

# Accelerating Offshore Wind.

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**How to combine Vortex and Youwind platforms for  
innovative pre-development of offshore wind projects**





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**VORTEX AND  
YOUWIND LINK**

Process  
introduction

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**VORTEX  
PRESENTATION**

Series, LES

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**YOUWIND  
PLATFORM INTRO  
& INTEGRATION**

Youwind Model  
Pixel & Pixel Park

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**Q&A**

Ready for case  
study:  
California

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01

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# VORTEX AND YOUWIND LINK

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Most accurate synthetic wind resource data in the market prior to acquire measurements

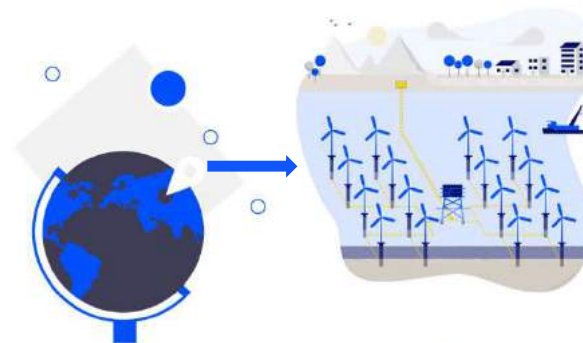


BUT, WHAT TO DO WITH THIS VALUABLE DATA??



- Where is the **best location** for my wind farm?
- Which turbine performs best within my project?
- What park capacity provides lowest **LCoE**?
- Floating** VS **Fixed** foundation?

.....



# Vortex and Youwind process and interface

## INTEL LIBRARY AND USER INTERFACE



- Side data (Wind, Waves, Bathymetry,...)
- GIS layers (environmental, technical and human constraints)
- Engineering sub-functions
- CAPEX and O&M Costs of components:



OFFSHORE PLATFORM



EXPORT CABLES



TURBINES



DEVELOPMENT



ONSHORE PLATFORM



ARRAY CABLES



FOUNDATIONS



VESSELS

Yield and  
Layout  
Optimization



Costs and  
financial  
accurate  
modelling

## OUTPUTS FOR ANALYSIS

- AEP (P50/P90) with losses (incl. wake modelling) and availabilities
- Overall costs & Breakdown
- Financial Drivers
- Optimized Layout
- LCOE calculations
- Projects Comparison
- Turbine Lifetime
- Maps and Visualization (GIS)
- Uncertainties analysis
- Project traceability
- Reporting & Data Export
- ... and much more!

02

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# VORTEX PRESENTATION

Description main products

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## What is Vortex ?

- Online atmospheric modeling service
- Addressed to technical Wind & Site departments
- Provide global estimations of wind at places or periods where no measurements are available.

# Vortex Solutions for all Wind Farm development stages





# Vortex Solutions for Offshore Wind Projects

# Vortex SERIES



- Long-term time series
- 10 / 20 / 30 / 38 years available
- Hourly time-stamp
- Simulated at 3 km horizontal resolution
- Three reanalysis sources: ERA5, CFSR, MERRA2

# Vortex LES



- One-year time series (specific or long-term)
- 10-minute time-stamp
- Standard deviation and 3 second gust
- Simulated at 100 m horizontal resolution



VORTEX

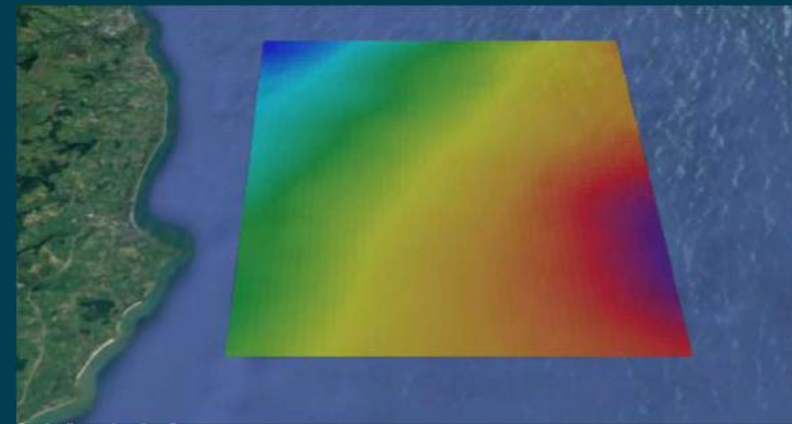
**Youwind**

Renewables

# Vortex FARM



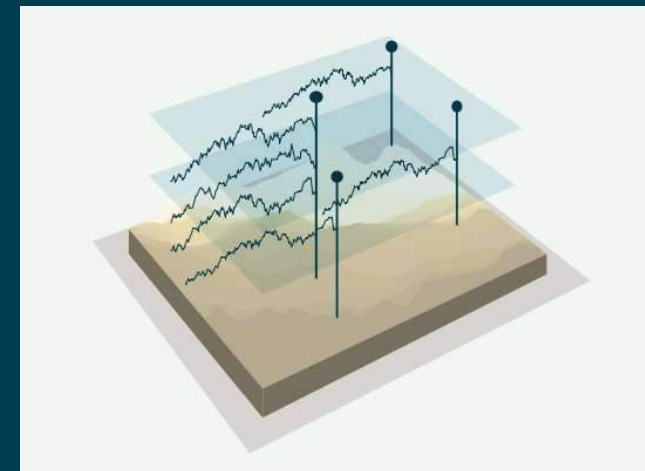
- High-resolution map
- Simulated at 100 m horizontal resolution
- Areas up to 2,000 km<sup>2</sup>
- WRG file
- Calibration with measurements (*Remodeling*)



# Vortex BLOCKS



- Simulated at 100 m horizontal resolution. Areas up to 1500 km<sup>2</sup>.
- One-year 30-minute time-series at each grid point.
- Possible to calibrate with measurements
- Output formats: KML, ESRI grid, WRG files, WRB files, and TXT format
- User-defined WRG & GIS filters, allowing for time selection or variable conditioning filters.



