

Experiences from Developing the first Offshore Wind Farm



Vietnam Wind Power Conference

12 June 2019

A WORLD ELECTRIFIED BY
RENEWABLE ENERGY





Neart na Gaoithe

Hornsea

Horizont



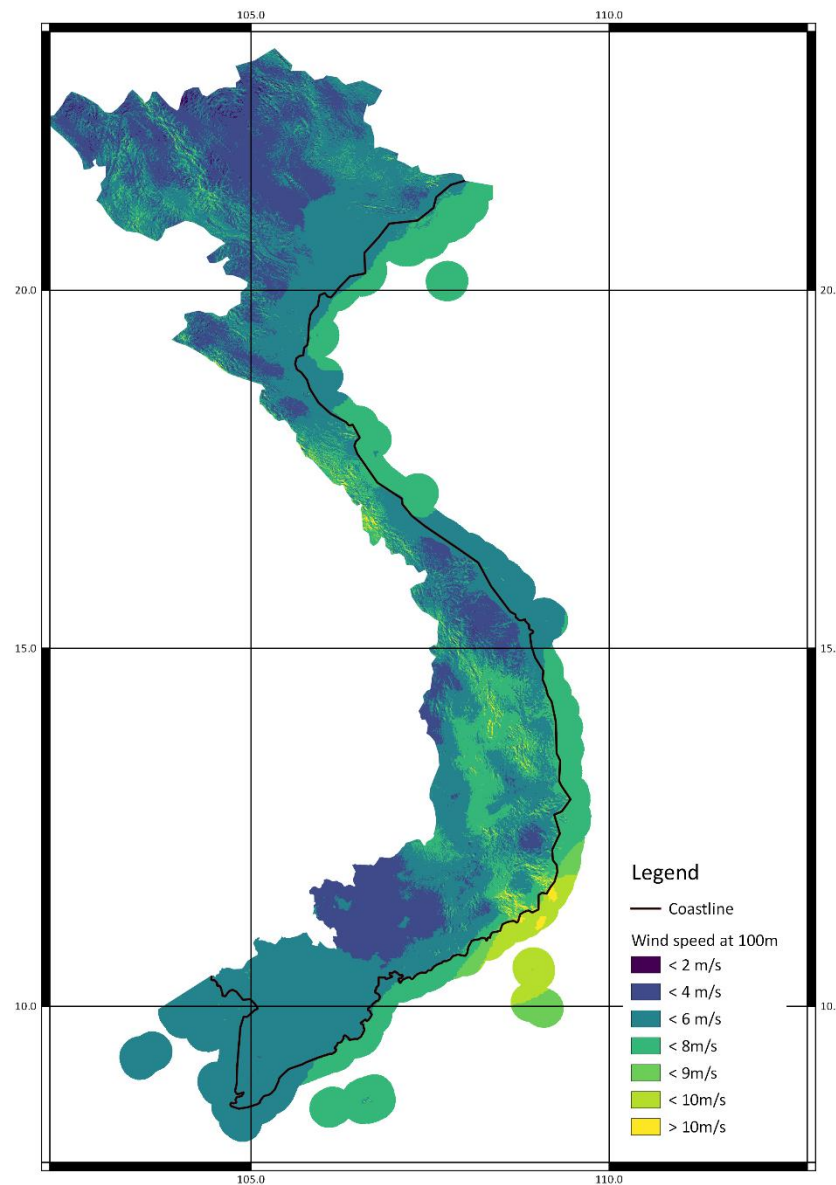
Vietnam - Resource, Legislative and Planning Background

