Planned NRE Development Programs and Available Opportunities for Investors

Jakarta, May 19th, 2022

PT PLN (PERSERO)

ISO 37001 ANTI-BRIBERY MANAGEMENT
ISO
37001

Sistem Manajemen
Anti Penyuapan (SMAP)

www.pln.co.id

PLN

Carbon Neutral

01 | **2060**

PLN has shared its net zero emission commitment by 2060 in COP26…

Serial COP26 : Di KTT COP26, Momentum PLN Tunjukkan Program Dekarbonisasi RI ke Mata Dunia

Source: PLN press release

Indonesia's Power System Pathways for Decarbonization

Glasgow, 02 November 2021 – Indonesia optimistis akan menjadi pemeran penting dalam penurunan emisi karbon dunia. Dalam perhelatan COP26 di Glasgow, Senin (1/11), Presiden Republik Indonesia (RI) Joko Widodo memastikan Indonesia dapat memenuhi komitmen pada tahun 2030 di dalam Paris Agreement, yaitu pengurangan emisi sebesar 29 persen secara unconditional.

"Indonesia telah mengadopsi Strategi Jangka Panjang Rendah Karbon dan Ketahanan Iklim 2050, serta road map yang detail untuk mencapai target net zero emission pada 2060 atau lebih awal," ujar Presiden.

Untuk bisa mempercepat target tersebut, Presiden mengharapkan pendanaan adaptasi dari negara maju segera dipenuhi guna mempercepat upaya penanganan perubahan iklim.

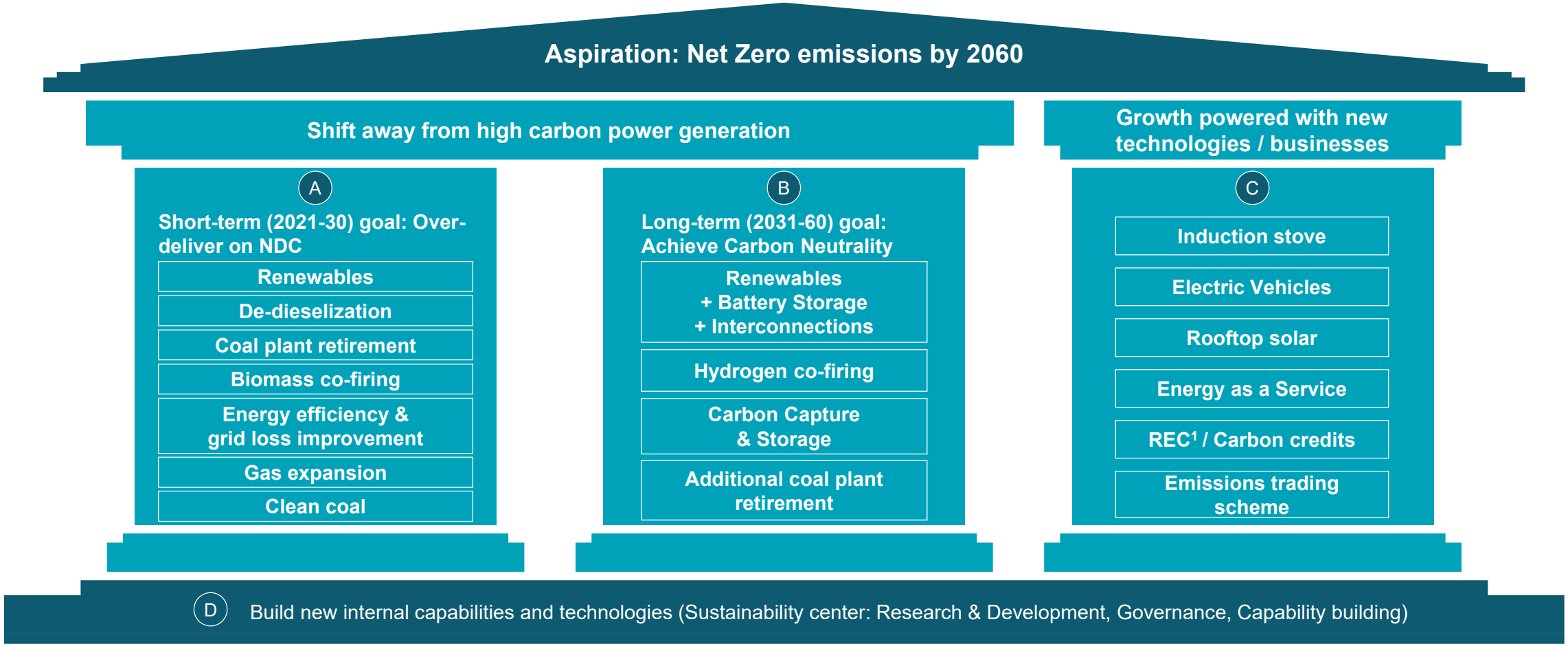
"Dalam beberapa tahun terakhir, Indonesia telah menunjukkan langkah konkret dalam hal pengendalian iklim. Laju deforestasi kita saat ini yang paling rendah selama 20 tahun, tingkat kebakaran hutan berkurang 82 persen. Indonesia juga akan melakukan restorasi sebesar 64 ribu hektare lahan mangrove. Ini sangat penting karena mangrove menyimpan karbon 3-4 kali lebih besar dibandingkan lahan gambut," tutur Presiden.

