



BREAK THE GRIDLOCK! WIRE FOR GROWTH!



21 - 23 OCTOBER 2025
8:00 am – 5:00 pm



CAPE TOWN, SA
CTICC 2

2025 PRESENTATION

Evaluating WAsP Performance in Complex Island Terrain: Case Study of Reunion Island

OWEN STRUB

23 October 2025





SPEAKER **OVERVIEW**



OWEN STRUB

University of Reunion, EnergyLab

Master's Student in Renewable Energy





PRESENTATION **OVERVIEW**

01 • **CONTEXT AND MOTIVATIONS**

02 • **DATA AND METHODOLOGY**

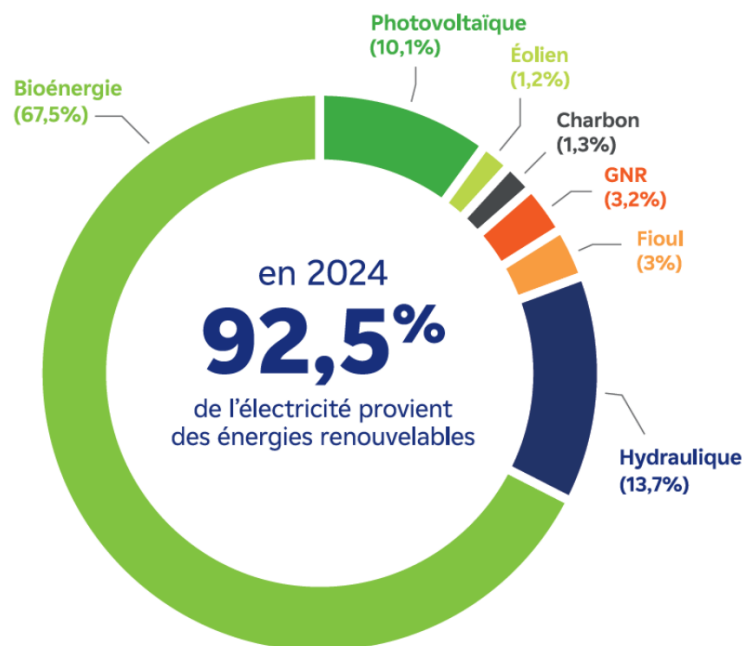
03 • **RESULTS**

04 • **CONCLUSION AND OUTLOOK**





- CONTEXT AND MOTIVATIONS



In 2024, 92.5% of electricity came from renewable energy.

Distribution of the energy mix:

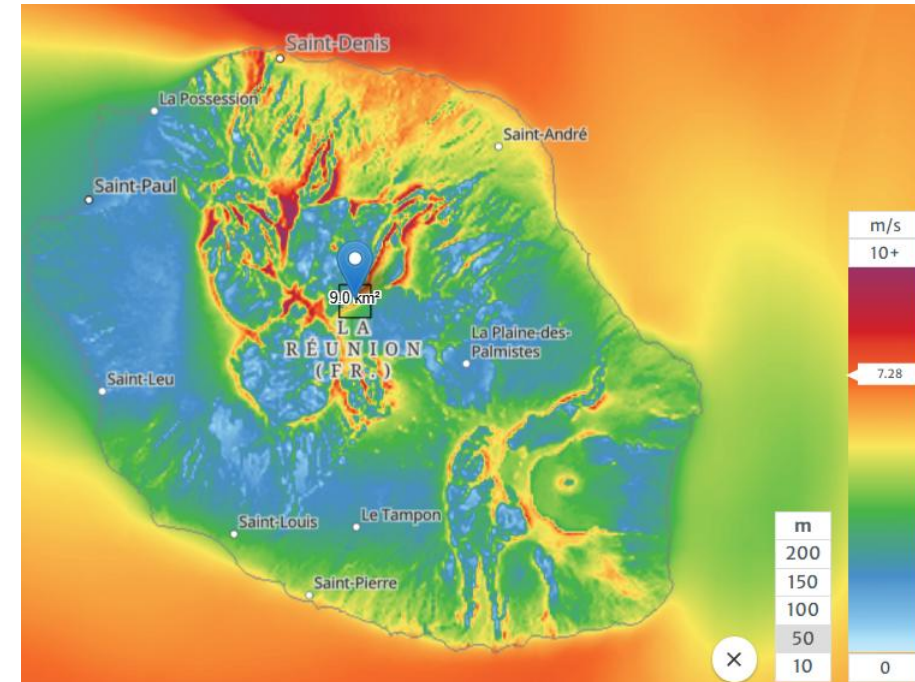
- Bioenergy: 67.5%
- Hydraulics: 13.7%
- Photovoltaic: 10.1%
- Wind: 1.2%
- Fuel oil: 3%
- Biofuel: 3.2%
- Coal: 1.3%





