

# BRUNEI DARUSSALAM

## GENERAL OVERVIEW

Brunei Darussalam, with a population of around 421,300 in 2017<sup>1</sup>, is the smallest country in the ASEAN region, both in terms of area and population. The country is independent from energy import, due to its vast domestically available oil and gas reserves. Brunei Darussalam has the ninth largest Liquefied Natural Gas (LNG) reserve in the world as well as the fourth largest oil producer in South East Asia region. In 2017, the GDP of Brunei accounted is around 12.2 billion USD<sup>2</sup>, of which 52.6% came from the oil and gas industry. This sector also accounts for more than 90% of the total national export. Hence the declination of oil prices and drop in fossil energy production causes Brunei's GDP to decline over the past few years (-1.3% as of 2017). Bandar Seri Begawan is the city of the state. Malay is the official language, while english is widely spoken among the population.

## ENERGY SECTOR

### ENERGY POLICIES

With the abundant oil and gas resources, there is no urgent need for development of renewable energy (RE) in Brunei. Nevertheless, the Long-Term Development Plan (Brunei Vision 2035) recognizes that oil and gas resources cannot keep up with the increasing demand and population growth. Therefore, it aims for economic diversification in parallel to the reinforcement of the oil and gas sector.

The important policy for oil industry is the Oil Conservation Policy, in force since 1981, when the peak of production was recorded. An equivalent strategy for the gas sector

<sup>1</sup>By Department of Economic Planning and Development Brunei Darussalam

<sup>2</sup>ASEAN Secretariat. ASEAN Statistical Leaflet 2018

The best efforts have been undertaken to minimize inconsistencies in data presentation or reference to outdated/invalid information in the ASEAN RE and EE Country Profiles. Due to the rapid development in the region and the high number of sources, it cannot be excluded that reference is made to outdated sources or that new developments have occurred in the respective ASEAN Member States. Therefore, the ASEAN Centre for Energy (ACE) cannot be held responsible for any consequences related to the use of information provided in the Country Profiles.

Comments, suggestions, and updates are welcome and will contribute to the quality of the ASEAN RE and EE Country Profiles in the future: [agep@giz.de](mailto:agep@giz.de)

i.e. Brunei Natural Gas Policy was introduced in 2000 to ensure that gas export obligation can be met.

A concrete plan for development of renewable energy has not yet been made although there are already some efforts to establish a regulatory framework to facilitate this development. Brunei has already implemented a solar demonstration power plant with the capacity of 1.2 MW. It is planned to expand this plant in the future. Moreover, in the long-term Brunei aims to develop offshore wind projects with the total capacity of between 18 and 20 MW. At this moment, the projects are in an early stage and feasibility study is required before further implementation.

Energy efficiency has been receiving more attention in comparison to renewable energy. Brunei has implemented the National Appliance Standards and Labelling Regulation, which aims at reducing domestic energy consumption in order to enable higher exports of gas. The Energy Efficiency and Conservation Program envisages the reduction of energy use by 45% by 2035 based in 2005 level

Brunei has also developed Energy White Paper (launched on 24 March 2014), which elaborates Brunei's goals and vision in energy sector. The white paper sets out a framework for action to enable Brunei to address challenges and to manage the projected risks. Under this framework, Brunei in partnership with domestic and international investors are planning and executing initiatives that help them to achieve Brunei Vision 2035.

According to Energy White Paper, the energy sector, in particular oil and gas, is a core driver of Brunei's economy as it accounts for more than 60% of Brunei's GDP and employs around 24,000 people with the target at 50,000 people by 2035. Power plant installed capacity in 2015 is 819.4 MW with conventional power stations from oil and gas generated 99.95% of total power generation, while 0.05% was generated by the solar power plant Tenaga Suria Brunei. The target is to increase the share of Renewable energy in the total power generation mix by 10% or 954,000 MWh in 2035 and at the same time to reduce energy intensity by 45% in line with Brunei's commitment to Asia-Pacific Economic Cooperation (APEC).

## ENERGY MIX

The primary energy supply of Brunei comes exclusively from fossil fuels (**Figure 1**) with total of 3,420 ktoe. The majority of natural gas is exported. Nevertheless, the domestic natural gas utilisation still dominates the primary energy supply (80%). Oil covers the remaining 20% of primary energy supply. Brunei's total energy supply is declining in proportional due to low oil price in 2016 which makes Brunei held their oil production.

