MINISTRY OF ENERGY AND MINERAL RESOURCES
REPUBLIC OF INDONESIA

ENERGY TRANSITION PROGRAM IN INDONESIA

Prof. Dr. Eng. Eniya Listiani Dewi
Director General of New, Renewable Energy and Energy Conservation

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The President's Vision for Energy Security

Asta Cita Mission No. 2

"Strengthening the country's defense and security system and encouraging national independence through food, energy, water, creative economy, green economy and blue economy independence."

Law Number 16:2016
on Ratification of the Paris Agreement for UNFCCC. GHG emission reduction target of 29% unconditionally under business-as-usual (BAU) and 41% conditionally (with adequate international support) by 2030.

ENDC: Indonesia has increased its greenhouse gas emission reduction target by **31.89**% with its own efforts (unconditional), and by **43.20**% if it receives international support (conditional).

The 2060 energy sector emissions target is **129 million tonnes of CO2** based on assumptions of improved GDP, increased electrification on the demand side, and the implementation of CCUS in the industrial sector.

ENHANCEMENT RENEWABLE NERGY MIX AND ENERGY CONSERVATION

The Global Stocktake
Keeping track of implementing the Paris Agreement

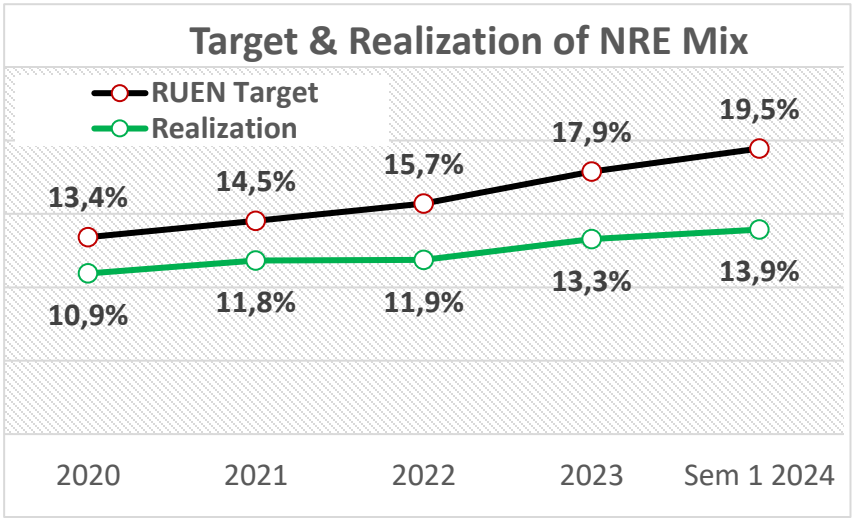
The Global Stock Take (1st GST), which was launched at COP28 includes two main things:

- Increase global **renewable energy capacity (3 times).**
- Increase global **energy efficiency by 2 times** (2020-2030) compared to the previous decade (collective global target).

This ambition is necessary to limit temperature rise to 1.5ºC, which can only be achieved with more ambitious targets, especially in the energy sector.

