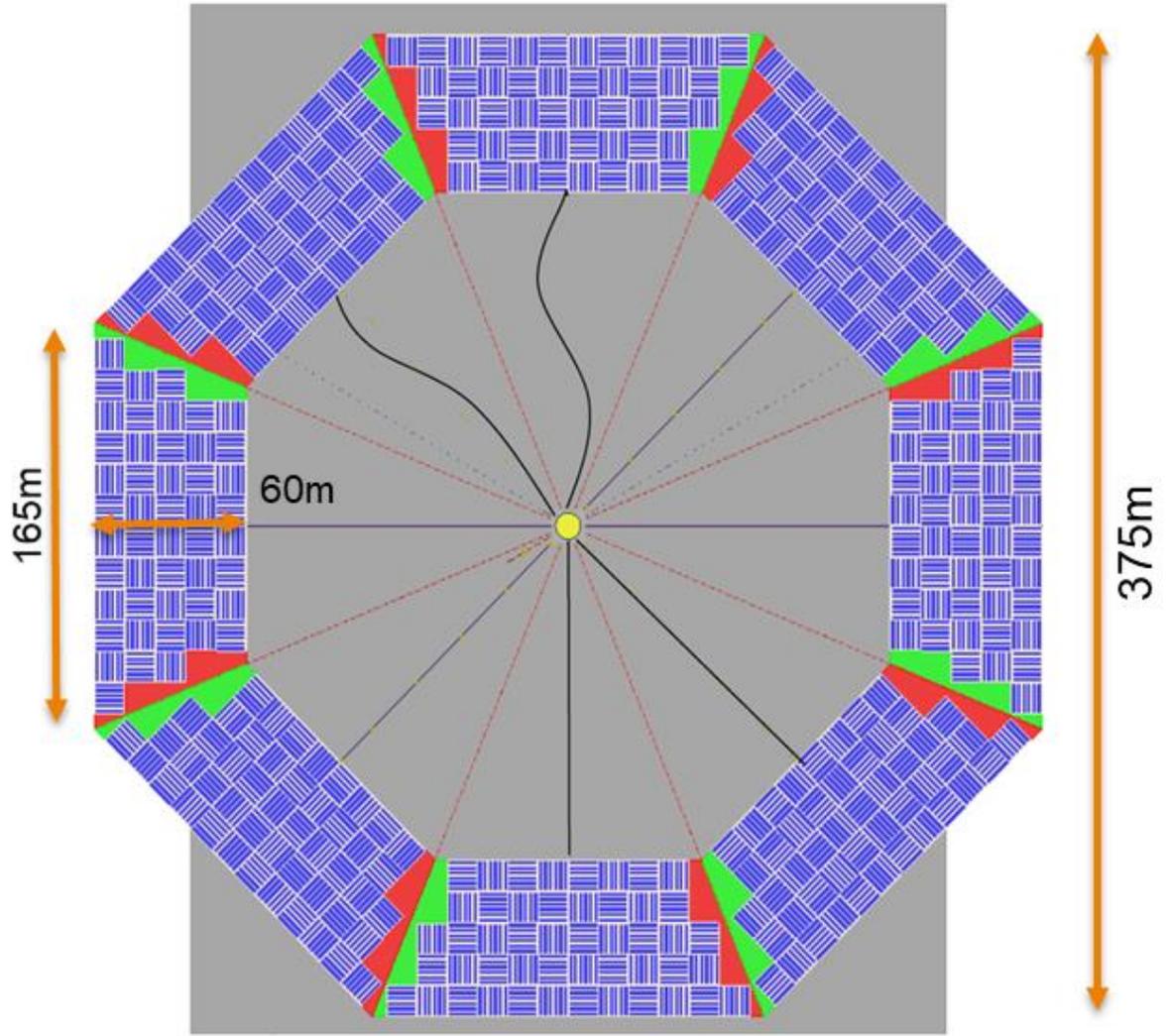


1 kWp flex vs 2,1 MWp rigid (Groenleven)



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Possible layout large system



400m donut shape system

- Made up from 8 sections of 165x60m
- Totally 13824 PV panels of 300Wp = 4.15MWp