PLN mendukung penuh program dekarbonisasi yang diusung pemerintah guna menghadirkan ruang hidup yang lebih baik bagi generasi mendatang. Mengingat saat ini, dengan menggunakan skenario business as usual (BAU), Indonesia diperkirakan memberikan kontribusi 4 miliar ton CO2 per tahun pada 2060 sejalan dengan pertumbuhan ekonomi.

"PLN memiliki peran penting dalam menggerakkan pertumbuhan energi hijau di Indonesia. Kami berkomitmen untuk melakukan dekarbonisasi," ujar Direktur Utama PLN Zulkifli Zaini dalam seri diskusi bertemakan Becoming the World's Leader in Green Economy dalam Konferensi Tingkat Tinggi (KTT) COP26 di Glasgow, Skotlandia, pada Senin (1/11) waktu setempat.

Zulkifli menjelaskan, dalam skenario BAU, emisi sektor listrik mencapai 0,92 miliar ton CO2 pada 2060. Untuk itu, PLN meluncurkan strategi demi menjadi perusahaan listrik yang bersih dan hijau. Salah satunya dengan menghentikan pembangunan serta mempensiunkan pembangkit listrik tenaga uap (PLTU) eksisting secara bertahap.

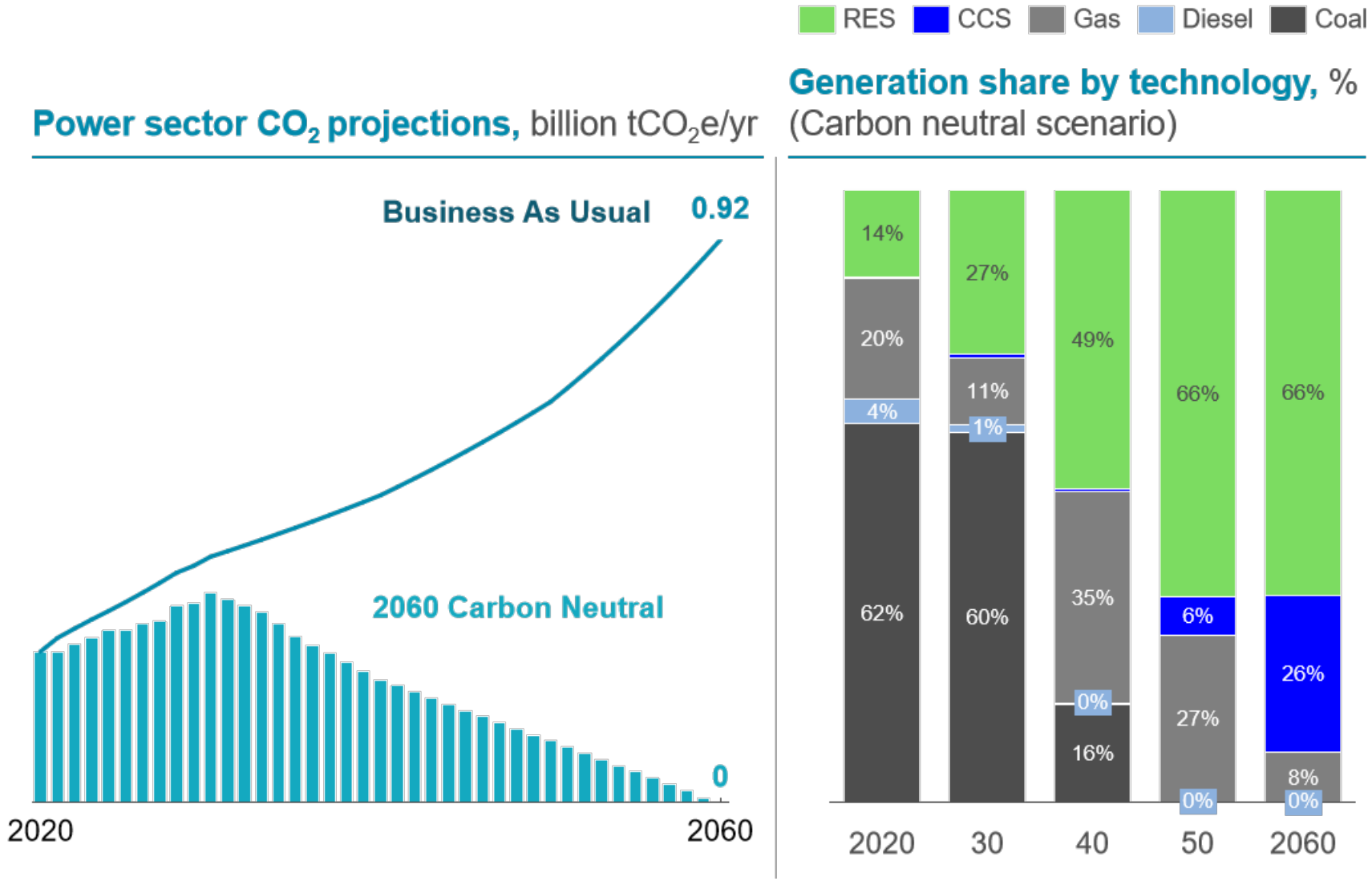
PLN's comprehensive roadmap to meet Indonesia's 2030 NDC and 2060 Carbon Neutral commitments, while sustaining growth



1. Renewable Energy Certificates

~USD 500 Bn total incremental cost to move from BAU to carbon neutral by 2060, at a cost of **~USD 35-40/ton** of CO_2 mitigated

Current best scenario is to shift to 66% renewables based power and 26% CCS implementation by 2060



Source: Power model

PLN is on a journey to become a clean power company

Our product will be sustainable energy (electricity is a by-product)

We need investment support to accelerate our transition

Four unlocks needed on the journey to Carbon Neutrality

	Unlock needed	
Incremental electricity cost to customer of 3.3 c/kWh in 2060	**Price**	**Subsidies / compensation** mechanism to support incremental cost to customer
Large-scale **capital outlay**[1] of ~ 500 billion USD (cumulative) for PLN; immediate funding support of up to 5 billion USD	**Financing**	Access to lower cost **green financing**, development grants and G2G support
Early-stage technology such as Hydrogen, CCS to be deployed at scale, in Indonesia	**Technology**	Mega-project **investment and technology sharing** by global leaders in BESS, CCS, Hydrogen
High upfront cost preventing uptake of low carbon end-uses such as Electric Vehicles	**Policy**	**Policy support** such as removal of EV import tariffs and introduction of subsidies to reduce upfront EV cost

