DIRECTORATE GENERAL OF ELECTRICITY
MINISTRY OF ENERGY AND MINERAL RESOURCES
REPUBLIC OF INDONESIA

ELECTRICITY OF INDONESIA

"Leveraging Carbon Pricing to Accelerate Power Sector Decarbonisation in Asia Pacific"
Asia-Pacific Climate Week 2021 side-event

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Directorate General of Electricity
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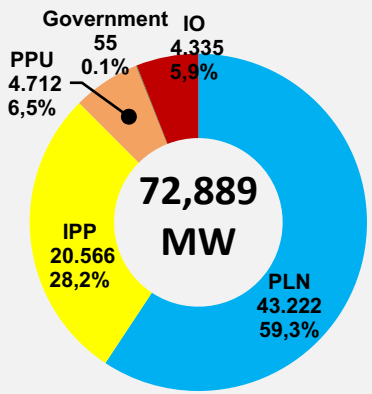
outline

1 INDONESIA'S ELECTRICITY: CONTEXT AND POLICY

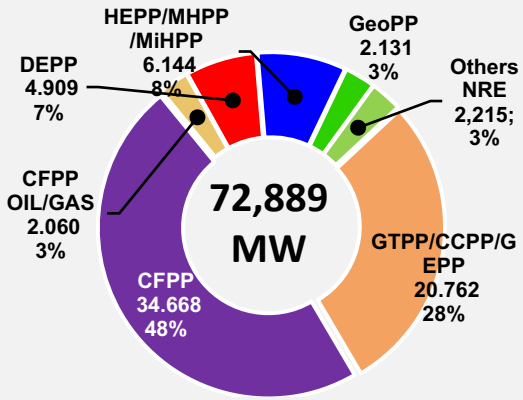
STATUS OF NATIONAL ELECTRICITY (MAY 2021)

INSTALLED CAPACITY OF NATIONAL POWER GENERATION

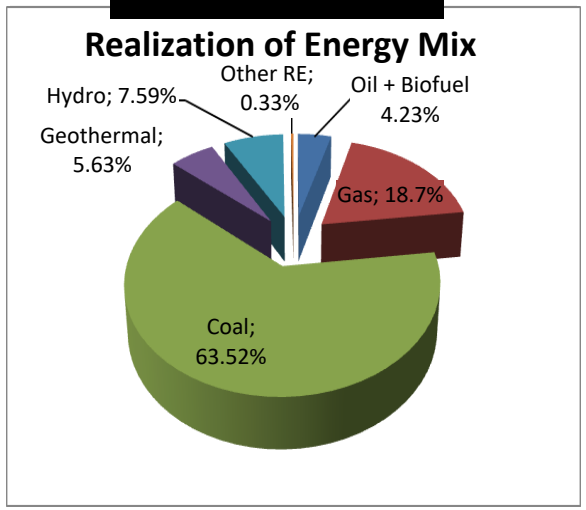
BASED ON THE OWNER



BASED ON THE TYPE



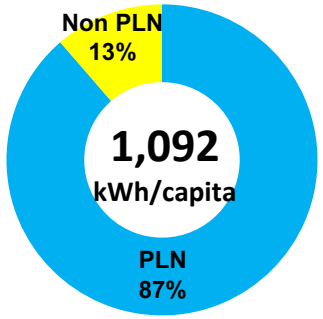
ENERGY MIX OF PLN'S POWER GENERATION



TRANSMISSION AND DISTRIBUTION

Transmission	**61,591 kmc**
Substation	**150,618 MVA**
Distribution	**1,011,949 kmc**
Distribution Substation	**62,227,370 MVA**

NATIONAL ELECTRICITY CONSUMPTION



- IPP: *Independent Power Producer*
- PPU (Private Power Utility) is a holder of a business area other than PLN
- IO non BBM is the holder of an Operation License with a generator that uses fuel other than BBM

Notes:

GTPP: Gas Turbine Power Plant
CCPP: Combine Cycle Power Plant
CFPP: Coal Fired Power Plant
DEPP: Diesel Engine Power Plant
HEPP: Hydro Electric Power Plant
MHPP: Mini Hydro Power Plant
MiHPP: Micro Hydro Power Plant
GeoPP: Geothermal Power Plant

NATIONAL ENERGY SECURITY

Energy Security

Gov. Regulation No. 79/2014 on National Energy Policy

Energy Security is the condition which availability of energy and public access to energy at an affordable price in the long run are guaranteed, with due regard to environmental protection.

