ASEANのエネルギー分野の現状・関連動向に係る調査 – 定点調査業務2023

報告書 - Indonesia

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エネルギー定点調査

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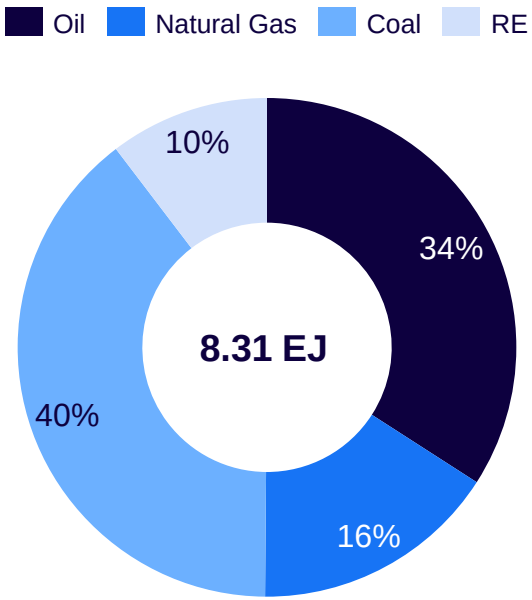
1. 一次エネルギー構成

インドネシアの主要なエネルギー源は石炭・石油が中心

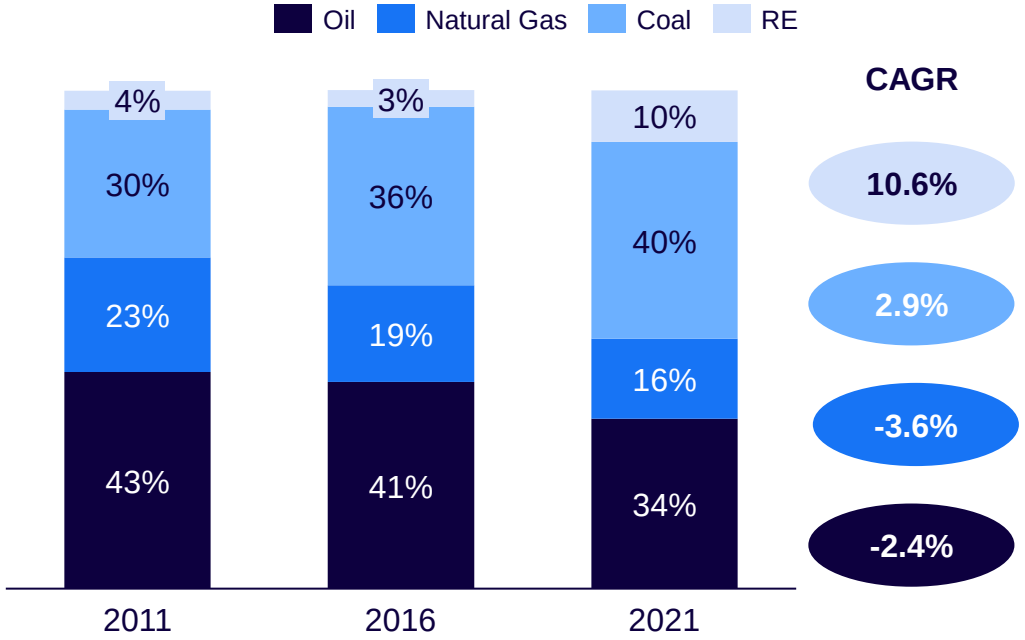
Primary energy consumption
2021, Exajoules

Indonesia's primary energy demand in 2021 is 8.31 Exajoules, which comes mainly from fossil fuels (74%), especially coal at 3.3 EJ and oil 2.8 EJ



Historical primary energy consumption
2011 – 2021, %

Indonesia has developed an over-reliance on coal to meet its energy needs with a YOY growth at 2.9%. However, with 2060 Net Zero goals, renewable energy has been growing exponentially at a rate of 10.6% YOY.

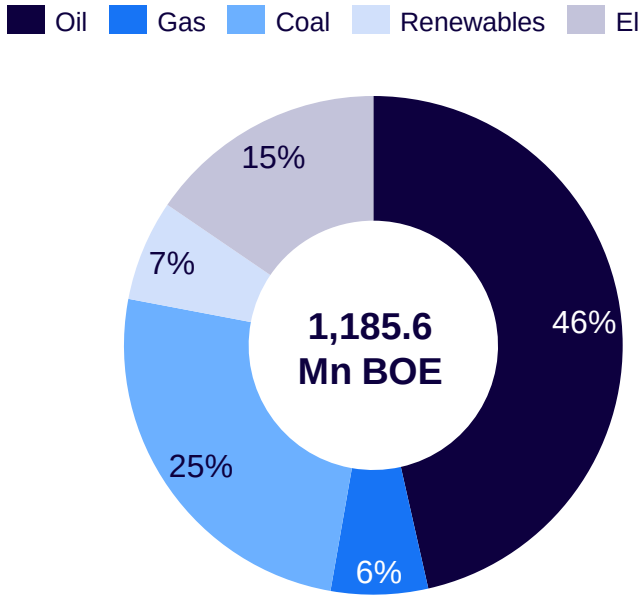


Source: BP Statistical Review of World Energy 2012, 2017, 2022, Arthur D. Little analysis

インドネシアは最終エネルギー消費を石油と石炭に大きく依存しており、産業や運輸が消費の中心

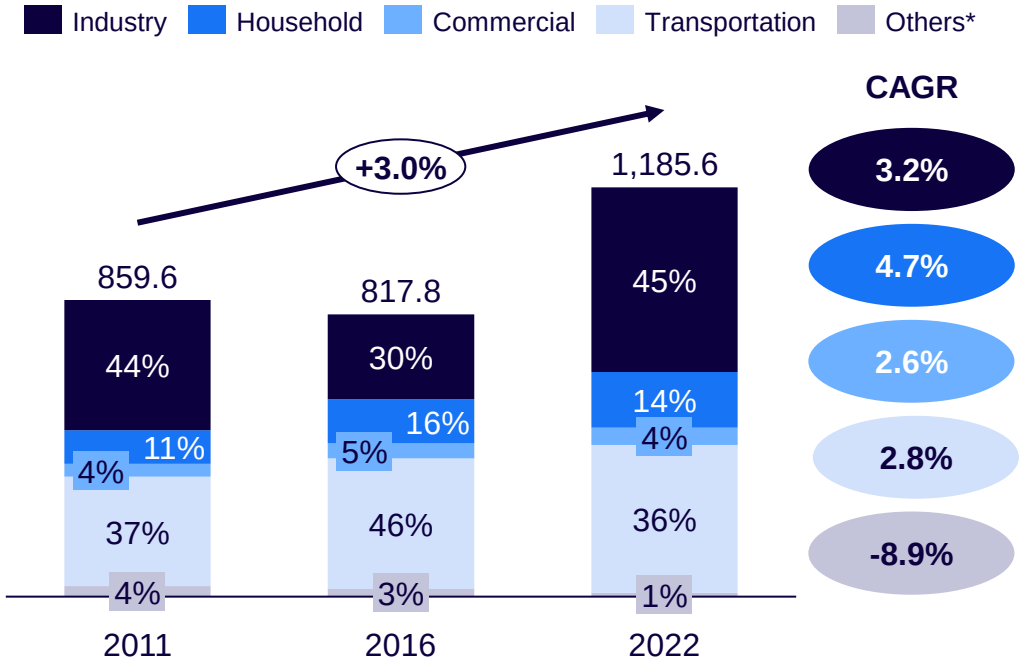
Final energy consumption
2022, Mn BOE

The final energy consumption was 1,186 mn BOE, with oil dominating at 46% (551 mn BOE) followed by coal at 25% (229 mn BOE). The reason for the drop of coal dominance from primary to final energy consumption is due to a large portion being used in the energy transformation process



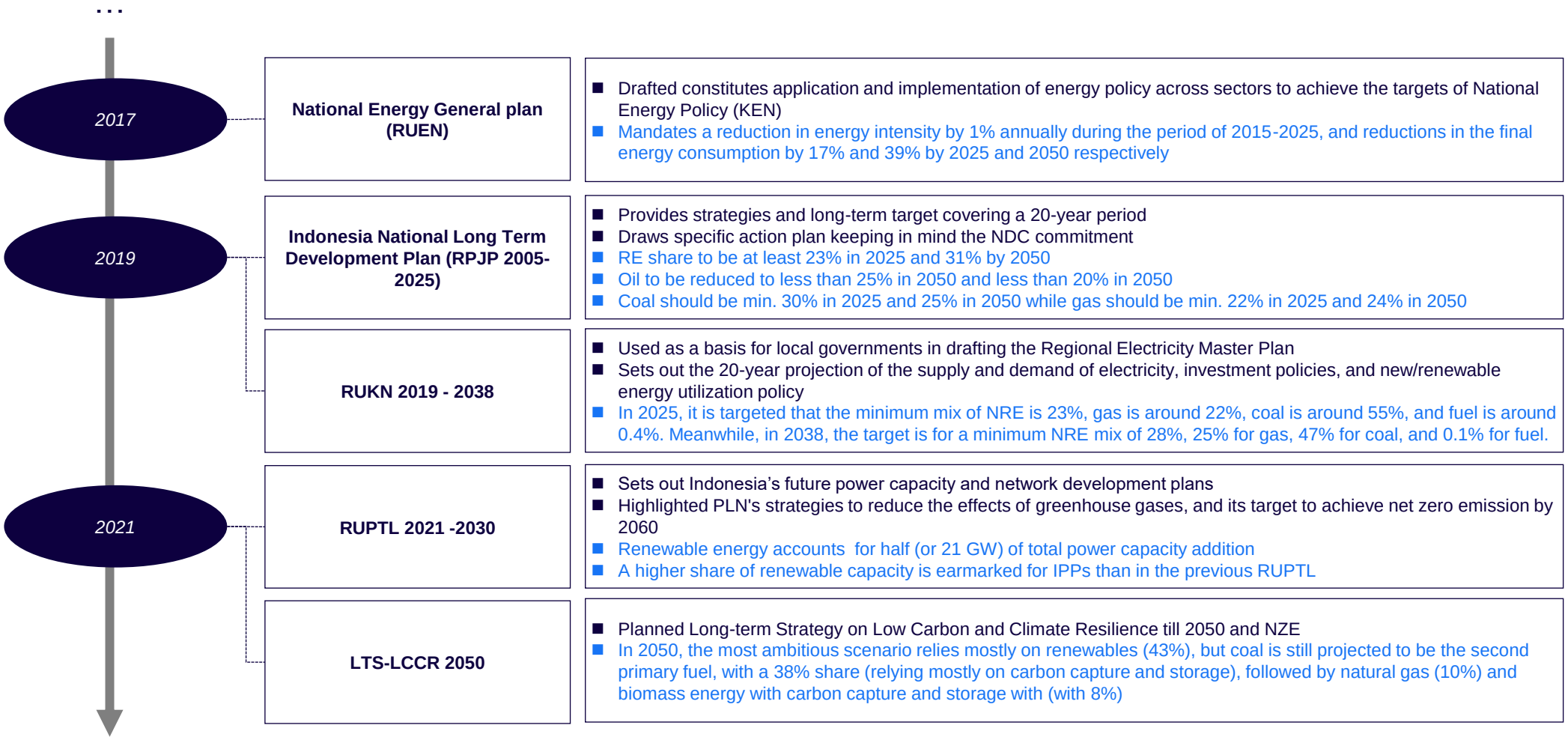
Final energy consumption, by sector
2011 – 2022, Mn BOE

The transport and industrial sectors are the major consumers of energy, accounting for >75% consistently, with 81% in 2022. This is followed by households, growing at the fastest rate of 4.6% YOY



Note: *Others is comprised of undefined sectors
Source: MEMR Statistical Handbook 2022, Arthur D. Little analysis

国家電力総合計画により、再エネ目標などが定められている



Note: 1) Indonesia defined BAU as emission levels based on 2010 levels assuming no change policy and based on this direction calculated emission for milestone years
Source: Arthur D. Little analysis, Secondary Research , International Institute for Sustainable Development 2022, Perusahaan Listrik Negara 2021, Ministry of Energy and Mineral Resources 2019

インドネシア 2019年RUPTLを改定、電力プロジェクト（発電、インフラ等）の最新情報、2030年目標達成に向けた施策の再調整等

Overview of RUPTL plan

RUPTL

TIMING 2021 - 2030

OVERALL

National electricity business plan launched by PLN (state-owned utility company), to help support the fovernment’s objectives to achieve 23% share of renewable energy (RE) in energy mix by 2025 and reduce GHG emissions by 29-41% by 2030, and next-zero by 2060.

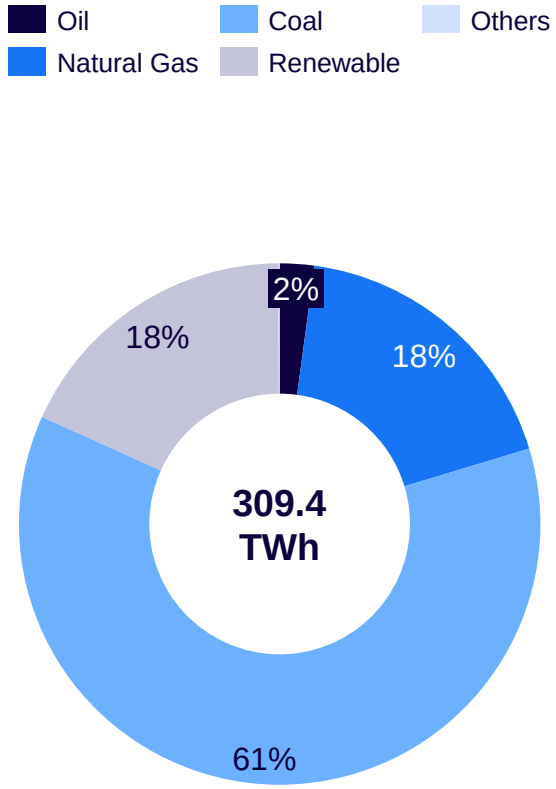
KEY NOTES

- PLN's 10-year business plan for the development of power projects, including power generation, distribution and transmission projects development.
- RE account for 52% of 41 GW of power generation projects to be developed (50% hydro, 22% solar, 16% geothermal and 12% split between wind, biomass and new EBT base projects
- Independent power producers (IPPs) given larger share from PLN
- PLN and/or its subsidiaries will either have minority a stake in the IPP’s project after MEMR Regulation No. 4/2020 removed the build-own-operate-transfer (BOOT) model
- IDR 128.7 trillion per annum (IDR 72.4 trillion by PLN, and IDR 56.3 trillion by IPPs) of investment needed for new infrastructure, excluding investment requirements for maintenance
- 30% biomass co-firing in coal plants and retiring of old coal-fired power plants starting 2030
- Transmissions, distribution, smart grid, EV and rooftop solar infrastructure to be built

Source: RUPTL 2021 - 2030

現在、発電のエネルギー源は石炭が190TWhで61%を占め、2030年まで支配的

Electricity generation mix
2021, TWh



Energy mix forecast
2023 – 2030, %

No.	Material Type Burn	2023	2024	2025	2026	2027	2028	2029	2030
1	Hydro	6.43%	6.68%	7.98%	8.55%	8.65%	9.19%	9.77%	9.94%
2	Geothermal	5.64%	5.62%	7.56%	8.21%	8.09%	8.46%	8.50%	9.71%
3	Other renewable energy	1.89%	2.67%	7.46%	6.10%	5.80%	4.73%	3.88%	2.17%
	Solar	0.39%	0.46%	0.64%	0.63%	0.62%	0.61%	0.60%	0.59%
	Wind	0.18%	0.56%	0.80%	0.78%	0.80%	0.76%	0.73%	0.69%
	Municipal waste	0.03%	0.08%	0.46%	0.43%	0.42%	0.39%	0.38%	0.36%
	Biomass	1.21%	1.49%	5.55%	4.24%	3.94%	2.95%	2.16%	0.51%
	Others[1]	0.08%	0.07%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
4	Natural gas	15.95%	15.62%	14.52%	13.97%	13.70%	13.16%	12.92%	12.64%
	Dry natural gas	6.92%	6.18%	5.79%	5.62%	5.33%	4.94%	4.82%	4.49%
	Liquid Natural Gas	9.03%	9.44%	8.74%	8.35%	8.37%	8.23%	8.10%	8.15%
5	Fuel oil	1.27%	0.55%	0.40%	0.38%	0.39%	0.39%	0.40%	0.41%
	High speed diesel oil	1.20%	0.48%	0.40%	0.38%	0.39%	0.39%	0.40%	0.41%
	Marine fuel oil	0.07%	0.07%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	HFO	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
6	Coal	68.81%	68.87%	62.08%	62.65%	62.91%	63.44%	63.69%	63.95%
7	New renewable energy	0.00%	0.00%	0.00%	0.14%	0.45%	0.63%	0.84%	1.18%

Note: 1) Others is undefined in primary source
Source: RUPTL 2021 – 2030, Arthur D. Little analysis

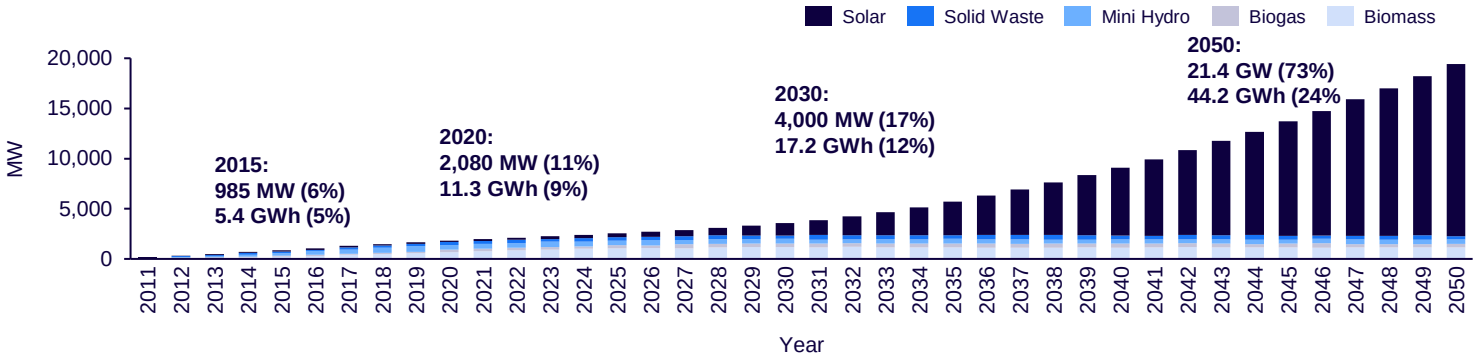
インドネシアは2030年と2050年の再生可能エネルギー目標を達成するために太陽光発電に注目している

Renewable energy policy

- **Enhanced NDC (2022):** 32% reduction in emissions against BAU forecast by 2030, and up to 43% with international support
- Presidential Regulation No. 112/2022: PLN to be compensated if development of new RE capacity increases its average costs
- **MEMR 4/2020:** PLN plans the development and R&D of new and RE (EBT). PLN must operate PP that use RE sources with capacity up to 10MW
- **RUKN:** Encourage coal PP to become more flexible to meet energy mix goals
- **National EV programme for Road Transportation (2019):** Target of 20% EV domestic sales by 2025, 0.6mn electric cars two and 2.5mn electric 2-wheelers by 2030

National renewable energy goals

2011 – 2050, MW & GWh



Renewable energy power plant development Plan (MW)

No.	Name/Type	Unit	2023	2024	2025	2026	2027	2028	2029	2030
1	PLTP	MW	190	141	870	290	123	450	240	808
2	Hydro power plant	MW	132	87	2.478	327	456	1.611	1.778	1.950
3	MHP	MW	277	289	189	43	-	2	13	6
4	Solar power plant	MW	1.308	624	1.631	127	148	165	172	157
5	PLT Bayu	MW	33	337	155	70	-	-	-	-
6	Biomass / Waste power plant	MW	88	191	221	20	-	15	-	-
7	PLT EBT base	MW	-	-	-	100	265	215	280	150
8	*Peaker renewable power plant*	MW	-	-	-	-	-	-	-	300
Total		MW	2.028	1.670	5.544	978	991	2.458	2.484	3.370

Source: RUPTL 2021 – 2030, World Bank Climate and Development Report 2023, Arthur D. Little analysis

再生可能エネルギーの規制・法律

REGULATION ABOUT RENEWABLE ENERGY (1/3)

#	Policy	Year	Status	Jurisdiction
1	2023 national budget - renewables development	2023	In force	National
2	Increase in 2023 electricity access enhancement budget	2023	In force	National
3	Minister of Finance Order No.38 2023 on VAT reduction for Battery Electric Vehicle	2023	In force	National
4	Subsidies for Battery Electric Vehicle	2023	In force	National
5	Jakarta-Jambi Electric Car Touring Campaign	2022	In force	National
6	2021-2023 Energy subsidies	2021	In force	National
7	Permen ESDM 35/2021 - Procedure for Determination and Bid of Oil and Gas Working Areas	2021	In force	National
8	National Economic Recovery programme (GR 23/2020)	2020	In force	National
9	Incentives for biodiesel	2020	In force	National
10	Provision of Electric Charging Infrastructure for Battery Based Electric Motor Vehicles	2020	In force	National
11	Regulation 65/2020 on the Conversion of Gasoline Motorcycles into Battery-Based Electric Motorcycles	2019	In force	National
12	Utilisation of Rooftop Solar Power Generation System by Customers of PT Perusahaan Listrik Negara (Persero)	2019	In force	National
13	Energy Efficiency Awareness Raising	2017	In force	National
14	General Plan for National Energy (Presidential Regulation No.22 Year 2017)	2017	In force	National
15	Renewable Energy Purchase Policy 2017	2017	Ended	National
16	Utilization and Selling Price of Gas Flaring in Upstream Oil and Gas Business Activities	2017	In force	National
17	Electricity Supply Business Plan (Rencana Umum Penyediaan Tenaga Listrik – “RUPTL”) 2016-2025	2016	In force	National
18	Indonesia geothermal auctions 2016	2016	In force	National

Source: International Energy Agency 2023

再生可能エネルギーの規制・法律

REGULATION ABOUT RENEWABLE ENERGY (2/3)

#	Policy	Year	Status	Jurisdiction
19	Solar Feed-In Tariff of Indonesia (2016)	2016	Ended	National
20	Ceiling Price for Geothermal (Ministerial Regulation No. 17/2014)	2014	In force	National
21	New Geothermal Law (No. 21/2014)	2014	In force	National
22	Biofuel Blending (Ministry Regulation No. 25/2013)	2013	In force	National
23	Feed-in-Tariffs for Biomass (Ministerial Regulation No. 19/2013)	2013	Ended	National
24	Power purchase from solar photovoltaic plants (No. 17/2013)	2013	Ended	National
25	Clean Technology Fund	2012	In force	National
26	Electricity Purchase from Small and Medium Scale Renewable Energy and Excess Power (No. 4/2012)	2012	In force	National
27	Energy Management Regulation (Minister of Energy and Mineral Resources, No. 14/2012)	2012	In force	National
28	Geothermal Fund (Ministry of Finance Regulation No. 3/2012)	2012	In force	National
29	National Energy Efficiency Award	2012	In force	National
30	Prototyping of Electric Buses and City Cars	2012	In force	National
31	National Action Plan for Reducing Greenhouse Gas Emissions	2011	In force	National
32	Purchase of Electricity from Geothermal Plants (Regulation No. 02/2011)	2011	In force	National
33	Tax exemption on goods for geothermal exploration (No. 22/PMK.011/2011)	2011	Ended	National
34	Income tax reduction for energy development projects (MoF Regulation No. 21/2010)	2010	In force	National
35	Indonesia Value-Added Tax and Import Duty Exemption For Renewable Energy Property	2010	In force	National
36	Biofuel Supply, Utilization and Trading (Ministerial Regulation No. 32/2008)	2009	Ended	National

Source: International Energy Agency 2023

再生可能エネルギーの規制・法律

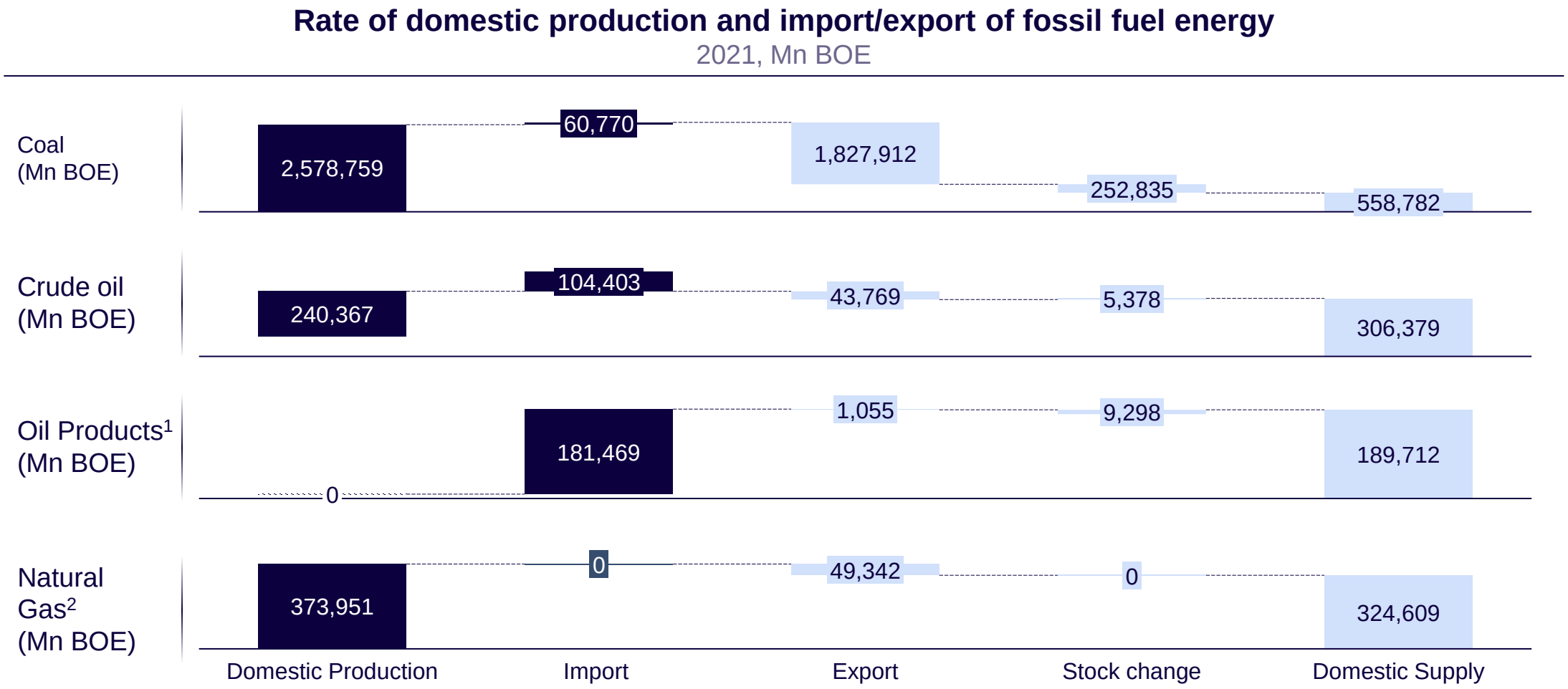
REGULATION ABOUT RENEWABLE ENERGY (3/3)

#	Policy	Year	Status	Jurisdiction
37	Electricity Law (No. 30/2009)	2009	In force	National
38	Energy Conservation (Government Regulation No. 70/2009)	2009	In force	National
39	Energy Efficiency Labeling programme	2009	In force	National
40	Minister of Environment Decree No. 13/2009: Emission Standards for Stationary Sources of Oil and Gas Industry Activities	2009	In force	National
41	Tariffs for Small and Medium Scale Power Generation using Renewable Energy (No. 31/2009)	2009	Ended	National
42	Minister of Energy and Mineral Resources No. 36 of 2008 - Coal Bed Methane Commercial Utilisation	2008	In force	National
43	Energy Law No. 30/2007	2007	In force	National
44	Geothermal Business Activities (Government Regulation No. 59/2007; 70/2010)	2007	In force	National
45	Development credits for biofuels and plantation revitalisation (MoF Regulations No. 117/2006; No. 79/2007)	2006	In force	National
46	Medium-Scale Power Generation using Renewable Energy (Ministerial Regulation No. 2/2006)	2006	In force	National
47	National Team for Biofuel Development and Biofuel Roadmap (Decree No. 10/2006)	2006	In force	National
48	Provision and Utilization of Biofuel (Presidential Instruction No. 1/2006)	2006	In force	National
49	Blueprint of National Energy Management (2005-2025)	2005	In force	National
50	National Master Plan for Energy Conservation	2005	In force	National
51	Presidential Instruction on Water and Energy Savings (10/2005; 2/2008; 13/2011)	2005	In force	National
52	Green Energy Policy (Ministerial Decree No. 2/2004)	2004	In force	National
53	Old Geothermal Law (No. 27/2003)	2003	Ended	National
54	Small Distributed Power Generation Using Renewable Energy (Ministerial Regulation No. 1122 K/30/MEM/2002)	2002	In force	National
55	Law No. 22/2001 Petroleum and Natural Gas	2001	In force	National

Source: International Energy Agency 2023

2 化石エネルギー

石炭は多くを輸出されているのに対し、原油と天然ガスの多くは国内で消費

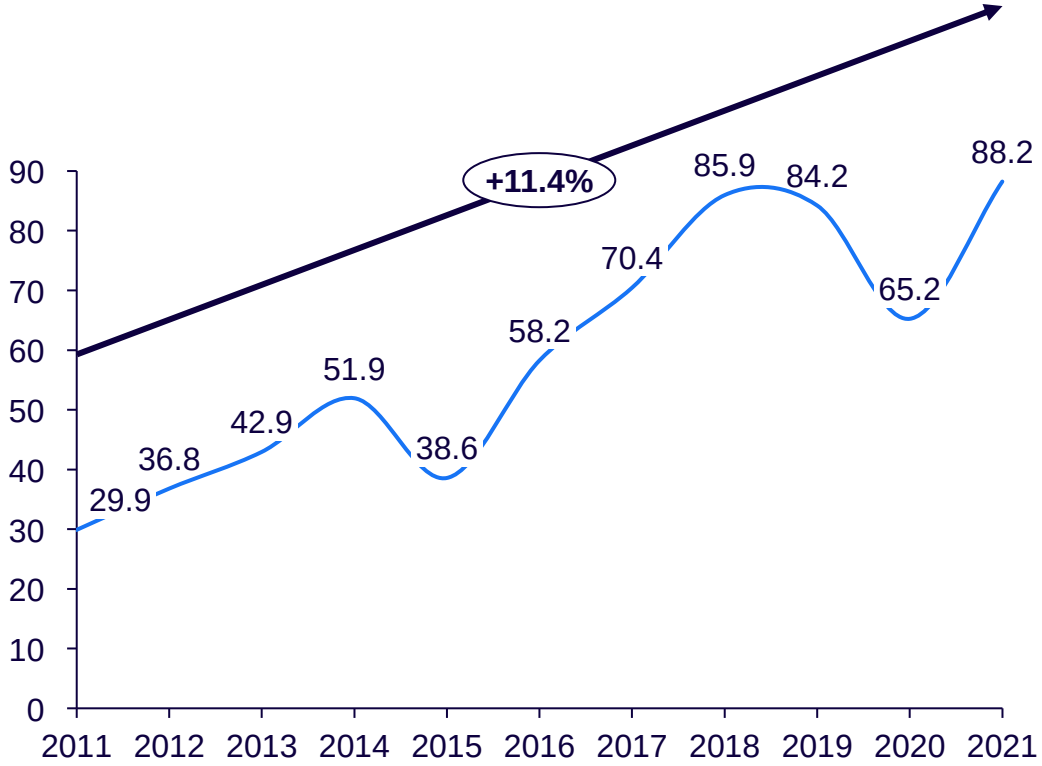


Note: 1) Fuel and LPG; 2) Excl. LNG
Source: MEMR Statistical Handbook 2021, Arthur D. Little analysis

石炭輸出は年々増加している

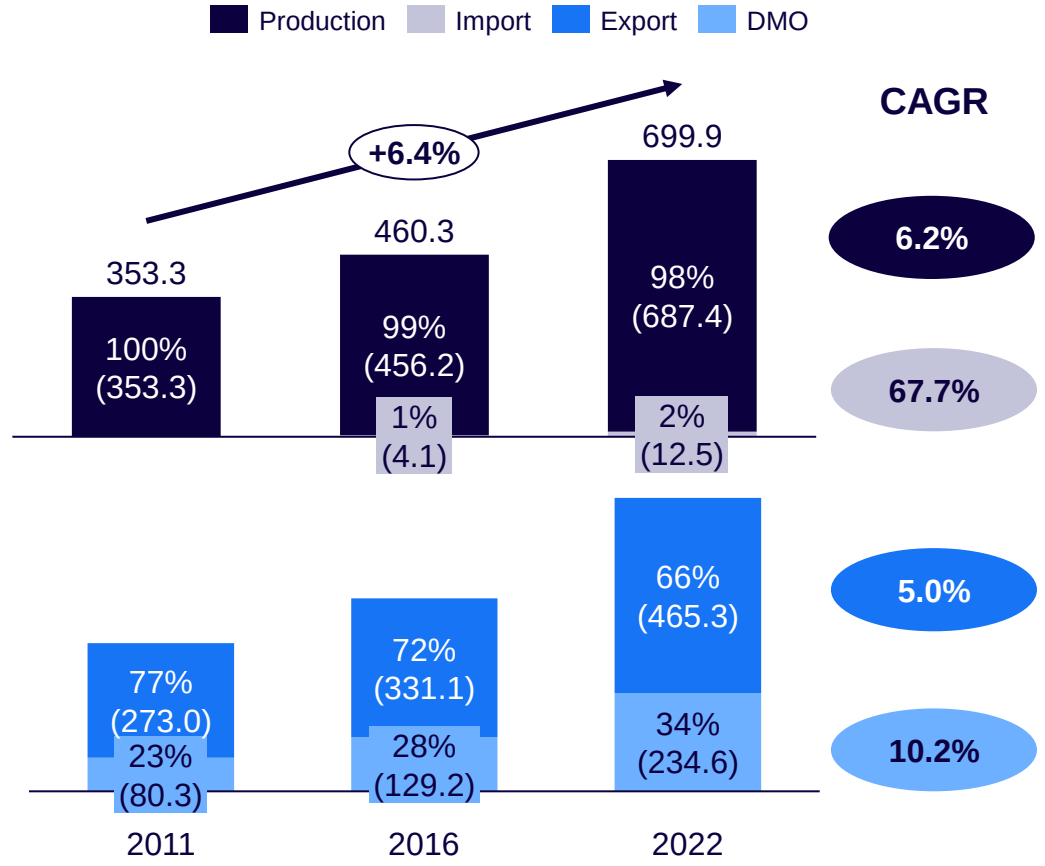
Lignite coal net export trend

2011 – 2021, Bn tons



Steam coal key trends

2011 – 2022, Mn BOE

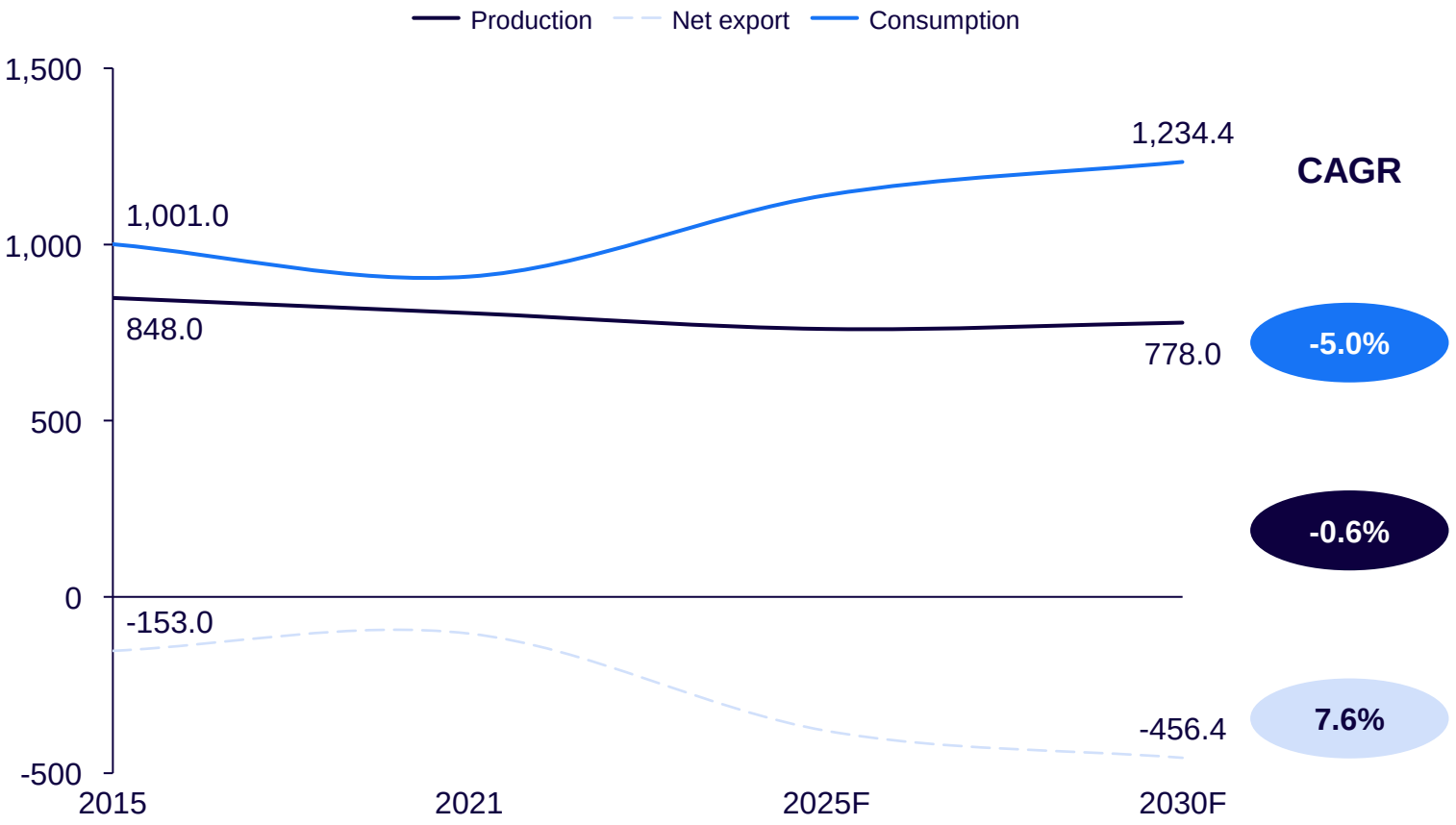


Source: The United Nations Energy Statistics Database, Myanmar Data collection survey Coal-fired thermal power generation 2013, Indonesia Ministry of Energy and Mineral Resources 2022, Arthur D. Little analysis

国内の経済成長に合わせて消費は上昇。一方で、多くの油田が既に成熟化しており、生産量は減少傾向にあるため、今後輸入が増加する見込み

Crude oil, NGPL & other liquids key trends

2015 – 2030, 000's bpd

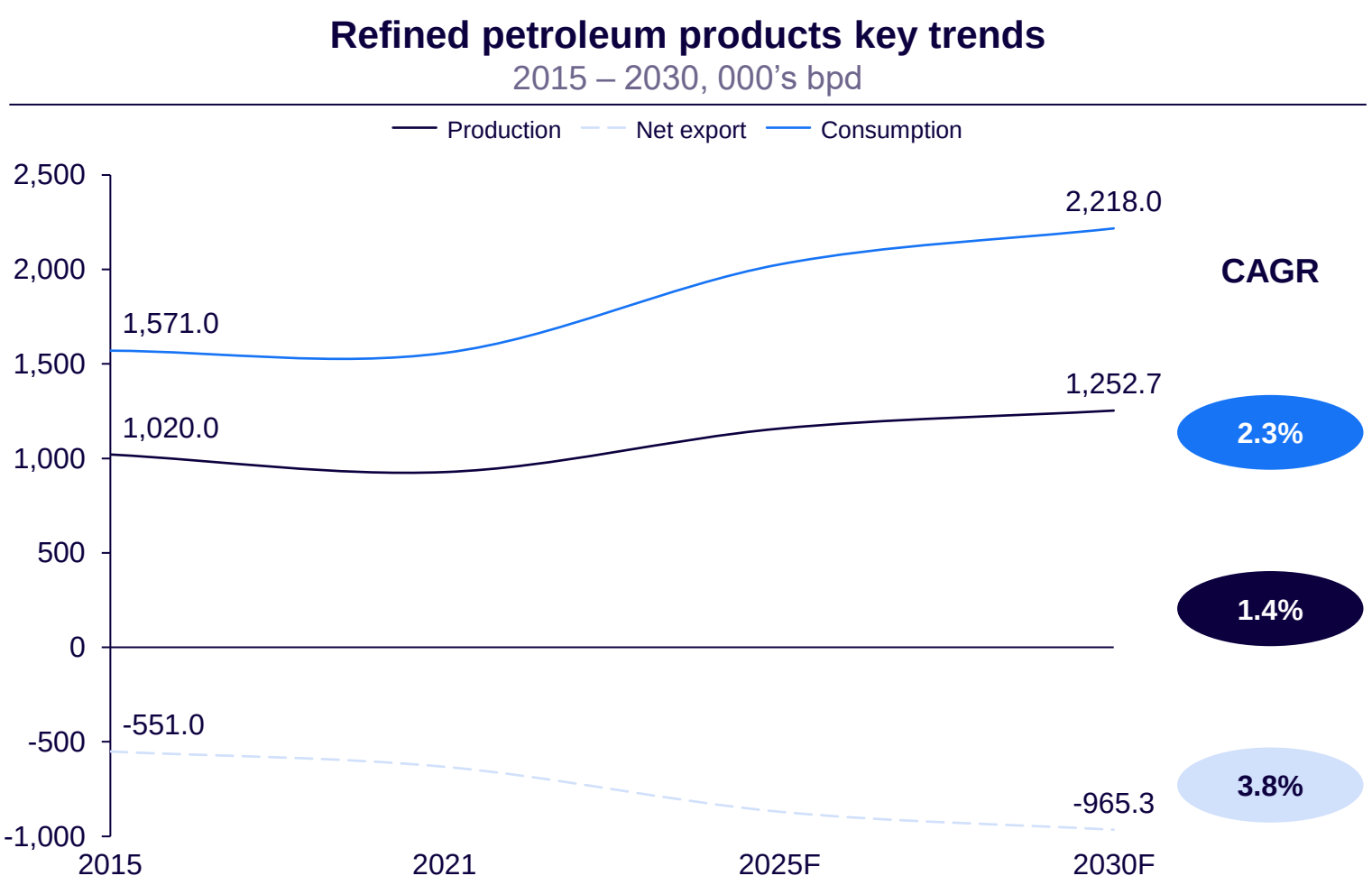


COMMENTS

- Indonesia was the 3rd largest producer of crude oil (behind China and India) in 2022 and is estimated to see growth of -0.6% YOY from 2015-2030 from 0.85mn bpd to 0.79mn bpd
- Most of the oil reserves that are in areas operated by PLN (which accounts for 47% of Indonesia's production) are in mature fields and require enhanced oil recovery (EOR) technology
- Currently a domestic market obligation (DMO) of 25% acts as a production floor to offset rising oil imports and serve domestic needs

