



PLN

Planned NRE Development Programs and Available Opportunities for Investors

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PT PLN (PERSERO)



Sistem Manajemen
Anti Penyuapan (SMAP)

PLIS Pulau Messa, Nusa Tenggara Timur

www.pln.co.id

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



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.

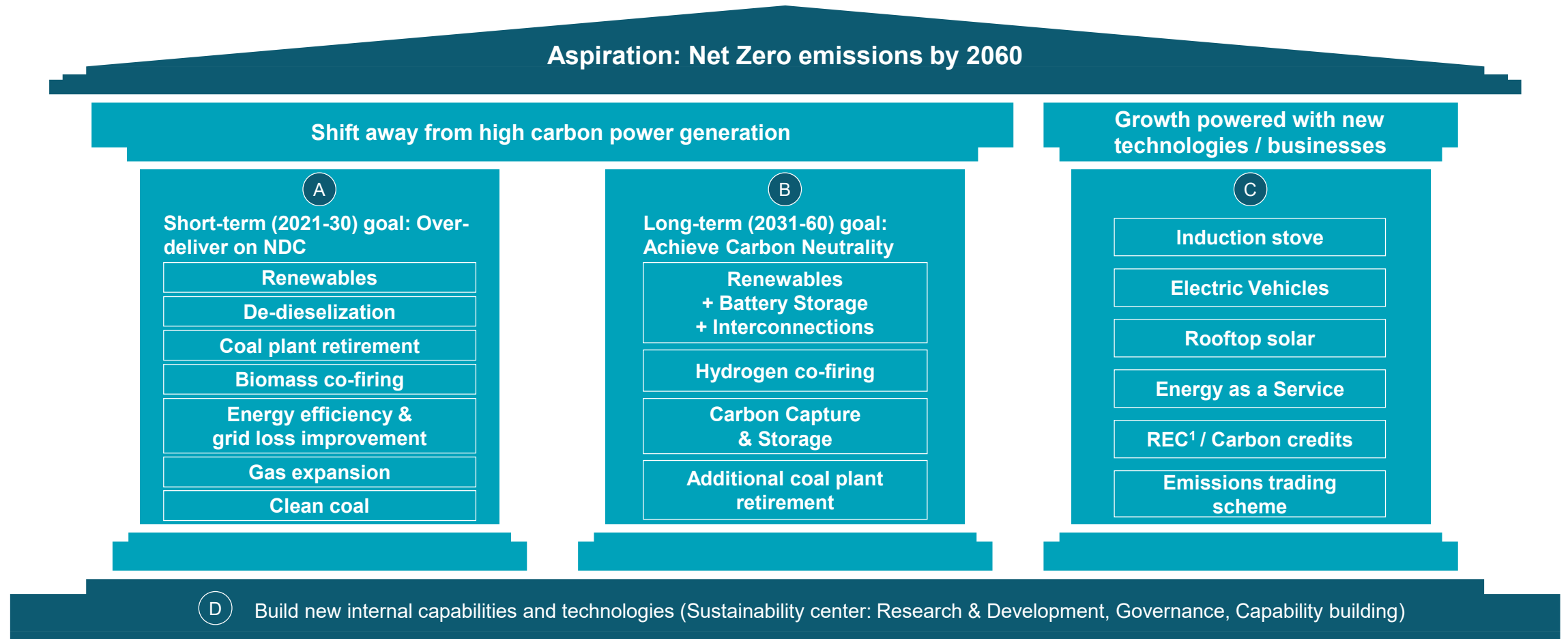
"Dalam beberapa tahun terakhir, Indonesia telah menunjukkan langkah konkret dalam hal pengendalian iklim. Laju deforestasi kita saat ini yang paling rendah selama 20 tahun, tingkat kebakaran hutan berkurang 82 persen. Indonesia juga akan melakukan restorasi sebesar 64 ribu hektare lahan mangrove. Ini 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 bertema *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 pensiunkan 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



