# RENEWABLE ENERGY DEVELOPMENT IN INDONESIA

November 25th, 2024

DIVISI ANEKA ENERGI BARU TERBARUKAN
DIREKTORAT MANAJEMEN PROYEK DAN EBT
PT PLN (PERSERO)

PLN

# For 79 years,
# PLN has been powering millions of lives in Indonesia

**~90 Million**
Customers

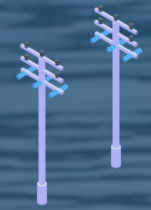
**~275 Million**
Lives powered

**Rp 488 T**
Revenues1

**72+ GW**
Generation capacity2

**71.000 kms**
Transmission Line

**166.000 MVA**
**2.367 unit**
Substation



**66.000 MVA**
**559.000 unit**
Distribution Substation

1 Include IPP
2 Audited consolidated financial statements of PLN 2023

# Indonesia provide abundant source of renewable energy, enable PLN to be the key components of Indonesia energy transition

## Renewable Energy







## New Energy

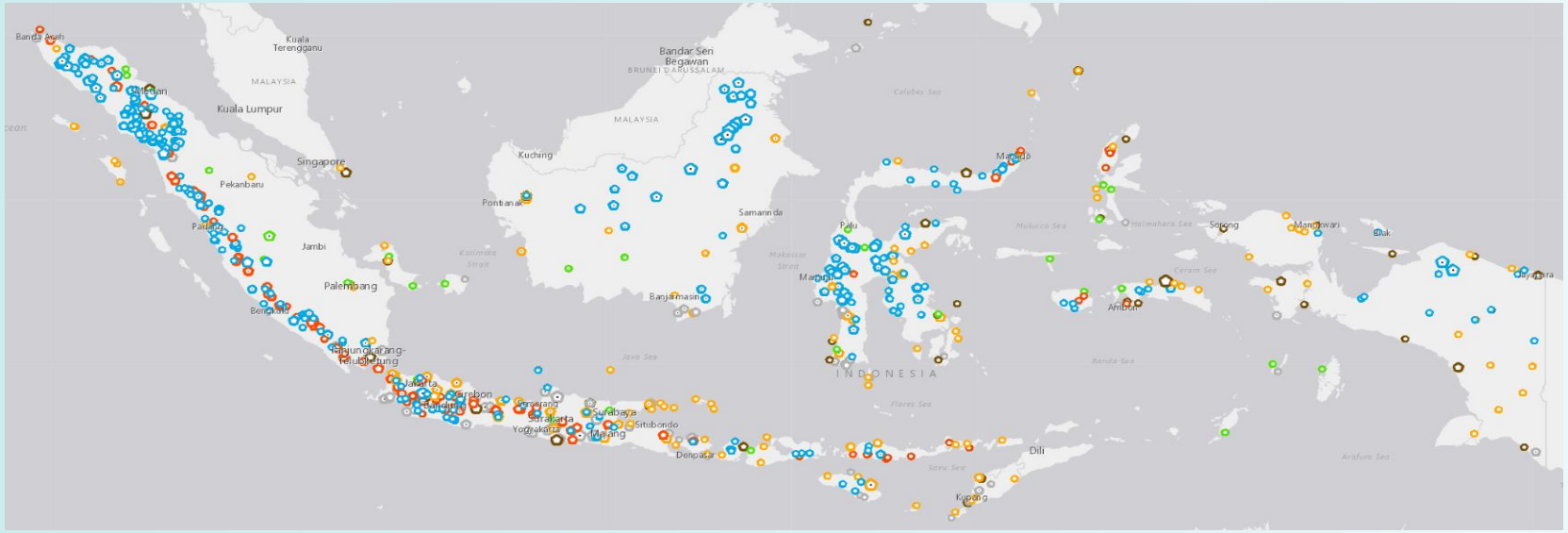


| ENERGY | POTENTIAL (GW) | PLN UTILIZATION (GW) |
|---|---|---|
| SOLAR | 3.295 | 0,09 |
| HYDRO | 95 | 5,6 |
| BIOENERGY | 57 | 0,14 |
| WIND | 155 | 0,13 |
| GEOTHERMAL | 24 | 2,53 |
| OCEAN | 60 | 0 |
| TOTAL | 3.686 | 8,5 |

**Currently the utilization of NRE is only 0.2% of the total potential. Indonesia has large, varied, and dispersed NRE resources:**

- Hydro potential is spread throughout Indonesia, especially in North Kalimantan, NAD, West Sumatra, North Sumatra and Papua.
- Solar potential is spread throughout Indonesia, especially in NTT, West Kalimantan, and Riau with higher radiation.
- Wind potential (>6 m/s) is mainly found in NTT, South Kalimantan, West Java, South Sulawesi, NAD and Papua.
- Geothermal potential is spread in the ring of fire area covering Sumatra, Java, Bali, Nusa Tenggara, Sulawesi, and Maluku.
- The potential of marine energy is spread throughout Indonesia, which can be in the form of energy from ocean currents, ocean waves, tides, or from differences in sea temperature.