Note:
- ✓ *GDP Constant Prices 2010*
- ✓ *Excludes traditional biomass*

Indonesia's NRE Mix

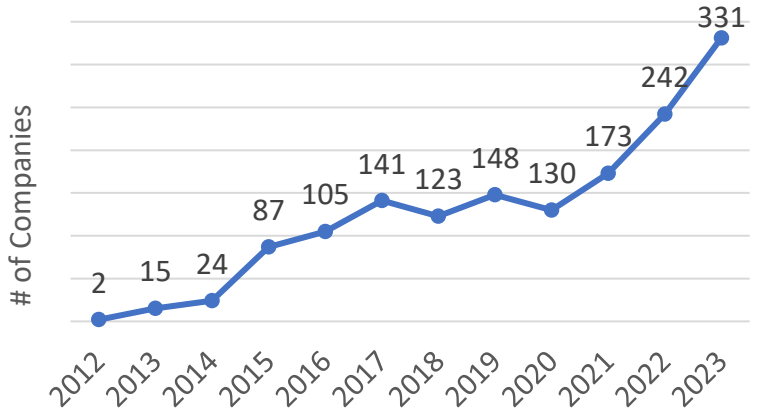


Primary Energy Provision Targets in the newly drafted National Energy Policy*

Year	NRE Mix
2030	19 - 22%
2040	36 - 40%
2050	53 - 55%
2060	70 - 72%

**in the process of being issued*

Application of Energy Management



Number of Reported Companies

331 Companies

Total Energy Consumption
955,932 GWh

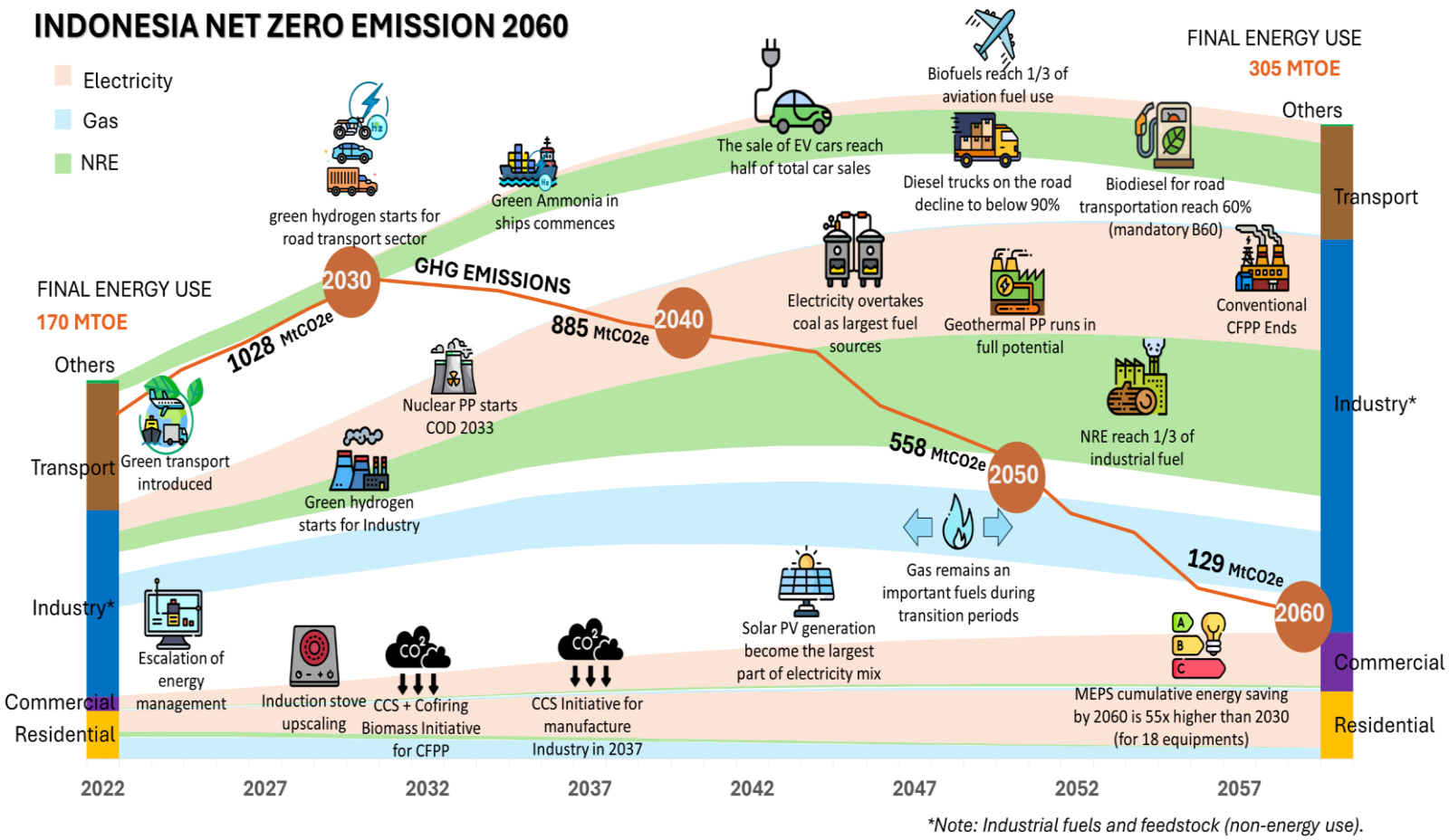
Energy Saving
16,529 GWh

CO_2 Emission Reduction
8,432,769
Ton CO_2 eq

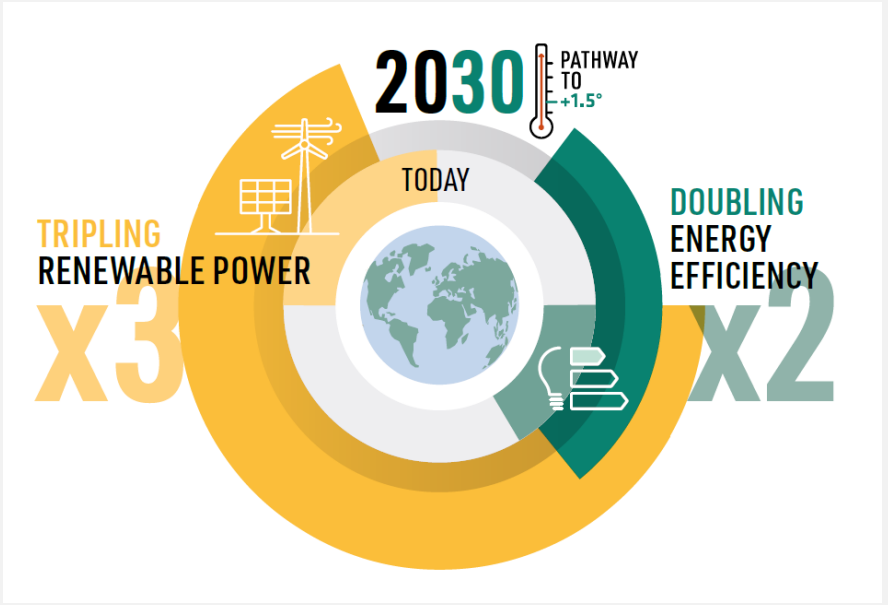
PP 33/2023 on Energy Management

Activity	Threshold
Exploitation of Energy Resources; Energy Production.	6.000 TOE
Transportation Sector	4.000 TOE
Industry Sector	4.000 TOE
Commercial Building Sector	500 TOE

NZE ROADMAP FOR ENERGY SECTOR



*Note: Industrial fuels and feedstock (non-energy use).



