



33/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong
香港灣仔告士打道5號稅務大樓33樓

ACE-EIA Paper 2/2022
For advice on 14 February 2022

Environmental Impact Assessment Ordinance (Cap. 499)
Environmental Impact Assessment Report

Re-provision of Open Cycle Gas Turbines at Lamma Power Station

PURPOSE

This paper presents the key findings and recommendations of the Environmental Impact Assessment (EIA) report on “Re-provision of Open Cycle Gas Turbines at Lamma Power Station” (hereafter known as “the Project”) submitted under Section 6(2) of the Environmental Impact Assessment Ordinance (EIAO) (Application No. EIA-276/2021). The Project is a Designated Project (Item 4, Part II, Schedule 2 and Item D.1, Part I, Schedule 2) under the EIAO, as it will involve the decommissioning of a public utility – electricity power plant and, the construction and operation of public utility electricity power plant. The Hongkong Electric Co., Ltd (HK Electric) (the Applicant) and its consultants will present the report at the meeting of the EIA Subcommittee.

ADVICE SOUGHT

2. Members’ views are sought on the findings and recommendations of the EIA report. The Director of Environmental Protection (DEP) will take into account the comments from the public and the Advisory Council on the Environment (ACE) in deciding whether or not to approve the EIA report under Section 8(3) of the EIAO.

BACKGROUND

3. The Applicant operates the Lamma Power Station with a number of power generating units currently in active operation, including six coal-fired units (i.e. L2, L4 to L8), three gas-fired combined cycle gas turbine units (CCGTs) (i.e. L9, L10 and GT57) and five oil-fired open cycle gas turbine units (OCGTs) (i.e. GT1 to GT4, GT6).

4. The current proposal involves decommissioning and demolition of the aging GT2, GT3, GT4, GT57 and GT6 which are approaching the end of their service life since their first commissioning in the late 1980s. Hence, the Applicant proposes to decommission and demolish these units sequentially from 2022 onwards, and to construct and commission up to four new OCGTs within the same Gas Turbine Compound (GT Compound) in order to maintain the peak-opping and emergency operational requirements. The new OCGTs will continue to use the existing stacks.

5. DEP considered that the EIA report has met the requirements in the EIA Study Brief and the Technical Memorandum on EIA Process, for the purpose of its exhibition for public inspection under Section 7(4) of the EIAO.

NEED FOR THE PROJECT

6. According to the HK Electric, the existing OCGTs (i.e. GT2, GT3, GT4 and GT6) and CCGT (i.e. GT57) within the GT Compound have been in operation for more than 30 years since 1989. The aging units, which are approaching the end of their service life, are becoming less efficient in their operation and requiring more frequent maintenance. The control system of the existing units is also obsolete and the equipment suppliers do not have the necessary spare parts or provide technical support that enable the continuous operation of these existing units.

7. As a result, there is a need to replace these existing units with new ones progressively to cater for the peak-opping and emergency operation requirements; so as to ensure the Lamma Power Station will maintain stable and reliable electricity supply in Hong Kong.

ENVIRONMENTAL BENEFITS

8. Comparing with the aging units, new OCGTs are much more efficient and capable of attaining a more stringent emission standards and thus producing lower air emissions during operation, in particular nitrogen oxides (NO_x), when generating the same amount of power. For these reasons, the Project is beneficial from an environmental perspective and can be considered as part of the ongoing effort of HK Electric to further reduce the overall emissions from the operation of Lamma Power Station and contribute to the long-term air quality improvement in Hong Kong.

DESCRIPTION OF THE PROJECT

9. The Project site is located within the existing GT Compound of Lamma Power Station. The layout plan of the Project is shown in **Figure 1**.

10. The existing GTs to be decommissioned and demolished are located at the Lamma Power Station, have been zoned as an “Other Specified Uses (Power Station)” under the existing Lamma Island Outline Zoning Plan. The proposed decommissioning, construction and operation works under the Project will be all within the Lamma Power Station without encroaching upon any adjacent environmental sensitive areas.

CONSIDERATION OF ALTERNATIVE OPTIONS

11. The EIA report has considered alternative options for the development of the Project, including type of fuels / turbines to be used, other power supply options and site locations to avoid and minimise environmental impacts while meeting the project demands. The recommended options have taken into account environmental considerations, site constraints and operational requirements. The key approaches that have been adopted by the Applicant to avoid or minimise environmental impacts are summarised as below:

- (i) locate the construction and operation of OCGTs within the existing GT Compound to avoid encroaching upon any environmental sensitive areas;

- (ii) reuse the existing stacks, foundation piles and reinforced concrete structures to minimize impacts during demolition and generation of C&D materials;
- (iii) the new OCGTs can enhance the energy generation efficiency, reduce fuel consumption and achieve lower air emissions as compared with the existing GTs; and
- (iv) operate the new OCGTs only during peak-loading and emergency situations and not used as base load for electricity generation¹. The operation of the OCGTs is only intermittent and the associated emissions are only short-term.

SPECIFIC ENVIRONMENTAL ASPECTS TO HIGHLIGHT

Air Quality

12. The key environmental impact of the Project is the emissions from Lamma Power Station during operation. Potential air pollutants including NO_x, sulphur dioxide (SO₂) and particulate matters (PM₁₀ and PM_{2.5}) may arise from the discharge of exhaust gas generated from the new OCGTs via the existing stacks. As confirmed by the EIA Report, results of the comparative assessments show that contribution from the Project under all phases of the “With Project” scenario (with the new OCGTs in operation) are lower than that under the “Without Project” scenario (with the old GTs in operation) at all identified Air Sensitive Receivers (ASRs). For instance, the EIA assessed that the Project would reduce the maximum 1-hour NO₂, at various ASRs by 7 - 156 µg m⁻³.