1. We have experience in most of the regions where offshore projects are being developed worldwide.
2. Our standard solutions: SERIES, LES, FARM, BLOCKS
3. Different customized solutions
4. Extensively validated, internally and by third parties.
5. Find different offshore related documents in our *Knowledge Center*.

03

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# YOUWIND PLATFORM INTRO & INTEGRATION



## Accelerating Offshore Wind

### Who we are

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**Youwind Renewables** is a **SaaS** company with its own developed **web-based IT-platform** to support strategic decision processes when developing or installing offshore wind projects.





# Our cutting-edge IT systems

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Technical and cost simulations of offshore wind farms.



Installation and logistics optimization of offshore wind farms.

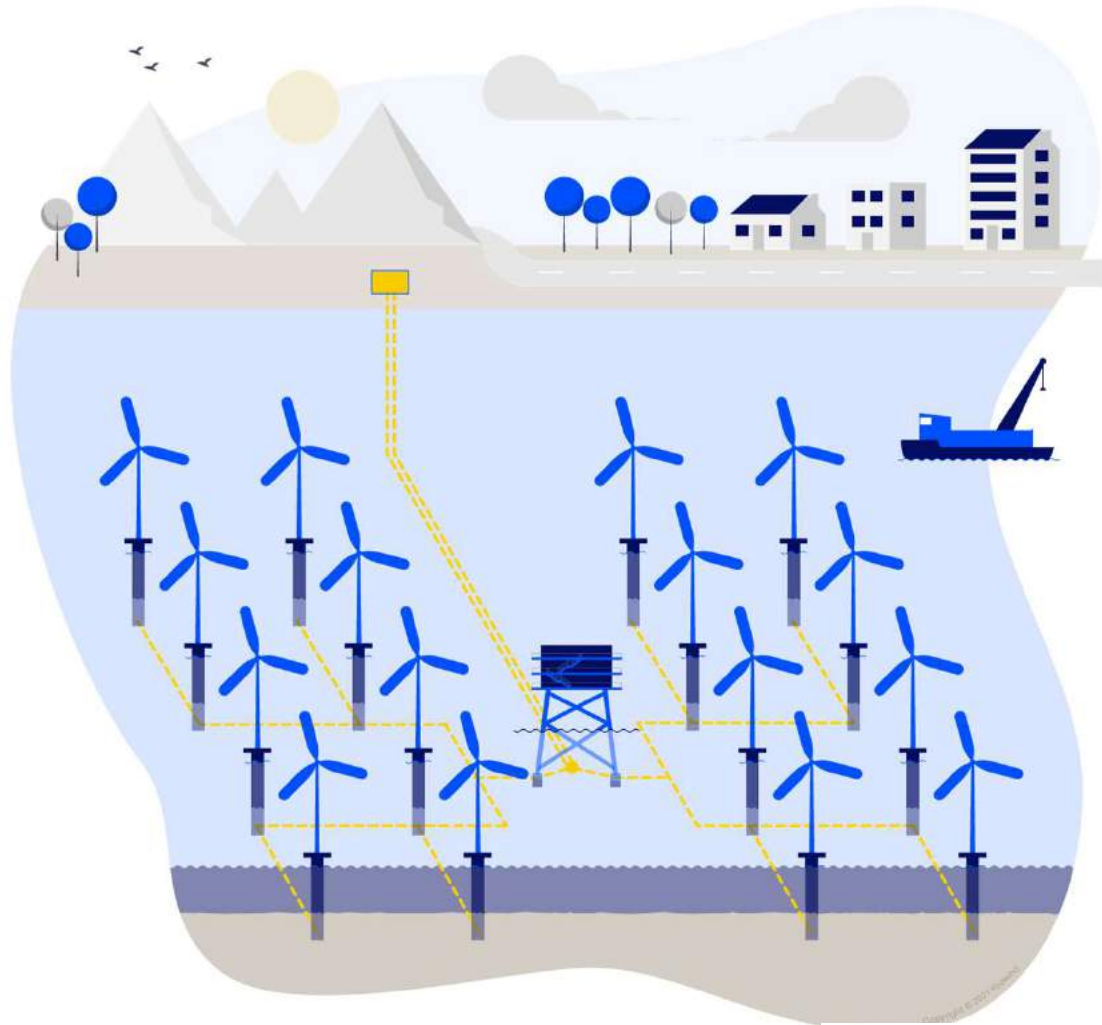


Interactive visualization platform for LCoE/IRR heat mapping plus optimal layout generator with state-of-the-art wake modelling





Technical, cost and financial evaluations of offshore wind farms under development – keep track of production, layout and business case in any project scenario



# Platforms integration



Projects Library OpWindow Anna Rivera Jov6 @ Youwind Renewables

### Sites / Morro Bay

Site form: Official data Upload weather data (0)

**Update Duplicate**

Author:  
 Is locked  
No one can make changes to the item if it's locked.