KEN: Kebijakan Energi Nasional

AFFORDABILITY

affordability of energy investment costs, from exploration, production, and distribution costs, to consumer affordability of energy prices

ACCESSIBILITY

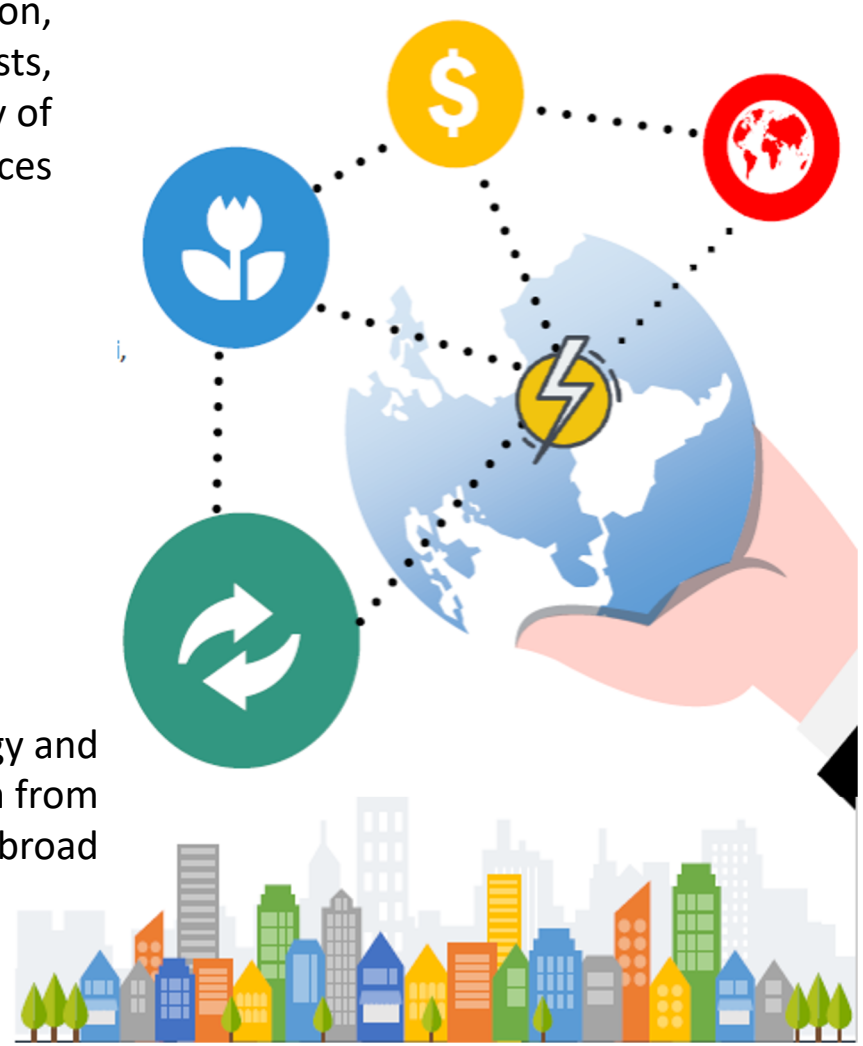
ability to access energy sources, grid infrastructure, including geographic and geopolitical challenges

ACCEPTABILITY

use of energy which are environmentally friendly (land, sea, and air), including public acceptance (on nuclear power etc.)