Note: The negative net export refers to import greater than export
Source: Fitch Solutions 2023, International Energy Agency 2023, Lexology 2023, Arthur D. Little analysis

消費量が石油精製品の需要が増加しており、合わせて輸入量も 3.8%と同様に増加傾向

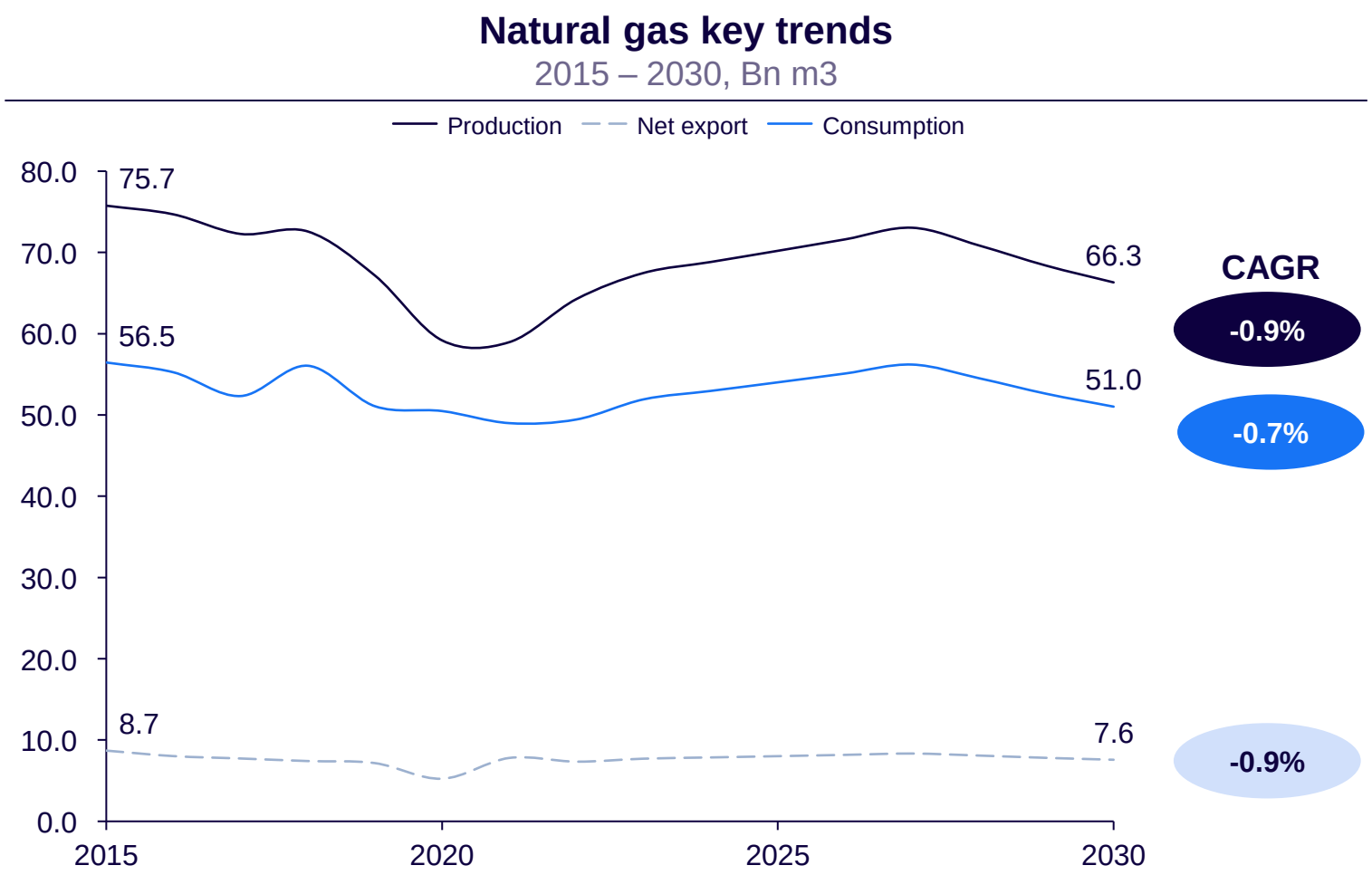


COMMENTS

- There is a general increase in demand for refined petroleum products, domestic consumption seeing an increase of 2.3% YOY, and net exports seeing a growth of 3.8%, fast outpacing production growth of 1.4% from 2015-2030
- In 2021, Indonesia exported $1.88bn in Refined Petroleum, making it the 42nd largest exporter of Refined Petroleum in the world.
- For production, gasoline RON 88, RON 90 (21%) and Gasoil CN48 (44%) account for ~65% of all production in 2021 and have generally maintained this mix from 2011-2021
- Current refineries are spread out across 8 locations with a processing capacity of 1151mn bpd

Note: The negative net export refers to import greater than export
Source: Fitch Solutions 2023, Arthur D. Little analysis

天然ガス生産、消費共に減少傾向

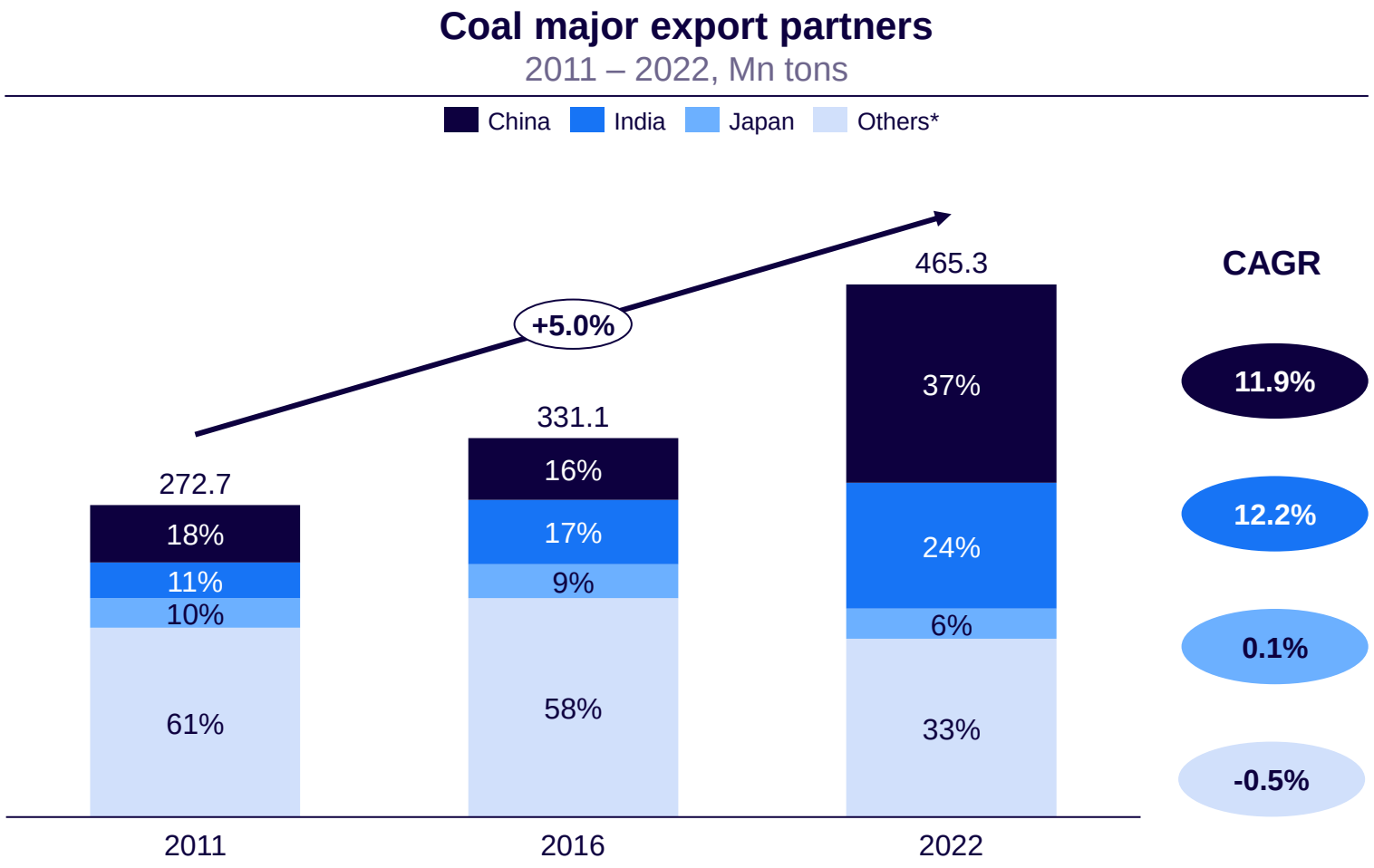


COMMENTS

- The failure of projects like cross-country small-scale gas-to-power network has led to imports exceeding exporting as seen from a 4.0% YOY growth of net exports from 2015-2030
- Indonesia contains the third-largest gas reserves of the Asia Pacific region (after Australia and China), with the largest in Arun, Bontang, Tangguh and Natuna Island,

Note: The positive net export refers to export greater than import
Source:Indonesia Ministry of energy

インドネシアからの石炭輸出のうち37%は中国向けであり、最大の輸出先



COMMENTS

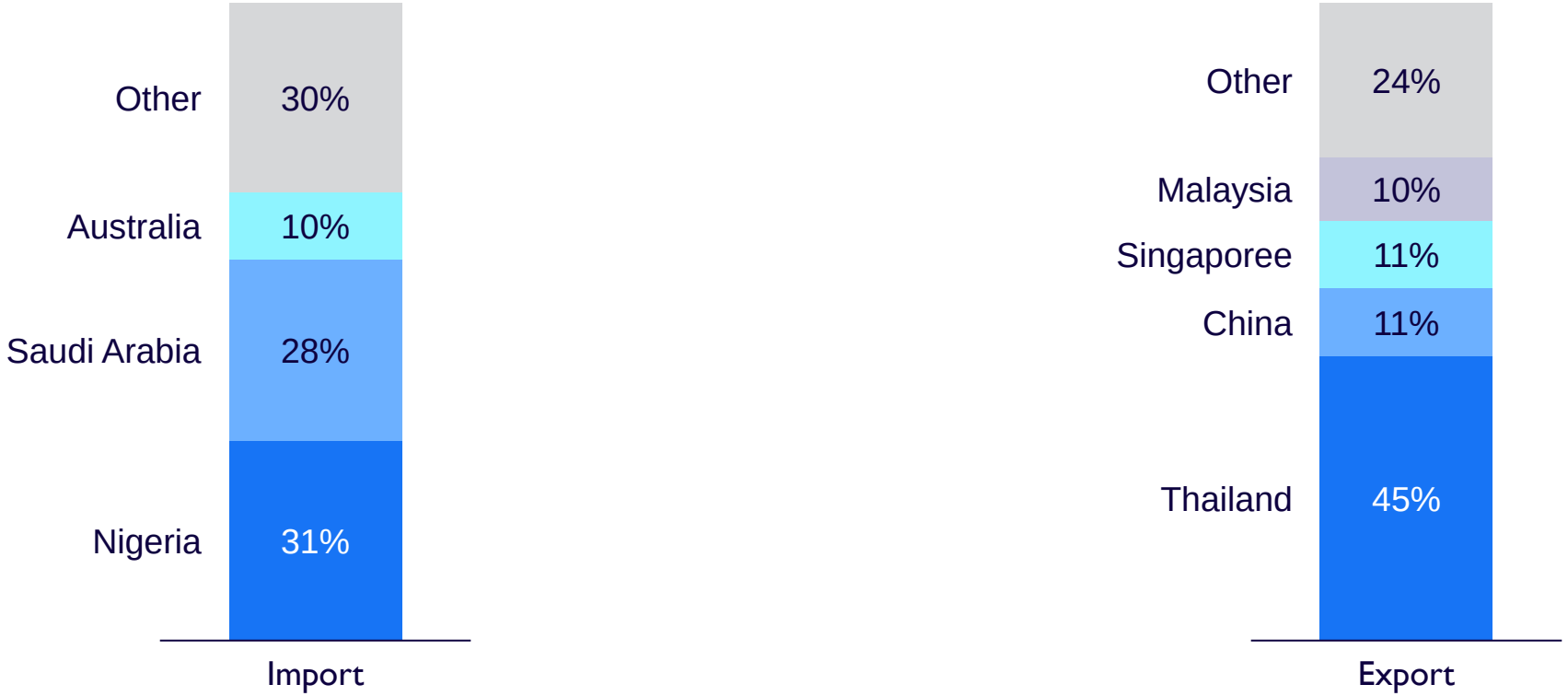
- Indonesia's coal exports have seen a growth of 5.0% over the past decade, rising from 273 bn tons 2011 to 465 bn tons in 2022
- China, India and Japan account for the bulk of coal exports in 2022 at 66.5%, however, Philippines comes in at 6.6% in 2022.due to high prices in Vietnam
  - PH imported 15.5/42.5 mn tons of coal from ID in 2022
- The overall export increase was largely driven by demand from China at 11.9% growth YOY, stemming from expansion of industries and growth of the economy
- Likewise, we see increased growth in demand from India at 12.2% YOY
- Due to national policies on sustainability and emission goals, there has been a decrease in demand from Japan, seeing a drop of 0.1% YOY, similarly, this could be said of the Others category as well which is comprised of SEA, East Asia and European countries

Note: *Inclusive of countries lesser than 10% share incl. SK, TW, HK, MY, SP, TH, PH, etc (undefined)
Source: MEMR Statistical Handbook 2022, Reuters 2022, Arthur D. Little analysis

石油は中東、アフリカを中心に輸入しており、一部タイなどにも輸出している

Crude oil major export partners
2021, B USD

HS code: 2709 Crude petroleum oils



Note: *Inclusive of US, TW, Others (undefined)
Source: The Atlats Growth Lab

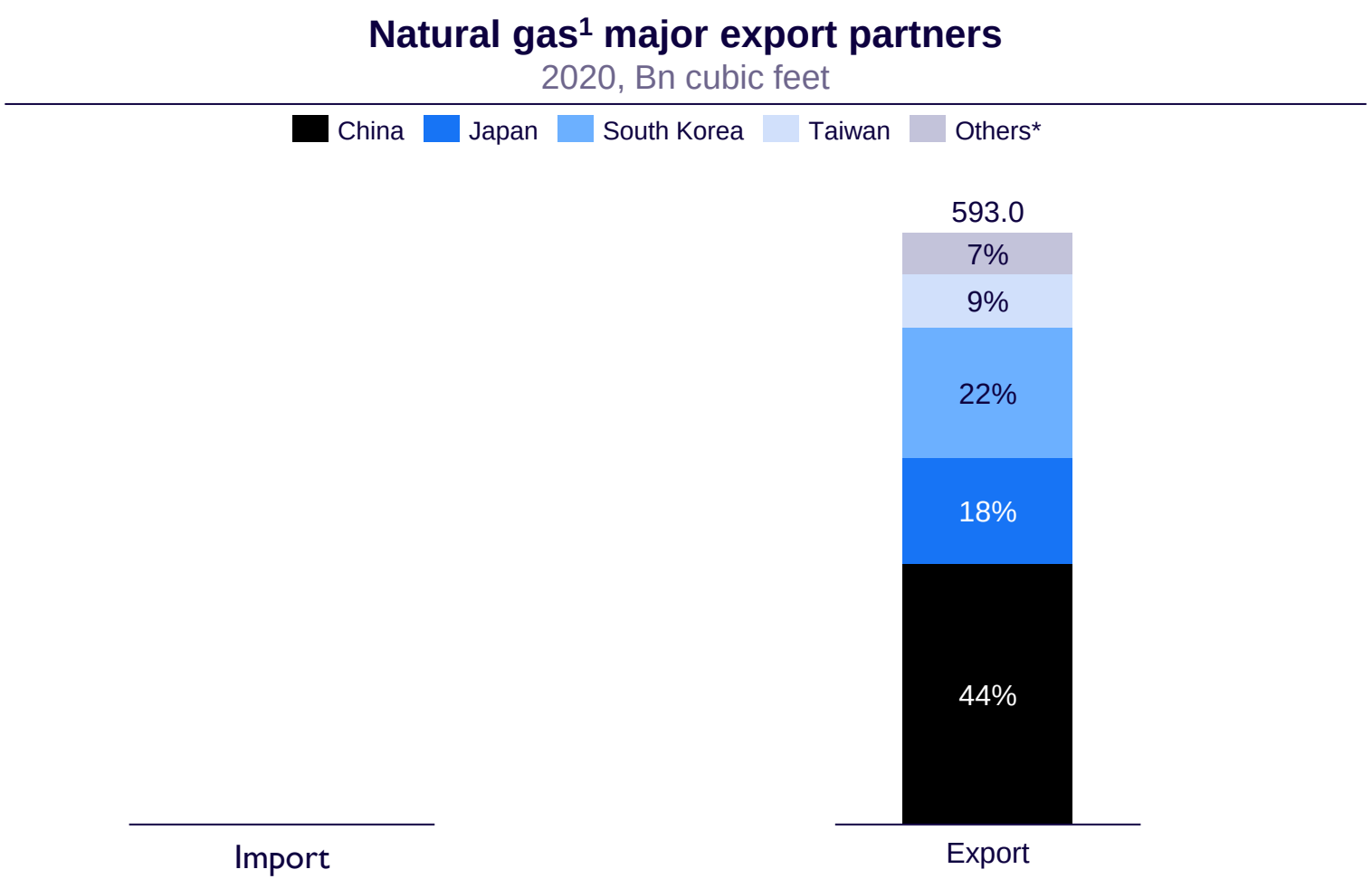
石油精製品はシンガポールやマレーシアが主な貿易相手

Refined Petroleum products import and export partners
2021, B USD

HS code: 2710 Petroleum Oils,refined

Note: *Inclusive of US, TW, Others (undefined)
Source: The Atlats Growth Lab

天然ガスは、中国への輸出が中心



COMMENTS

- DMO requires 25% of natural gas output to meet domestic supply
- PGN controls 93% of all national downstream infrastructure, >6,318 miles of transmission and distribution pipelines
- In 2020, Indonesia was the 7th largest LNG exporter at ~593 bcf of LNG, largely to China (261 bcf), South Korea (130 bcf) and Japan (107 bcf)
- Indonesia has been largely losing market share to other LNG producers like Qatar, Malaysia, Australia, and the United States.
- 3 liquefaction plants have a combined capacity of 1 Tcf per tear
  - The Sengkang LNG Train 1 was operation in end 2021 adding 24 Bcf while the Tangguh LNG Trains 3 was 2022 adding 182 bcf of capacity
- Indonesia currently >400 bcf in regasification capacity and has the first LNG-topower floating storage and regasification unit (FSRU) that began operating in 2020
  - capacity of 494 thousand cf, and it is run by PT Sulawesi Regas Satu

Note: 1) LNG trade; *Others is undefined
Source: U.S. Energy Information Administration 2021, Arthur D. Little analysis

スマトラ州とカリマンタン州には大量の石炭があり、低コストであることから、インドネシアでは石炭が最も有力なエネルギー源となっている

Coal reserves in Indonesia

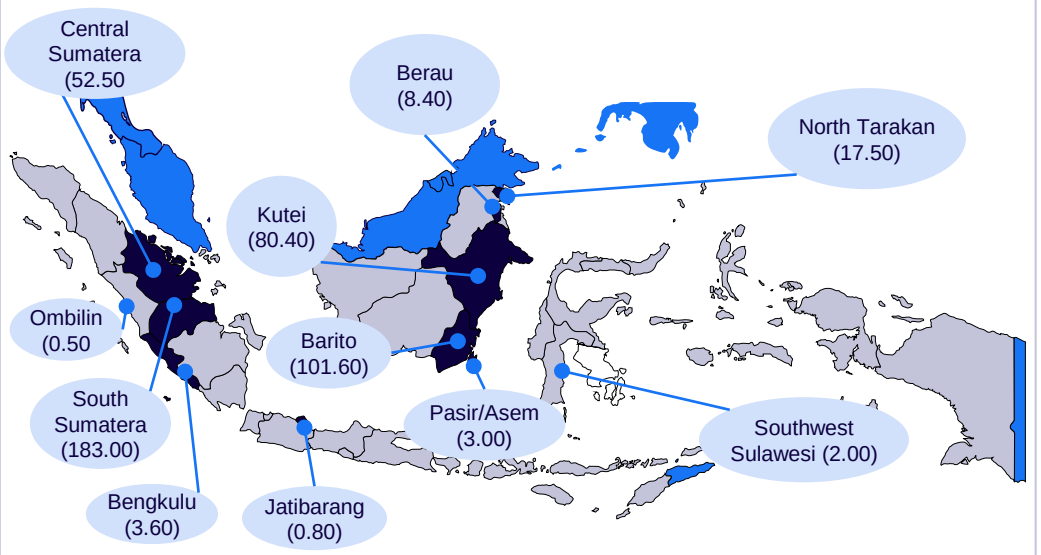
as of December 2022 (Million Ton)

Province	Exploration Target[1]	Total inventory[1]	Resources[1] Inferred	Indicated	Measured	Total	Verified Resources[2]	Reserves[1]	Verified Reserves[2]
Banton	5.47	52.18	0	0	0	0	0	0	0
Central Java	0	0.82	0	0	0	0	0	0	0
East Java	0	0.08	0	0	0	0	0	0	0
Aceh	1.16	87.83	275.46	421.87	325.59	1,022.93	803.79	539.34	428.65
North Sumatera	0	14.62	10.24	8.48	7.55	26.26	0	7.12	0
Riau	36.1	412.05	150.47	502.59	293.51	946.57	901.98	407.82	382.82
West Sumatera	1.19	318.34	35.95	15.21	35.69	86.85	50.82	29.75	8.99
Jambi	142.37	1,704.89	1,153.56	1,157.47	1,865.32	4,176.35	3,476.16	1682.26	1,538.72
Bengkulu	36.86	210.61	139.54	111.54	167.92	418.99	370.78	124.76	102.64
South Sumatera	4,885.39	10,749.68	7,384.14	9,311.68	8,163.14	24,858.95	22,473.01	9,808.30	9,345.57
Lampung	0	106.95	149.6	134.2	29.6	313.4	313.4	109.8	109.8
West Kalimantan	2.26	463.44	0.98	0.48	0	1.46	1.46	0.43	0.43
Central Kalimantan	31.34	3,069.97	4,270.55	3,281.68	3,215.52	10767.75	8,757.41	2,929.52	2,434.38
South Kalimantan	7.83	1343.64	3,663.23	4,032.61	7,351.49	15,047.33	14,224.16	4,780.40	4,579.45
East Kalimantan	890.55	15,724	8,487.92	12,942.97	17,560.83	38,991.71	38,272.00	13,701.52	13,528.95
North Kalimantan	25.79	333.32	848.12	792.23	872.35	2512.7	2,472.19	919.40	903.89
West Sulawesi	13.79	25.74	3.02	1.84	0.72	5.57	5.57	1.77	1.77
South Sulawesi	11.46	26.26	0	0	1.8	1.8	1.8	1.26	1.26
Southeast Sulawesi	0.52	1.98	0	0	0	0	0	0	0
Central Sulawesi	0.64	0	0	0	0	0	0	0	0
North Maluku	8.22	0	0	0	0	0	0	0	0
West Papua	93.66	32.82	4.31	6.24	3.94	14.49	14.49	10.63	10.63
Papua	7.2	31.36	0	0	0	0	0	0	0
TOTAL	6,201.80	34,711.03	26,577.09	32,721.09	39,894.97	99,193.11	92,139.02	35,054.08	33,377.95

Coal will remain the main fuel used for power generation due to its low price and abundant availability in Indonesia, with estimated resources of ~144 bn tons while actual coal reserves were ~39bn tons in a 2019 survey

Coal bed methane

- CBM reserves are estimated to be larger than conventional gas reserves, esp. in the South Sumatra (183 TCF) and Kutai Basins
- Currently PLN is working together with Exxonmobil on development of CBM in S. Kalimantan for electricity



Total Resources = 453.30 TCF

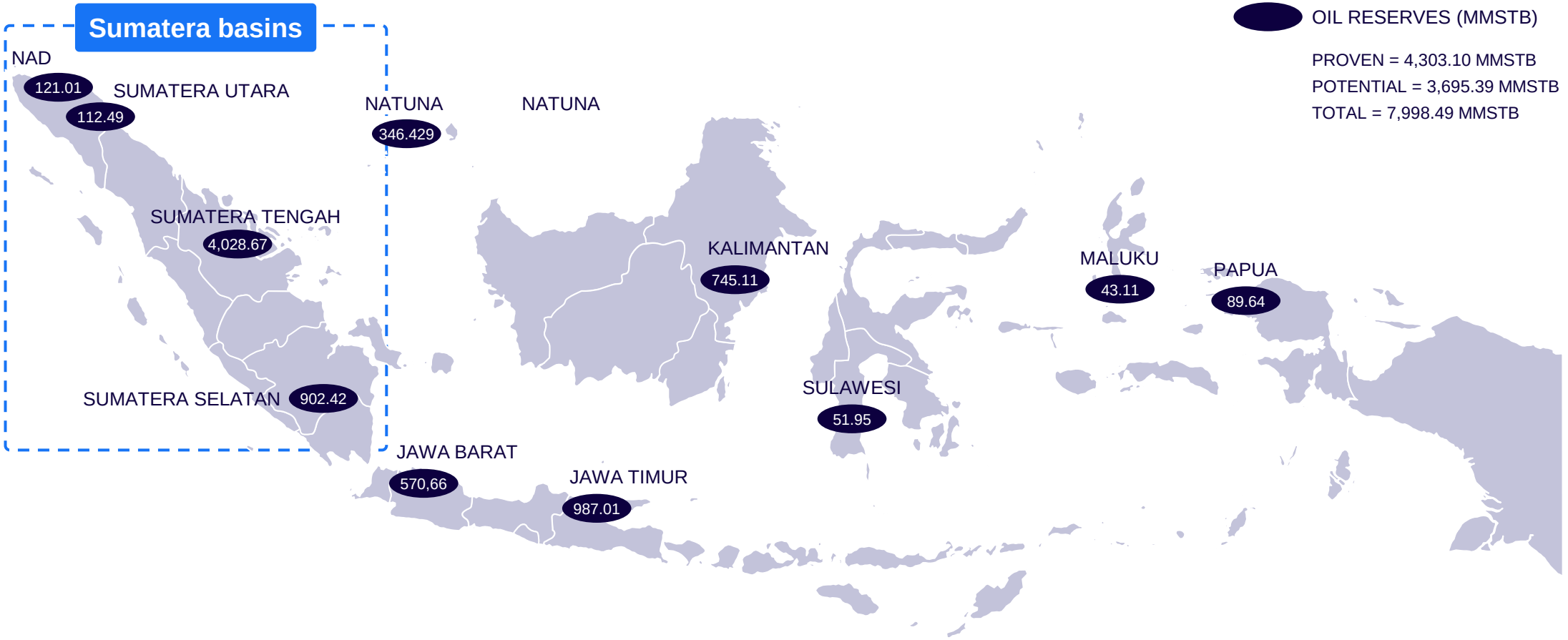
Source: MEMR Statistical Handbook 2022, Nomura Indonesia 2017, Arthur D. Little analysis

Coal bed methane list

No.	Basin	Province	Target Formation	Coal Thickness (m)	Coal Rank (Ro%)	Average Depth (m)	High Graded Area (km^2)	Completable (Tcf)	Concentration (Bcf/mi^2)
1	S. Sumatra	S. Sumatra	M.Enim	37	0.47	762	7,350	183	25
2	Barito	S. Kalimantan	Warukin	28	0.45	915	6,330	102	16
3	Kutei	E. Kalimantan	Prangat	21	0.50	915	6,100	80	13
4	C. Sumatra	Riau	Petani	15	0.40	762	5,150	53	10
5	N. Tarakan	E. Kalimantan	Tabul	15	0.45	701	2,734	18	6
6	Berau	E. Kalimantan	Latih	24	0.45	671	780	8.4	11
7	Ombilin	W. Sumatra	Sawaht	24	0.80	762	47	0.5	11
8	Pasir/Asem	S. Kalimantan	Warukin	15	0.45	701	385	3.0	8
9	NW Java	W. Java	T.Akar	6	0.70	1,524	100	0.8	8
10	Sulawesi	S. Sulawesi	Toraja	6	0.55	610	500	2.0	4
11	Bengkulu	Bengkulu	Lemau	12	0.40	610	772	3.6	5
	Total						**30,248**	**453**	**15**

Source: Stevens, S. "Indonesia Coalbed Methane Indicators and Basin Evaluation", presented at SPE Asia Pacific Oil and Gas Conference and Exhibit, Perth, Australia, 18-20 October, 2004, SPE 88630, Advanced Resources International, Inc. on behalf of Hadiyanto, Indonesian Ministry of Energy and Mineral Resources, Directorate General of Geology and Mineral Resources.

Like coal, oil reserves are largely located in the Sumatra province



Source: Indonesian Petroleum Association 2009, Oil & gas journal 2012, PricewaterhouseCooper 2012, Arthur D. Little analysis

List of major oil & gas fields currently in operation in Indonesia (1/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
		(75%)				
Block B	North Belut	Medco Energi (75%), Chevron (25%)	Production	33,000	3.2	Gas & Condensate
Block B	Bawal	Chevron (25%), Medco Energi (75%)	Production			Gas
Block B	South Belut	Chevron (25%), Medco Energi (75%)	Production		1.2	Gas
Block B, Aceh Province	Arun	ExxonMobil (100%)	Production	130,000	34	Gas & Condensate
Block Cepu	Banyu Urip	Badan Kerja Sama Blok Cepu (10%), ExxonMobil (45%), Pertamina (45%)	Production	201,000		Oil
Block Jabung, Jambi	North Geragai, Makmur, North Betara, Northeast Betara and Gemah	China National Petroleum, Corporation (CNPC) (27.86%), PP Oil & Gas (30%), Petronas, (27.86%), Pertamina (14.28%)	Production	50,000		Oil & Gas
Block Jambi Merang	Sungai Kenawang, Pulau Gading, Gelam	Repsol (25%), Pertamina (50%), Pacific Oil & Gas (25%)	Production			Gas & Condensate
Block Kakap	KH, KRA, Jangkar, South KRA, KF	Star Energy Indonesia (56.25%), Singapore Petroleum Company (15%), Pertamina (10%), Premier Oil (18.75%)	Production	7,500	0.6	Oil & Gas
Block Kepala Burung	Klalin	China National Petroleum Corporation (30%), RH Petrogas Production (60%), Pertamina (10%)	Production			Oil & Gas
Block Lematang	Singa	Medco Energi (100%)	Production		0.5	Gas

Source: Fitch Solutions 2023

List of major oil & gas fields currently in operation in Indonesia (2/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Block Makassar Strait, Kutei Basin	West Seno	Chevron (90%), Pertamina (10%)	Production	60,000	1.5	Oil & Gas
Block Ogan Komering	Air Serdang, Guruh, Mandala	Pertamina (100%)	Production	8,300		Oil
Block Raja and Pendopo (King and Pendopo)	Air Hitam, Tanjung Kurung, and Tempira	Golden Spike Indonesia (50%), Pertamina (50%)	Production			Oil & Gas
Block Salawati Kepala Burung	Block Salawati, Kepala Burung	China National Petroleum Corporation (16.8%), RH Petrogas (33.2%), Pertamina (50%)	Production			Oil
Block Sampang, East Java Basin	Oyong, Wortel, Paus Biru	Ophir Energy (45%), Cue Energy (15%), Singapore Petroleum Company (40%)	Production		0.9	Gas
Bangko Block, South Sumatera	Gambang, West Piano, Kenong	China National Petroleum Corporation (100%)	Production			Oil & Gas
Block B	Belida	Chevron (25%), Medco Energi (75%)	Production	130,000		Oil
Block B	Belanak	Chevron (25%), Medco Energi (75%)	Production	50,000		Oil, Gas & Condensate
Block B	Hiu	Chevron (25%), Medco Energi (75%)	Production			Gas
Block B	Kerisi	Chevron (25%), MedcoEnergi	Production			Oil & Gas
Block South Sumatera	Block South Sumatera	Medco Energi (100%)	Production	8,000	1.3	Oil & Gas
Block Tarakan	Block Tarakan	MedcoEnergi (100%)	Production			Oil & Gas

Source: Fitch Solutions 2023

List of major oil & gas fields currently in operation in Indonesia (3/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Block Tengah, Block Mahakam	Sisi, Nubi	Pertamina (4.2%), Inpex Corporation (47.9%), Total (47.9%)	Production		3.5	Gas
Block Tuban, East Java	Mudi, Sukowati	Corporation (25%), Pertamina (75%)	Production	60,000		Oil & Gas
Brantas PSC	Wunut, Carat, Tanggulangin	Energi Mega Persada (50%), Prakarsa Transforma Indonesia (32%), Santos (18%)	Production			Gas
Corridor PSC	Corridor PSC	Repsol (36%), ConocoPhillips (54%), Pertamina (10%)	Production	48,000	8.1	Oil & Gas
Indonesia Deep Water Development	Bangka	Tip-Top Oil & Gas (18%), Eni (20%), Chevron (62%)	Production		1.1	Gas & Condensate
Jangkrik Complex, Muara Bakau Block, Kutei Basin	Jangkrik, Jangkrik North East	Saka Energi (11.7%), Engie (33.3%), Eni (55.0%)	Production		4.5	Gas & Condensate
Kangean PSC, East Java	Ngimbang, Rancak, Sepanjang, North Pagerungan, West Kangean, Terang, Sirasun, Batur	Japan Petroleum Exploration (25%), Mitsubishi Corporation (25%), Energi Mega Persada (50%)	Production	38,000		Oil & Gas
Kangean PSC, East Java	Terang, Sirasun, Batur	Japan Petroleum Exploration (25%), Energi Mega Persada (50%), Mitsubishi Corporation (25%)	Production		3	Gas
Ketapang Block	Bukit Tua	Perusahaan Gas Negara (20%), Petronas (80%)	Production	20,000	0.5	Oil & Gas
Korinci Baru PSC	Baru, West Baru	Energi Mega Persada (100%)	Production			Gas

Source: Fitch Solutions 2023

List of major oil & gas fields currently in operation in Indonesia (4/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Madura Block, East Java Basin	MDA, BD, MBH, MDK, MAC, MAX, MBJ, MBF	Samudra Energy (20%), China National Offshore Oil Corporation (40%), Husky Energy (40%)	Production	6,000	2.5	Gas & Condensate
Madura Offshore PSC	Maleo, Peluang	Petrogas Pantai Madura (10.0%), PC Madura (22.5%), Santos (67.5%)	Production		1.1	Gas
Mahakam Block	Peciko	Inpex Corporation (50%), Total (50%)	Production		13	Gas & Condensate
Mahakam Block	Bekapal	Inpex Corporation (50%), Total (50%)	Production	60,000	1	Oil & Gas
Mahakam Block	Handil	Inpex Corporation (50%), Total (50%)	Production	180,000		Oil
Mahakam Block	Tunu	Inpex Corporation (50%), Total (50%)	Production		180	Gas & Condensate
Mahakam Block	Tambora	Inpex Corporation (50%). Total (50%)	Production		3	Gas & Condensate
Malacca Strait PSC	Kuat, Lalang, Kurau, Ponder, Melibur Selatan, Mengkapan	China National Offshore Oil Corporation (39.51%), Energi Mega Persada (60.49%)	Production	7,000		Oil & Gas
Matindok, Banggal Basin	Donggi, Matindok Sukamaju, Maleo Raja and Minahaki	Pertamina (100%)	Production		1	Gas
Muriah Block	Kepodang	Saka Energi (20%), Petronas (80%)	Production		1.2	Gas

Source: Fitch Solutions 2023

List of major oil & gas fields currently in operation in Indonesia (5/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Natuna Block A PSC	Gajah Baru	Kuwait Foreign Petroleum Exploration Company (33.33%). Premier Oil (28.67%), Petronas (15%), PTT Exploration and Production (11.5%), Pertamina (11.5%)	Production		1.4	Gas
Natuna Block A PSC	Anoa	PTT Exploration and Production(11,5%), Pertamina Natuna Block A PSC Anoa (11.5%), Kuwait Foreign Petroleum Exploration Company (33.3%), Petronas (15.0%), Premier Oil (28.7%)	Production	25,000		Oil & Gas
Natuna Block A PSC	Naga	Pertamina (11.590, PTT Exploration and Production (11.5%), Kuwait Foreign Petroleum Exploration Company (33.3%), Petronas (15.0%), Premier Oil (28.7%)	Production			Gas
Natuna Block A PSC	Pelikan	Pertamina (11.5%), PTT Exploration and Production (11.5%), Kuwait Foreign Petroleum Exploration Company (33.3%), Petronas (15.0%), Premier Oil (28.7%)	Production			Gas
North Sumatra Offshore Block	North Sumatra Offshore Block	Pertamina (100%)	Production		4	Gas
Paku Gajah	Paku Gajah	Pertamina	Production		0.5	Oil & Gas
Pangkah PSC	Ujung Pangkah. Sidayu	Saka Energi (100%)	Production	25,000	1.5	Oil & Gas
Pase PSC, Aceh Province	Pase PSC	Enso Asia (100%)	Production		1.4	Gas

Source: Fitch Solutions 2023

List of major oil & gas fields currently in operation in Indonesia (6/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Rokan PSC	Rokan PSC	Chevron (100%)	Production	213,550		Oil & Gas
Sanga Sanga Block, Kutei Basin	Badak, Mutiara, Semberah, Nilam, Paraguan, Lampake and Beras	Karunia Utama Perdana (13.7%) Opicoil (8.78%), Pertamina (67.5%)	Production			Oil
Sanga Sanga CBM Block, Kutel Basin	Sanga Sanga CBM Block	Universe Gas and Oil (4.4%), BP (37.8%), Eni (37.8%), Opicoil (20.0%)	Production		4.2	CBM
Sebuku PSC	Ruby	Mubadala Petroleum (70%), Inpex Corporation (15%), Total (15%)	Production		1	Gas
Sengkang PSC	Kampung Baru, Wasambo (Walanga. Sampi Sampi, Bonge)	Energy World Corporation (100%)	Production			Gas
Senoro-Tolli PSC	Senoro, Tiaka, Cendanapura, Toili	Tomori E&P (20%), Pertamina (50%), MedcoEnergi (30%)	Production	8,000	3.1	Oil, Gas & Condensate
Seram PSC (Non-Bula) Seram Basin	Oseil, Lofin, Nief Utara	Lion Oil Company (2.5%), Gulf Petroleum Investment (16.5%), Kuwait Foreign Petroleum Exploration (30.0%), CITIC Group (51.0%)	Production	35,000		Oil & Gas
South Mahakam	Stupa, West Stupa, East Mandu Jempang Metulang	Total (50%), Inpex Corporation (50%)	Production	14,000	3.3	Gas & Condensate
Southeast Sumatra PSC	Southeast Sumatra PSC	Pertamina (20.5%), Saka Energi (8.91%), China National Offshore Oil Corporation (65.5%), Kuwait Foreign Petroleum Exploration (5.0%)	Production	200,000		Oil & Gas

Source: Fitch Solutions 2023

List of major oil & gas fields currently in operation in Indonesia (7/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Tangguh	Berau, Muturi, Wiriagar	Repsol (3.06%), BP (37.16%), China National Offshore Oil (13.9%), Nippon Oil (12.23%), LNG Japan (7.35%), KG Berau/ KG Wiriagar Petroleum (10%), MI Berau (16.3%)	Production			Gas
Una Dos Rayu K50	Uno, Dos Rayu	Indrilico (50%), Samudra Energy	Production			Oil & Gas
Merakes Field	Merakes Field	TotalEnergies	Production		4.62	Gas
Hiu Phase 2	Hiu Phase 2	Medco E&P Natuna	Production		0.50	Gas
Belida Extension	Belida Extension	Medco E&P Natuna	Production		0.41	Gas
Baru Gas Plant Modification to Tenayan PLN	Baru Gas Plant Modification to Tenayan PLN	EMP Bentu Ltd	Production		0.31	Gas
JOB PMEPS	JOB PMEPS	OPL South Sembakung	Production		0.31	Gas
Jumelai	Jumelai	Pertamina Hulu Mahakam	Production		0.41	Gas
North Sisi North Nubi	North Sisi North Nubi	Pertamina Hulu Mahakam	Production		0.92	Gas
Bekapai 3	Bekapai 3	Pertamina Hulu Mahakam	Production		0.28	Gas
MDA MBH	MDA MBH	Husky CNOOC Madura Ltd	Production		1.08	Gas

Source: Fitch Solutions 2023

List of major oil & gas fields currently in operation in Indonesia (8/8)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
MAC	MAC	Husky CNOOC Madura Ltd	Production		0.56	Gas
Bukit Tua Phase-2B Project	Bukit Tua Phase-2B Project	Petronas Carigali Ketapang II Ltd	Production		0.31	Gas
Jambaran Tiung Biru	Jambaran Tiung Biru	Pertamina	Production		1.95	Gas
Tangguh T3	Tangguh T3	BP	Production		7.19	Gas
Merakes East Field	Merakes East Field	TotalEnergies	Production		4.52	Gas
Tuna Gas Field	Tuna Gas Field	Pertamina	Production		1.18	Gas