# IDENTIFICATION FOR RE POTENTIAL IN INDONESIA




**Legend :**

| | | |
|---|---|---|
| Hydro | : | 28.9 GW |
| Geothermal | : | 18.1 GW |
| Wind | : | 17.6 GW |
| Solar PV | : | 19.7 GW |
| Bio Energy | : | 0.4 GW |
| **Total** | **:** | **84.4 GW** |

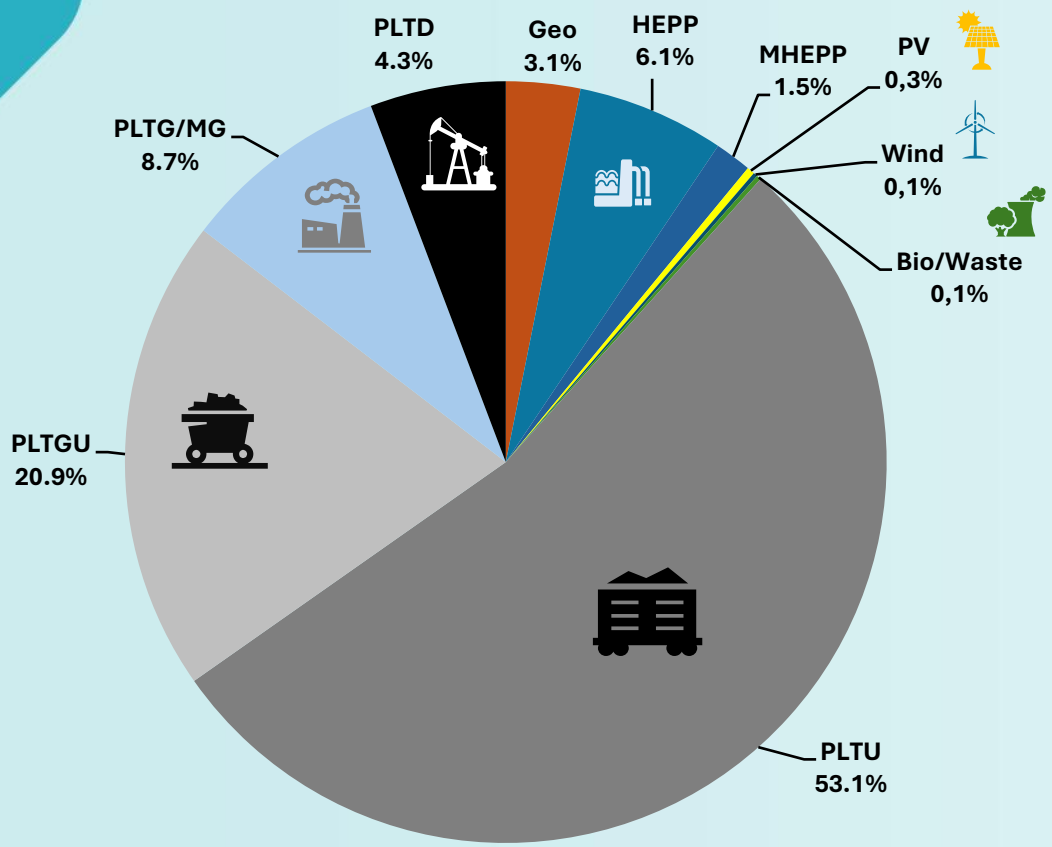
*) Include Solar PV PUPR 13,8 GW

| Province | Hydro | Geo | Wind | Solar PV | Solar PV PUPR | Bio | Total |
|---|---|---|---|---|---|---|---|
| Aceh | 3,700.39 | 1,154.00 | 265 | 2 | 374.49 | | 5,295.88 |
| Bali | 1 | 510 | 330 | | 59 | | 900.00 |
| Bangka Belitung | | 46 | 510 | | | | 556.00 |
| Banten | 27.54 | 506 | 1,300.00 | 100 | 373.9 | | 2,301.44 |
| Bengkulu | 81.06 | 550 | | | | | 631.06 |
| Gorontalo | 16 | 160 | | | 122.94 | | 298.94 |
| Jambi | 16 | 863 | | | 137.35 | 440 | 1,456.35 |
| West Java | 245.39 | 2,786.00 | 890.00 | 650 | 3,429.35 | | 8,000.74 |
| Central Java | 59.65 | 1,260.00 | 4,060.00 | 530 | 3,480.49 | | 9,390.14 |
| East Java | 25.3 | 1,135.00 | 6,871.00 | 350 | 1,288.69 | | 9,669.99 |
| West Kalimantan | 441.48 | 65 | | 162 | | | 668.48 |
| South Kalimantan | 332 | 50 | 70 | 50 | 215.81 | | 717.81 |
| Central Kalimantan | 508.13 | | | | | 2.9 | 511.03 |
| East Kalimantan | 1,282.00 | 17 | | 440 | 450.14 | | 2,189.14 |
| North Kalimantan | 11,320.00 | 43 | | | | | 11,363.00 |
| Lampung | 24 | 1,304.00 | 1,000.00 | 100 | 1,193.49 | | 3,621.49 |

| Province | Hydro | Geo | Wind | Solar PV | Solar PV PUPR | Bio | Total |
|---|---|---|---|---|---|---|---|
| Maluku | 72 | 487 | 40 | | 88.68 | | 687.68 |
| North Maluku | | 409 | | | | | 409.00 |
| East Nusa Tenggara | 35 | 698 | 56 | 2,000.00 | 254.29 | | 3,043.29 |
| West Nusa Tenggara | | 86 | 145 | | 675.85 | | 906.85 |
| Papua | 2,000.00 | | 50 | | | | 2,050.00 |
| West Papua | | 75 | 58 | | | | 133.00 |
| West Sulawesi | 1,004.50 | 356 | 60 | | 73.83 | | 1,494.33 |
| South Sulawesi | 1,119.00 | 525 | 535 | 985 | 1,241.18 | | 4,405.18 |
| Central Sulawesi | 2,943.72 | 771 | | 200 | | | 3,758.72 |
| Southeast Sulawesi | 335 | 318 | | 130 | 145.57 | | 928.57 |
| North Sulawesi | 42.25 | 568 | 63 | 41 | 48.15 | | 762.40 |