AVAILABILITY

availability of energy and energy sources, both from domestic and abroad



PARIS AGREEMENT AND COMMITMENT ON ENERGY SECTOR

Mitigation actions will be carried out through:

1. Diverting the fuel subsidy budget to productive activities (infrastructure);
2. 23% renewable energy of the total national primary energy mix by 2025;
3. Waste to Energy (WtE).

Global Commitment

Paris **Agreement Target** :

Keeping global temperature rise not exceeding 2°C, and striving to be 1.5°C

National Commitment :

Mandate of Law No. 16/2016 on Ratification of the Paris Agreement

Reduce GHG emissions according to NDC by 2030:

29% from BaU (own ability)	**41%** from BaU (International assistance)

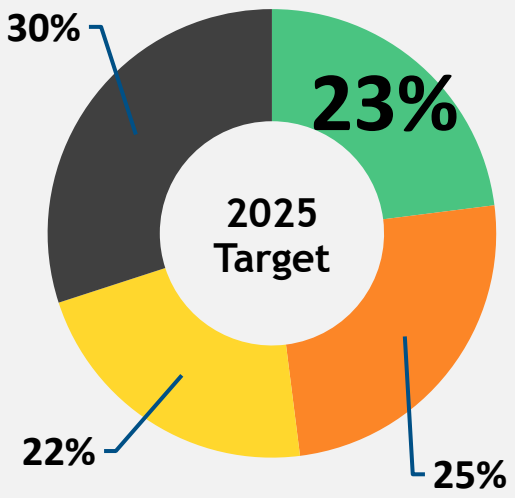
Energy Sector Commitment:

Reduce GHG emissions by 314 – 398 Million Tons of CO2 by 2030

Gov. Reg. No. 79/2014 on National Energy Policy & Presidential Reg. No. 22/2017 on National Energy General Planning :

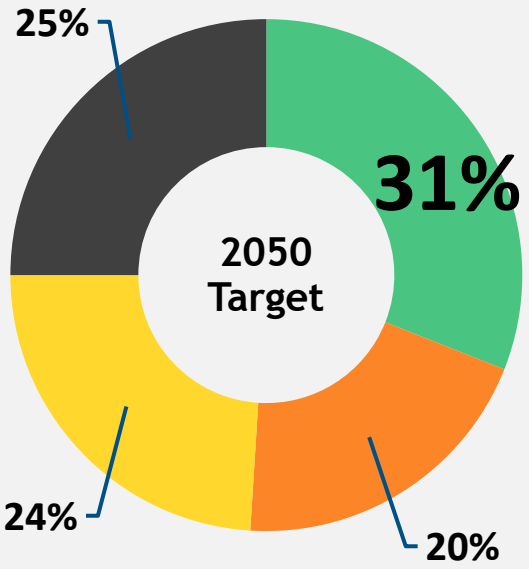
Target 23% NRE from Primary Energy Mix & 17% Energy Efficiency from BaU Final Energy

NATIONAL ENERGY GENERAL PLANNING TARGET IN 2025 & 2050



Coal Oil NRE Gas

1	Total Generation Capacity:	115 GW **(NRE 45 GW)**
2	Energy Consumption:	1,4 TOE/capita
3	Electricity Consumption:	2.500 kWh/ capita



1	Total Generation Capacity:	430 GW **(NRE 168 GW)**
2	Energy Consumption:	3,2 TOE/capita
3	Electricity Consumption:	7.000 kWh/ capita

Priority Principles of National Energy Development

- Maximize **RE utilization**
- Minimize **oil utilization**
- Optimize **gas and new energy usage**
- Utilization of coal as part of **the baseload power plants**
- Utilization of Nuclear Power Plants as **the last option**