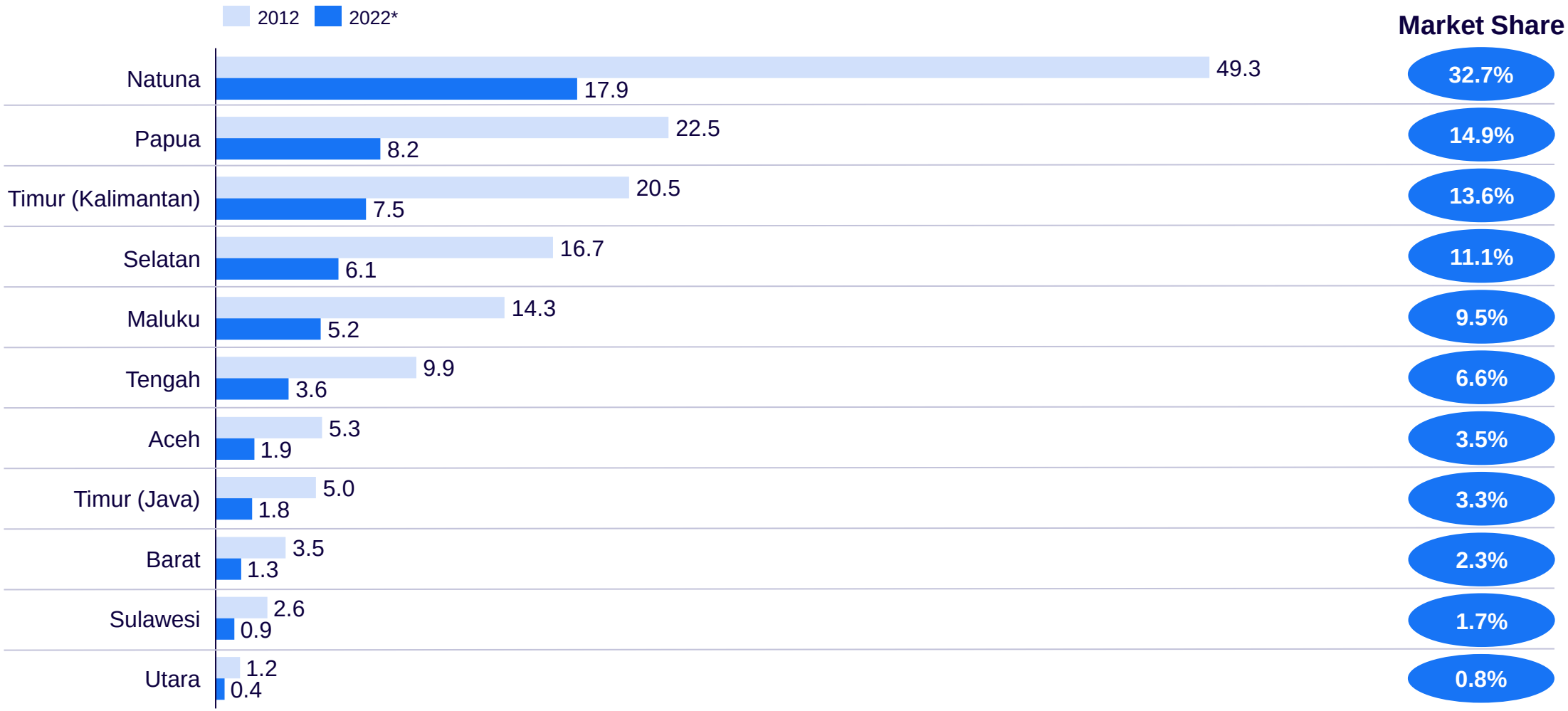
Source: Fitch Solutions 2023

天然ガス埋蔵量は以下

Natural gas reserves, by region, TSCF			
	2012	2022*	% share
Natuna	49.28	17.93	32.70%
Papua	22.45	8.17	14.90%
Timur (Kalimantan)	20.50	7.46	13.60%
Selatan	16.73	6.09	11.10%
Maluku	14.32	5.21	9.50%
Tengah	9.95	3.62	6.60%
Aceh	5.27	1.92	3.50%
Timur (Java)	4.97	1.81	3.30%
Barat	3.47	1.26	2.30%
Sulawesi	2.56	0.93	1.70%
Utara	1.21	0.44	0.80%

Note: *Assuming regions identified in 2012 retain similar quantity and no new basins of substantial amounts were found in the period 2012 – 2021, also excl. the gas reserve found in 2022 in Aceh
Source: Indonesia Ministry of Energy and Mineral Resources 2022

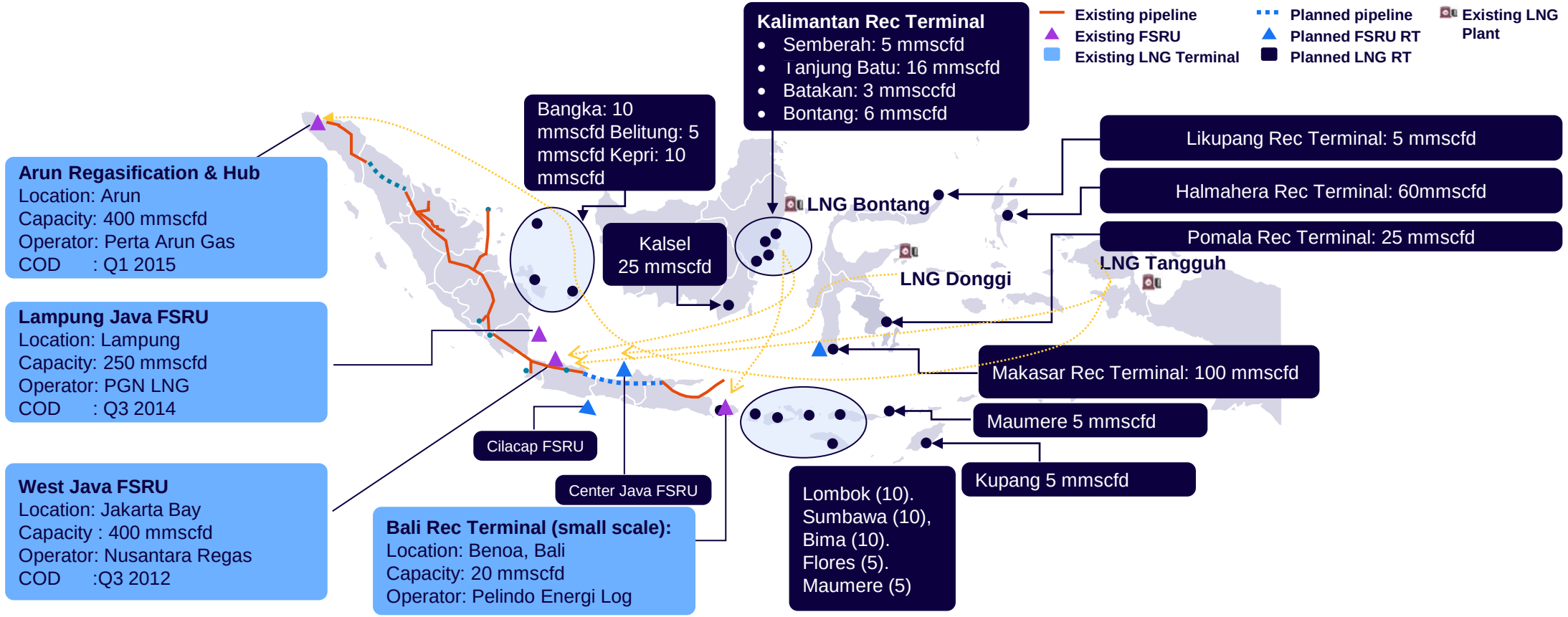
天然ガス埋蔵量は以下



Note: *Assuming regions identified in 2012 retain similar quantity and no new basins of substantial amounts were found in the period 2012 – 2022, also excl. the gas reserve found in 2022 in Aceh
Source: Indonesia Ministry of Energy and Mineral Resources 2022, Arthur D. Little analysis

LNG基地は、天然ガス埋蔵地域近郊に基本的には所在

LNG plants and terminals



Source: Natural Gas World

List of main oil & gas fields in the pipeline – (1/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Ande Ande Lumut, West Natuna Basin	Ande Ande Lumut	Santos (50%), AWE (50%	Appraisal	25,000		Oil
Bengara II Block	Seberaba	GeoPetro Resources (12%), Continental Engineering Corporation (18%), China National Petroleum Corporation (70%)	Appraisal			Oil & Gas
Block Bengara	South Sebuku	MedcoEnergi (100%)	Appraisal			Gas
Block East Ambalat	Block East Ambalat	Pertamina (100%)	Appraisal	40,000		Oil & Gas
Block Kampar	Block Kampar	Pertamina (100%)	Appraisal			Oil
Block MNK Sumbagut	Block MNK Sumbagut	Pertamina (100%)	Appraisal		1	Shale Gas
Block Sampang, East Java Basin	Jeruk	Ophir Energy (45%), Cue Energy (8.2%), Singapore Petroleum Company (21.8%)	Appraisal			Oil
Block Sangatta I, East Kalimantan	Block Sangatta I (Sangatta West)	Ephindo (48%), Pertamina (52%)	Appraisal			CBM
Block Sangatta II, East Kalimantan	Block Sangatta II	Visi Multi Artha (60%), Pertamina (40%)	Appraisal			CBM
Block Tanjung Enim, South Sumatera	Block Tanjung Enim	NuEnergy Gas (45%), Bukit Asam (27.5%), Pertamina (27.5%)	Appraisal			CBM
Bulu PSC	Lengo	HyOil (42.5%), Satria (15%), KrisEnergy (42.5%)	Appraisal		0.7	Gas
Central Mahakam Block, Kutai Basin	Central Mahakam Block	Percie Mahakam Petroleum	Appraisal			Oil & Gas

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (2/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
East Natuna Block, Riau Islands	East Natuna Block (Natuna D Alpha)	Exploration and Production (15%), Pertamina (35%)	Appraisal		40	Gas
East Sepinggan Block, Kutei Basin	Merakes	Pertamina (15%), Eni (85%)	Appraisal			Gas
Indonesia Deep Water Development	Gendalo - Gehem	Eni (20%), Chevron (63%)	Appraisal	47,000	11	Gas & Condensate
Kutai West PSC	Kutai West PSC	CBM Asia (18%), Ephindo (27%), Newton Energy (55%)	Appraisal			Gas
Lemang Block	Selong	Mandala Energy (35%), Sugih Energy (34%), Ramba Energy (31%)	Appraisal			Oil & Gas
Mahakam Hilir PSC	Sambutan, Naga Utara	Cue Energy (100%)	Appraisal			Oil & Gas
Masela Block	Abadi (Masela)	Shell (35%), Inpex Corporation (65%)	Appraisal			Gas
North Sokang PSC	Dara	Black Platinum Energy (100%)	Appraisal		1.1	Gas
Nunukan PSC, Tarakan Basin	Badik, West Badik	Videocon Group (23.0%) Pertamina (64.5%), Bharat Petroleum Corporation (12.5%)	Appraisal		0.6	Oil & Gas
South Sesulu PSC, Kutei Basin	South Sesulu PSC	Saka Energi (100%)	Appraisal			Gas
Tabulako PSC	Tabulako PSC	Bumi Resources (30%), Energi Mega Persada (70%)	Appraisal			CBM

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (3/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Block A Aceh, North Sumatra Basin	Alur Rambong, Alur Siwah, Julu Rayeu, Matang	KrisEnergy (15%), MedcoEnergi (85%	Development			Gas & Condensate
Block Cepu	Jambaran-Tiung Biru	Government of Central Java (9.2%), Pertamina (90.8%)	Development		3.3	Gas & Condensate
Block Kepala Burung PSC (Basin PSC)	North Klalin	China National Petroleum Corporation (30%), RH Petrogas (60%), Pertamina (10%)	Development			Oil & Gas
Krueng Mane Block	Jambu Aye Utara	Eni (100%)	Development		1.1	Oil & Gas
Lemang Block	Akatara	Mandala Energy (35%), Ramba Energy (31%), Sugih Energy (34%)	Development	10,000		Oil & Gas
Natuna Block A PSC	Bison	Pertamina (11.5%), PTT Exploration and Production (11.5%), Petronas (15.0%), Premier Oil (28.7%), Kuwait Foreign Petroleum Exploration Company (33.3%)	Development			Gas
Natuna Block A PSC	Iguana	Pertamina (11.5%), PTT Exploration and Production (11.5%), Petronas (15.0%) Premier Oil (28.7%), Kuwait Foreign Petroleum Exploration Company (33.3%)	Development			Gas
Natuna Block A PSC	Gajah Puteri	Pertamina (11.5%), PTT Exploration and Production (11.5%), Petronas (15.0%), Premier Oil (28.7%), Kuwait Foreign Petroleum Exploration Company (33.3%)	Development			Gas
Abar Block	Abar Block	Pertamina (100)%	Discovery			Gas

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (4/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Bunga Mas PSC, South Sumatra Basin	Bunga Mas PSC	Samudra Energy (49%), Asia Pacific Exploration Consolidated (51%)	Discovery			Oil & Gas
East Jabung PSC	East Jabung PSC	Repsol (51%), Pan Orient Energy (49%)	Discovery			Oil & Gas
Pabuaran Kerjasama Operasi Block	Pabuaran Kerjasama Operasi Block	Pertamina (5%), IEV Holdings (95%)	Discovery			Oil & Gas
South Block A	South Block A Kuda, Singa	Peak Oil And Gas (59.3%), Lion Energy (40.7%)	Discovery			Oil & Gas
Tuna Block	Kuda, Singa Laut	GS Energy (15%), Premier Oil (65%), Moeco Oil & Gas (20%)	Discovery			Gas
Bentu PSC	Seng, Segat	Energi Mega Persada (100%)	Expansion		1	Gas
Block West Madura	Block West Madura	Kodeco Energy (20%), Pertamina (80%)	Expansion	27,000	1.7	Oil & Gas
Offshore Northwest Java PSC	Offshore Northwest Java PSC	Energi Mega Persada (36.7%), Risco Energy Investments (5.0%), Pertamina (58.3%)	Expansion	175,000	2.3	Oil & Gas
Rokan PSC	Duri	Pertamina	Expansion	300,000		Oil
Anggursi Block	Anggursi Block	Pertamina (100%)	Expansion			Oil & Gas
Arguni PSC, Bintuni Basin	Arguni PSC	Eni (100%)	Expansion			Oil & Gas
Aru PSC	Aru PSC	Statoil (40%), Ophir Energy (60%)	Expansion			Oil & Gas

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (5/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Aru Trough I License	Aru Trough I License	Statoil (100%)	Exploration			Oil & Gas
Babar Selaru PSC	Babar Selaru PSC	Pertamina (15%), Inpex Corporation (85%)	Exploration			Oil & Gas
Bala-Balakang PSC (formerly Tanjung Aru)	Bala-Balakang PSC (formerly Tanjung Aru)	Mandala Energy (85%)	Exploration			Gas
Batanghari Block	Batanghari Block	China National Offshore Oil Corporation (100%)	Exploration			Oil & Gas
Block Air Benakat I	Block Air Benakat I	Pertamina (79.5%), Sugico (20.5%)	Exploration			CBM
Block Air Benakat II	Block Air Benakat II	Pertamina (69.7%), Sugico (30.3%)	Exploration			CBM
Block Air Benakat III	Block Air Benakat III	Pertamina (73.5%), Sugico (26.5%)	Exploration			CBM
Block Ambalat, East Kalimantan	Block Ambalat	Eni (66.25%), Pertamina (33.75%)	Exploration			Oil & Gas
Block Bangkanai	Kerendan	Ophir Energy (70%), Saka Energi (30%)	Exploration			Gas
Block Cendrawasih VII	Block Cendrawasih VII	Medco Energi (100%)	Exploration			Oil & Gas
Block Cendrawasih VIII	Block Cendrawasih VIII	Medco Energi (100%)	Exploration			Oil & Gas
Block Muara Enim	Block Muara Enim	NuEnergy Gas (40%), Pertamina (60%)	Exploration			CBM

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (6/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Block Muara Enim I	Block Muara Enim I	Pertamina (65%), Sugico (35%	Exploration			CBM
Block Muara Enim II	Block Muara Enim II	Sugico (30%), NuEnergy Gas (30%), Pertamina (40%)	Exploration			CBM
Block Muara Enim III	Block Muara Enim III	Pertamina (73%), Sugico (27%)	Exploration			CBM
Block Pulau Moa	Block Pulau Moa	Shell (100%)	Exploration			Oil & Gas
Block Randugunting, Central & East Java	Block Randugunting,	Pertamina (40%), Petronas (30%), PetroVietnam (30%)	Exploration			Oil & Gas
Block Semai I	Block Semai I	Murphy Oll (28.3%)	Exploration			Oil & Gas
Block Suban I	Block Suban I	Pertamina (58%)	Exploration			CBM
Block Suban II	Block Suban II	Pertamina (50%)	Exploration			CBM
Block Tanjung II, South Kalimantan	Block Tanjung II	Pertamina (100%)	Exploration			CBM
Block West Glagah Kambuna, North Sumatera	Block West Glagah Kambuna	Pertamina (40%)	Exploration			Oil & Gas
Block Wokam II	Block Wokam II	Saka Energi (100%)	Exploration			Gas
Bohorok PSC	Bohorok PSC	Blue Sky International (50%), Surya Buana Letarijaya (10%), New Zealand Oil & Gas (45%)	Exploration			Oil & Gas

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (7/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Bone PSC	Bone PSC	AziPac (100%)	Exploration			Oil & Gas
East Seruway PSC, North Sumatra Basin	East Seruway PSC	KrisEnergy (100%)	Exploration			Oil & Gas
Garung Block	Garung Block	Interra Resources (33.3%)	Exploration			Oil & Gas
Gurita PSC	Gurita PSC	Lundin Petroleum (90%), Nido Petroleum (10%)	Exploration			Oil & Gas
Halmahera-Kofiau PSC	Halmahera-Kofiau PSC	Tately NV (20%), Ophir Energy (80%)	Exploration			Oil & Gas
Icewine Development	Icewine Development	88 Energy (63.4%)	Exploration			Oil
Kofiau PSC	Kofiau PSC	Ophir Energy (100%)	Exploration			Oil & Gas
Kuala Kurun Block	Kuala Kurun Block	ConocoPhillips, Petronas	Exploration			Oil & Gas
Kutai II Block, East Kalimantan	Kutai II Block	RAIN Group (8%), Newton Energy (25%), Ephindo (67%)	Exploration			CBM
Kutai PSC	Kutai PSC	Orchid Kutai (22%), Ophir Energy (23.4%)	Exploration			Oil & Gas
Kutai Timur Block, East Kalimantan	Kutai Timur Block	Ephindo (100%)	Exploration			CBM
Mahato PSC	Mahato PSC	Cue Energy (12.5%), Arrow Energy (20.0%), Black Diamond Energy (67.5%)	Exploration			Oil & Gas
Mangkalihat PSC	Mangkalihat PSC	Samudra Energy (100%)	Exploration			Oil & Gas

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (8/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Merangin Ill PSC, South Sumatra Basin	Merangin III PSC	Mandala Energy (100%)	Exploration			Oil & Gas
North East Bangkanai PSC, Greater Kerendan	North East Bangkanai PSC	Ophir Energy (100%)	Exploration			Gas
North Ganal PSC, Kutai basin	North Ganal PSC	Ophir Energy (18.5%), Eni (24.5%), Statoil (26%), Black Platinum Energy (18.5%), Engie (12.5%)	Exploration			Gas
North Madura Il Block	North Madura II	Petronas (100%)	Exploration			Oil & Gas
North Madura PSC	North Madura PSC	AziPac (100%)	Exploration			Oil & Gas
Palmerah Baru Block	Palmerah Baru Block	Blue Sky International (54%), Sarana Niaga Petrogas (10%), New Zealand Oil & Gas (36%)	Exploration			Oil & Gas
Rombebai PSC	Rombebai PSC	AED Oil (100%)	Exploration			Oil & Gas
Sakakemang Block	Sakakemang Block	Repsol (90%)	Exploration			Oil & Gas
Sakti Block	Sakti Block	KrisEnergy (95%), Golden Heaven Jaya (5%)	Exploration			Oil & Gas
Sebatik PSC, Tarakan Basin	Sebatik PSC	Star Energy Indonesia (100%)	Exploration			Oil & Gas
Sekayu PSC	Sekayu PSC	Star Energy Indonesia (100%)	Exploration			Oil & Gas
Sokang PSC	Sokang PSC	Black Platinum Energy (100%)	Exploration			Oil & Gas

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (9/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
South Bengara II PSC, Greater Tarakan Basin	South Bengara II PSC	Samudra Energy (97.85%)	Exploration			Oil & Gas
South East Tungkal Block	South East Tungkal Block	Gujarat State Petroleum Corporation (50.5%), Essar (49.5%)	Exploration			Oil & Gas
South Sokang PSC	South Sokang PSC	Medco Energi (100%)	Exploration			Oil & Gas
Sumbagsel PSC, South Sumatra Basin	Sumbagsel PSC	Mandala Energy (100%)	Exploration			Oil & Gas
Tanjung Lontar KSO, South Sumatra Basin	Tanjung Lontar KSO	Samudra Energy (84%)	Exploration			Oil & Gas
Telen Block	Telen Block	Total (100%)	Exploration			Oil & Gas
Udan Emas PSC	Udan Emas PSC	KrisEnergy (100%)	Exploration			Oil & Gas
Ujung Kulon Block	Ujung Kulon Block	M3nergy (100%)	Exploration			Oil & Gas
Wain Block	Wain Block	Pandawa Prima Lestari	Exploration			Oil & Gas
West Bangkanai PSC, Greater Kerendan	West Bangkanai PSC	Saka Energi (30%), Ophir Energy (70%)	Exploration			Gas
West Jambi Block, Jambi Sub Basin	West Jambi Block	Ramba Energy (100%)	Exploration			Oil & Gas
West Papua IV PSC	West Papua IV PSC	Ophir Energy (49.9%), Statoil (40%), Tately NV (10.1%)	Exploration			Oil & Gas
West Sebuku Block	West Sebuku Block	Mubadala Petroleum (75.5%), Inpex Corporation (24.5%)	Exploration			Oil & Gas

Source: Fitch Solutions 2023

List of main oil & gas fields in the pipeline – (10/10)

Name	Field Name	Companies	Status	Est.Peak Oil/ Liquid Range (b/d)	Est.Peak Gas Output (bcm)	Type of Project
Block Bawean	Block Bawean	MedcoEnergi (100%)	Upgrade/EOR			Oil
Block Gebong (Gebang JOB PSC)	Arbel, Anggor, Secanggeng, Gebang	Energi Mega Persada (50%), Pertamina (50%)	Upgrade/EOR			Oil & Gas
Block Rimau	Kaji Semoga	Perusahaan Daerah Pertambangan & Energi Sumsel (5%), MedcoEnergi (95%)	Upgrade/ EOR	68,000		Oil
Coastal Plains Pekanbaru Block	Kasikan, Zamrud, Pedada, Beruk	Bumi Siak Pusako (50%), Pertamina (50%)	Upgrade/ EOR	99.000		Oil
Meruap KSO, South Sumatra Basin	Meruap KSO	Samudra Energy (100%)	Upgrade/ EOR			Oil
Pilona TAC, South Sumatra Basin	Arahan-Banjarsari, Sengkuang,Tanjung Lontar	Samudra Energy (84%)	Upgrade/ EOR			Oil
Rokan PSC	Minas	Chevron (100%)	Upgrade/ EOR	190,000		Light Oil
Tuna Gas Field	Tuna Gas Field	Harbour Energy (50%) Zarubezhneft (50%)	Development		115	Gas
Hidayah oil field	Hidayah oil field	Petronas (100%)	Development			Oil
Merakes East Field	Merakes East Field	Eni East Sepinggan Ltd	Development			Gas
Ketapang 2 Block	Ketapang 2 Block	Petronas	Development			Gas
IDD Ganal Field	IDD Ganal Field	Chervon	Development		2.11	Gas
IDD Gendalo & Gehem	IDD Gendalo & Gehem	Chervon	Development		8.67	Oil & Gas

Source: Fitch Solutions 2023

地元住民の反対運動やバンドン行政裁判所による環境許認可の取り消し判決を受け、 PLNはインドラマユの1GW発電所開発計画の中止を決定

CCT development

- CCT that can be adopted and implemented in Indonesia is Ultra Super Critical (USC) and Integrated Gasification Combined Cycle (IGCC) according to JICA study.
- Java-Bali 1GW PP will be the first USC in Indonesia and is expected to be in operation by 2019, followed by 0.6GW
- Sumatera 0.3-0.6GW PP planned to be built

Indonesia's plan of USC coal-fired power plant

No	Power Plant	Capacity (MW)	Open	Developer	Location
1	Steam pp Lontar Exp	1 x 315	2022	PLN	Banten
2	Steam PP Jawa Tengah	2 x 950	2019	IPP	Central Java
3	Steam pp Indramayu	1 x 1000	Cancel	PLN	East Java
4	Steam PP Jawa 1	1 x 660	2022	IPP	East Java
5	Steam PP Jawa 3	2 x 1000	2024	IPP	East Java
6	Steam PP Jawa 4	2 x 1000	2021	IPP	Central Java
7	Steam PP Jawa 5	2 x 1000	2019	IPP	Banten/East Java
8	Steam PP Jawa 7	2 x 1000	2019	IPP	Banten
9	Steam PP Jawa 8	1 x 1000	2018	IPP	Central Java
10	Steam PP Jawa 9	1 x 600	2025	IPP	Banten
11	Steam PP Sumsel 8	2 x 600	2023	IPP	South Sumatra
12	Steam PP Sumsel 9	1 x 600	2023	IPP	South Sumatra
13	Steam PP Sumsel 10	1 x 600	2023	IPP	South Sumatra

Source: ASEAN Clean Coal Technology Handbook for Power Plants 2017, RUPTL 2021 - 2030, Power Technology 2023, Arthur D. Little analysis

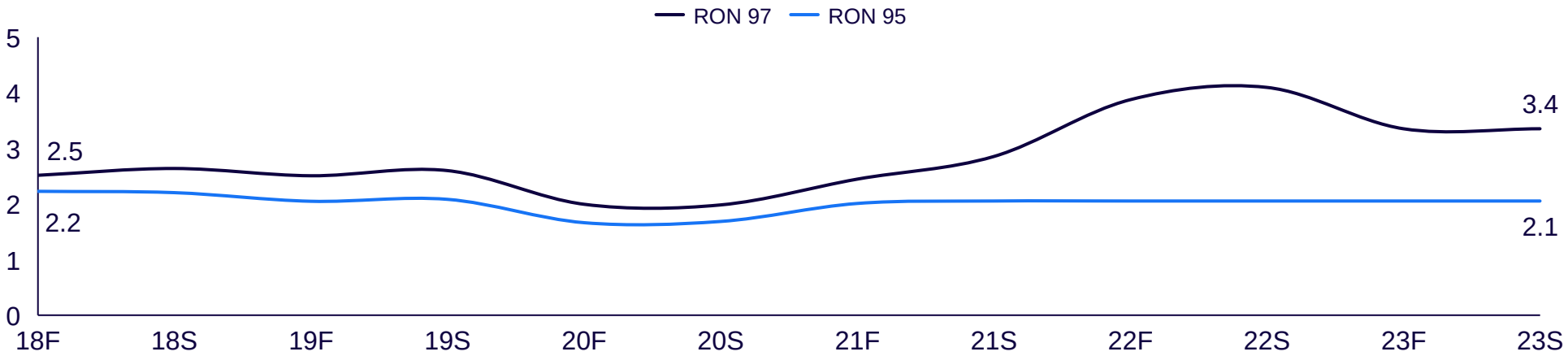
インドネシアの原油価格は世界の原油価格に大きく影響されるため、供給過剰による2016年、COVID-19の混乱による2020年が価格の底となっている

Official selling price of Crude Oil, USD/barrel

Indonesia crude oil prices have seen large volatility in the periods 2011-2021, with the sharpest drops being in 2015 due to supply factors including increased production in US, change in OPEC policy and 2020 (COVID-19 driven global price crash).

Crude Oil Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
SLC	113.63	115.59	108.15	98.63	49.39	40.98	51.98	68.2	63.1	41.98	68.94	99.18
Arjuna	112.47	111.75	104.23	94.82	48.54	39.35	51.2	67.65	63.42	39.24	68.15	98.38
Attaka	114.38	114.47	107.57	97.96	51.2	41.82	52.86	69.78	65.14	40.07	69.45	99.27
Cinta	110.5	114.07	106.51	96.83	48.22	40	50.59	66.65	61.79	40.27	66.81	97.47
Duri	107.57	112.31	104.44	94.67	47.6	37.63	49.47	65.76	64.75	48.69	73.84	107.15
Widuri	110.55	114.16	106.05	97.03	48.44	40.13	50.76	66.82	61.99	40.82	67.75	98.02
Belida	114.14	115.19	109.69	99.63	52.62	43.15	53.33	70.25	64.87	39.89	69.64	99.42
Senipah Condonsate	109.02	108.97	106.48	98.25	52.92	43.44	53.31	69.57	59.89	39.35	69.9	91.7
Average[1]	111.53	113.31	106.64	97.23	49.87	40.81	51.69	68.09	63.12	41.29	69.31	98.82

Official selling price of Retail Petrol Prices

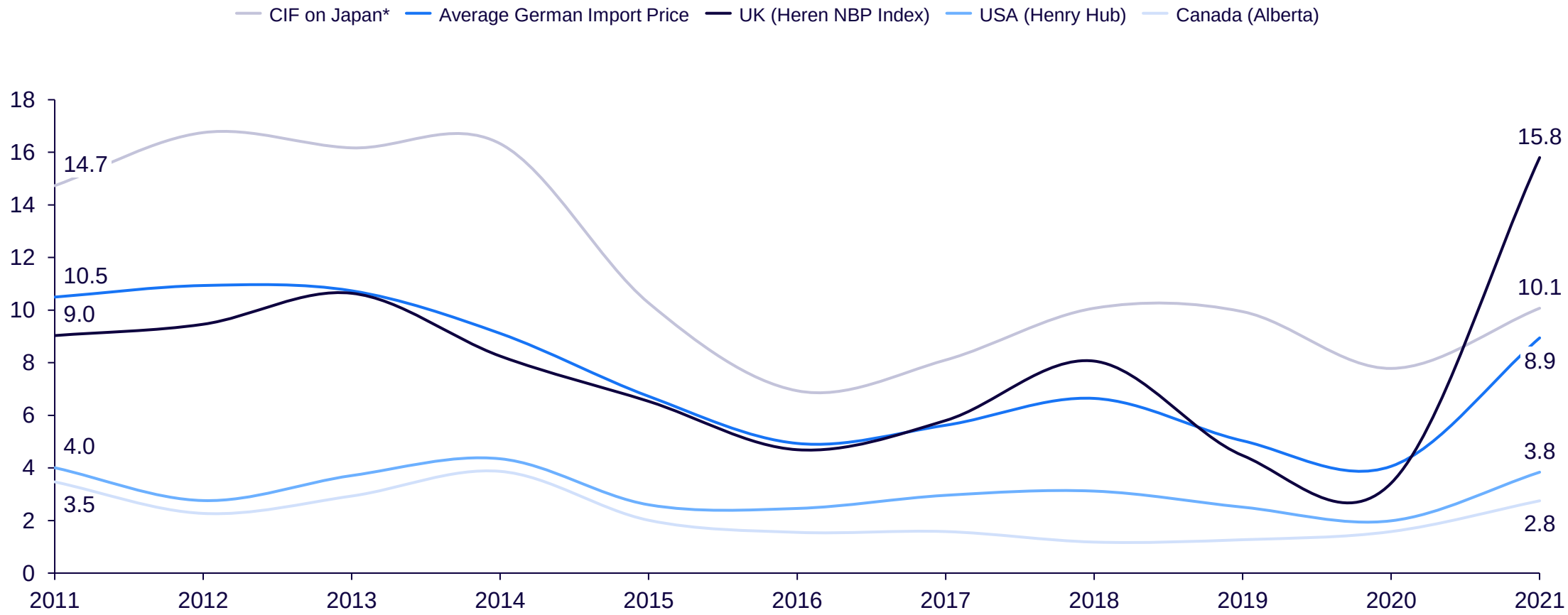


Source: MEMR Statistical Handbook 2022, World Bank 2023, Arthur D. Little analysis

世界的に天然ガス価格は、2020年から2021年にかけて英国価格が450%以上上昇するという需要増を背景に、2020年以降少なくとも50%以上上昇

Official selling price of natural gas

2011-2021, USD/MMBTU



Note: *Price of LNG
Source: BP Statistical Review of World Energy 2022, Arthur D. Little analysis

エネルギーにまつわる政府機関は、MEMRが中心

Category	Name	Function
Government branch	Indonesia Investment Authority (IDA)	Indonesia's SWF. Invests in green infrastucture. 2023: Made its first green energy investment (undisclosed sum) in Pertamina Geothermal Energy's (PGE) initial public offering
	Ministry of Energy and Mineral Resources (MEMR)	**Main Government institution in-charge of energy policy**
	Ministry of Environment and Forestry (MOEF)	WRT[1] to RE, MOEF is in-charge of making policy for and supervising, among other things, forest utilization area permits and other relevant approvals for development in forest and other protected areas
	Ministry of Industry (MOI)	In-charge of making policy for and supervising mandated local content requirements that apply for renewable energy projects
	Ministry of Public Works and Housing ("MPWH")	WRT[1] to RE, in-charge of overseeing the construction work policy and supervision. Hydro and floating solar PPs fall under MPWH's authority
	Ministry of Finance ("MOF")	In-charge of country's budget, subsidies and other fiscal incentives
GLC	PT Perusahaan Listrik Negara (Persero) ("PLN")	State-owned electricity company, manages electricity projects. PLN runs the electricity business from power generation and power transmission to the distribution and sale of electricity.
Financial institutions	Commercial banks, Development financing institutions and local infrastructure financial institutions	Some have specially-catered green financing platforms for RE projects. End 2021: 13 banks have joined the Indonesia sustainable financial initiative (IKBI) and have disbursed USD 200M total
Contractors	Contractors	Have the licenses required to carry out Engineering, Procurement and Construction ("EPC") or Operation and Maintenance ("O&M") work for power plants

Note: 1) With respect to
Source: National renewable energy policy and action plan 2017, Multiple Indonesian ministry websites 2023

3 パイプライン（ガス・石油）

インドネシアのガス網運用会社は、大きくPGN、Pertagas、民間のTGIが存在

Regulation of natural gas transmission pipeline

Transmission or distribution of gas by pipeline **requires approval from the downstream regulator, BPH Migas**, which grants licenses only for specific pipelines in commercial regions.

Transmission pipelines are considered by government to be a natural monopoly, and Law 22 imposes the requirement for open access. Otherwise, no requirement is placed on operators of pipelines and storage facilities to expand their projects to accommodate third-party access.

Gas transportation by pipeline in Indonesia is regulated under Government Regulation No. 36 of 2004 (“GR 36”) regarding Upstream Oil and Natural Gas Business Activities and has been amended by Government Regulation No. 30 of 2009 and Ministry of Energy and Mineral Resources (“MEMR”) Regulation No. 19 of 2009 regarding **Natural Gas Business through Pipelines, and is controlled by the Downstream Oil and Gas Regulatory Agency (“BPH Migas”)**

Natural gas transmission & distribution network & operators

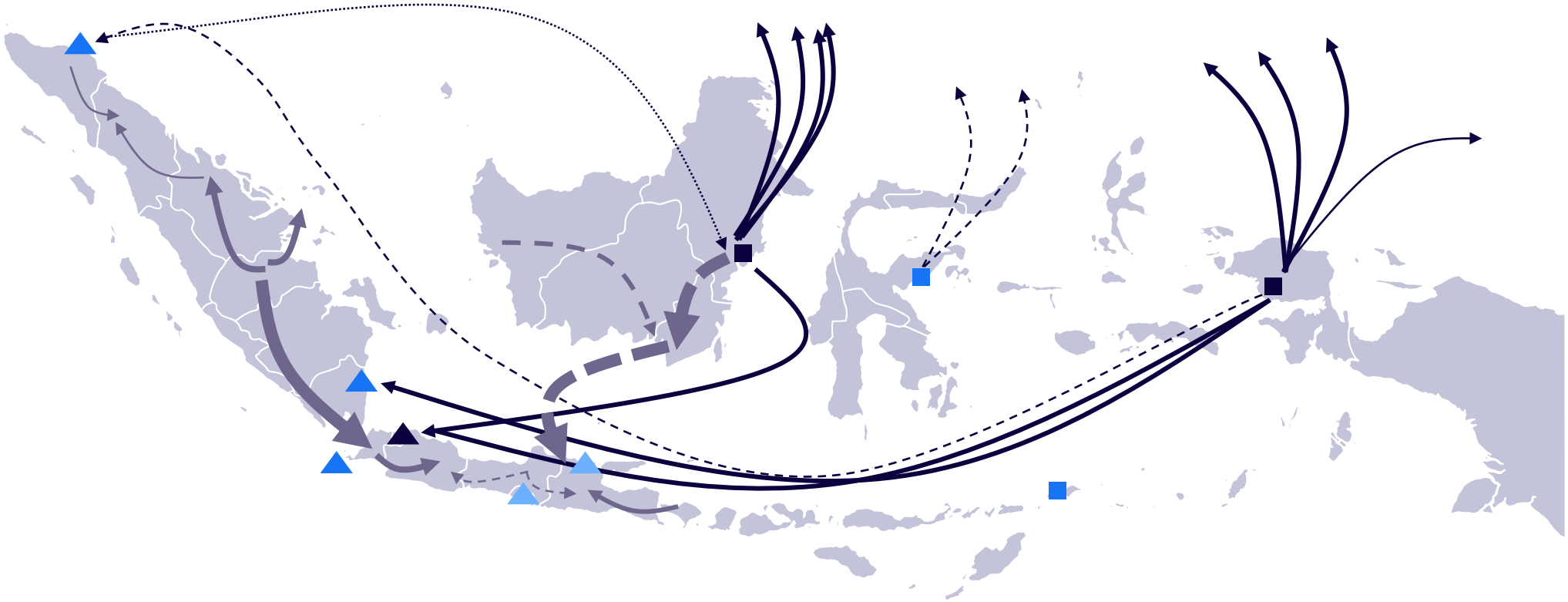
The Indonesian natural gas pipeline network is comprised of a number of fragmented point-to-point grid systems, which transport gas between supply sources and large consumers or demand centres. Most pipeline networks are unconnected, as the country is composed of more than 17 000 islands and natural gas production is located on several islands.

Indonesia has **three large gas transmission system operators (TSOs), two of which, PGN and Pertagas, are state-owned.** A third, **Transportasi Gas Indonesia (TGI),** which is owned 60% by PGN and 40% by a consortium of ConocoPhillips, Petronas, Talisman Energy and Singapore Petroleum, owns and operates two transmission pipelines. Pertagas operates 42% of the country’s transmission system network, followed by PGN (28%) and TGI (27%).

PGN dominates the natural gas distribution network. It operates a natural gas pipeline distribution network of more than 10000 km, supplying natural gas to power plants, industry, the commercial sector and households. **Nonetheless, the distribution of natural gas is fully open with 19 distribution system operators in the Java and Sumatra regions**

Source: U.S. Energy Information Administration 2021, Arthur D. Little analysis

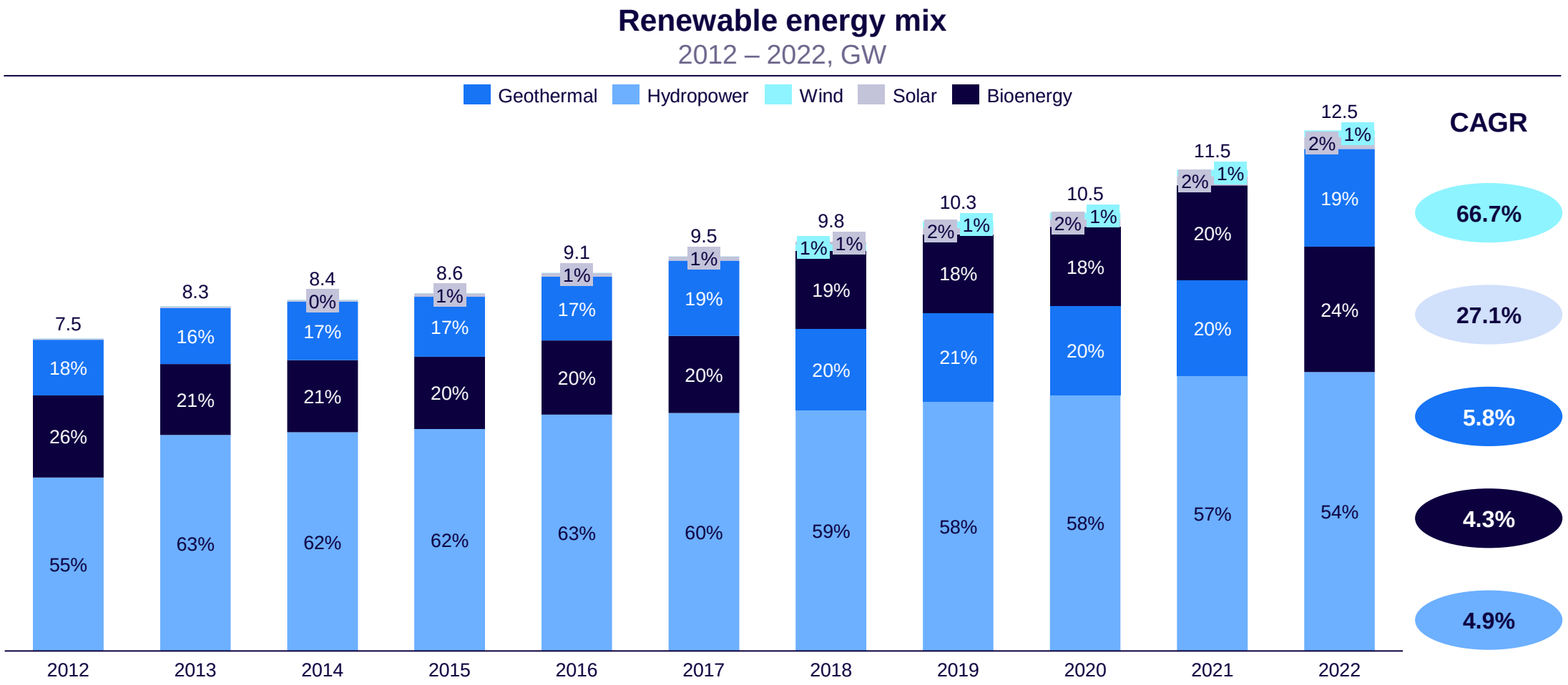
ガスのトランスミッションネットワークは以下



Source: Research paper 2015

4 次世代・再生可能エネルギー

現状の再エネMixは、水力を中心に、地熱及びバイオマスを主力としている



Source: International Renewable Energy Agency 2023, Arthur D. Little analysis

再エネの中で地熱発電も重要視しており、IPPの地熱発電を推奨

Geothermal potential, by region

2022, MW

No	Island	Potential Energy (MWe)					
		Resources		Reserve			Total
		Speculative	Hypothe-tical	Possbile	Probable	Proven	
1	Sumatra	2188	1567	3514	867	1169	9305
2	Java	1164	1270	3121	363	1855	7773
3	Bali	70	21	104	110	30	335
4	Nusa Tenggara	215	146	731	138	33.5	1263.5
5	Kalimantan	151	18	6	0	0	175
6	Sulawesi	1352	342	996	180	120	2990
7	Maluku	560	80	496	6	2	1144
8	Papua	75	0	0	0	0	75
	Total	**5775**	**3444**	**8968**	**1664**	**3209.5**	**23060.5**

- Transmission or distribution of gas by pipeline **requires approval from the downstream regulator, BPH Migas,** which grants licences only for specific pipelines in commercial regions.
- **Transmission pipelines are considered by government to be a natural monopoly,** and Law 22 imposes the requirement for open access. Otherwise, no requirement is placed on operators of pipelines and storage facilities to expand their projects to accommodate third-party access.
- **Geothermal Law:** PP encouraged to be built by IPP with auction process for geothermal working areas (WKP) as a total of 1000 GW. New plants must not sacrifice steam supply of existing plants.

