WAve **R**esource for **E**lectrical **P**roduction (**WAVREP**)

Dr. George Lavidas
Marie Skłodowska-Curie Research Fellow

Ocean Energy Platform Annual Meeting
January 2019

TUDelft

Wave as an energy resource

Unique characteristics

✓ Highest energy density
✓ Highly predictable
✓ Persistence of resource
✓ Access to the resource
✓ Cross-Correlations
✓ Variability reduction
✓ Offshore hybrid systems
✓ And many more…..

So what is the problem???

➢ Depth
➢ Significant Wave Height ($_{Hm0}$)
➢ Wave period(s) ($_{Tm02;m01;m10;peak}$)
➢ Wave Direction ($_{Dir, PkDir}$)
➢ Orientation

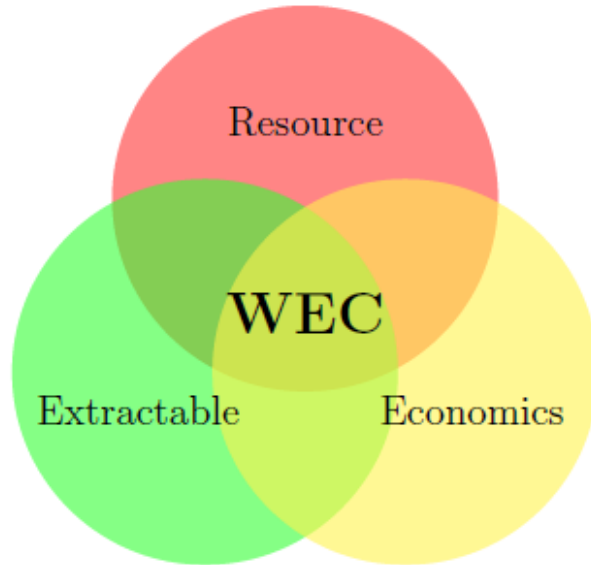*….Always device dependent*

TUDelft

Wave as an energy resource
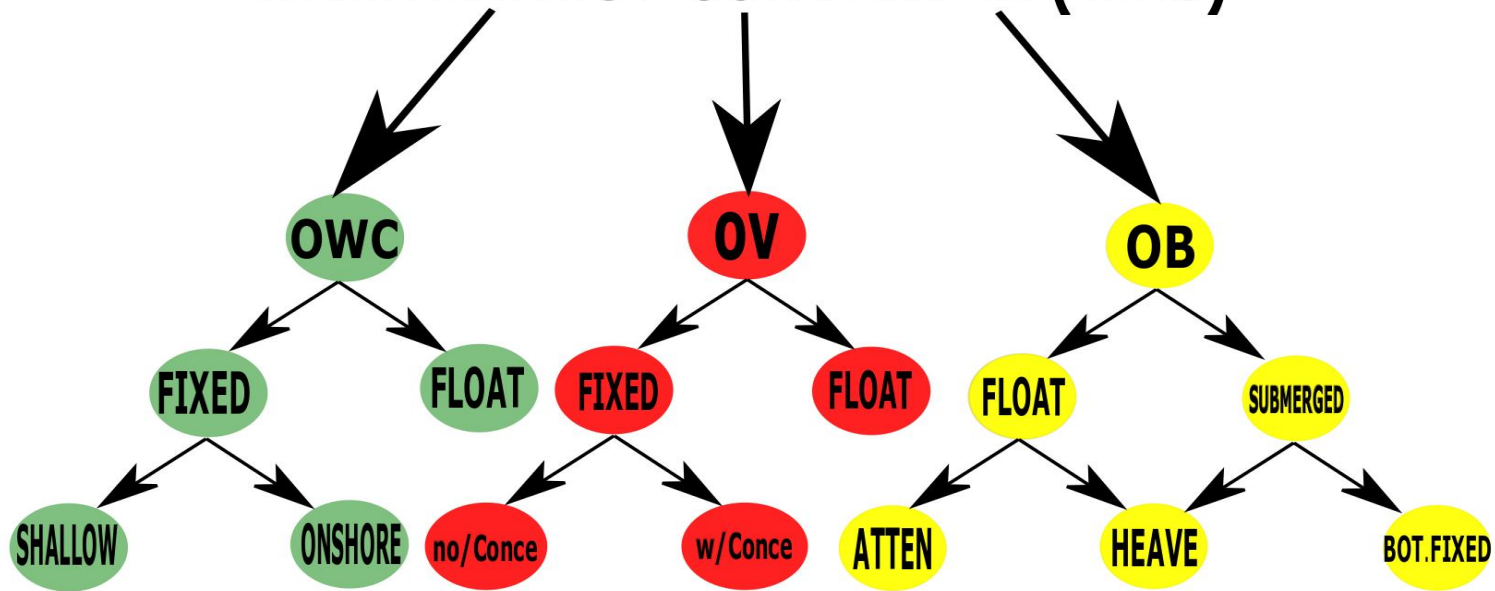
WAVREP

Problems (amongst others):