1. Capital outlay is for generation only (not including T&D)

Renewable Energy Development Plan

02|

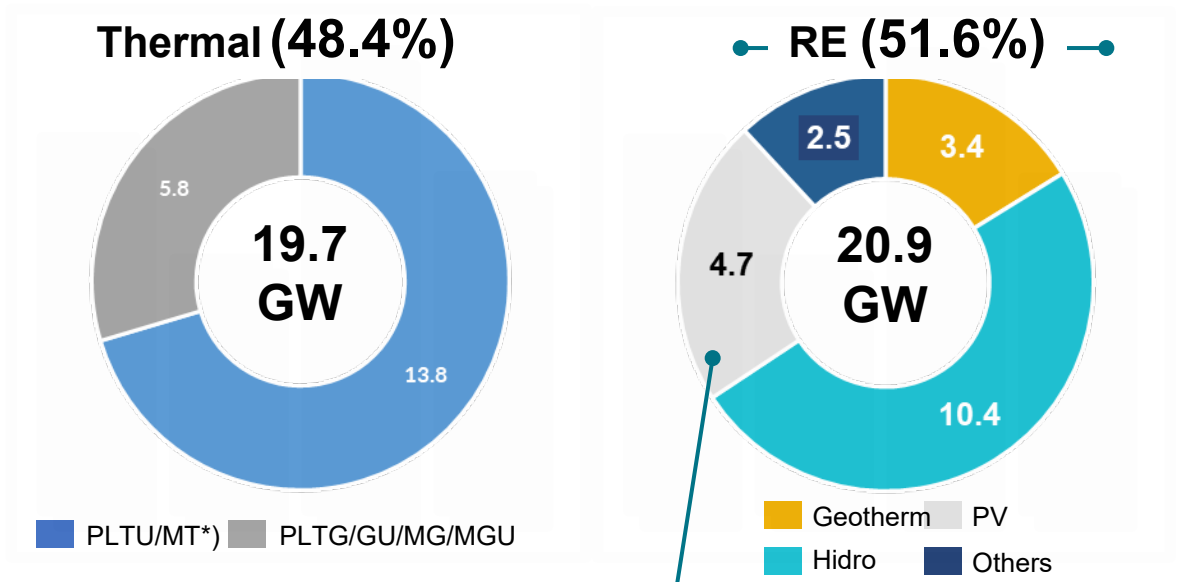
51.6% of Power Development Plan is Renewable Energy (Based on RUPTL 2021-2030)

New and Renewable Energy Power Plant will dominate the additional capacity of power plant (51.6%) with 24.8% total energy mix in 2030

Plan for total additional capacity of Power Plant based on RUPTL 2021-2030

40.6 GW

Plan for Power Plant Additional Capacity
(Based on Energy Source Type, in RUPTL 2021-2030)



Total New and Renewable Energy Mix 24.8% in 2030

Notes :
*) Existing Contract, Construction Stage

20.9 GW Additional Capacity for New and Renewable Energy (NRE) in 2030 (Based on RUPTL 2021-2030)

Total Capacity and Energy Mix

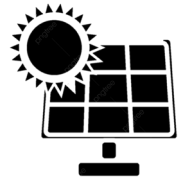
	2021[1]	2025	2030
Total *Capacity (GW)*	63	90	99
RE Capacity (GW)	8.2	18.6	28.9
Energy Mix (%)	12.6	23	24.8

1. In order to achieve energy mix target EBT 23%, additional RE capacity of 10.6 GW is needed.

2. Initiative cofiring biomass PLTU is expected to increase the energy mix.

Potential RE Development 2021-2030→ 20.9 GW

Geothermal 3.3 GW



VRE 5.3 GW :
- PV 4.7 GW
- Wind 0.6 GW

Hydro 10.4 GW

Bioenergi 0.6 GW

Others (base/peaker) 1.3 GW

RE development 20,9 GW consist of:

- PLN : **9,144 MW (43.7%)**
- IPP : **11,779 MW (56.3%)**

03 | Opportunities for Investors

How To Collaborate In Developing NRE Power Plant

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 PERMEN No. 4/2020 & 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)

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

- **IPP Scheme** (e.g refer to regulations MEMR 04/2020, for electricity sales of RE **)**

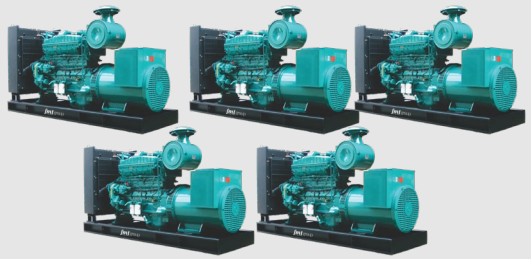
	Direct Appointment	Direct Selection
Energy	Geothermal MSW Plant PUPR Hydro Grant, Excess Power and Expansion	Hydropower Bio Energy Solar PV Wind Ocean
Mechanism	Assignment from MEMR → Tender → PPA	DPT → Tender → PPA
Contract Scheme	BOOT / BOO	