Weather stations location (data collected at 10 a.g.l., Source : Météo-France)

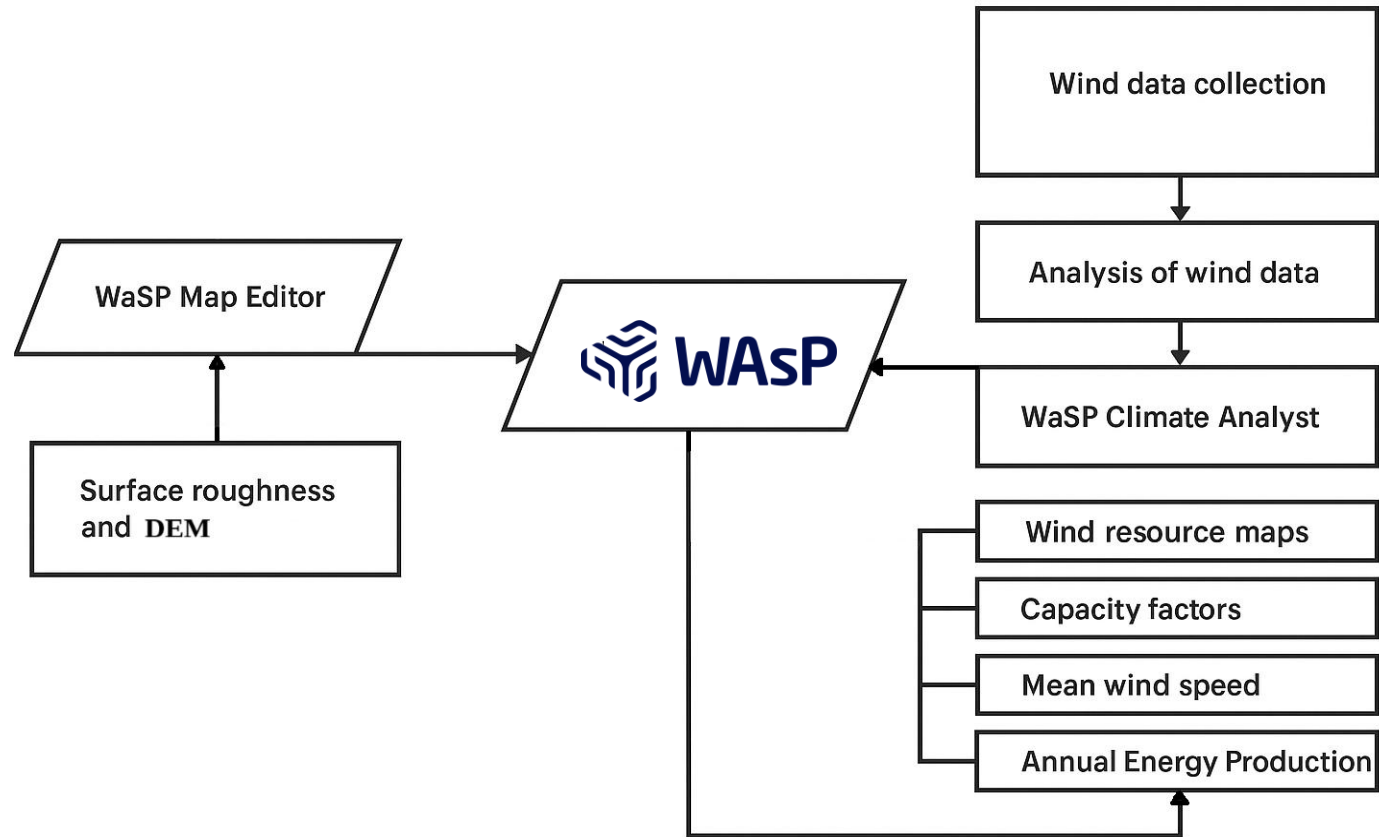
▲ : Wind farm

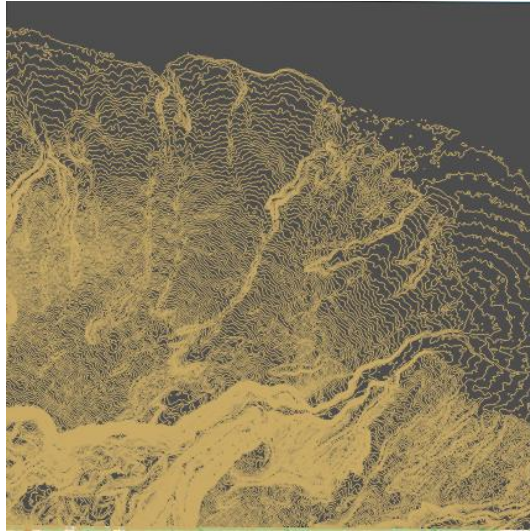


Mean wind speed at 50m a.g.l., 250m spatial resolution. (Source : Global Wind Atlas)

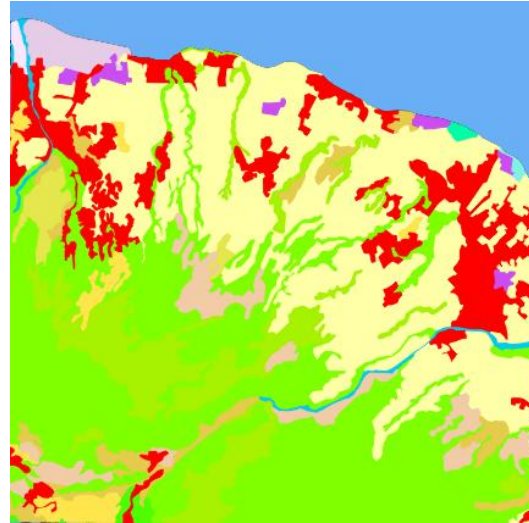