| West Sumatera | 1,402.60 | 914 | | | | | 2,316.60 |
| South Sumatera | 271.3 | 1,032.00 | 500 | | 93.6 | | 1,896.90 |
| North Sumatera | 1,644.31 | 1,460.00 | | 67 | 49.36 | | 3,154.67 |
| Yogyakarta | | 10 | 350 | | 31.4 | | 391.40 |
| Riau dan Kep. Riau | | | | 10.38 | 71.2 | 4 | 85.58 |
| **Jumlah** | **28,949.1** | **18,158.00** | **17,153.00** | **5,817.38** | **13,898.76** | **446.90** | **84.423.16** |

# POWER GENERATION CAPACITY COMPOSITION

## Capacity Mix, October 2024




| Power Plant | MW | % MW | GWh | % GWh |
|---|---|---|---|---|
| **A. RE** | | | | |
| Geothermal | **2.338** | **3,10** | **13.874** | **4,85** |
| HEPP | **4.647** | **6,15** | **13.332** | **4,66** |
| MHEPP | **1.172** | **1,55** | **4.141** | **1,45** |
| Solar PV | **243** | **0,32** | **363** | **0,13** |
| WEPP | **131** | **0,17** | **419** | **0,15** |
| Bio/Waste Energy | **153** | **0,20** | **1.683** | **0,59** |
| Subtotal | **8.684** | **11,50** | **33.813** | **11,82** |
| **B. Thermal** | | | | |
| PLTU | **40.155** | **53,16** | **191.782** | **67,06** |
| PLTGU | **15.798** | **20,92** | **40.215** | **14,06** |
| PLTG/MG | **6.592** | **8,73** | **14.312** | **5,00** |
| PLTD | **4.302** | **5,70** | **5.862** | **2,05** |
| Subtotal | **66.846** | **88,50** | **252.171** | **88,18** |
| TOTAL | **75.530** | **100** | **285.985** | **100** |

Renewable energy power plants contribute 8,684 megawatts to the total installed capacity, representing 11.50% of the overall power generation mix.

**Energy Mix**

The 2024 target based on the RKAP is 12.4%.

Realization up to October 2024: **11,82 %**

Source: SILM

A comprehensive electricity infrastructure planning is required that fulfills the **Energy Trilemma** to create an equitable Electricity System, considering the balance between supply and demand, local energy potential, economic efficiency, reliability, national energy resilience, and sustainability

*"Electricity sector trilemma"*


**1 Affordability**

Electricity prices must be affordable for all segments of society. Therefore, maintaining a stable BPP to prevent significant increases is one of the primary objectives.