Resource

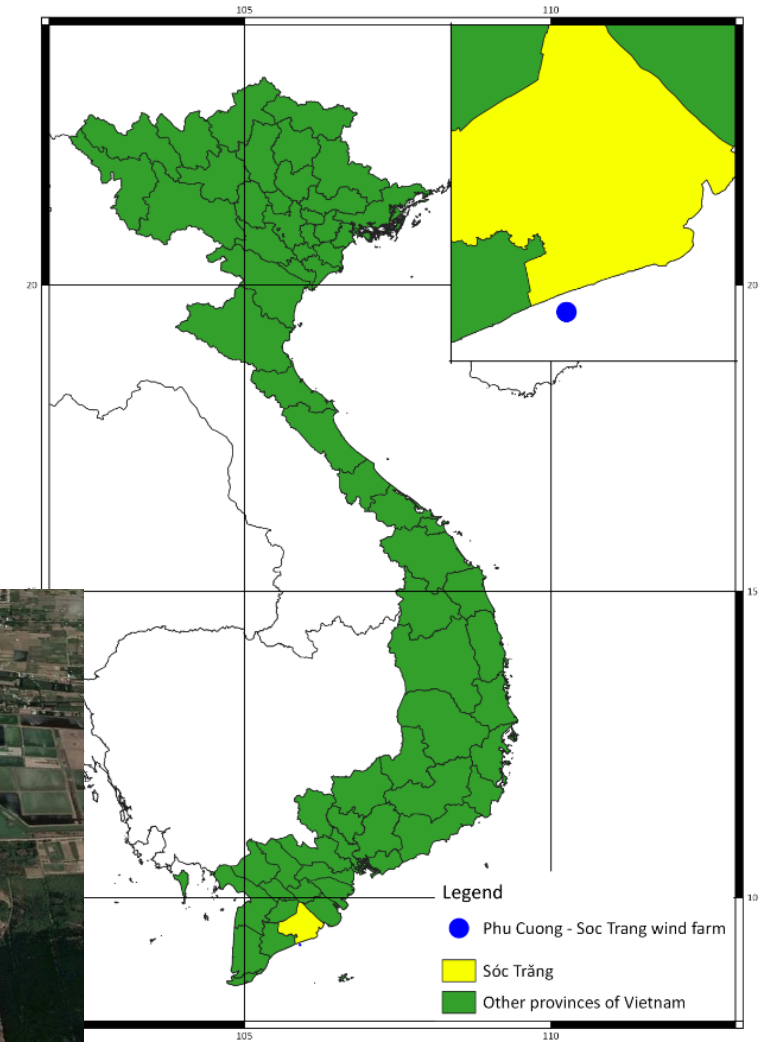
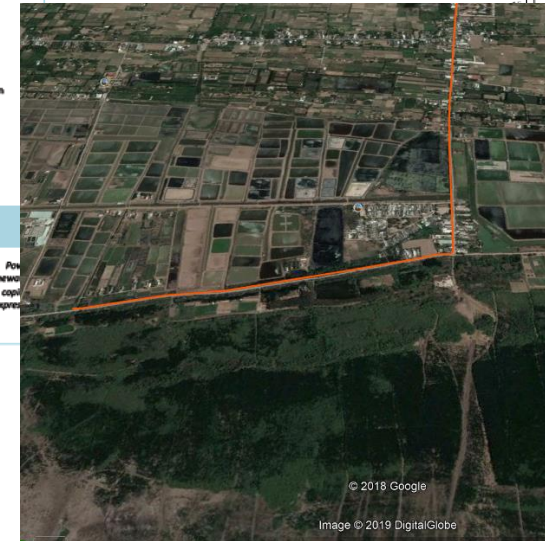
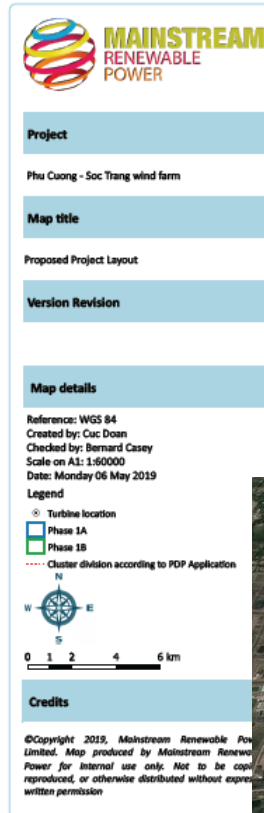
- As with onshore, south has best offshore wind resource
- Best resource off Ninh Thuan, Binh Thuan but deeper water than further south in Mekong

