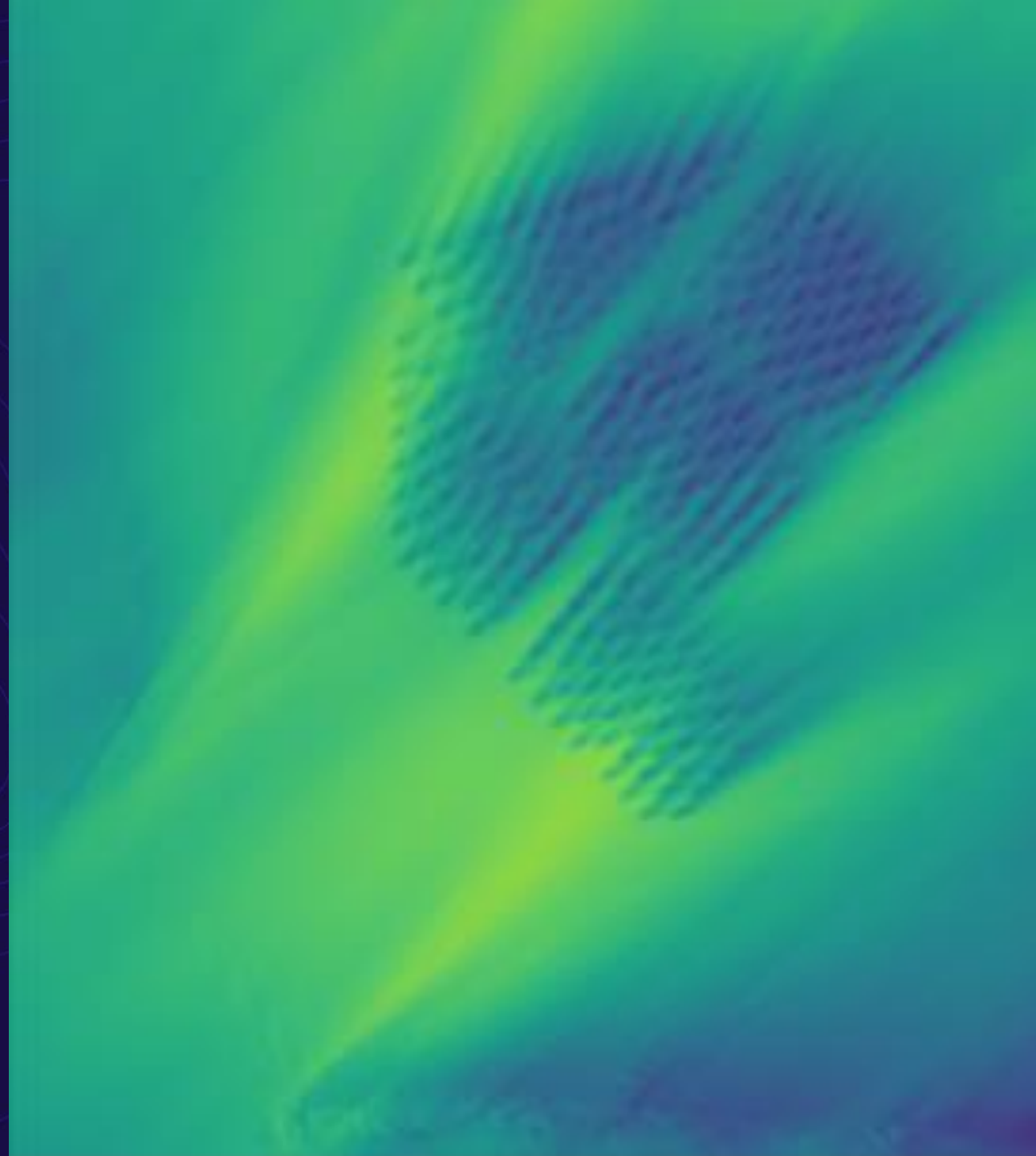
whiffle

Offshore scenario planning “Do we get new neighbours?”

Wind Europe 2026

Madrid



A quick talk about the impact of scenario planning in offshore wind roll out

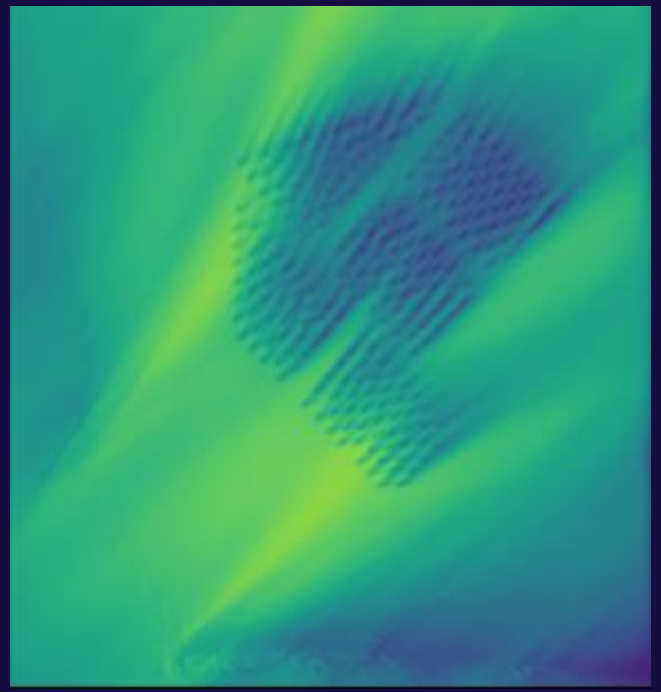
✅ Get the wind climate right including land sea transitions using large area meso-scale downscaling from ERA-5.

✅ Use Large Eddy Simulation (LES) to further downscale and include turbulence and atmospheric stability (real weather).

