Vietnam’s Offshore Wind Potential

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Chief Financial Officer

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Who We Are

- Mainstream Renewable Power Limited ("Mainstream") is a leading **global international developer** of large **utility-scale** renewable energy projects.

### Delivered into Operation
- **804 MW**

### In Construction
- **707 MW**

### Offshore Assets Sold with Consent
- **3.450 MW**

### In Development
- **11.270 MW**

- **Four** platforms – onshore wind and solar ASEAN, LATAM, Africa and global Offshore wind.
- **Offshore** – developing SE Asia’s first large scale offshore wind farm – 800MW Phu Cuong Soc Trang, Vietnam.
Our Offshore Wind Development Experience

TOTAL: 6,000MW

- 25MW Arklow Bank, Ireland
- 504MW Greater Gabbard, England
- 288MW Butendiek, Germany
- 450MW Neart na Gaoithe, Scotland
- 4,000MW Hornsea, England
- 800MW Phu Cuong, Soc Trang, Vietnam

Airtricity
Airtricity
Airtricity
Mainstream Renewable Power
Mainstream Renewable Power
Mainstream Renewable Power

2002 - 2019
The regional opportunity
Vietnam and renewable energy
Vietnam

- Total area: 331,212 km²
  - ~50% larger than UK Coastline: 3,444km

- Population: 97m
  - ~1/3 live in urban areas

- Key sectors
  - Agriculture, fishery
  - Food processing
  - Mining
  - Manufacturing
  - Banking & finance
  - Tourism

- Economic sectors

- Imports
  - Fuel imports $12bn
  - Mineral fuels including oil are 4.6% of imports. Imported almost $2bn of coal in 2018
World class resources

> Vietnam has some of the best wind and solar resources in the region
> Potential for 300GW solarPV, 20+GW onshore wind and 475GW offshore wind
> Current 51GW total installed capacity
> PDP VII
  • 45GW more coal by 2030
  • 18GW renewable energy by 2030
800 MW Phu Cuong Soc Trang Offshore Project

➢ Phu Cuong Group USTDA grant 2014
➢ Partnership between Mainstream and Phu Cuong Group since 2017
➢ USD 1.6 BN investment
Project Development to Date (1)

● Wind Measurement Campaign
  ➢ 4 years wind data from onshore met mast
  ➢ LIDAR Platform M1 Installed in August 2018 in Block 4
  ➢ Lidar unit placed on the M1 platform in December 2018 and currently measuring.

● Wind Measurement Campaign
  ➢ LIDAR Platform M2 Installed in July 2019
  ➢ Lidar unit placed on the M2 platform in September 2019 and currently measuring.
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. Report issued

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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.
● Feasibility Study (FS) and Technical Design

➢ FS ongoing
   - finalisation of grid line route
   - Scada and metering study
   - Grid Connection Agreement

➢ Technical Design ongoing by International Consultants (GDG, Xero Energy, OWC).
Attracting overseas investment
International project finance
Offshore PPA

- Government decision No. 39/2018/QD-TTg dated 10\textsuperscript{th} September 2018
- Onshore 8.5 c/KWhr, Offshore 9.8c/kWhr
- ‘Offshore wind turbines are wind turbines whose foundations are constructed outside the lowest average sea level edge for 18.6 years.’
Concluding remarks
Thank-you