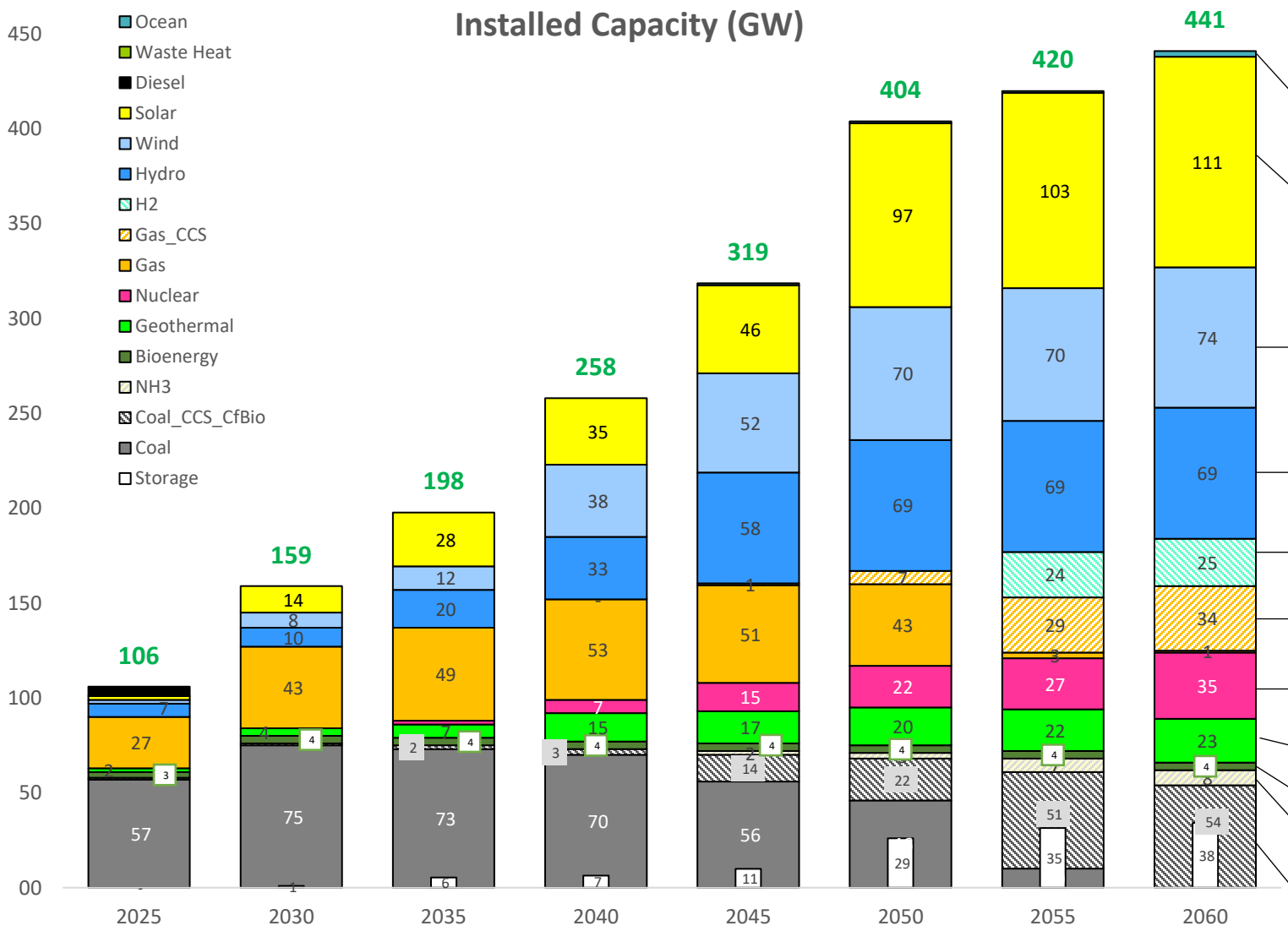
STRATEGIES TO ACHIEVE NZE 2060

1. **Energy Efficiency**
2. **Electrification** (EV, electric for cooking, agrigulture, etc)
3. **Moratorium for New Coal-Fired Power Plant & coal phase down**
4. **Renewable energy** (on-grid, off-grid & biofuel)
5. **New Energy** (nuclear, hydrogen, ammonia)
6. ***CCS/CCUS***

DRAFT ROADMAP OF ELECTRICITY SUPPLY

Installed Capacity (DMN) 2060 is 441 GW consist of
- **42% VRE** with **storage 38 GW**, and
- **58% Non VRE** (dispatchable)

