Chapter 1

Introduction

1.1 Background and Objective of the Study

1.1.1 Many islands, many diesel generators

The Philippines consists of more than 7,000 islands and their electricity supply depends mostly on diesel generators due to the high cost of constructing transmission lines, especially submarine cables. Diesel generation is useful as the technology is well established and oil is easy to manage. However, it has the disadvantages of higher generating costs, depending on the crude oil price, and higher emissions compared to natural gas.

1.1.2 Substitution by liquefied natural gas

The advantages of LNG compared to diesel oil as a fuel for power generation are its lower fuel cost and lower emissions. Until recently, countries had moved away from using LNG because of its larger up-front cost and the extremely low temperature needed to store it. But technological developments, particularly floating storage and regasification units (FSRUs), are reducing such challenges. The Philippines can enjoy the economic and environmental benefits of LNG by adopting such technologies to supply LNG for power generation in mid-sized and large islands.

1.1.3 The study

The study aims to analyse such opportunities by identifying possible configurations for a small-scale LNG supply chain for power generation. This will support the national power development efforts in the Philippines and help provide a stable and affordable supply of electricity in a sustainable way.

1.2 Study Method

1.2.1 Electricity and liquefied natural gas demand estimation by grid and island

The study will forecast electricity demand in selected mid-sized and large islands in the Philippines. The study referred to the Philippines' Power Development Plan 2016–2040 to identify prospective electricity demand by region – Luzon, Visayas, and Mindanao.

Regional electricity demand will be broken down to the major islands using available socio-economic data. Then, the study will identify the islands where electricity demand exceeds a threshold level, and where an LNG-based power plant could be installed, including a gas-fired combined-cycle gas turbine power generator. Electricity demand will be converted to LNG fuel demand to run an LNG-based power plant including a combined cycle-gas turbine power generator.

1.2.2 Identify how to introduce liquefied natural gas-based power plants

The study will develop an optimisation model applying the linear programming approach to determine where and what kind of LNG supply chain is needed for LNG delivery solutions between the islands.

1.2.3 Simulation of physical liquefied natural gas delivery

The study will develop a computerised dynamic simulation model to simulate LNG delivery from primary terminals to subordinate terminals.

1.2.4 Conclusion and policy recommendation

The study will deliver policy recommendations for the supply of LNG between small and mid-sized islands in the Philippines.