2 INDONESIA'S ELECTRICITY MARKET

ELECTRICITY INTERCONNECTION DEVELOPMENT PLAN

Interconnection Acceleration on
11 sections of Transmission Line

1	500 kV Interconnection of Batam-Singapore (Sumatera-Singapore)
2	500 kV Interconnection of Sumatera-Malaysia **(2030)**
3	150 kV Interconnection of Sumatera-Bangka **(2022)**
4	150 kV Interconnection of Bangka-Belitung
5	150 kV Interconnection of Belitung-Kalimantan (Sumatera-Kalimantan)
6	150 kV Interconnection of Sumatera- Bintan **(2027)**
7	500 kV Interconnection of Jawa-Sumatera
8	150 kV Interconnection of Bali-Lombok **(2028)**
9	150 kV Interconnection of Kalimantan **(2023)**
10	150 kV Interconnection of Sulawesi (Tambu-Bangkir)
11	150 kV Interconnection of Bau Bau-Sulbagsel

Note:
Letters in blue denote **Interconnection related to Supergrid Nusantara Study**

MAP OF ELECTRICITY SUPPLY BUSINESS AREA HOLDERS

1. **PT PLN BATAM**
   Island of Batam, except stipulated as other companies' Business area
2. **PT PANBIL UTILITAS SENTOSA**
   Panbil Industrial Area, City of Batam
3. **PT TUNAS ENERGI**
   Tunas Industrial Area, City of Batam
4. **PT BATAMINDO INVESTMENT CAKRAWALA**
   Batamindo Industrial Area, City of Batam
5. **PT Bintan Resort Cakrawala**
   Bintan Resort Integrated Tourism Area, Bintan Regency
6. **PT Bintan Inti Industrial Estate**
   Bintan Industrial Area, Bintan Regency

1. **PT SOMA DAYA UTAMA**
   Island of Karimun, Zone I, Karimun Regency
2. **PT KARIMUN POWER PLANT**
   Island of Karimun, Zone II, Karimun Regency
3. **PT BINTAN ALUMINA INDONESIA**
   Galang Batang Special Economic Area, Bintan Regency

1. **PT MABAR ELEKTRINDO**
   Medan Industrial Area, City of Medan
2. **PT NADIKA LISTRIK MANDIRI**
   Medan Star Industrial Area (KIM Star), Deli Serdang Regency

1. **PT PERKEBUNAN NUSANTARA III**
   Sei Mangkei Special Economic Area, Simalungun Regency

1. **PD TUAH SEKATA**
   Pangkalan Kerinci district, Pelalawan, Teluk Meranti, and Teknopolitan Area, Pelalawan Regency

1. **PT DWI MAHARANI-NADI KUASA BERSEKUTU. SDN. BHD. JOINT VENTURE**
   Semelinang Tebing District, Indragiri Hulu Regency
2. **PT RIAU PERKASA ENERGI**
   Pelindo 1 Industrial Area, Dumai

1. **PT KRAKATAU POSCO**
   PT KP's Integrated Steel Factory and CRM #2 Development Area, City of Cilegon
2. **PT KRAKATAU DAYA LISTRIK**
   Krakatau Industrial Estate Cilegon I,II,III, PT Krakatau Tirta industri (Stasiun Pompa Cidanau), and Anyer Beach Hotel (Hotel Patra Jasa), Banten
3. **PT SUMBER TENAGA LESTARI**
   City Light Apartment Ciputat, City of Tangerang Selatan
4. **PT MERAK ENERGI INDONESIA**
   Sucofindo Adi Usaha Plant, Serang Regency
5. **PT DIAN SWASTIKA SENTOSA – SERANG MILL**
   PT Indah Kiat Pulp & Paper factory area, Serang Regency
6. **PT DIAN SWASTIKA SENTOSA – TANGERANG MILL**
   PT Indah Kiat Pulp & Paper factory area, City of Tangerang Selatan