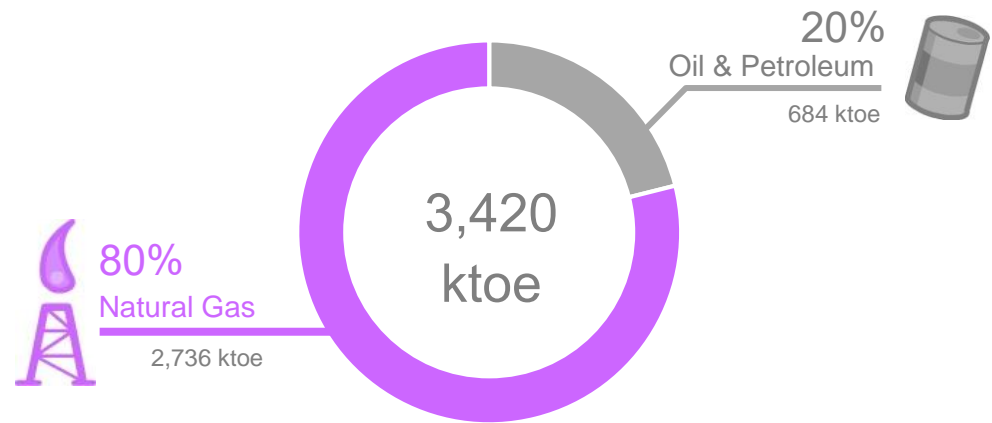


Figure 1: Primary Energy Supply (2015)

Source: *Clean Energy Technology Study in the ASEAN Member States by ASEAN Centre for Energy*

**Figure 2** presents the electricity generation in the power sector. Natural gas is almost exclusively used with its share as high as 98.95%. The total electricity generation in 2015 was accounted at 4,200 GWh, with only 2 GWh of electricity were contributed from solar PV.

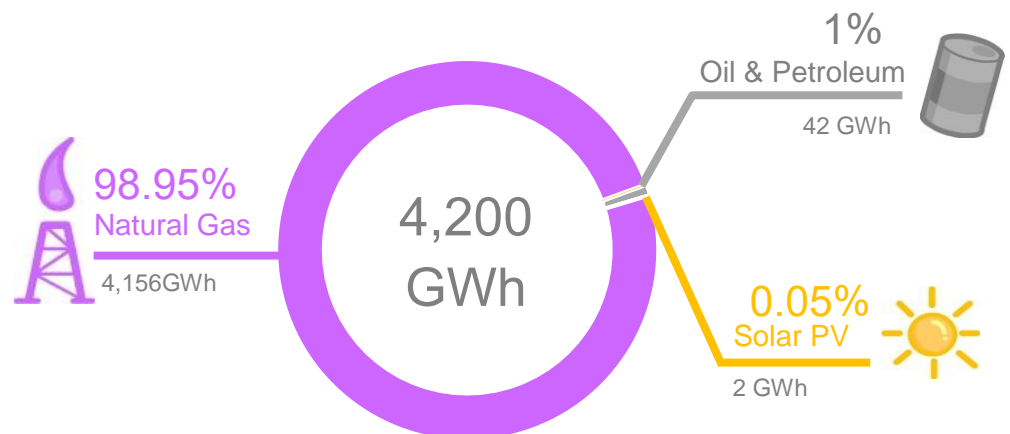


Figure 2: Electricity Generation (2015)

Source: *Energy Balance for Brunei Darussalam by IEA 2017 [accessed December 2018]*

## ELECTRICITY TARIFF & ELECTRIFICATION RATE

The new electricity tariff in Brunei has been in effect since 2012. The value of the tariff itself varies depending on the type of the consumer, as shown in **Figure 3** – residential and commercial/industrial. The electricity tariff for the residential sector was adjusted in the year of 2012 from regressive to progressive rate to encourage the smart use of electricity and to help the poor by giving cheaper rate to the low users of electricity. The electricity tariff for a residential sector is calculated per kWh as for commercial/industrial sector, it is determined from each electricity unit. Brunei Darussalam has the lowest value of electricity tariff among other ASEAN Member States (AMS).