DATA AND METHODOLOGY

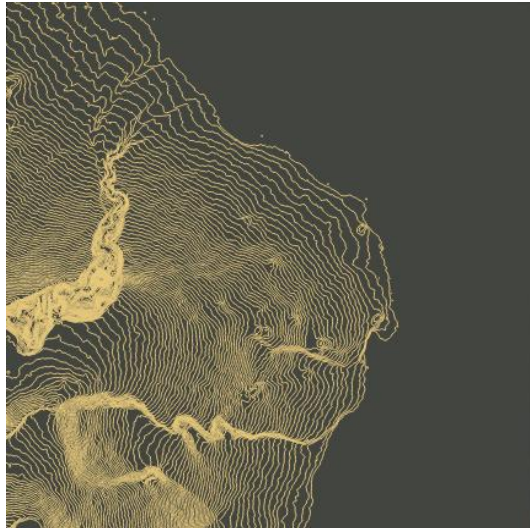




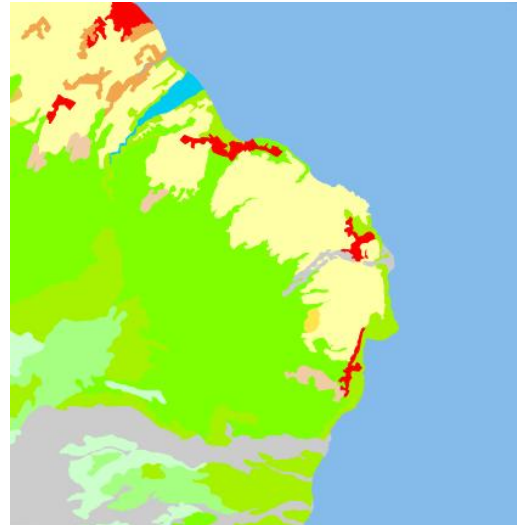
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Elevation map and Land cover class map of Site 1
(up) and Site 2 (down)



+



(Elevation from SRTM, 30 m resolution)
(Corine Land Cover, 2018)