1. **PT CIKARANG LISTRINDO**
   Jababeka Industrial Area, Bekasi Regency
2. **PT BEKASI POWER**
   PT Gerbang Teknologi Cikarang area, Bekasi Regency
3. **PT TATAJABAR SEJAHTERA**
   Kota Bukit Indah Industrial Area, Karawang and Purwakarta Regency
4. **PT DIAN SWASTIKA SENTOSA – KARAWANG 1**
   PT Indah Kiat Pulp & Paper factory area, Karawang Regency
5. **PT DIAN SWASTIKA SENTOSA – KARAWANG 2**
   PT Indah Kiat Pulp & Paper factory area, Karawang Regency
6. **PT TEGAR PRIMAJAYA**
   Maruda Center Industrial and Warehouse Area, Bekasi Regency
7. **PT CIBINONG CENTER INDUSTRIAL ESTATE**
   Kp. Pasir Tangkil RT 013 RW 005, Bogor Regency

1. **PT ENERGI PELABUHAN INDONESIA**
   Tanjung Priok Harbour, Jakarta Utara

1. **PT UNITED POWER**
   Kaliwungu Industrial Area, Kendal Regency

1. **PT LAMONG ENERGI INDONESIA**
   Teluk Lamong Terminal
2. **PT BERKAH KAWASAN MANYAR SEJAHTERA**
   JIIPE Industrial Area, Gresik Regency
3. **PT PUPUK INDONESIA ENERGI**
   PT Petrokimia Gresik Unit II Industrial Complex, Gresik

1. **PT KARIANGAU POWER**
   Kariangau Industrial Area, City of Balikpapan
2. **PT KALTIM DAYA MANDIRI**
   Kaltim Estate Industrial Area, City of Bontang
3. **PT KALIMANTAN POWERINDO**
   PT SBSA dan PT KD Mineral IDN Area, Kutai Kartanegara Regency
4. **PT INDO PUSAKA BERAU**
   PT Berau Coal mining area, Berau Regency

1. **PT SUMBER ALAM SEKURAU**
   PT Pesona Khatulistiwa Nusantara mine area, Bulungan Regency

1. **PT ENERGIA PRIMA NUSANTARA**
   Coal Mining Area, Kapuas Regency
2. **PT SURYA BORNEO INDUSTRI**
   PT Surya Borneo Industri Industrial Area, Kotawaringin Barat Regency

1. **PT TELUK SUMBANG ENERGI**
   Kampung Teluk Sumbang Residential Area, Berau Regency
2. **PT LONG BELIU TAU ENERGI**
   Long Beliu Residential Area, Berau Regency
3. **PT SINANG PURI ENERGI**
   Desa Merabu Residential Area, Berau Regency

1. **PT BAKRIE POWER**
   PT Batuta Chemical Industrial Park Area, Kutai Timur Regency
2. **PT KAYAN HYDRO ENERGY**
   Bulungan Regency, North Kalimantan & Sangkulirang Industrial Area, Kutai Timur Regency, East Kalimantan

Total:

55 Business Areas

: Yet to Operational: **11**

: Operational: **44**

1. **PT WEDA BAY ENERGI**
   PT IWIP Industrial Area, Halmahera Tengah Regency

1. **PT KARAMPUANG MULTI DAYA**
   Desa Karampuang, Mamuju Regency

1. **PT MAKMUR SEJAHTERA WISESA**
   PT Adaro Operational Area, Tabalong Regency
2. **PT WIJAYA TRIUTAMA PLYWOOD INDUSTRI**
   PT Wijaya Tritama Plywood Industri, PT Basirih Industrial, dan PT Intan Wijaya Internasional, Tbk, Industrial Area, City of Banjarmasin

1. **PT PUNCAKJAYA POWER**
   PT Freeport Indonesia Mining Area, Mimika Regency

1. **PT BIOGREEN POWER JAYAPURA**
   PT Tunas Sawa Erma Area, Boven Digoel Regency

1. **PT INDONESIA MOROWALI INDUSTRIAL PARK**
   PT IMIP Industrial Area, Morowali Regency

1. **PT SULTRA ENERGI INDONESIA**
   PT Kendari Industrial Pratama Industrial Area, Konawe Selatan Regency