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Our Vision



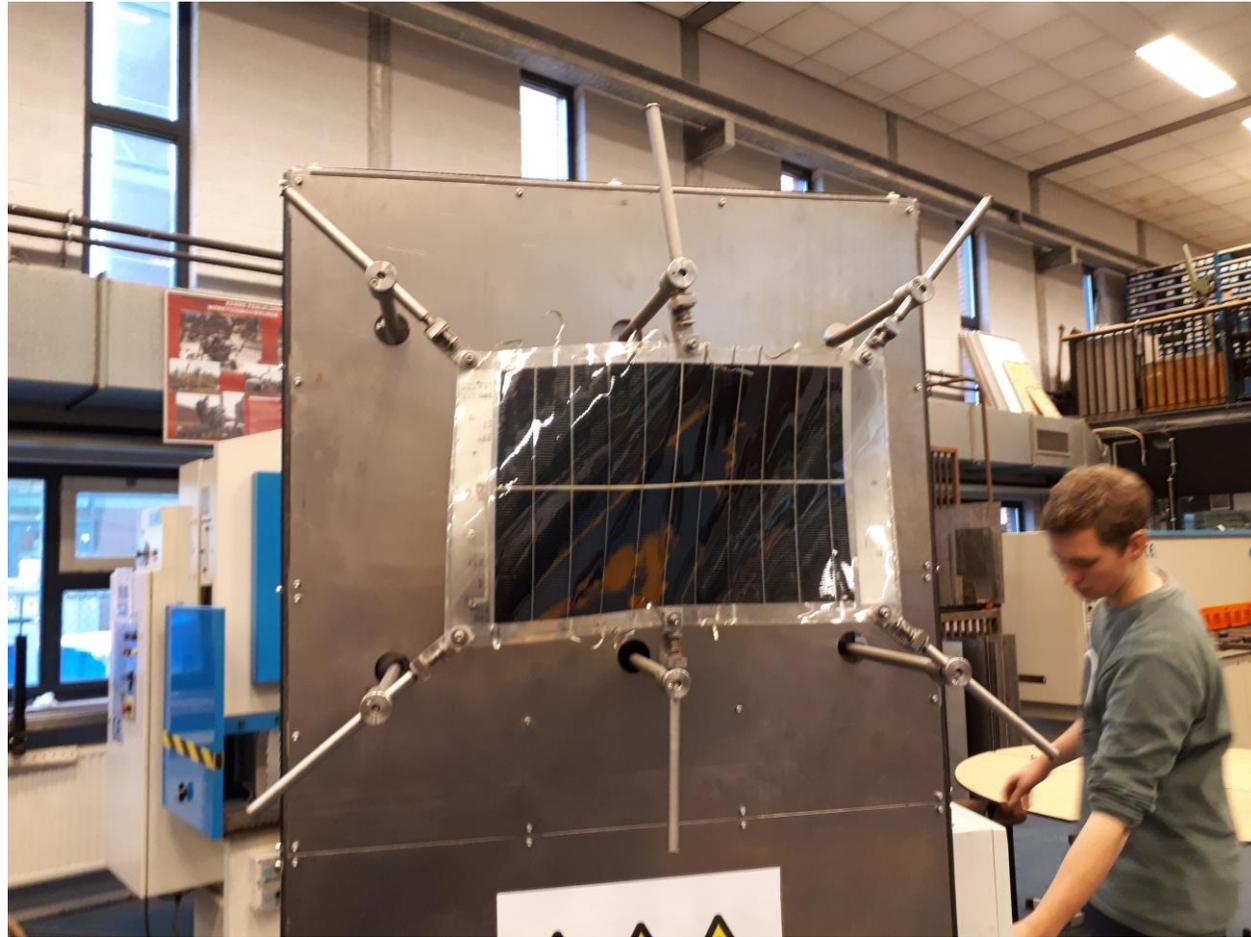
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Scale model tests @Marin