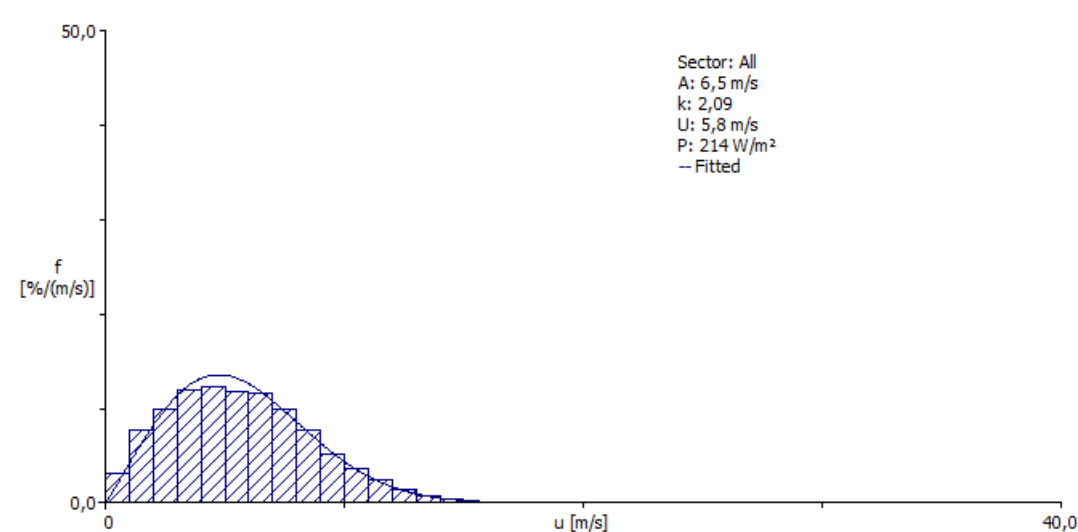
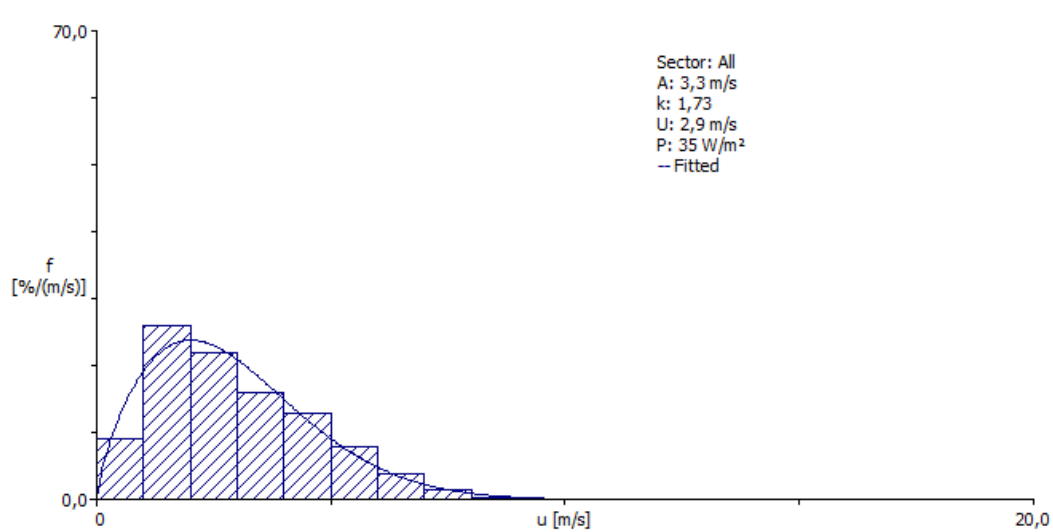
Wind measurement

Site 1

- 10 m above ground level
- 1 hour sampling interval
- Located ~12 km inland from the wind farm