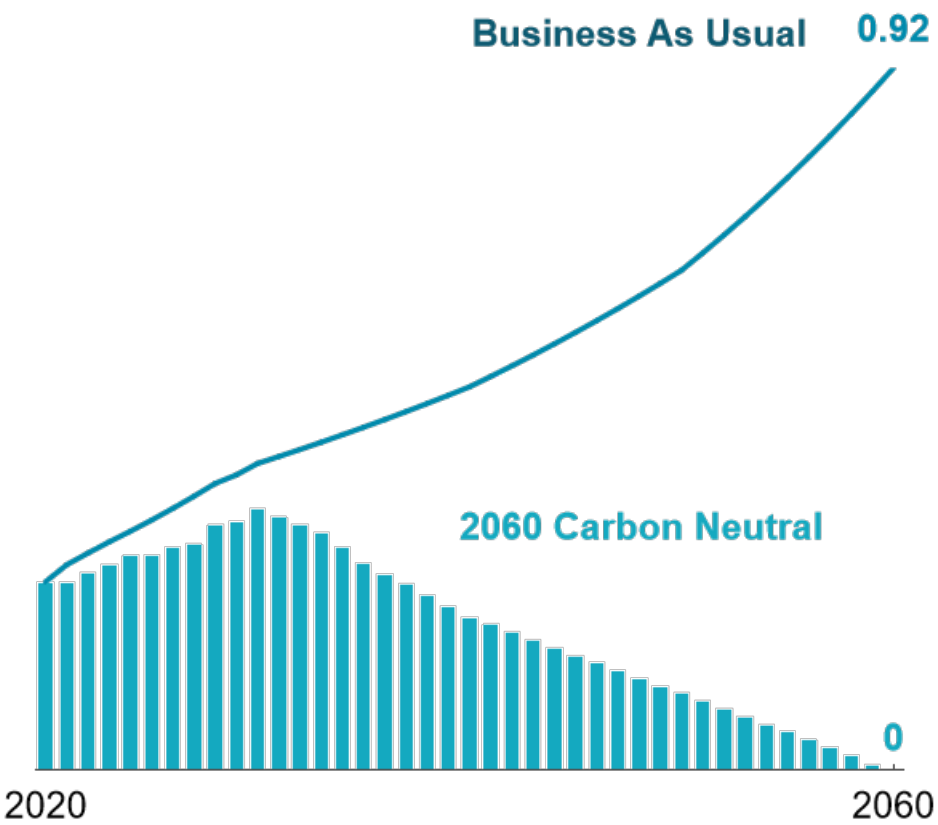
1. Renewable Energy Certificates

~USD 500 Bn total incremental cost to move from BAU to carbon neutral by 2060, at a cost of ~USD 35-40/ton of CO₂ mitigated

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

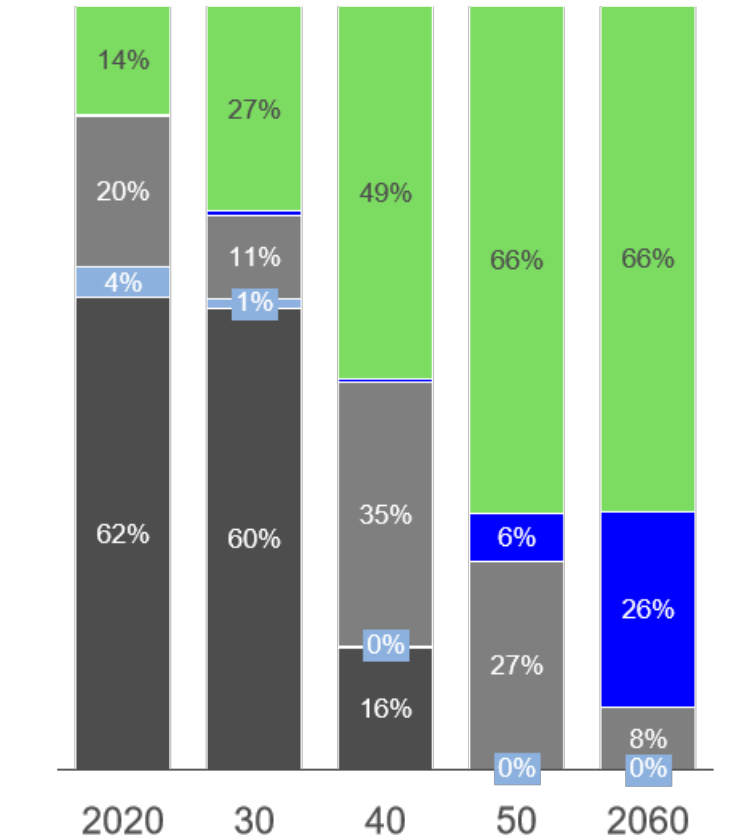


Power sector CO₂ projections, billion tCO₂e/yr



Source: Power model

Generation share by technology, %
(Carbon neutral scenario)



