5 February 2010

Development of an Offshore Wind Farm

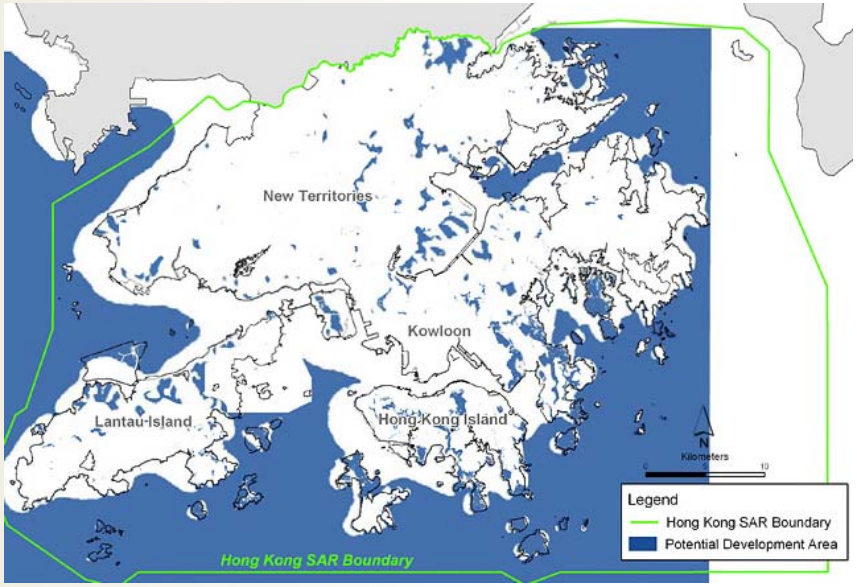
Project Background

- Experience gained from operation of Lamma Winds
- Develop renewable energy in support of Government policy
- Combat climate change & improve air quality
- Reduced dependency on fossil fuels
- Socio-economic benefit

Site Search Study

- Carried out feasibility study for development of a large scale wind farm since 2006
- No suitable land for development of onshore wind farm