Source: MEMR Statistical Handbook 2022, Ministry of Energy and Mineral Resources 2022, Asian Development Bank 2020, Arthur D. Little analysis

地熱発電の大部分は KOB 鉱区にあり、近年新しい鉱区も登場

Geothermal power generators, by region

2011-2021, kT

Field Name	Area	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Pertamina Field	Kamojang	12470.0	10878.0	11256.0	10489.0	11974.0	12679.0	12522.0	14305.0	13534	13123.0	13869.0
Pertamina Field	Sibayak	310.0	160.0	239.0	184.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pertamina Field	Lahendong	2510.0	3262.0	3841.0	4138.0	4693.0	3295.0	6059.0	5525.0	6628.0	6694.0	6143.0
Pertamina Field	Ulubelu	0.0	1393.0	5575.0	6174.0	6044.0	6718.0	10187.0	9923.0	11290.0	11753.0	11733.0
Pertamina Field	Karaha	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1334.0	1192.0	789.0	733.0
Pertamina Field	LumutBalai	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	193.0	3138.0	3252.0
KOB Field	Salak	24673.0	24513.0	23728.0	24307.0	24755.0	24575.0	24655.0	24820.0	22511.0	22785.0	23836.0
KOB Field	Darajat	14131.0	14283.0	10678.0	13856.0	13916.0	13952.0	13871.0	12722.0	13055.0	14224.0	13929.0
KOB Field	Wayang Windu	13523.0	13233.0	13378.0	13143.0	7850.0	13613.0	13526.0	13222.0	12972.0	13695.0	13552.0
KOB Field	Sarulla	0.0	0.0	0.0	0.0	0.0	0.0	4877.0	13593.0	11683.0	11503.0	12747.0
PT PLN (Persero) Field	Ulumbu	0.0	0.0	253.0	261.0	382.0	339.0	610.0	545.0	679.0	707.0	774.0
PT PLN (Persero) Field	Mataloko	0.0	0.0	0.0	0.0	41.0	0.0	0.0	0.0	0.0	0.0	0.0
PT Geo Dipa Energy Field	Dieng	1106.0	1047.0	348.0	205.0	1770.0	1393.0	2835.0	2511.0	2570.0	2711.0	2639.0
PT Geo Dipa Energy Field	Patuha	0.0	0.0	0.0	840000.0	2837.0	3153.0	2947.0	2967.0	3003.0	3028.0	2994.0
PT Sorik Marapi Geothermal Power	Sorik Marapi	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	649.0	2401.0	3569.0
PT Supreme Energy	Muara Laboh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	197.0	4366.0	4533.0
PT Supreme Energy	Rantau Dadap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	338.0
Total		68723.0	68769.0	69296.0	912757.0	74262.0	79717.0	92089.0	101467.0	100156.0	110917.0	1146.41.0

Source: MEMR Statistical Handbook 2021, Arthur D. Little analysis

List of potential geothermal project areas in Indonesia (1/5)

Geothermal potential, by region

2021

No	Name	Province	Output (MW)
1	G. Gouroudong	Aceh	50
2	Mt. Twin	Aceh	330
3	Jaboi (FTP2) #3	Aceh	80
4	Lokop	Aceh	20
5	Soulawah Agam (FTP2) #1	Aceh	55
6	Soulawah Agam (FTP2) #2	Aceh	55
7	Sarulla II #2	North Sumatra	110
8	Sarulla II #3	North Sumatra	110
9	Sarulla II (FTP2) #1	North Sumatra	40
10	Sibual Buali	North Sumatra	590
11	Simbolon Samosir (FTP2)#1	North Sumatra	50
12	Simbolon Samosir (FTP2)#2	North Sumatra	60
13	Sipoholon Ria-Ria (FTP2)	North Sumatra	10
14	Bonjol (FTP2)	Sumbar	60
15	Cubadak	Sumbar	20

No	Name	Province	Output (MW)
16	Mt. Tandikat & Singgalang	Sumbar	20
17	Home	Sumbar	55
18	Simision	Sumbar	55
19	Sumani	Sumbar	20
20	Talamau	Sumbar	20
21	Graho Nyabu #1	Jambi	50
22	Graho Nyabu #2	Jambi	60
23	Sungai Penuh Semurup	Jambi	30
24	Sungai Penuh Small Scale	Jambi	5
25	Quiet River	Jambi	10
26	Moss Hall #3	South East	55
27	Moss Hall #4	South East	55
28	Small Scale Hall Moss	South East	5
29	Margabayur #1	South East	30
30	Margabayur #2	South East	30

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

List of potential geothermal project areas in Indonesia (2/5)

Geothermal potential, by region

2021

No	Name	Province	Output (MW)
31	Tanjung Sakti	South East	55
32	Bukit Daun #1	Bengkulu	55
33	Bukit Daun #2	Bengkulu	30
34	Hululais (FTP2) #3	Bengkulu	55
35	Hululais (FTP2) #4	Bengkulu	55
36	Hululais Small Scale #1	Bengkulu	10
37	Hululais Small Scale #2	Bengkulu	10
38	Lawang-Malintang	Bengkulu	20
39	Mine Fields	Bengkulu	10
40	Mt. Way Panas-Ulubelu	Lampung	110
41	Sekincau (FTP2) #1	Lampung	55
42	Sekincau (FTP2) #2	Lampung	165
43	Ulubelu Small Scale	Lampung	10
44	Gunung Endut (FTP2)	Banten	40
45	Cibeureum Parabakti	West	85

No	Name	Province	Output (MW)
46	Cibuni #2	West	20
47	Cilayu	West	20
48	Ciseeng	West	20
49	Cisolok-Cisukarame	West	50
50	Gede Pangrango	West	55
51	Mount Ciremai (FTP2) #1	West	55
52	Mount Ciremai (FTP2) #2	West	55
53	Mount Galunggung #1	West	55
54	Mount Galunggung #2	West	55
55	Kamojang-Darajat	West	65
56	Karaha #2	West	20
57	Masigit #1	West	55
58	Papandayan	West	40
59	Tampomas	West	45
60	Wayang Windu (FTP2) #4	West	120

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

List of potential geothermal project areas in Indonesia (3/5)

Geothermal potential, by region

2021

No	Name	Province	Output (MW)
61	Mount Lawu #1	Central Java	55
62	Mount Lawu #2	Central Java	55
63	Jar #1	Central Java	55
64	Jar #2	Central Java	55
65	Mangunan-Wanayasa	Central Java	40
66	Umbul Telumoyo (FTP2)	Central Java	55
67	Arjuno Welirang	East Java	185
68	Bromo-Tengger	East Java	20
69	Mount Pandan	East Java	60
70	Gunung Wilis #1	East Java	10
71	Mount Wilis #2	East Java	10
72	Iyang Argopuro (FTP2)	East Java	55
73	Krucil Tiris	East Java	30
74	Songgoriti	East Java	35
75	Banyu Wedang	Bali	10

No	Name	Province	Output (MW)
76	Bedugul	Bali	110
77	Mt. Batur	Bali	40
78	Tabanan	Bali	65
79	Pontadio	Gorontalo	10
80	Puhuwato	Gorontalo	10
81	Suwawa	Gorontalo	20
82	Klabat Wineru	North Sulawesi	40
83	Klabat-Winoru	North Sulawesi	10
84	Kotamobagu I (FTP 2)	North Sulawesi	20
85	Kotamobagu II (FTP 2)	North Sulawesi	20
86	Kotamobagu III (FTP 2)	North Sulawesi	20
87	Kotamobagu IV (FTP 2)	North Sulawesi	20
88	Lahendong #7	North Sulawesi	20
89	Lahendong #8	North Sulawesi	20
90	Lahendong Binary	North Sulawesi	5

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

List of potential geothermal project areas in Indonesia (4/5)

Geothermal potential, by region

2021

No	Name	Province	Output (MW)
91	Lahendong Small Scale #2	North Sulawesi	5
92	Lahendong Small Scale #3	North Sulawesi	5
93	Bora Pulu (FTP 2)	Central Sulawesi	40
94	Kadidia	Central Sulawesi	55
95	Marana (FTP 2)	Central Sulawesi	20
96	Laines	Southeast Sulawesi	20
97	Bittuang	Southeast Sulawesi	20
98	Massepe	Southeast Sulawesi	55
99	Pincara	Southeast Sulawesi	10
100	Lilli-Seporaki	West Sulawesi	10
101	Banda Baru	Maluku	10
102	Tehoru	Maluku	10
103	Akesahu	North Maluku	10
104	Mt. Hamiding #2	North Maluku	200
105	Mount Hamiding	North Maluku	20

No	Name	Province	Output (MW)
106	Jailolo (FTP2) #1	North Maluku	10
107	Jailolo (FTP2) #2	North Maluku	20
108	Telaga Ranu	North Maluku	10
109	Hu'u (FTP2) #1.	NTB	10
110	Hu'u (FTP2) #2	NTB	10
111	Sembalm (FTP2) #1	NTB	10
112	Sembalun (FTP2) #2	NTB	10
113	Gou-Inelika	NTT	10
114	Lesugolo	NTT	10
115	Mapos	NTT	20
116	Nage	NTT	40
117	Sokoria #7	NTT	30
118	Waisano	NTT	20
119	Wapsalit	NTT	10
120	Way Pesi	NTT	10

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

List of potential geothermal project areas in Indonesia (5/5)

Geothermal potential, by region

2021

No	Developer	Capacity	Location
1	Kamojang PLTP 1 - 3	1 x 30MW and 2 x 55MW	West Java
2	Mt.Salak geothermal power plant 1 - 3	3 x 60MW	West Java
3	PLTP Darajat 1	1 x 55MW	West Java
4	Lahendong Power Plant 1 - 4	4 x 20MW	North Sulawesi
5	Ulubelu Power Plant 1 - 2	2 x 55MW	Lampung

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

インドネシアのクリーン・テクノロジー・ファンド（CTF）は、電化率100%を目標に、エネルギー効率の高い再生可能エネルギー・プロジェクトを支援することを目的としている

	Capacity	Main Financer	Co-financer	Impact	How CTF is used
Geothermal power plant projects					
1	260MW geothermal power plant	Pertamina Geothermal Energy	World Bank	Double the geothermal capacity of Indonesia by 2025	• Subsidize the difference in cost between geothermal power and fossil-based power • Reduce risk of early-stage geothermal exploration & field development
2	250 MW	PT. Perusahaan Listrik Negara (PLN)	ADB		
3	300 MW	Private sector participation	International Finance Corporation & ADB		
Renewable energy projects					
~	Varies (all biomass projects are preferred)	Varies	Varies	Varies	• Increase access to financing for SMEs • Recover risk premium of EE/RE investments • Direct lending to large end-users of EE/RE to reduce cost of financing • Technical/advisory services

Source: Ministry of Energy and Mineral Resources 2020, Asian Development Bank 2020, Arthur D. Little analysis

水力発電は2021年に発電量の8%を占め、2025年には10%に成長されると予測されている

Hydropower Development Plan in Indonesia (2020 - 2024)

(MW)

Parameter	2019	2020	2021	2022	2023	2024
Kapasitas Pembangkit EBT (MW)	10.301	10.986	11.987	13.909	15.687	19.350
Kapasitas PLTP (MW)	2.131	2.271,0	2.351,0	2.483,0	2.783,0	3.158,0
Kapasitas PITA **Hidro** (MW)	5.976	6.141,2	6.581,5	7.537,4	7.934,4	9.885,8

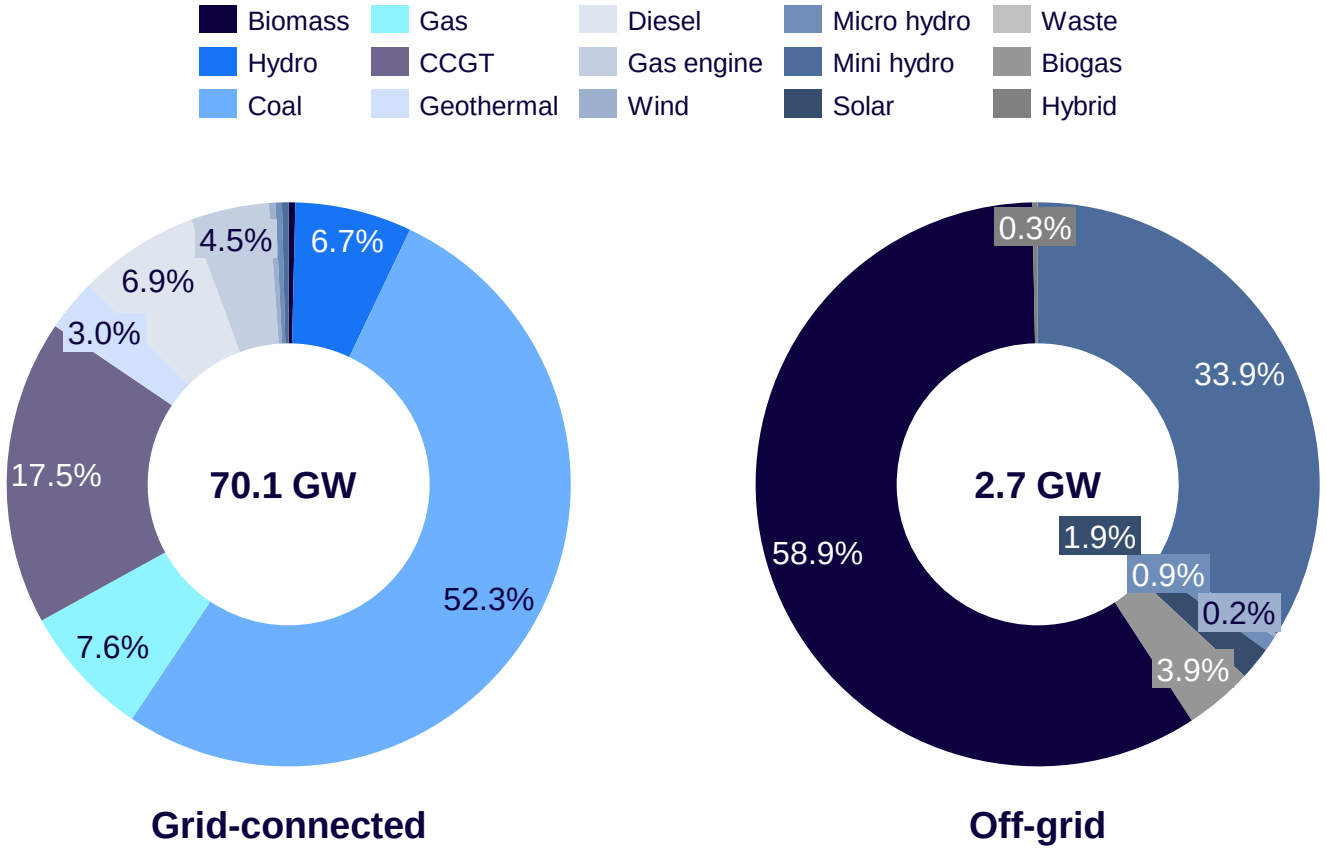
- **Hydropower accounts for 8.0% of power generation in 2021 and is projected to grow to 10.4% in 2025.**
- The largest project currently under construction is the **1,040 MW Upper Cisokan plant**, Indonesia's first **pumped storage PP** located in western Java, under construction since 2015. The project is a JV between **Daelim, Astaldi Group and Wika**. The total project cost is estimated at **USD 800 mn** and was supported by a USD 640 mn loan from the World Bank. USD 380 mn was awarded in 2021. It was expected to take 50 more months (since Sep 2021) and is planned to be **operational between 2024 and 2025**. One of two dams is already built as of Sep 2021

Source: Ministry of Energy and Mineral Resources 2020, Arthur D. Little analysis

グリッドベースでは、石炭が主流も、オフグリッドでは、バイオマスが59%、小規模水力が34%を占める。

Total installed grid-connected and off-grid installed electricity generation capacity

2020, MW



Grid-connected **Off-grid**

- **MEMR regulation 50/2017** aids in the development of MHP/MH (mini and micro hydro plants) via a direct selection mechanism, which aims to improve licensing issues to reduce overlap which decreases developer's financing ability
- The **1,040 MW Upper Cisokan plant**, is ID's first **pumped storage PP** located in western Java, under construction since 2015. The project is a JV between **Daelim, Astaldi Group and Wika**. The total cost is estimated at **USD 800 mn** and was supported by a USD 640 mn loan from the World Bank. USD 380 mn was awarded in 2021. It is planned to be **operational between 2024 and 2025**. One of two dams is built as of Sep 2021

Source: International Renewable Energy Agency 2021, Asian Development Bank 2020, PV Magazine 2021, Arthur D. Little analysis

List of potential hydropower project areas in Indonesia (1/6)

No	Name	Province	Output (MW)
1	Kla	Aceh	12.0
2	Pousangan V-B	Aceh	13.0
3	Redelong	Aceh	18.0
4	Gumpang	Aceh	19.0
5	Krueng Lep	Aceh	20.0
6	Meurobo	Aceh	38.0
7	Jagong Joget	Aceh	41.0
8	Tripa 1	Aceh	48.0
9	Krueng Meriam	Aceh	48.0
10	Woyla 5	Aceh	56.0
11	Meurebo 2	Aceh	59.0
12	Batee	Aceh	100.0
13	Meurebo 3	Aceh	100.0
14	Termom Hilir	Aceh	150.0
15	Pousangan IV	Aceh	120.0

No	Name	Province	Output (MW
16	Tripa River	Aceh	120.0
17	Kluet 2	Aceh	120.0
18	Teunom 3	Aceh	135.0
19	Tripa 3	Aceh	142.0
20	Lawe Alas	Aceh	151.0
21	Kluot 1	Aceh	180.0
22	Lae Souraya	Aceh	240.0
23	Tounom 2	Aceh	240.0
24	Tampur 1	Aceh	443.0
25	Tampur 2	Aceh	59.0
26	Loutoung	Aceh	14.74
27	Jambu Ayo	Aceh	140.01
28	Woyla 1	Aceh	174.9
29	Cinendang	Aceh	75.5
30	Samarkilang	Aceh	76.8

Source: RUPTL 2021 - 2030

List of potential hydropower project areas in Indonesia (2/6)

No	Name	Province	Hood (MW)
31	Sei Wanpu I	North Sumatra	12.0
32	Batang Toru 8	North Sumatra	13.0
33	Aek Poring-1	North Sumatra	15.0
34	Lau Gunung	North Sumatra	15.0
35	Sidikalang-1	North Sumatra	15.0
36	Palao Julu 1	North Sumatra	18.0
37	Sireme	North Sumatra	18.0
38	Ordi 5	North Sumatra	27.0
39	Ask Sirahar	North Sumatra	30.0
40	Pahao Julu 2	North Sumatra	30.0
41	Palkat 2	North Sumatra	35.0
42	Garoga	North Sumatra	40.0
43	Munte Tigabinanga	North Sumatra	45.0
44	Aak Poring River	North Sumatra	50.0
45	Batang Toru 1	North Sumatra	55.0

No	Name	Province	Hood (MW)
46	Sitanduk	North Sumatra	55.0
47	Toru Hilir	North Sumatra	60.0
48	Simonggo River	North Sumatra	90.0
49	Cinendang	North Sumatra	100.0
50	Bilah River	North Sumatra	120.0
51	Bah Karai	North Sumatra	12.6
52	Sei Wampu II	North Sumatra	13.4
53	Sihope	North Sumatra	14.4
54	Kualu	North Sumatra	15.12
55	Mandoge	North Sumatra	15.68
56	Batang Gadis	North Sumatra	17.19
57	Sei Wampu III	North Sumatra	24.6
58	Aek Kuslu	North Sumatra	33.5
59	Asahan 5	North Sumatra	46.8
60	Kapeгаз	North Sumatra	67.8

Source: RUPTL 2021 - 2030

List of potential hydropower project areas in Indonesia (3/6)

No	Name	Province	Hood (MW)
61	Sibundong	North Sumatra	73.7
62	Air Pura	Sumbar	13.1
63	Sangir	Sumbar	19.0
64	Lubu	Sumbar	28.0
65	Sinamar River	Sumbar	40.0
66	Central Hamlet	Sumbar	40.0
67	Padang Aro	Sumbar	40.0
68	Pasaman	Sumbar	62.0
69	Masang III	Sumbar	105.0
70	Sijunjung	Sumbar	255.0
71	Liki	Sumbar	15.6
72	Batang Sinamar	Sumbar	20.5
73	Pasaman 2	Sumbar	41.16
74	Iaman	Sumbar	78.9
75	Merangin Dam	Jambi	150.0

No	Name	Province	Hood (MW)
76	Mount Seven	Jambi	16.0
77	Merangin 5	Jambi	21.0
78	Bangko 4	Jambi	61.2
79	Bangko 1	Jambi	81.0
80	Bangko 2	Jambi	87.0
81	Bangko 3	Jambi	93.0
82	Merangin 4	Jambi	200.0
83	Endikat River	South East	75.0
84	Lomatang-1	South East	41.7
85	Lebong-2	Bengkulu	12.0
86	Talang Ratu	Bengkulu	18.0
87	Kepahiang	Bengkulu	36.0
88	Ketaun Tengah	Bengkulu	13.06
89	Musi Kota Agung	Bengkulu	27.0
90	Bosai 2	Lampung	24.0

Source: RUPTL 2021 - 2030

List of potential hydropower project areas in Indonesia (4/6)

No	Name	Province	Hood (MW)
91	Semuong	Lampung	30.0
92	Wado	West	50.0
93	Cikaso-3	West	53.0
94	Cibumi-4	West	105.0
95	Cibumi-3	West	172.0
96	Cimandiri-3	West	238.0
97	Cipasang	West	400.0
98	Maung	Central Java	227.0
99	Rawalo-2	Central Java	10.3
100	Kesamben	East Java	37.0
101	Karangkates 4-5	East Java	100.0
102	Sei Tubu	Kaltara	200.0
103	Mentarang 2	Kaltara	240.0
104	Sembakung	Kaltara	250.0
105	Kaltara	Kaltara	300.0

No	Name	Province	Hood (MW)
106	Kayan 1	Kaltara	900.0
107	Kayan 2	Kaltara	1200.0
108	Kayan 3	Kaltara	1800.0
109	Dian's data	Kaltara	1200.0
110	Mentarang Induk	Kaltara	1375.0
111	Jerawi cascade	Kaltara	72.0
112	Muara Juloi	Kaltara	284.0
113	Long Build	East Kalimantan	20.0
114	Tabang	East Kalimantan	240.0
115	Bob	East Kalimantan	882.0
116	Mentarang 1	East Kalimantan	300.0
117	Riam Kiwa	South Kalimantan	42.0
118	Muara Jambi	South Kalimantan	284.0
119	Ambalau	Kalbar	100.0
120	Nanga Balang	Kalbar	133.0

Source: RUPTL 2021 - 2030

List of potential hydropower project areas in Indonesia (5/6)

No	Name	Province	Hood (MW)
121	Minut 3	North Sulawesi	12.0
122	Minut 1	North Sulawesi	14.0
123	Poigar 3	North Sulawesi	20.0
124	Minut 2	North Sulawesi	27.0
125	Ranoyapo 2	North Sulawesi	27.0
126	Poigar 2	North Sulawesi	30.0
127	Mangondow	North Sulawesi	37.0
128	Ranoyapo 1	North Sulawesi	81.0
129	Hammer 3	Central Sulawesi	75.0
130	Salo Karangana	Central Sulawesi	103.0
131	Kulawi	Central Sulawesi	150.0
132	Gumbasa	Central Sulawesi	156.0
133	Laa	Central Sulawesi	160.0
134	Lariang IV	Central Sulawesi	200.0
135	Bongka River	Central Sulawesi	300.0

No	Name	Province	Hood (MW)
136	SR-1 (Bada)	Central Sulawesi	420.0
137	Salo Pobatus	Central Sulawesi	426.0
138	SR-2 (Tuare)	Central Sulawesi	720.0
139	Ustangko	Central Sulawesi	136.5
140	Lariang 7	Central Sulawesi	257.6
141	Pebatua 2	Central Sulawesi	303.12
142	Tamboli	Southeast Sulawesi	24.0
143	Lalindu River	Southeast Sulawesi	110.0
144	Lasolo	Southeast Sulawesi	145.0
145	Pongbembe	South Sulawesi	18.0
146	Bonto Batu	South Sulawesi	72.0
147	Kalaena I	South Sulawesi	75.0
148	Salu Uro	South Sulawesi	89.0
149	Pongkeru	South Sulawesi	92.0
150	Palelong	South Sulawesi	134.0

Source: RUPTL 2021 - 2030

List of potential hydropower project areas in Indonesia (6/6)

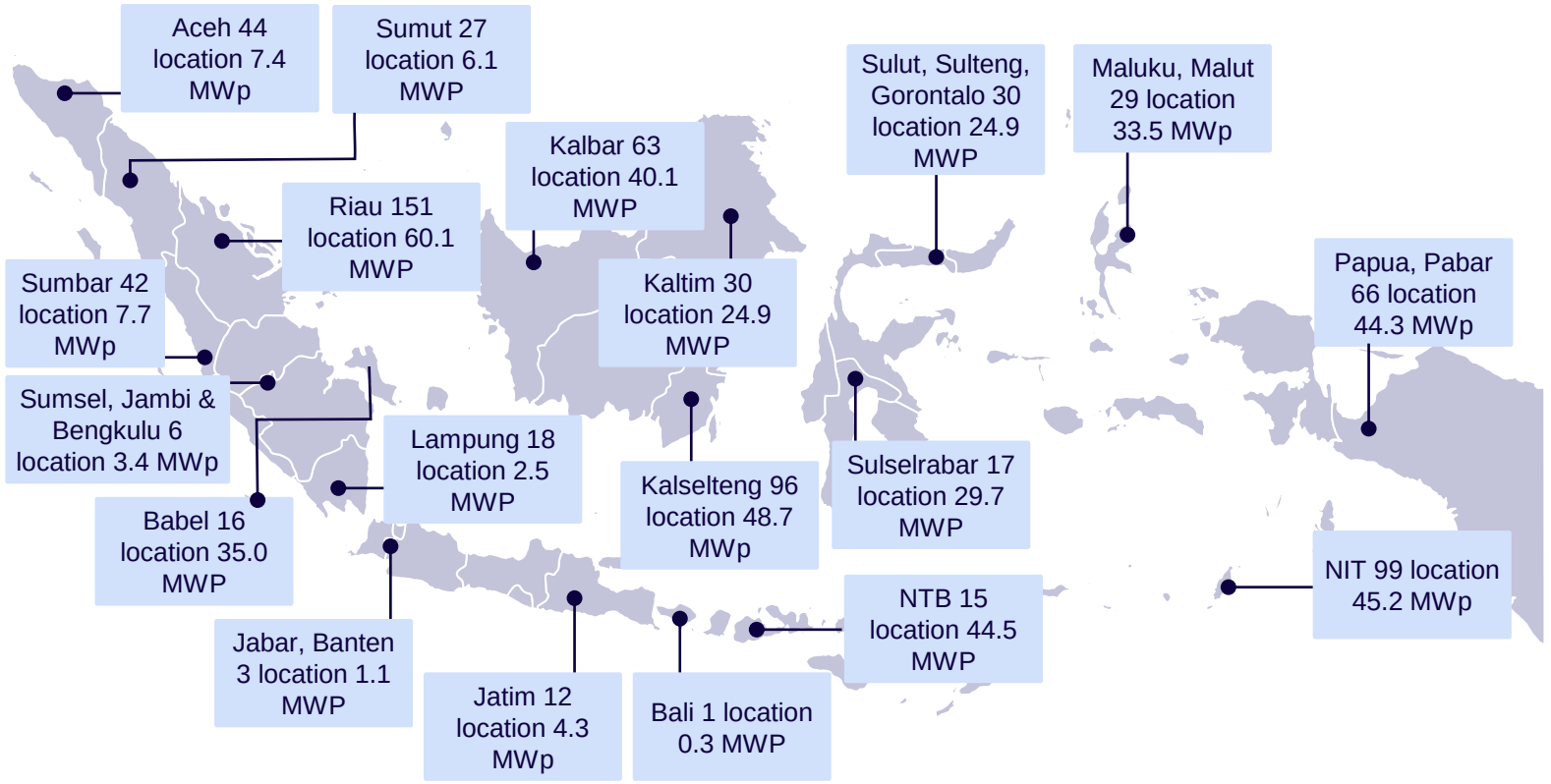
No	Name	Province	Hood (MW)
151	Tumbuan 1	South Sulawesi	300.0
152	Seko 1	South Sulawesi	480.0
153	Baliase	South Sulawesi	10.9
154	Tabulahan	West Sulawesi	18.0
155	Sadang River	West Sulawesi	35.0
156	Karama	West Sulawesi	190.0
157	Tumbuan/Mannuju	West Sulawesi	150.0
158	Mapilli	West Sulawesi	174.0
159	Tinauka	West Sulawesi	300.0
160	Wai Tina	Maluku	12.0
161	Isal River	Maluku	60.0
162	Orya 2	Papua	14.0
163	Sentani	Papua	20.0
164	Warsamson	Papua	20.0
165	Brang Behl-2	NTB	18.0

No	Name	Province	Hood (MW)
166	Wanupanggantu	NIT	15.0
167	Was Rancang I and II	NIT	16.5
168	Sumith Pasinaro	Maluku	16

Source: RUPTL 2021 - 2030

離島の孤立した地域の電力供給不足に対処するため、インドネシアは持続可能な農村電化を増やすことを目的とした1,000島プログラムを開始

1,000 Islands solar development programme



- The programme aims to reduce the use of diesel fuel and to increase the electrification ratio in remote island.
- PLN plans to develop the PV as the **hybrid system** with an existing diesel, biomass, or other RE potentials as a respond to the government policy to reduce oil consumption.
- The development plan will use public-private partnership (PPP) scheme.

Source: PricewaterCooper 2016, PLN 2013, Arthur D. Little analysis

List of candidate of solar projects in Indonesia (1/4)

Solar power plants, by region

2023

#	Province	Name	Capacity	Method	Status	Start up date
1	Banda Sea & Gulf of Boni	PLTS Bombana + Diesel	10	Solar PV	Concept	2025
2	Celebes Sea	PLTS Sulut	5	Solar PV	Concept	2035
3	Flores Sea	PLTS Selayar + Battery	8	Solar PV	Concept	2028
4	Indian Ocean	PLTS Sumba	5	Solar PV	Concept	2027
5	Indian Ocean	PLTS Simeulue	2	Solar PV	Financial Close	2023
6	Indian Ocean	PLTS Nias	6	Solar PV	Financial Close	2023
7	Java	PLTS Waduk Karangkates	100	Solar PV	Concept	2025
8	Java	PLTS Waduk Gajahmungkur	100	Solar PV	Concept	2025
9	Java	PLTS Subang/Indramayu	150	Solar PV	Concept	2025
10	Java	PLTS Saguling	100	Solar PV	DA Application	2024
11	Java	PLTS Pemalang	40	Solar PV	Concept	2028
12	Java	PLTS Pasuruan	40	Solar PV	Concept	2026
13	Java	PLTS Kedung Ombo	100	Solar PV	Financial Close	2023
14	Java	PLTS Jatiluhur	100	Solar PV	Concept	2025
15	Java	PLTS Jatigede	100	Solar PV	Concept	2028
16	Java	PLTS Indramayu	10	Solar PV	Concept	2028
17	Java	PLTS Cirata	1	Solar PV	Operating	2015

Source: Rystad Energy 2023

List of candidate of solar projects in Indonesia (2/4)

Solar power plants, by region

2023

#	Province	Name	Capacity	Method	Status	Start up date
18	Java	PLTS Cianjur	4	Solar PV	Concept	2026
19	Java	PLTS Bogor	1	Solar PV	Concept	2028
20	Java	PLTS Bekasi	600	Solar PV	Concept	2026
21	Java	Karangkates Floating PV	100	Floating PV	Concept	2025
22	Java	Floating Saguling	60	Floating PV	Concept	2025
23	Java	Cirata Floating Photovoltaic Power Plant	145	Floating PV	Construction	2023
24	Java Sea	PLTS Tuban	74	Solar PV	Concept	2025
25	Java Sea	PLTS Pulau Legundi	5	Solar PV	Concept	2025
26	Java Sea	PLTS Bakahuni	100	Solar PV	DA Application	2024
27	Kalimantan	PLTS Tarakan	3	Solar PV	Concept	2025
28	Kalimantan	PLTS Kotabaru	1.63	Solar PV	Concept	2025
29	Kalimantan	PLTS -Badak- East Kalimantan	3.25	Solar PV	Operating	2021
30	Nusa Tengara and Bali	PLTS Sumbawa	20	Solar PV	Concept	2027
31	Nusa Tengara and Bali	PLTS Sumba Timur	10.1	Solar PV	Concept	2027
32	Nusa Tengara and Bali	PLTS Sumba Barat	10	Solar PV	Financial Close	2023
33	Nusa Tengara and Bali	PLTS Sengkol Lombok	5	Solar PV	Operating	2019
34	Nusa Tengara and Bali	PLTS Selong Lombok	5	Solar PV	Operating	2019

Source: Rystad Energy 2023

List of candidate of solar projects in Indonesia (3/4)

Solar power plants, by region

2023

#	Province	Name	Capacity	Method	Status	Start up date
35	Nusa Tengara and Bali	PLTS Sambelia	5	Solar PV	Operating	2020
36	Nusa Tengara and Bali	PLTS Pulau Pantar	5	Solar PV	Concept	2028
37	Nusa Tengara and Bali	PLTS Priggabaya Lombok	5	Solar PV	Operating	2019
38	Nusa Tengara and Bali	PLTS Oelpuah-Kupang	4.0650406	Solar PV	Operating	2015
39	Nusa Tengara and Bali	PLTS Melaya Bali	50	Solar PV	Operating	2019
40	Nusa Tengara and Bali	PLTS Maumere	1.63	Solar PV	Operating	2020
41	Nusa Tengara and Bali	PLTS Mandalika KEK	50	Solar PV	Operating	2020
42	Nusa Tengara and Bali	PLTS Larantuka/Flores	4	Solar PV	Concept	2027
43	Nusa Tengara and Bali	PLTS Bali Timur	20	Solar PV	Financial Close	2023
44	Nusa Tengara and Bali	PLTS Bali Barat	20	Solar PV	Financial Close	2023
45	Nusa Tengara and Bali	PLTS Bali 2-Jembrana Regency	40.650406	Solar PV	Operating	2022
46	Nusa Tengara and Bali	PLTS Bali 1-Kubu Regency	40.650406	Solar PV	Operating	2022
47	Nusa Tengara and Bali	Archipelago Hybr Power - Solar Pilot	8	Solar PV	Concept	2028
48	South China Sea	Tembesi Reservoir Floating Solar	266.39999	Floating PV	Concept	2025
49	Sulawesi	PLTS Sumalata	1.6	Solar PV	Operating	2016
50	Sulawesi	PLTS Sapuka	50	Solar PV	DA Application	2024
51	Sulawesi	PLTS Pulau Selayar + Diesel	10.1	Solar PV	Concept	2028

Source: Rystad Energy 2023

List of candidate of solar projects in Indonesia (4/4)

Solar power plants, by region

2023

#	Province	Name	Capacity	Method	Status	Start up date
52	Sulawesi	PLTS Likupang North Sulawesi	15	Solar PV	Operating	2019
53	Sulawesi	PLTS Gorontalo	10	Solar PV	Operating	2021
54	Sulawesi	PLTS Gorontalo nv vogt	11.7	Solar PV	Operating	2019
55	Sulawesi	PLTS Buton+ pumped storage	30	Solar PV	Concept	2025
56	Sulawesi	PLTS Bitung	41	Solar PV	Concept	2027
57	Sulawesi	PLTS Bitung w ESS	63	Solar PV	Concept	2027
58	Sulawesi	Nickel Indurstries-Morowali Industrial Park	160	Solar PV	Concept	2030
59	Sulawesi	Morowali Industrial Park (Solar)	1000	Solar PV	Concept	2027
60	Sumatra	South Sumatra hybr	10.5	Solar PV	Operating	2021
61	Sumatra	Singkarak Floating	48	Floating PV	Concept	2025
62	Sumatra	PLTS Sebesi	5	Solar PV	Concept	2026
63	Sumatra	PLTS Jakabaring Sports City	1.6	Solar PV	Operating	2018
64	Sumatra	PLTS Duri	17	Solar PV	Concept	2025
65	Sumatra	Duriangkang Reservoir Floating Solar Complex	1760	Floating PV	DA Approved	2024
66	Sumatra	Batam-Bintan-Karimun Large-scale Integrated	800	Solar PV	Concept	2050
67	Sumatra	Anantara Energy-Solar	3500	Solar PV	Concept	2032

Source: Rystad Energy 2023

List of candidate of wind potential areas and projects in Indonesia (1/2)

Wind energy potential, by region

2022

		50m Hub Height	100m Hub Height
1	Aceh	1104.5	1211.1
2	Bali	71.5	20.9
3	Banten	0.0	0.0
4	Bengkulu	0.0	0.0
5	DI Yogyakarta	0.0	0.0
6	DKI Jakarta	0.0	0.0
7	Jambi	0.0	0.0
8	Jawa Barat	780.3	418.6
9	Jawa Tengah	444.4	185.3
10	Jawa Timur	488.2	205.3
11	Kalimantan Barat	0.0	0.0
12	Kalimantan Selatan	120.4	86.7
13	Kalimantan Tengah	0.0	0.0
14	Kalimantan Timur	0.0	0.0
15	Kalimantan Utara	0.0	0.0
16	Kepulauan Bangka Belitung	0.0	0.0
17	Kepulauan Riau	36.2	0.0
18	Lampung	70.4	0.0
19	Nusa Tenggara Barat	183.8	34.5
20	Papua	1085.2	161.4
21	Papua Barat	0.0	0.0
22	Riau	0.0	0.0
23	Sumatra Barat	11.9	0.0
24	Sumatra Selatan	15.9	0.0
25	Sumatra Utara	246.2	38.4

Wind energy power plants, by region

2023

#	Province	Name	Capacity	Status	Start up date
1	Arafura Sea	Saumlaki	5	Concept	2026
2	Banda Sea & Gulf of Boni	Kei Kecil	5	Concept	2030
3	Banda Sea & Gulf of Boni	Buton	15	Concept	2027
4	Flores Sea	Selayar	5	DA Approved	2024
5	Indian Ocean	PLTB Sukabumi UPC 2	80	Concept	2025
6	Indian Ocean	PLTB Sukabumi UPC 1	170	DA Approved	2024
7	Java	Tegal	65	Concept	2028
8	Java	Probolinggo	50	Concept	2028
9	Java	Lebak	200	Concept	2027
10	Java	Gunung Kul	10	DA Approved	2024
11	Java	Garut	150	Concept	2025
12	Java	Cirebon	85	Concept	2028
13	Java	Bayuwangi	25	Concept	2027
14	Java	Bantul	50	Concept	2025
15	Java Sea	Pendeglang	253	Concept	2026
16	Java Sea	Lombok	15	Concept	2026
17	Java Sea	Lombok - NTB	100	Concept	2026
18	Kalimantan	Tanah Laut - Phase 3	60	Concept	2029
19	Kalimantan	Tanah Laut - Phase 2	20	Concept	2027
20	Kalimantan	Tanah Laut-Phase 1	70	Construction	2023
21	Makassar Strait	Takalar	60	DA Approved	2024
22	Makassar Strait	Majene	30	Concept	2028
23	Maluku	Ambon	15	Concept	2030
24	Maluku	Ambon 2	20	DA Approved	2024
25	Nusa Tengara and Bali	Tuban	66	Concept	2027

Source: Rystad Energy 2023, Wind Power in Indonesia textbook (BRIN Publishing) 2022, Arthur D. Little analysis

List of candidate of wind potential areas and projects in Indonesia (2/2)

Wind energy potential, by region

2022

	Textbook	50m Hub Height	100m Hub Height
26	Nusa Tenggara Timur	4933.0	5943.8
27	Sulawesi Utara	0.0	0.0
28	Sulawesi Tengah	15.2	0.0
29	Sulawesi Selatan	8732.7	6525.0
30	Sulawesi Tenggara	2.1	0.0
31	Gorontalo	65.1	9.7
32	Sulawesi Barat	107.2	0.0
33	Maluku	6391.7	4857.6
34	Maluku Utara	20.9	0.0
	Total	24926.8	19698.3

Wind energy power plants, by region

2023

#	Province	Name	Capacity	Status	Start up date
26	Nusa Tengara and Bali	South Central Timor 2	10	Concept	2025
27	Nusa Tengara and Bali	South Central Timor 1	10	DA Approved	2024
28	Nusa Tengara and Bali	Oelbubuk Soe	20	Concept	2025
29	Nusa Tengara and Bali	Nusa Pena/ Nusa Lembongan/Nusa Cenir	20	Concept	2027
30	Nusa Tengara and Bali	Kupang	30	Financial Close	2023
31	Nusa Tengara and Bali	East Sumba	3	Concept	2026
32	Sulawesi	Tolo 2	72	Construction	2023
33	Sulawesi	Tolo 1	72	Operating	2019
34	Sulawesi	Srap	75	Operating	2018
35	Sulawesi	Srap II	65	DA Approved	2024
36	Sulawesi	Morowali Industrial Park (Wind)	1000	Concept	2028
37	Sulawesi	Bulukumpa	50	Concept	2025
38	Sumatra	East Belitung	10	Concept	2025