**2 Reliability**

Electricity is the primary energy source for societal activities; therefore, reliable energy sources must be consistently available.

**3 Sustainability**

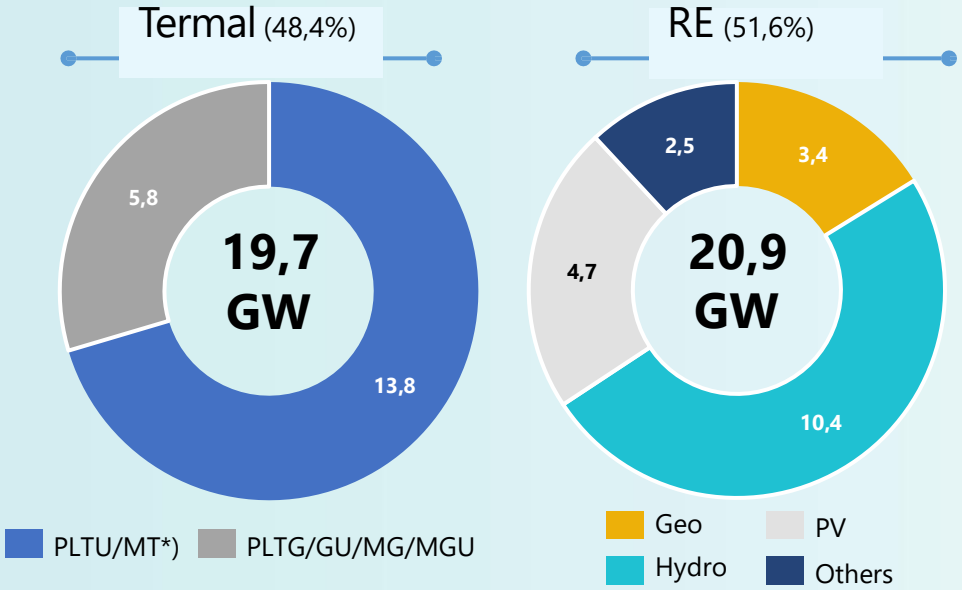
The utilization of energy sources for electricity generation must consider their environmental impact. Minimizing emissions is a crucial parameter in developing electrical infrastructure.

PLN has demonstrated its dedication to sustainability by committing to develop **20.9 GW** of **renewable energy** as outlined in the RUPTL 2021-2030. This significant investment, constituting **52%** of the total new capacity, underscores the company's role in driving Indonesia's green energy transition.

## Renewable Energy Additional Capacity

*(based on energy sources, RUPTL 2021-2030)*

**40,6 GW**




*) existing contract, under construction

The 2024-2033 RUPTL draft aligns with the ARED Energy Transition Scenario. To meet the growing demand under this scenario, renewable energy (RE) capacity is projected to reach 75% (~61.5 GW), while gas-based power generation will contribute 25% (~20 GW). With advancements in smart grid and flexible generation, variable renewable energy (VRE) is expected to increase to approximately 28 GW. Additionally, the development of hydropower plants is set to expand to 19.8 GW by 2040.

## RE Additional Capacity on DRUPTL 2024-2033

### RE Additional Capacity based on RUPTL 2021-2030
"The Greenest RUPTL"

**20,9 GW**

- **Hydro: 10,4 GW**
- Geothermal: 3,3 GW
- PV and Wind: 5,3 GW
- Others: 1,9 GW

### RE Additional Capacity based on DRUPTL 2024-2033 (ARED)
"Beyond The Greenest RUPTL"

**33,2 GW**

- **Hydro: 13,5 GW**
- Geothermal: 5,6 GW
- PV and Wind: 13,2 GW
- Others: 0,9 GW

## RE Additional Capacity Based on ARED Scenario

### RE Additional Capacity based on Energy Transition 2024-2040 (ARED)
"Beyond The Greenest RUPTL"

**61,5 GW**

- **Hydro: 19,8GW**
- Geothermal: 7,1 GW
- **New Energy:** 2,4 GW
- Others: 3,9 GW
- PV and Wind: 28,3 GW