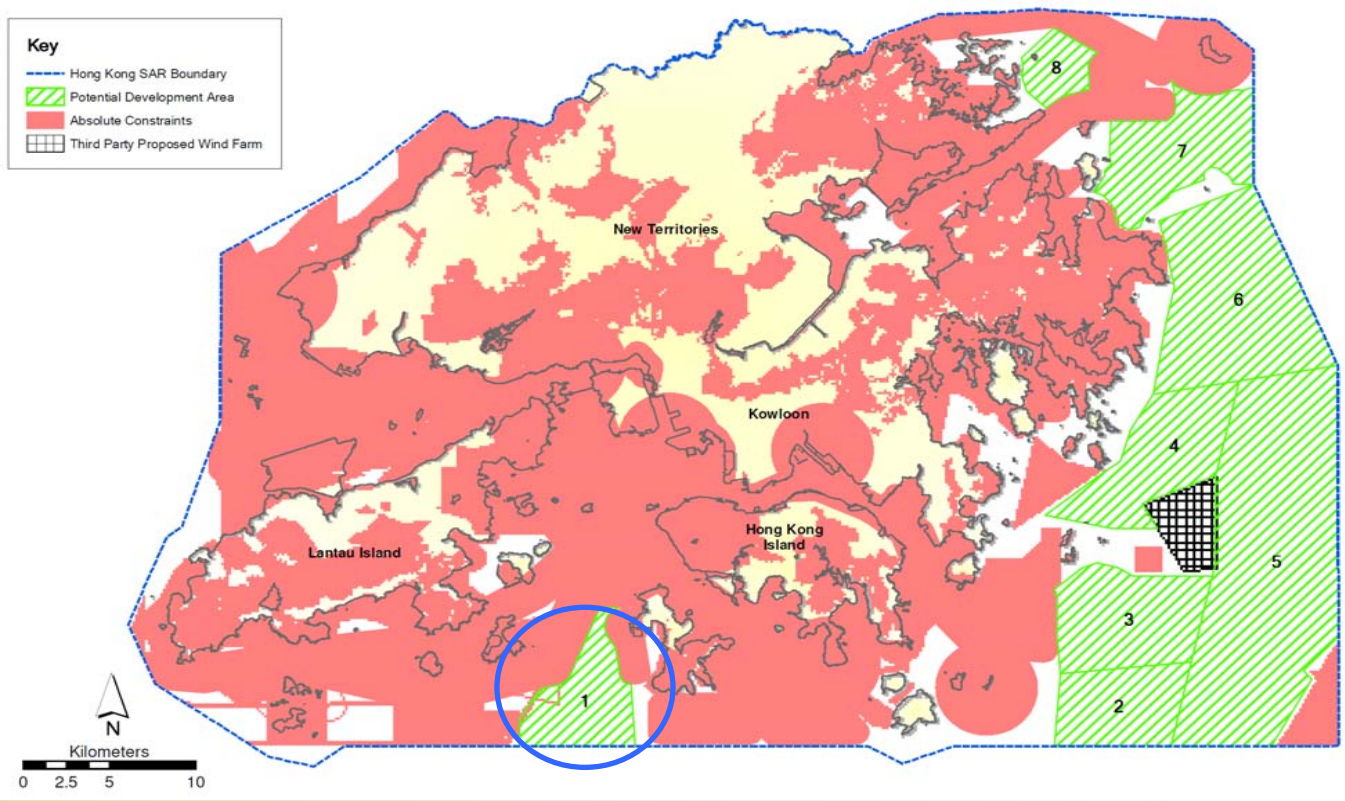
Hong Kong Map



Areas with Adequate Wind Resource for Development of Wind Farm

Site Search Process

- 8 alternative sites have been reviewed
- South West Lamma is the most preferred site for offshore wind farm development



Advantages of SW Lamma Site

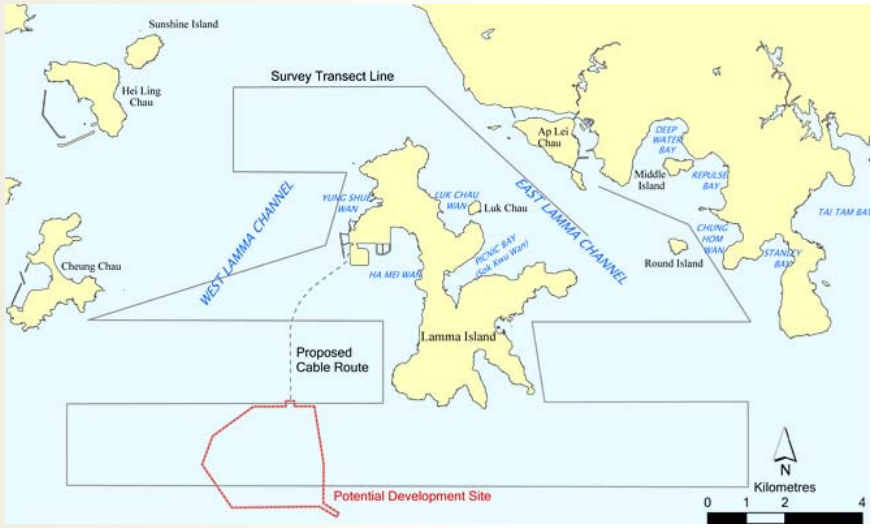
- Least environmental impact

- Merits in technical & geographical aspects:
  - Shorter transmission cable
  - Utilization of LPS as logistics support during construction phase
  - Shallow water compared with Eastern Offshore sites

- Lower total costs

EIA Study – Terrestrial Ecology

- Baseline survey
- 14 identified species recorded; most are common and widespread
- Wind farm is not located within important bird habitat or on flight path of migratory birds
- Most birds in the areas are low flying; potential risk of bird collision is low