- Wind energy has seen the highest growth in capacity of YOY 66.7% from 0.9 MW in 2012 to 154.3 MW in 2022
- Despite numerous projects in the pipeline and potential identified, wind energy development is largely hampered by low wind velocity, high investment cost, permits and land acquisition
- Low annual wind speeds of 3m/s-6m/s are below general required speed for wind turbine blades to spin
- Permitting and land acquisition complications remains as challenges in developing wind farm project. As an example, Samas Wind Farm Project 50MW, a joint development project of PT. UPC Renewables Indonesia and PT. Binatek Energy Terbarukan, was unable to meet the PPA's financial close deadline due to those reasons
- The 75MW Sidrap Wind Farm in Sulawasi, is ID's first wind farm and costed USD 150mn

Source: Rystad Energy 2023, Wind Power in Indonesia textbook (BRIN Publishing) 2022, Jakarta Post 2018, Arthur D. Little analysis

インドネシアのバイオマス発電所プロジェクトは、出力10MWが一般的な傾向で、最大の発電所は16MWで2025年に運転を開始する予定

Biomass power plants

No	Province	District/City	System	Project	COD	Capacity (MW)
1	West Kalimantan	*Unknown*	*Unknown*	Tersebar	2025	16
2	Maluku	Kota Tual and Maluku Tenggara	Tual	Langgur 2	2024	10
3	Maluku	Buru	Buru	Namles 2	2024	10
4	Maluku	Maluku Tenggara Barat	Saumlaki	Saumlaki 2	2024	10
5	Maluku	Aru Islands	Dobo	Dobo 2	2024	10
6	North Maluku	Sula Islands	Sanana	Sanana 2	2024	5

Source: RUPTL 2021- 2030, Power Technology 2021, Arthur D. Little analysis

政府は2021年にB40の走行試験を実施し、2023年のB35義務化を推進

Biofuel provisions for transportation sector

2016 - 2050

		2016	2025	2050
Biodiesel	Blend rate (%)	20	30	30
	Volume (Bn liter)	2.5	6.9	17.1
Bioethanol	Blend rate (%)	5	20	20
	Volume (Bn liter)	0.1	2.6	11.4
Bioavtur	Blend rate (%)	2	5	10
	Volume (Bn liter)	0.0	0.1	2.7

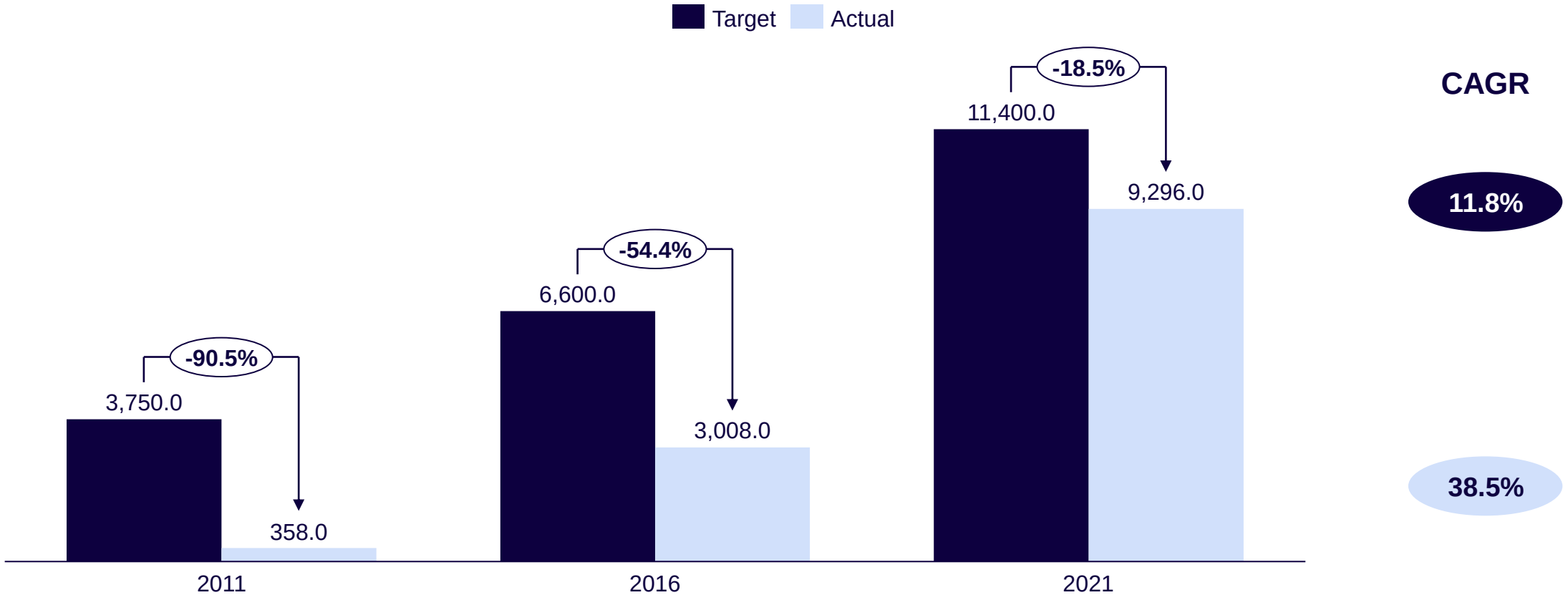
- KEN energy mix targets
  - 2025: Biofuels 13.9 Bn litres
    - RE 23% of energy mix
  - 2050: Biofuels 52.3 Bn litres
    - RE 31% of energy mix
- ID government announced in Mar 2023 that the blend will be increased to 35% by end of the year and will giving fuel retailers till mid-year 2023 to adjust their blending facilities

Source: USDA GAIN Indonesia Biofuel Annual Report 2022, Mongabay 2021, Arthur D. Little analysis

政府はバイオ燃料に対して、高い目標を掲げてきたが未達が続いていた。一方で、達成度は向上している

Tracking target and realization of national biofuel roadmap

2011 – 2021, bn litres



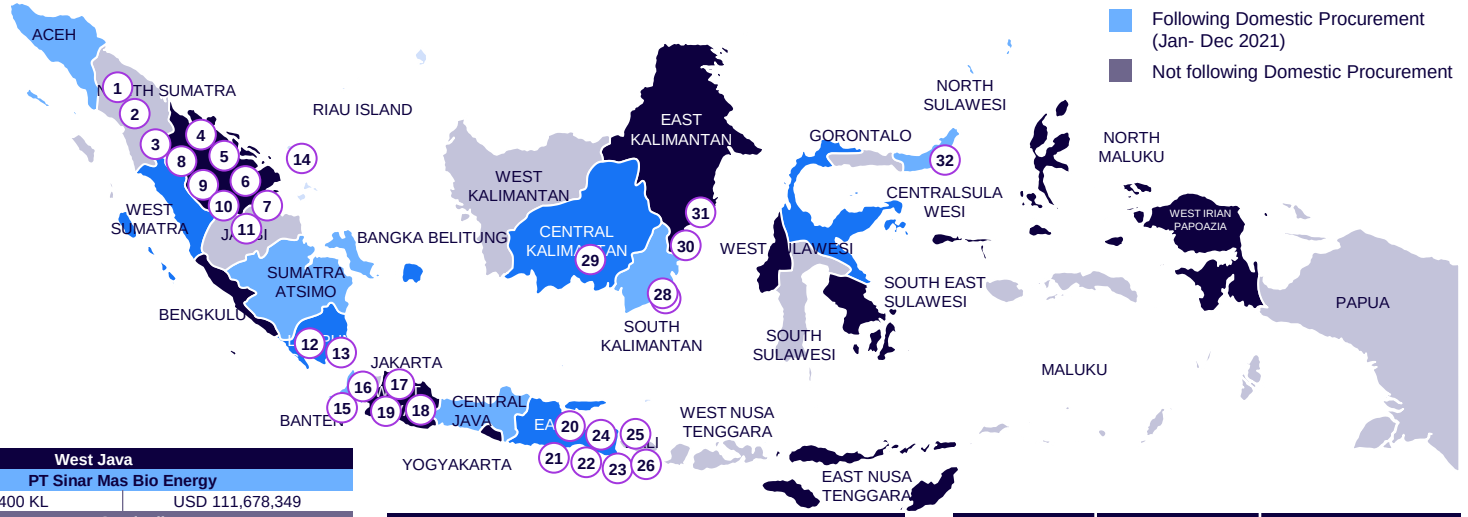
Source: Ministry of Energy and Mineral Resources 2017, Center for International Forestry research 2017, Statistica 2022, Arthur D. Little analysis

バイオディーゼル工場は主にスマトラとジャワに所在

Installed capacity of biodiesel plants, by region

2021

	North Sumatra	
1	PT Sintong Abadi	
	35,000 KL	USD 2,444,000
2	PT Muslim Mas (Medan)	
	459,770 kl	USD 31,339,031
3	PT Permata Hijau Palm Oleo	
	417,214 KL	USD 56,165,185
	Riau	
4	PT Sari Dumai Oleo	
	413,793 KL	USD 41,379,310
5	PT Intibenua Perkasatama	
	442,529 KL	USD 55,555,556
6	PT Ciliandra Perkasa	
	287,356 KL	USD 46,581,449
7	PT Pelita Agung Agrindustri	
	229,885 KL	USD 48,275,862
8	PT Pelita Agung Agrindustri	
	568,966 KL	USD 70,671,724
9	PT Sari Dumai Sejati	
	689,655 KL	USD 30,000,000
10	PT Wilmar Bioenergi Indonesia	
	1,603,448 KL	USD 158,126,118
11	PT Bayas Biofuels	
	862,069 KL	USD 85,000,000
	Lampung	
12	PT LDC Indonesia	
	482,759 KL	USD 78,518,519
13	PT Tunas Baru Lampung	
	402,299 KL	USD 26,962,963
	Riau island	
14	PT Musim Mas (Batam)	
	896,552 KL	USD 172,364,673
	Banten	
15	PT Alpha Global Cynergy	
	12,000 KL	USD 3,000,000
16	PT Multimas Nabati Asahan	
	568,966 KL	USD 48,642,000



	West Java	
17	PT Sinar Mas Bio Energy	
	455,400 KL	USD 111,678,349
18	PT Sumiasih	
	114,943 KL	USD 26,666,667
19	PT Darmex Biofuel	
	287,356 KL	USD 57,629,630
	East java	
20	PT Anugerahinti Gemanusa	
	160,920 KL	USD 48,984.354
21	PT Batara Elek Semesta Terpadu	
	780,459 KL	USD 52,618,102
22	PT Wilmar Nabati Indonesia	
	2,250,000 KL	USD 109,335,484
23	PT Energi Baharu Lestari	
	229,885 KL	USD 6,370,370
24	PT Eterindo Nusa Graha	
	568,966 KL	USD 80,548,055
25	PT Eco Prima Energi	
	579,310 KL	USD 30,099,594

	Bali	
26	PT Bali Hijau Biodiesel	
	360 KL	USD 222,222
	South Kalimantan	
27	PT SMART Tbk	
	440,517 KL	USD 59,677,951
28	PT Jhonlin Agro Raya	
	568,966 KL	USD 60,426,512
	Central Kalimantan	
29	PT Sukajadi Sawit Mekar	
	402,299 KL	USD 52,222,222
	East Kalimantan	
30	PT Kutal Refinery Nusantara	
	1,143,247 KL	USD 65,640,556
31	PT Energi Unggul Persada	
	948,276 KL	USD 25,444,253

Region	Capacity (KL)	Investment (USD)
Sumatera	7.791.322	903.384.834
Java	5.370.634	575.794.827
Kalimantan	3.503	263.411.493
Sulawesi	475.862	32.620.407
Total	**17.141.122**	**1.775.211.561**

	North Sulawesi	
32	PT Multi Nabati Sulawesi	
	475,862 KL	USD 32,620,407

Source: Asosiasi Produsen Biofuel Indonesia 2022, Arthur D. Little analysis

インドネシア政府はエネルギー政策や環境政策でCCS導入の重要性に言及。また2023年3月にはエネルギー鉱物資源省が上流石油・ガス事業活動におけるCCS・CCUSの実施に関する規則を発表

インドネシア動向サマリ

インドネシアのCCUS導入に対する意向		
CCUS事業の推進に対する意向		• 現時点で規制・補助金は未整備であるものの、CN目標達成のためにCCSを導入を図る方針であり、CCSを推進する意向あり
	各種政策（産業/エネルギー/環境）	• 再エネ導入を導入するものの石炭火力依存は継続するため、CCS導入を目指す意向あり • CO2削減の手段としてCCSの重要性を言及しており、産官学連携でCCS技術開発や事業化に向けて取り組みを強化 • 2023年3月にエネルギー鉱物資源省が上流石油・ガス事業活動におけるCCS・CCUSの実施に関する規則を発表。CCU・CCSの構成や実施の段階及び手続き、モニタリング・報告・検証（MRV）、CCS・CCUSの結果の金銭評価、インセンティブ、保険等の経済的な規定などを定める
	規制	• CCS施設「Gundih CCS」、「Tangguh CCS」の立ち上げに向けて、2023年~2024年にCCS制度を整備する予定
	補助金	• 稼働時の直接補助金、クレジット制度、税額控除に関しては2023年~2024年に制度設計図る方針
CCUS事業の反対活動		• CCSを国民があまり認知しておらず、現時点では具体的な反対意見は出ていない
インドネシアでの事業参入における有望手段		
CCUS事業の意思決定者におけるパワーバランス		• CoE*が中核となりCCS戦略、規制、補助金政策の策定を行う
CCUS事業の意思決定者に対する働きかけ		• インドネシアにおけるCCS推進上の課題を踏まえた際、CCSHUBの構築支援、地下構造が複雑な立地向けのCO2貯留技術の提供、CCSに関する共同研究や現地技術者への専門知識の共有が有効と想定

*CoE：National Center of Excellence (CoE) for CCS and CCUS（政府、研究機関、民間企業によって結成された組織）
Source：IEEJ、各種二次情報よりADL作成

民間企業・研究機関の意見を集約し、Center of ExcellenceがCCS戦略、規制、補助金政策を策定

CCS関連プレイヤー

政策意思決定者

政府

President Staff Office

CoEを立上

CCS関連政策・規制を策定

- Ministry of Energy and Mineral Resources (MEMR) — Center of Excellence (CoE)
- Ministry of Environment and Forestry (MoEF)
- Ministry of Finance

：

※CCSの規制は中央政府が規定するものであり、州政府による規制は策定されない方針

民間企業

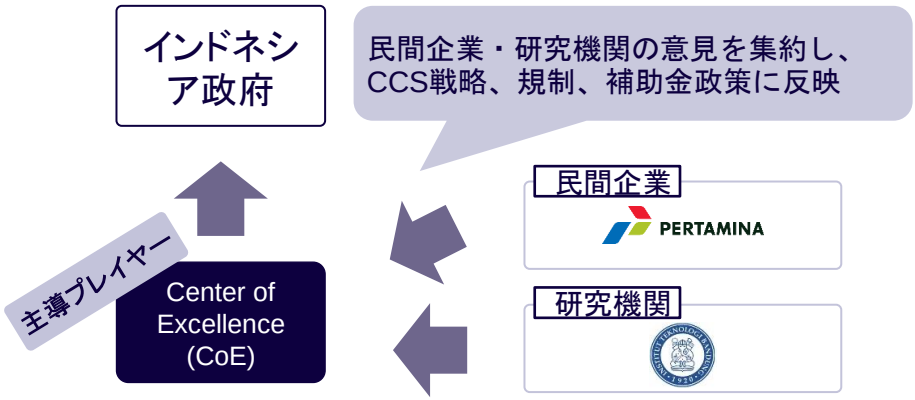
内資系	外資系
PERTAMINA	bp ExxonMobil

CCSプロジェクトにおけるパワーバランス

概要

- Center of Excellence(CoE)がインドネシアのCCS関連プレイヤ（民間企業・研究機関）の意見を集約し、ルールを策定

パワーバランス



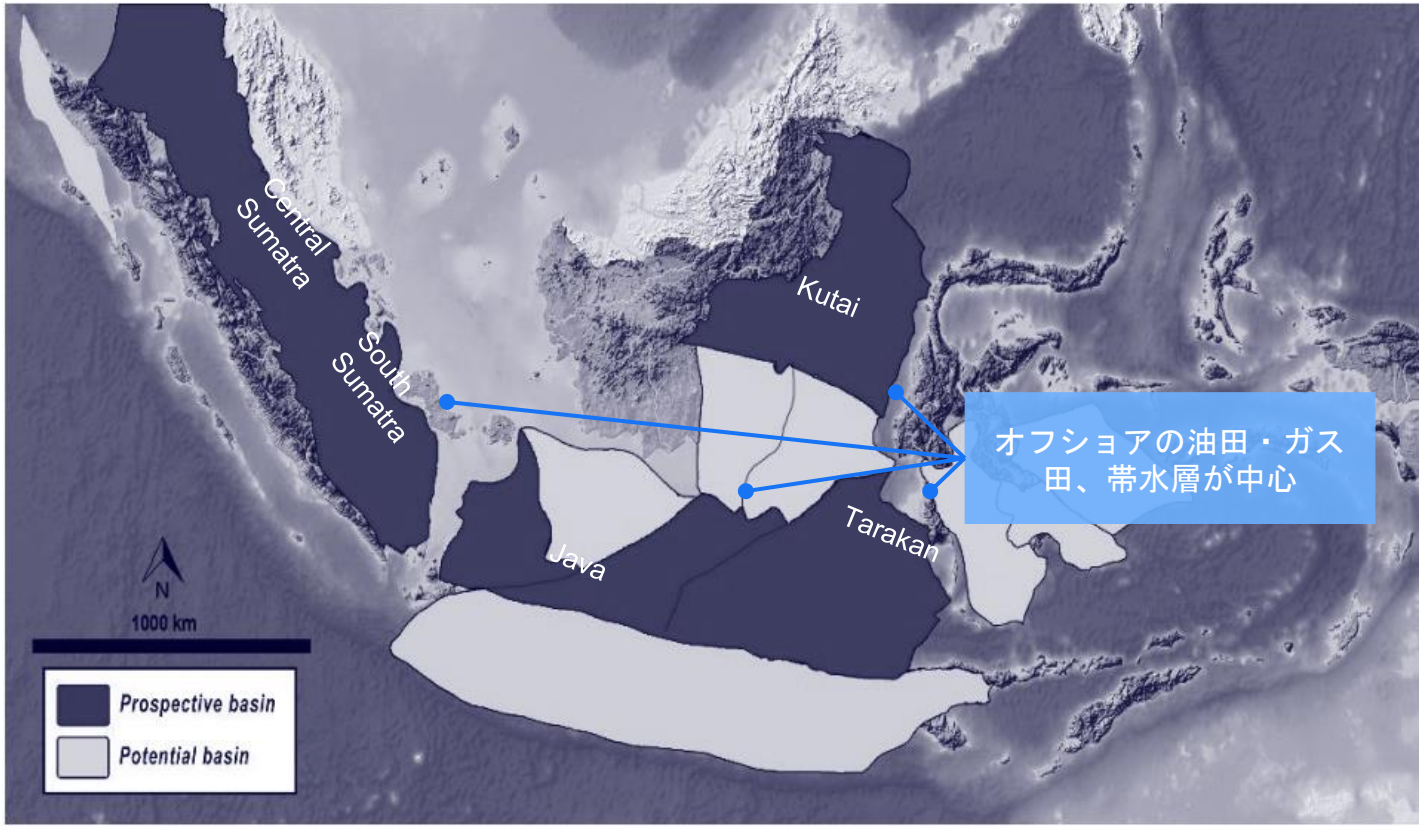
背景

- Center of Excellence(CoE)は国内のCCSに関する政策・技術のネットワーク拠点としてエネルギー鉱物資源省(MEMR)が立上
- CCS関連の政策・技術について、意見を募るワークショップを定期的に開催し、 CCS戦略、規制、補助金政策に反映している

出所：出所：National Center of Excellence (CoE) for CCS and CCUS HP及びGCCSI ”The Emergence of CCS in Malaysia and Indonesia（2022年4月）より

インドネシアにはオフショアの帯水層やガス田、油田の近くを中心に90-100GtonのCO2貯留ポテンシャルが存在

インドネシアのCCS適地



COMMENTS

- 90-100GtonのCO2貯留ポテンシャルが存在
- 貯留可能地域は開発済み、または既に枯渇したオフショアのガス田や油田の近くに存在

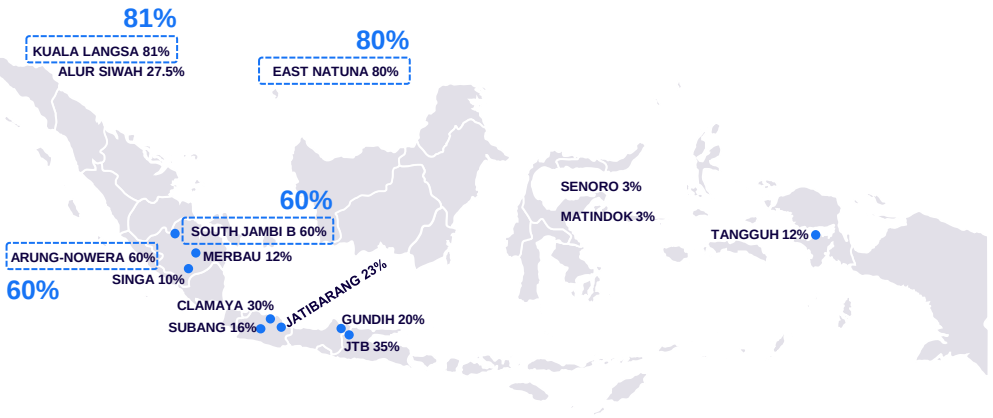
【主要なCCS適地の貯留ポテンシャル】

– South Sumatra: 874 ~1,278 mn tons
– Central Sumatra: 229 mn tons
– Kutai: 8,000 mn tons
– Java: 386 mn tons
– Tarakan: 130 mn tons

出所：GCCSI “A global assessment of the geological CO2 storage resources potential (2016)

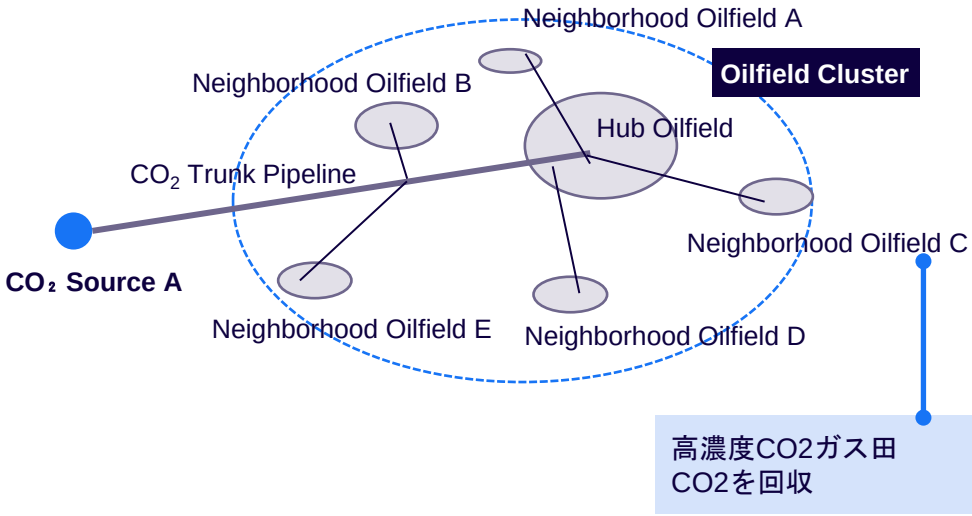
高濃度CO2ガス田の開発のため、複数のCCS施設を組み合わせたCCSHUBを構築を行う必要がある

インドネシアの高濃度CO2ガス田地帯



- 油･ガス田に含まれるCO2含有量は60～81%で分布しており、他産油国に比べ相対的にCO2含有量が高い

複数のCCS施設を組み合わせたCCSHUBを構築



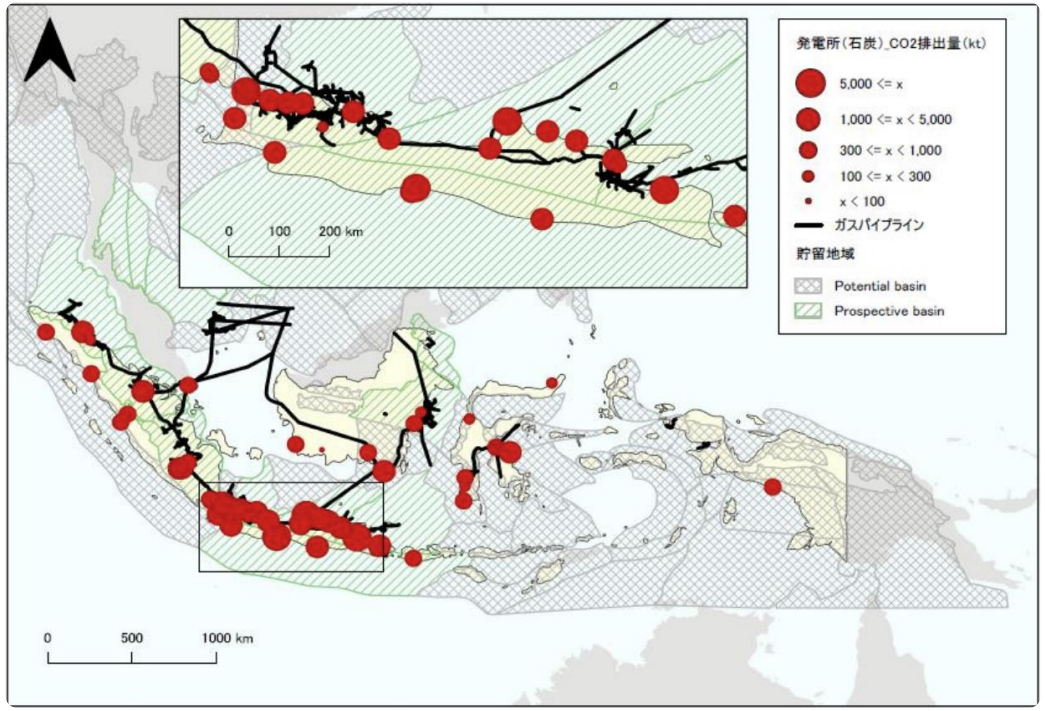
- 複数のCCS施設を組み合わせたCCSHUBを構築

出所：JGC Corporation (2018) A Comprehensive Study of CO2-EOR for Mature Oil Field in South Sumatra, 14th International Conference on Green House Gas Control Technologies (GHGT-14), October 2018よりADL作成

排出源-石炭火力発電/天然ガス火力発電

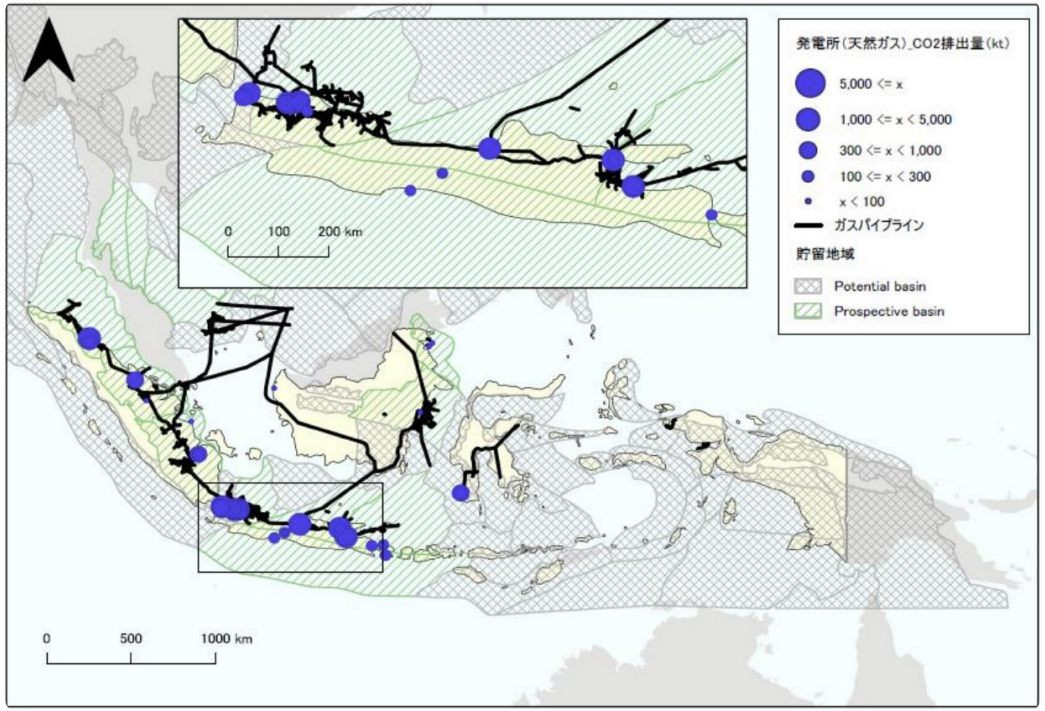
石炭火力発電×貯留地

石炭火力発電所は、主にジャワ島に分布しており、年間 CO2 排出量が 5,000kt を超える大型の石炭火力発電所がいくつも存在



天然ガス火力発電×貯留地

天然ガス火力発電所の分布は石炭火力発電所と同様にジャワ島に多 く存在し、特にジャカルタ周辺に集中している。天然ガス火力発電所の年間 CO2 排出量は 1,000kt 以下の小型のものが比較的多い

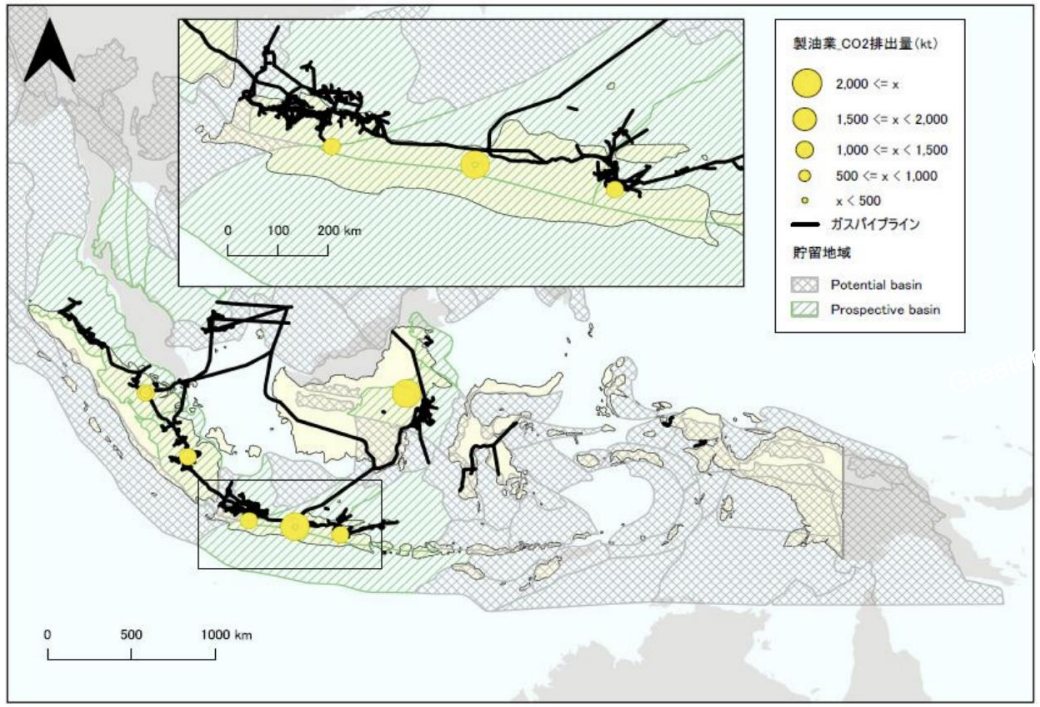


Source：令和２年度二国間クレジット取得等のためのインフ ラ整備調査事業（国際貢献定量化及びＪＣM実現可能 性調査（ＣＣＵＳ含む）、人材育成事業支援事務局及 びＣＥＦＩＡ国内事務局業務）報告書

排出源-製油所/製鉄所

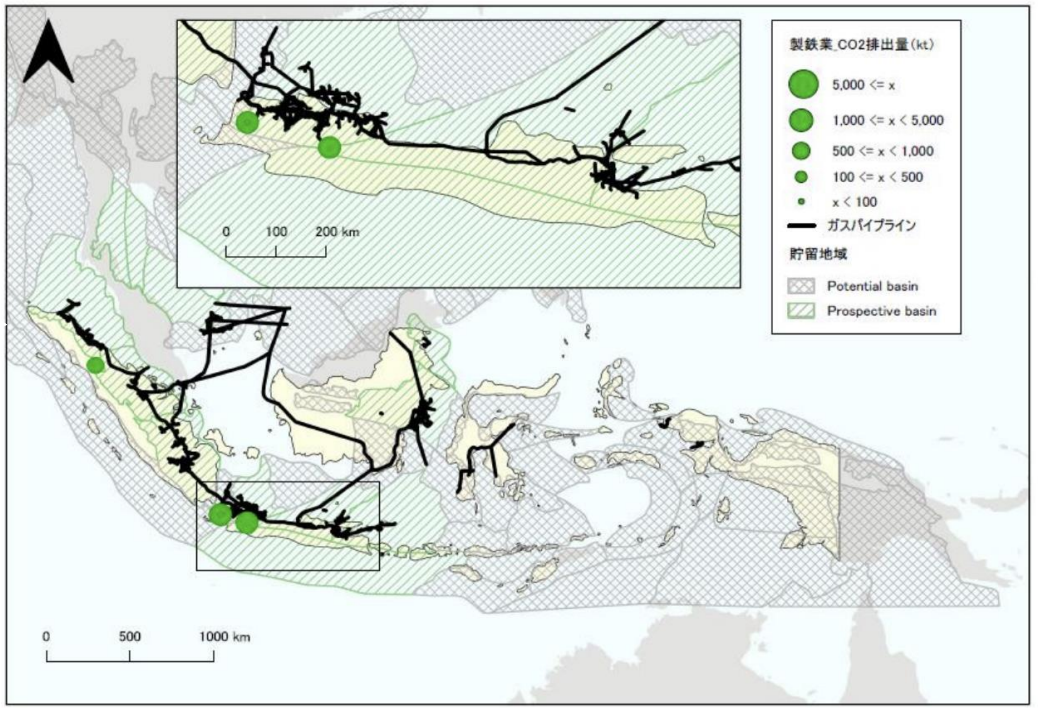
製油所・ガス×貯留地

製油所及び国際ガスパイプラインとCO2貯留地は図 6-46のとおり である。ジャワ島の中部とカリマンタン島の東部には年間 CO2 排出量が 2,000kt 以上の大型 の製油所が存在



製鉄所×貯留地

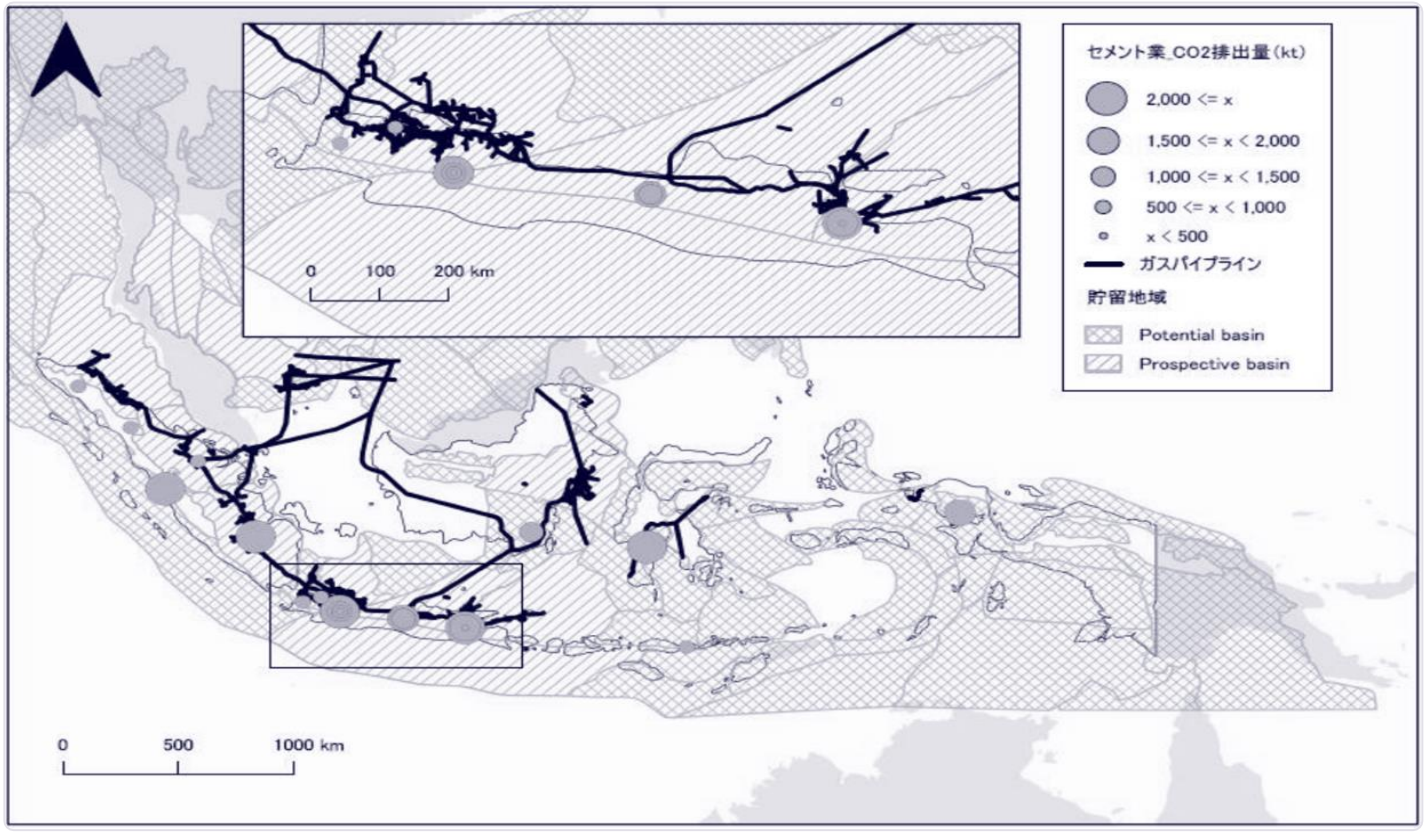
鉄鋼所及び国際ガスパイプラインとCO2貯留地は図 6-47のとおり である。製鉄所は主にジャワ島西部に分布しており、年間 CO2排出量は 3,000kt 程度



Source：令和２年度二国間クレジット取得等のためのインフ ラ整備調査事業（国際貢献定量化及びＪＣM実現可能 性調査（ＣＣＵＳ含む）、人材育成事業支援事務局及 びＣＥＦＩＡ国内事務局業務）報告書

排出源-セメント

セメント×貯留地



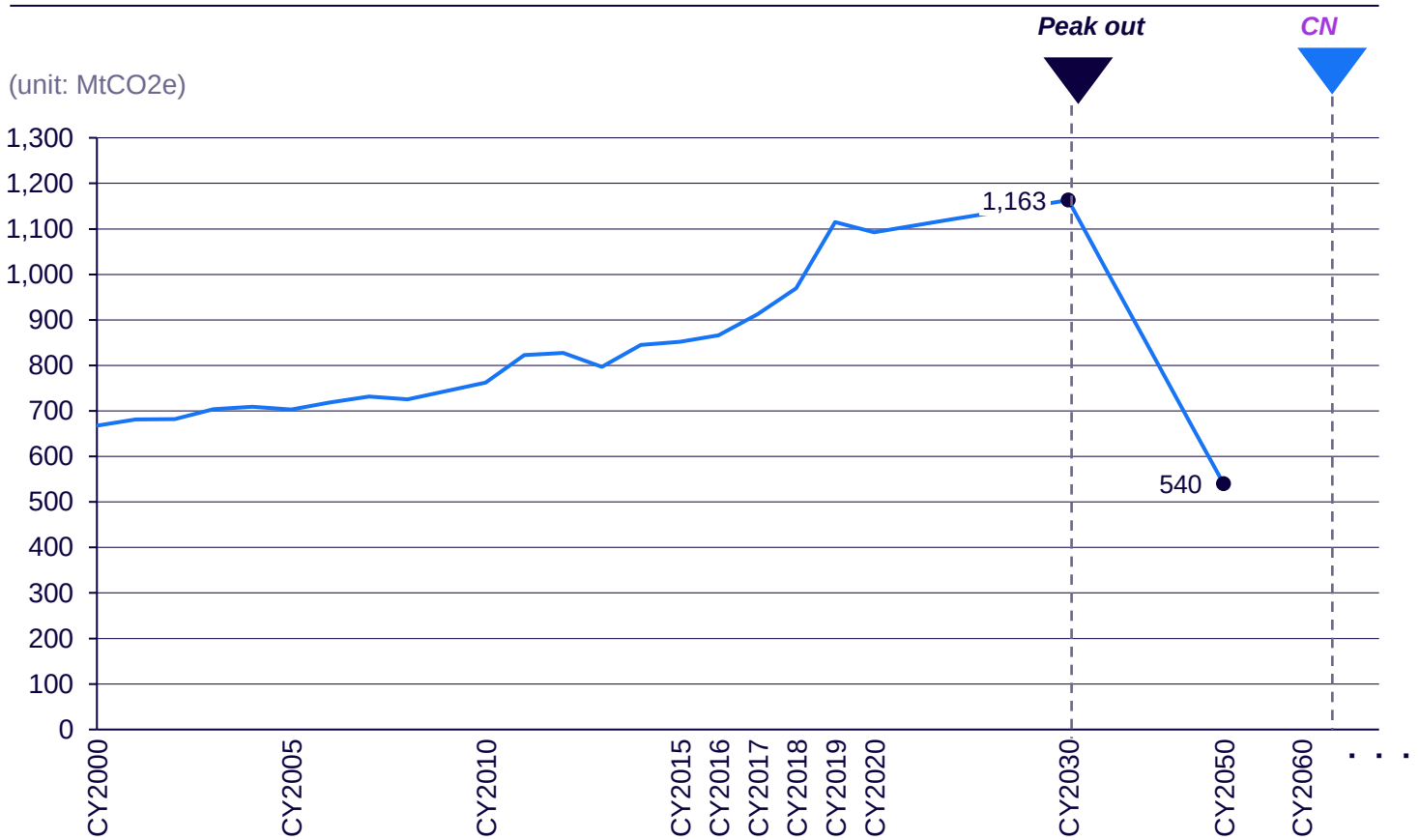
COMMENTS

セメント工場は主にジャワ島に分布しているが、スマトラ島やスラウェシ島にお いても、年間 CO2 排出量が 2,000kt 以上の大規模排出源が存在

Source：令和２年度二国間クレジット取得等のためのインフ ラ整備調査事業（国際貢献定量化及びＪＣM実現可能 性調査（ＣＣＵＳ含む）、人材育成事業支援事務局及 びＣＥＦＩＡ国内事務局業務）報告書