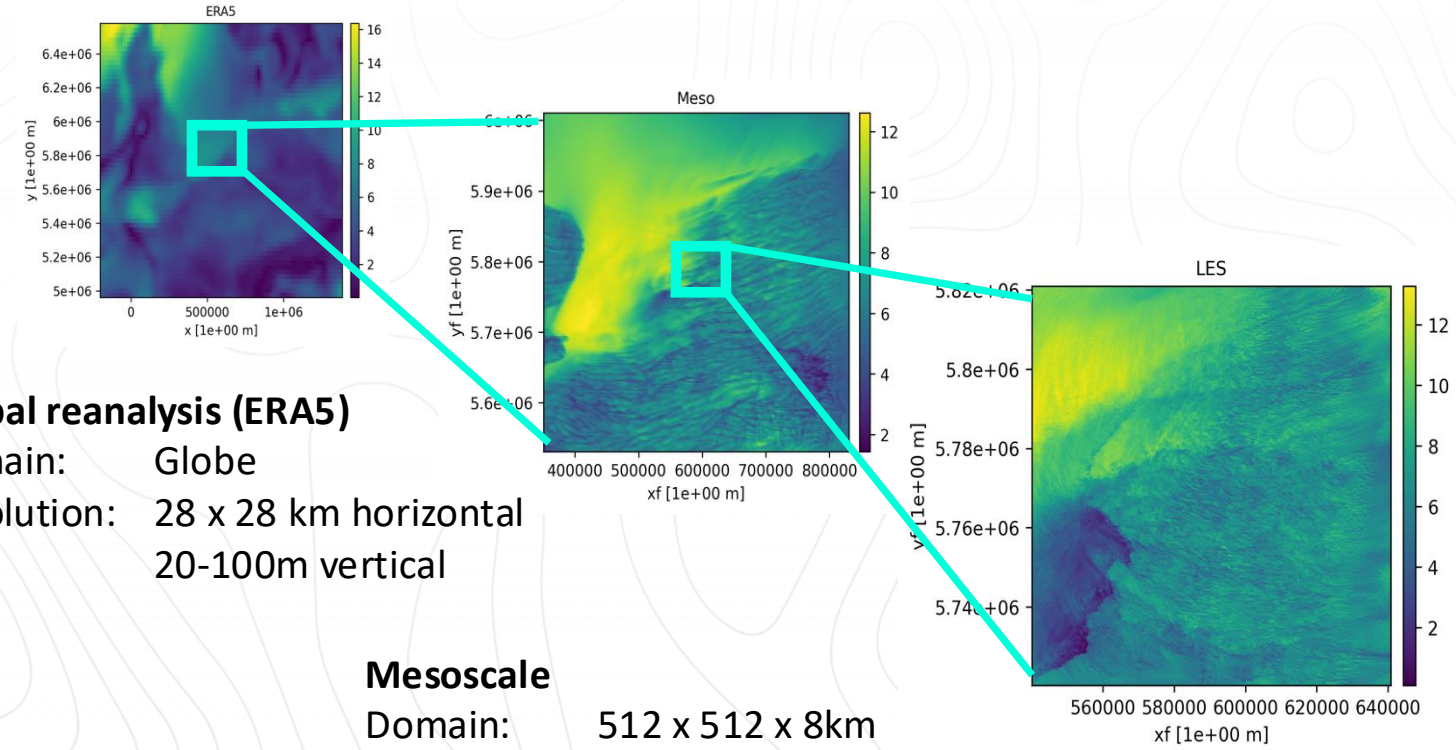
✅ Wake modelling with real weather LES – Resolving turbulence, shear, and flow recovery at turbine-relevant scales allowing precision assessment of wake effects and AEP.

✅ Planning scenario's where neighboring wind farms are switch on or off creating insights in yield variations over the lifetime.

- **Hypothetical North Sea Cluster**
- **±4 GW in 5 wind farm zones**



Our standard LES set-up



Global reanalysis (ERA5)
Domain: Globe
Resolution: 28 x 28 km horizontal
20-100m vertical

Mesoscale
Domain: 512 x 512 x 8km
Resolution: 2 x 2 km horizontal
25-100m vertical

LES
Domain: 100km x 100 km x 4km
Resolution: 100 x 100 m horizontal
25-100m vertical

Physics modules of:
- ✓ Wind turbines
- ✓ Vegetation
- ✓ Mountains
- ✓ Buildings
- ✓ Clouds and thermodynamics
- ✓ Precipitation
- ✓ Surface energy balance
- ✓ Soil moisture
- ✓ Radiation
- ✓ Aerosols

Compute on NVIDIA GPUs using different types of GPUs

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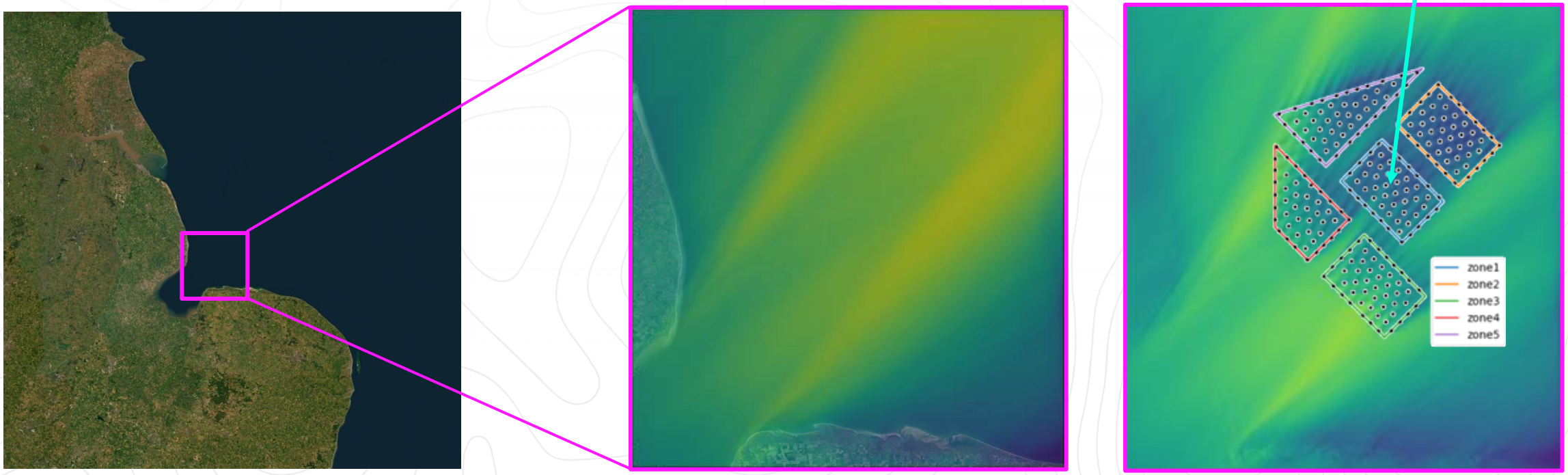
Our Hypothetical Wind Farm in a real location

North Sea / Greater Wash

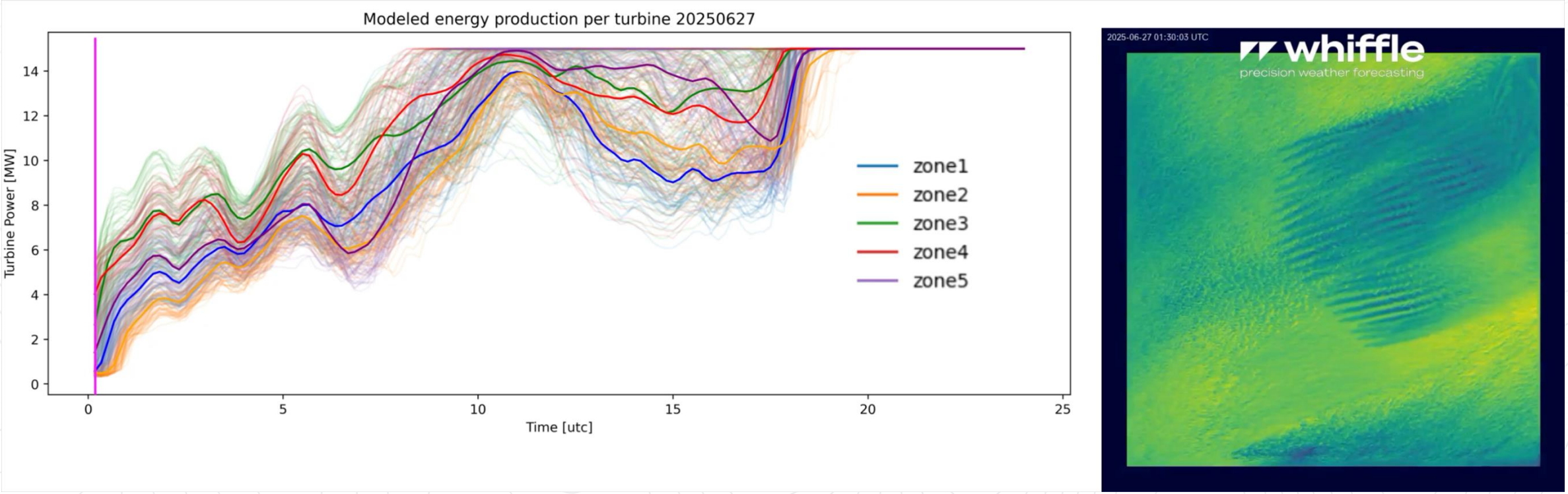
Location

Large-Eddy Simulation of the cluster:

