# Renewable Energy Development on Indonesia's Small Islands Case Study: Sumba Island


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# Overview of Indonesia

- Indonesia, situated between Indian and Pacific oceans, comprises over 17,000 islands, including Sumatera, Java, Sulawesi, parts of Borneo, and Papua.
- Indonesia is the 14th largest country, covering an area of 1.9 million square kms (735,358 square miles). With a population of approximately 280 million people spread across 38 provinces, Indonesia is the fourth most populous country in the world.

- The energy resources in Indonesia consist of fossil fuels such as oil, natural gas, and coal, as well as renewable energy sources including solar, geothermal, biomass, and hydro energy.
- Indonesia is also home to vast areas of wilderness, supporting one of the world's highest levels of biodiversity.

# Challenges in the Electricity Sector

| Geographical Aspect | Construction aspect | Technical Aspect | Economical aspects | Social Aspect |
|---|---|---|---|---|
| • Availability of local renewable energy resources not matching the demand | • Permits<br>• Land Aqcuisition | • Long term continuity of supply due to climate and seasonal variability<br>• Intermittent nature of some RE sources | • High investment<br>• Financial support<br>• Affordable tariffs<br>• Local content | • Support from society |

*Source: National Electricity Company (PLN)*

# Case Study: Sumba Iconic Island (SII)

The Iconic Island For Renewable Energy
SUMBA ICONIC ISLAND

Initiated by the Ministry of Energy and Mineral Resources, the National Development Planning Body, and Hivos, this program adopted a multi-actor approach. The efforts to involve various stakeholders in energy and non-energy sectors contributing to the development of renewable energy and the environment in Sumba Island was conducted in around 2010.

Sumba Island was selected as a case study based on the findings of a study at the time, which revealed several conditions on Sumba Island:

(1) a very low level of electrification ratio among communities, amounting to 29.3% in 2013, with per-capita electricity consumption of 42 kWh, far below the national average of 591 kWh;

(2) the energy supply was still predominantly dependent on fossil fuels, particularly diesel (Diesel-powered Electricity Generator) that required fuel imports from outside the island;

(3) its dominant RE potentials include wind power, solar power, hydro power, biomass and biogas power;

(4) 20% of Sumba's residents were classified as poor.

**Sumba Iconic Island is one of the success story on renewable energy facilities provision in rural and remote areas. The Sumba projects are financed by multi-sources, such as the Specific Allocation Fund, grants (Mentari Program, ACCESS Program, etc.).**

*Source: Directorate General of New, Renewable Energy, and Energy Conservation*

# INCREASING ENERGY ACCESIBILITY IN RURAL AREA

***SUCCESS STORY- SUMBA ICONIC ISLAND PROGRAM***

***Source: Directorate General of NRE, 2022***

Since 2016 the contribution of solar generators has been getting bigger, due to the existence of solar home systems and communal solar power plants, and currently the share is 48%, followed by Hydro 40% and Biomass 11%. PV technology is a renewable energy technology with the most diverse uses.

## ELECTRIFICATION

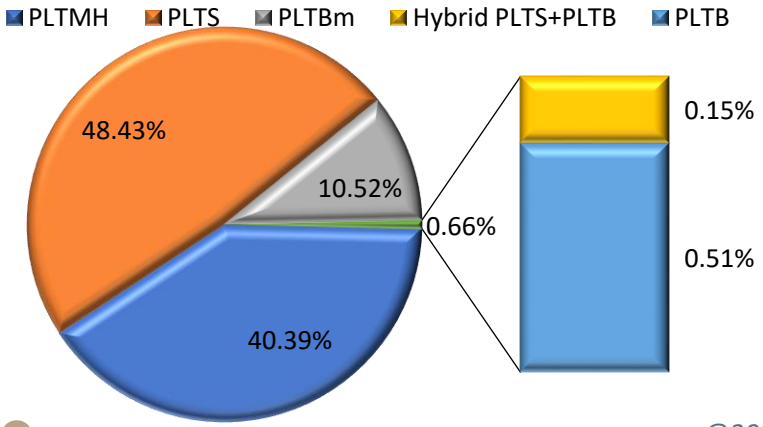
**SOLAR PV**
Potential: 10 MW
Installed: 4,7 MW
(Solar PV PP, PV Agro processing, PV School dan Kiosk Energy, PJU, Solar Water Pump)