Supported by **SUPER GRID** to support improvement of New & Renewable Energy penetration



NRE Mix Target (Draft of New National Energy Policy)

19-22% → 36-40% → 53-55% → 70-72%

- Ocean (2 GW)
- Solar (111 GW)
- Wind (74 GW)

VRE **42%**

- Hydro (69 GW)
- H2 (25 GW)
- Gas / Gas+CCS (34 GW)
- Nuclear (35 GW)
- Geothermal (23 GW)
- Bioenergy (4 GW)
- NH3 (41 GW)
- Coal_CCS_CfBio (54 GW)

Non VRE **58%**

Disclaimer: draft for discussion only

NRE TO SUPPORT THE ENERGY TRANSITION

RENEWABLE ENERGY

	Potential (GW)	Installed Capacity (MW)*
SOLAR	3294	728
WIND	155	152
HYDRO	95	6698
OCEAN	63	0
BIO -ENERGY	57	3426
GEO-THERMAL	23	2598
GASSIFIED COAL		250
TOTAL	3687	13846

*) Status as of Q3 2024

0.3%

UTILIZED NRE POTENTIAL

- **Types: floating, concentrated, rooftop.** Spread throughout Indonesia, especially in NTT, West Kalimantan and Riau (areas with high irradiation).
- **Type: offshore/onshore.** Found in NTT, South Kalimantan, West Java, South Sulawesi, NAD and Papua.
- **Type: hydro, micro/mini-hydro, hybrid, pump-storage.** Spread evenly, especially in North Kalimantan, NAD, West and North Sumatra, and Papua.
- **Research in Eastern Indonesia.** Location: Yogyakarta, Nusa Tenggara, Bali.
- **Types: biofuel (including SAF), biomass, biogas.** Scattered throughout Indonesia (vegetable products), forestry/plantation waste, industrial waste.
- **Support: government drilling, fiscal incentives.** Spread across the ring of fire area, including Sumatra, Java, Bali, Nusa Tenggara, Sulawesi and Yogyakarta.

NEW ENERGY SOURCES

NUCLEAR

HYDROGEN

DME, etc.

Acceleration of Renewable Energy Program

SOLAR ENERGY

Being prioritized due to continuously decreasing of cost

PV Rooftop

PLTS Atap PT Pabrik Kertas Tjiwi Kimia 9,8 MWp, Jatim

- Total PV Rooftop Quota until 2028**: 1.59 GW**
- Emission Reduction: **2.23 million tons CO2e**

Large Scale PV

PLTS Amman 26,8 MW, Sumbawa Barat, NTB

- Based on RUPTL, total capacity target until 2030**: 4.68 GW**
- Emission reduction**: 6.97 million tons CO2e**

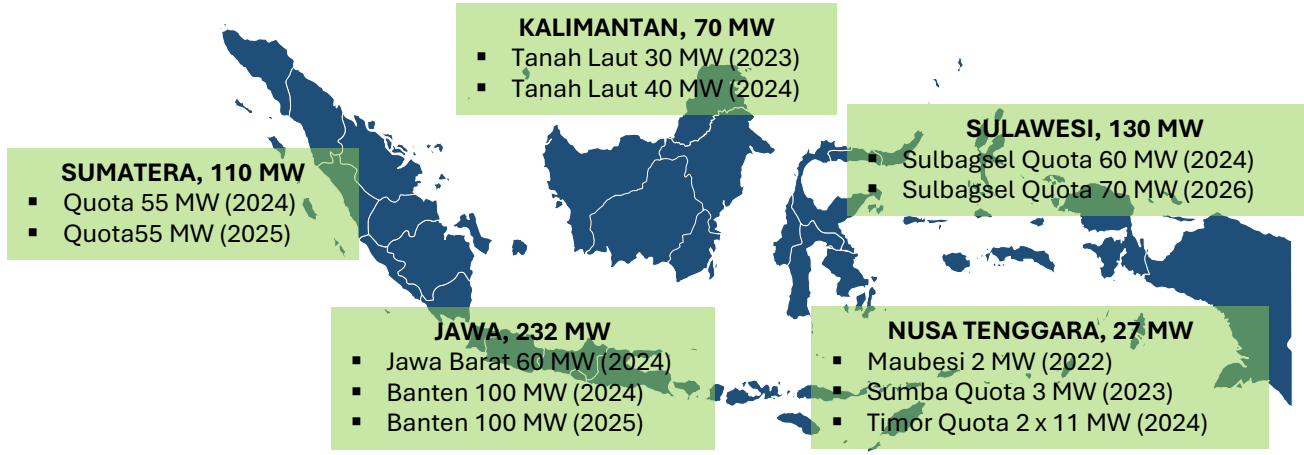
Floating PV

PLTS Terapung Cirata 192 MWp, Jawa Barat

- Potential: **89.37 GW** (293 locations) including **14.7 GW PUPR dams** and **74.6 MW lakes**.
- COD: 145 MW (Cirata Floating PV)
- In-Progress: 590 MW *(including tender - construction)*

