

Preface

Brunei Darussalam has been consuming gasoline and diesel oil for road transport activities due to the increase of personal cars and natural gas for power generation following the rapid increase of electricity demand. In addition, a new refinery, which started its operation at the end of 2019, consumes imported coal for auto generation in the refinery site. According to the country's energy outlook produced by the Ministry of Energy, the total primary energy supply (TPES), mainly from fossil fuels, will increase significantly at 4.3% per year until 2040 at 5.6% of gross domestic product growth. In parallel, CO₂ emissions will increase at 3.6% annually until 2040.

Whilst variable renewable energy (vRE), such as solar/photovoltaic, is one of the options for Brunei, it will not be a sustainable solution due to its intermittency and lower capacity factor (maximum 15%), the need for a huge land area, and its higher generation cost compared to existing power plants. If the country will shift from internal combustion engine to battery electricity vehicle, it will need additional electricity demand, and power generation to consume natural gas will increase because of insufficient electricity generation by vRE.

Currently hydrogen is highlighted globally. Some East Asia Summit (or ASEAN 10 + 8 countries – Australia, China, India, Japan, Republic of Korea, New Zealand, Russian Federation, and the United States) have formulated their hydrogen strategic plans for future available technology and carbon-free energy. Brunei Darussalam, being a natural gas-rich country has opened a hydrogen demonstration plant in western Brunei Darussalam with the support of Japan. It means that Brunei Darussalam will be a hydrogen production country and will use some portion of the hydrogen to be produced domestically for its internal use, such as road transport sector and power generation. If this could be achieved in the future, gasoline and diesel consumption, as well as natural gas use for power generation, will drastically reduce. The country could also be carbon neutral if it could use hydrogen. But a still-large issue is the much-higher hydrogen supply cost compared to gasoline and natural gas prices.

With these backgrounds, this study forecasts the hydrogen demand potential in Brunei Darussalam by applying the econometrics approach and the hydrogen production potential, especially from natural gas, through technical investigation. In addition, this study touches upon hydrogen supply costs in Brunei Darussalam.

The results of this study are expected to contribute to the wider use of hydrogen not only in Brunei Darussalam but also in the East Asia Summit region.



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