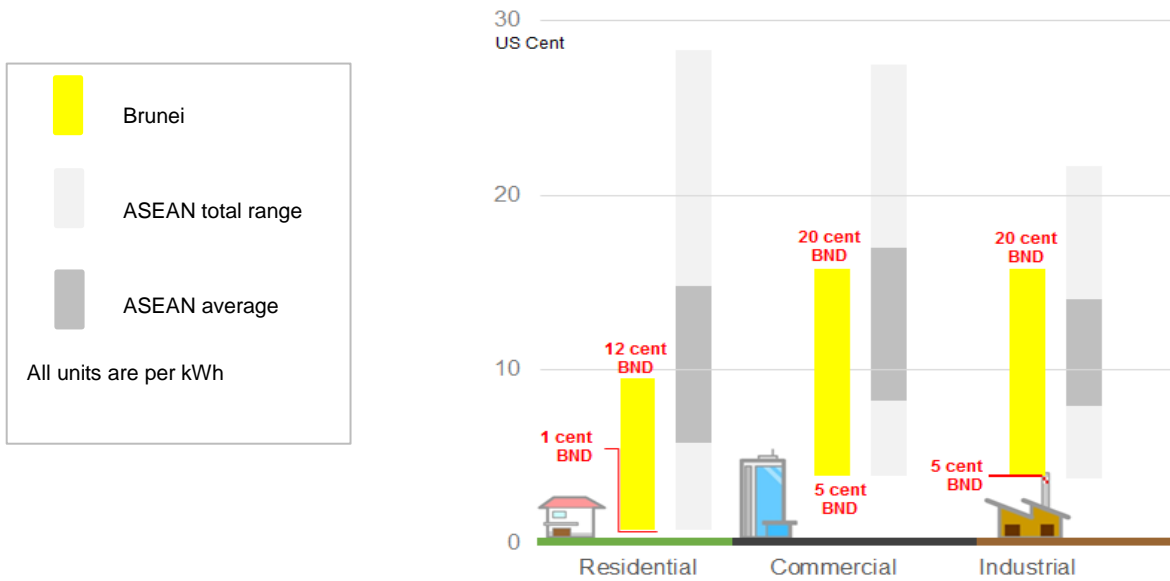


Figure 3: Electricity tariff in Brunei Darussalam

Source: Department of Electrical Services

*Notes:* Commercial and industrial rates are the same, but for comparison purposes with the other ASEAN they are represented separately.

Conversion factor from BND to USD (US-Dollar) is 0.73 (as of December 2018)

The electricity tariff for residential sector is set progressively in accordance to the consumption level i.e. a consumer that has lower consumption level is accountable to pay with cheaper rate. The maximum tariff value is applied to the customers that have consumption level exceeding 4 MWh.

The commercial and industrial consumers are subject to the same tariff system, that is calculated according to the unit of electricity used and the maximum demand rates of power used. The most expensive tariff applies for the first 10 unit used, as the following 100 units will be applied with the next two tariffs. Above 100 units, the 3<sup>rd</sup> tier will be applied where the remaining units are charged with the cheapest rate.

According to the World Energy Outlook which published in 2016 by IEA, Brunei Darussalam has achieved 100% rate of electrification with only 6% of transmission loss.

## RENEWABLE ENERGY SECTOR

### RENEWABLE ENERGY TARGETS

According to Brunei Energy White Paper, the country is planning to cover 10% (954 GWh) of its electricity consumption from renewable energy by the year of 2035. The document sets the ground for the renewable energy policy. It aims to scale-up market deployment of renewable energy technologies, but also to promote capacity development e.g. by supporting research and development.

The white paper provides the general outline of the activities to achieve the above-mentioned targets. It identifies four key priority initiatives:

- Introduce Renewable Energy Policy and Regulatory Frameworks
- Scale-up Market Deployment of Solar PV and Promote Waste to Energy Technologies
- Raise Awareness and Promote Human Capacity Development
- Support Research, Development and Demonstration (RD&D) and Technology Transfer

### INSTALLED CAPACITY OF RENEWABLE ENERGY

The total installed capacity of renewable energy sources in Brunei is exclusively coming from the photovoltaic (PV) demonstration plant owned by Tenaga Suria Brunei (TSB), the national electrical utility. The installed capacity of the plant amounts to 1,244 kW by 2015. The government is planning to take a leading role in identifying land for utility-scale solar projects and developing a waste-to-energy (WtE) project using municipal solid waste. The project is expected to install 10-15 MW plant in Sungai Paku, Tutong.

### RENEWABLE ENERGY GENERATION

In 2015 Brunei Darussalam has generated about 2 GWh of electricity that comes from Solar PV plant. According to the energy white paper, renewable and new energy generation that comes from solar and waste to energy is planned to increase up to 124 GWh by 2017 (2.7% of the electricity generation mix) and 954 GWh by 2035 (10% of the electricity generation mix).