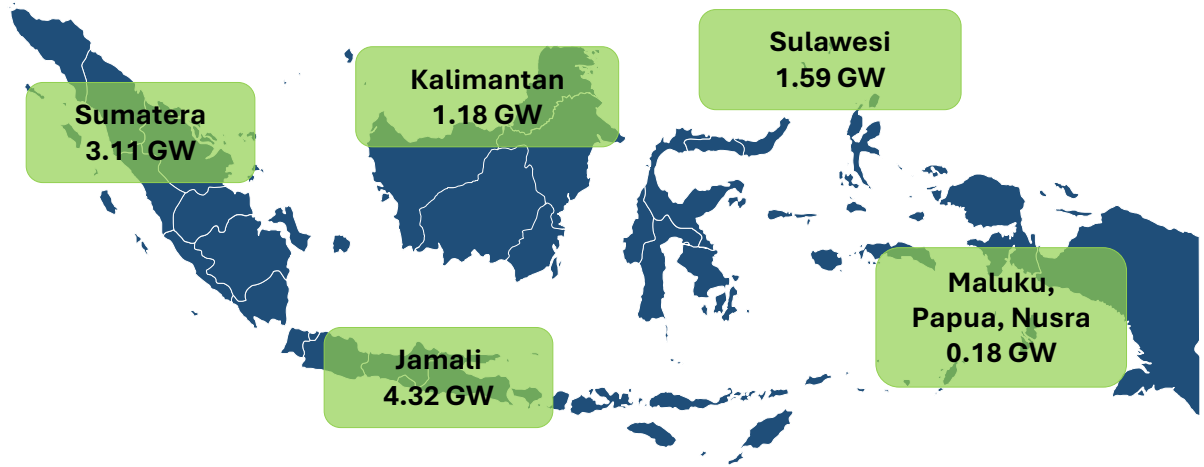
WIND ENERGY

Target 2030: 597 MW (RUPTL PLN)