# DEVELOPMENT PROGRESS OF NRE POWER PLANT BASED ON RUPTL 2021-2030

## Additional power generation capacity 2021-2030

**RE Development portion on RUPTL**

**52%**

**RE Additional Capacity**

**20,9 GW**

**Hydro:**
**10,4 GW**

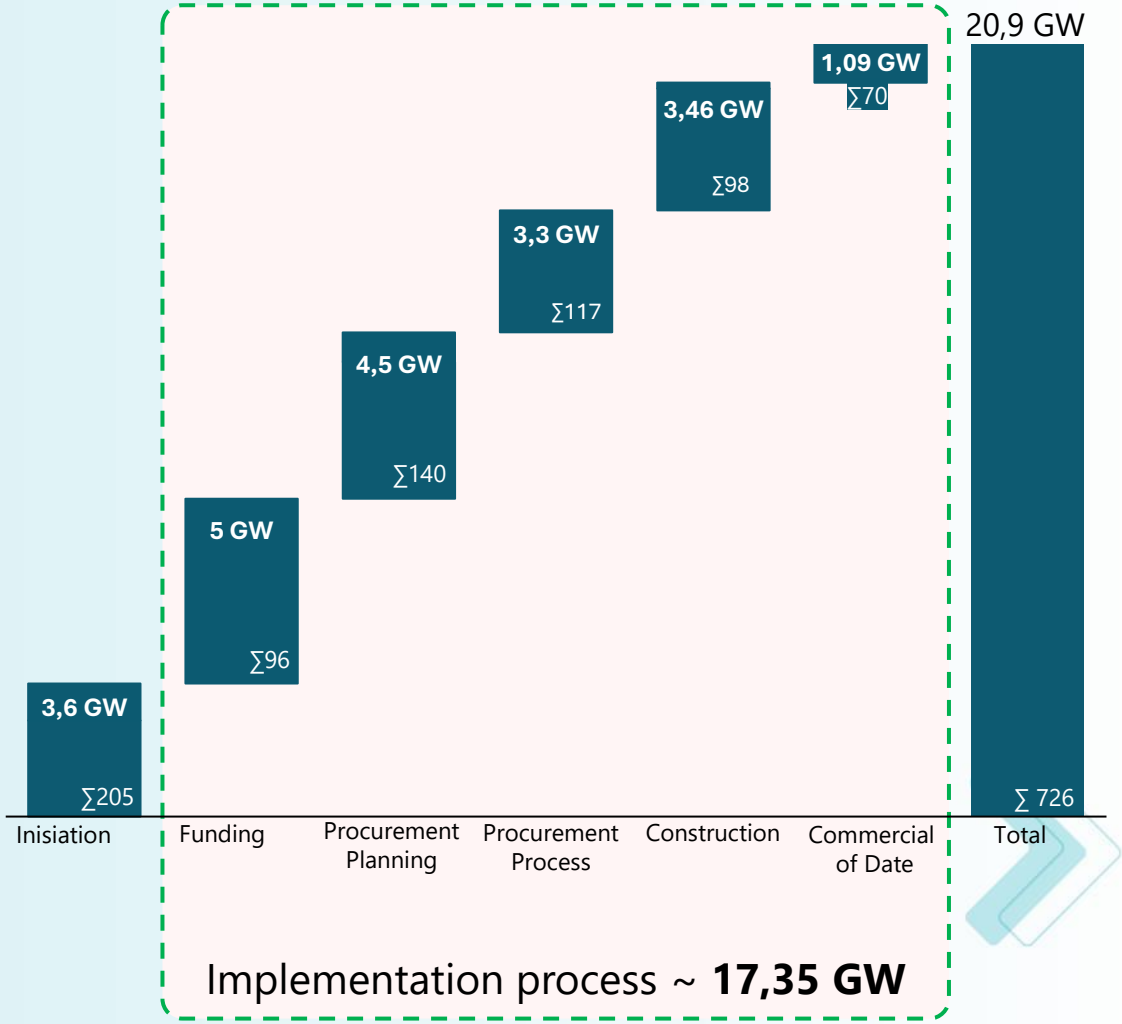
**Geothermal:**
**3,3 GW**

**Bio Energy, Waste:**
**0,6 GW**

**Solar, Wind:**
**5,3 GW**

**Others:**
**1,3 GW**

**RE development scheme:** 9,1 GW PLN, 11,8 GW IPP



# HOW TO WORK TOGETHER IN DEVELOPING RE PROJECT

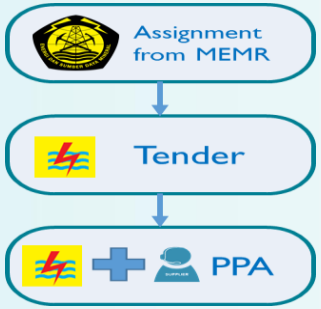
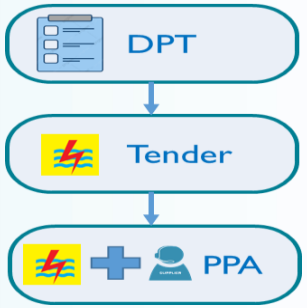
## Policies & Procurement Mechanism

- The development can be carried out with EPC scheme for the PLN Project or IPP scheme.
- Policies, development provisions The procurement mechanism follows the applicable regulations, currently for the sale of EBT electricity according to PERPRES 112/2022 & PLN procurement provisions.
- Other policies / related Government Regulations e.g:
  - Regulations on the use of TKDN;
  - Environmental regulations related to AMDAL / UKL UPL;
  - Relevant regulations according to the type of generator.