- **640 x 640 x 64 grid points (26 million)**
- **30-day simulation for illustration – representative days**
- **Total 252 turbines – 15 MW concept – 3,780 MW**
- **8 MW / km2**



Timeseries of power production

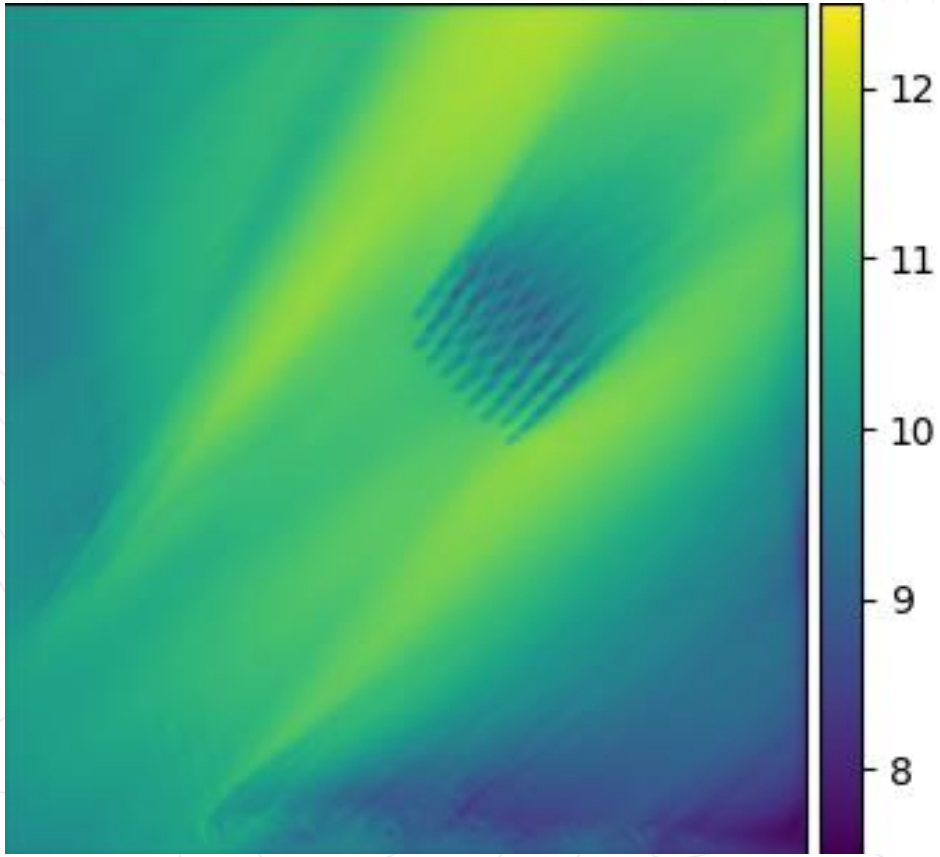


link to video

Wake & Blockage effects

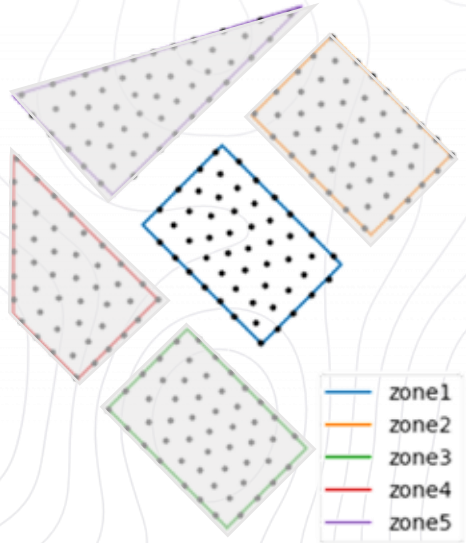
Our project: Zone 1

wind speed @ hub height (m/s)



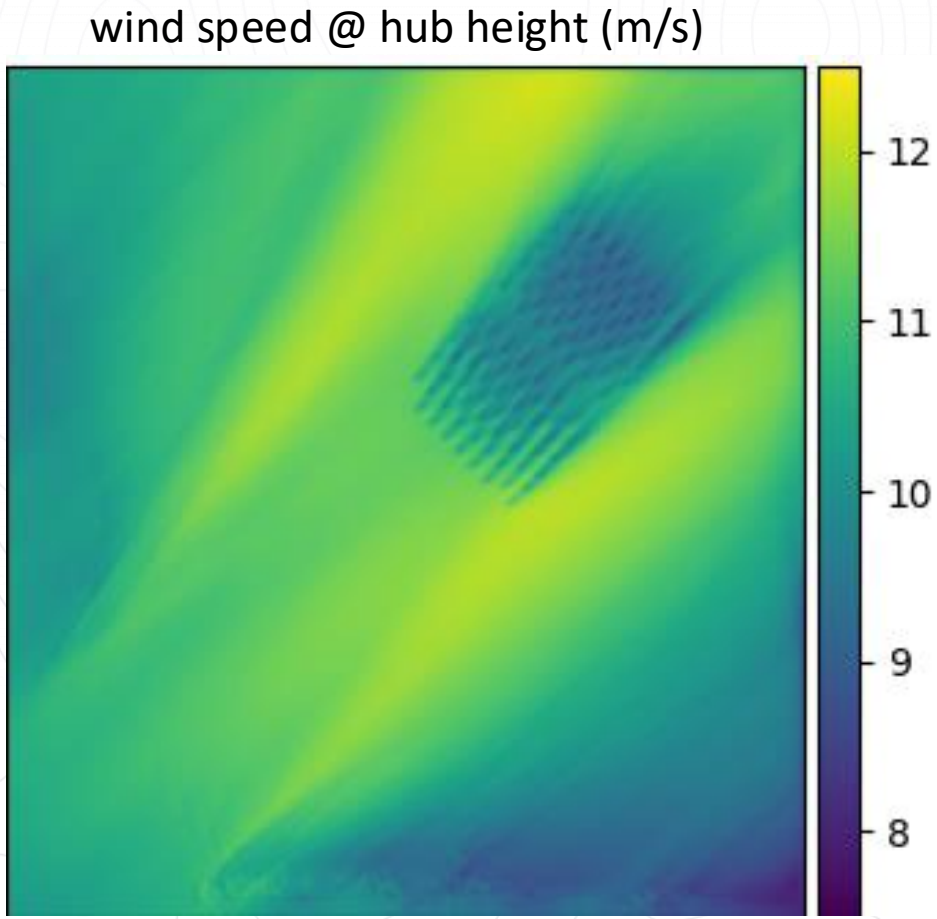
Maximum production =

Free stream production:	10.73 MW
Net production:	9.62 MW
Aerodynamic losses:	10.4%