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**

There are 5 major changes needed towards 2060 Net Zero emissions



Large-scale NRE with BESS, interconnection and green industry clusters in remote areas



Distributed generation with NRE through Rooftop Solar Power Plants, battery storage and smart grids



Carbon Capture and Storage (CCS)



Coal plants early retirement through ETM



New technologies such as **biomass and hydrogen**

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

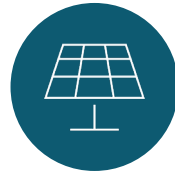
Large-scale **capital outlay**¹ of ~ 500 billion USD (cumulative) for PLN; immediate funding support of up to 5 billion USD



Financing

Access to lower cost **green financing**, development grants and G2G support

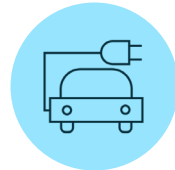
Early-stage technology such as Hydrogen, CCS to be deployed at scale, in Indonesia



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

02 | Plan

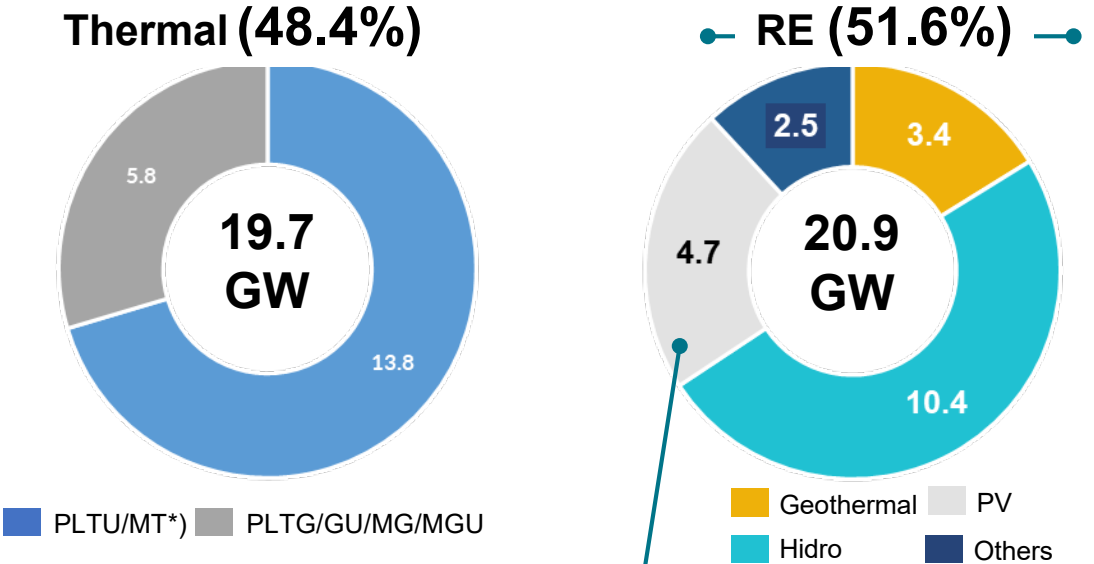
51.6% of Power Development Plan is Renewable Energy (Based on RUPTL 2021-2030)

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



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

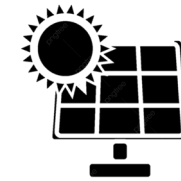
	2021 ¹	2025	2030
 Total Capacity (GW)	63	90	99
 RE Capacity (GW)	8.2	18.6	28.9
 Energy Mix (%)	12.6	23	24.8