NDCでは2030年に無条件でBAU比32%減を宣言。更に、インドネシア政府の戦略文書では、2030年にピークアウト、2060年にCN達成を宣言

GHG Target



COMMENTS

Current declaration of unconditional **reduction in emissions of 32% of BAU by 2030**, and up to 43% reduction with international support. Target of 2060 has been framed keeping in mind peak of GHG would be 2030

In next 10 years, GHG levels will be stable as economic growth and carbon sink created via natural forest cover would limit emissions

Rate of decline from 2030 to 2060 is estimated to be 30.7 Mton CO2e/year

Focus of LTS-LCCR[1] is to prioritize 5 key sectors: energy, waste, industry, agriculture, and forestry

With the given trend, 2050 emission would be reduced to 540 MtCO2e reducing impact of climate change of national GDP loss by 3.45% in 2050

Source：令和２年度二国間クレジット取得等のためのインフラ整備調査事業（国際貢献定量化及びＪＣＭ実現可能性調査（ＣＣＵＳ含む）、人材育成事業支援事務局及びＣＥＦＩＡ国内事務局業務）報告書

インドネシアのCN政策は、石炭火力発電を制限し、森林保護と外国投資を奨励する規制に主眼が置かれている

	GHG Target Action	Detail
アメの政策	助成金	• Subsidy is provided to alternative energy sector to boost adoption and usage • RE projects have an established tariff ceiling called BPP
	税制優遇措置	• Tax related incentives such as reduced overall tax or tax holiday boosting overall financial viability • Govt imposed tax reduction by 5% on RE projects • Allow faster asset amortization and lower tax on dividend payment for NRI in RE projects
ムチの政策	排出権取引制度 (ETS)	• Carbon credit trading system to meet carbon credit/emission related criteria • No ETS policy however a trial programme was conducted in March-Aug 2021 in which 80 coal plans participated • Pilot was to study the ETS mechanism and inform development of national ETS which should be implemented by 2024
	罰則	• Penalty imposed via higher taxes or cess to disincentivize usage (Currently stop) • Carbon tax or carbon pricing to be implemented following ETS as part of 12MP
	規制	• Mandates to increase alternative energy source • Limiting new coal fire plant constriction • Forced emission reporting disclosure for monitoring and control • For forest preservation – integrated, comprehensive, spatially explicit land use planning via Regulation 46/2016 • **Allowing foreign shareholder ownership depending upon differ-rent capacity (for e.g. >1 MW up to 95% of foreign ownership)** • **No new coal fired plant from 2023 onwards**

Source: Arthur D. Little Analysis, Secondary Research, Expert Interview

非エネルギー起源である森林・土地利用部門でのGHG削減が重要であり、林地の使用禁止、泥炭地の新規許可の禁止などの政策により削減に取り組む

産業別		CN目標	政策方針の概要
非エネルギー起源	森林・土地利用	• Current AFOLU emission levels are **568 Mt² CO2e with target to convert it into net sink by 2030**	• **Bans conversion of forested land** (productive production forest) in forest area • Govt Regulation No 46/2016 on strategic environment assessments (SEAs) provided comprehensive guidance on land use planning • **No new permit for the use of peatland (50% of total emission from AFOLU sector comes from use of peatland through peat fire)** • Govt. Regulation No. 15/2017 mandates private sector and local government to improve use of peatland and water management • **Private sector involvement in management of peatland and water management is expected to be prioritized**
	農業	• Target given jointly **with Forest and Land** Use called AFOLU (Agriculture, Forest, and Land Use) – Given above	• Agriculture sector contributes around 8-10% of GHG and major policy being encouraged is use of low emission variety and water saving paddy cultivation system as well as utilization of livestock • **Agriculture loans by banks is only 9% given banks impose collateral requirements however this would rise through innovative finance schemes** • **Encouraging organic fertilizer would reduce dependency on nitrogen** • Integrated farming system is being regulated by Minister Regulation No. 105/2014- **however current penetration level only 3% of total potential;** priority form of farming to be developed • Other proposed policies are modernization of harvesting tools and policies to reduce yield losses which is 11% of retail level

Note: 1) Refers to quantitative target of the item discussed based on Indonesia LTS LCCR 2050 Document; 2) 1,000,000 tons
Source: Arthur D. Little Analysis, Expert Inputs, Secondary Research

エネルギー起源のGHG削減では、再エネとCCUSの利用による脱炭素化に加え、運輸部門に焦点を当てた一連の政策に取り組んでいる

産業別	CN目標	政策方針の概要
エネルギー起源	• Current Energy sector emission levels are **393 CO2e** with following target – **2030: Achieve peak of Mt[2] 1030 CO2e** – **2050: Reduce to Mt[2] 575 CO2e** • **Broad power generation mix are renewables 43%, coal 38, natural gas 10%, CCS 8%** • Current energy mix are renewables 16%, coal 59%, natural gas 21%, others 4% (geothermal/biomass) • By 2050, carbon intensity of power generation to be 104 gram CO2/kWh • Within transport sector, dependence on fossil fuel is to reduce – Target in 2050 is Biofuels (46%), oil fuels (20%), electricity (30%), natural gas (4%) – Expected rise in biofuels translate into 20-25% growth in volumes	• 3 key policy focus covering (i) energy efficiency measure in sub sectors (ii) substitution of fossil fuel by RE (iii) electrification of end use – building and transportation • Decarbonize power sector by high utilization of RE, equipping operational coal fired plants with CCUS/CCS • Switch to RE is also important because Indonesia exports 50% of its coal and in long term other countries too would reduce its dependence on coal • **Indonesia's RE potential is estimated at 442GW of which only 5% has been exploited** • **Around 75% of coal plants would be equipped with CCS to achieve zero emissions in coal power plants** • Targeted that all future household will have electricity access through grid and non grid as well as solar roof top PV • Plans to deploy Smart Micro Grid in remote areas **Transport Sector (Policies)** • **Emission reduction in transportation sector is expected via electrification of transport** – **Target of 2.1 mn EMC in 2025 to reach 2.5 mn in 2030** – **Target of 400K PV in 2025 to reach 600K in 2030** • Supplying more biofuels for diesel substitute and ethanol blending

Note: 1) Refers to quantitative target of the item discussed based on Indonesia LTS LCCR 2050 Document; 2) 1,000,000 tons
Source: Arthur D. Little Analysis, Expert Inputs, Secondary Research

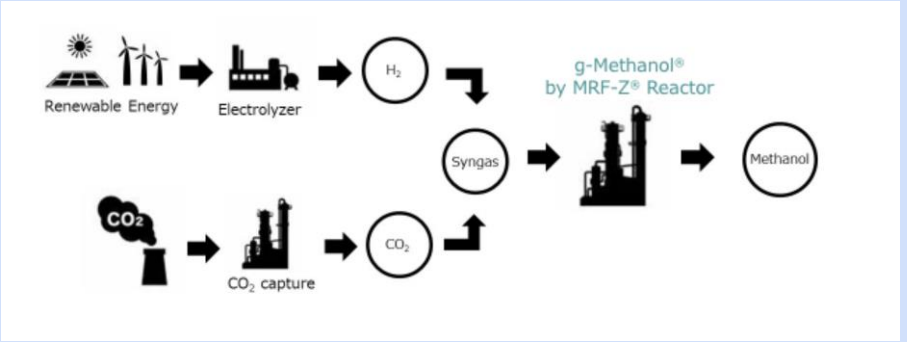
Blue CarbonやE-fuelへの取り組みが存在（ただしCOP27 前からのアップデートは限定的）

Blue Carbon

- 世界経済フォーラム（WEF）は、2023年1月19日、2023年年次総会において、インドネシア政府によるブルーカーボン生態系の復元と海洋保全に対する取り組み拡大への高い志を支援するため、同政府と新たなパートナーシップを結んだことを発表
- 本パートナーシップは、世界で急増する高品質なブルーカーボンのクレジットとプロジェクトの需要に応じ、世界のさまざまな分野でブルーカーボンの活動を行う人々をつなげるために、フォーラムが主導する一連の海洋行動計画（Ocean Action Agenda）の第一弾となる

E-Fuel/E-Methanol

- 東洋エンジニアリングによる
  CO_2と再生可能エネルギー由来の水素から合成された環境循環型のメタノールを製造する「G-Methanol」プロセスの実証を検討



Source: Blue Carbon.jp 2023年3月3日記事、2022年7月 JETRO「インドネシアの脱炭素化に向けた貢献」

5 発電事業者

09年秋に制定された新電力法により、PLN社以外の電力事業への新規参入も認められたが、新規参入者は無電化地域など限定的な地域展開のみとなる可能性がある

電力事業への新規参入に関する新法案

- インドネシア国会は2009年9月8日、「新・新電力法案」を賛成多数で可決した。改正前の「電力法」では、国有電力公社（PLN）が電気事業を独占的に行うとされていたが、「新・新電力法案」では新たに中央・州政府に電気事業の許認可権を付与することが盛り込まれており、電気事業への新規参入者の登場が期待される。
- プルノモ・エネルギー鉱物資源相は、新法の骨子について、1945年憲法第33条の理念に則し、電力供給事業が国の管理下にあると説明した上で、政府は規制機能に加え、国営・州営企業を通じた電力事業者の役割を担うと指摘。**民間企業の電力供給事業参入は認められるものの、国営企業に優先順位を与える**と述べた。
- 一方で、同省のプルウォノ電力エネルギー利用局長は、**PLNの電力インフラが整備されていないへき地では、民間企業による電力小売が認められる**と説明。インフラが構築済みの地域では、民間企業や協同組合などがPLNに電力を卸売販売できると指摘している。

Source: 海外電力調査会website, NNA.ASIA (2009/09/09）

政府は、外資による発電事業への参入を奨励している

Act on power generation business

Royalty and Tax Regime	· **Tax incentives and VAT-free for development of power generated from renewable energy** in end to end supply chain (spare parts, import duty exemptions, etc) · Preferences the use of local contents for both human and material resources for nation development · Tax Holiday for investment in RE PPs as of 2019
Permitting and Approval	· State electricity company (PLN) is given "first priority position" to supply electricity in the public interest · Government/ local government has the right in providing opportunities for local owned enterprises, private enterprises to the development of un-served area of electricity · Government set up priorities for the development of power plant sourced from renewable energies, which are (1) Geothermal, (2) Hydro, (3) Biomass, (4) Solar, (5) Wind, (6) Tidal · Multiple approvals for land right acquisition (central, local government, MOEF), or for hydro and floating solar PPs (central, local government, MPWH)
Competition Laws	· PLN has a de facto monopoly over transmission, distribution and supply of electricity (government mandate) · **For medium to large scale power plant, depending on investment capability, government may appoint joint partners in investment, technology transfer and operatorship** · Electricity business includes power generation, transmission and distribution conducted by 1 business entity within one business area
Subsidies & Prices	· **Government has the right in deciding electricity prices/ tariff** according to the public interest and regional purchasing power level inclusive of production cost consideration · Government allows differentiation of tariffs across regions, and parliament approval is required · Government has undertaken significant reforms to reduce energy subsidies, such as the Bahan Bakar programme (BBM) · Government has introduced price act mechanisms to regulate the prices of certain energy products, such as electricity
Investment Climate	· Investment for power plant < 1 MV is reserved for micro and small medium enterprises and cooperatives · **Investment for small power plant (1-10MV) is open with partnership scheme** with State Electrical Company and/or local enterprises, · **Investment for power plant >10 MV and Geothermal power plan is open for foreign capital ownership** · Power plant transmission, distribution, construction & installation, EPC services, electricity consultation, tech development are open for foreign capital ownership with maximum share of 95

Source: Asian Development Bank 2020, Ministry of Environment and Forestry 2023, Ministry of Public Works and Housing 2023, Lexology 2023, SSEK 2023, Fitch Ratings 2022, International Institute for Sustainable Development 2022, Climate Investment Fund 2022

しかし、限られた補助金や政策の相違、PPA契約の参入禁止などがIPP参入の障壁となっている

Barriers to IPP entry

Lack of incentives mechanism	· Indonesia currently subsidises fossil fuel-based power generation (IDR 83.7 trillion or $5.6 billion in 202112) and provides tariff subsidies to the different consumer categories. In contrast, **limited subsidies are available for renewable power sources**, which places them at a disadvantage vis-à-vis fossil fuels
Tariff caps for renewable energy	· **Currently, if the final tariffs (capped at 85% of the local BPP if higher than the national average) are subject to extensive negotiations between PLN and the IPPs and require significant time and effort from the latter** · However, in the absence of direct subsidies for renewables, the present tariff mechanism does not allow renewable energy projects to compete fairly with fossil fuel-based infrastructure, which limits their financial viability
Land acquisition procedures	· Securing land for renewable energy projects, such as solar or wind farms is a major obstacle where Securing land for renewable energy projects, such as solar or wind farms, can be a major obstacle are time consuming
Excess Capacity from Coal-Fired Power Plants	· Indonesia has plans to move forward with renewable energy, however, PLN has excess capacity as majority of it's energy sourced are from Coal-Fired Power plants
Discrepancies and planning in policies	· Discrepancies in planning and policy considerations were observed in **the different power sector planning documents published by national agencies**, which add add complexity for investors and project developers · Stringent local content requirements discourage investments in renewable infrastructure projects in Indonesia
Power purchase agreement practices	· **Indonesian regulations do not allow IPPs to enter into direct power purchase agreements with customers**, which limits the ability of consumers to procure power produced from renewable sources directly · Indonesia also does not currently have a standard PPA regime, agreements are assessed and negotiated on a case-by-case basis, increasing complexity, reducing transparency, and lowering investor confidence overall

Source: World Economics Forum 2022, Kamar Dagang dan Industri Indonesia 2022

同前頁

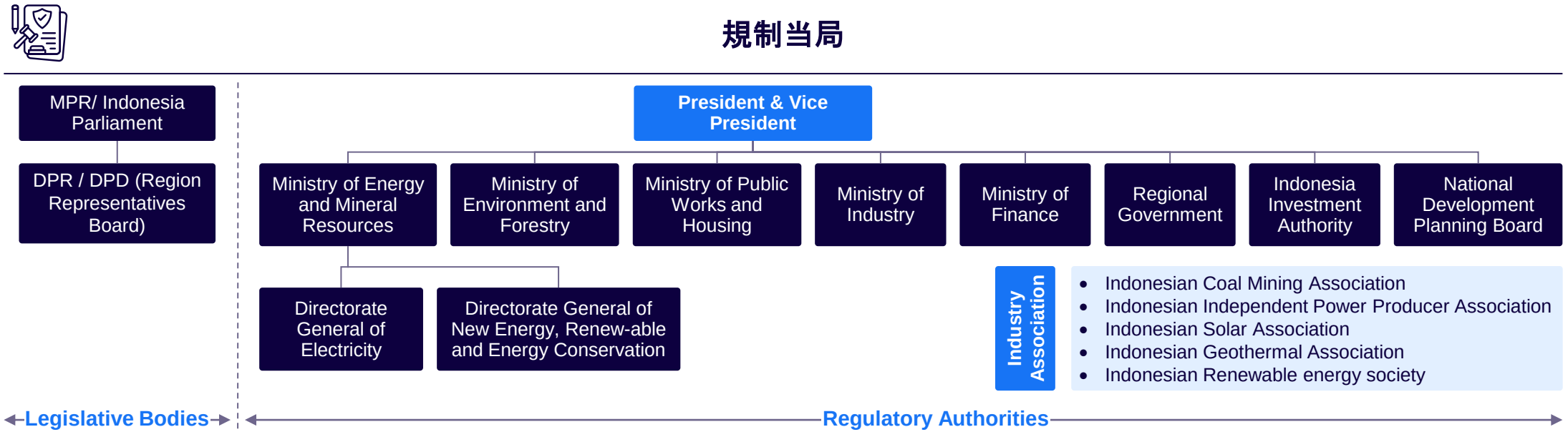
Risks Consideration for IPPs with the new MEMR Regulation No.10/2017

Risk Sharing and Allocation	・ Under the new PPA, **PLN is no longer obliged to pay Deemed Dispatch for natural disaster force majeure (FM).** Instead, the PPA can be extended by the length of time interrupted by disaster and project repair which may not satisfy lenders, who require regular debt service from project cash flows. ・ In a case for government FM, both parties will be released from their obligations.
Type of Contract and Period	・ **A PPA's duration is a maximum of 30 years after COD and no renewal is possible** since IPP must apply BOOT business scheme (Building-Own-Operate-Transfer) in which **IPP's facilities shall be transferred to PLN at the end of concession.**
Penalties	・ In a case that IPP cannot meet its obligations and there is a delay in COD on accounts of IPP, IPP is required to pay a penalty proportional to the cost that PLN must bear for unrequited supply. ・ PLN is also required to pay a penalty for the failure of a power evacuation on account of PLN, except under certain FM events.

Source: 海外電力調査会website 2017、NNA.ASIA（2009/09/09）

電力関連事業への参入に当たっては、複数の規制当局から受ける様々な事業規制のインパクトについて検討しておく必要がある

規制当局



Impact to Industry Players

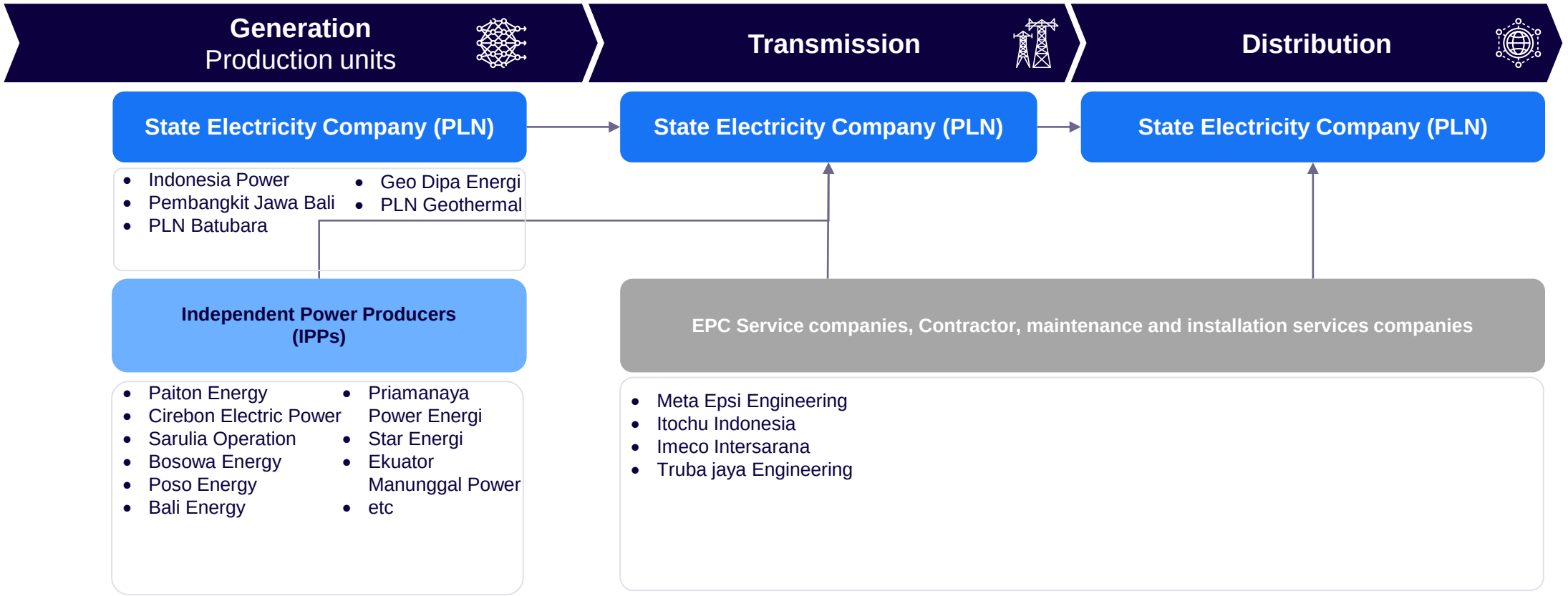
- Formulate laws and required regulations regarding industry practice for approval of President
- Approval bodies
- Tariff setting
- Oversee electricity supply situation
- National Electricity master plan
- State budget for rural electrification, RE and T&D
- Approval of IPP tariff
- Domestic market obligation on coal
- Policies on RE: geothermal, small hydro, etc
- Set mechanism and policies electricity pricing and subsidies
- Tax and levies for Power and Electricity sector
- IPPs Contract Scheme
- Regional rights in approving regional/ local power/ electricity project
- Regional income tax
- Land approval
- Overseeing foreign direct investment to Indonesia
- One door step policy for Investment
- Set up medium term national dev. Plan
- Foreign loan, & grant (Multilateral & Bilateral)
- Public Private Partnership Development

Source: Multiple Indonesian ministry websites 2023, Arthur D. Little analysis

インドネシアの電力を取り巻くプレイヤーは以下の通りで、PLNを中心に発電においてIPPが存在(発電自由化のみ)

Key players and value chain

NON-EXHAUSTIVE

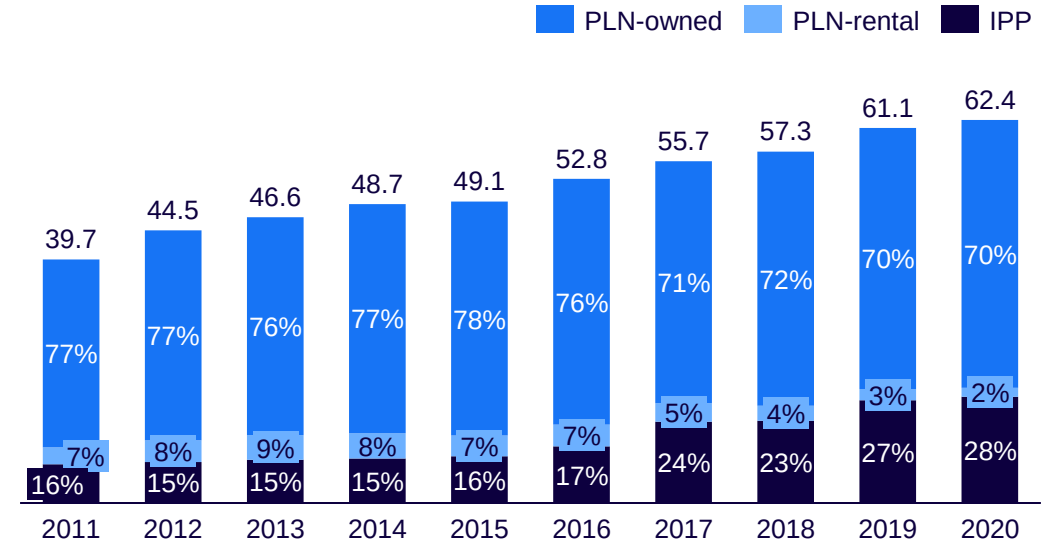


Source: Perusahaan Listrik Negara (PLN) 2023. Arthur D. Little analysis

PLNがエネルギー市場を支配しているため、将来的にはIPPに追加容量を割り当て、より多くのIPPの参入を認める計画

Realized generation, by operators

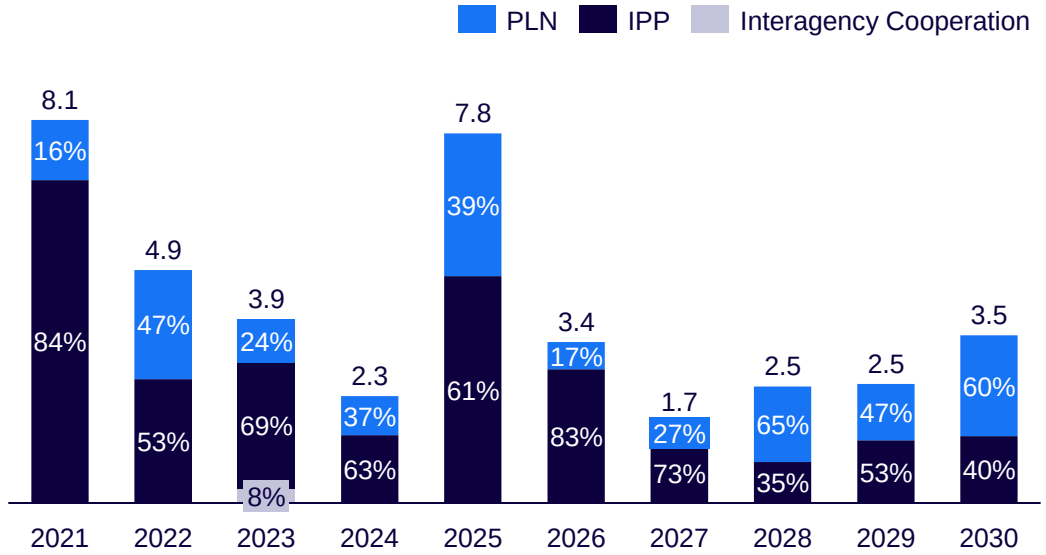
2021 – 2030, GW



- As of December 2020, the total installed capacity of power plants in Indonesia is 62.4 GW, consisting of PLN-owned 43.7 GW, rental 1.4GW and IPP 17.3 GW
- Most of these plants are in the form of 51% PLTU, followed by PLTG / PLTTGU / PLTMG about 29%, PLTD about 7%, PLTA / PLTM about 8%, PLTP about 5% and the rest is other renewable energy.

Total additional installed capacity, by operators

2021 – 2030, GW



- The total additional capacity required is 40.2 GW over the next 7 years till 2030, spikes in 2021 and 2025 are efforts to meet energy targets
- The type of plant to be built the most would be EBT of 20.9 GW (51.6%) consisting of hydropower / PLTM by 10.4 GW (25.6%) of the total capacity, followed by PLTS by 4.7 GW (11.5%), PLTP by 3.4 GW (8.3%), other EBT by 1.5 GW (3.7%) in the form of PLTB (0.6 GW), PLTSa, PLTBg, PLTBn and PLTBm (0.6 GW).

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

政府はエネルギー源の多様化により燃料補助金を削減する方針

Background	• Indonesia is the 8th highest country with fuel subsidy in the world. • Fuel subsidy spending in 2022 reached Rp 157.6 trillion and in 2023, government predicts fuel subsidies will rise as high as **336.7 trillion rupiah.** • Fuel subsidy constitutes of 11.4% of Indonesian state budget in 2022.
Challenges	• Current **fuel subsidy is too high** and could be allocated to other government project and sectors • Indonesian is experiencing government **budget deficit around 4.51%-4.85% of GDP** just slightly below the legally binding 3% of GDP, reducing fuel subsidy could alleviate the deficit • **Subsidy is enjoyed by the middle- and high-income** populations instead of the low-income target • Indonesia has plans to increase production of renewable energy, however, currently Indonesia has excess capacity of Coal-Fired Power plants

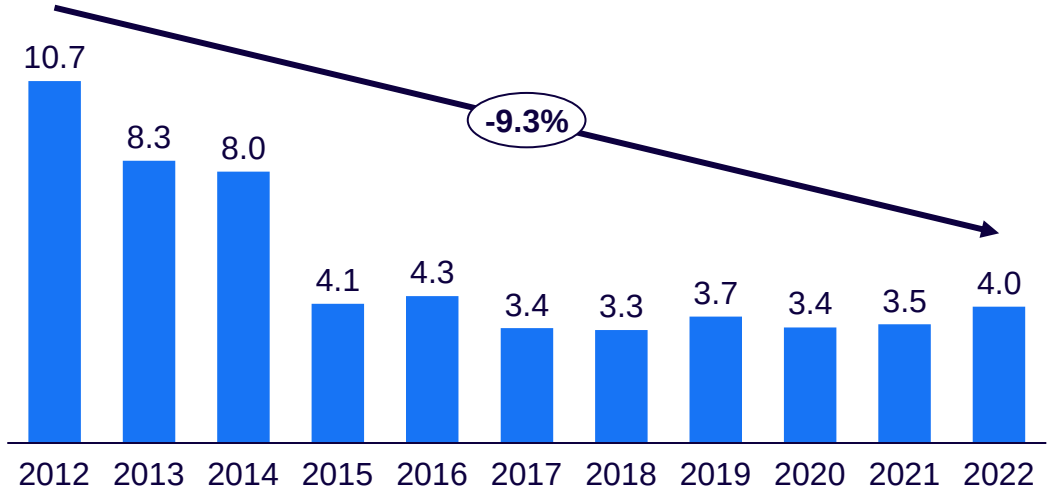
There is a need for Indonesia Government to reduce fuel subsidy and increase renewable energy subsidies

2022 – 2023 Subsidies Reform	As global oil prices surged, expenditures on energy consumer subsidies and compensations to producers more than tripled compared to the original 2022 budget (increased by about 2 percentage points of GDP). Below market pricing and delayed compensations have affected cost recovery in SOEs, particularly Pertamina and PLN. A transition back to regular adjustments in fuel and electricity prices—potentially by reviewing the existing but unused semi-automatic pricing formula9 —would save fiscal resources, allow cost recovery in the fuel and electricity sectors, anchor expectations, and depoliticize price adjustments by making them less discretionary. Finally, subsidy reform is essential to change incentives in the energy sector and help achieve climate objectives

Source: International Energy Agency 2021, International Monetary Fund 2023, Arthur D. Little analysis

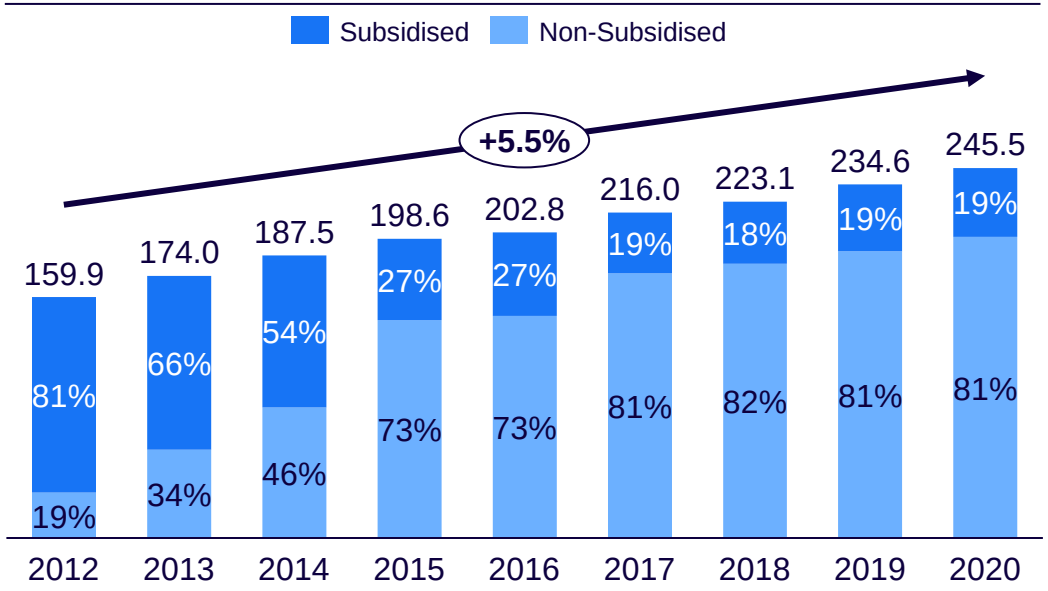
電気代への補助金は全て減少傾向

Electricity subsidies*
2012 – 2022, USD Bn



- Decline in subsidies of 9.3% YOY is attributed to multiple factors: improvement of the fuel mix by reducing the use of fuel, the operation of coal-fired power plants in a number of regions, the decline in network shrinkage, reduced oil prices, revocation of electricity subsidies for several tariff classes (2013, 2014, 2017) via the tariff adjustment (2015.2017)
- 2020: Subsidies provided for non-subsidy customers of IDR 22.5/kWh, additional subsidies for 450 – 900 VA customers in multi-sectors

Electricity consumption breakdown
2012 – 2020, TWh

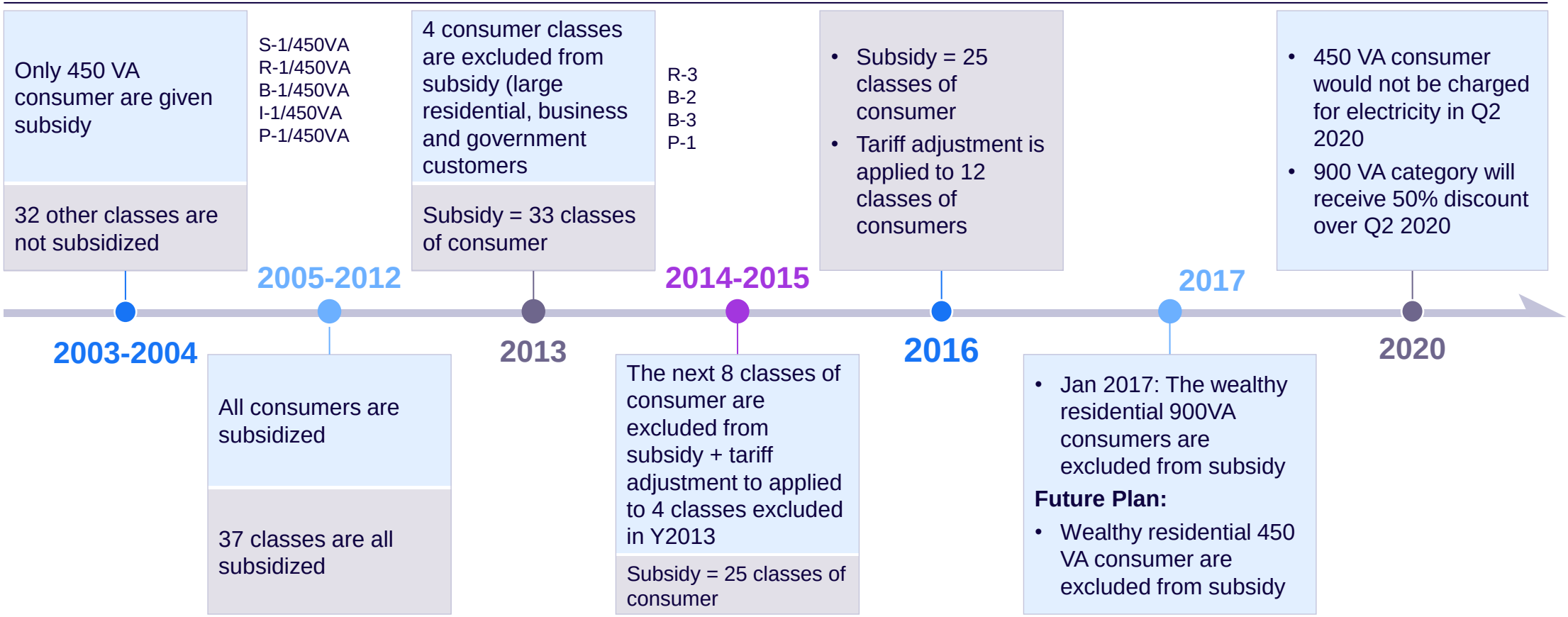


- In line with a decreasing trend in electricity subsidies, the share of subsidised electricity consumed dropped from 81.1% (130.0 TWh) in 2012 to just 18.6% (45.8 TWh) in 2020, a YOY decrease of 12.2%
- Meanwhile, non-subsidised electricity consumption increased from 18.9% (30.2 TWh) to 81.4% (199.8 TWh) in 2020, a CAGR or 26.6%

Note: * Variable forex rates from 2012 – 2022
Source: Indonesia Ministry of Energy and Mineral Resources 2017, RUPTL 2021- 2030, Arthur D. Little analysis

2013年に補助金削減が始まり、2016年には電力補助金が国家予算に重くのしかかる中、関税調整が行われた。

Development of electricity subsidy reform in Indonesia



Source: Indonesia Ministry of Energy and Mineral Resources 2023, Jakarta Post 2020, Arthur D. Little analysis

6 発電所

List of identified power plants – Coal fired(1/4)

#	Name	Output (MW)	Method	Status
1	Unit Pembangkit Listrik Paiton	4,608	Combustion	Operating
2	PLTU Suralaya	4,025	Combustion	Operating
3	PLTU Tanjung Jati	2,640	Combustion	Operating
4	PLTU Cilacap	2,121	Combustion	Operating
5	PLTU Batang	2,000	Combustion	Operating
6	PLTU Jawa 7	2,000	Combustion	Operating
7	PLTU Banten Lontar	1,260	Combustion	Operating
8	PLTU Palabuhan Ratu	1,050	Combustion	Operating
9	PLTU Indramayu	990	Combustion	Operating
10	PLTU Tanjung Awar-Awar	700	Combustion	Operating
11	PLTU Cirebon Unit 1	660	Combustion	Operating
12	PLTU Cirebon Unit 2	660	Combustion	Operating
13	PLTU Jawa Tengah 2	660	Combustion	Operating
14	PLTU Kab. Rembang	630	Combustion	Operating
15	PLTU Pacitan	630	Combustion	Operating
16	PLTU Banten Serang	625	Combustion	Operating
17	PLTU Labuan Banten	600	Combustion	Operating
18	PLTU Pangkalan Susu	440	Combustion	Operating
19	PLTU Nagan Raya	400	Undefined	Operating
20	PLTU Celukan Bawang	380	Combustion	Operating
21	PLTU Paluh Kurau	300	Undefined	Operating

Source: OpenInfraMap 2023

List of identified power plants – Coal fired(2/4)

#	Name	Output (MW)	Method	Status
22	PLTU Simpang Belimbing	300	Combustion	Operating
23	PLTU Sumsel 5	300	Combustion	Operating
24	PLTU Cikarang Babelan	280	Combustion	Operating
25	PLTU Keban Agung	270	Combustion	Operating
26	PLTU Asam Asam	260	Combustion	Operating
27	PLTU Bukit Asam	260	Undefined	Operating
28	PLTU Jeneponto	250	Combustion	Operating
29	PLTU Kaltim Teluk	250	Combustion	Operating
30	PLTU Labuhan Angin	230	Combustion	Operating
31	PLTU Teluk Sirih	224	Undefined	Operating
32	PLTU Tenayan Raya	220	Combustion	Operating
33	PLTMG Balai Pungut	200	Undefined	Operating
34	PLTU Bengkulu	200	Combustion	Operating
35	PLTU Embalut	200	Undefined	Operating
36	PLTU Galang Batang	200	Combustion	Operating
37	PLTU Kaltim 2	200	Undefined	Operating
38	PLTU Ombilin	200	Undefined	Operating
39	PLTU Sebalang	200	Undefined	Operating
40	PLTU Tabalong	200	Combustion	Operating
41	PLTU Takalar (Punagaya-2)	200	Combustion	Operating
42	PLTU Tarahan	200	Combustion	Operating

Source: OpenInfraMap 2023

List of identified power plants – Coal fired(3/4)

#	Name	Output (MW)	Method	Status
43	PLTU Pulang Pisau	120	Combustion	Operating
44	PLTU Tello	120	Combustion	Operating
45	PLTU Tanjung Kasam	110	Undefined	Operating
46	PLTU Barru	100	Combustion	Operating
47	PLTU Kendari 3 DSSA	100	Undefined	Operating
48	PLTU Parit Baru (FTP1)	100	Combustion	Operating
49	PLTU Sambelia	100	Undefined	Operating
50	PLTU Sulbagut 1	100	Undefined	Operating
51	PLTU Sulbagut 3	100	Undefined	Operating
52	PLTU Sulut 3	100	Undefined	Operating
53	PLTU Jeranjang	90	Undefined	Operating
54	PLTU DSS	85	Undefined	Operating
55	PLTU Tanjung Bara	64	Undefined	Operating
56	PLTU Amurang	60	Undefined	Operating
57	PLTU MSW	60	Combustion	Operating
58	PLTU Muara Jawa	55	Undefined	Operating
59	PLTU Lombok Timur	50	Undefined	Operating
60	PLTU Mamuju	50	Combustion	Operating
61	PLTU Bolok	33	Undefined	Operating
62	PLTU Suge	33	Undefined	Operating
63	PLTU Palu	30	Combustion	Operating

Source: OpenInfraMap 2023

List of identified power plants – Coal fired(4/4)

#	Name	Output (MW)	Method	Status
64	PLTU Sintang	27	Combustion	Operating
65	PLTU Holtekamp	24	Combustion	Operating
66	PLTU Nii Tanasa	20	Undefined	Operating
67	PLTU Sanggau	17	Combustion	Operating
68	PLTU Baruta	14	Combustion	Operating
69	PLTU Ropa	14	Undefined	Operating
70	PLTU Sumbawa Barat	14	Undefined	Operating
71	PLTU Tidore	14	Undefined	Operating
72	PLTU Koto Ringin	Unknown	Undefined	Operating
73	Banjarsari Power Plant	Unknown	Combustion	Operating
74	Batu Hijau Power Plant	Unknown	Combustion	Operating
75	Delong Nickel Phase II Power Station	Unknown	Combustion	Operating
76	PLTS Perjuangan	Unknown	Combustion	Operating
77	PLTU PT Semen Tonasa Indonesia	Unknown	Combustion	Operating
78	PLTU Weda Bay Power Plant	Unknown	Combustion	Operating
79	Perawang Mill Coal Power Plant	Unknown	Combustion	Operating
80	Perawang Mill Power Plant	Unknown	Combustion	Operating
81	PLTU Sampit	50	Combustion	Development
82	PLTU Waai	30	Combustion	Development
83	PLTU Sofifi	6.0	Combustion	Development

Source: OpenInfraMap 2023

List of identified power plants – Oil

#	Name	Operator	Output (MW)	Method	Status
1	PLTD Senayan	Indonesia Power	101	Combustion	Operating
2	PLTD Siantan Kalbar	Unknown	30	Combustion	Operating
3	PLTD Long Nawang	Perusahaan Listrik Negara	Unknown	Combustion	Operating