## ➢ EPC Scheme (owned by PLN) -- open tender

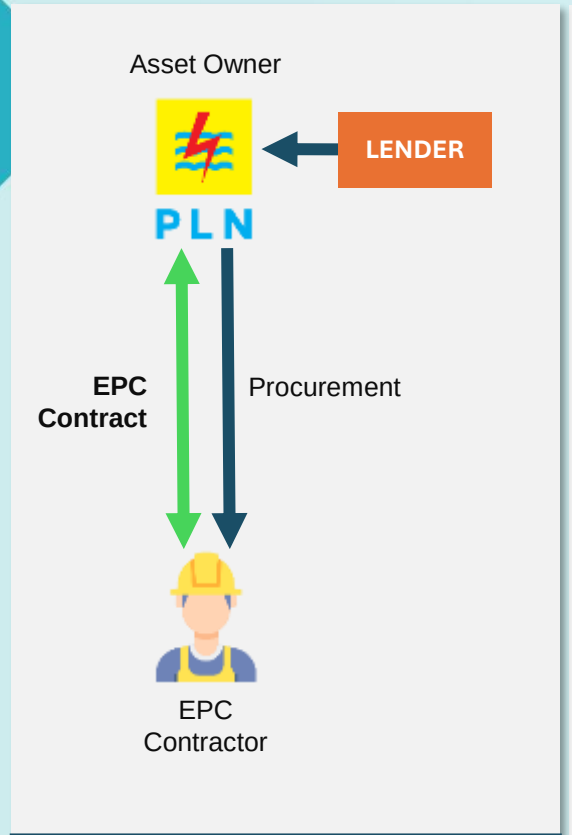
Financing options (e.g, equity, bonds, loan, ECA etc.)

## ➢ IPP Scheme ( e.g refer to regulations Perpres 112/2022)

| | Direct Appointment | Tender (Direct Selection ) |
|---|---|---|
| **Energy** | Geothermal<br>MSW Plant<br>PUPR Hydro<br>Grant, Excess Power and Expansion | Hydropower<br>Bio Energy<br>Solar PV<br>Wind<br>Ocean |
| **Mechanism** |  |  |
| **Contract Scheme** | BOOT / BOO | |

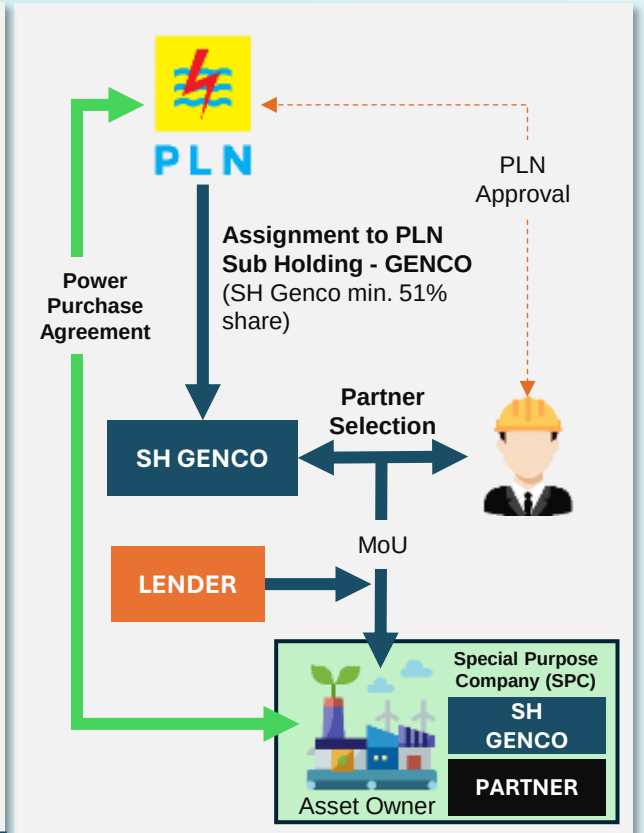
- Interested investors in participating PLN's procurement for IPP scheme can register as DPT / Pre-approved List at **http://eproc.pln.co.id**
- PLN will invite companies that have been registered in the DPT to participate in IPP's procurement.