Potential Tender in 2022: Diesel (PLTD) Conversion to RE

Existing Diesel PP

5200
Unit PLTD

Scattered in
2130 locations



Oil Fuel Cost In 2020

Oil Fuel Consumption
~ 2,7 million kL

Oil Fuel Cost
~16 trillion IDR

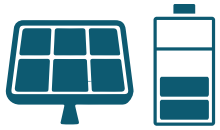
Diesel Conversion Program (Dedieselisasi)

1. Diesel Conversion to RE

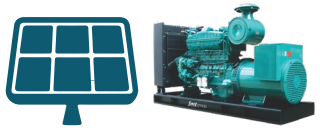
499 MW

PLTD replaced by Renewable Energy → PLTS + BESS + Hybrid PLTD

PLTS + Battery (BESS)



Hybrid PLTS & PLTD



PHASE I
PLTD Conversion ~212 MW

PHASE II
PLTD Conversion ~287 MW

Benefit:

- Oil fuel consumption reduction: **67** 10^3 kL / **476** Rp billion
- CO2 emission reduction: **0,3** Million ton
- Increase RE mix: **0,15%**

2. Diesel Conversion to Gas

304 MW

PLTD replaced by PLTG/PLTMG (gasification)

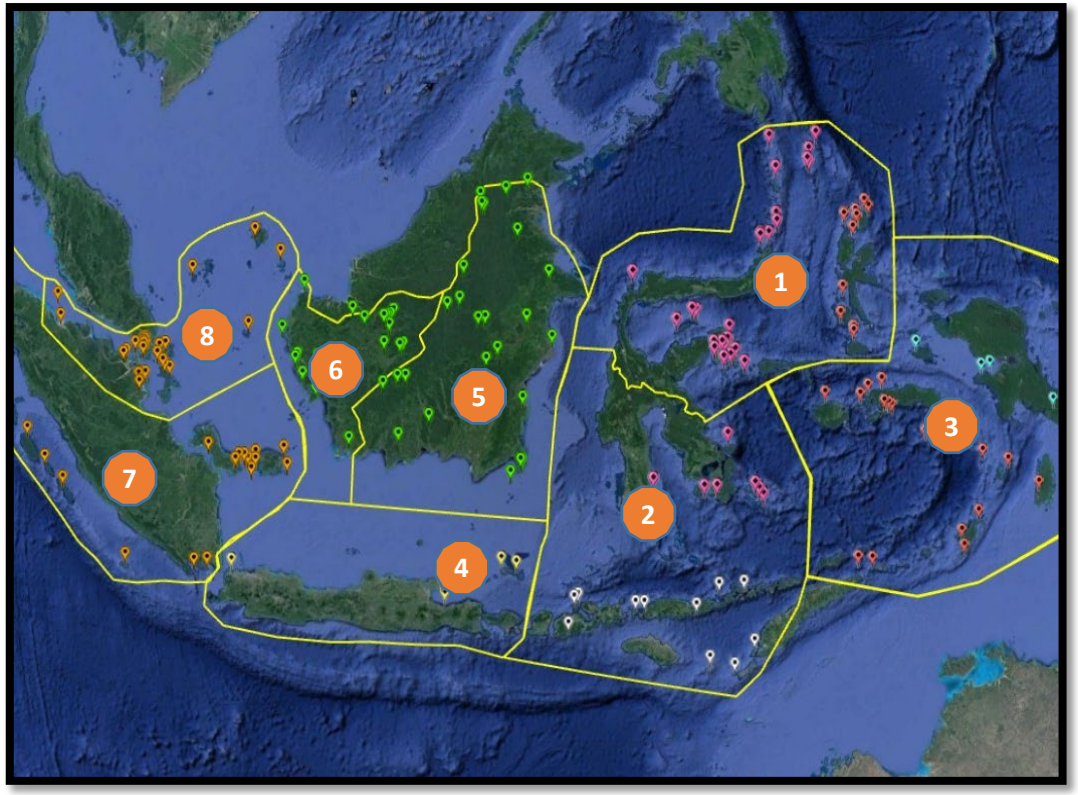
3. Diesel Conversion to Grid

1070 MW

PLTD replaced by interconnection to the larger Grid

Diesel Conversion Program Clustering Phase 1 (PV + BESS)