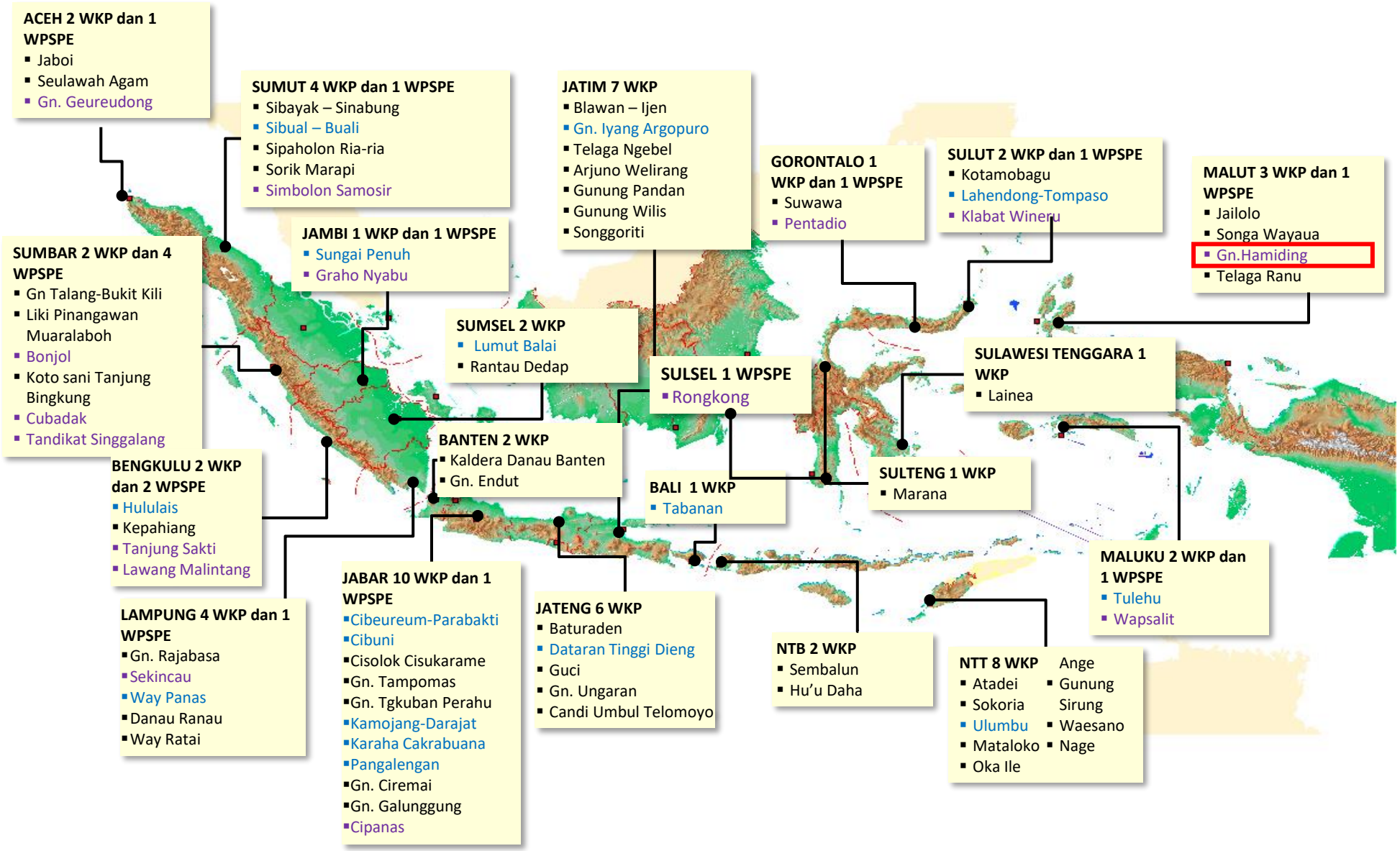


HYDRO ENERGY

Target 2030: 10.4 GW (RUPTL PLN) including Pump Storage.



DEVELOPMENT OF GEOTHERMAL AREA (61 WKP AND 16 WPSPE)



Indonesia has the abundant geothermal potential that reaches **23.6 GW.** Current installed capacity is **2.6 GW** (11%).

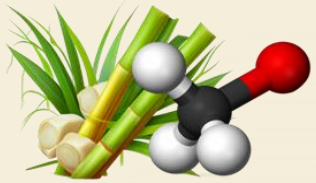
WKP: Geothermal Service Area
WPSPE: Preliminary and Exploration Survey Assignment Area

NOTES:
- WKP Exisitng before Law No 27/2003
- WKP After Law No 27/2003
- WPSPE

Biofuels Development Program

Biodiesel

- Since 1st February 2023, Indonesia has implemented B35 for all related sectors.
- In 2022, B40 road tests were conducted for the automotive sector (B40 and B30D10).
- In 2024, B40 usage tests were conducted in the non-automotive sector (trains, navy, power plants, agricultural machinery, and mining heavy equipment).
- The government plans to implement B40 in 2025



Bioethanol

- Bioethanol Mandatory Program has not been implemented due to limited feedstock, and no available incentive mechanism provided by the government.
- Starting July 2023, PT Pertamina Patra Niaga conducted a market trial of of Pertamax Green 95 (RON95 + RON98 + 5% Bioethanol) has been carried out in Jabodetabek and Surabaya City.
- PT Pertamina plans to expand the market trial to all of Java.
- The government has issued a Presidential Regulation on The Acceleration of Bioethanol Supply for Biofuel (Presidential Regulation 40/2013).

Bioavtur - SAF

- PT Kilang Pertamina Internasional has successfully produced J2.4, a jet fuel containing 2.4% bioavtur/ Sustainable Aviation Fuel (SAF) using RBDPKO.
- The SAF has been successfully used in test flights using military aircraft (2021) and commercial aircraft (2023).
- The government is currently preparing a road map for the use of SAF and encouraging SAF production to an industrial scale.

Diesel Biohidrokarbon/HVO

- To accelerate the utilization of HVO, the Government has included the Cilacap and Plaju Green Refinery as National Strategic Projects (PSN).
- Phase I of the Cilacap Green Refinery (2022) can produce 3,000 BPD of Green Diesel and SAF.
- Phase II of the Cilacap GR (2026) is expected to produce 6,000 BPD of Green Diesel and SAF.
- The Plaju Green Refinery, set to be constructed in 2028, is expected to produce 20,000 BPD of Green Diesel and SAF.

Green Gasoline & Bensin Sawit

Green Gasoline:

- In 2019, Pertamina successfully produced green gasoline from RBDPKO through co-processing at Plaju RU.

Bensin Sawit (Bensa):

- The ITB team with BPDPKS funding has succeeded in creating a demo plant with a capacity of 1,000 Ltr/day.
- Bensa will be developed in small-scale but widespread using oil palm from smallholders.

INDONESIA'S HYDROGEN NATIONAL STRATEGY

Objective:
to establish a hydrogen economy that contributes to the energy transition and plays an essential role in decarbonizing the global energy system

Indonesia will reduce dependence on fossil fuels to ensure sovereignty and security of energy

Indonesia will pursue its decarbonization target by developing the domestic hydrogen market

Indonesia will export hydrogen and its derivatives to the global market by taking advantage of its uniqueness as a maritime country

Outcome

- NZE target achieved
- High NRE penetration
- High foreign investment in green industry
- Creation of green jobs
- Universal energy access meets SDGz 7 criteria
- Exports of low-carbon hydrogen and ammonia increased

LOW CARBON HYDROGEN AND AMMONIA DEVELOPMENT FOCUSED IN FOUR SECTORS IN INDONESIA

Industrial

- **As a gradual substitution for high carbon (existing) hydrogen.** Low-carbon hydrogen and ammonia produced from NRE sources supports the decarbonization of the industrial sector, and increases industrial competitiveness when a carbon tax is implemented.
- Reducing emissions for industries that require high temperatures (cement and steel)

Transportation

- Starting in 2030, **low-carbon hydrogen** will be used in the transportation sector **for long-distance vehicles** such as trucks, heavy transport and shipping.
- **Hydrogen vehicles** as a diversification of electric vehicles such as batteries

Electricity

- **Low carbon hydrogen/ammonia cofiring in fossil fuel plants**. This option can be considered in the 2030-2050 period, when there are high EBT penetration and curtailment, EBT prices are already cheap, carbon prices are quite high
- **Storage options** for off grid generation
- Storage technology options to overcome curtailment of NRE generators

Hydrogen and ammonia have the potential trading on regional and international markets, taking into account: Indonesia's strategic position as a maritime country, the potential for monetization of NRE sources for power generation with low demand, and the high interest of market players in capturing opportunities for trading low-carbon hydrogen and ammonia.