Key Planning Stages

- Survey rights secured
- Pre-FS and PDP Amendment submission, IRC and ERC
- FS (MONRE role offshore)
- Grid Connection Agreement
- PPA



- Phu Cuong Group USTDA grant
- Partnership between Mainstream and Phu Cuong Group in 2018

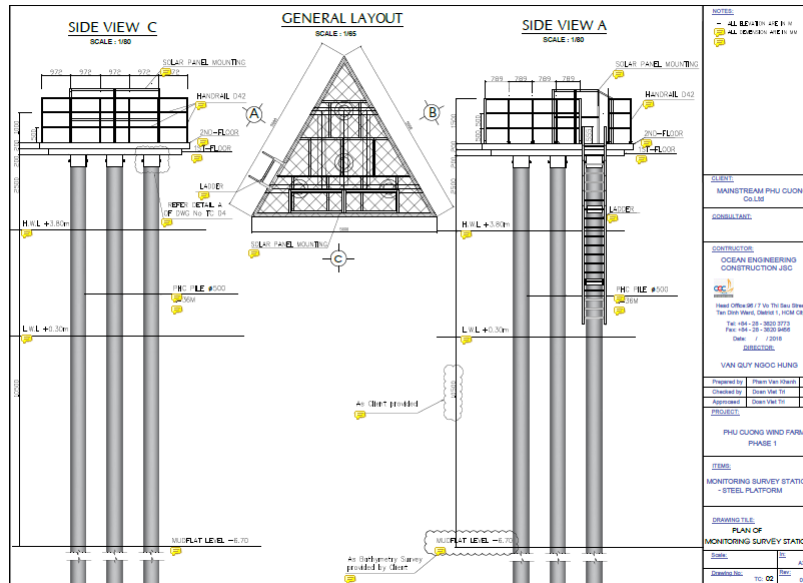


Project Development to Date (1)



- **Wind Measurement Campaign**

- 4 years wind data from onshore met mast
- LIDAR Platform Installed by local contractor in August 2018 in Block 4
- Lidar unit was placed adjacent to onshore met mast in November 2018
- Lidar unit placed on the offshore platform in December 2018 and currently measuring.
- Second LIDAR to be placed in Phase 1A area by local contractor in Q2 2019

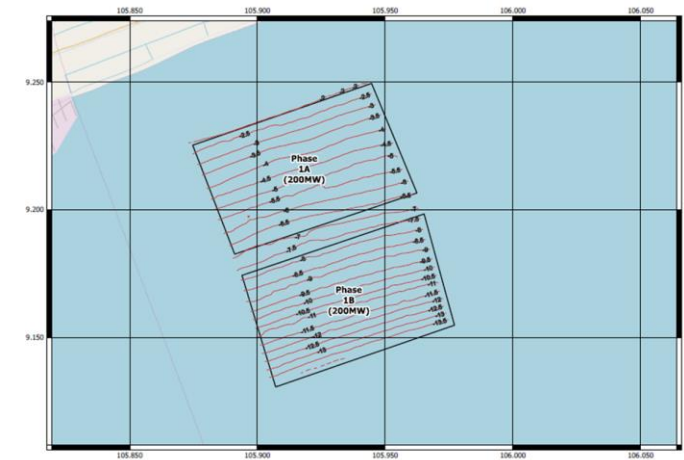


Project Development to Date (2)



- **Metocean Campaign**

- Collaboration between eCoast (New Zealand) and University of Science, VNU Ho Chi Minh City.
- Bathymetry Survey of started in September 2018 now completed.
- Wave height and current speed instruments placed on the sea-bed. Data recovery in October 2018 and December 2018.