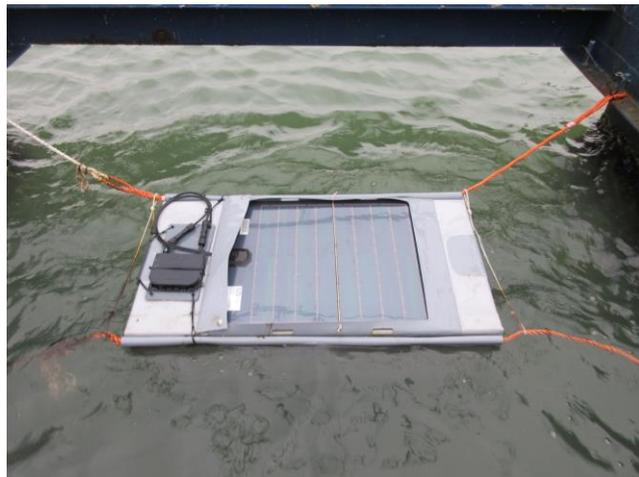
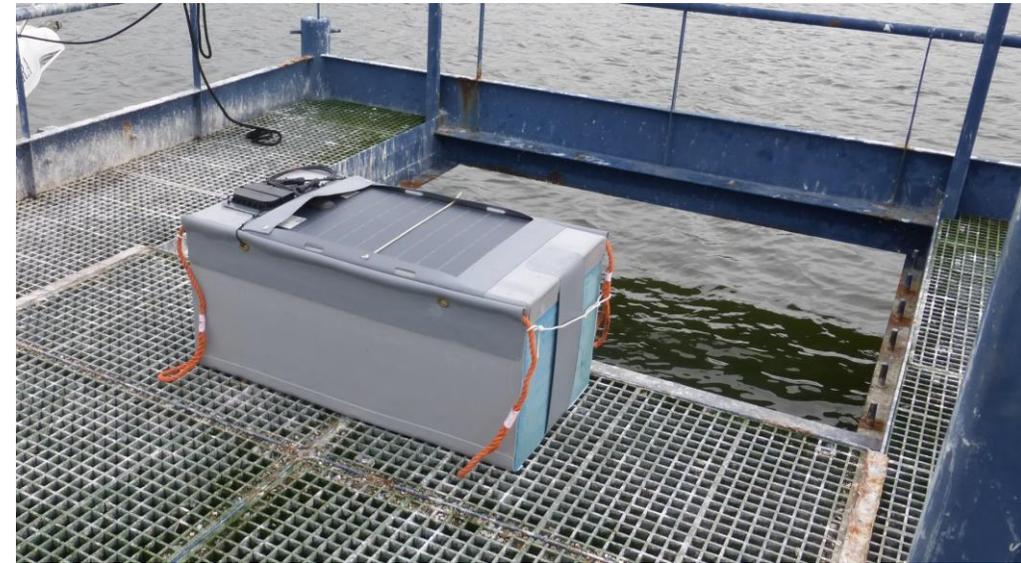


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Fatigue tests at TNO



Fouling tests in the harbour of Den Helder



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Test with UV-C leds as anti-fouling



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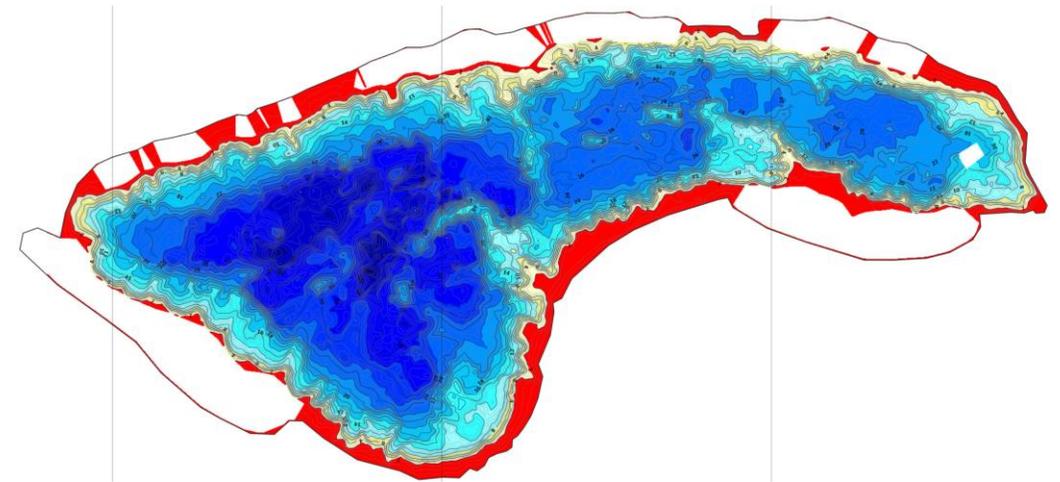
TKI project Solar@Sea II

- **Kick-off: 19 February 2020**
- **Consortium:**
 - GENAP: foil specialists
 - Bluewater Energy Services: mooring systems
 - Hyet Solar: thin film solar modules
 - Marin: hydrodynamics
 - Avans University of Applied Sciences: materials
 - Endures: anti-fouling measures
 - TNO: Solar specialists



Objectives

- 50 kWp demo system in the Oostvoornse Meer
About 200 units of 3x1 m plus mooring system (depth 20 m)
Extensive monitoring



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Windpark Zijpe (Burgerbrug) First windpark in NL Erected in 1990, severely damaged in the first storm



Originally 15 Lagerwey 15/75 turbines (75 kW)
Installed about 25 years ago.
8 left, 7 operational

**At that time, only dreamers
could imagine windparks at sea**



Thank you for your attention!

wim.soppe@tno.nl