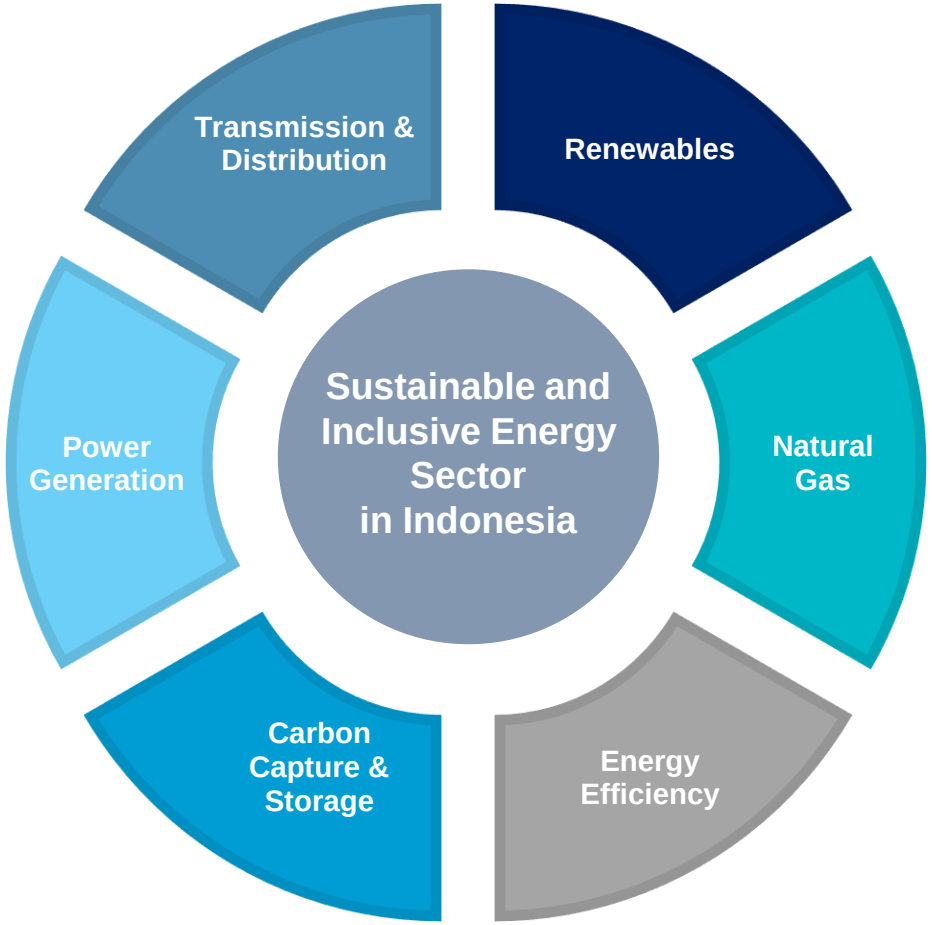
# ADB-PLN Electrical Grid Strengthening Program:

Ongoing and Planned Support

**23th Feb 2021**

# ADB Energy Sector Support to Indonesia.




**Analytics and Awareness**

**Mainstreaming Energy Security, Energy Access, and Clean Energy Considerations**

**Financing Clean Energy and Sustainable Infrastructure**

**ADB's Lending Pipeline in Indonesia for 2021-2023 to support over USD 3 billion in financing.**

# ADB Results-Based Lending for Grid Strengthening.

| TITLE | SCOPE |
|---|---|
| **Electricity Grid Strengthening Sumatra**<br>$600 million ADB ($25 million AIF);<br>Approved: 2 Dec 2015 | • First ever **result-based lending (RBL)** program in the energy sector in any country.<br>• Upgrading of existing SS and reconductoring of existing TLs.<br>• New mid-voltage and low-voltage distribution lines. |
| **Sustainable Energy Access in Eastern Indonesia (SEAEI) – Electricity Grid Development Program (EGDP)**<br>$600 million ADB;<br>Approved: 14 Sep 2017 | • **Strengthening and expanding** distribution system in Nusa Tenggara and Sulawesi.<br>• Smart grid pilots considered to help improve power quality and increase use of renewable energy.<br>• Grant TA for independent verification. |
| **SEAEI –**<br>**Electricity Grid Development Program, Phase 2 (EGDP 2)**<br>$600 million ADB<br>Approved: 8 Nov 2020 | • **Strengthening / expansion** of the distribution system in Kalimantan, Maluku and Papua.<br>• Small solar PVs.<br>• Participatory electrification programs with gender targets. |
| **Sustainable and Reliable Energy Access Program (SREAP)**<br>$600 million ADB<br>Approval: [Q4 2020] | • **Transmission and distribution strengthening** in Banten, DKI Jakarta, West Java, and Central Java-Yogyakarta.<br>• Transmission losses reduction and line reconductoring.<br>• Distribution lines rehabilitation, extension, loss reduction.<br>• Jawa-Madura-Bali control centre modernization.<br>• Increase the number of remote-controlled distribution switchgear. |