#### Site specifications

Site name: Morro Bay

Country: USA

Site area (km<sup>2</sup>): 93.0

Uses map coordinates to get elevation.  
Elevation (m): -625.0  
USA

Site area (km<sup>2</sup>): 93.0

Uses map coordinates to get elevation.  
Elevation (m): -625.0

Bathymetry minimum depth (m): 5

Bathymetry maximum depth (m): 12

Average water depth: -625.0  
Will use Elevation if supplied, else uses (bathymetry min + max) / 2

Distance to shore (km):

#### Wind resource

**VORTEX** Powered by Vortex

Site latitude (°): 35.787225468358564

Site longitude (°): -121.76698603517353

#### Wind Rose

Wind rose: ["47", "60", "49", "35", "37", "61", "105", "152", "150", "113", "162", "27", "16", "20", "27", "38"]

Site roughness length (m): 0.0002

#### Consent constraints

Maximum capacity (MW): 300.0

Maximum rotor diameter (m):

Maximum tip height (m):

#### Site specific efficiencies

Site blockage effect (%): 100.0

Site specific efficiency factor (%):

Maximum tip height (m):

#### Site specific efficiencies

Site blockage effect (%): 100.0

Site specific efficiency factor (%): 100.0

#### Site and resource uncertainties

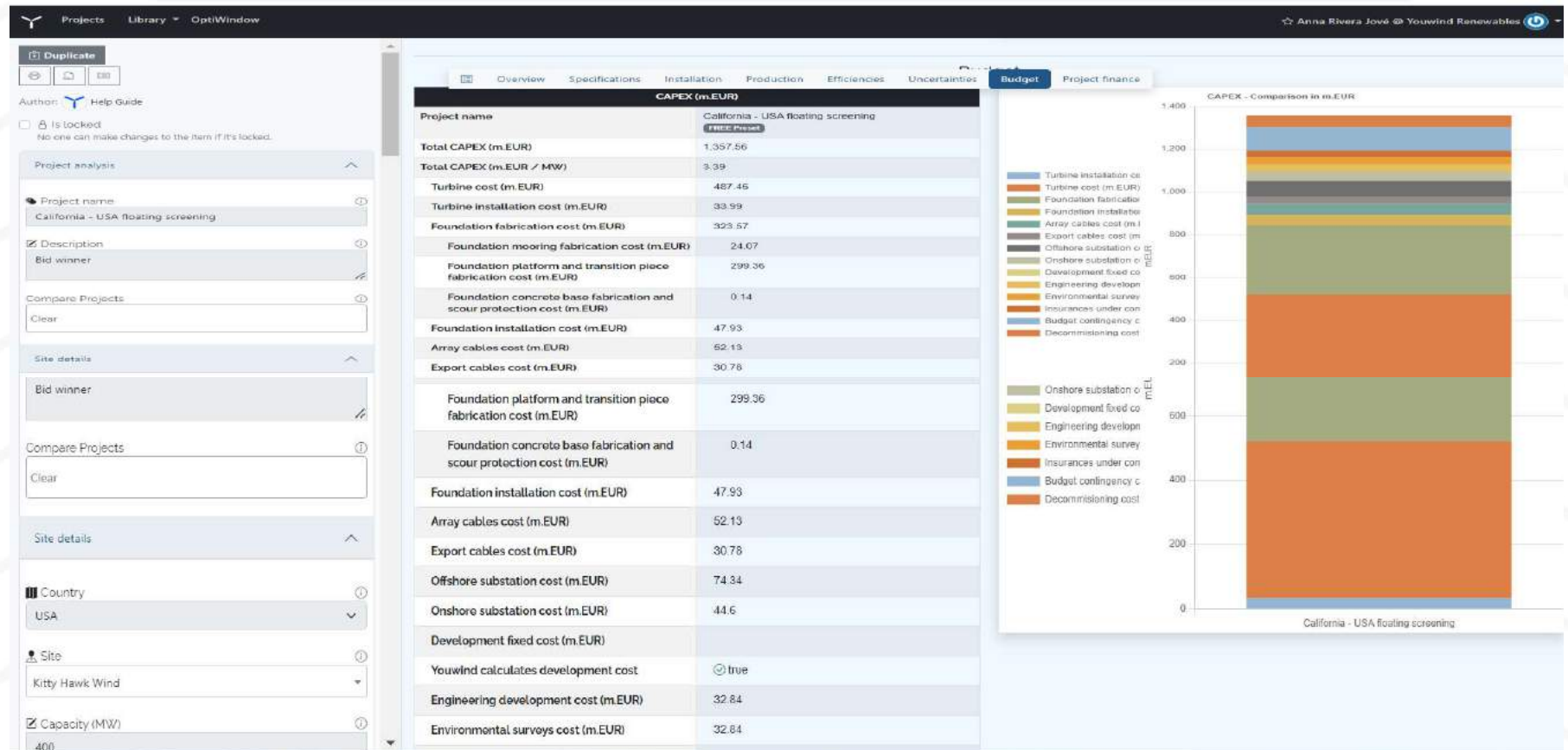
Device measurement accuracy (%): 3.5

Flow distortion (%): 0.5

Show desktop

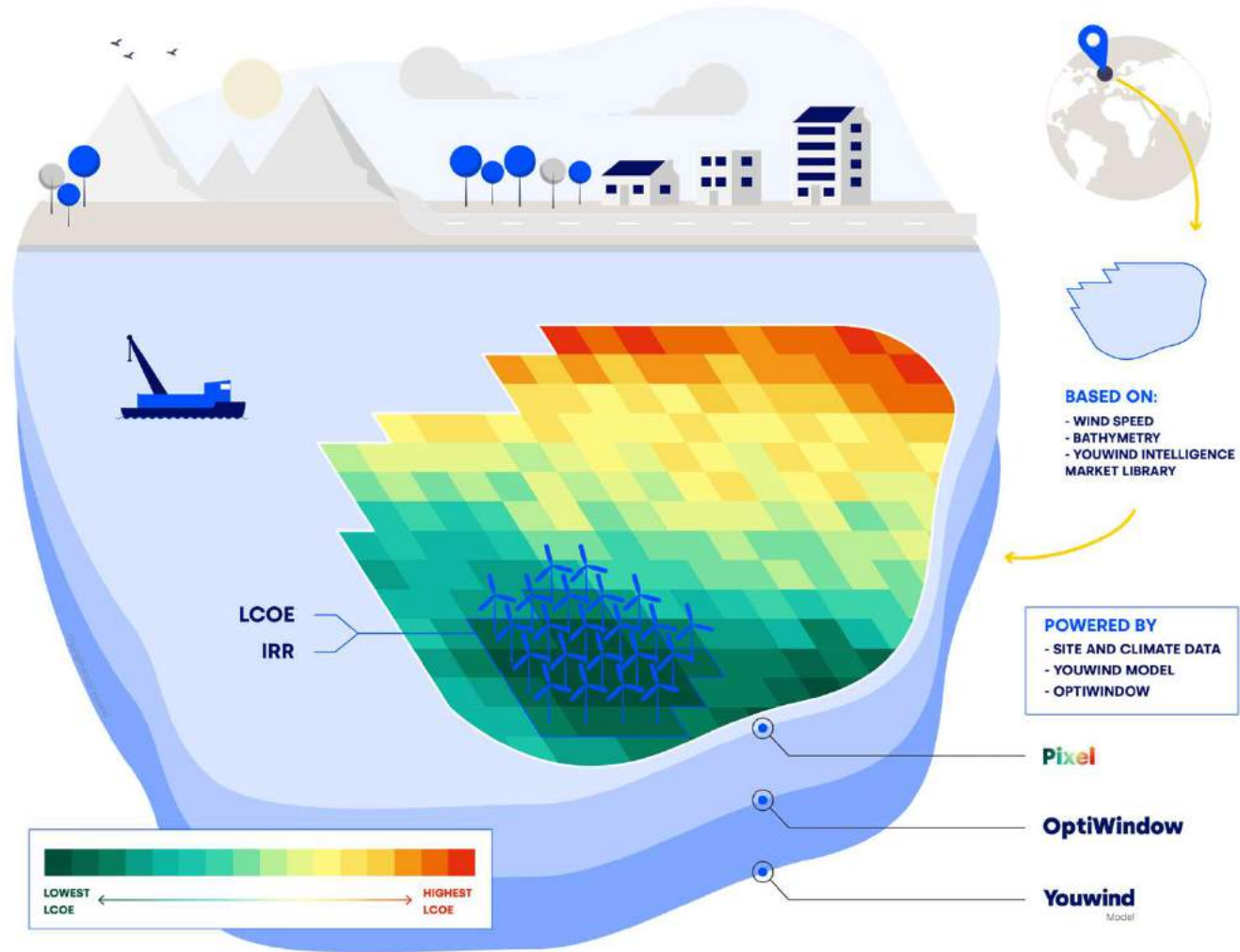
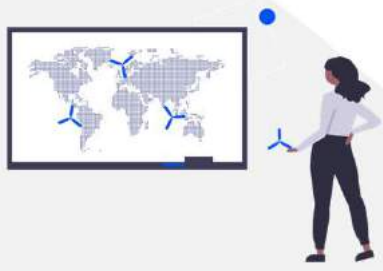


# Platforms integration





1. Accelerate early-stage screening with our interactive visualization platform
2. Linked to perfection with Youwind Model, OptiWindow and external data resources.
3. When starting a new offshore wind project, complex multicriteria challenges arise. Pixel simplifies that.



# PixelPark in a nutshell



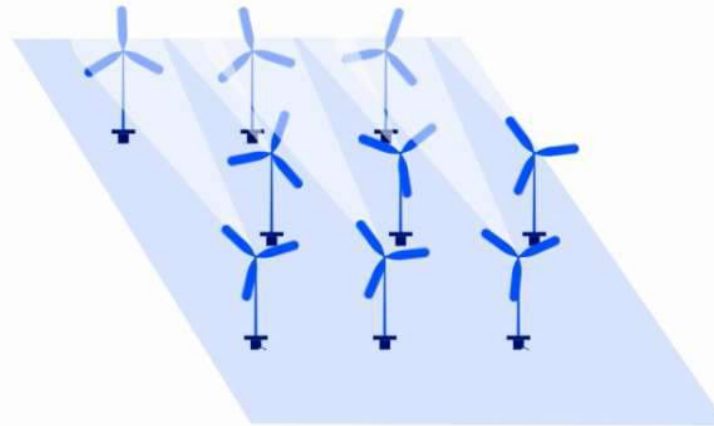
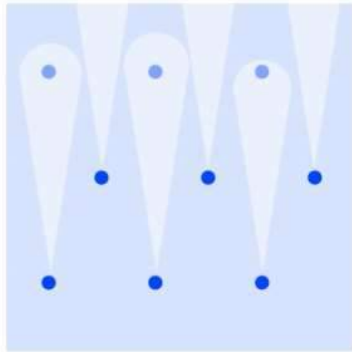
Automatically generate a park layout