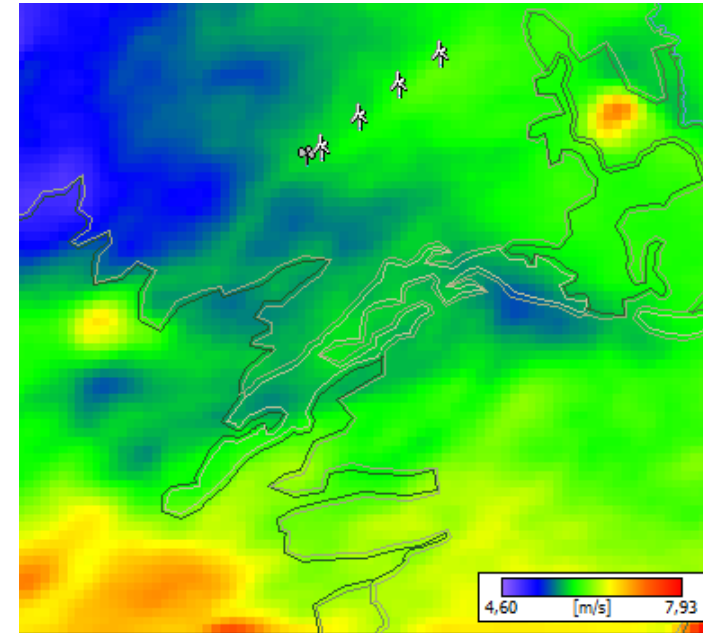
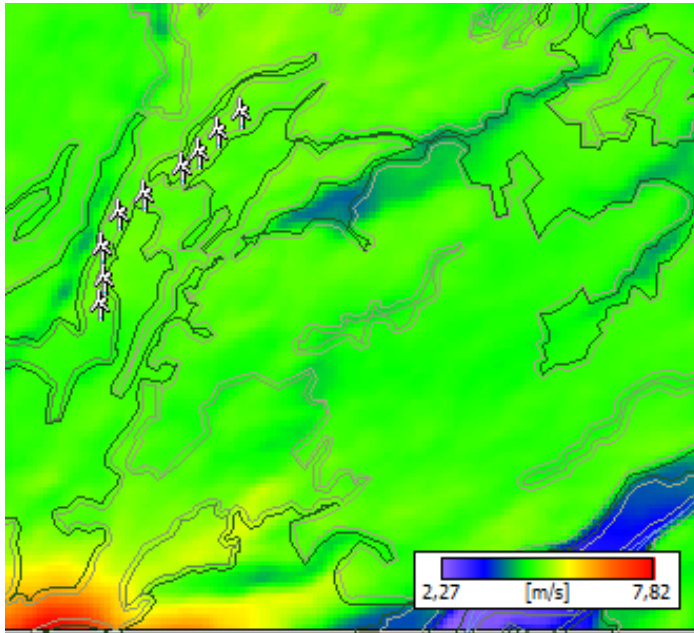
Site 2

- 62 m above ground level
- 10-minute sampling interval
- On-site measurements





RESULTS



Mean wind speed maps generated by WAsP over Site 1 (left) and Site 2 (right) with 50m spatial resolution





SITE 1

Annual Energy Production : 32,0 GWh

- Wind speed : 4,9 m/s
- CF : 20,4 %
- RIX : 2,5 %
- dRIX : -6,0 %

SITE 2

Annual Energy Production : 21,3 GWh

- Wind speed : 6,0 m/s
- CF : 30,4 %
- RIX : 1,4 %
- dRIX : -0,2 %





Site 1

Production in 2024 with 4 operating turbines : 18,1 GWh

Estimation by WasP model : 14,2 GWh
i.e. 21,3 % lower

Site 2

Production expected between 16 GWh and 24 GWh

Estimation by WasP : 21,3 GWh

Differences can be explained by :

- Quality/emplacement of wind data measurements
- $dRIX < 0$, implying an under-estimated wind speed
- Turbine model of 2MW instead of 2,2MW
- Production data measured at grid level





CONCLUSION AND OUTLOOK

- Better spatial resolution compared to GWA (adapted for micrositting)
- Very low uncertainty when provided with site-representative input data notably in moderate terrain complexity.
- Despite lack of some datas, WAsP remains an efficient tool for preliminary site assessments and feasibility studies on the island.

Future work should focus on building a high-resolution local wind atlas for Reunion Island to support more precise micrositing and repowering projects.

Improving model accuracy by combining CFD, LiDAR measurements, supervised learning algorithm...



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THANK YOU FOR LISTENING!

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