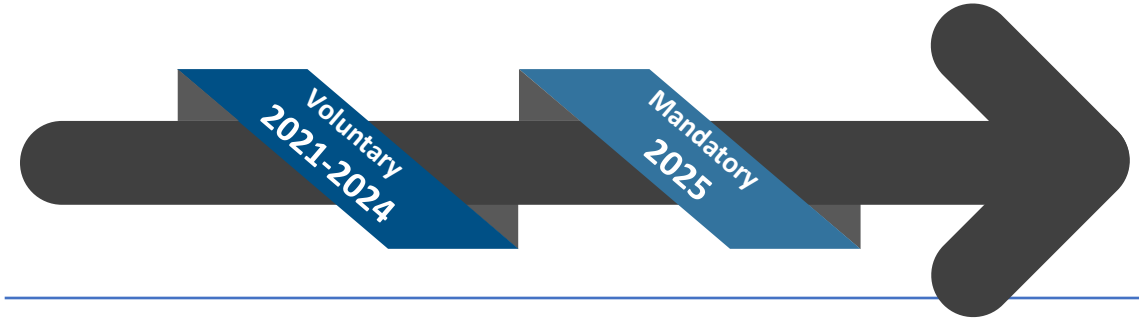
1. **PT MIKRO KISI SUMBA**
   Residential area in Sumba Timur Regency

The rest is
Business Area of PT PLN (Persero)
(MEMR Decree 634-12/20/600.3/2011)

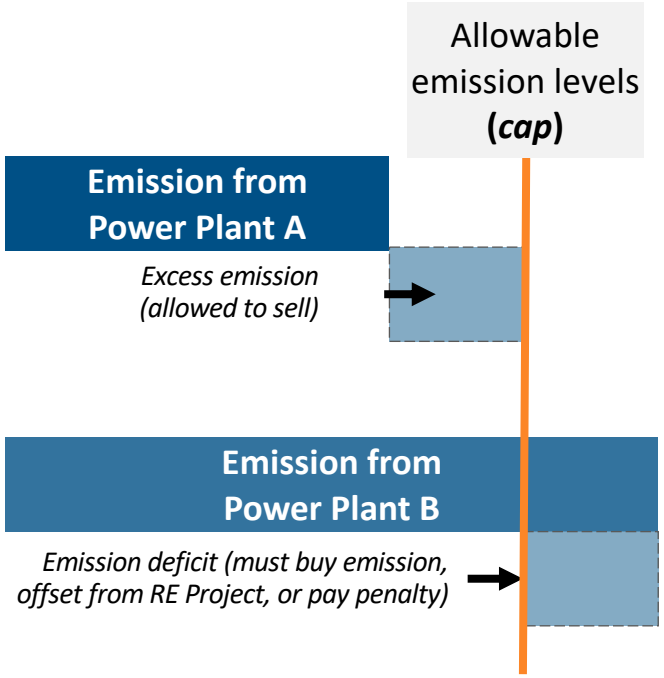
3 VOLUNTARY CARBON TRADING IN ELECTRICITY SECTOR

VOLUNTARY EMISSION TRADING SYSTEM (ETS) IN POWER SECTOR

According to article 52 of Government Regulation No. 46/2017 on Economic Instrument of Environment, emission trading must be implemented maximum in November 2024. For preparing the mandatory ETS in 2024, starting this year Directorate General of Electricity conducting ETS trial (voluntary scheme).



Cap	maximum allowed emission stipulated by the Government
Trade	Trade of the differences between green house gas emission relative to the capped value.
Offset	Carbon credit trade from mitigation activities beyond ETS, to reduce greenhouse gas emission.