❖ WECs mismatch

❖ Oversized

❖ Increased CapEx

❖ Availability reduced

❖ Accessibility reduced

TUDelft

Funded by the Horizon 2020 Framework Programme
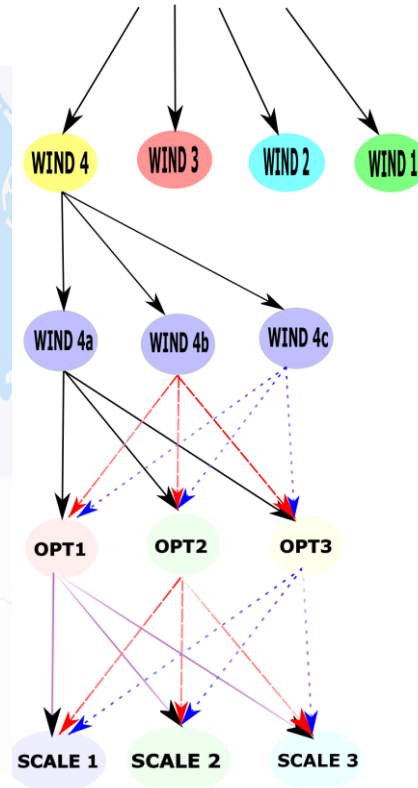of the European Union

WAVREP

- ✓ Enhance availability.
- ✓ Energy production.
- ✓ Enhance accessibility.
- ✓ Enhance survivability.
- ✓ Reduce CapEx, OpEx.
- ✓ Reduce LCoE.
- ✓ Increase WEC outreach.
- ✓ Improve global applicability.
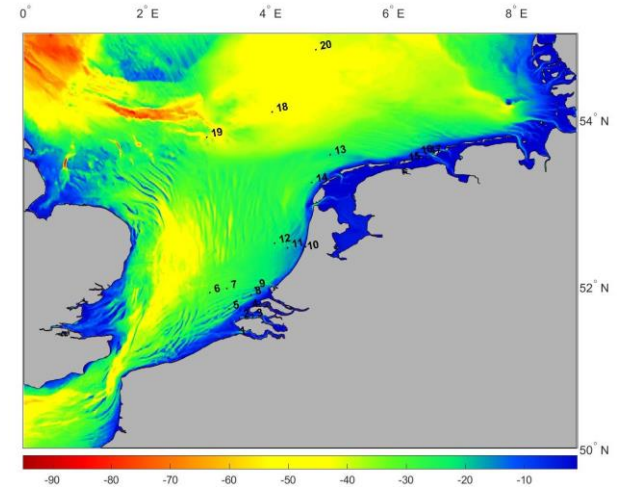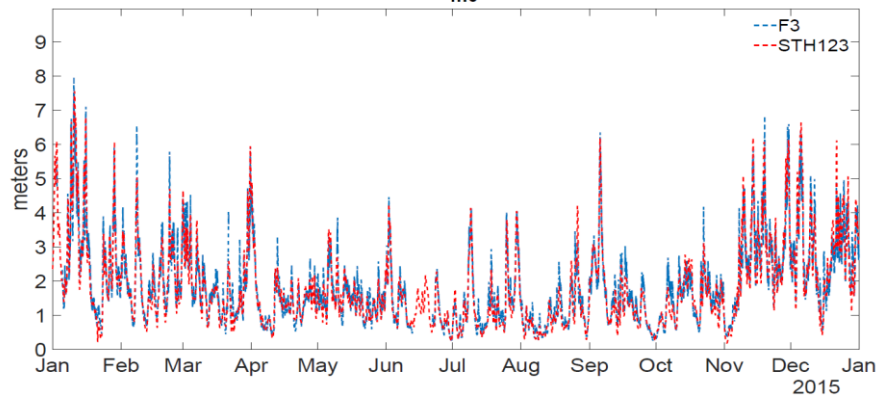- ✓ Open up new market pathways.
- ✓ more synergies...