Source: OpenInfraMap 2023

List of identified power plants – Diesel

#	Name	Output (MW)	Method	Status
1	PLTD & PLTG Trisakti	111	Combustion	Operating
2	PLTD Suppa	62	Combustion	Operating
3	PLTD Seberang Barito	45.0	Combustion	Operating
4	PLTD Suka Merindu	33.0	Undefined	Operating
5	PLTD Tegineneng	28.0	Undefined	Operating
6	PLTD Kayu Merah	25.0	Undefined	Operating
7	PLTD Sungai Juaro	25.0	Undefined	Operating
8	PLTD Koto Lolo	21.0	Undefined	Operating
9	PLTD Girimukti	20.0	Undefined	Operating
10	PLTD Bitung	17.0	Undefined	Operating
11	PLTD Gunung Malang	16.0	Undefined	Operating
12	PLTD Batu Ampar	10.0	Undefined	Operating
13	PLTD Kahayan Baru	10.0	Combustion	Operating
14	PLTD Kuala Kapuas	10.0	Combustion	Operating
15	PLTD Lopana	10.0	Undefined	Operating
16	PLTD Sambaliung	10.0	Undefined	Operating
17	PLTD Banua Lima Unit Panangkalaan	8.0	Combustion	Operating
18	PLTD Banua Lima Unit Barabai	6.0	Combustion	Operating
19	PLTD Cot Abeuk	6.0	Undefined	Operating
20	PLTD Koba	5.0	Undefined	Operating

Source: OpenInfraMap 2023

List of identified power plants – Diesel

#	Name	Output (MW)	Method	Status
21	PLTD Maburai	5.0	Combustion	Operating
22	PLTD Padang	5.0	Undefined	Operating
23	PLTD Pilang	5.0	Undefined	Operating
24	PLTD Aneuk Laot	4.0	Undefined	Operating
25	PTLD Batakan	4.0	Undefined	Operating
26	PLTD Seurapong	0.5	Undefined	Operating
27	PLTD Deudap	0.3	Undefined	Operating
28	PLTD Selayar		Undefined	Operating

Source: OpenInfraMap 2023

List of identified power plants – Natural gas-fired (1/3)

#	Name	Output (MW)	Method	Status
1	PLTGU Priok	2,720	combustion	Operating
2	PLTGU Muara Tawar	2,593	combustion	Operating
3	PLTGU Tambak Lorok	2,014	combustion	Operating
4	PLTGU Gresik	1,924	combustion	Operating
5	PLTUG Muara Karang	1,908	combustion	Operating
6	PLTGU Jawa-1	1,760	Undefined	Operating
7	PLTGU Grati	1,425	combustion	Operating
8	Pembangkit Listrik Jababeka	755	combustion	Operating
9	PLTGU Cilegon	740	combustion	Operating
10	PLTGU Belawan	720	Undefined	Operating
11	PT Krakatau Daya Listrik	520	combustion	Operating
12	Pembangkit Listrik Tenaga Diesel Pesanggaran	325	combustion	Operating
13	North Duri Cogeneration Plant	300	combustion	Operating
14	Sumbagut 2 Peaker Power Plant	250	combustion	Operating
15	Cilegon Krakatau Posco Power Plant	200	Undefined	Operating
16	PLTMG Arun I	184	Undefined	Operating
17	PLTGU Sengkang	180	combustion	Operating
18	PLTMG Bangkanai	155	combustion	Operating
19	PLTGU Gunung Megang	150	Undefined	Operating
20	Palembang Timur Power Plant	150	Undefined	Operating

Source: OpenInfraMap 2023

List of identified power plants – Natural gas-fired (2/3)

#	Name	Output (MW)	Method	Status
21	Lombok New Peaker Steam Gas Engine Power Plant	136	combustion	Operating
22	PLTG Gilimanuk	134	combustion	Operating
23	PLTGU Bekasi Power	119	combustion	Operating
24	PLTGU Senipah	117	Undefined	Operating
25	PLTD & PLTG Trisakti	111	combustion	Operating
26	Pembangkit Listrik MM-2100	109	combustion	Operating
27	PLTG Gorontalo	100	Undefined	Operating
28	PLTG Pemaron	98	combustion	Operating
29	PLTGU Keramasan	80	Undefined	Operating
30	PLTG Paya Pasir	75	Undefined	Operating
31	PLTG Sunyaragi 2	72	combustion	Operating
32	PLTG Talang Duku	60	Undefined	Operating
33	PLTGU Tanjung Batu	60	Undefined	Operating
34	PLTG Jakabaring	51	Undefined	Operating
35	PLTMG Holtekamp	50	Undefined	Operating
36	PLTMG Sorong	50	Undefined	Operating
37	PLTMG Sumbawa	50	Undefined	Operating
38	PLTG Pauh Limo	49	Undefined	Operating
39	PLTD Seberang Barito	45	combustion	Operating
40	PLTG Glugur	44	combustion	Operating

Source: OpenInfraMap 2023

List of identified power plants – Natural gas-fired (3/3)

#	Name	Output (MW)	Method	Status
41	PLTG Sambera	40	Undefined	Operating
42	PLTMG Kupang	40	Undefined	Operating
43	PLTMG Maumere	40	Undefined	Operating
44	PLTGU Musi II	30	Undefined	Operating
45	PLTMG Baubau	30	combustion	Operating
46	PLTMG Ternate	30	Undefined	Operating
47	Pembangkit Listrik Tata Jabar	30	Undefined	Operating
48	PLTGU Panaran	25	combustion	Operating
49	PLTD/G Teluk Lembu	22	Undefined	Operating
50	PLTMG Labuan Bajo	22	Undefined	Operating
51	PLTMG Tanjung Selor	15	Undefined	Operating
52	PLTMG Timika	10	combustion	Operating
53	Arun Aceh LNG Gas Power Plant	Unknown	combustion	Operating
54	MV Karadeniz Powership Onur Sultan	Unknown	combustion	Operating
55	PLTG Borang	Unknown	combustion	Operating
56	PLTG Indocement	Unknown	Undefined	Operating
57	PLTGU Jawa-2 Power Project	Unknown	combustion	Operating
58	PLTMG Dullah	Unknown	combustion	Operating
59	SPPBE PT. Bitcom Asri Energi	Unknown	combustion	Operating
60	PLTMG Luwuk	40	combustion	Development

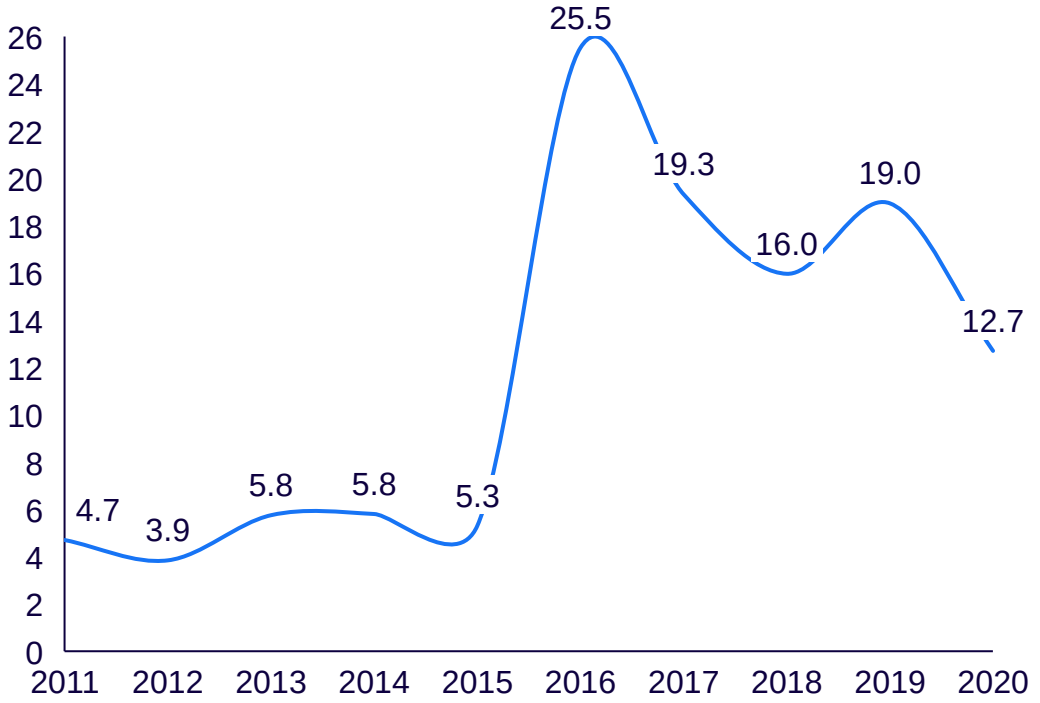
Source: OpenInfraMap 2023

7 電力品質

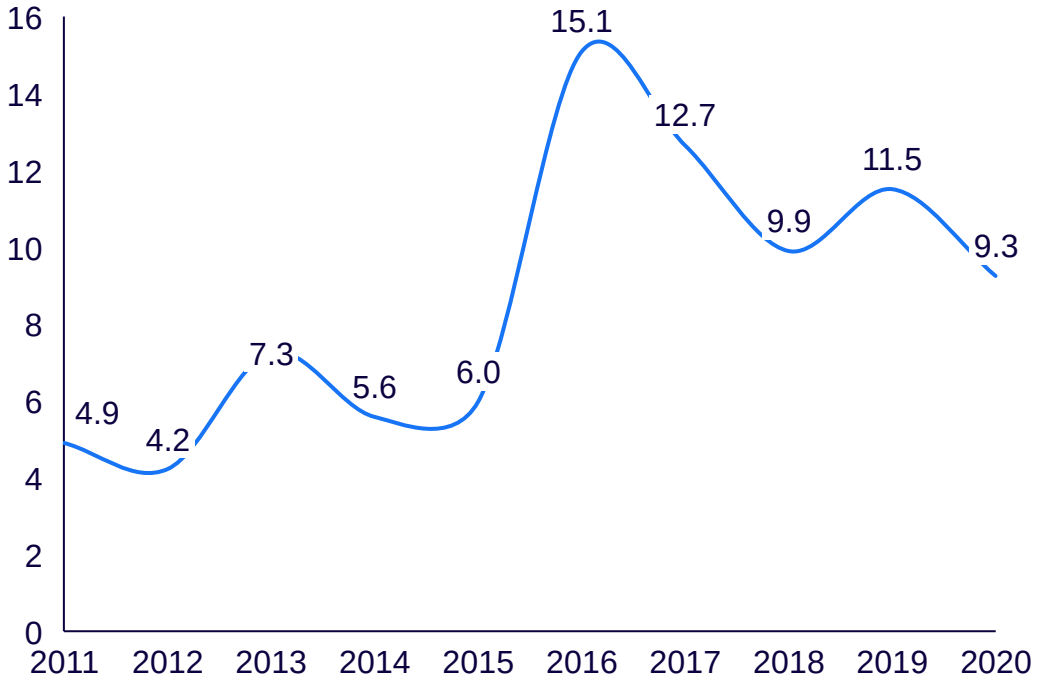
2016年からSAIDI/SAIFIともに改善傾向

Electricity Quality Index
2011 - 2020

SAIDI[1]



SAIFI[2]



Note: 1) System Average Interruption Duration Index (Minutes/Customer/Year); 2) System Average Interruption Frequency Index (Number of Interruptions/Customer/Year)
Source: RUPTL 2021 – 2030, Arthur D. Little analysis

省エネ目標を掲げ、省エネプログラムを2016年に実施

Energy efficiency implementation strategy

CURRENT SITUATION & TARGET

Energy Manager TARGET 2019:
1000 managers 2015: 192 managers

Energy Auditor
TARGET 2019: 700 people 2015: 127 people

Smart Street Lighting
2016: 90 districts/cities 2015: 7 districts/cities

MEPS and Labelling
TARGET 2016: Refrigerator, Rice cooker, Pump, Electric Motor, and Iron

Energy Management Mandatory
104 of 224 Industry has been reported to MEMR

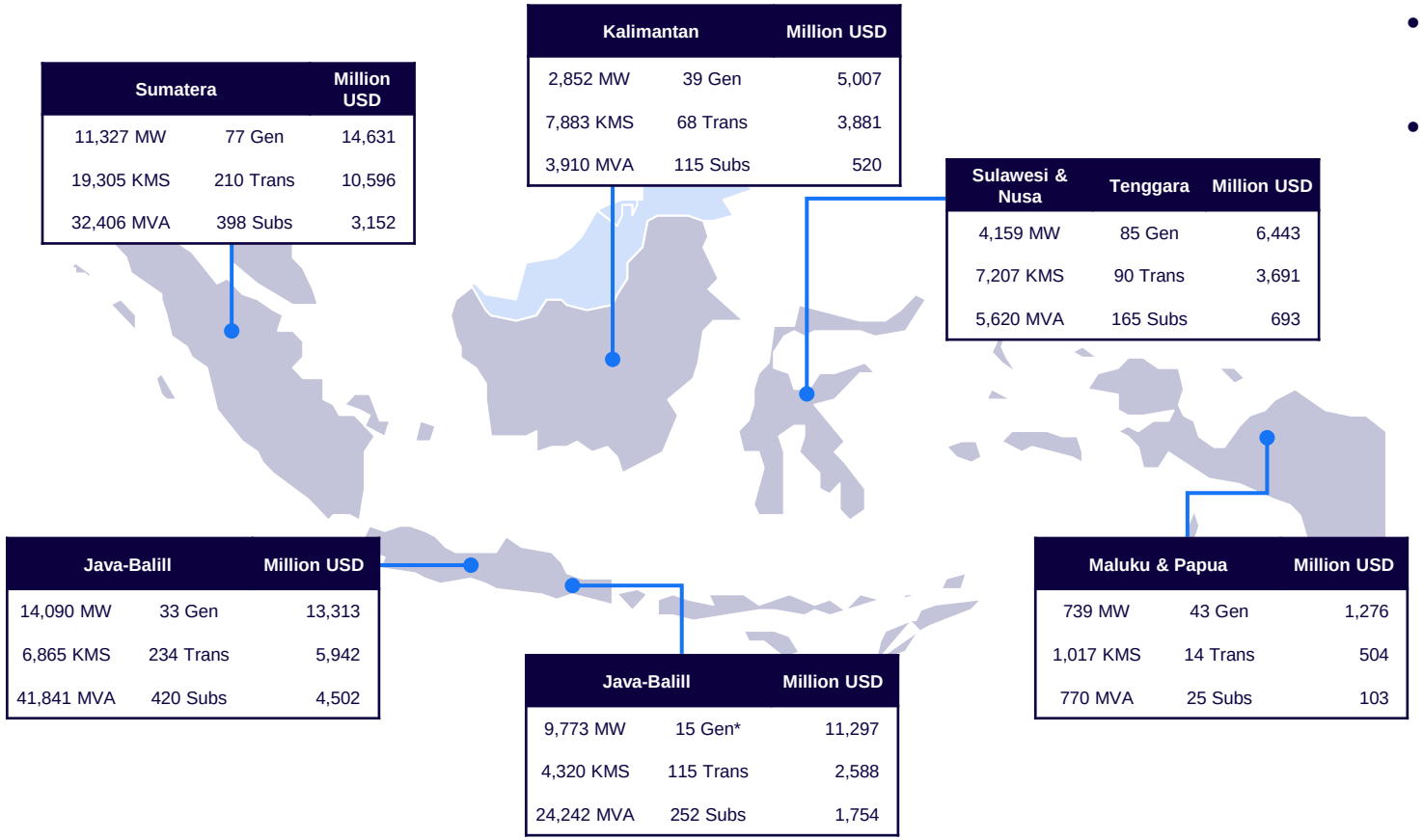
ENERGY EFFICIENCY CAMPAIGN programme

Awareness Raising	Behavior Change	Action
Mass Media Campaign	Incentive & regulation	Incentive & regulation
SOCIAL MEDIA	Stakeholders Involvement	Energy Manager & Auditor
	Regional Campaign	MEPS and Labeling
	Award	Energy Efficiency Award

Source: Ministry of Energy and Mineral Resources Republic of Indonesia 2016, Arthur D. Little analysis

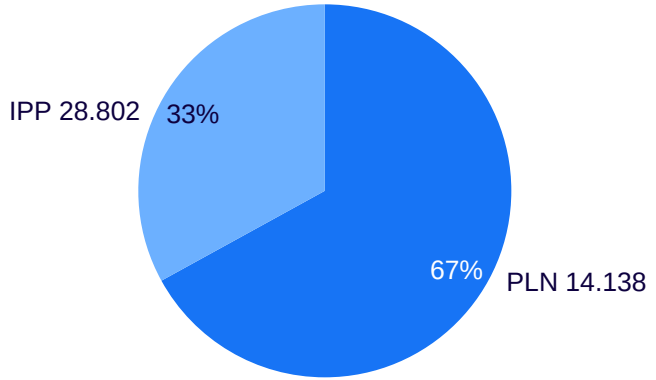
インドネシアでは、2015年に35GWの発電容量追加を計画

Government 35GW programme (1/2)



- To accelerate the needs of electricity, the Indonesian government launched the 35,000 MW programme in 2015
- The goal was to complete all delayed projects by 2019 and achieve an electrification ratio of >95%
  - As of 2021, there are 6 GW of projects stuck in the financial close stage
  - The projects' signed PPAs were cancelled by the President on environmental grounds

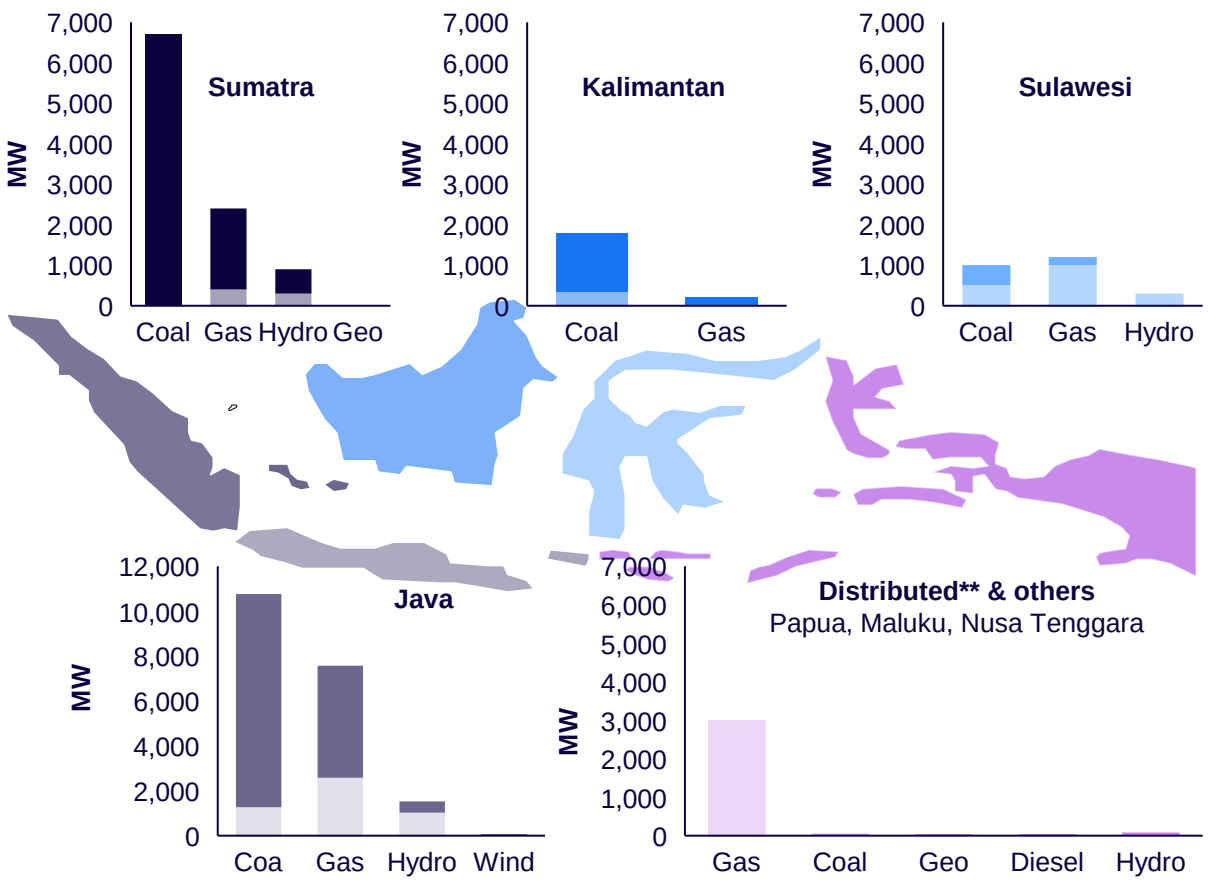
IPP vs PLN (MW)



Note: *Including Java Bal distributed Minihydro generation
Source: RUPTL 2021 – 2030, Deloitte 2016, Arthur D. Little analysis

インドネシアでは、2015年に35GWの発電容量追加を計画

Government 35GW programme (2/2)



Total Funding	
Power Plant	US$ 53,663M
Transmission	US$ 10,893 M
Substation	US$ 8,386 M
Distribution	US$ 7,355 M
IDC	US$ 5,319 M
Land Acquisition	US$ 7,291 M
Total	**US$ 92,907 M**

IPP Funding	
Power Plant	US$ 37,454 M
Transmission	US$ 680 M
Substation	US$ 249 M
Land Acquisition	US$ 4,055 M
Total	**USS 42,438 M**

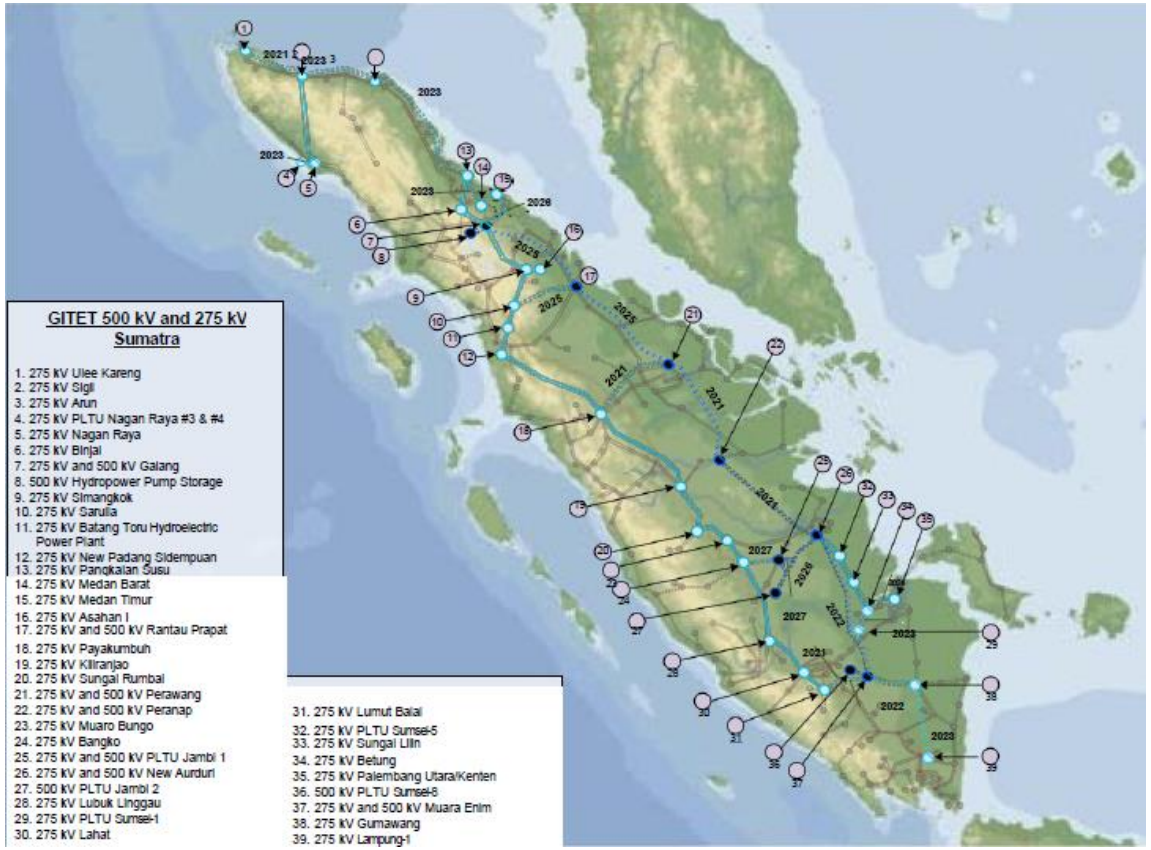
PLN Funding	
Power Plant	US$ 16,209 M
Transmission	US$ 10,213 M
Substation	US$ 8,137 M
Distribution	US$ 7,355 M
IDC	US$ 5,319 M
Land Acquisition	US$ 3,236 M
Total	**US$ 50,469 M**

Source: Deloitte 2016, Baker McKenzie 2016, Arthur D. Little analysis

8 送電網

スマトラ島における送電網は以下の通り

Sumatra System Transmission Development Plan 2021 - 2030



COMMENTS

- Main: 275 kV Betung - North Palembang transmission network (2024 operational) in the western corridor and 500 kV SUTET Perawang - Rantau Prapat - Galang network built in eastern corridor connecting large-scale generation centres and large load centres
  - Addition to the current 500 kV SUTET Muara Enim - New Aur Duri - Peranap - Perawang is already under construction
- Section, initially planned to use a 4-circuit tower, was adjusted to 2 circuits and the development of the next 2 will be dependant on other needs
- Other plans include:
  - construction of new 70 kV, 150 kV, 275 kV and 500 kV transmission networks linked to generation projects
  - Development of existing scattered 70 kV and 150 kV
  - Accelerate the Sumatra-Bangka 150 kV interconnection via sea cable
  - Sumatra-Malaysia interconnection plan via 500 kV HVDC system

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

ジャワ島・バリ島における送電網は以下の通り

Java Bali System Transmission Development Plan 2021 - 2030

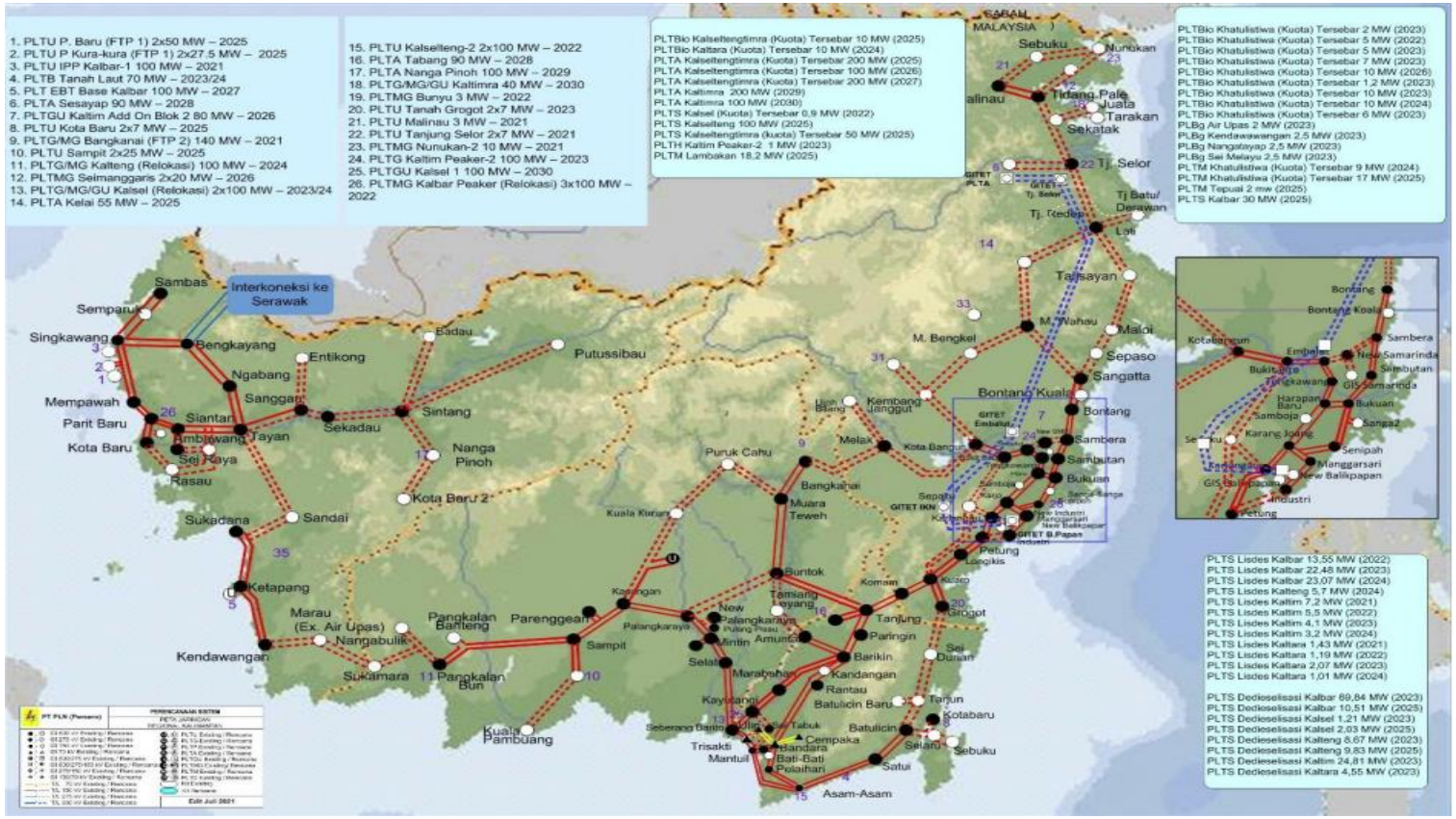
COMMENTS

- Projects are currently facing delays in construction due to licensing and social issues, therefore PLN is making efforts to reconductor some 500 kV or 150 kV transmission sections utilise existing 150 kV transmission sections to be built into 500 kV transmissions in major cities instead
- 66 kV systems: uprated to increase power flow capacity and supply reliability, while the transmission lines will be utilised for 150 kV transmission
- W. Java: planned GITET, SUTET and 150 kV outlets are intended to supply the load centre in Jakarta, Cilegon subsystem and industrial areas
- C. Java: 500 kV Central West Java Transmission Line construction is intended to strengthen the Java Bali system through the addition of more than the current 2 corridors
- E. Java, Madura and Bali: Increase supply via multiple GITETs to underserved cities and industrial areas. 500 kV Java Bali Connection aims to supply Bali island with cheap energy from large PPs in Java, while Bali PPs will be EBT

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

カリマンタン島における送電網は以下の通り

Kalimantan System Transmission Development Plan 2021 - 2030



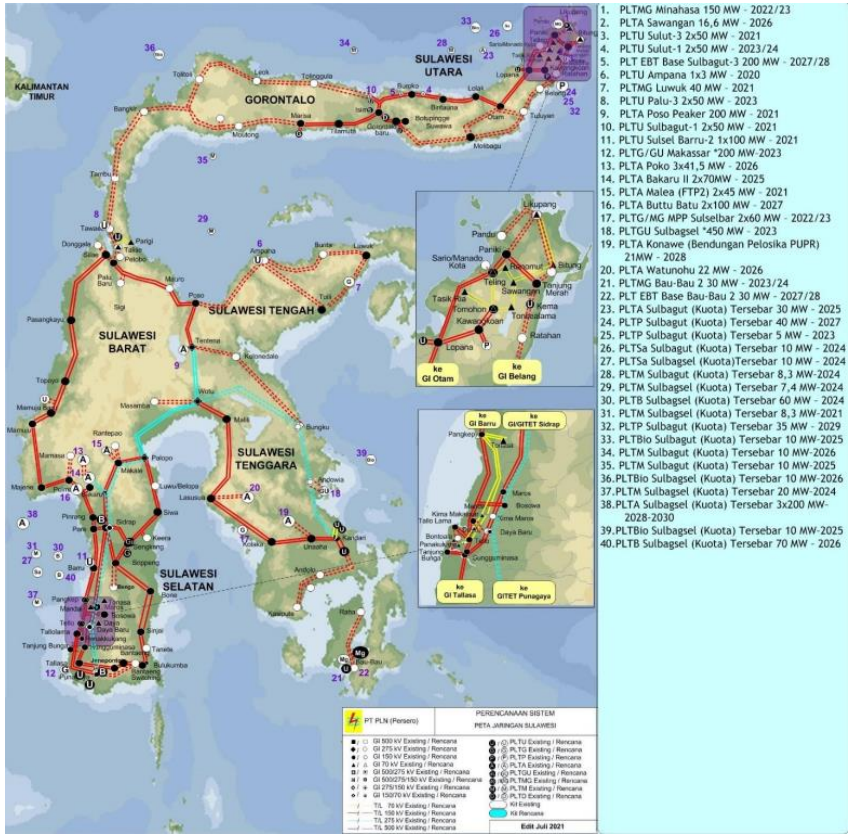
COMMENTS

- The main goal of the plan in Kalimantan is to connect the existing isolated systems, especially the cross-border interconnection between W. Kalimantan and Sarawak that is already in operation
- Main: 500 kV line from N. hydro PP) to E. Kalimantan (new capital)
- Other plans include:
  - 150 kV line built in 2023 to connect W. Kalimantan system to Kalseltengtimra System
  - 150 kV Bangkanai - Melak - Kota Bangun transmission to strengthen the Kalseltengtimra interconnection
  - 150 kV Embalut - New Samarinda - Sambera transmission to support the supply of power from the Embalut plant to the load centre
  - Transmission of 150 kV Tanjung Redep - Tanjung Selor - Tidang Pale - Malinau to improve the reliability of supply to the cities in N. Kalimantan
  - Transmission of 150 kV Sangatta - Tanjung Redep to connect Kalseltengtim System with N. Kalimantan System

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

スラウェシ島における送電網は以下の通り

Sulawesi System Transmission Development Plan 2021 - 2030



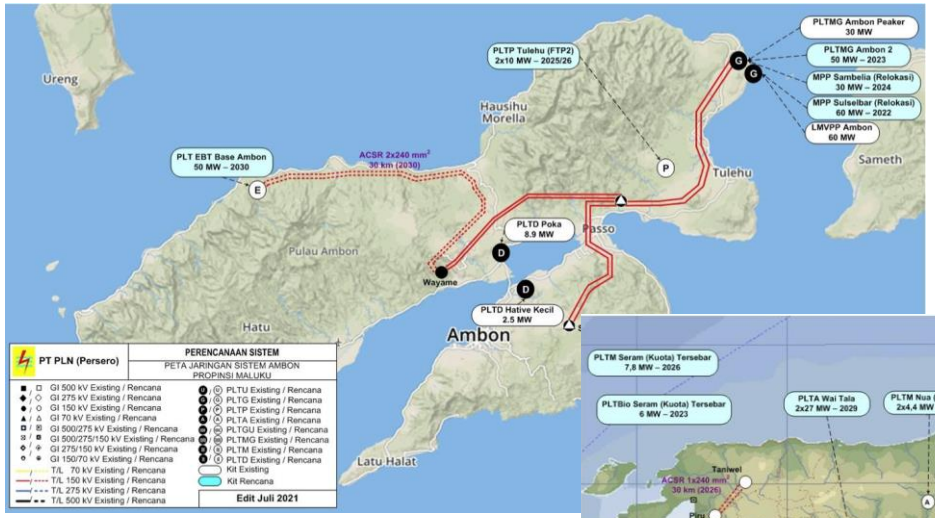
COMMENTS

- The priority in Sulawesi is to form 2 large systems, Sulbagsel (S. Sulawesi) and Sulbagut (N. Sulawesi), and to deliver large supply to widely spread load centres and cities
- Main plans include:
  - S. Sulawesi: 275 kV system construction to link multiple hydro PPs to the 4 provinces (Palopo - Sidrap - Daya Baru – Punagaya), compltetion aimed at 2027
  - SE. Sulawesi: Sulawesi Electricity Master Plan aims at a 500 kV system, but initial stage the operational system will be 275 KV linking Wotu - Bungku - Andowia – Kendari, due to the widely spread PPs
- Current isolated systems: Pasang Kayu and Topoyo systems in W. Sulawesi, Ampana, Bunta, Luwuk to Toili in C. Sulawesi
- 150kV transmission system plans linking:
  - Bau-Bau
  - Marisa - Moutong - Tolitoli - Leok and Gorontalo – Tolinggula - Leok - Tolitoli
  - Tolitoli - Bangkir – Tambu

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

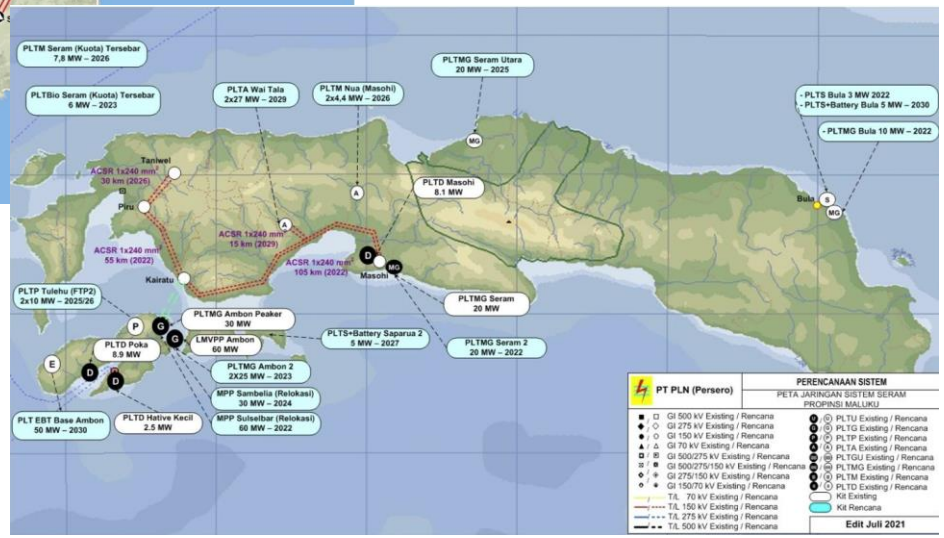
マルク州、パプア州、東・西ヌサテンガラ州における送電網は以下の通り

Maluku, Papua and Nusa Tenggara (E. Indonesia) System Transmission Development Plan 2021 – 2030 (1/3)



Ambon Transmission Development Plan 2021 - 2030

Ambon – Seram marine cable system plan



COMMENTS

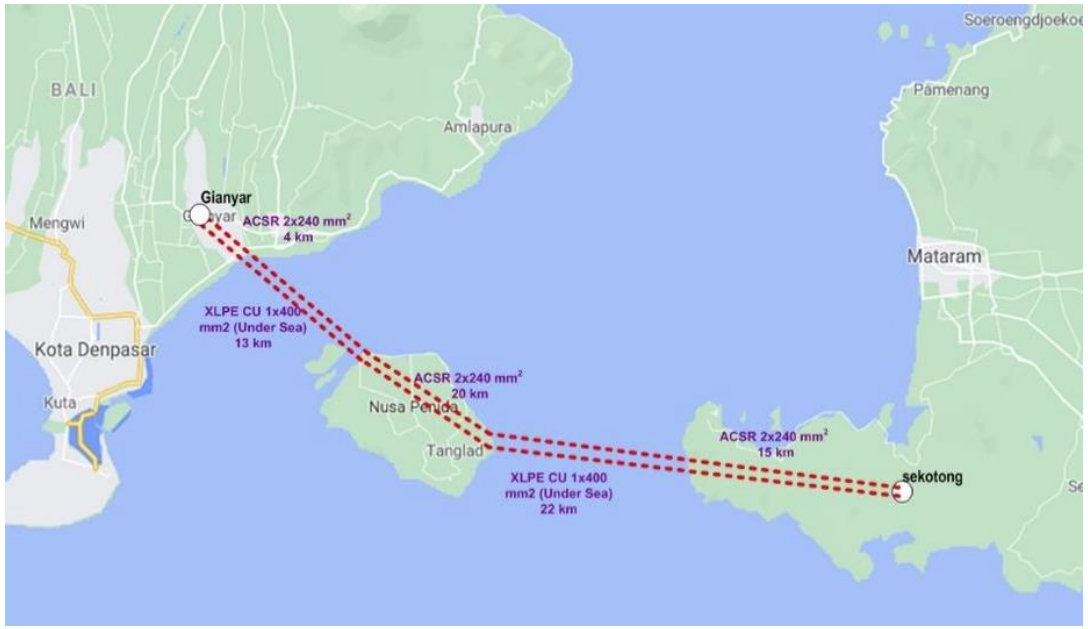
- The priority in E. Indonesia is to connect multiple cities in the Ambon and Jayapura systems to form a transmission backbone
- Plans include:
  1. Transmission system in Maluku, primarily the 70 kV and 150 kV Ambon, 150 kV Seram and the 150 kV Halmahera systems
  2. 50km Ambon – Seram interconnection plan, operation in next 5-10 years (from 2021)
  3. 74 km Lombok-Bali interconnection plan where 25km will be a sea cable, an option to replace the Base Lombok renewable PP (development after 2026)
  4. Transmission of 70 kV and 150 kV Jayapura System and Sorong System to deliver power from non-BBM plants to load centres in Jayapura and Sorong
  5. Timor system developed new 150 kV transmission line from Kupang MHP - Bolok - Tenau and Kupang - Naibonat - New Kupang power plants as well as from Kefemenanu - Malacca - Atambua

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

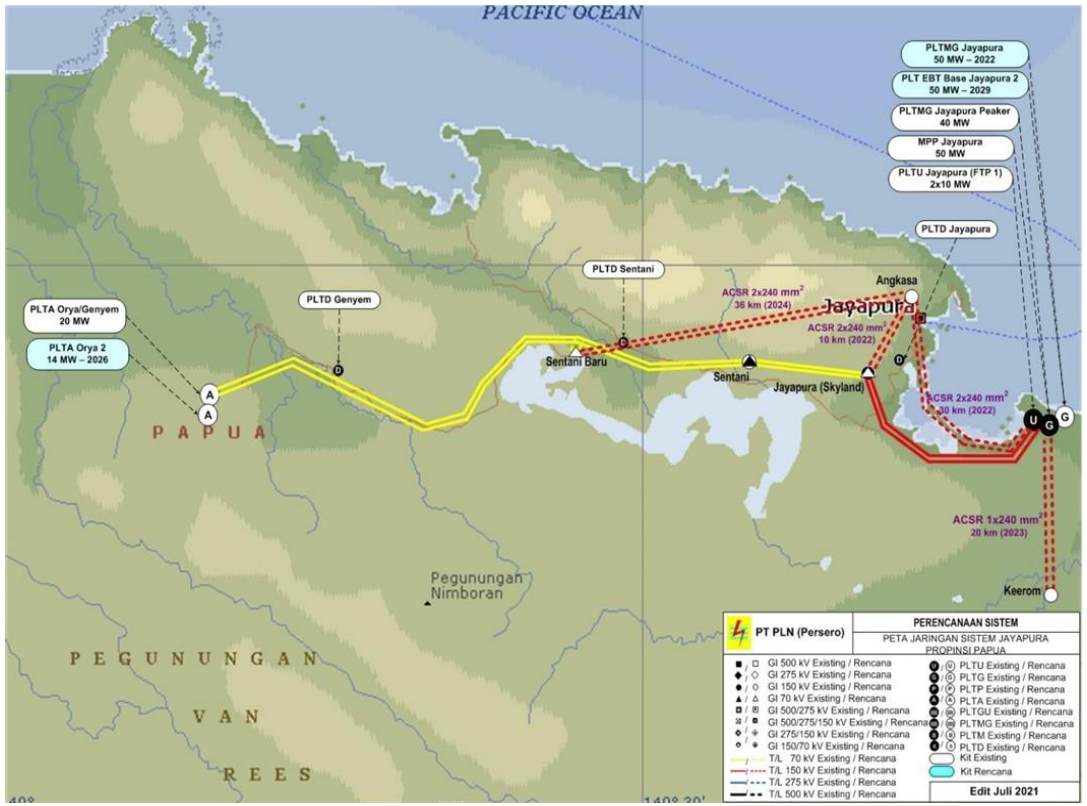
マルク州、パプア州、東・西ヌサテンガラ州における送電網は以下の通り

Maluku, Papua and Nusa Tenggara (E. Indonesia) System Transmission Development Plan 2021 – 2030 (2/3)

