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POLICY BRIEF

# Harnessing the Sun and Wind

The Sumba Inconic Island Initiative aims to provide inhabitants with power sourced entirely from renewable energy sources within 10 years. It is hoped the project will provide a model for replication in similar areas around the world. Photo credit: Sean Crowley/ADB.

*Indonesia's ambition to provide universal access to electricity by 2025, and from clean energy sources wherever possible, rests on its ability to harness wind and solar energy.*

## Introduction

### Statement of issue

Indonesia has substantial solar and wind power capacity but it needs to significantly scale up the use of these renewable energy sources if it is to reach its target of supplying electricity to more than 97% of all households by 2020.

The government is targeting total installed wind capacity of 2,500 megawatts (MW) and national solar capacity of 5,000 MW by 2025. As of July 2016, the total installed capacity of wind power in Indonesia was just 6.5 MW and 80 MW of solar. However, the government is faced with both tariff and implementation issues that need to be addressed to reach these goals.

Policymakers looking at pricing mechanisms for promoting renewable energy generating capacity need to take into account a host of factors, including the principle of cost avoidance—i.e., the costs of installation/operation of clean energy systems should not exceed the benefits to Indonesia from switching away from thermal powered generation. Such benefits include the avoided cost of greenhouse gas (GHG) emissions, as well as improved energy security, local environmental benefits and local economic development.

# Policy Options

## PROs and CONs

### Harnessing the sun

Solar energy can be harnessed using a photovoltaic (PV) system in which electricity-generating solar panels are mounted on the rooftop of residential or commercial buildings or directly on the ground for large utility-scale systems (greater than 100 kW).

**PROs**

- Thanks to its location on the equator, Indonesia enjoys a substantial solar resource that is fairly consistent all year round.
- About a quarter of Indonesia's population, mostly in eastern areas, does not have access to grid-supplied electricity so off–grid solar PV energy is a good solution, particularly for more remote locations.
- Not only is the operating cost lower than oil and diesel-fired power generation, it also reduces GHG emissions at no incremental cost.

**CONs**

- Radiant energy is less available in Sumatra, Jakarta, and Western Java compared to eastern parts of the archipelago.
- Solar PV is not economically viable in Jakarta because there is a cost-effective supply of electricity generated from natural gas and the estimated benefits (including the value of avoided GHG emissions) are significantly less than the cost of power production from this source.
- There is limited land for developing commercial-scale PV plants, a lack of incentives and policy mechanisms to encourage PV uptake, as well as high upfront costs for installing PV systems.

### Harnessing wind

**PROs**

- Indonesia has an estimated 1-3 GW of potential wind power, making it a viable energy source in selected regions of the country.
- Wind-generated electricity can be readily fed into power grids and can significantly reduce thermal-powered energy production.

**CONs**

In the eastern islands, demand for electricity is relatively small and the high operational and maintenance costs of smaller wind turbines mean solar plants are a more cost effective option.

### Key statistics

| | |
|---|---|
| 55.5 GW | Total generation capacity of Indonesia |
| 80% | Eectricity generated in the Java-Bali grid |
| > 97% | Target electrification ratio by the Government of Indonesia |
| 2,500 MW | Target wind capacity by 2025 |
| 5,000 MW | Target solar capacity by 2025 |

# Recommendations

What is the right approach for policymakers deciding on tariff regulations for solar PV and wind projects to make them economically viable? Here are five recommendations:

### 1. Weigh the economic PROs and CONs of each location

Estimate the economic benefits of wind and rooftop solar PV, based on the thermal fuel displaced on the specific island/region. The primary benefit is the avoided cost of thermal generation. The next most important benefit is the value of avoided GHG emissions. Other benefits such as energy security, local environmental benefits, and local economic development are also estimated.

### 2. Crunch the cost/benefit of numbers

Adjust the benefits if there are additional system integration costs (in the case of wind) and avoided transmission and distribution losses (in the case of solar PV). Establish the benefits for the short-, medium-, and long-term.

### 3. Establish regional tariffs

Propose a tariff ceiling for each technology for specific islands based on overall benefits to Indonesia. This is to ensure that any competitively bid tariff is at a level that is in the economic interest of Indonesia to implement.

### 4. Set the production cost

Establish the likely range of production costs for the wind and solar PV developers. Assess whether the technology to be used can be employed at a cost that is at, or below, the benefits – in which case the technology can be considered economically viable.

### 5. Review the implementation details carefully

Assess the implementation issues, especially the need for competition for large projects and a fixed feed-in-tariff for small projects.

# Resources

Asian Development Bank. 2015. Tariff Support for Wind Power and Rooftop Solar PV in Indonesia. Report prepared for the Government of Indonesia under the Sustainable Infrastructure Assistance Program. Manila.

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Peter Meier
Economist, Consultant, Asian Development Bank

Pramod Jain
Wind Technology Specialist, Consultant, Asian Development Bank

Follow Pramod Jain on

Paul Rodden
Solar PV Specialist, Consultant, Asian Development Bank

Djoko Prasetijo
Power Systems Engineer, Consultant, Asian Development Bank

Berliana Yusuf
Power Systems Analyst, Consultant, Asian Development Bank

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