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ACE-EIA Paper 6/2009
For advice

Environmental Impact Assessment Ordinance (Cap. 499)
Environmental Impact Assessment Report
Hong Kong Offshore Wind Farm in Southeastern Waters

PURPOSE

This paper presents the key findings and recommendations of the Environmental Impact Assessment (EIA) report for the development of Hong Kong Offshore Wind Farm in Southeastern Waters (hereafter known as the Project), submitted under section 6(2) of the Environmental Impact Assessment Ordinance (EIAO) (Application No. EIA-167/2009). Hong Kong Offshore Wind Limited (the applicant) and their consultants will make a presentation at the EIA Subcommittee meeting if necessary. Comments from the public and Advisory Council on the Environment will be taken into account by the Director of Environmental Protection in deciding on the approval of the EIA report under the EIAO.

ADVICE SOUGHT

2. Members' views are sought on the findings and recommendations of the EIA report.

NEED FOR THE PROJECT

3. The HKSAR Government has set a target of meeting 1% to 2% of Hong Kong's total electricity supply by renewable energy by 2012. This Project has a capacity to produce about 1% of Hong Kong's annual electricity demand.

4. The potential for large-scale land-based wind farm development in HKSAR is limited owing to lack of land availability. With the availability of offshore technology, offshore waters offer more useable space for large scale wind farm development.

DESCRIPTION OF THE PROJECT

5. The Project is located in the southeastern waters of HKSAR. The Project location and the cable alignment are shown in the attached figure. Key elements of the Project include –

(i) either 67 turbines each of 3 mega-watt (MW) power generation capacity or 40 turbines each of 5MW power generation capacity;

(ii) an offshore transformer platform;

(iii) sub-sea collection and transmission cables; and

(iv) a research mast.

6. The EIA has assessed both options of 3MW and 5MW turbines as stated above. With either option, the Project will be capable of producing a maximum output of approximately 200MW of electricity, approximately equivalent to 1% of Hong Kong's total electricity needs. The final choice of turbines would be made at a later stage taking into consideration latest turbine technology development.

7. The Project constitutes a designated project under item D.1, Schedule 2 of the EIAO: *"Public utility electricity power plant"*.

CONSIDERATION OF ALTERNATIVE OPTIONS

8. The EIA has considered various options for project locations, turbine array alignments, transmission cable routings and construction methods. In particular, with the use of constraint mapping in the site selection, all environmental sensitive areas, such as important coral sites, core habitat for marine mammals and the proposed Geopark, have been avoided. The southeastern waters was considered to offer the best potential for a commercial

scale offshore wind farm development given the large area of contiguous seabed, the relative lack of environmental sensitivity indicated by site screening exercise and the anticipated higher relative wind speed.

9. The proposed use of suction caisson as foundation of turbines would avoid dredging and piling works for installation of turbines, and hence minimize water quality impacts.

SPECIFIC ENVIRONMENTAL ASPECTS TO HIGHLIGHT

Water Quality

10. The major potential water quality impact arising from the Project would be from sediment dispersion owing to turbine foundations construction and submarine cables installation. With the use of suction caisson foundation as recommended in the EIA, elevations of suspended solids and sediment deposition rate would be minimized. Water quality objectives (WQO) at all nearby sensitive receivers would be met. To ensure the practicality and environmental performance of the proposed suction caisson, a field trial was carried out in 2008 involving the installation and removal of a suction caisson. No water quality impact was observed during the field trial.

11. Regarding the cable installation works, the EIA recommended grab dredging for the section at inner Junk Bay and jetting at the remaining sections. With the implementation of the recommended mitigation measures, including provision of silt curtains and restricting the dredging rate and jetting speed, the predicted suspended solids at all sensitive receivers and sediment deposition rate at nearby coral sites would meet the WQO.

Benthic Ecology

12. The EIA indicated that proposed wind farm footprint is in general composed of silty mud of low ecological value without any corals. The conservation importance of the benthic community in Junk Bay and the Tathong Channel (i.e. the cable alignment) is relatively low.

