

GRID CONNECTED ELECTRICITY GENERATION PLANT USING NATURAL GAS AT JURONG ISLAND IN SINGAPORE



Document Prepared By EKI Energy Services Limited

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1 PROJECT DETAILS

1.1 Summary Description of the Project

PacificLight Power Pte. Ltd. has developed a new, grid connected 800 MW natural gas fired combined cycle power plant. The plant, through its use of natural gas and advanced combined cycle technology, provides consumers in Singapore with a clean, highly efficient source of electricity.

Purpose of the project activity

The purpose of the project activity is to construct and operate a 800 MW natural gas based power plant. The electricity generated is exported to the Singapore national grid. The project activity helps to reduce the carbon intensity.

At the site ambient conditions and a frequency of 50 Hz, the rated capacity of the plant is 800 MW (two units 400 MW each)¹. Each of the two units have one combustion turbine, one Heat recovery Steam Generators (HRSG) and one Steam Turbine Generator (STG). The heat content of the exhaust gas from the combustion turbine is recovered in individual heat recovery steam generators. The steam generated is then expanded in a condensing type steam turbine driving an electric generator.

Pre-project scenario: The project activity is a new, independent natural gas based power plant and thus no power generating equipment existed on the project site before the project activity plant. Thus, the pre-project scenario is continuation of existing higher carbon intensive fuel used to generate power for the grid.

Baseline Scenario: As identified in Section B.4 of the registered PDD, the baseline scenario is generation of equivalent power from a coal based power plant (due to the lower cost of electricity generation from same and hence financially viable). There is at least one coal based power plant that operates in Singapore on imported coal.

How the project activity reduces greenhouse gas emissions

In the absence of the project activity less efficient plant, including coal, would have been required to run to meet electricity demand. The project activity thus reduces anthropogenic GHG emissions into the atmosphere due to the use of relatively lower GHG intensive fuel (Natural Gas and / or Re-gasified-LNG) and much higher efficient power generation due to combined cycle operation in comparison to coal.

1.2 Sectoral Scope and Project Type

Project type: Renewable energy projects

Sectoral Scope: 1- Energy Industries (renewable/non-renewable sources).

1.3 Project Proponent

Organization name	PacificLight Power Pte. Ltd.
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¹ As per technical specifications of the EPC contract with Siemens

Contact person	Clare Savereux
Title	Senior Manager, Regulations & Corporate Communications
Address	PacificLight Power Pte Ltd, 47 Jurong Island Highway Singapore 627626
Telephone	-
Email	clare.savereux@pacificlight.com.sg

1.4 Other Entities Involved in the Project

Organization name	EKI Energy Services Limited
Role in the project	Project Consultant
Contact person	Ramkrishna Patil
Title	General Manager-Operations
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1.5 Project Start Date

The PP got commissioning generation facility (CGF) acceptance from EMA in 2013. Unit's commissioning started in June-2013 & Aug-2013 and completed by Dec-2013 & Jan-2014, respectively for Unit 10 & Unit 20. Unit 10 was synchronized to grid for the first time on 29/06/2013 and Unit 20 was first time synchronized on 30/08/2013. Subsequent to testing & commissioning, Units were declared as commercial operating facility (also called as GRF: Generation Registered facility) on 15/01/2014 & 06/02/2014 respectively for Unit 10 & Unit 20.

The start date of the project activity is the initial date of commissioning of the first unit of the plant namely 29/06/2013.

1.6 Project Crediting Period

The crediting period of the project activity is for 10 years which will be renewed twice.

PP has considered start date of crediting period as 01/01/2014.

The first crediting period starts from 01/01/2014 to 31/12/2023.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

The project falls under Project category since the emission reductions are less than 300,000 tCO₂e per annum

Project Scale	
Project	✓
Large project	-

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	286,755
Year 2	286,755
Year 3	286,755
Year 4	286,755
Year 5	286,755
Year 6	286,755
Year 7	286,755
Year 8	286,755
Year 9	286,755
Year 10	286,755
Total estimated ERs	2,867,550
Total number of crediting years	10
Average annual ERs	286,755

1.8 Description of the Project Activity

Not Applicable as project is registered under CDM.