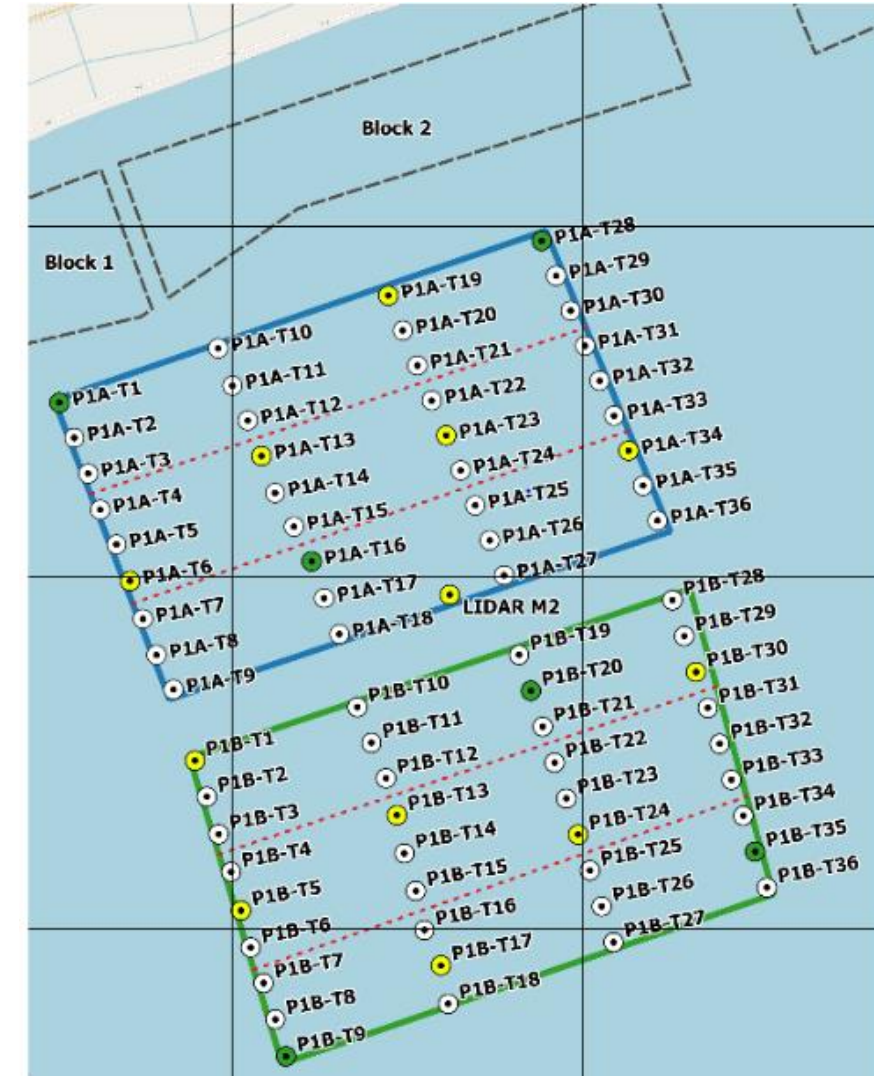


Development Progress to Date (3)