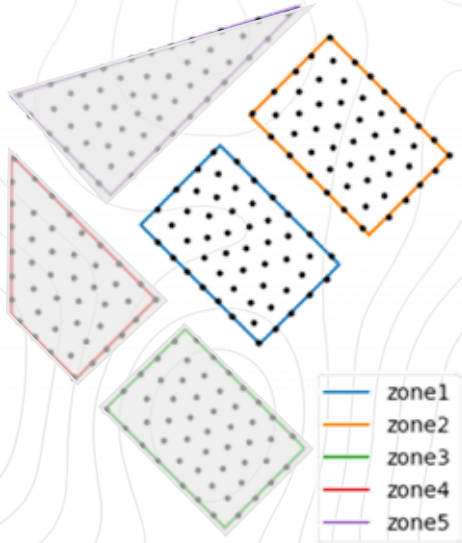


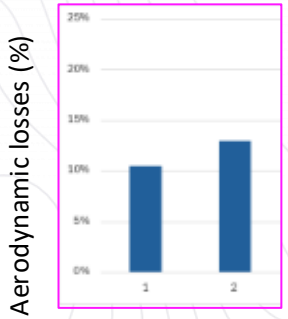
Wake & Blockage effects

New neighbours! Zone 1 + 2



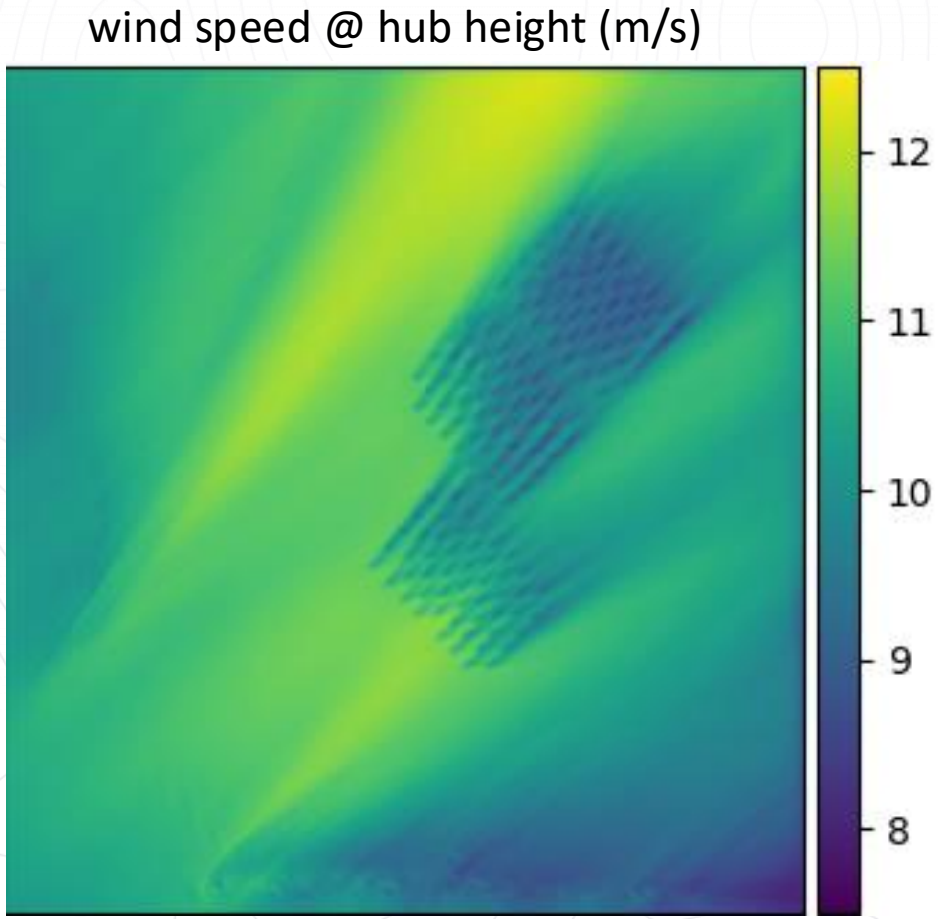
Free stream production: 10.73 MW
Net production: 9.35 MW
Aerodynamic losses: 12.9%



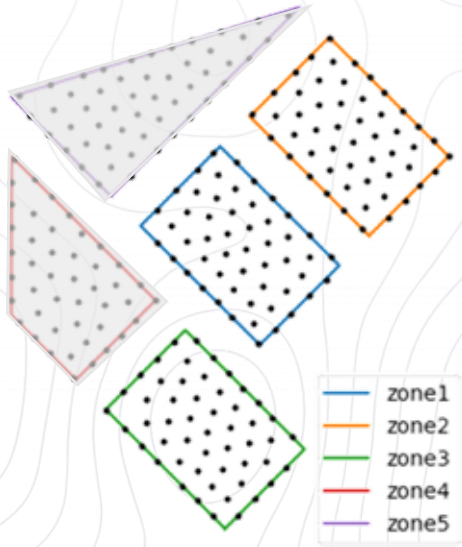


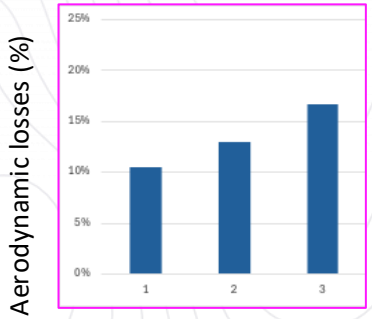
Wake & Blockage effects

It’s getting busier: Zone 1 , 2 and 3



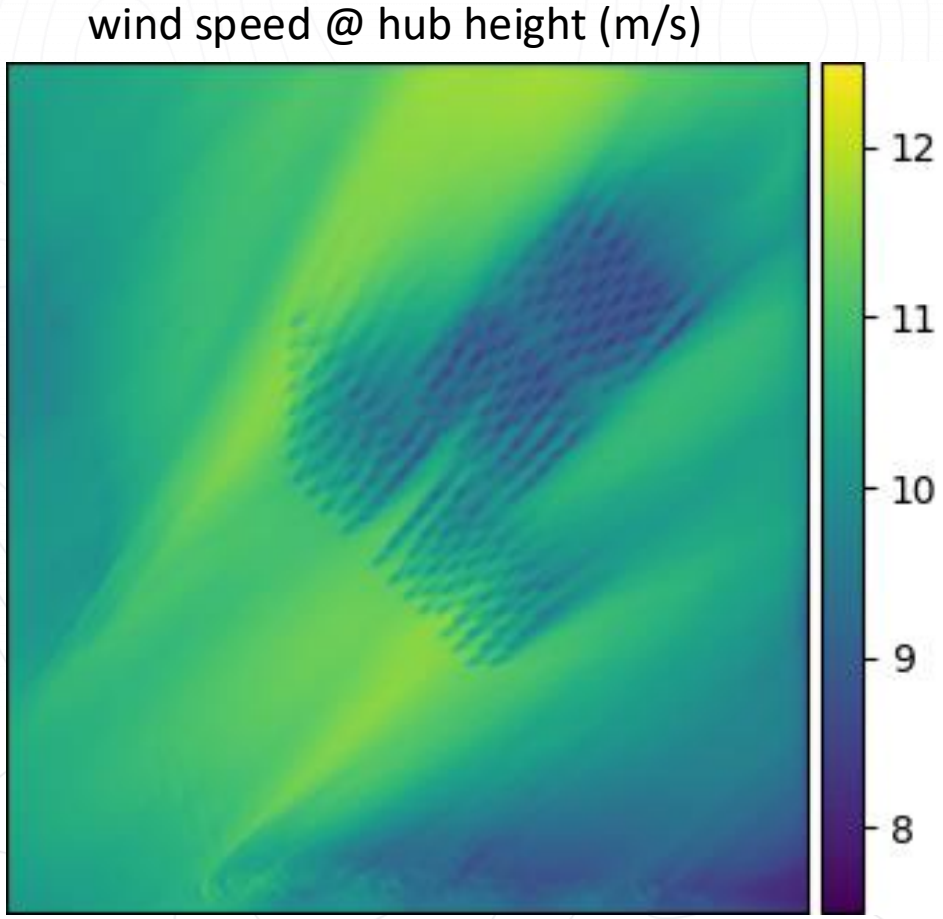
Free stream production: 10.73 MW
Net production: 8.94 MW
Aerodynamic losses: 16.7%