**WIND POWER**
Potential: 10 MW
Installed: 100 unit/50 kW, Hybrid with solar pv : 2 unit/14,5 kW

**RoR HYDRO**
Potential for RoR Hydropower : 7.1 MW
Installed: 40 unit Microhydro/ 3.955,7kW

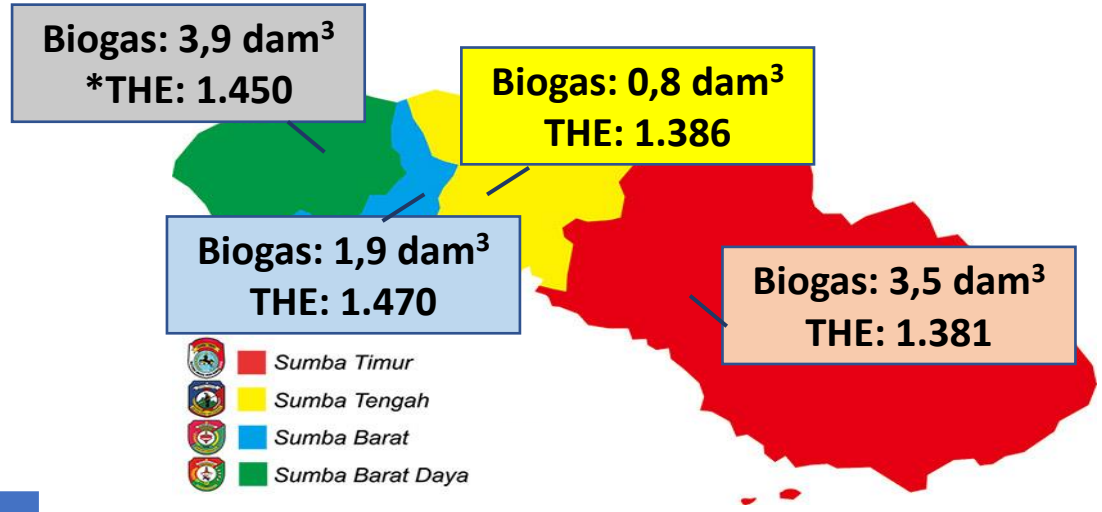
**BIOMASS**
Potential: 1 MW
Installed: 2 unit/ 1,030 kW

*RE potential data based on ADB report in 2014*




| Indicator | Year 2010 | Current condition |
|---|---|---|
| Electrification ratio | 24.5% | 76.8% |
| RE Mix | 0% | 20.9% |
| Capacity (MW) | 0 | 9.3 MW |

## NON-ELECTRIFICATION




Cookstove and Biogas are the most widely implemented non-generating projects every year on Sumba Island.

## BENEFIT

- ✓ Empowering Communities to Increase Income and Improve Children's Education
- ✓ Improving Family's Health

** THE : Tungku Hemat Energi (energy efficient wood cookstove)*
*dam3 : dekameter cubic*

# Lessons Learned From Renewable Energy Development in Remote Areas

- It is crucial **to involve the local community** in the development programs right from the beginning to foster a sense of ownership and responsibility towards the renewable energy facilities;
- **Identifying a local champion**, a key person who can mobilize the community and ensure proper management of the facilities, is of utmost importance. This local champion serves as a leader within the community;
- There is an importance of **establishing a formal and legal entity** capable of running a business. The developed facilities should be professionally managed to cover costs and generate profits for sustainability;
- **Transparency and accountability in business management** are critical aspects of facility operations;
- The **successful projects in one location can serve as models for others,** they must be adapted to suit the specific needs of local communities;

- **Increasing capacity and providing post-installation support** are also important aspects to address the gap between technological expertise, management capabilities, and public knowledge;
- It is vital to maintain **strong coordination** among stakeholders, including the central government, provincial/regional governments, and PLN (state-owned electricity company).
- **Adopting a multi-stakeholder approach** is essential to ensure successful outcomes.

*Source: Directorate General of New, Renewable Energy, and Energy Conservation*

# THANK YOU

NATIONAL ENERGY COUNCIL