1.9 Project Location

The project activity is located near City & District: Jurong Island, Singapore. The project site is located at 47 Jurong Island Highway Singapore 627626

Geographic location and accessibility:

Nearest airport: Singapore

The geographical coordinates of the project activity are 1°17'24" N and 103°43'30" E.

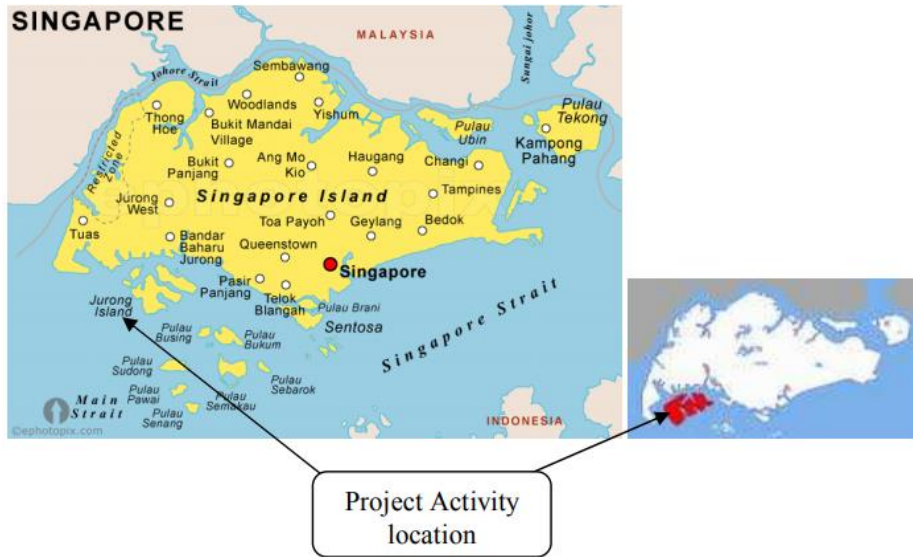


Figure 1: Map of (A) Singapore and (B) Map showing the site of project activity (Jurong Island)

1.10 Conditions Prior to Project Initiation

This is a Greenfield project. The project activity replaces the higher carbon intensive grid electricity. The proposed project activity effectively utilises less carbon intensive Natural gas to generate electricity which will be fed into the Singapore Grid. Thereby the project activity contributes to the reduction of greenhouse gases (GHG) emissions.

Please refer section B.4 of the registered PDD. The web link for the same is mentioned below:

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

Not Applicable as no legal obligation

1.12 Ownership and Other Programs

1.12.1 Project Ownership

As per VCS Program Definitions version 3.7, the project ownership is the legal right to control and operate the project activities.

PacificLight Power Pte. Ltd. is the project proponent (PP) of project activity and they have the legal right to control and operate the project activities.

The project ownership has been demonstrated through below supporting documents:

1. Commissioning certificates – The letter from Energy Market Company (EMC) to PacificLight Power Pte. Ltd. for registration of commissioning of generation facility indicates that PP have the legal right to control and operate the project activities.

2. Contract with EPC contractor – The purchase order on the name of PacificLight Power Pte. Ltd. indicates that PP have the legal right to control and operate the project activities.

Based on above evidences, the project ownership is with PacificLight Power Pte. Ltd.

1.12.2 Emissions Trading Programs and Other Binding Limits

Singapore is a Non-Annex 1 country and there is no compliance required with an emission trading program or to meet binding limits on GHG emissions for this project activity. The project is registered under Clean Development Mechanism (CDM) and UNFCCC (Registration ID 9687²). The project is also approved by the Designated National Authority (DNA) and a copy of the approval is also submitted to the Designated Operational Entity (DOE). Project Proponent (PP) has submitted undertaking that they will not claim same GHG emission reductions of the project from CDM and VCS. PP would not use net GHG emission reductions by the projects for compliance with emission trading program to meet binding limits on GHG emissions.

1.12.3 Other Forms of Environmental Credit

Project has been registered with the UNFCCC under the CDM program. Registration reference number is 9687³. PP has submitted undertaking for not availing other forms of environmental credit for the same crediting period under consideration.