Survey Transect of Avifauna Vessel Survey

Monitoring Programme

Pre, during & post installation monitoring of birds for 3 years

EIA Study – Marine Ecology

- Baseline survey
- Assess potential impacts on marine ecology
- No unacceptable impacts predicted to marine ecological resources

Mitigation Measures and Monitoring Programmes

- Restrictions on working vessel speed
- Using hydraulic tools for foundation works
- Adoption of closed periods for foundation works during peak marine mammal season
- Finless porpoise / sea turtle exclusion zones during foundation work
- Pre, during & post installation monitoring of marine mammals for 3 years

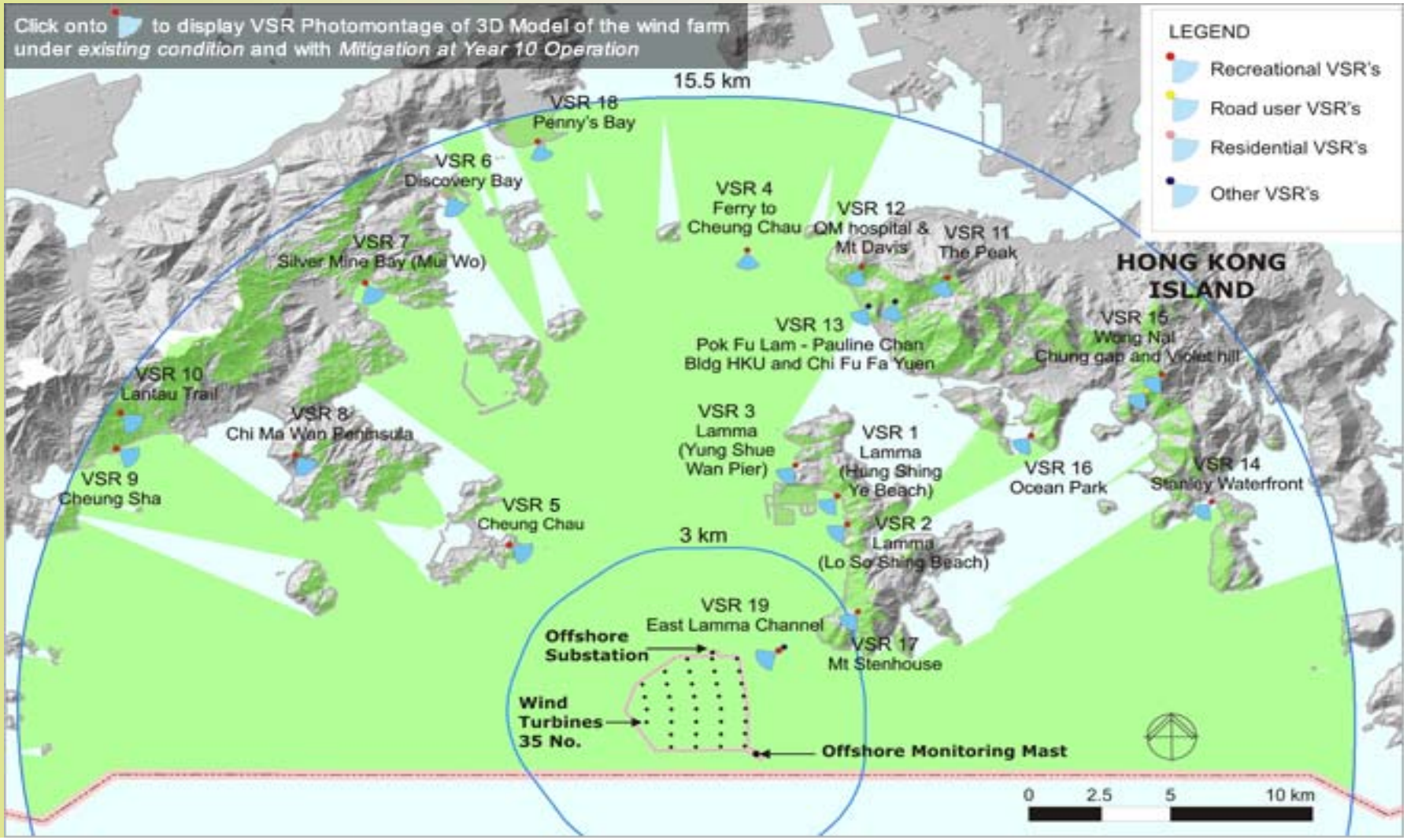
EIA Study - Fisheries

- Assess potential impacts on fisheries
- Loss of 0.16 ha of habitat only represents 0.0001% of Hong Kong's territorial waters
- EIA assumes 0.42% of Hong Kong's territorial waters will be lost for fishing operation due to exclusion of fishing vessels from the wind farm area. No unacceptable impacts expected
- Wind turbine support structures and scour protection will provide hard substrate habitat in the wind farm area. This "artificial reef" effect will have potentially positive impact on fishery resources

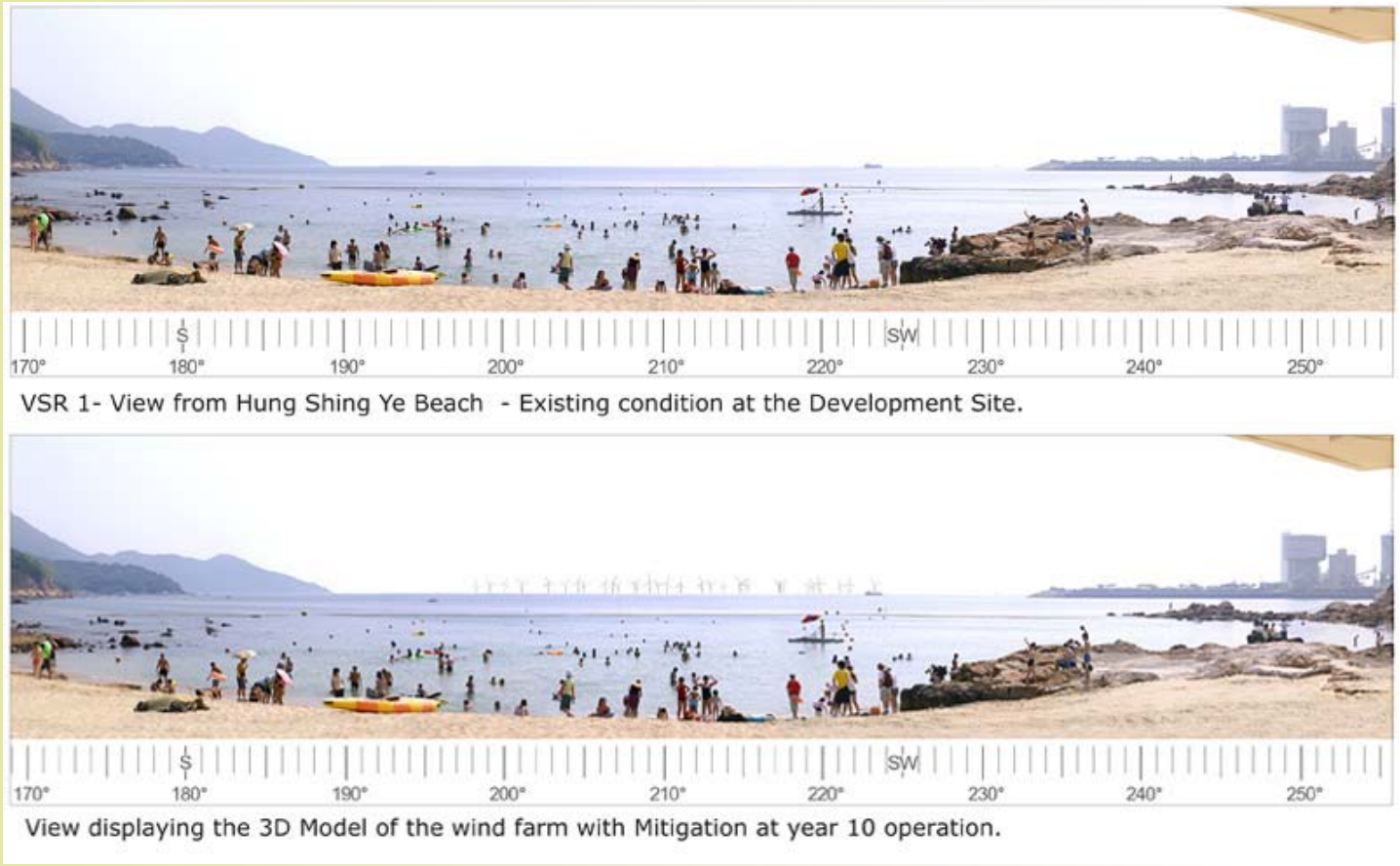
Mitigation Measures and Monitoring Programmes