# West Kalimantan Power Grid Strengthening

## Financing

Project Cost: $130m
$99 million ADB (including 49.5 million co-financing from AFD);
$2.0 million TA (grant from CEFPF)

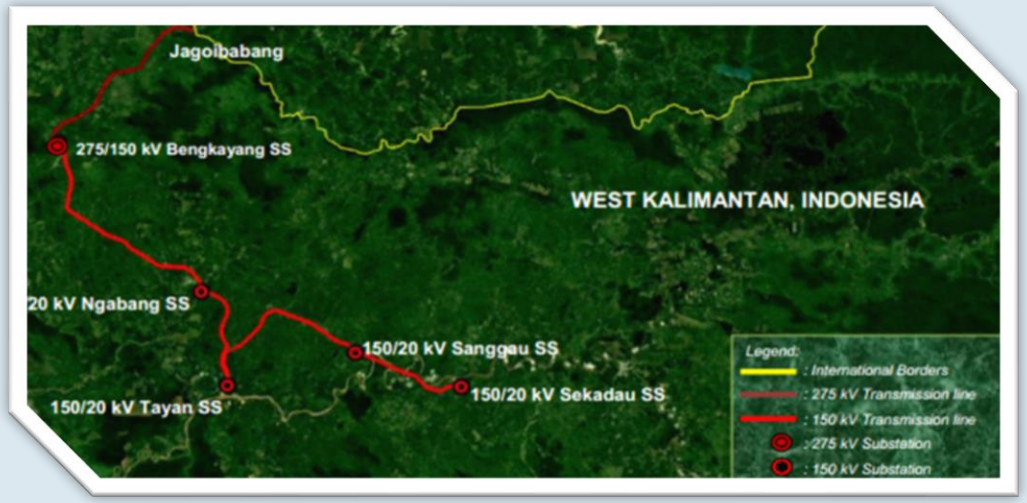
Approval: 27 Aug 2013

## SCOPE

- 230 MW 83 km cross border transmission interconnection
- P1: 275 kV transmission line(TL) from Bengkayang to Jagoibabang
- 150 kV TL from Bengkayang to Tayan
- 150 kV TL from Tayan to Sekadau ( using loan saving)
- Associated substations (SS)

PLN energy purchase: 50 MW base load take or pay + 180 MW 6 hours take and pay = total 650GWh/yr
PLN purchase price: 60% cost savings/KWh
PLN savings: estimated $100m/yr
Performance guarantee: to help fast track project

- $35m with $25k/day delay cost
- interconnection agreement signed on 30 June 2013



# Java-Bali 500 kV Power Transmission Crossing

## Financing

Project Cost: $249 million)

$20.84 million ADB (including $2.08 million co-financing from AIF), plus parallel co-financing from KfW