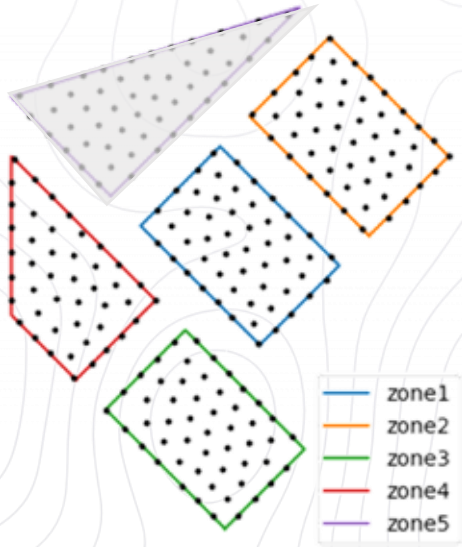


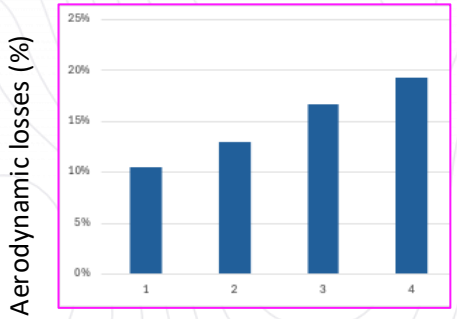
Wake & Blockage effects

Even busier! Zones 1, 2, 3 and 4



Free stream production: 10.73 MW
Net production: 8.66 MW
Aerodynamic losses: 19.3%

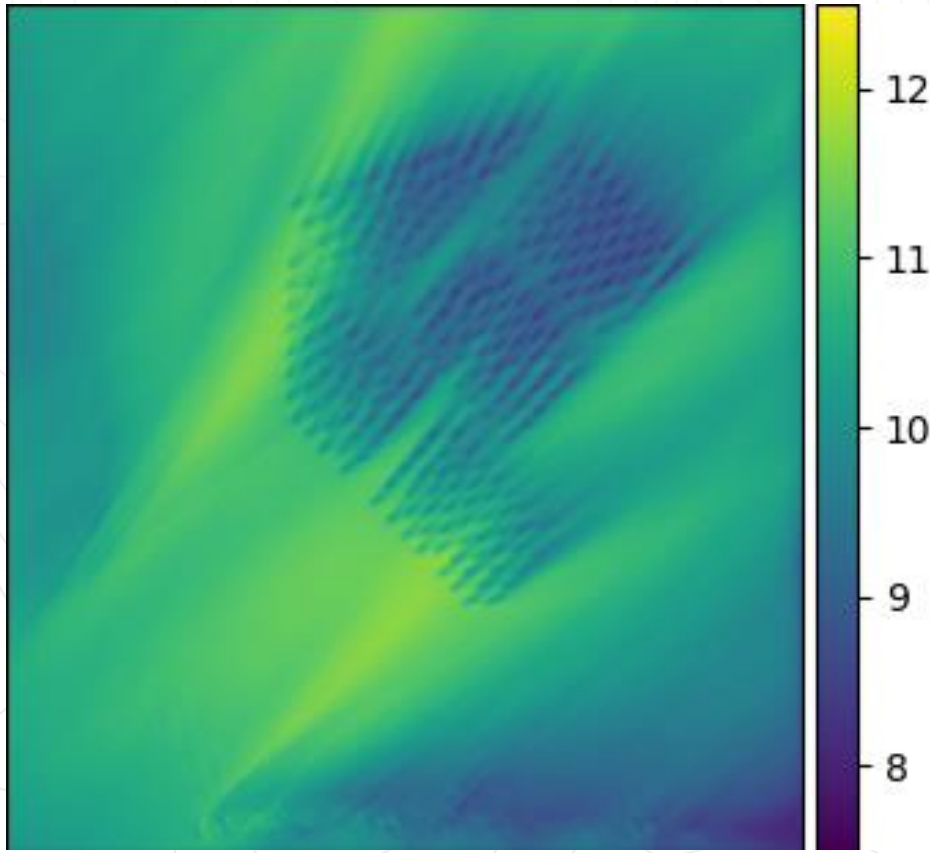




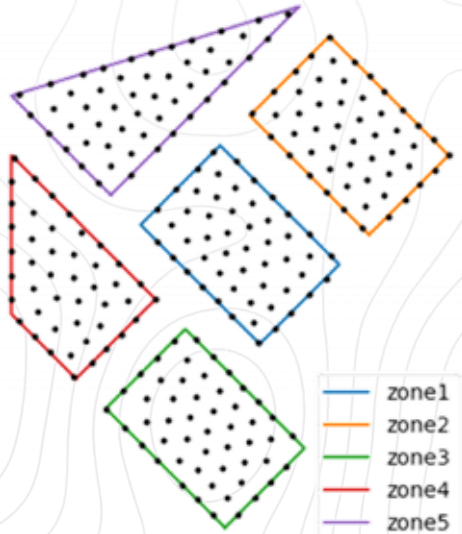
Wake & Blockage effects

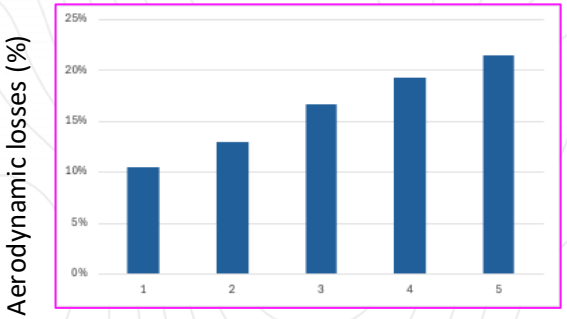
The Cluster is complete: zones 1,2,3,4 and 5

wind speed @ hub height (m/s)