- Water quality monitoring programme
- Continued communication with fishermen to study further enhancement on fishery resources
- Study feasibility and requirements for fisheries operations within the area

EIA Study – Landscape & Visual Impact



EIA Study – Landscape & Visual Impact

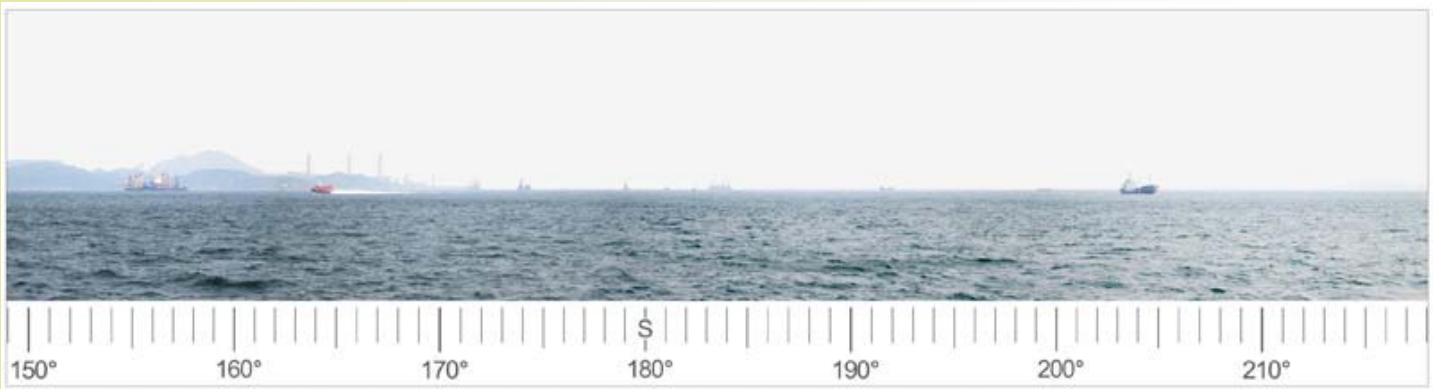


VSR 1- View from Hung Shing Ye Beach - Existing condition at the Development Site.