- 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%)**



Opportunities 03 | for Investors



How To Collaborate In Developing NRE Power Plant

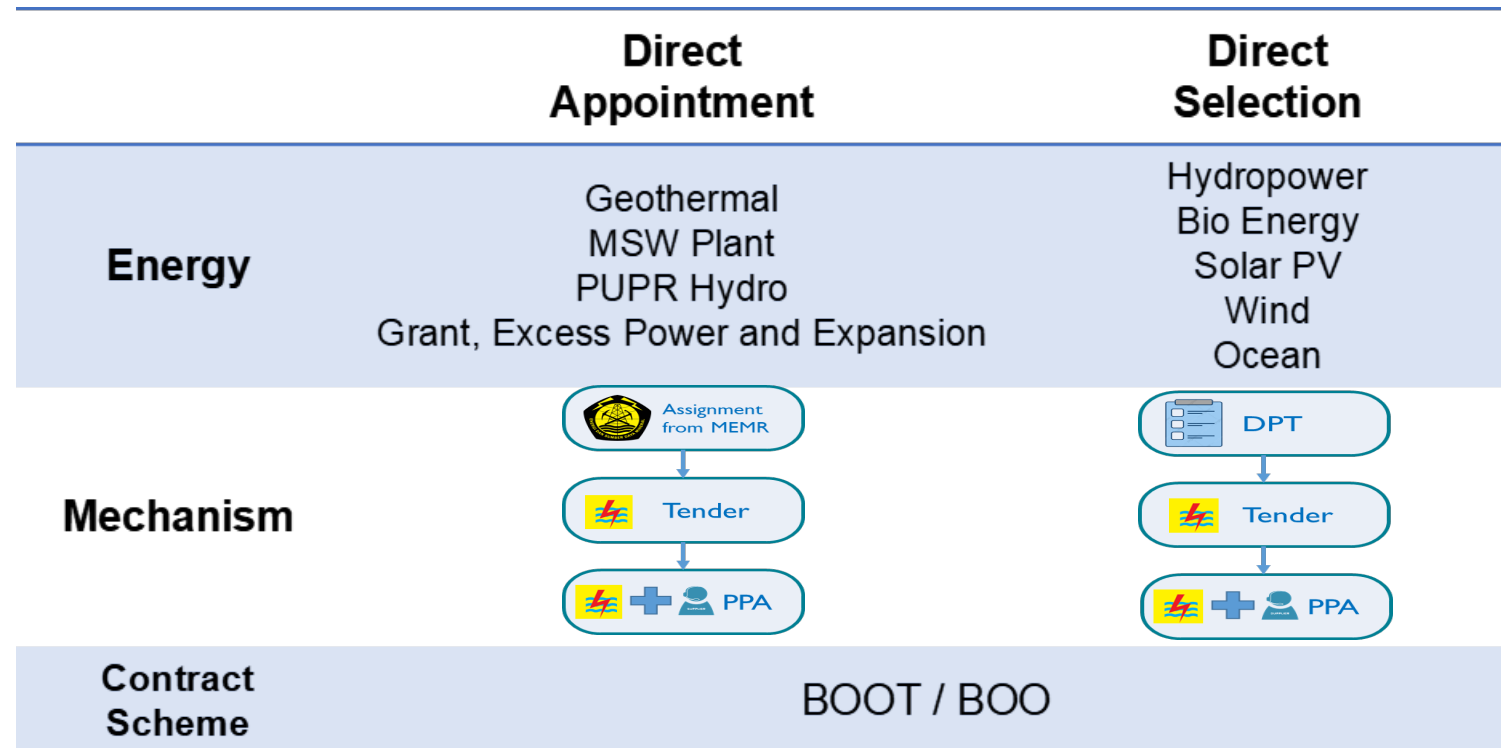
Policies & Procurement Mechanism

- 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)

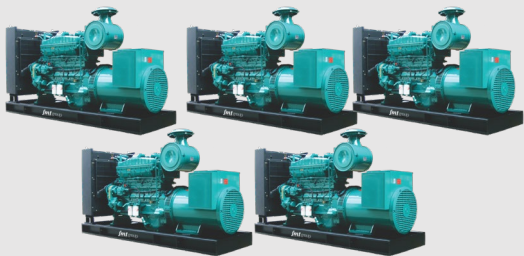


Potential Tender in 2022: Diesel (PLTD) Conversion to RE

Existing Diesel PP

5200
Unit PLTD

Scattered in
2130 locations

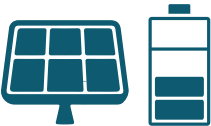
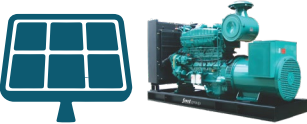