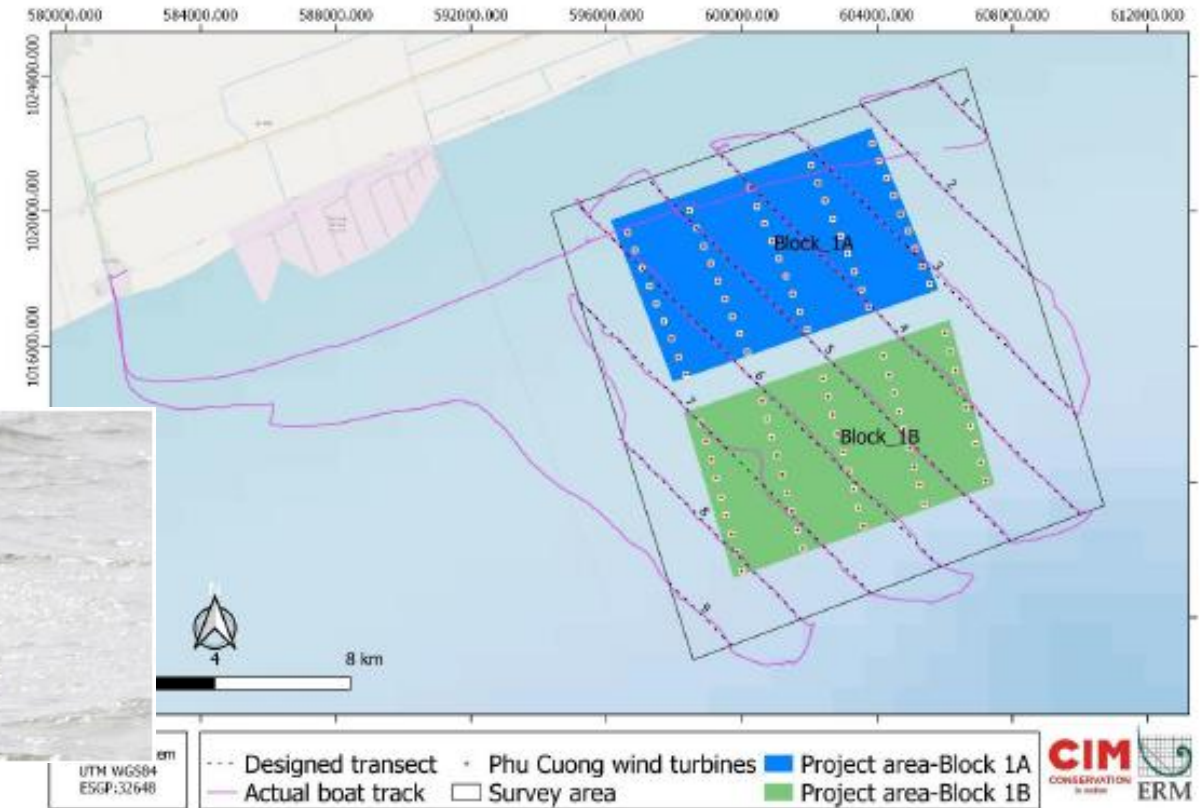
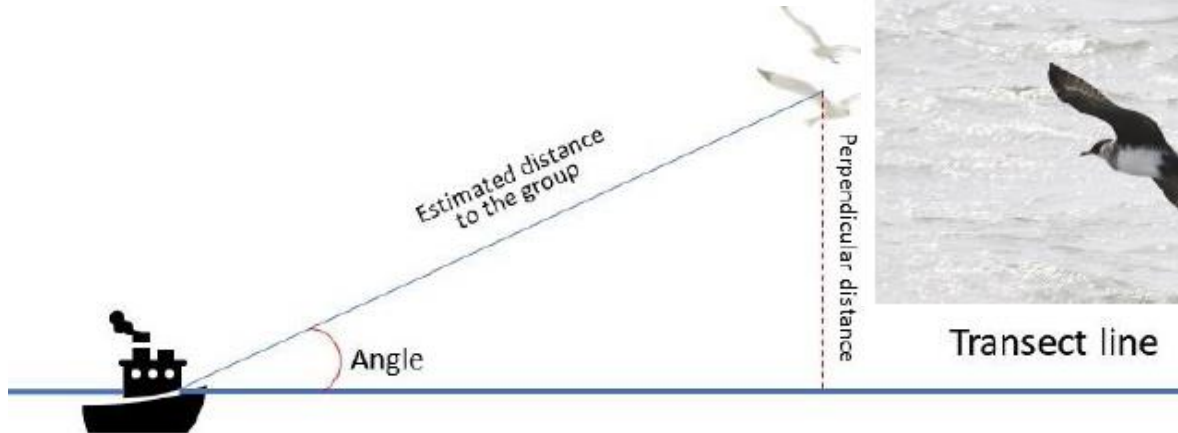
- **Geotechnical Investigation Campaign**

- 3 boreholes completed in Block 4 in 2016
- Detail Geotechnical Investigation commenced in May 2019 by Fugro, preceded by UXO Survey by Lung Lo.



Development Progress to Date (4)

- **Environmental Impact Assessment Studies (ESIA and regulatory EIA)**
 - ESIA ongoing by ERM (international consultant) and EIA ongoing by Institute of Energy (Vietnamese consultants).
 - Studies include both dry season and wet season bird and bat surveys.