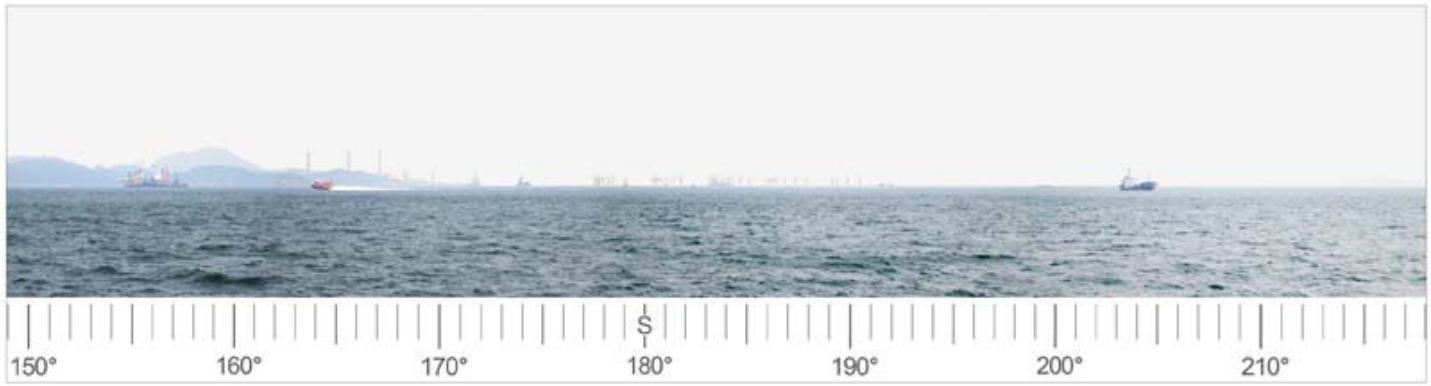
View displaying the 3D Model of the wind farm with Mitigation at year 10 operation.

View from Lamma Island (Hung Shing Ye Beach)

EIA Study – Landscape & Visual Impact



VSR 4- View from Ferry to Cheung Chau - Existing condition at the Development Site.

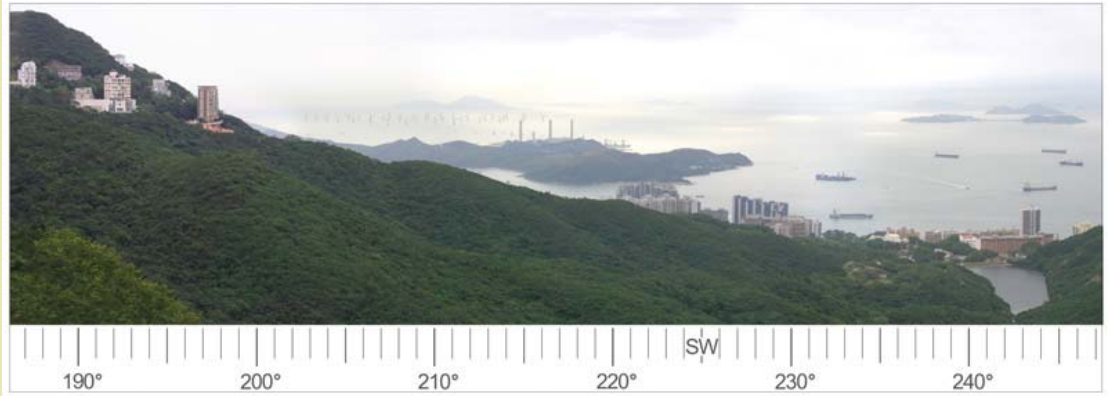


View displaying the 3D Model of the wind farm with Mitigation at year 10 operation.

View from Cheung Chau

EIA Study – Landscape & Visual Impact

VSR 11 - View from The Peak - Existing condition at the Development Site.



View displaying the 3D Model of the wind farm with Mitigation at year 10 operation.