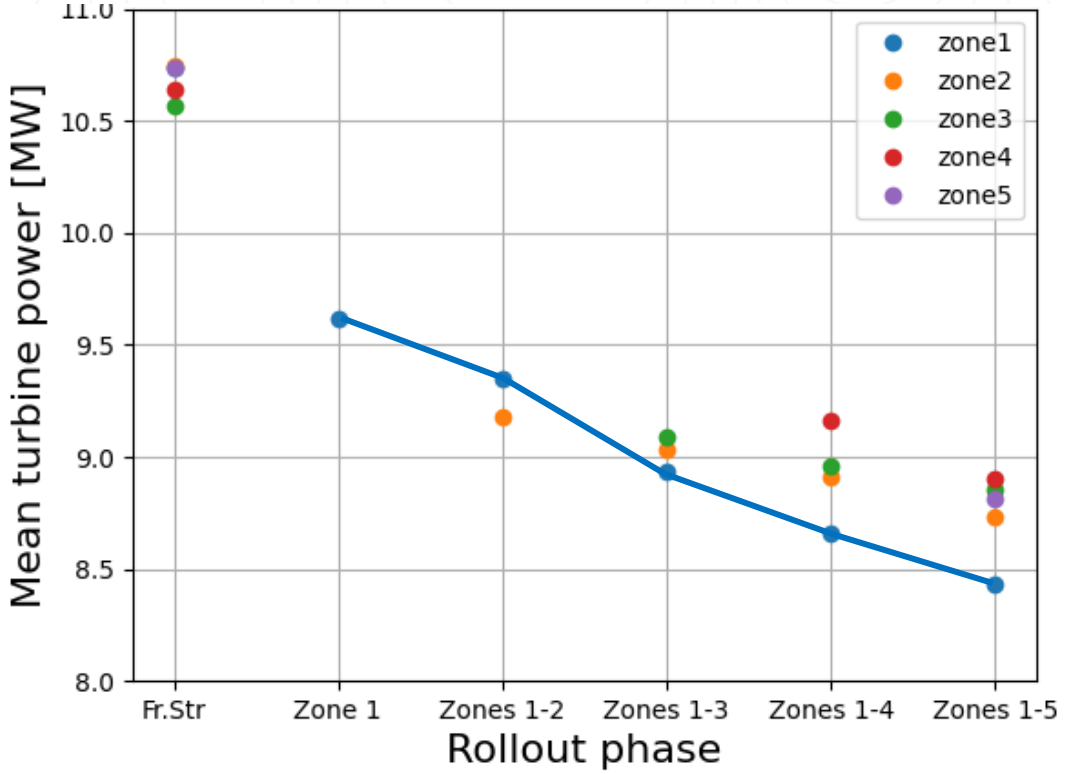


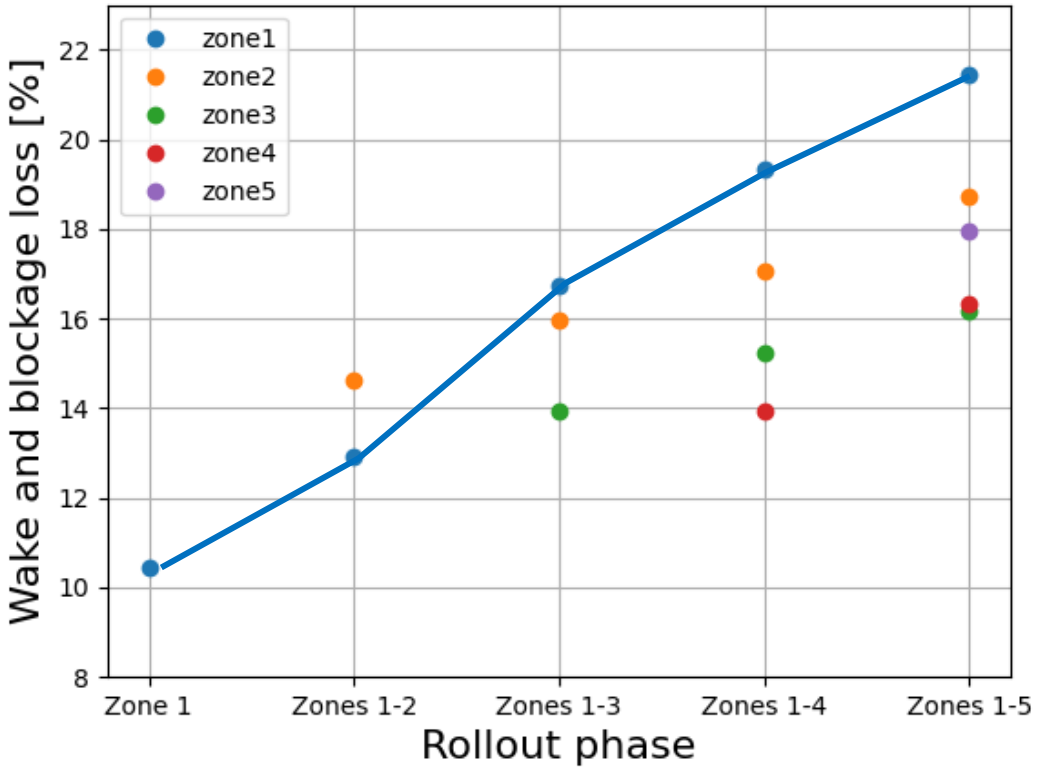
Free stream production: 10.73 MW
Net production: 8.43 MW
Aerodynamic losses: 21.4%