# PARTNERSHIP SCHEME



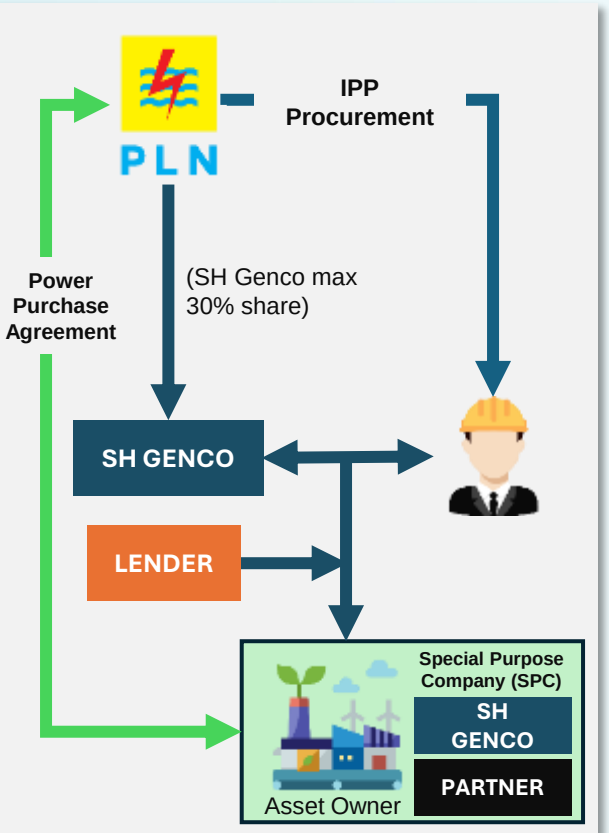

## EPC Scheme (PLN)

- The development can be undertaken via an EPC scheme for PLN projects, which are procured through an open tender process.



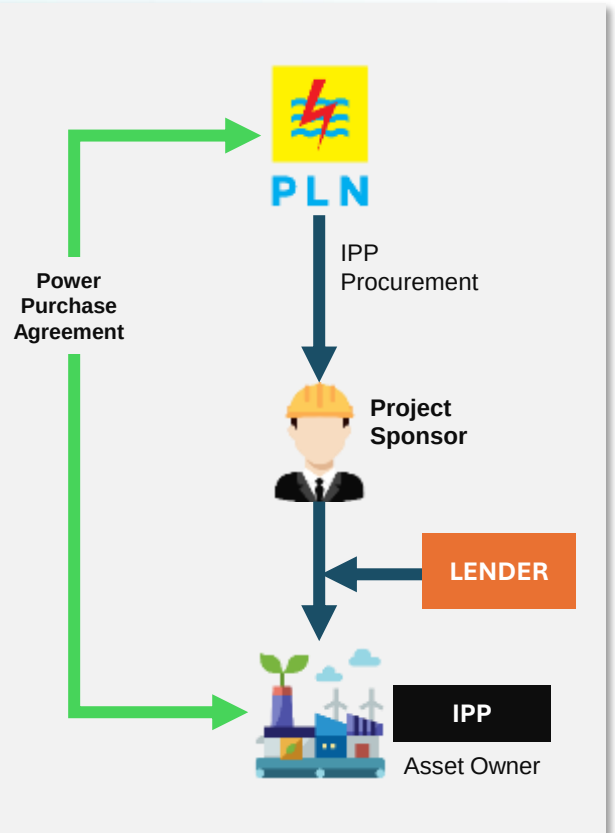

## Strategic Partner

- The development can be implemented through an assignment to PLN Sub Holding-GENCO (majority) in collaboration with a strategic partner.




## Option Mandatory Partner

- The development can be undertaken via an option mandatory partner scheme, whereby an Independent Power Producer (IPP) partners with PLN Sub Holding-GENCO (minority shareholder).




## IPP Scheme

- The development can be undertaken via a Power Purchase Agreement (PPA) with an Independent Power Producer (IPP).