View from The Peak

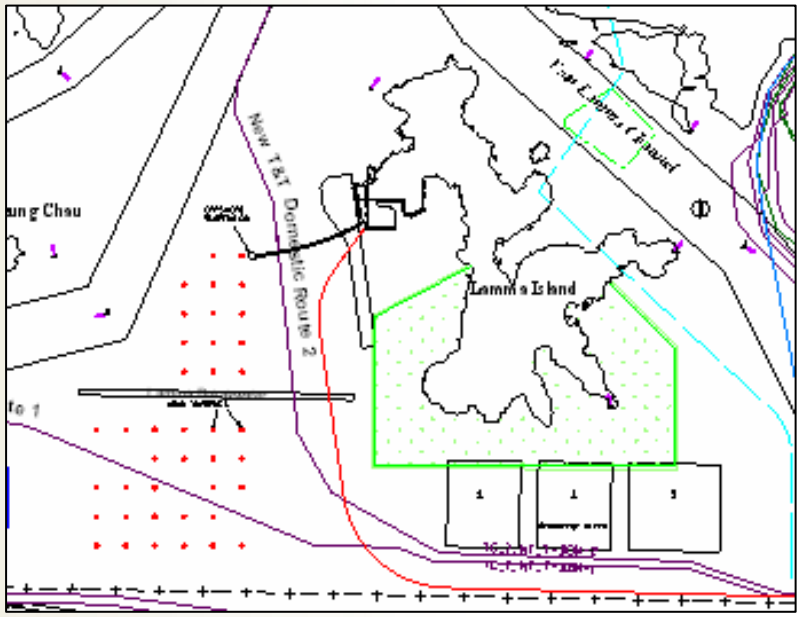
EIA Summary

- Comply with EIAO-TM requirements
- Environmental Monitoring and Audit (EM&A) Manual established
- Acceptable environmental impacts after mitigation measures in place
- Help improve HK air quality and reduce various emissions

Site Optimization

Optimization of Wind Farm Layout:

- Meet marine traffic requirements
- Far away from high sensitive receivers
- Reduce wind farm area

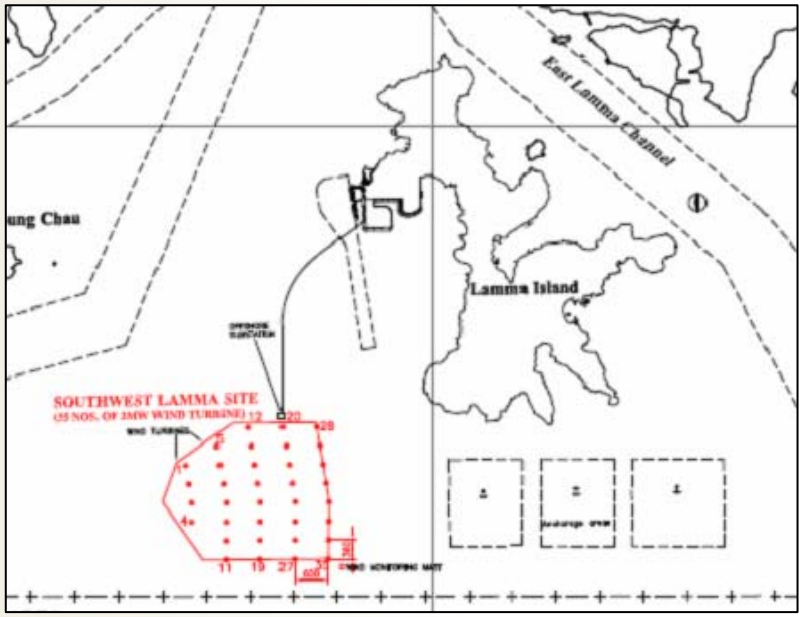


Initial Wind Farm Layout

Site Optimization

Optimization of Wind Farm Layout:

- Meet marine traffic requirements
- Far away from high sensitive receivers
- Reduce wind farm area