Progress so far…
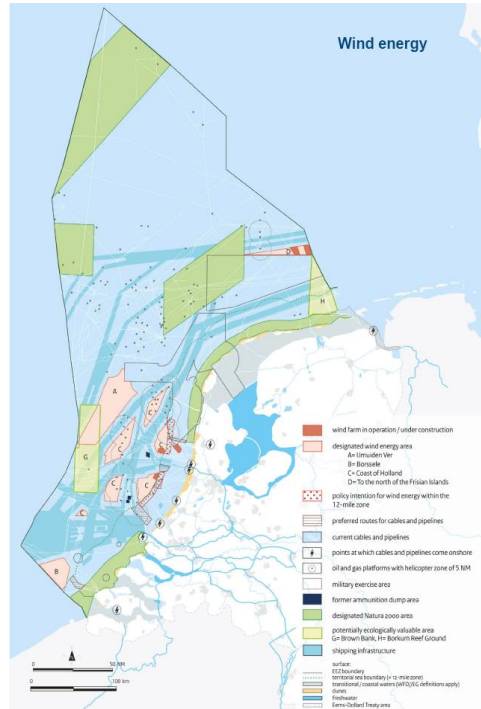
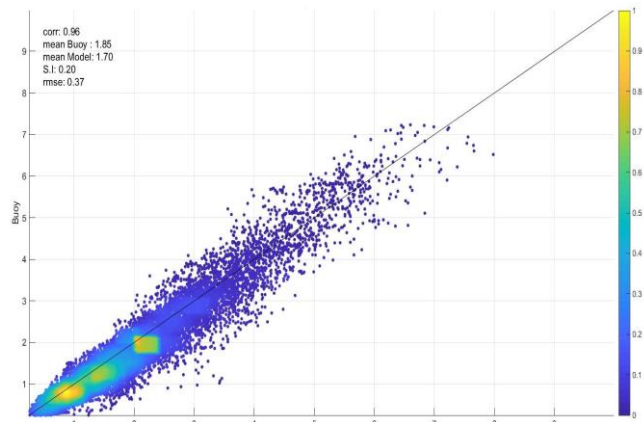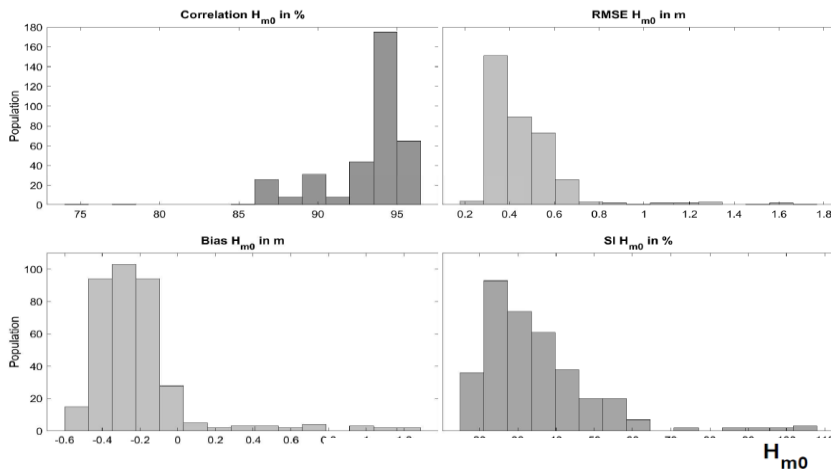
Spectral modelling with re-configuration of

i. Wind generation.

ii. Dissipation mechanism.

iii. "Auto-correction" by mean square slope.

iv. Swell dissipation

Progress so far…

WAVREP will provide….

- ❑ Assessment of metocean & P_{wave}, availability, accessibility.
- ❑ Extreme return waves and impacts.
- ❑ Optimal sitting & arrays configuration.
- ❑ Coastal impacts & wave run-up effects.
- ❑ WECs optimisation.
- ❑ LCoE, CapEx reductions.
- ❑ Offshore Energies Deployment (OED) methodology.

Additionally:

- *Maintenance, failure rates.*
- *Climate effects on offshore energies (incl. wind).*
- *Optimisation of revenue for offshore energies.*
- *Power quality.*
- *Environmental impacts & coastal erosion.*
- *etc…*

Thank you for your attention

TUDelft