13. Field surveys recorded amphioxus at some sections near the proposed cable alignment at south of the Ninepin. However, they were found in small quantity in isolated locations during the wet season survey but none in the dry season. By making reference to other published documents, the EIA concluded that the silty sediment of the seabed in the vicinity of the transmission cable route south of the Ninepin is not a major habitat for amphioxus. The EIA also recommended to arrange jetting at the southern section of the cable alignment in the dry season to minimize impact on amphioxus.

14. The predicted water quality impacts are localized and would be within the WQO. Also, re-colonization by species from adjacent seabed areas is anticipated within short duration. Hence, impacts on benthic ecology are not considered significant.

Pelagic Ecology

15. On pelagic ecology, the EIA indicated that based on both desk-top review and field surveys, the waters of the proposed wind farm are only lightly utilized by Finless porpoise. It was found that this particular species preferred more sheltered coastal waters around the Ninepins and Po Toi islands, and other waters to the south. The EIA concluded that with the adoption of the suction caisson foundations and because of the nature of the operation of the Project, no adverse impact is anticipated.

Fisheries

16. With the implementation of mitigation measures recommended in the EIA, all relevant WQO would be met. No significant adverse fisheries impacts are anticipated during the construction stage.

17. The applicant has carried out a separate Marine Navigation Safety Risk Assessment (MNSRA) to assess impact of the wind farm on the existing and future marine traffic profile in southeastern waters. For safety reasons during the operation stage, the MNSRA proposed that the wind farm area is designated as a controlled water space to restrict waterbourne access, including the prohibition of trawling and possibly other types of fishing activities in the wind farm area resulting in permanent loss of fishing ground. However, the

wind farm footprint is in general composed of silty mud of low ecological value. Baseline information and field surveys also indicated relatively little fishing activity takes place at the site and productivity of capture fisheries is relatively low. Hence, the EIA concluded that the project will not result in any significant adverse fisheries impacts during operation of the Project. On the other hand, overseas experience revealed that turbine foundations could serve as artificial reef substrate for colonization by benthic epifauna, which is likely to benefit the overall abundance and diversity of fisheries resources in the area.

Avifauna

18. A total of 57 bird species were identified in the Study Area by boat surveys between May 2006 and December 2007. It is observed that the Project is not located near any significant feeding or roosting areas, and bird numbers recorded within the wind farm area were generally a small proportion of the recorded populations. Moreover, majority of birds recorded in the baseline survey were highly restricted to near-shore coastal areas and surface-feeding.

19. The EIA concluded that the proposed wind farm has no adverse impact on avifauna due to the remoteness of the proposed wind farm, lack of habitat of conservation interests, low fisheries productivity, the existence of many other corridors for migratory species to enter the HKSAR coastline, and low collision risk.

20. In particular, the EIA assumed two scenarios in the assessment of collision risk – (i) birds with no avoidance action; and (ii) with 95% avoidance action (probability that an individual bird, or individuals within a flock, has a 95% chance of avoiding collision with the turbines). Seven bird species that are most dominant in the study area and considered potentially sensitive to wind farm operation have been considered, including Black-naped Tern, Bridle Tern, Red-necked Phalarope, Cattle Egret, Aleutian Tern, White-winged Black Tern and Black-tailed Gull. The predicted magnitude of collision risk for all the above seven species for both the 3MW and 5MW options are considered negligible.

Landscape and Visual Impacts

21. The Project will introduce a variety of features into the marine landscape for an area of about 16 km^2 including wind turbines and navigation lighting. With the implementation of mitigation measures including controlling of night-time lighting, minimizing area with bright colour and safety lights, the EIA concluded that the predicted landscape and visual impacts are acceptable.

Other Environmental Impacts

22. Other impacts including waste & materials management and cultural heritage have been addressed in the report and concluded that, with the implementation of recommended mitigation measures, the Project would comply with relevant requirements under the Technical Memorandum on EIA Process.