Drag-and-drop turbines to optimize further



Integrated with the Youwind Model

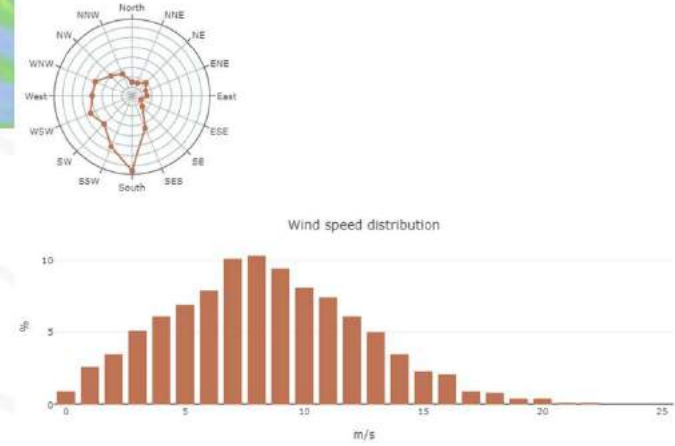
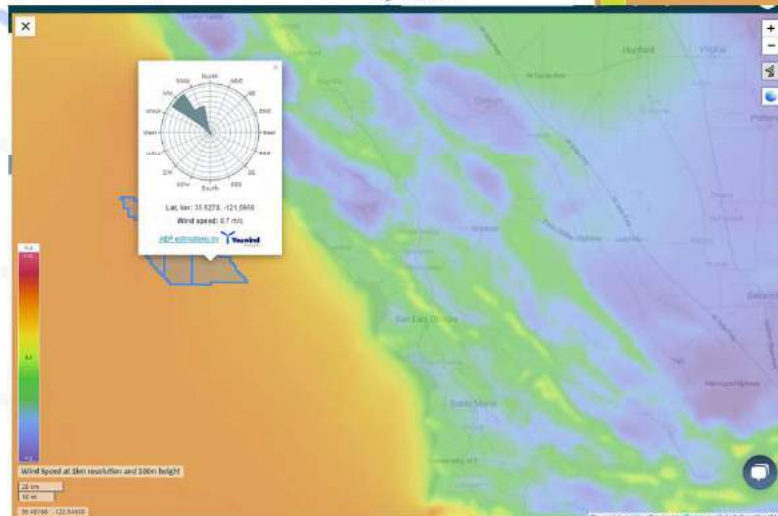
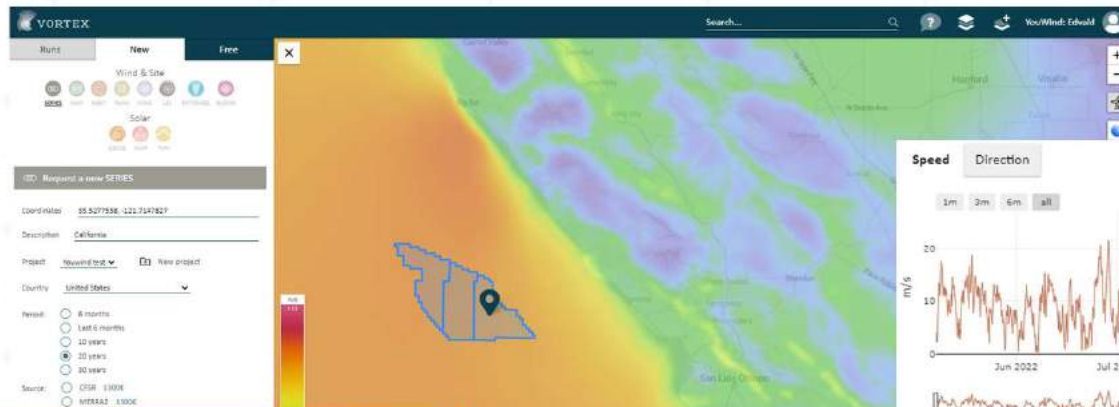


Fully Integration of [N.O. Jensen](#) modelling as well as Ørsted open-source [TurbOPark wake model](#)