As an export commodity

STRATEGIC RESOURCES FOR DOWNSTREAMING INVESTMENT

The down-streaming, including in the energy and mining sector, can potentially generate huge potential for the economy

Mineral

USD 498.4 Billion

Coal

Nickel

Tin

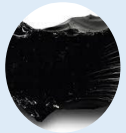
Copper

Bauxite

Iron & Steel

Gold & Silver

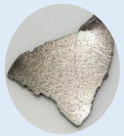
Asphalt Buton



Silica Sand

Manganese

Cobalt



Rare Earth Metal

Crude Oil

Natural Gas

USD 68.3 Billion

Oil

Natural Gas

Agriculture

Maritime

Fisheries

Forestry

USD 51,3 Miliar

Palm

Coconut

Rubber

Biofuel

Wood Beam

Pine Sap

Shrim

TCT Fish

ECONOMIC IMPACT UP TO 2040

Investment
USD 618 Billion

GDP
USD 235.9 Billion

Export Value
USD 857.9 Billion

Workforce
3,016,179 people

Rajungan

Seaweed

Salt

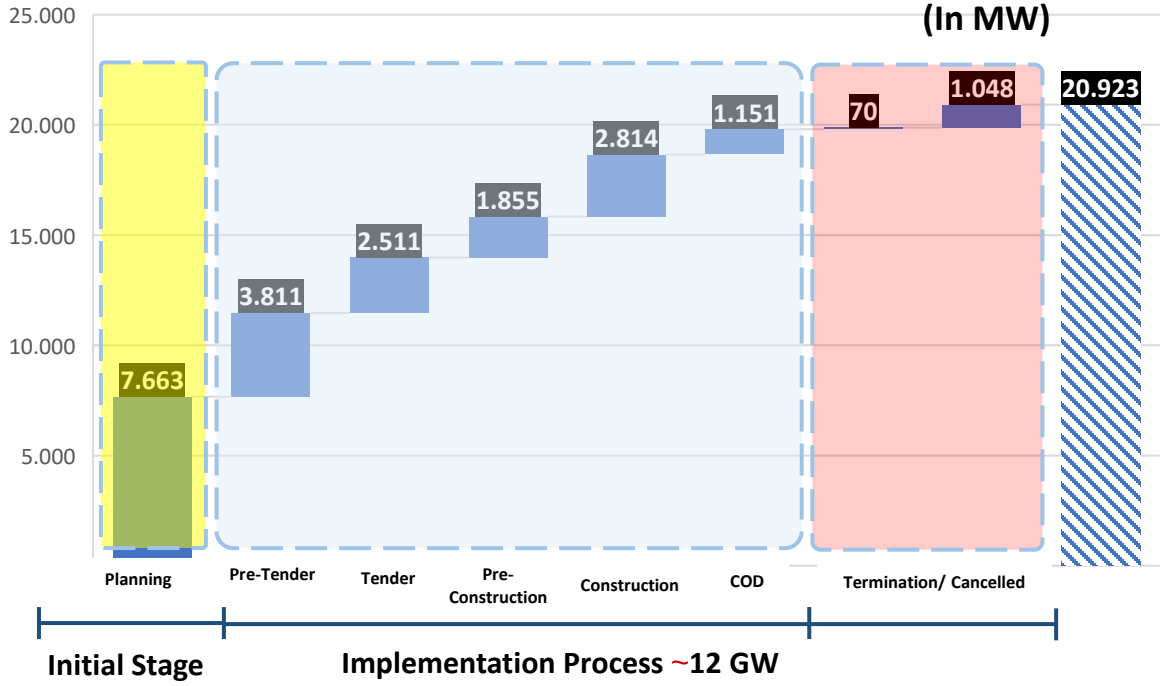
Nutmeg

Chocolate

Tilapia

CHALLENGES: HOW TO ACCELERATE INVESTMENT

Progress Implementation of RUPTL PLN 2021-2030



Investment Opportunities

15.9 Billion USD

To realize projects on "Planning" Status under RUPTL PLN.