## RENEWABLE ENERGY MARKET

At this moment, there is no a clear policy on renewable energy feed-in tariff scheme in Brunei. However, the country is planning to introduce a feed-in tariff and net metering policy in the future to encourage the investment in renewable energy systems. Renewable energy activities in the country focus on renewable energy potential studies, project feasibility studies, cost assessments, and capacity building. Some of concerns that limit the renewable energy development in Brunei are existing cheap electricity tariff that generated from abundant fossil fuel, having of almost 100% citizen has been connected to utility grid and the absence of feed-in-tariff scheme.

The Brunei Energy and Industry Department at the Prime Minister's Office (EIDPMO) considers to apply the Renewable Energy Certificate (RECs) for power generated by renewable energy sources. One RECs will be worth 1 MWh of renewable energy power generation, with the proposed fixed price at B\$0.25 per kWh or B\$250 per REC.

In addition, commercial feasibility study on waste power generation is currently being performed, the 20 MW waste-to-energy project is planned to be built in *Sungai Paku* with the main objective to reduce the amount of waste by around 80% - 90%. This project will be developed through a joint-venture between domestic and foreign companies. The Government aims to generate at least 10% of its total power generation mix from renewable energy sources by 2035.

## ENERGY EFFICIENCY AND CONSERVATION (EE&C) SECTOR

### EE&C TARGET

The Energy Efficiency and Conservation target has been defined in The Brunei Energy White Paper 2014. The country aims to achieve 45% of energy intensity reduction by 2035 (baseline 2005).

Brunei Darussalam has already established the EE&C roadmap to meet the reduction on energy intensity target. Through rigorous implementation of energy efficiency and conservation programs, Brunei Darussalam will be able to reduce the nation's total final energy consumption up to 63% that is mainly from the reduction of fossil fuel supply for inland energy use via five major sectors; power plant, commercial, residential, transport, and industrial sectors. The residential sector itself is set to achieve 36% reduction of energy consumption, that is about 16.2% of the total targeted energy intensity reduction. While the reduction from commercial sector is targeted to reach as much as 41% of energy consumption, that accounts 18.5% of the total targeted energy intensity reduction by 2035. The relevant government agencies, industries, and individuals are in collaboration to evaluate the legislative, financial, and fiscal policy measures that promote energy efficiency and low-energy intensive industries.

### EE&C POLICY

The Brunei Darussalam Ministry of Energy and Industry (MEI) established three Strategic Goals set out in Brunei Darussalam's Energy White Paper 2014 which was launched in 2014 to set out a framework for the government to address challenges and manage the projected risks in the energy sector in order to lead Brunei's economy into a sustainable future as set out in Brunei Vision 2035:

- Strategic Goal 1: Strengthen and grow oil and gas upstream and downstream activities.
- Strategic Goal 2: Ensure safe, reliable and efficient supply and use of energy.
- Strategic Goal 3: Maximize economic spin-off from energy industry – boost local content and secure high participation of local workforce

The Strategic Goal 2 that focuses on the energy sector, has laid down an essential basis for improving EE and promoting energy conservation. Under this strategic goal, the government sets the target to reduce EI by 45% by 2035 with 2015 baseline which will be achieved through seven key policies and regulatory frameworks, namely (i) electricity tariff reform, (ii) EE&C building guidelines for non-residential sector, (iii) standards and energy labelling for products and appliances, (iv) energy management policy, (v) fuel economy regulation, (vi) financial incentives, and (vii) awareness raising.

### EE&C ACTIVITIES AND INVESTMENT

Brunei's INDC (Intended Nationally Determined Contribution) stated that the Energy and Industry Department (EID) in association with the Ministry of Finance will identify suitable financial incentives which can be introduced in the country such as tax exemptions, tax reductions or rebate schemes on energy-efficient appliances and products. The white paper provides the general outline of implementation to achieve energy efficiency and conservation goals. It identifies four key priority initiatives on energy savings:

1. **Power Generation Efficiency:** The Department of Electrical Services (DES) and Berakas Power Management Company (BPMC) have set out plans to increase energy efficiency in the power generation from 23% to more than 45% in 2035. Plans include implementation of combined cycle turbine and co-generation power plant, reduction of partial load operation, improvement of transmission and distribution losses, mandate an energy efficiency standard for new power plants and reduction of gas consumption through integration of renewable and alternative energy to meet domestic power demand.
2. **Transportation Sector:** Under the jurisdiction of Ministry of Communications, measures towards energy intensity reduction include promotion of fuel efficient technologies, the use of hybrid cars for private transportation and introduction of fuel economy standards. These efforts are set to reduce about 13% of energy consumption from the BAU scenario which is about 5.9% of the total targeted energy intensity reduction by 2035. The Government through Centre of Strategic and Policy Studies (CSPS) has introduced a Brunei Land Transport Masterplan that promotes modal shift towards public transportation and will play a role in further reducing energy consumption in the sector.
3. **Strengthening Policy and Governance in Energy Efficiency:** In 2009, CSPS has conducted an Energy Efficiency and Conservation Study on the Roadmap Formulation and Policy Advice which as a result, designed seven key policies that came with the following recommendation:
  - Appliance Energy Efficiency Standards and Labelling
  - Regulation on Building
  - Energy Management and Certification
  - Fuel Economy Regulation
  - Electricity Tariff Reform for residential sector
  - Financial Incentives
  - Public Awareness Raising
4. **Residential and commercial buildings:** Measures include applying "smart" tariffs, application of high-energy efficient technologies in buildings, installation of smart meters and evaluation of feasibility of altering tariff structure that promotes efficient consumption behavior. Implementation of the initiatives set out in the residential sector would reduce energy consumption to 36% from the BAU scenario which is about 16.2% of the total targeted energy intensity reduction by 2035. Similar measures in commercial sector could result up to 41% reduction which is about 18.5% of the total targeted energy intensity reduction by 2035.

The Ministry of Development (MOD) published the latest version of Building Guidelines and Requirement in 2017 that reflects the current state of Brunei's building industry and also contains the Building Control Order (BCO) and the Building Control Regulations (BCR) in 2014. The Piawai Brunei Darussalam (PBD) 12:2017 elaborates Green Building technology and sustainable building construction in areas of energy efficiency, materials and resources, sustainable site management and indoor environment quality among others

## REFERENCE SOURCES

- 1 Department of Statistics & Department of Economic Planning and Development. 2017. *Gross Domestic Product Third Quarter 2017*. [http://www.depd.gov.bn/DEPD%20Documents%20Library/DOS/GDP/2017/GDP\\_Q32017.pdf](http://www.depd.gov.bn/DEPD%20Documents%20Library/DOS/GDP/2017/GDP_Q32017.pdf) [Accessed September 2018]
- 2 n.a., 2016. *12<sup>th</sup> ASEAN+3 New and Renewable Energy (NRE) and Energy Efficiency and Conservation (EEC) Forum*. Phnom Penh, Cambodia. 29 January 2016.
- 3 Kasim, A.M.. 2016. *Renewable Energy in Brunei Darussalam*. In: Department of Energy and Industry, Prime Minister's Office. *23<sup>rd</sup> Annual Meeting of Renewable Energy Sub-Sector Network (RE-SSN)*. Iloilo, Philippines. 7 April 2016.
- 4 IEA. 2015. *Brunei Darussalam Electricity and Heat for 2015*. IEA: Paris. Available at <http://www.iea.org/statistics/statisticssearch/report/?country=Brunei&product=electricityandheat> [Accessed September 2018]
- 5 Reegle, n.d. *Energy Profile Brunei*. [online] Reegle. Available at <http://www.reegle.info/countries/brunei-energy-profile/BN> [Accessed September 2018]
- 6 Department of Electrical Services – Prime Minister's Office. [online] *Electricity Tariffs*. Available at <http://www.des.gov.bn/> [Accessed September 2018]
- 7 *The Energy Sector in Brunei Darussalam*. [online] Available at <http://www.ei.gov.bn/SitePages/Energy%20Sector%20in%20Brunei%20Darussalam.aspx> [Accessed September 2018]
- 8 *Energy White Paper 2014* [online] Available at [http://www.des.gov.bn/SiteCollectionDocuments/Energy%20White%20Paper%202014\(1\).pdf](http://www.des.gov.bn/SiteCollectionDocuments/Energy%20White%20Paper%202014(1).pdf) [Accessed September 2018]
- 9 ASEAN Centre for Energy. 2018. *ASEAN Renewable Energy Policies*
- 10 ASEAN Centre for Energy. 2018. *Financing Energy Efficiency in the ASEAN Region*
- 11 ASEAN Centre for Energy. 2018. *Green Building and Energy Efficiency & Conservation Codes in ASEAN*