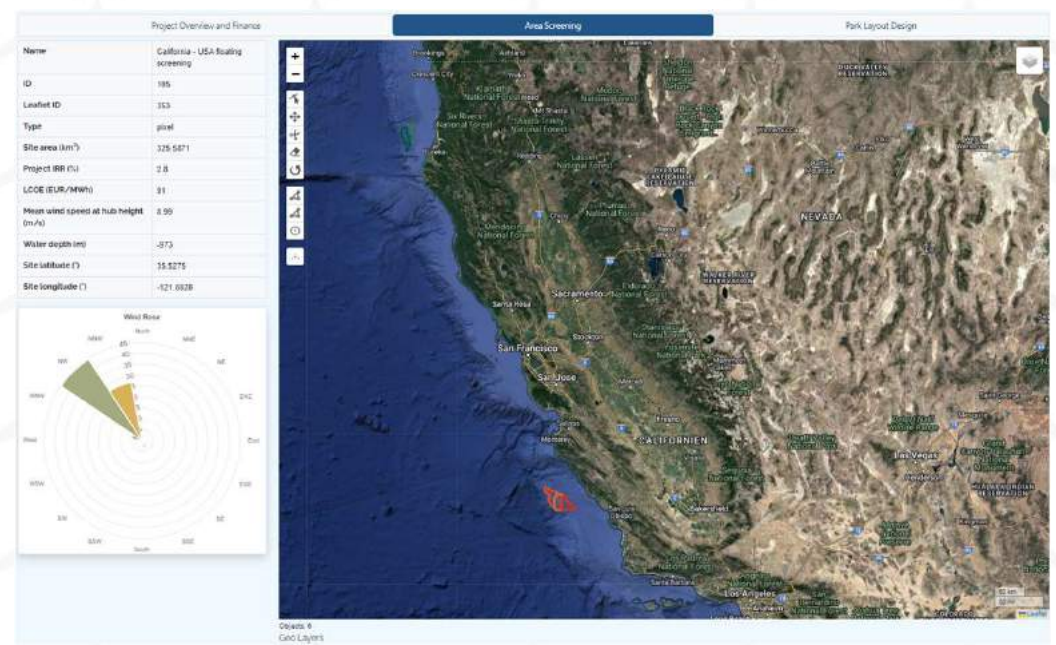
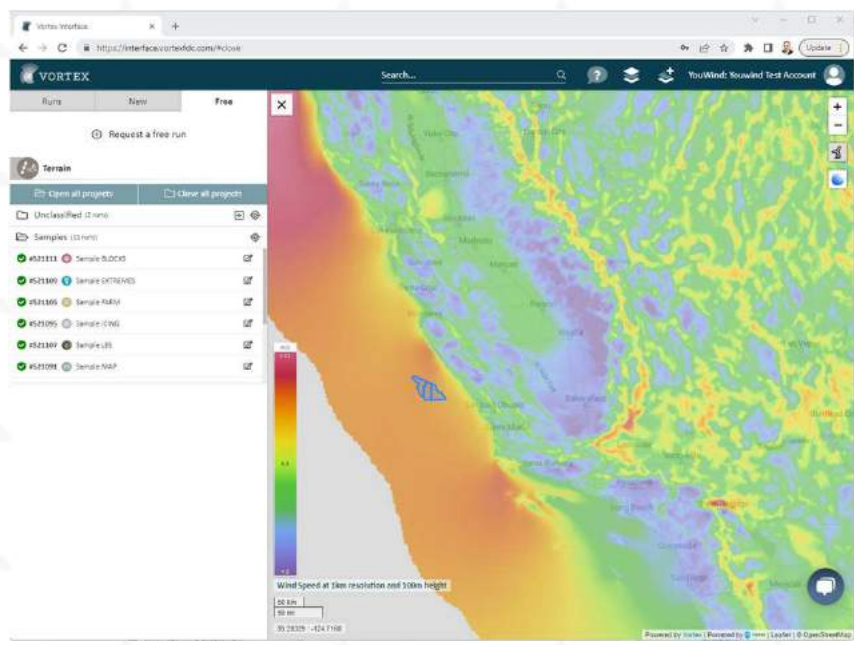


**VORTEX** **Youwind**  
Renewables

# Platforms integration

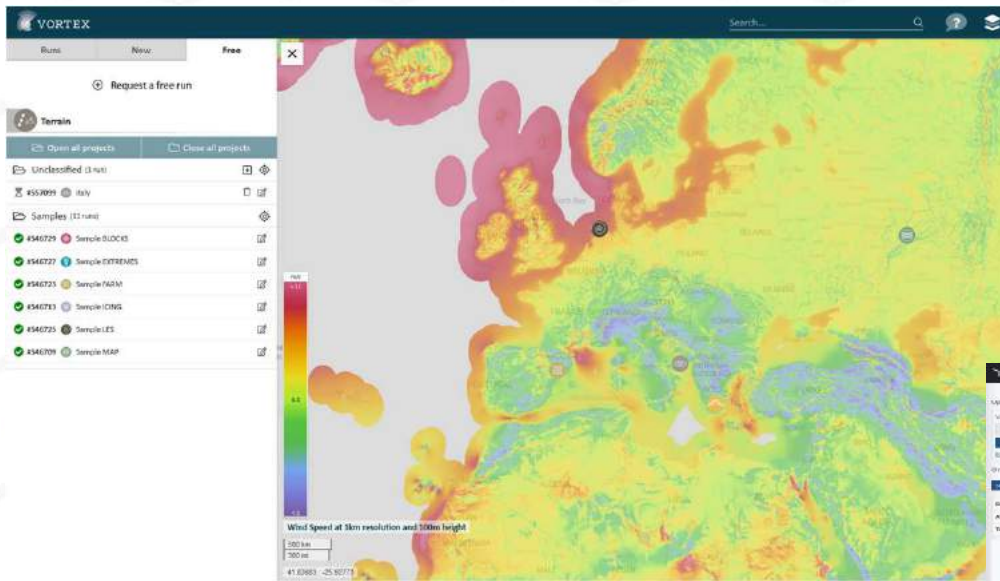


# Platforms integration





# Platforms integration



All your project runs available on the Vortex platform are visible to load into Youwind