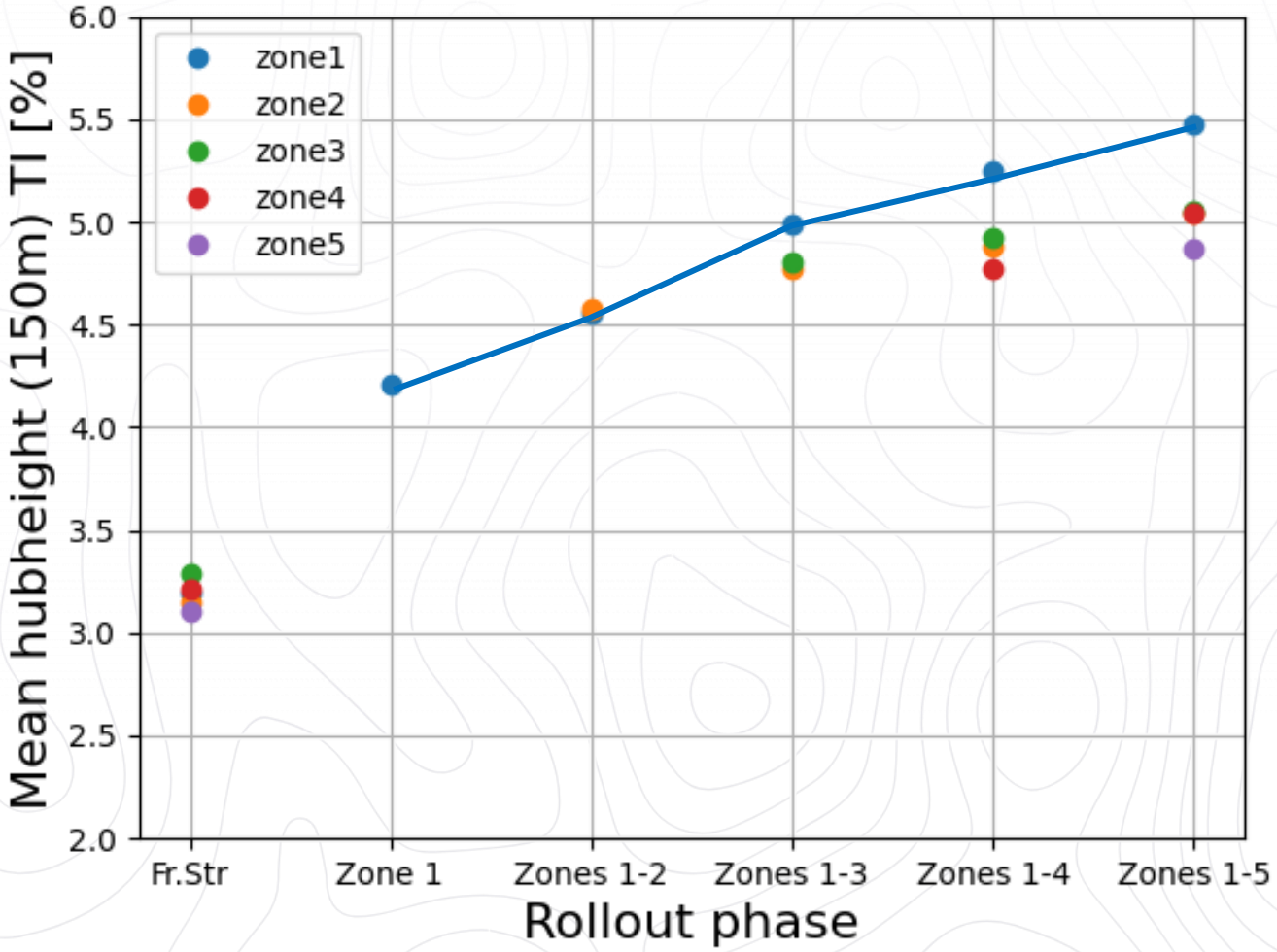


Wake & Blockage effects

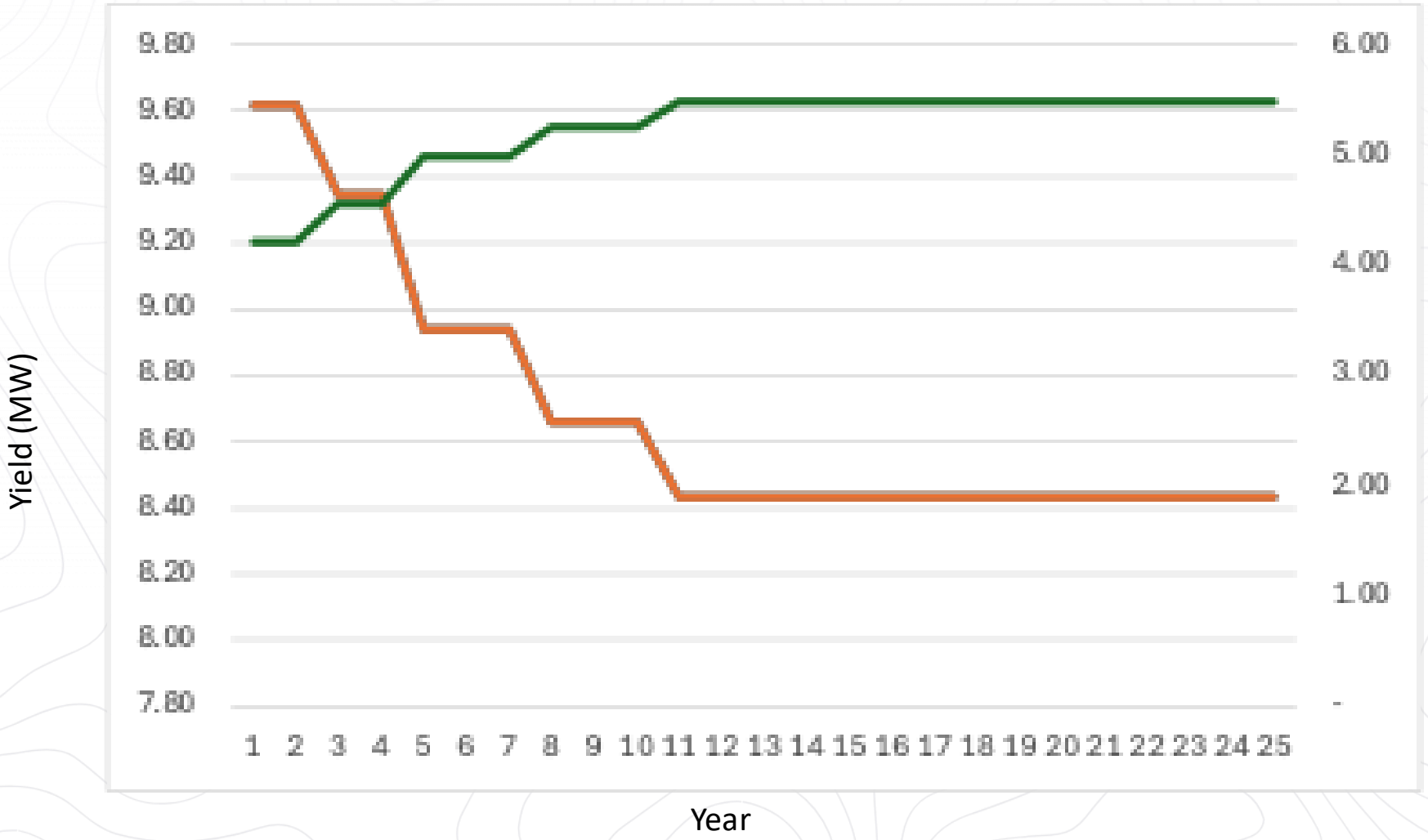




And increased Turbulent Loads



Life cycle impact: Yield and Load



Create scenarios in roll out variations

Establish impact on lifetime yield and loads

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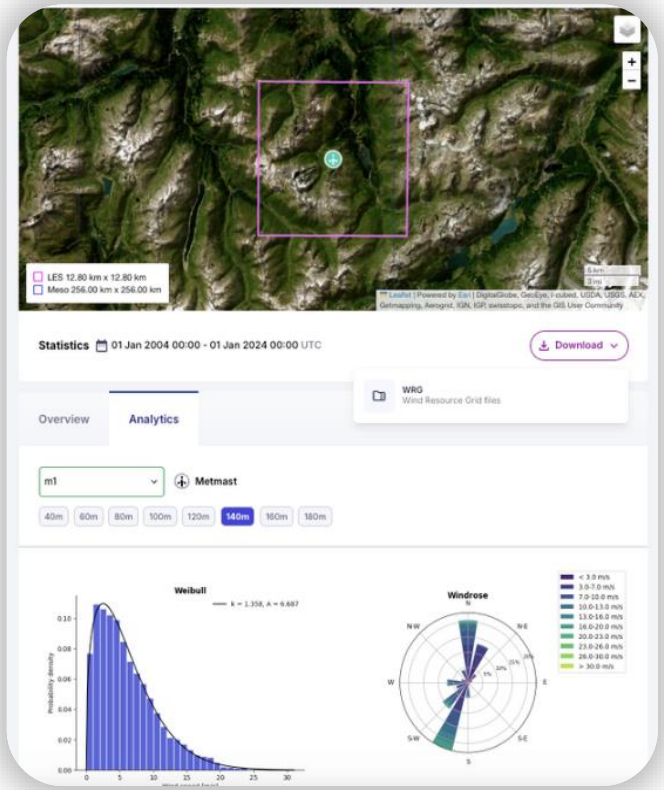
whiffle

