



Feed-in tariff vs incentivized self-consumption: Options for residential solar PV policy in Brunei Darussalam



Romeo Pacudan

Brunei National Energy Research Institute (BNERI) and Institute of Policy Studies, Universiti Brunei Darussalam (UBD), Brunei

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ABSTRACT

The study assesses policy options for the proposed 5-year rooftop solar PV deployment program in Brunei Darussalam targeting around 1000 households per year or installing a total of 50 MW_p¹ (5000 × 10 kW_p) capacity in 5 years. At present, small scale solar PV systems are not competitive in the country and that the government needs to introduce a policy framework that incentivizes households to participate in the proposed deployment program. Feed-in tariff and self-consumption schemes (net metering and net billing) are the main policy frameworks adopted globally to promote deployment of residential solar PV systems and these could be designed to provide the same level of incentives to residential households given the same technical and financial requirements. For the implementation of the proposed 5-year deployment program, a feed-in tariff policy framework would require a much higher level of subsidy and would result in higher financial burden to consumers compared with net metering and net billing schemes. Electricity tariff reforms on the other hand could complement deployment policies by putting upward pressure on retail electricity prices making solar PV technologies more attractive and requiring less subsidies.

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1. Introduction

Brunei Darussalam is one of the few oil- and gas-resource rich countries in Southeast Asia. As a net energy exporter, the oil and gas sector contributes the biggest share of the country's gross domestic product (GDP) representing around 56.9% in 2015 [18,7]. Economic activities are fueled mainly by conventional energies due to its abundance with 99% of the power fuel supply coming from natural gas while the transport sector is 100% dependent on petroleum products.

The Energy and Industry Department at the Prime Minister's Office (EIDPMO) is the apex body responsible for energy policy and regulation. EIDPMO's regulatory authority encompasses economic and technical regulation in the energy sector including those related to renewable energies and energy efficiency. EIDPMO launched in 2014 the country's Energy White Paper which outlines the Government's strategy to steer the country towards sustainable energy future. One of the country's strategic goals is to diversify the power supply mix and increase the share of renewable energies to

10% of the total electricity production by 2035. Based on the projected baseline electricity generation, the target represents around 954,000 MWh of renewable electricity generation [10].

Various resource assessment studies were carried out in the country over the past years and these studies show that solar and municipal solid waste (MSW) are the 2 main resources that have proven potential in the country and could be commercially developed given the right policy framework and investment incentives [32]. MSW's resource potential, based on household waste generation, is however limited and estimated to range about 20–25 MW of installed capacity by 2035. Solar PV is one of the technological options that could meet the long-term renewable energy target. Using solar PV technology alone, this target corresponds to over 700 MW_p installed capacity.

Deployment options for solar PV technologies include building-mounted distributed generation systems (residential, commercial and industrial buildings) and ground-mounted utility scale systems. This study focuses on rooftop solar PV program for residential sector. A 5-year deployment program, targeting around 1000 households per year, is envisaged in this study. The 5000 households target represent around 8% of the total number of occupied houses in the country based on the 2011 household census [3]. Taking an average size of 10 kW_p per system, the program aims at

E-mail addresses: romeo.pacudan@bneri.org.bn, romeo.pacudan@ubd.edu.bn, romeo.pacudan@gmail.com.