ID	Run name	Run status	Run start	Run end	Location	Country	Latitude	Longitude	Run Information
101000	name	pending	2020-11-20 10:57:24		sweden	SE	43.79440	17.198138	see 2020-11-20 10:57:24
045726	see	done	2020-10-26 14:52:16		sweden	SE	64.184336	6.887847	see 2020-11-20 10:57:24
045716	see	done	2020-10-26 14:42:10		germany	DE	51.520100	13.000057	see 2020-11-20 10:57:24

Find the run you have submitted and when finished, you load it to your project for a full AEP result



# Platforms integration



The screenshot displays the software interface with the following components:

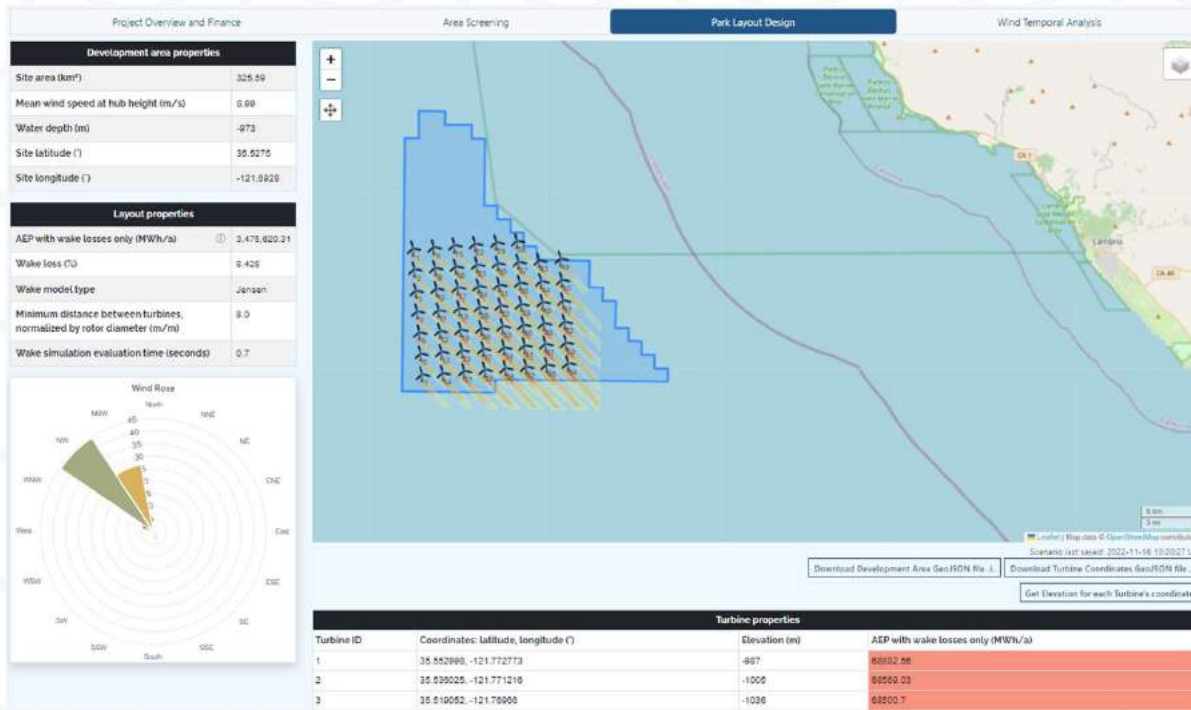
- Project Overview and Finance:**

Name	California screening
ID	47
Leaflet ID	8804
Type	pixel
Site area (km <sup>2</sup> )	2040.428
Project IRR (%)	6.7
LCOE (EUR/MWh)	101
Mean wind speed at hub height (m/s)	8.33
Water depth (m)	-1125
Site latitude (°)	35.8632
Site longitude (°)	-122.7732
- Area Screening:** A map of California showing a grid of pixels. A red rectangle highlights a specific area on the coast. A wind rose chart is visible below the map, showing wind direction and speed distribution.
- Filters:** A sidebar on the left contains various filters for the area screening table, including:
  - IRR (t) filter: 0.0
  - Hide Pixels with lower IRR values
  - LCOE (EUR/MWh) filter: 2000
  - Hide Pixels with higher LCOE values
  - Wind speed filter: 3.0
  - Hide Pixels with lower Wind speed values
  - Water depth filter: -5000
  - Hide Pixels with lower Water depth values
  - Pixel sorting method: ID