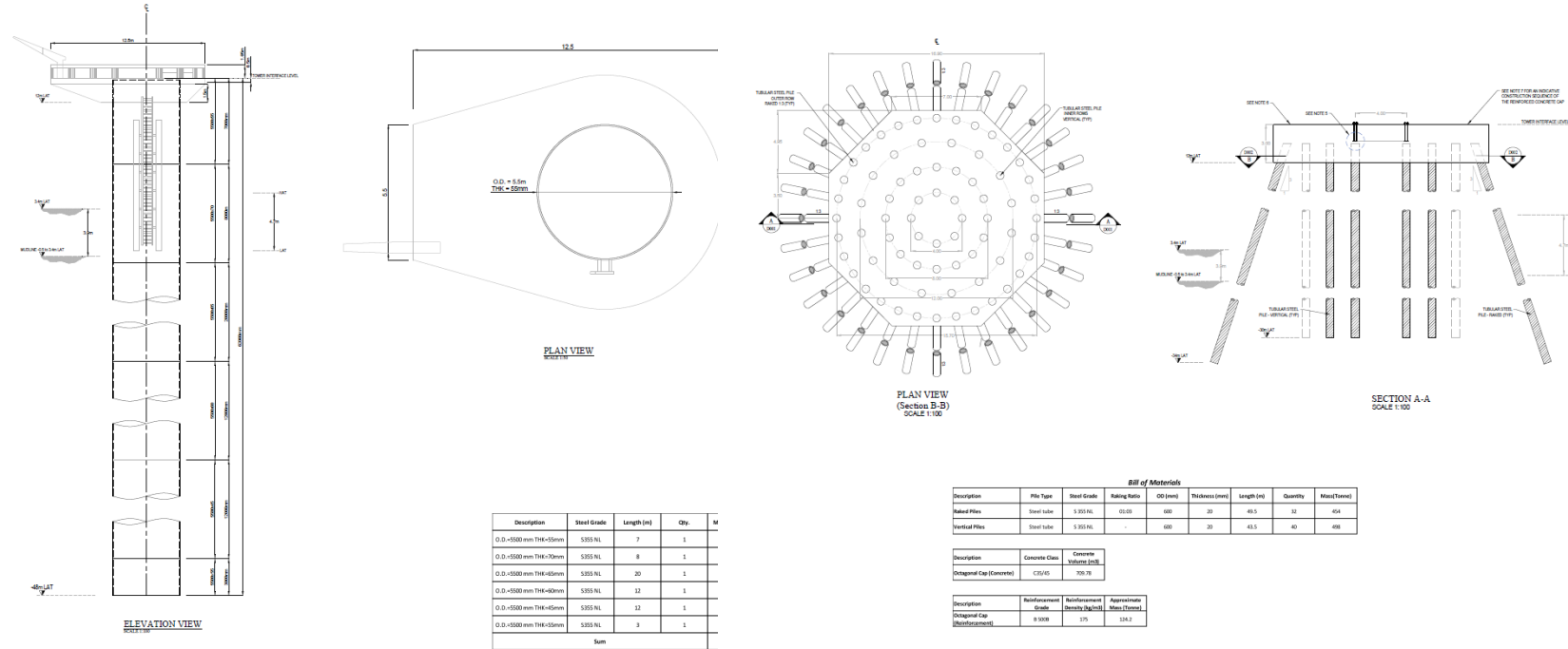


Development Progress to Date (5)



● Wind Turbine Foundation Design

- Two preliminary concept designs completed (steel monopile and concrete piled raft)
- Designs sent to Vietnamese and International EPC Contractors for pricing.
- Non binding offers received from International WTG suppliers and BOP Contractors
- Formal tender when Geotechnical Investigation report available



Next Steps



- **Next Key Project Development Milestones**

- Tender Process for Phase 1A Turbine Supply and Balance of Plant Q3 2019
- In Principle Approval for Phase 1A PPA, Grid Connection agreement, environment approval Q4 2019
- Financial Close Phase 1A - Q2 2020
- Construction Start Phase 1A - Q2 2020

Thank-you

Bernard Casey

Development Director, Mainstream Renewable Power

Email: bernard.casey@mainstreamrp.com