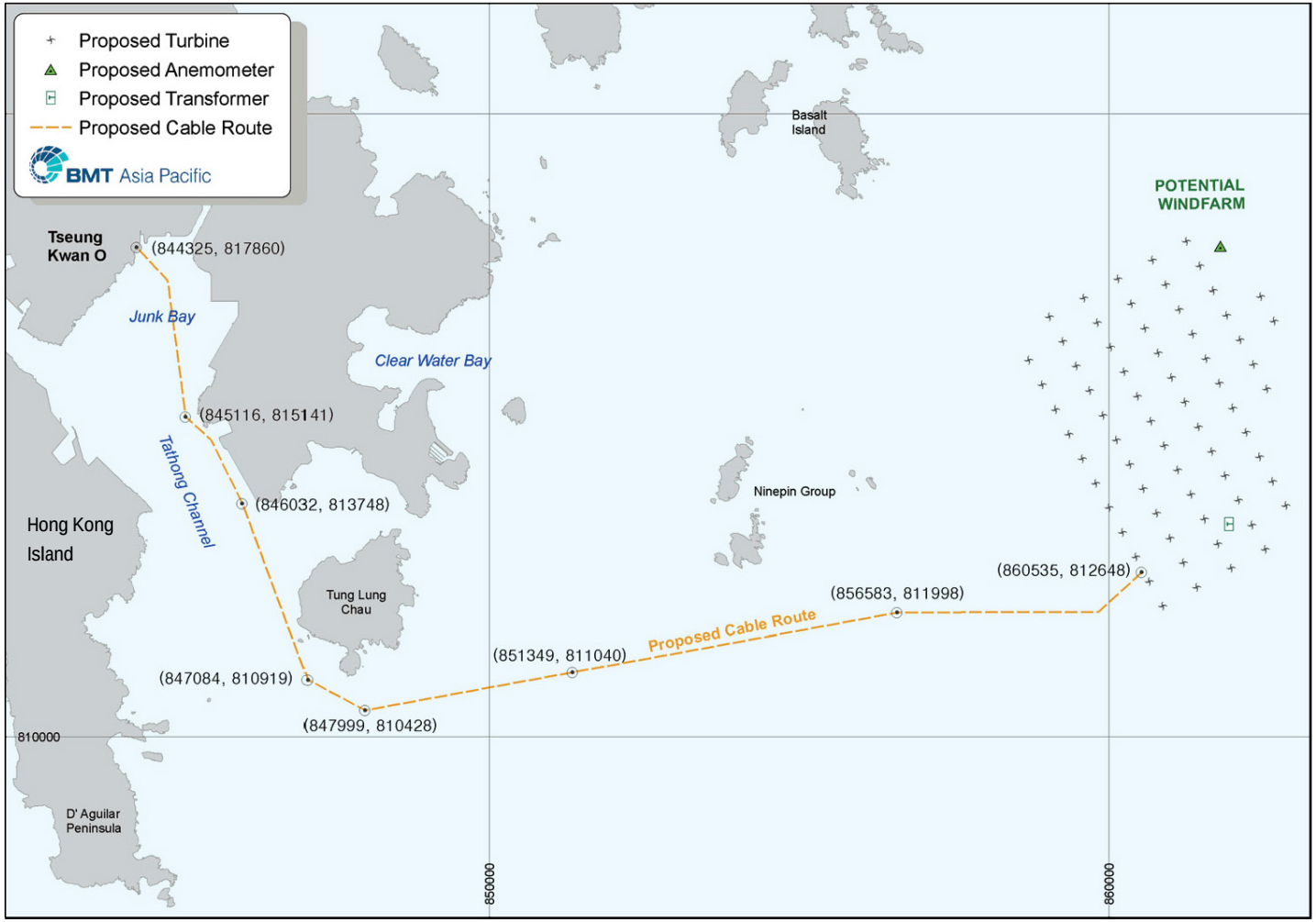
ENVIRONMENTAL MONITORING AND AUDIT

23. The EIA report includes an Environmental Monitoring and Audit (EM&A) Manual which recommends an EM&A programme during the construction and operation phases of the Project.

PULBIC CONSULTATION

24. The applicant has made the EIA report, EM&A Manual and Executive Summary available for the public to comment under the EIAO from 3 June to 2 July 2009. Members will be briefed on any public comment received at the meeting.

June 2009
Environmental Assessment Division
Environmental Protection Department



Project Title: **Hong Kong Offshore Wind Farm in Southeastern Waters**

Figure: **Location Plan (Reproduced from Figure 2.26 of the EIA Report)**