Identify best location for your farm with integrated LCoE heat map



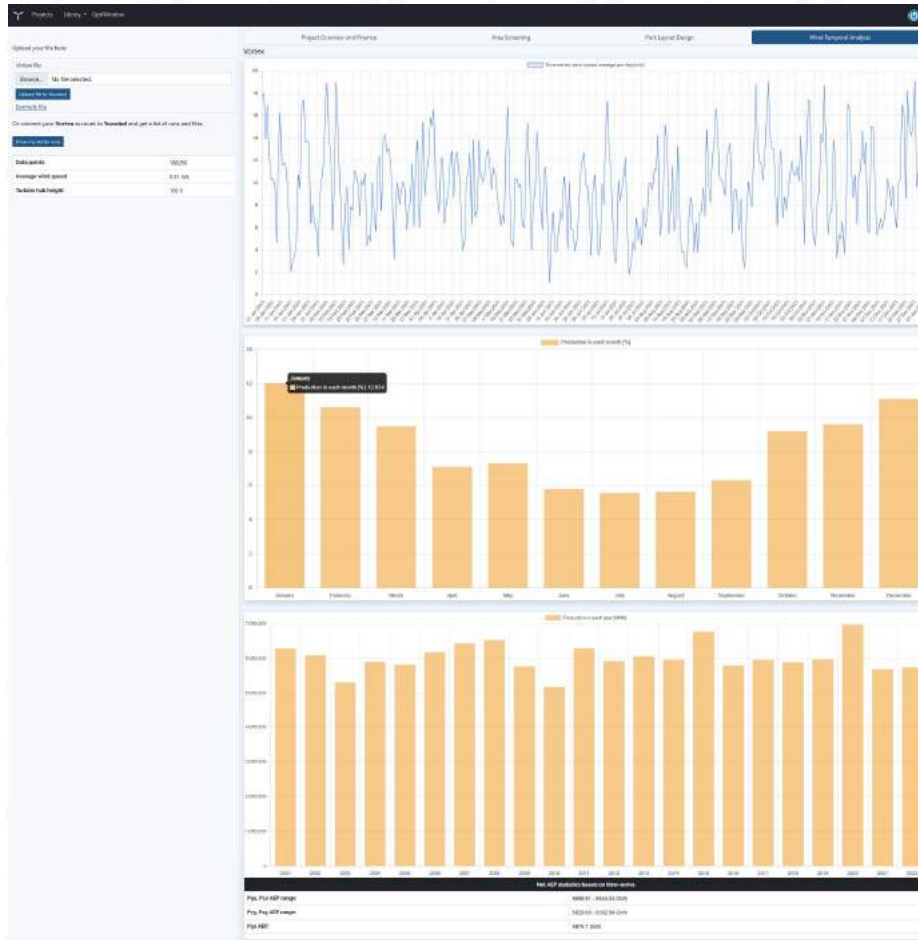
# Platforms integration



## Park layout design:

- Use the **wind rose** to optimize the wind turbine placement, minimizing wake losses.
- Calculate the yield per turbine.

# Platforms integration



Simulate you wind park with a wind time series (LES/SERIES) and calculate:

- Time variation of production, e.g. by year / month.
- The P50/P75/P90 production
- Yearly cash flows



# Don't miss our next session next week!



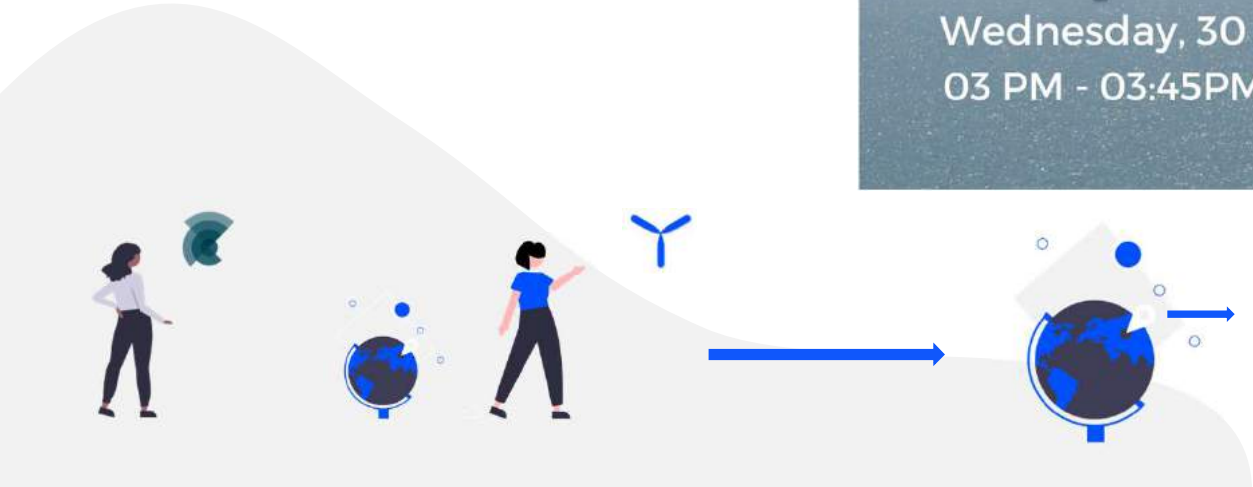
**LIVE WEBINAR**

**VORTEX**

**Youwind**  
Renewables

**Case study California Lease Sale  
(Morro Bay Area)**

**Wednesday, 30 november 2022  
03 PM - 03:45PM**



# Thanks!

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Anna Rivera Jové

Commercial Director

[arj@youwindrenewables.com](mailto:arj@youwindrenewables.com)  
[www.youwindrenewables.com](http://www.youwindrenewables.com)



Pau Casso

Technical Director

[pau.casso@vortexfdc.com](mailto:pau.casso@vortexfdc.com)  
[www.vortexfdc.com](http://www.vortexfdc.com)



04

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# Q&A SESSION

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