Other Environmental Impacts

13. Other environmental impacts including noise, water quality, waste management, land contamination, and construction stage air quality impacts have also been addressed in the EIA report. With the implementation of the recommended mitigation measures, the Project will comply with the relevant requirements under the Technical Memorandum.

¹ The base load will be supported by gas-fired L9, L10 and other CCGTs to be constructed under the Lamma Power Station expansion project.

ENVIRONMENTAL MONITORING AND AUDIT

14. The EIA report has also included an Environmental Monitoring and Audit Manual recommending weekly environmental site inspections during the construction stage to ensure that various pollution control and site management measures are properly in place. The operation stage emissions would be controlled and monitored under the Specified Process licence under the Air Pollution Control Ordinance.

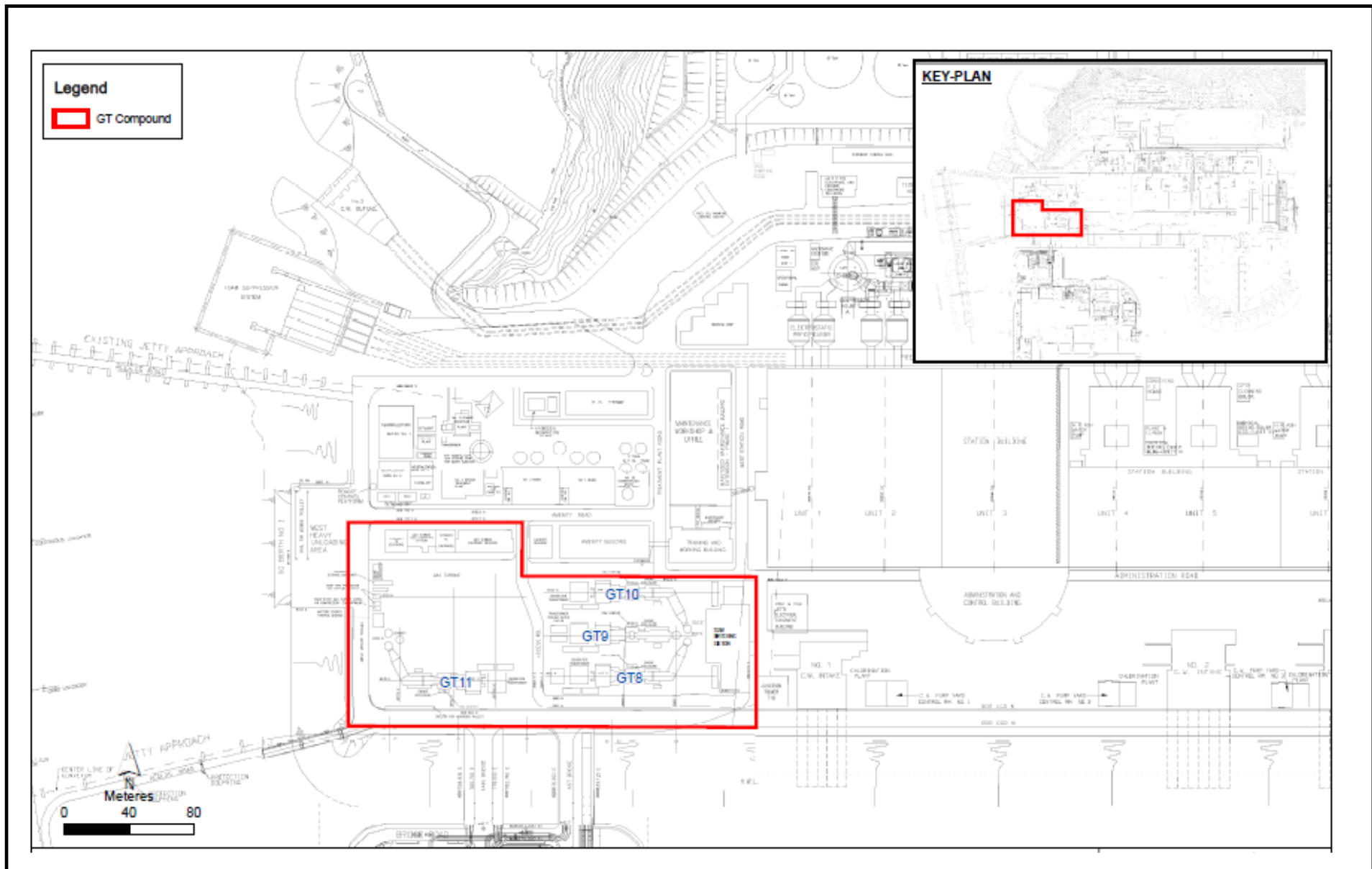
PUBLIC CONSULTATION


15. The applicant has made the EIA report, Environmental Monitoring and Audit Manual and Executive Summary available for public inspection under the EIAO from 21 December 2021 to 19 January 2022. No public comment was received during the public inspection period under the EIAO.

January 2022

Environmental Assessment Division

Environmental Protection Department



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| Project Title: | Re-provision of Open Cycle Gas Turbines at Lamma Power Station | EIA Application No.: |  |
| Figure 1 | Project Layout Plan [Remarks: This figure is prepared based on Figure 3.1b of the EIA Executive Summary] | EIA – 276/2021 | |