# BID PROCEDURES – TENDER (DIRECT SELECTION )

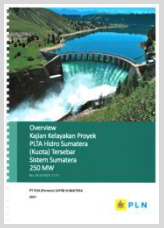
**Applicant**

**Pra-Qualification DPT (est. 1 month)**

| Administrative | Businesses | Technical | Financial |
|---|---|---|---|
| • Company Deed<br>• Relevant Business License<br>• Company Address<br>• Statement Letter<br>• Authorized Signatures | • Board of Directors<br>• Organizational Structure<br>• Representative Office<br>• Key Personel<br>• Parent Company Information | • IPP/EPC and or O&M Experience<br>• Project Experience<br>• Contract Evidence | • Financial Credit Rating (D&B, S&P, Moodys) 3A3/5A3<br>• Audited Financial Report<br>• Net Worth Positif |

**DPT List**

**INISIATION** | **PROCUREMENT PLANNING** | **PROCUREMENT PROCESS** | **CONSTRUCTION** | **OPERATION**




1. **RUPTL**
2. **PLN Internal Documents:**
   - Project Operational and Financial Assessment.
   - Project Risk Assessment

**Procurement planning document:**

- RFP
- Draft Power Purchase Agreement
- Engineering Estimate

**START**

Bid Document Review → Invitation → Pra-Bid Conference → Bid Submission Date → Evaluation of the Proposal → Clarification to Bidders → Ranking of Responsive Bidder → Negotiation → Announcement of Winning Bidder → Letter of Intent → CDA (Contract Discussion Agreement) → Signing of PPA

**FINISH**

**Effective Date**

**Financing Date**

**Construction**

**COD**

**Operation Periode**
*Term 25 – 30 years after RCOD*

# QUALIFIED COMPANIES FOR DEVELOPING RE PROJECTS

More than 600 businesses have successfully passed the selection process to be included in PLN's DPT, thereby becoming eligible to participate in the procurement of EBT IPP projects in Partnership with PLN, with the following details:

## HYDROPOWER

**HEPP**

| 143 | 13 GW |
|---|---|
| *Companies* | *Capacity* |

**MHEPP**

| 163 | 0.8 GW |
|---|---|
| *Companies* | *Capacity* |

## VRE

**SOLAR PV**

| 190 |
|---|
| *Companies* |

**WIND POWER**

| 76 |
|---|
| *Companies* |

## GEOTHERMAL

**GEOTHERMAL**

| 15 |
|---|
| *Companies* |

## BIOENERGY

**BIO ENERGY**

| 47 |
|---|
| *Companies* |

# PLN'S RENEWABLE ENERGY DEVELOPMENT PROJECTS

PLN is committed to **decarbonize the power system** by transitioning to new and renewable energy sources to **achieve net zero emission by 2060.**

In the coming period, PLN is set to develop a total of 4 GW of renewable energy capacity, including 3 GW from hydropower, 0.8 GW from geothermal sources, and 0.25 GW from solar sources.

## HYDROPOWER

### IPP's PROJECT

| 6 | 1.8 GW |
|---|---|
| *Projects* | *Capacity* |

1. *Sulbagsel HEPP 400 MW*
2. *Sulbagsel HEPP 305 MW*
3. *Sumatera HEPP 250 MW*
4. *Sumatera HEPP 400 MW*
5. *Kalseltengtimra HEPP 300 MW*
6. *Kalseltengtimra HEPP 200 MW*

### PLN's PROJECT

| 6 | 1.2 GW |
|---|---|
| *Projects* | *Capacity* |

1. *Kumbih HEPP 45 MW*
2. *Masang HEPP 44 MW*
3. *Grindulu PS 1000 MW*
4. *REEP II HEPP 36 MW*
5. *Kelai HEPP 45 MW*
6. *Kelai-2 HEPP 65 MW*

## PV SOLAR

### IPP's PROJECT

| 3 | 0.25GW |
|---|---|
| *Projects* | *Capacity* |

1. *Banten Solar PV 50 MW*
2. *Banten Solar PV 100 MW*
3. *West Java Solar PV 100 MW*

## GEOTHERMAL

### IPP's PROJECT

| 3 | 0.43GW |
|---|---|
| *Projects* | *Capacity* |

1. *Baturaden 220 MW*
2. *Ijen 2&3 80 MW*
3. *Rantau Dedap -2 136 MW*

### PLN's PROJECT

| 10 | 0.4GW |
|---|---|
| *Projects* | *Capacity* |

1. *Tulehu 20 MW*
2. *Ulumbu 5-6 40 MW*
3. *Mataloko 2-3 20 MW*
4. *Sungai Penuh 10 MW*
5. *Songa Wayaua 10 MW*
6. *Atadei 10 MW*
7. *Kepahiang 110 MW*
8. *Ungaran 55 MW*
9. *Tangkuban Perahu 40 MW*
10. *Kotamobagu 80 MW*

# THANK YOU

The New PLN 4.0, Unleashing Energy and Beyond

www.pln.co.id