Oil Fuel
Cost
In 2020

Oil Fuel Consumption
~ **2,7** million kL

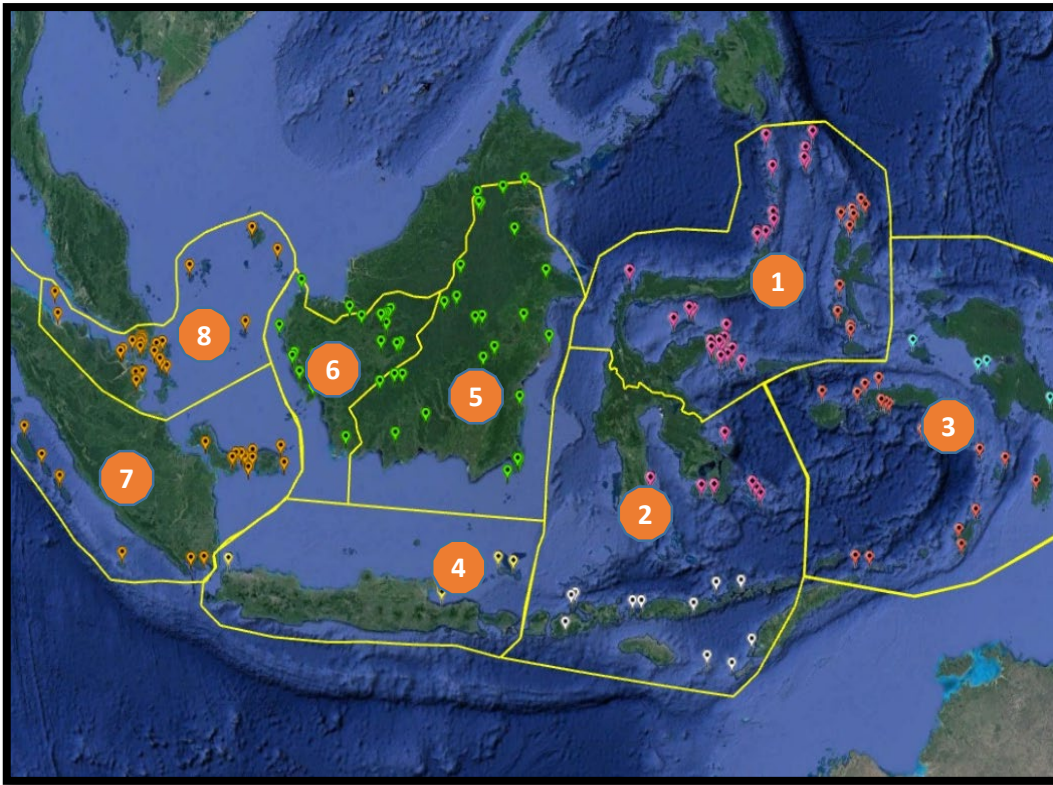
Oil Fuel Cost
~ **16** trillion IDR

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 / 476 10^3 kL / 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 be 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

Dibutuhkan dukungan finansial untuk melakukan *early retirement* PLTU melalui skema ETM dan mengembangkan pembangkit EBT

ETM's steps	Required/alternatives of action	Funding sources
① Coal plants retirement 	<i>Possibly be done by three means:</i> <ol style="list-style-type: none"> 1. Early retirement of CFPP asset in PLN book 2. Spin off PLN CFPP to new-co 3. Refinance asset of IPP 	 GoI: cash support & guarantee  MDBs: green finance scheme  Investors: low equity IRR  Philanthropists: grants  Banks: low interest cost of debt
② Renewable investments 	Built new renewable power plant to increase renewable in the generation mix	 ESG fund: lower required yield  ESG bond: lower coupon & higher investor based  Investors: technology expertise & funding

“An energy transition mechanism (ETM) accelerates the shift in energy mix toward low carbon power generation using public or philanthropic finance.”

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

Challenges to tackle:

1. Implementation of early retirement on PLN's CFPP 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



Thank You