Scenario Planning in Whiffle Wind

Our solution: whiffle | wind

whiffle | wind

Whiffle Wind Statistics

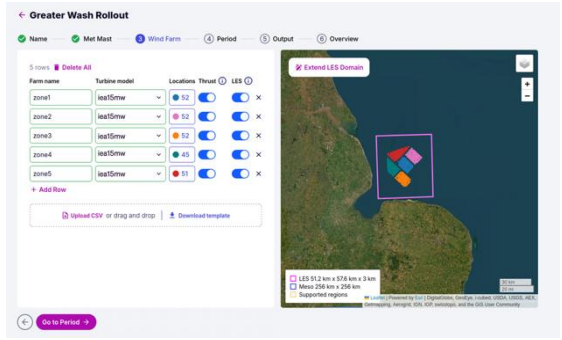


- LES-based long-term statistics for any terrain type, worldwide

Whiffle Wind Time Series

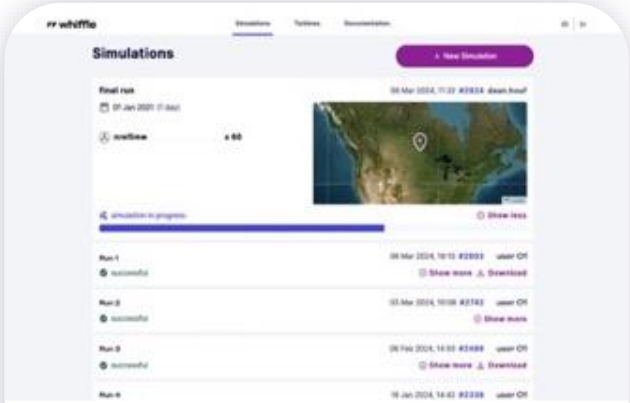
- LES time series data for optimised wind and energy yield modelling

Conduct LES simulations for your wind farm or site with just a few clicks.



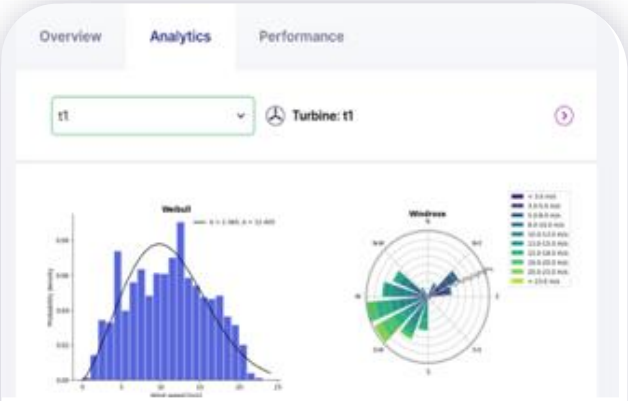
Step 1: Provide

Input met virtual met mast details, turbine type, site layout, and desired simulation period.



Step 2: Submit

Review the output settings, the simulation setup and price, then submit for processing.



Step 3: Retrieve

Explore the results dashboard with wind statistics, time series data (csv, NetCDF, WRG), simulation videos and more.

**Whiffle Wind can also be used programmatically with Python thanks to the Whiffle API Client.*

Greater Wash Rollout

whiffle | wind

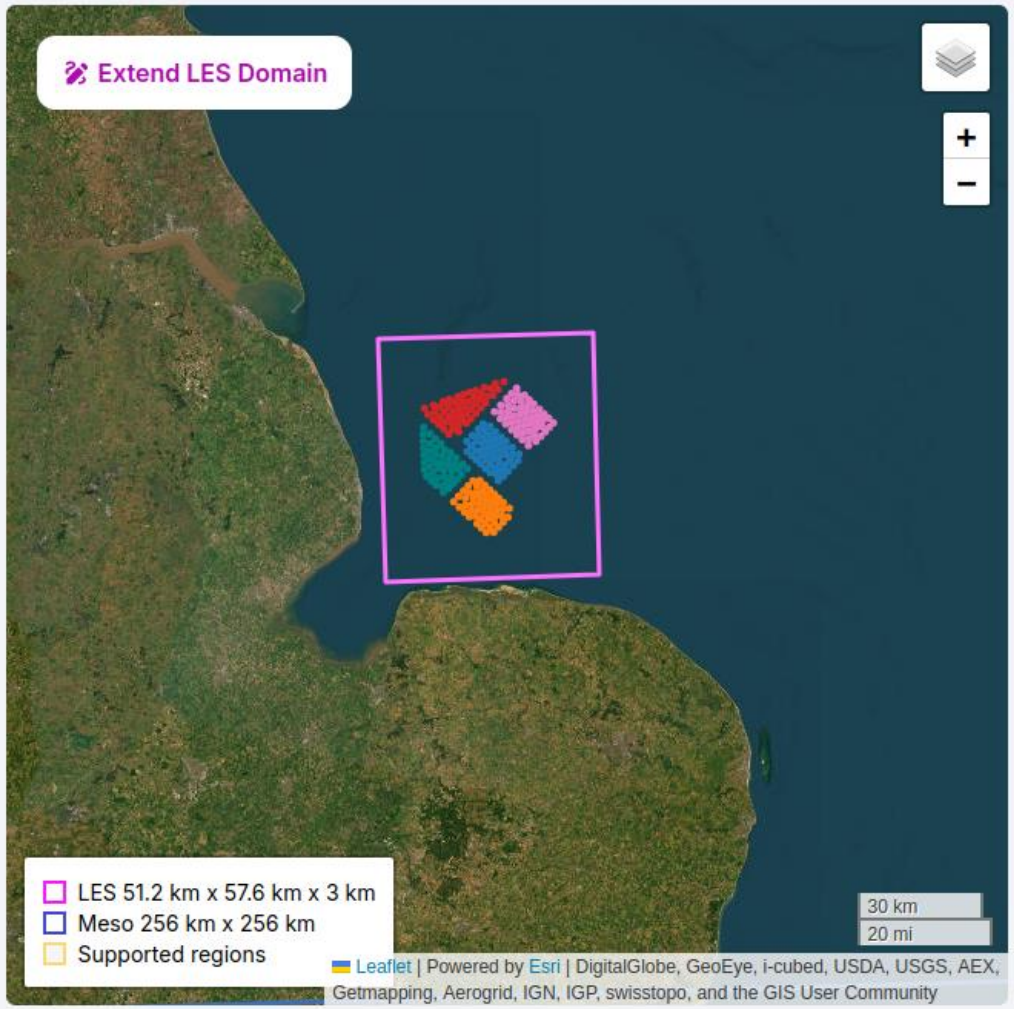
Name — Met Mast — 3 Wind Farm — 4 Period — 5 Output — 6 Overview

5 rows | Delete All

Farm name	Turbine model	Locations	Thrust	LES	
zone1	iea15mw	52			×
zone2	iea15mw	52			×
zone3	iea15mw	52			×
zone4	iea15mw	45			×
zone5	iea15mw	51			×

+ Add Row

Upload CSV or drag and drop | Download template



Go to Period →

Wakes, Blockage & Loads – Get it right

- ✅ Wind climate: including land sea transitions, real weather effects including turbulence and atmospheric stability
- ✅ Include the turbines in the simulation, resolve turbulence, shear, and flow recovery at turbine-relevant scales allowing precision assessment of wake effects and AEP.
- ✅ Use planning scenario's where neighboring wind farms are switched on or off creating insights in yield and load variations over the lifetime.
- ✅ whiffle | wind
  Real Weather Large Eddy Simulation brings all this with a few simple mouse clicks.

  (or via a scriptable API)

link to video

whiffle

Thank You

Stay and talk to our team!