Approval: 3 Dec 2013

## SCOPE

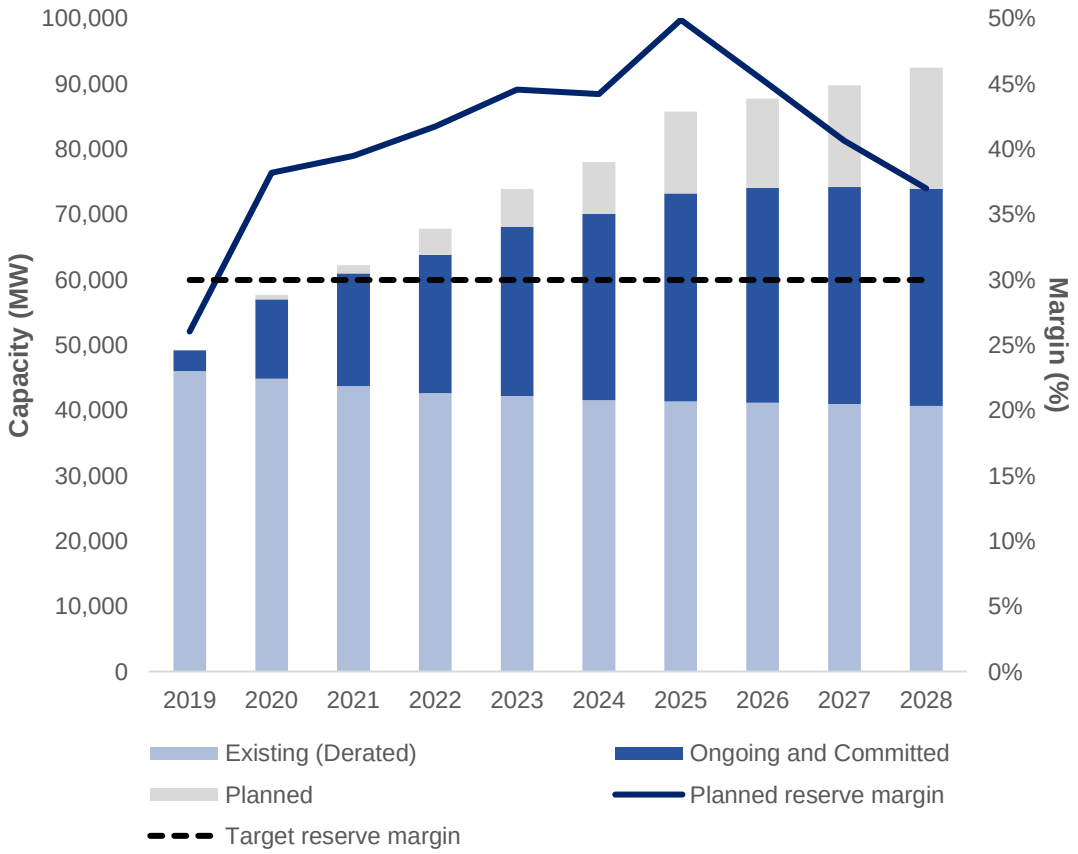
- Extension/upgrading of 11 existing SS
- New 500/150 kV SS – cancelled
- 500 kV TL crossing the Bali Strait (KfW and PLN) with a total transmission capacity of 3,600 megavolt-amperes (MVA) with power capacity of 3,000 MW - cancelled

Transmission of power from East Java to Bali at 500 kV optimal solution to improve the power supply in Bali based on least-cost power system studies.

Coupling Bali with more efficient generation capacity in Java, transmitting power from Java would be a more technically and economically feasible option before installing new generation plants in Bali given demand growth in Bali.

# Investment planning has neglected networks leading to higher costs and inadequate reliability.

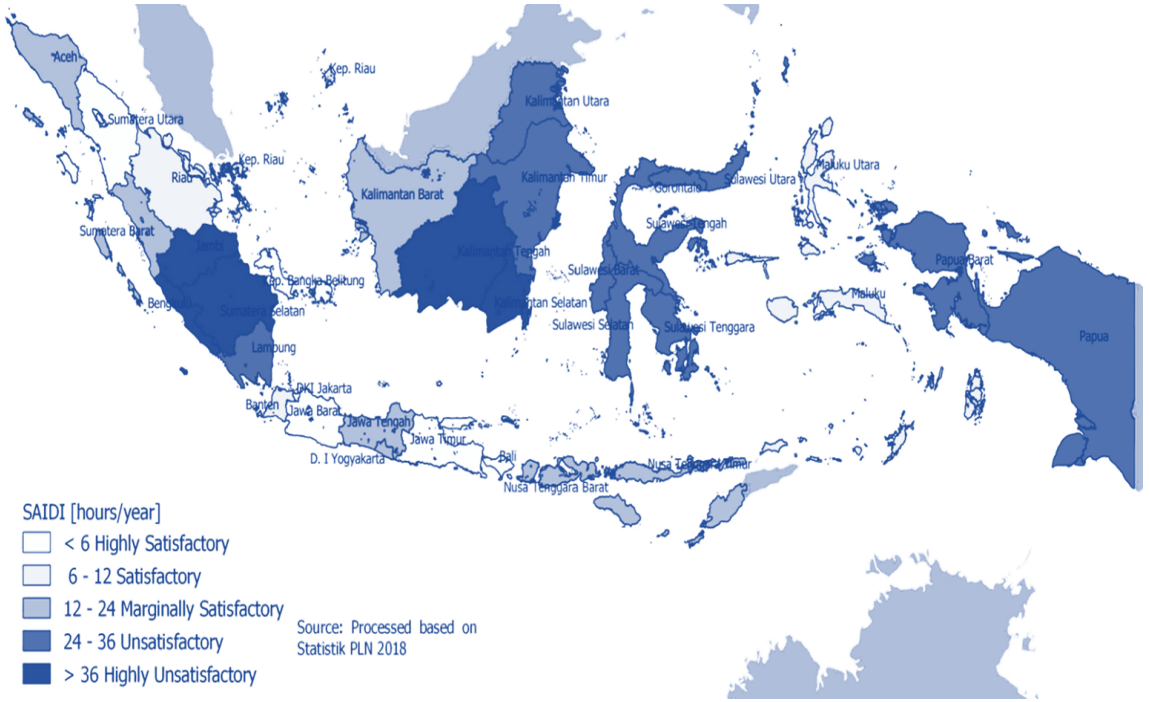
**Unrealistic demand and generation planning led to greatly exceeded reserve margins**