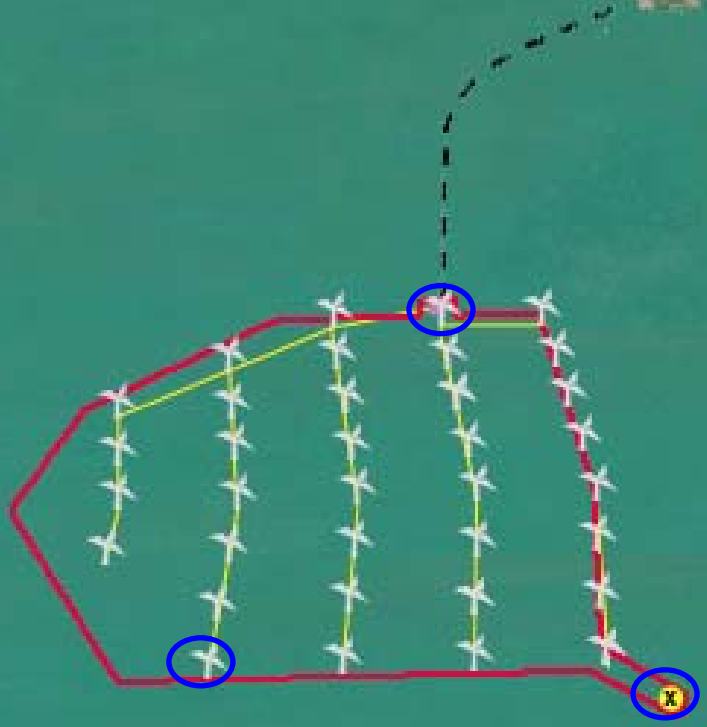
Optimized Wind Farm Layout

General Information of Offshore Wind Farm

Location	4 km Southwest of Lamma Island	
Capacity	100 MW	
No. of Wind Turbine	28 – 35 nos.	
Wind Turbine Capacity	2.3 – 3.6 MW	
Land-take Area	Site Boundary:	600 Ha
	Land-take by Foundations:	0.16 Ha
Water Depth	17 – 22 m	

Components of Offshore Wind Farm

Wind Turbine

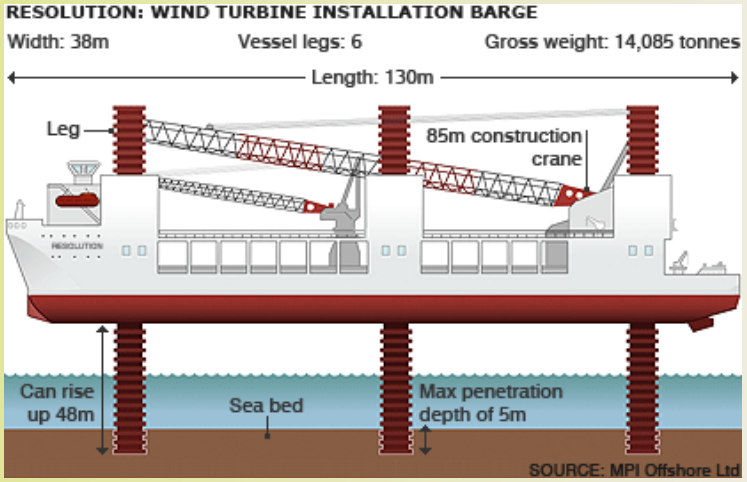


Substation

Wind Monitoring Mast

Wind Turbine Installation

- Pre-assembly in Lamma Power Station
- Jack-up barge for offshore installation



Wind Farm's Environmental Benefits

- Estimated annual generation of around 170 million units of electricity, enough energy for around 50,000 families in HK
- No fuel required, thus offsetting use of around 62,000 tonnes of coal per annum
- Reduce 150,000 tonnes of carbon dioxide emission per annum
- Reduce 520 tonnes of sulphur dioxide emission per annum
- Reduce 240 tonnes of nitrogen oxide emission per annum

Major Challenges

- Specialized barge for wind turbine transportation, erection & maintenance
- Limited window suitable for offshore work
- Unpredictability of wind energy
- Management of offshore wind farm area

Programme

Major Activities	2009	2010	2011	2012	2013	2014
EIA	15M					
Construction & Installation of Wind Monitoring Mast		9M				
Wind Monitoring & Analysis			12M			
Tender, Procurement, Construction & Delivery				24M		
Foundation Installation					9M	
Wind Turbine Installation						9M
Testing & Commissioning						6M
Project Completion						
Stakeholder Engagement						

Conclusion

- Welcome public comments on EIA report during public inspection period from 8/2/2010 to 9/3/2010
- Subject to EIA approval, detailed financial plan will be submitted for Government approval
- Target commissioning date is 2015 if project is confirmed to go ahead, accounting for 1-2% of HK Electric's total electricity generation