ETS trial (voluntary scheme) is conducted through Subroto Awards in Efficiency Energy, using the following scheme:

Objectives of ETS trial:

- ✓ Reducing GHG emissions to achieve NDC target
- ✓ Implementing of cap emission for coal-fired power plants
- ✓ Strengthening Measurement, Reporting and Verification in Inventory GHG emission
- ✓ Raising awareness in implementation of carbon pricing, especially in cap and trade, and offset

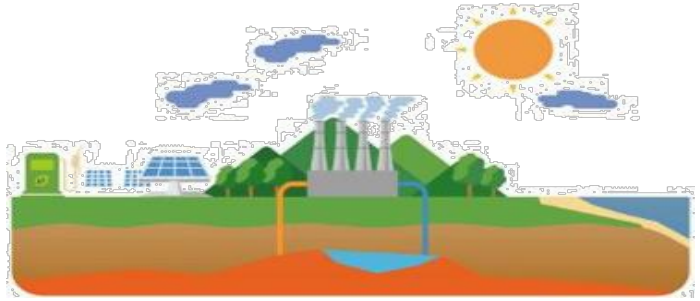
GHG emission cap in Coal Fired Power Plant (CFPP)

Power Plant	Installed Capacity (MW)	Cap (tonnes CO_2/MWh)
CFPP	Larger than 400 MW	0,918
CFPP	Between 100 and 400 MW	1,013
Mine Mouth CFPP	Between 100 and 400 MW	1,094

- CFPP capacities distribution according to the MEMR Regulation No 9/2020 on the Efficiency of the Electricity Supply of PT PLN (Persero).
- The cap value based on the 2019 weighted average GHG emission intensity in each CFPP groups and considering the emission quota status.

INCENTIVE FOR ELECTRICITY GENERATION FROM RENEWABLE ENERGY

MEMR Regulation No. 50 of 2017 jo No. 53 of 2018 jo No 04 of 2020 on Utilization of Renewable Energy for Power Generation



Types of Renewable Energy

Solar PV, Wind, Hydro, Biomass, Biogas, Biofuel, Municipal Waste, Geothermal, and Tidal/ocean

Implementation of Power Purchase

In accordance to the provisions of the legislation

Procurement mechanism:
Direct selection and Direct appointment

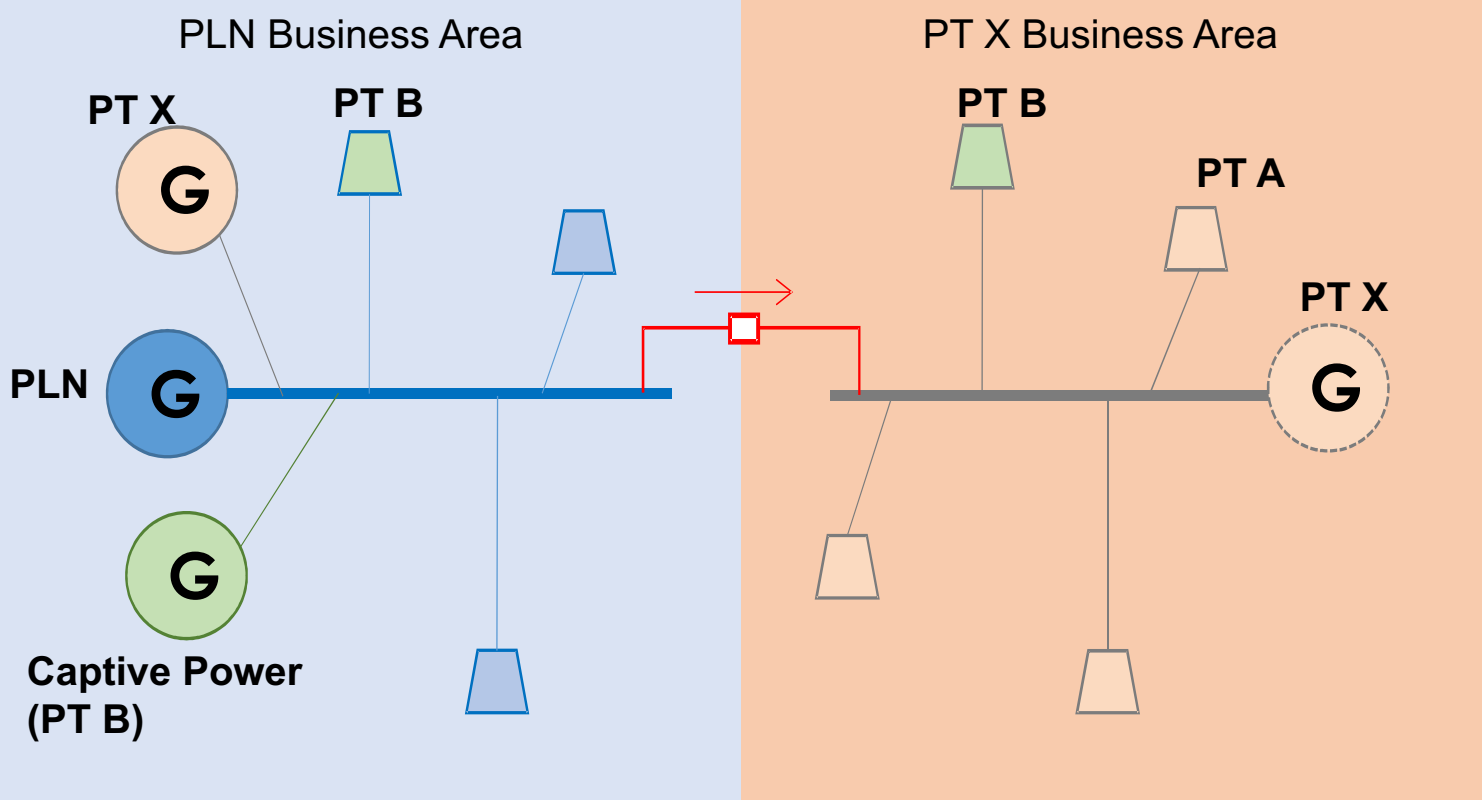
Direct selection: Hydro, Solar PV, Wind, Biomass, Biofuel Tidal/Ocean, and Biogas Power Plant, Geothermal, and Municipal Waste