1.12.4 Participation under Other GHG Programs

Project has been registered with UNFCCC under CDM program. Registration reference number is 9687⁴. PP also submitted undertaking for Project that neither does it intend to generate any form of GHG related environmental credit for GHG emission reductions nor removals claimed under the VCS program.

1.12.5 Projects Rejected by Other GHG Programs

Not Applicable. The Project is not rejected by other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

The project does not fall under Agriculture, Forestry and Other Land Use (AFOLU) category, hence not applicable.

Leakage Management

Project does not involve any leakage emissions other than methodology requirement for NG based power project. The leakage emission are calculated per methodology. Hence there are no any extra Leakage Management Plan and risk mitigation measures are required.

² <http://cdm.unfccc.int/Projects/DB/BVQI1373973780.44/view>

³ <http://cdm.unfccc.int/Projects/DB/BVQI1373973780.44/view>

⁴ <http://cdm.unfccc.int/Projects/DB/BVQI1373973780.44/view>

Commercially Sensitive Information

There is no any commercially sensitive information that has been excluded from the public version of the project description. There is no commercially sensitive information accounted for the determination of baseline, net GHG removals and for demonstration of additionality for the present project activity.

Sustainable Development

The sustainable development criteria as per the Singapore DNA (National Environment Agency, NEA, Singapore Government)⁵ are as follows:

1) Environmental Sustainability:

- i) The project activity will meet NEA's Environmental Protection requirements, standards and regulations
- ii) The electricity generated by project activity will be supplied to Singapore grid, which otherwise would have been generated by more carbon intensive fossil fuels and existing old power plants that are less efficient. Hence the project activity will help in reduction of the greenhouse gases emission and air pollutants (especially NOx).

2) Economic Sustainability:

The project activity is utilizing latest F class turbines and this advanced technology is more efficient⁶ and environment friendly compared to existing old power plants on the grid. This will result in the CO₂ emission reduction when compared with the build margin of the grid as discussed in Section B.6.3 of the registered CDM PDD.

3) Social Sustainability:

The project activity provided direct employment to persons during the construction and on an ongoing basis during normal operations. In addition it is expected that some more persons will be directly benefited through casual work, subcontracts, trading etc. Thus, the project activity helps to improve quality of life by creating opportunities for jobs and business.

Thus, the project activity contributes to the sustainable development of the country.

Further Information

There are no information or incidents that will have bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

⁵ http://app2.nea.gov.sg/clean_development_mechanism.aspx

⁶ Siemens F-class advanced turbines have this efficiency - This link shows rounded off value 56%.
http://www.siemens.com/about/en/businesses/energy/energy_service.htm

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Not Applicable

2.2 Applicability of Methodology

Not Applicable.

2.3 Project Boundary

Not Applicable.

2.4 Baseline Scenario

Not Applicable as project is registered under CDM.

Please refer to section B.4 of the PDD of UNFCCC registered CDM project with Ref No: 9687. The web link for the same is given below:

<http://cdm.unfccc.int/Projects/DB/BVQI1373973780.44/view>

2.5 Additionality

Not Applicable as project is registered under CDM.

Please refer to section B.5 of the PDD of UNFCCC registered CDM project with Ref No: 9687. The web link for the same is given below:

<http://cdm.unfccc.int/Projects/DB/BVQI1373973780.44/view>

2.6 Methodology Deviations

The project activity does not involve any methodology deviations. Hence this section is not applicable.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Not Applicable.

3.2 Project Emissions

Not Applicable.

3.3 Leakage

Not Applicable.

3.4 Net GHG Emission Reductions and Removals

Not Applicable.

4 MONITORING**4.1 Data and Parameters Available at Validation**

Not Applicable.

4.2 Data and Parameters Monitored

Not Applicable.

4.3 Monitoring Plan

Not Applicable.

5 SAFEGUARDS**5.1 No Net Harm**

Not Applicable.

5.2 Environmental Impact

Not Applicable.

5.3 Local Stakeholder Consultation

Not Applicable.

5.4 Public Comments

Not Applicable.

APPENDIX X: <TITLE OF APPENDIX>

Not Applicable.