Source: *RUPTL 2019-28*.

Date 23rd Feb 2021

**Meanwhile, inadequate networks mean that service quality remains poor in many regions**




Source: *PLN Statistics 2018*.

# Need for Transmission Investment in Indonesia.

1. RUPTL 2019, identified additional transmission lines of 57,000 km, and sub-station transformer capacity of 124,000 MVA by 2028. Need to carefully assess what is really needed to avoid costly overbuilt.

| EHV (km) | Vietnam – 500kV+220kV (EVN annual reports) | Indonesia – 500kV+275kV (PLN statistics) |
|---|---|---|
| 2014 | 19,285 | 6,427 |
| 2018 | 24,876 | 8,531 |
| Change (2014-18) | 5,609 | 2,104 |

2. New transmission grid investments needed in Sumatra, Kalimantan, Java for intra-regional connection and reliability.

3. Inter-regional grid strengthening needed for example in Java/Bali to accommodate new generation.

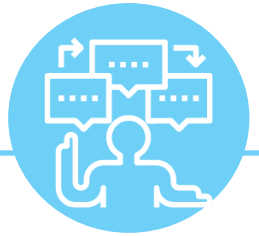
4. Integration of renewable energy presents challenges:
   - Geographical dispersion
   - Small, multiple projects
   - Need to smooth out variability in large geographical areas

5. Introduction of “smart grid” technologies will require new investment in substations, control centers, etc..

# Transmission Investment Challenges.

### Changing context

Energy policy, medium and long-term planning of PLN, demand projection.

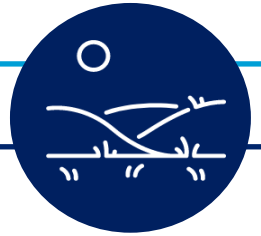


### Planning

If planning is not done well, public or private projects can lock in long-term financial obligations for under-used assets

### Safeguards

In particular environment, indigenous communities, and other compliance issues.



### Land acquisition

securing land and forestry permits, and rights of way from the government.

### Local content requirement

increasing project cost, not in accordance with the lender's procurement policy.

### Capacity building and information management

organizational changes, staff turn over, project supervision.

# Transmission Financing Overview.

## PLN CAPEX for EPC:

- based on state budget infusion.
- based on corporate lending.
- with multilateral funding (local content).

## PPP using build-lease-transfer and limited concession scheme as now permitted

- Private investment in transmission is widespread in middle income countries (MICs) and new PPP transmission projects are being implemented in many MICs.

**All financing routes need to be based on comprehensive and detailed technical, environmental, political/legal, financial assessments are needed to make the business case.**

# Conventional – PPP Comparison.

## Conventional Procurement

- PLN can meet its transmission needs with conventional borrowing and traditional EPC construction.
- PLN has the experience, know-how, and staff to build transmission in Indonesia.
- Total life-cycle costs of the new transmission assets are not fully transparent and difficult to evaluate with government projects.
- In Brazil, India, Peru, etc., overall value for money judged to be less than that of PPPs.

**VS**

## PPPs

- Indonesia's PPP rules require qualitative & quantitative value-for-money analysis to fully & transparently justify projects.
- Indonesia's PPP process is time consuming.
- Preparation plus competition lowers private sector costs but there is local content.
- PPPs take on (and pay for) many project risks that can increase project costs.
- Total life-cycle costs often lower than for conventional procurement, which increases value for money.

# Summary Financing of transmission.


State-budget infusion cheapest option for PLN to fund new transmission.

Multilateral funding more expensive but cheaper than corporate loans and have longer maturity.

Adopting PPPs for transmission may be better value for PLN than borrowing but cost will depend on risk and PLN's ability to increase revenue from new transmission lines.

There is a lack of an evidence base for PPPs as no value-for-money studies have been conducted to date.

Conduct a VFM analysis for the high priority projects before deciding on the financing route.


# Thank you