Islands District Council

Paper No. IDC 83/2018

Hong Kong Offshore Liquefied Natural Gas (LNG) Terminal

Purpose

Castle Peak Power Company Limited (hereinafter referred to as "CAPCO") together with the Hongkong Electric Company, Limited (hereinafter referred to as "HK Electric") will construct and operate an offshore Liquefied Natural Gas (LNG) terminal, which is located to the east of Soko Islands in the southern waters of Hong Kong. The marine works for the offshore LNG terminal include the construction of a Jetty of area approximately 4.9 hectares and two subsea gas pipelines of (i) approximately 45km in length from the Jetty to Black Point Power Station and (ii) approximately 18km in length from the Jetty to Lamma Power Station (collectively hereinafter referred to as "the Marine Works"). The total area of foreshore and sea-bed affected by the Jetty and the two subsea pipelines is approximately 68.5 hectares. This paper aims to present the offshore LNG Terminal project and consult members on the Marine Works. A plan showing the proposed offshore LNG Terminal and the two subsea pipelines is attached for reference.

Background

2. CLP Power Hong Kong Limited (hereinafter referred to as “CLP”) and the HK Electric are both responsible for providing a safe, highly reliable and clean supply of electricity to the consumers in Hong Kong at reasonable cost.

3. CLP operates three power stations that supply electricity to the consumers in Kowloon, the New Territories and most of the outlying islands, namely the Castle Peak Power Station (CPPS), the Black Point Power Station (BPPS) and the Penny’s Bay Power Station (PBPS) which are owned by the Castle Peak Power Company Limited (CAPCO), a joint venture between CLP and China Southern Power Grid International (HK) Co., Limited, of which CLP holds a 70% interest.

4. HK Electric operates the Lamma Power Station (LPS) that supplies electricity to the consumers on Hong Kong Island and Lamma Island.

5. Hong Kong has no indigenous energy resources and all fuel for electricity generation needs to be imported. Reliable fuel sources are critical to maintaining a secured power supply for Hong Kong while providing environmental benefits.

6. The BPPS, one of the CAPCO-owned power stations, is currently supplied with pipeline gas from two sources, namely the Yacheng Pipeline and the Second West-to-East Pipeline / Hong Kong Branch Line, both from the Mainland.

7. The LPS is currently supplied with pipeline gas from the Guangdong Dapeng LNG Terminal in Shenzhen, Mainland via the subsea Dapeng Pipeline.

8. In 2014, the Environment Bureau (ENB) of the HKSAR Government completed its consultations and discussions on the Future Fuel Mix for Electricity Generation for Hong Kong. According to the consultation document issued by ENB, two fuel mix options were proposed:

- Option 1: Importing more electricity through purchase from the Mainland power grid; and

- Option 2: Using more natural gas for local power generation.

9. The results of the consultation show that Option 2 was acceptable to the general public. On 31 March 2015, the HKSAR Government launched a three-month Public Consultation on the Future Development of the Electricity Market in Hong Kong. Subsequent to the consultation, the HKSAR Government planned to increase the percentage of natural gas used for power generation to around 50 per cent by 2020 to meet its pledged environmental targets.

10. The Climate Action Plan 2030+ Report includes phasing down Hong Kong's remaining coal plants as they reach their retirement and replacing them with natural gas or non-fossil fuel sources, which will enable Hong Kong to further reduce carbon emissions significantly in the medium term. The report also states that the HKSAR Government will work closely with CLP and HK Electric; to ensure they can secure adequate supplies of natural gas and put the required infrastructure in place in the coming decade to handle the additional quantities of natural gas that will be required to be imported into Hong Kong in order to meet these HKSAR Government emissions targets.

11. To support the HKSAR Government in the increased use of natural gas in Hong Kong to reduce carbon intensity from 2020 onwards, CLP and HK Electric have identified that the development of an offshore LNG receiving terminal (LNG Terminal) in Hong Kong based on Floating Storage and Regasification Unit (FSRU) technology presents an additional gas supply option that will provide long-term energy security for Hong Kong, as well as to allow access to the competitive gas supplies from world markets.

12. Therefore, CLP and HK Electric agreed to jointly explore the feasibility of siting an FSRU based LNG Terminal offshore in HKSAR waters to serve as a gas supply source to meet Hong Kong's future power generation fuel supply needs (hereinafter referred to as the 'Hong Kong Offshore LNG Terminal' or the 'Project').

The Project Scope

13. The Project comprises of three distinct components, (1) a jetty for the LNG Terminal will be built jointly by CAPCO and HK Electric and owned by a joint venture company to be formed by CAPCO and HK Electric, (2) a subsea pipeline from the jetty to BPPS will be built & owned by CAPCO and (3) a subsea pipeline from the jetty to LPS will be built & owned by HK Electric.

14. The LNG Terminal is planned to be a 'shared-use' LNG import facility that has the capability to receive and store LNG and then to deliver regasified LNG (natural gas) to BPPS and LPS through two separate subsea pipelines which will be respectively constructed by CAPCO and HK Electric.