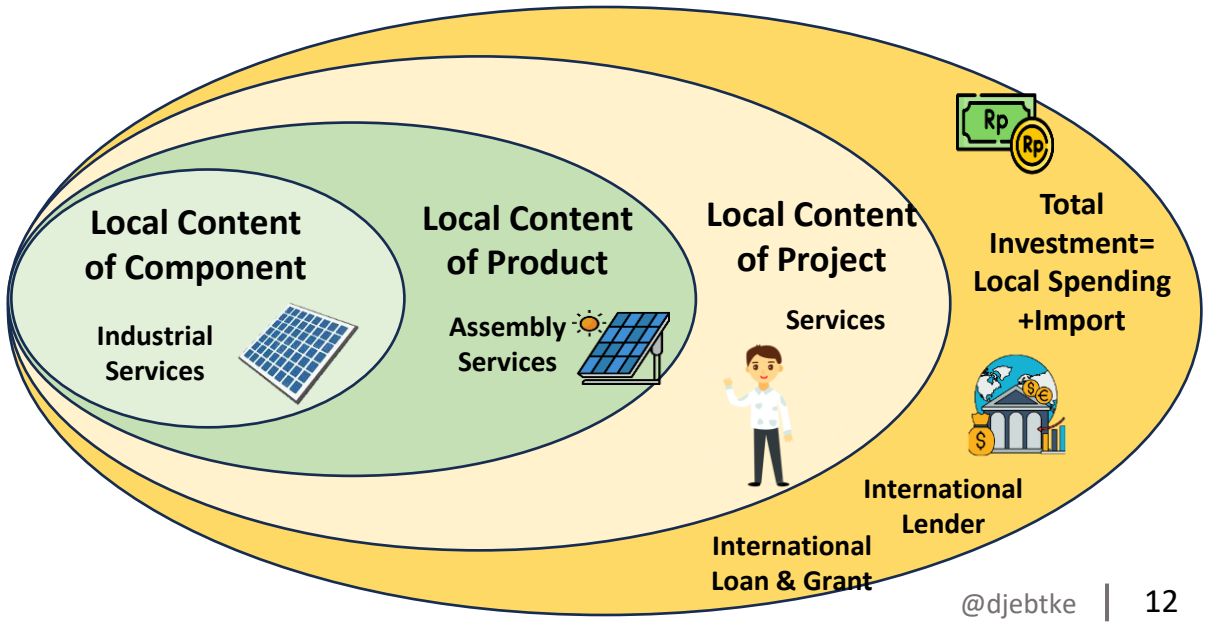
(Total Investment needed to implement 20.9 GW RUPTL PLN is USD 55.18 Billion)

BREAKTHROUGH TO NRE INVESTMENT:

MEMR REGULATION NO 11/2024 – LOCAL CONTENT

*"To **accelerate the development of electricity infrastructure while still prioritizing the use of domestic products,** it is necessary to regulate the use of domestic products for the development of electricity infrastructure"*

- Accompanied by Minister of Industry Regulation 33/2024 On Guidelines for The Use of Domestic Products for Electricity Infrastructure Development which repeals previous regulation (Minister of Industry Regulation 54/2012)
- Guidelines for the minimum local content value for electricity infrastructure development projects are regulated in MEMR Decree.
- General Illustration:



STRENGTHENING REGULATIONS & INCENTIVES TO ENCOURAGE NRE DEVELOPMENT

Indonesia NRE Investment Incentives and Facilities

Fiscal Incentive:

- Tax Allowance
- Import Duty Facilities
- Tax Holiday
- Land and Building Tax exemption

Non-Fiscal Incentive:

Biofuel incentive through BPDPKS

ONLINE SINGLE SUBMISSION (OSS) → oss.go.id

1. Business License of Power Supply for Public Purpose
2. Electricity Supporting Business Licensing
3. Gas Bio Procurement
4. Business Permit for Biofuel (new)

NREEC Online Licensing → perizinan.esdm.go.id

1. Geothermal License
2. Geothermal Goods Import Recommendation
3. Geothermal Supporting Business Registration
4. Biofuel Export/Import Recommendation

PRESIDENTIAL REGULATION NO 112/2022

Renewable Energy Development is carried out based on the RUPTL, which takes into account the target of the renewable energy mix, supply-demand balance, and the economic value of power plants

Ceiling Price (HPT) for 2-stage staging without escalation with location factors applies to stage 1, for each type of renewables:

Type	*Stage* 1 (cUSD/kWh)	*Stage* 2 (cUSD/kWh)
Geothermal	7.65 – 9.76 x F	6.5 – 8.30
Hydro	6.74 – 11.23 x n x F	4.21 – 7.02
Excess Power Hydro	5.80 x 0.7	
Solar PV	6.95 – 11.47 x n x F	4.17 – 6.88
Wind	9.54 – 11.22 x n x F	5.73 – 6.73
Biogas	7.44 – 10.18 x n x F	4.46 – 6.11 x n
Biomass	9.29 – 11.55 x n x F	7.43 – 9.24 x n

n: Technical Factor (0.7 – 1.0) F: Location Factor (1 – 1.5)

B to B (requires MEMR approval): Peaker Hydro; Biofuel PP; Ocean PP

- Presidential Regulation 112/2022 also mandates the Government c.q. The MEMR to prepare a roadmap to accelerate the retirement of the CFPP's operational life and limit the development of new CFPPs, except for those CFPPs that have been listed in the RUPTL and which are integrated with industry.
- Local content implementation (TKDN) is carried out in accordance with prevailing laws and regulations.

Thank You

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