Direct appointment: Emergency condition, excess power, expansion, or only one developer

Power Purchase Price

Power Generation Type	Solar PV, Wind, Biomass, Biogas, Biofuel, Ocean/Tidal	Municipal Waste , Geothermal, Hydro
Capacity	All capacity	All capacity
Ceiling price in case of: local BPP ≤ national BPP	Based on agreement	Based on agreement (including in Sumatera, Jawa, Bali)
Ceiling price in case of: local BPP > national BPP	Max 85% of local BPP	Max 100 % of local BPP

POWER WHEELING OPPORTUNITIES IN INDONESIA



Opportunites:

- RE potential located outside the business area
- RE demand potential from business area customers, including RE100 companies
- Potential of RE excess power from captive power outside the business area

Challenges:

- The government has **23% renewable energy utilization target** of the national energy mix by 2025
- **Limited land area** for business area holders **to develop RE power plants**

Power Wheeling Schemes

*	PT B as the captive power located in PLN business area distributes electricity to the PT B's factory located in PLN business area by utilizing the PLN network
*	PT B as the captive power located in PLN business area distributes electricity to the PT B's factory located in PT X business area by utilizing the PLN and PT X networks
*	PLN's RE power plant supplies RE demand from PT A (customer of PT X's business area) by utilizing the PLN network
*	PT X's power plant located in PLN business area distributes electricity to PT X's business area by utilizing the PLN network

CLOSING STATEMENT

The Government, through the Ministry of Energy and Mineral Resources, is committed to providing electricity in sufficient quantities, good quality, and at reasonable / affordable prices in order to improve the welfare and prosperity of the people in a just and equitable manner.

In an effort to **reduce carbon emissions in the electricity sector, the Indonesian government has established targets for CO2 emissions reduction, renewable energy development, and introducing voluntary carbon markets**.

Regulations for supporting renewable energy have been introduced to increase the economics of renewable energy power plants and for enabling power delivery across transmission network.

Thank You

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