15. Summary of Marine Works to be Gazetted

Marine Works – Double Berth Jetty, Subsea Pipelines and Dredging Works	Gazette Area
Construction of a Double Berth Jetty and its associated facilities.	4.9 hectares
Construction of one subsea gas pipeline from the Jetty to the gas receiving station (GRS) at the Black Point Power Station in HKSAR waters (BPPS Pipeline).	49.2 hectares
Construction of one subsea gas pipeline from the Jetty to the GRS at the Lamma Power Station in HKSAR waters which will be tied-in to an existing pipe joint about 1km from the existing seawall of the Lamma Power Station (LPS Pipeline).	14.4 hectares

Project Timeline

16. The overall construction duration is anticipated to be approximately 21 - 27 months. It is expected that construction of the LNG Terminal, the BPPS Pipeline and the LPS Pipeline will be constructed concurrently. The proposed work will commence in around 2019 and is estimated for commercial operations by 2020/2021.

Construction Methods

Construction of the jetty

17. The preferred conceptual design for the Jetty is based on the use of jacket structures and the typical sequence of the construction works to be used for the Jetty structures, including the platform, its mooring facilities and topsides, is described below.

18. The Jackets and their steel truss decks will be constructed offsite at a fabrication yard outside of Hong Kong. When complete, each Jacket will be loaded onto a flat top barge and transported to the Site of the Jetty where it will be lifted and installed at the location required using a derrick barge. Each Jacket will have a mudmat installed on its base and therefore will be able to stand by itself prior to the installation of the piles that will anchor it to the seabed. The derrick barge will progressively install all of the Jackets. Once each Jacket is secured in the template on the seabed, at its required position / angle, the open-ended steel tubular piles are inserted in turn into each of the jacket legs, and the hydraulic vibrator/ hammer is placed on the pile head by the crane barge and the pile is pushed/driven into its required penetration depth. Once all of the Jackets are in place, the derrick barge will be used to install the steel truss decks, and lock these into position. Once the Jetty platform and each of the decks for the mooring dolphins, walkways and vent stack structures are constructed and in place, the construction of the various topsides equipment and mooring facilities can be carried out.

Construction of the subsea pipelines

19. The typical sequence of pipeline construction methods to be used for the BPPS Pipeline and the LPS Pipeline based on the combination of dredging and jetting is shown below:

- Dredging – Pre-forming the required trench design profile by using either a grab dredger or a Trailer Suction Hopper Dredger;
- Pipelaying – Using a conventional pipeline laybarge;
- Jetting – Post-forming the required trench design profile by using a jetting machine to install the pipeline to the required depth;
- Rock Amour Placement – Covering the installed pipeline with the required rock armour using a conventional derrick barge, or side dump vessel;
- Testing – Carrying out the required hydrotesting to ensure the integrity of the installed pipeline; and
- Commissioning – Carrying out the commissioning of both pipelines as part of the overall commissioning plan for the FSRU Vessel, the Jetty topsides and the GRSs at the BPPS and the LPS.

20. Sediment Disposal Management

The total volume of dredged sediments that has to be disposed of is approximately 0.34Mm3, being approximately 0.33Mm3 for the BPPS Pipeline and 0.01 Mm3 for the LPS Pipeline

Latest Progress

21. A detailed environmental impact assessment (EIA Study) has been undertaken for the Project in compliance with the Environmental Impact Assessment Ordinance (Cap. 499) under the Study Brief No. ESB-292/2016. The EIA Report was formally submitted to the Environmental Protection Department on 11 May 2018.

22. The EIA Study critically assessed the overall acceptability of the environmental impacts (including air quality, hazard to life, noise, water quality, waste management, ecology, fisheries, visual and cultural heritage) likely to arise as a result of the construction and operation of the Project. It has demonstrated the acceptability of any residual impacts from this Project and the protection of the population and the environmentally sensitive resources. The EIA Study concluded that, with the implementation of the recommended mitigation measures, the Project would be environmentally acceptable and in compliance with the relevant assessment standards/criteria of the EIAO-TM.

23. The Project has been included in the new development plans of CLP/CAPCO and HK Electric which was approved by Chief Executive-in-Council on 3 July 2018, to ensure that Hong Kong will have a reliable and stable supply of natural gas in the long run. Hong Kong can purchase natural gas at a more competitive price directly from the international market to meet future gas-fired power generation needs.

Consultation

24. Lands Department will arrange for publication of gazette under Foreshore and Sea-bed (Reclamations) Ordinance (Cap. 127) regarding the Marine Works.

25. Members are invited to note the Hong Kong Offshore LNG Terminal Project and offer comments and suggestions on the publication of gazette for the Marine Works.

District Lands Office/Islands

September 2018

ATTACHMENT:

Location plan for the proposed offshore LNG Terminal and the two subsea pipelines