- To optimize the project based on the geographical location and project size, the diesel conversion program Phase 1 with the total capacity of PLTD ± 212 MW will carried out with the concept of clustering.
- Phase 1 will be divided into 8 Clusters with a total PV capacity of ±350 MWp and a Battery Energy Storage System (BESS) of ±800 MWh with a total project cost of around Rp. 10 trillion.

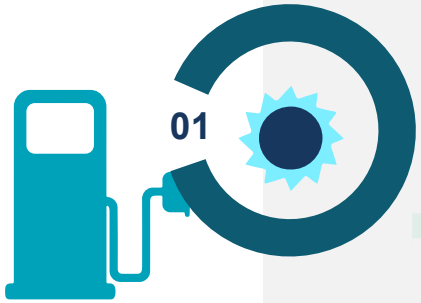


Cluster	Location	Number of	PLTD Capacity
		Location	MW
I	Sulutenggo & Maluku Utara	38	55,03
II	Sulselrabar & Nusa Tenggara	18	38,95
III	Maluku & Papua	24	30,15
IV	Jawa Madura	9	19,17
V	Kalimantan I (UIKL Kal, Kalselteng, Kaltimra)	27	17,08
VI	Kalimantan II (Kalbar)	19	18,63
VII	Sumatera I (Aceh, Sumut, Sumbar, S2JB, Babel, Lampung)	23	18,43
VIII	Sumatera II (RKR)	25	14,60
TOTAL			212,04

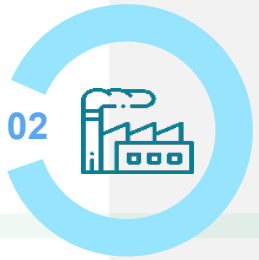
Early Coal PP
04| Retirement

Early Retirement CFPP beyond 2030 with Green Financing through Market Mechanism

- Indonesia through its energy policy targets to achieve Net Zero Emission by 2060.
- With the entry of large-scale IPP CFPP in the future, there will be over-supply of electricity in several locations in Indonesia, especially in the Jawa Island system, thus PLN's under-utilized coal-fired power plant is the right candidate for eraly retirement.
- In addition, to maintain the condition of the solvency ratio, PLN needs to deleveraging by releasing the coal power plant assets.



Early retirement is carried out by **shortening the economic life** of the CFPP with the aim of obtaining additional reductions in greenhouse gas emissions to achieve Nationally Determined Contribution (NDC) (CO2 emission avoidance)



Through this early retirement mechanism, Indonesia is estimated to save up to **400 MtCO2e of GHG emissions** with a **note that low-cost funding support is needed** from the Government to assist PLN in conducting CFPP early retirement.

CFPP early retirement will increase the demand for NRE power plants. By conducting the spin off scheme, PLN will obtain proceeds from the sale of PLTU assets which are useful to pay off PLN's existing debts which can improve PLN's solvency conditions.

Challenges and Opportunities to Implement Early Retirement of PLN's CFPP

Challenges to tackle:

1. Implementation of early retirement on PLN's CFSPP fleet will require great financial support (with low-cost fund) from international funding
2. With current revenue scheme PLN will have to rely in GOI 's support (in terms of subsidy and compensation) as the early retirement will increase the capital cost of CFPP
3. Requirement for new job creation to replace lost work opportunity in early retired CFPP

Opportunities to seize:

1. Gradually reduce the role of inefficient, old technology, and underutilized CFPP (Sub critical) in the system with better technology and efficiency CFPP (Supercritical and Ultra supercritical)
2. With the significant abatement of CO2 emission from early retirement CFPP, strongly support GOI's to achieve target of emission reduction based on Nationally Determined Contribution (NDC) 2021
3. Early retirement of CFPP can increase the demand for clean energy investment and create lower generation costs in the long run

PLN

Thank You