Lombok – Bali system plan



Jayapura Transmission Development Plan 2021 - 2030

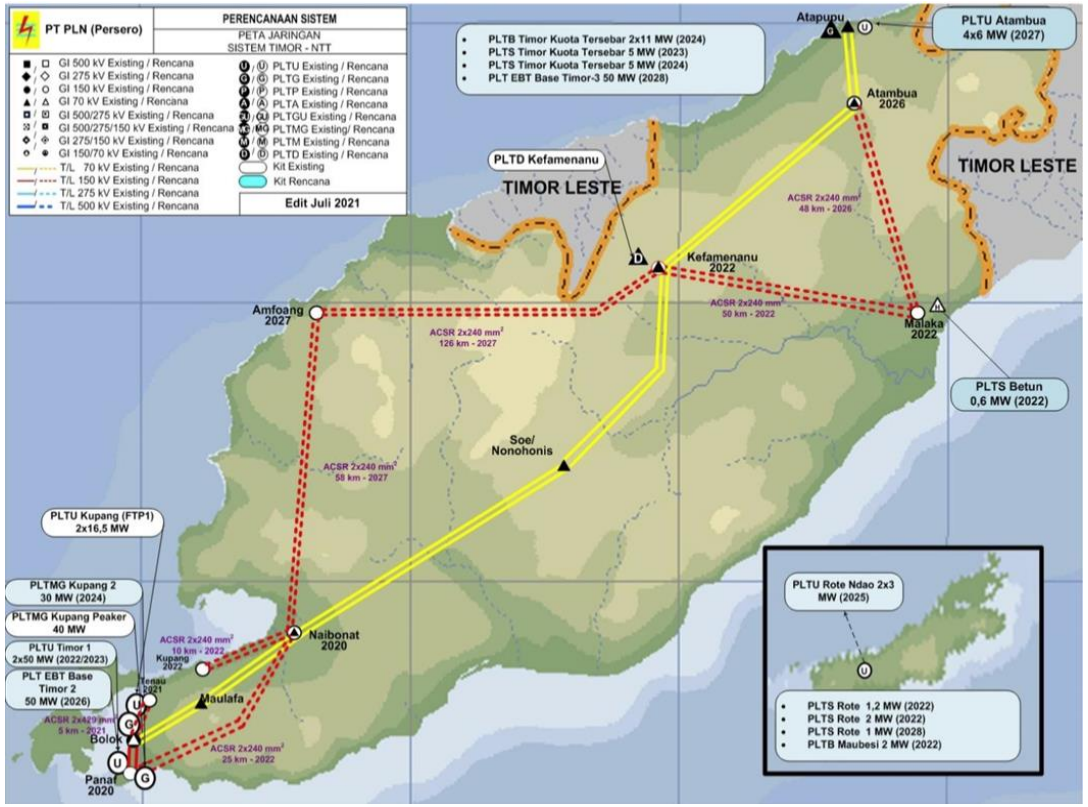


Source: RUPTL 2021 – 2030, Arthur D. Little analysis

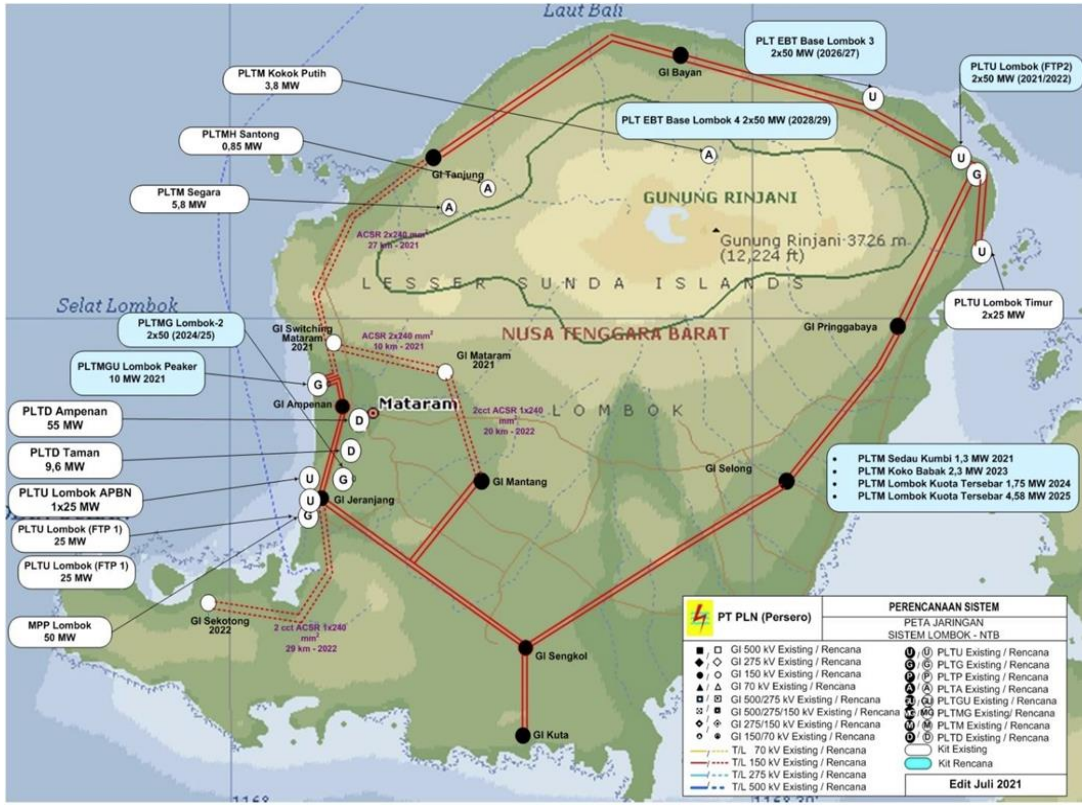
マルク州、パプア州、東・西ヌサテンガラ州における送電網は以下の通り

Maluku, Papua and Nusa Tenggara (E. Indonesia) System Transmission Development Plan 2021 – 2030 (3/3)

Timor Transmission Development Plan 2021 - 2030



Lombok Transmission Development Plan 2021 - 2030



Source: RUPTL 2021 – 2030, Arthur D. Little analysis

PLNは送配電網の大部分を所有し、47,723kmの送電網と456,547kmの配電線を新設する計画

Transmission network operator & future plans

- **Majority of transmission networks belongs to and are operated by PLN.** Certain transmission lines are privately operated and belong to IPPs, particularly those that are close to PLN's substations in remotely located power plant areas
- Indonesia aims to build an additional 47,723km of new transmission network by 2030. Huge addition will take place in 2021-2023 due to delays in completion of projects that should have been operational before 2021
- PLN has identified key areas for transmission network development as part of its planning, e.g:
  - the development of a strong backbone connection network interconnection network for Sumatra and Kalimantan
  - Reconstruction and upgrading transmission lines that do not meet reliability criteria or face social and permit-related challenges
  - Expansion of the transmission network extends to isolated systems served by PLTD BBM
  - Determination of GI location by considering the economics of high voltage transmission system facility construction costs, land acquisition costs, medium voltage distribution system facility construction costs

Distribution network operator & future plans

- Similar to transmission networks, **Indonesian law stipulates that distribution networks in Indonesia belong to, and are operated by, a utility within a defined area.** Each becomes known as an electricity exclusive area of that utility**. In practice, all distribution networks belong to and are operated by PLN.**
- The country's electricity distribution network currently uses 20 kV for JTM and 220 V lines for JTR
- Indonesia aims to build more than 456,547 km of new distribution lines by 2030
- Indonesia's main focus of investment in network expansion is to serve customer growth, improve service facilities as well as improve the ability of the distribution network to integrate renewable energy sources into the system with 4 key focus areas:
  - Improving service voltage
  - Improving System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) numbers
  - Reducing network technical losses
  - Rehabilitating old networks

Source: RUPTL 2021 – 2030, Arthur D. Little analysis

List of the planned transmission line projects, voltage, length and operation status – Aceh

No.	From	To	Voltage (kV)	Conductor	Panjang (kms)	COD Target	Status
1	Sigli	Ulee Kareng	275	2 cct, 2 Zebra	180	2021	Construction
2	Milk Base	Arun	275	2 cct, 2 Zebra	448	2023	Committed
3	Arun	Sigli	275	2 cct, 2 Zebra	294	2023	Committed
4	Nagan Raya	Nagan Raya PLTU #3,4	275	2 cct, 2 Zebra	1	2023	Construction
5	Blang Pidie	Tapak Tuan	150	2 cct, 2 Hawk	130	2021	Construction
6	Subulussalam	Singkil	150	2 cct, 1 Hawk	74	2023	Construction
7	Tapak Tuan	Subulussalam	150	2 cct, 2 Hawk	140	2023	Plan
8	Kumbih	Inc. 2 Phi (Sabulussalam-Sidikalang)	150	2 cct, 1 Hawk	10	2025	Plan
9	Laweung (Semen Indonesia-Aceh)	Inc 2 Phi (Sigli-B.Aceh/Jantho)	150	4 cct, 1 Hawk	36	2025	Plan
10	Calang	Meulaboh	150	2 cct, 2 Hawk	160	2025	Plan
11	Takengon	Blang Kjeren	150	2 cct, 2 Hawk	206	2029	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – N. Sumatra (1/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	Galang	Rantau Prapat	500	2 cct, 4 Zebra	440	2025	Procurement
2	Galang	Hydropower Pump Storage-1	500	2 cct, 4 Zebra	100	2029	Plan
3	Milk Base	West Medan	275	2 cct, 4 Zebra	120	2023	Committed
4	Batang Toru Hydroelectric Power Plant	Inc. 2 Pi (Sarulla-Pd.Sidempuan)	275	2 cct, 2 Zebra	40	2025	Construction
5	Sarulla	Rantau Prapat	275	2 cct, 4 Zebra	240	2025	Plan
6	Galang	East Medan	275	2 cct, 4 Zebra	40	2026	Plan
8	Sibisa (DPSP Toba)	Inc. 2 Pi (Pematang Siantar-Porsea)	150	2 cct, HTLS 310 mm2	2	2023	Plan
9	Sidikalang	PT DPM	150	2 cct, 1 Hawk	80	2028	Plan
10	Kuala tanjung	PT MNA	150	2 cct, 1 Hawk	8	2023	Committed
11	Pematang Siantar	Land of Java	150	2 cct, 1 Hawk	30	2022	Construction
12	PLTU Sumut-1	Belawan power plant	150	2 cct, 2 Zebra	4	2023	Construction
13	West Medan	Inc. 2 Pi (Glugur- Paya Geli) # Glugur direction	150	2 cct, HTLS 2x415 mm2 (equivalent)	2	2023	Committed
14	West Medan	Inc. 2 Pi (Glugur- Paya Geli) #arah payageli	150	2 cct, 1x360 mm2 HTLS (equivalent)	2	2023	Committed
15	Sorik Marapi Power Plant (FTP 2)	Christmas	150	2 cct, 2 Hawk	106	2023	Plan
16	Simangkok	Asahan III Hydroelectric Power Plant (FTP 2)	150	2 cct, 2 Hawk	22	2023	Committed

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – N. Sumatra (2/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
17	Christmas	Tip of the Ivory (Single phi operation)	150	2 cct, 2 Hawk	154	2023	Plan
18	Glugur	Kesawan	150	2 cct, XLPE CU 1x800 mm2	4	2024	Plan
19	Perbaungan	Kuala Namu	150	2 cct, 2 Hawk	20	2025	Committed
20	Kuala	Binjai	150	2 cct, 2 Hawk	72	2025	Committed
21	Christmas	Inc double phi	150	2 cct, 2 Hawk	0,1	2026	Plan
22	East Medan	Fishing rod	150	2 cct, 2 Hawk	20	2027	Committed
23	Kesawan	Electricity	150	1 cct, XLPE CU 1x800 Mm2	2	2029	Plan
24	Medan Barat (Reconductoring & Tower Reinforcement)	Glugur (Reconductoring & Tower reinforcement)	150	2 cct, HTLS 2x415 mm2	10	2029	Plan
25	Parlilitan	Inc. 2 Pi (Dolok Sanggul Simonggo)	150	2 cct, 1 Hawk	1	2029	Committed
26	Simonggo	Dolok Sanggul	150	2 cct, 1 Hawk	72	2029	Plan
27	Gunung Sitoli	West/North Nias	70	2 cct, ACSR 1x210 mm2	70	2025	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Riau (1/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	Peranap/Riau 1	Perawang/Riau 2	500	2 cct, 4 Zebra	360	2021	Construction
2	Rantau Prapat	Perawang/Riau 2	500	2 cct, 4 Zebra	560	2025	Plan
3	Payakumbuh	Perawang (Ex new Garuda Sakti)	275	2 cct, 2 Zebra	300	2021	Construction
4	Perawang	New Garuda Sakti	150	2 cct, 2 Zebra	40	2021	Construction
5	Rengat	Tembilahan	150	2 cct, 2 Hawk	120	2021	Construction
6	Rengat	Pangkalan Kerinci	150	1 cct, 2 Hawk	135	2021	Construction
7	Perawang	Siak sri indra Pura	150	2 cct, 2 Zebra	100	2021	Construction
8	PLTGU Riau	inc. 2 Pl (Pasir Putih - Tenayan)	150	2 cct, 2 Hawk	4	2021	Construction
9	KID	Pakning	150	2 cct, 2 Zebra	110	2023	Committed
10	Pakning	Workshop	150	2 cct, XLPE CU 1x400 mm2 (1 x240mm2 equivalent	14	2023	Committed
11	Siak Sri Indra Pura	Landing Point Long strait direction	150	2 cct, 2 Zebra	70	2023	Committed
12	Landing Point Long Strait direction	Long Strait Landing Point	150	2 cct, XLPE CU 2x400 mm2 (Equivalent 2x240mm2	10	2023	Committed
13	Landing Point Long Strait	Long Strait	150	2 cct, 2 Hawk	90	2023	Committed

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Riau (2/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
14	Pakning	Siak	150	2 cct, 2 Zebra	200	2023	Plan
15	Dumai (reconductoring)	Dumai industrial estate (KID)	150	2 cct, HTLS 1x310mm2	68	2023	Plan
16	Tanjung palas	Inc. 2 pi (KID-dumai)	150	2 cct, HTLS 1x310mm2	12	2024	Plan
17	Collection Centre	PTT Pertamina	230	2 cct, 2 Zebra	0,4	2024	Plan
18	Lubuk Gaung	Dumai	150	2 cct, 2 Hawk	60	2024	Plan
19	Sorek	Inc 2 phi (Rengat - Pangkalan Kerinci)	150	4 cct, 1 Hawk	1	2025	Plan
20	Loag Strait	Rangsang Island	150	2 cct, XLPE CU 1x400 mm2 (1x240 mm2 equivalent)	6	2025	Plan
21	Rangsang Island	Landing point TBK	150	2 cct, 1 Hawk	120	2025	Plan
22	Landing point TBK	Tanjung Balai Karimun	150	2 cct, XLPE CU 1x400 mm2 (1x240mm2 equivalent)	70	2025	Plan
23	Bangkinang	Fabric Folding	150	2 cct, 2 Hawk	70	2026	Plan
24	PTT RPE Kerinci	Pangkalan Kerinci	150	2 cct, 2 Zebra	10	2026	Plan
25	Peranap	Inc. 2 Pi (T1.Kuantan Rengat)	150	4 cct, 1 Hawk	6	2027	Plan
26	Perawang	Peninsular	500	2 cct, HVDC	300	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Riau Island (excl. Batam)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	Kijang	PLT EBT Base Bintan	150	2 cct, 2 Hawk	8	2029	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Bangka Belitung Islands

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
	Bangka system				306		
1	Sumatra Landing Point	Bangka Landing Point	150	1 cct, XLPE CU 1x400 mm2 (Under Sea)	36	2021	Construction
2	Bangka Landing Point (Sunsang)	Muntok	150	1 cct, 2 Hawk	8	2021	Construction
3	Sumatra Landing Point	Bangka Landing Point	150	2 cct, XLPE CU 1x400 mm2 (Under Sea)	72	2022	Construction
4	Bangka Landing Point (Sunsang)	Muntok	150	1 cct, 2 Hawk	8	2022	Construction
5	Pangkal Pinang 2	Rancid Water	150	2 cct, 2 Hawk	20	2026	Construction
6	Koba	Bangka Landing Point (Phase 2)	150	2 cct, 2 Hawk	132	2030	Plan
7	Sumatra Landing Point (Phase 2)	Bangka Landing Point (Phase 2)	150	2 cct, XLPE CU 2x400 mm2 (Under Sea)	30	2030	Plan
	Belitung System				122		
1	Manggar	Belitung Base Renewable Power Plant	70	2 cct, ACSR 1x210 mm2	52	2029	Plan
2	Dukong	North Belitung/Tj.High	70	2 cct, ACSR 1x210 mm2	70	2030	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Sumatra

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	Lubuk Sikaping/Pasaman	Simpang Empat	150	2 cct, 2 Hawk	60	2021	Construction
2	Kambang	Tapan	150	2 cct, 2 Hawk	143	2022	Construction
3	Padang City GIS	Single phi PIP/Lubuk Alung-Pauhlimo (Location Bingkuang)	150	2 cct, XLPE CU 1x800 mm2	40	2022	Committed
4	Tapan	Muko-Muko	150	2 cct, 2 Hawk	151	2022	Construction
5	Base	Inc. single Phi (Payakumbuh-Kotopanjang)	150	2 cct, 1x340 mm2	1	2023	Plan
6	Tip of the Ivory	Junction Four (single phi operation)	150	2 cct, 2 Hawk	140	2023	Plan
7	Bingkuang	Inc. 2 Pi (Pauli Limo - L.Alung)	150	2 cct, 1 Hawk	0,2	2025	Committed
8	Base	Inc. double Phi	150	2 cct, 1x340 mm2	0,1	2026	Plan
9	Tip of the Ivory	Inc. double Phi	150	2 cct, 2 Hawk	0,1	2026	Plan
10	Masang-2	Padang Luar	150	2 cct, 2 Hawk	80	2027	Plan
11	Sungai Penuh	Tapan	150	2 cct, 2 Hawk	80	2027	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Jambi

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	New Aurduri/Jambi 2	Peranap/Riau 1	500	2 cct, 4 Zebra	420	2021	Construction
2	New Aurduri	PLTU Jambi 1	500	2 cct, 2 Zebra	80	2026	Committed
3	PLTU Jambi 1	Jambi 2 power plant	500	2 cct, 2 Zebra	80	2026	Committed
4	PLTU Jambi 1	Inc. 2Pi (New Aurduri-Jambi power plant 2)	500	2 cct, 2 Zebra	0,2	2027	Committed
5	Bangko	PLTU Jambi 1	275	2 cct, 4 Zebra	180	2027	Committed
6	Muara Sabak	Kuala Tungkal	150	2 cct, 1 Hawk	109	2022	Construction
7	GI/GIS Jambi City	Payo Selincah	150	2 cct, XLPE CU 1x800 mm2	30	2024	Committed
8	Kuala Tungkal	Trade Harbour	150	2 cct, 1 Hawk	70	2024	Construction
9	Merangin Hydroelectric Power Plant	Inc (Bangko Direction)	150	2 cct, 2 Zebra	2	2025	Committed
10	Merangin Hydroelectric Power Plant	Inc (Full River Direction)	150	2 cct, 2 Hawk	2	2025	Committed
11	Seko	Inc. 2 Phi (Aurdurai-Payoselincah)	150	4 cct, ACSR 2x340 mm2	1	2025	Plan
12	Seko	Tx Muaro Sabak	150	2 cct, ACSR 2x340 mm2	0,4	2025	Plan
13	PLTU Jambi 1	Inc. 2 Phi (Murabulian-Sarolangun)	150	2 cct, 1 Hawk	8	2027	Plan
14	Bangko	Merangin Dam Hydroelectric Power Plant	150	2 cct, 1 Hawk	30	2028	Committed
15	River Power Plant Full	Sungai Penuh	150	2 cct, 1 Hawk	84	2028	Plan
16	Jambi Integrated City (JIC)	Payoselincah	150	2 cct, 2 Hawk	60	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – S. Sumatra (1/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	PLTU Sumsel-8	Muara Enim	500	2 cct, 2 Zebra	112	2021	Construction
2	Muara Enim/Sumsel 1	New Aur Duri/Jambi 2	500	2 cct, 4 Zebra	480	2022	Construction
3	Lumut Balai(Ex Lahat APBN)	Muara Enim (tx)	275	2 cct, 2 Zebra	132	2021	Construction
4	Muara Enim	Muara Enim (tx) (incomer 1/direction moss hall)	275	2 cct, 2 Zebra	64	2021	Construction
5	Muara Enim (tx)	Gumawang	275	2 cct, 2 Zebra	172	2022	Construction
6	Muara Enim	Muara Enim (tx) (incomer 2/Gumawang direction)	275	2 cct, 2 Zebra	64	2022	Construction
7	PLTU Sumsel-1	Betung	275	2 cct, 2 Zebra	160	2023	Construction
8	Betung	Palembang-1/Palembang North	275	2 cct, 4 Zebra	140	2024	Construction
9	Tanjung Api-Api	Sumatra Landing Point	150	1 cct, 2 Hawk	20	2021	Construction
10	Rantau dedap power plant	Moss Hall	150	2 cct, 1 Hawk	40	2021	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – S. Sumatra (2/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
11	Sarolangun	Muara Rupit	150	2 cct, 1 Hawk	80	2022	Construction
12	Lubuk Linggau	Tebing Tinggi	150	2 cct, 1 Hawk	110	2022	Construction
13	Pendopo	Inc. 2 pi (Lahat- Sp.Belimbing)	150	2 cct, ACSR 2x340 mm2	4	2022	Construction
14	Pendopo	Inc. 2 pi (Gn.Megang-Prabumulih)	150	2 cct, ACSR 2x281 mm2	4	2022	Construction
15	Tanjung Api-Api	Sumatra Landing Point	150	1 cct, 2 Hawk	20	2022	Construction
16	Tugumulyo	Gumawang	150	2 cct, 2 Hawk	120	2024	Construction
17	PLTU Sumbagsel-1	Baturaja	150	2 cct, ACSR 2x340	20	2024	PPA
18	Muara Dua	Lake Ranau Power Plant	150	2 cct, 1 Hawk	90	2028	Plan
19	Tanjung Sakti Hydroelectric Power Plant	Douple phi Manna-Pagar Alam	150	4 cct, 1 Hawk	60	2029	Plan
20	Mariana	Sumatra Landing Point 2	150	2 cct, 2 Hawk	220	2030	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Bengkulu

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	Pulo Baai	Arga Makmur	150	2 cct, 2 Hawk	108	2021	Construction
2	Manna	Bintuhan	150	2 cct, 1 Hawk	124	2023	Construction
3	Pekalongan	Hululais Power Plant	150	2 cct, 2 Hawk	100	2025	Committed
4	Kepahiang	Inc 2 phi (Pekalongan-Pulo Baai)	150	2 cct, 2 Hawk	20	2028	Plan
5	Muko-Muko	Arga Makmur	150	2 cct, 2 Hawk	292	2028	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Lampung

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD Target	Status
1	Gumawang	Lampung-1	275	2 cct, 4 Zebra	324	2023	Construction
2	Menggala	Kotabumi	150	1 cct, 2 Hawk (2nd circuit)	58	2021	Construction
3	Pakuan Ratu/Way Right	Inc. 2 PI (Menggala-Gumawang	150	4 cct, 2 Zebra	120	2021	Construction
4	Dente Teladas	Dipasena	150	2 cct, 2 Hawk	80	2021	Construction
5	Dente Teladas	Seputih Banyak	150	2 cct, 2 Hawk	120	2022	Construction
6	Performances	Gedong Tataan	150	2 cct, 2 Hawk	40	2022	Construction
7	Sidomulyo	Inc. 2 pi (Kalianda-Sabalang)	150	2 cct, 2 Zebra	1	2022	Construction
8	Lampung-1	Inc. 2 pi (Tegineneng-Metro-Sribawono) Tegineneng Direction	150	2 cct, 4 Zebra	4	2023	Plan
9	Lampung-1	Inc. 2 pi (Tegineneng-Metro-Sribawono) Direction Metro/Sribawono	150	2 cct, 2 Hawk	4	2023	Plan
10	Tegineneng (Upgrade Tower)	Lampung-1 (Tower Upgrade)	150	2 cct, 4 Zebra	10	2023	Plan
11	Gedong Tataan	Teluk Ratai	150	2 cct, 2 Hawk	60	2024	Construction
12	Garuntang	New Tarahan	150	2 cct, 2 Zebra	20	2025	Plan
13	Kalianda	Rajabasa Power Plant	150	2 cct, 2 Hawk	40	2025	Plan
14	Liwa	Krui	150	2 cct, 2 Hawk	80	2026	Construction
15	Teluk Betung	Garuntang	150	2 cct, XLPE CU 2x1000 mm2/2 cct, XLPE CU 1X1600 mm2/2 cct, 2XZebra	10	2027	Plan
16	KIM Tenggamus	Kota Agung	150	2 cct, 1 Hawk	20	2027	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Kalimantan(1/2)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
1	Sandalwood	Incomer 1 phi (P.Baru-K.Baru)	150 KV	2 cct, ACSR 2xHawk	1	2021	Construction
2	Sanggau	Sekadau	150 KV	2 cct, ACSR 2xHawk	93,26	2021	Construction
3	Sintang	Sekadau	150 KV	2 cct, ACSR 2xHawk	104	2021	Construction
4	Tayan	Sanggau	150 KV	2 cct, ACSR 2xHawk	156	2021	Construction
5	Ambawang	Incomer 2 phi (Siantan-Tayan)	150 KV	4 cct, ACSR 2xHawk	14	2022	Plan
6	Kendawangan	Marau (ex. Air Upas)	150 KV	2 cct, ACSR 2xHawk	142	2022	Procurement
7	Marau (ex. Air Upas)	Sukamara	150 KV	2 cct, ACSR 2xHawk	156	2022	Procurement
8	New Trench	Siantan	150 KV	Uprating 2 cct , HTLS (Existing 1xHawk)	35	2022	Plan
9	New Trench	New City	150 KV	Uprating 2 cct , HTLS (Existing 1xHawk)	40	2022	Plan
10	Sandai	Inc 1 Phi (Ketapanga-Sukadana)	150 KV	2 cct, ACSR 2xHawk	132	2022	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Kalimantan(2/2)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
11	Sandai	Tayan	150 KV	2 cct, ACSR 2xHawk	332	2023	Plan
12	Ambawang	Rasau	150 KV	2 cct, ACSR 2xHawk	100	2023	Plan
13	Ambawang	Sei raya	150 KV	2 cct, ACSR 2xHawk	12	2023	Plan
14	Badau	Sintang	150 KV	2 cct, ACSR 2xHawk	300	2023	Plan
15	Kotabaru	Rasau	150 KV	2 cct, ACSR 2xHawk	60	2023	Plan
16	Sekayam (Ex.Entikong)	Sanggau	150 KV	2 cct, ACSR 2xHawk	186	2023	Plan
17	Siantan	Tayan	150 KV	Uprating 2 cct, HTLS (Existing 1xHawk)	200	2023	Plan
18	Sintang	Nanga Pinoh	150 KV	2 cct, ACSR 2xHawk	112	2023	Plan
19	Nanga pinoh	New Town 2	150 KV	2 cct, ACSR 2xHawk	144	2024	Plan
20	Sintang	Putussibau	150 KV	2 cct, ACSR 2xHawk	464	2024	Plan
21	PLT EBT Base Kalbar3	Ketapang	150 KV	2 cct, ACSR 2xZebra	10	2027	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – S. Kalimantan (1/2)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
1	Batulicin	Tarjun	150KV	2 cct, ACSR 2xHawk	96	2021	Construction
2	Cempaka	Ulin (GIS)	150KV	2 cct, ACSR 2xHawk	63	2021	Plan
3	Paringin	Incomer 1 Phi (Barikin-Tanjung)	150KV	1 cct, ACSR 2xHawk	1	2021	Construction
4	Pulang Pisau	Inc 1 Phi (Palangkaraya-Mintin)	150KV	2 cct, ACSR 2xHawk	1	2021	Construction
5	Sebuku	inc 1 phi (Slippery stone-City new)	150KV	2 cct, ACSR 1xHawk	75	2021	Construction
6	Sei Tabuk	Mantuil	150KV	2 cct, ACSR 2xHawk	20	2021	Construction
7	Barikin	Mantuil	150 KV	Uprating 2 cct, HTLS (Existing 1xHawk)	60	2022	Plan
8	Inc 2 Phi (Batulicin Kotabaru)	Selaru	150 KV	2 cct, ACSR 2xHawk	1	2022	Construction
9	Kandangan	Incomer 1 phi (Cempaka-Barikin)	150 KV	1 cct, ACSR 1xHawk	6	2022	Construction
10	Tarjun	Sei Durian	150 KV	2 cct, ACSR 2xHawk	169	2022	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – S. Kalimantan (2/2)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
11	Acidic acid	Satui	150 KV	Uprating 2 cct, HTLS (Existing 1xHawk)	128	2023	Plan
12	Batulicin Baru	Inc 2 Phi (Batulician-Tarjun)	150 KV	2 cct, ACSR 2xHawk	4	2023	Plan
13	PLTG/MG/GU South Kalimantan	Seberang Barito	150 KV	2 cct, ACSR 2xZebra	6	2023	Plan
14	Satui	Batulicin	150 KV	Uprating 2 cct, HTLS (Existing 1xHawk)	150	2023	Plan
15	Seberang Barito	Kayutangi	150 KV	Uprating 2 cct, HTLS (Existing 1xHawk)	38	2023	Plan
16	L. Point New City	New City	150 KV	2 cct, ACSR 2xHawk	3	2028	Plan
17	L. Point Tarjun	L. Point City New	150 KV	2 cct, ACSR 2xSea	8	2028	Plan
18	Tarjun	L. Point Tarjun	150 KV	2 cct, ACSR 2xHawk	9	2028	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – C. Kalimantan

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
1	Power Plant Inc, Kalselteng 1	Kuala Kurun	150 KV	2 cct, ACSR 2xHawk	88,86	2021	Construction
2	Nanga Bulik	Incomer 1 phi (Base Bun-Sukamara)	150 KV	2 cct, ACSR 2xHawk	78	2021	Construction
3	Bull Base	Incomer 1 phi (Base Bun-Sampit)	150 KV	2 cct, ACSR 2xHawk	1	2021	Construction
4	Bun Base	Sukamara	150 KV	2 cct, ACSR 2xHawk	174	2021	Construction
5	PLTU Sampit	Kuala Pembuang	150 KV	2 cct, ACSR 1xHawk	215	2025	Construction
6	Puruk Cahu	Kauala Kurun	150 KV	2 cct, ACSR 2xHawk	94	2021	Construction
7	Sudan	Inc 1 phi (Sampit-Kasongan)	150 KV	2 cct, ACSR 2xHawk	1	2021	Procurement
8	Amuntai	Tamiang Layang	150 KV	2 cct, ACSR 2xHawk	81	2022	Plan
9	Buntok	Tamiang Lanyang	150 KV	2 cct, ACSR 2xHawk	92	2022	Plan
10	Central Kalimantan Power Plant	Bun Base	150 KV	2 cct, ACSR 2xHawk	60	2024	Plan
11	Sudan	Inc 1 Phi (Sampit-Parenggean)	150 KV	2 cct, ACSR 2xHawk	1	2024	Plan
12	Buntok	Palangkaraya	150 KV	2 cct, ACSR 2xHawk	300	2028	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Kalimantan (1/3)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
1	New Balikpapan	Kariangau	150 KV	2 cct, ACSR 2xZebra	31	2021	Construction
2	New Samarinda	Sambera	150 KV	2 cct, ACSR 2xZebra	44	2021	Construction
3	Sangatta	Maloi	150 KV	2 cct, ACSR 2xHawk	144	2021	Construction
4	Beard Flower	Kotabangun	150 KV	2 cct, ACSR 2xHawk	190	2022	Plan
5	MHP Bangkanai	Melak	150 KV	2 cct, ACSR 2xHawk	382	2022	Recana
6	Talisayan	Maloy	150 KV	2 cct, ACSR 2xHawk	234	2022	Plan
7	Tanah Grogot	Sei Durian	150 KV	2 cct, ACSR 2xHawk	140	2022	Plan
8	Tanjung Redeb	Talisayan	150 KV	2 cct, ACSR 2xHawk	210	2022	Construction
9	Kariangau	Sepaku	150 KV	2 cct, ACSR 2xHawk	64	2023	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Kalimantan (2/3)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
10	Melak	Kotabangun	150 KV	2 cct, ACSR 2xHawk	334	2023	Plan
11	Muara Wahau	Sangatta	150 KV	2 cct, ACSR 2xHawk	256	2023	Plan
12	Samboja	Inc 2 Phi (Karangjoang-Hope New)	150 KV	4 cct, ACSR 2xHawk	2	2023	Plan
13	Embalut	Blue Hill	150 KV	Uprating 2 cct, HTLS (Existing 1xHawk)	40	2024	Plan
14	New Hope	Bukuan	150 KV	Uprating 2 cct, HTLS (Existing 1xHawk)	24	2024	Plan
15	Melak	Ujoh Bilang	150 KV	2 cct, ACSR 2xHawk	150	2024	Plan
16	Tanjung Redeb	Tanjung Batu (Derawan)	150 KV	2 cct, ACSR 2xHawk	100	2024	Plan
17	Tenggarong/Bukit Blue	Sepaku	150 KV	2 cct, ACSR 2xHawk	151	2024	Plan
18	Bontang Lestari (ex Bontang Koala)	Inc 2 Phi (PLTU Kaltim 2 (FTP 2)) – Bontang)	150 KV	4 cct, ACSR 2xHawk	10	2025	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Kalimantan (3/3)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
19	Industry (Coastal Road)	Petung (Coastal Road)	150 KV	2 cct, ACSR 2xHawk	90	2025	Plan
20	Beard Road)	Muara Bengkal	150 KV	2 cct, ACSR 2xHawk	200	2025	Plan
21	Kuaro	Sepaku	150 KV	2 cct, ACSR 2xHawk	250	2025	Plan
22	Muara Wahau	Tanjung Redeb	150 KV	2 cct, ACSR 2xHawk	304	2025	Plan
23	New Balikpapan	Balikpapan (Ex. GIS Balikpapan)	150 KV	2 cct, UGC XLPE, 800 mm	20	2025	Plan
24	Kelai Hydroelectric Power Plant	Inc 2 Phi (M. Wahau-Tj. Redeb)	150 KV	2 cct, ACSR 2xHawk	1	2025	Plan
25	Samarinda (Ex. GIS)	New Samarinda	150 KV	2 cct, UGC XLPE, 800 mm	30	2026	Plan
26	Muara Bengkal	Muara wahau	150 KV	2 cct, ACSR 2xHawk	240	2026	Plan
27	GITET Embalut	GITET IKN	150 KV	2 cct, 4xZebra	150	2028	Plan
28	GITET IKN	GITET Balikpapan	150 KV	2 cct, 4xZebra	150	2028	Plan
29	Tabang Hydroelectric Power Plant	Beard Flower	150 KV	2 cct, ACSR 2xZebra	140	2028	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – N. Kalimantan

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
1	Tanjung Redeb	Tanjung Selor	150 kV	2 cct, ACSR 2xHawk	180	2021	Construction
2	Juata	Tarakan	150 kV	2 cct, ACSR 1xHawk	34	2022	Plan
3	Landing Point Apas Payau	Landing Point Juata	150 kV	2 cct Marine cable	4,4	2022	Plan
4	Landing point Juata	Juata	150 kV	2 cct, ACSR 1xHawk	6	2022	Plan
5	Sei Menggaris	Tidang Pale	150 kV	2 cct, ACSR 1xHawk	164	2022	Plan
6	Sekatak	Landing Point Apas Payau	150 kV	2 cct, ACSR 1xHawk	112	2022	Plan
7	Tanjung Selor	Tidang Pale	150 kV	2 cct, ACSR 2xHawk	226	2022	Construction
8	Nunukan Landing Point	Nunukan	150 kV	2 cct, ACSR 2xHawk	42	2024	Plan
9	Tinabasan Landing Point	Nunukan Landing Point	150 kV	2 cct Marine cable	8,8	2024	Plan
10	Malinau	Tinabasan Landing Point	150 kV	2 cct, ACSR 2xHawk	342	2024	Plan
11	Sei Menggaris	Nunukan	150 kV	2 cct, ACSR 1xHawk	90	2024	Plan
12	HYDROPOWER GITET	GITET TJ. Selor	500 kV	2 cct,4xZebra	80	2028	Plan
13	GITET TJ. Selor	Embalut GITET	500 kV	2 cct,4xZebra	760	2028	Plan
14	HYDROPOWER Wing	Tj. Selor	150 kV	2 cct, ACSR 2xZebra	80	2028	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Jakarta (1/3)

No.	From	To	Voltage (kV)	Scope of work	Length (kms)	COD Target	Status
1	CSW II / Antasari	Inc. (Durentiga - Kemang)	150 kV	New, 2 cct, SKTT	5,2	2021	Energize
2	Gandaria II / J1. Raya Bogor	Gandaria	150 kV	New, 2 cct, SKTT	9,4	2021	Energize
3	Grogol II / Kedaung	Inc. (Duri Kosambi - Grogol)	150 kV	New, 4 cct, SUTT	4,0	2021	Energize
4	Jatiwaringin	Inc. (Tambun - Pondok Coconut)	150 kV	New, 4 cct, SUTT	1,0	2021	Energize
5	New Rubber	Old Rubber	150 kV	New, 1 cct, SKTT	0,2	2021	Procurement
6	Angke	Ketapang	150 kV	New, 2 cct, SKTT	11,7	2021	Construction
7	New Rubber	Kebon Jeruk	150 kV	New, 2 cct, SKTT	12,5	2021	Construction
8	Mampang Baru	Abadi Guna Papan	150 kV	New, 2 cct, SKTT	7,0	2021	Construction
9	Kembangan II / Metland Cyber City	Inc. (Ciledug - Kembangan)	150 kV	New, 4 cct, SKTT	1,1	2022	Construction
10	Traction Halim	Poncol Baru II	150 kV	New, 1 cct, SKTT	2,5	2022	Construction
11	Traction Halim	Bekasi II / Riverbank Summarecon	150 kV	New, 1 cct, SKTT	5,5	2022	Construction
12	Priok	Tx. Kemayoran	150 kV	New, 2cct, SKTT	3,0	2022	Plan
13	Coral Estuary	Duri kosambi	500 kV	New, 2cct, SUTET	30,0	2022	Construction
14	Gandul	Kemang	150 kV	New, 2cct, SKTT	24,0	2022	Plan
15	Penggilingan II / Rawa Kuning	Milling	150 kV	New, 2cct, SKTT	12,0	2022	Construction
16	Cawang Baru	Rasuna Park	150 kV	New, 1 cct, SKTT	11,2	2022	Plan
17	Cawang Baru	Abadi Guna Papan	150 kV	New, 1 cct, SKTT	10,6	2022	Plan
18	Plumpang II	Inc. (Plumping – Gambir New)	150 kV	New, 4 cct, SKTT	1,0	2022	Energize

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Jakarta (2/3)

No.	From	To	Voltage (kV)	Scope of work	Length (kms)	COD Target	Status
19	Tomang	Grogol	150 kV	New, 2 cct, SKTT	8,1	2022	Construction
20	Gambir Lama II	Inc. (Kebon sirih - Gambir Lama)	150 kV	New, 4 cct, SKTT	2,0	2023	Construction
21	Kebon Sirih II	Inc. (Gambir Lama - Pulo Mas I Tanah Tinggi)	150 kV	New, 4 cct, SUTT	2,0	2023	Construction
22	Gandaria	Cibinong	150 kV	New, 2 cct, SUTT	24,0	2023	Construction
23	Priok	Muara Tawar	500 kV	New, 2 cct, SUTET	30,0	2023	Construction
24	Rasuna Park	Abadi Guna Papan	150 kV	New, 1 cct, SKTT	2,8	2023	Plan
25	Pulo Gadung II	Pulo Gadung Reconditioning	150 kV	New, 2 cct, SKTT	1,0	2023	Construction
26	Senayan III / Ulujami	New Senayan	150 kV	New, 2 cct, SKTT	6,4	2023	Construction
27	Cipinang II /Jatinegara	Pulo Gadung II	150 kV	New, 2 cct, SKTT	10,0	2024	Construction
28	Duren Tiga II / Ragunan	Depok II	150 kV	New, 2 cct, SUTT	16,7	2024	Construction
29	Kebon Jeruk	Duri Kosambi	150 kV	New, 2 cct, SKTT	20,0	2024	Plan
30	Pondok Kelapa II	Inc. (Bekasi - Pondok Kelapa)	150 kV	New, 4 cct, SUTT	4,0	2024	Plan
31	Old Muara Karang	Budi Kemuliaan	150 kV	New, 2 cct, SKTT	24,0	2025	Plan
32	Budi Kemuliaan	Kebon Sirih	150 kV	New, 2 cct, SKTT	4,0	2025	Plan
33	Senayan	Petukangan	150 kV	New, 2 cct, SKTT	20,0	2025	Plan
34	Danayasa	Abadi Guna Papan	150 kV	New, 2 cct, SKTT	4,0	2025	Plan
35	Cawang Baru II / Cililitan	Cawang	500 kV	New, 2 cct, SKTET	1,0	2026	Plan
36	Cawang Baru II / Cililitan	Gandul	500 kV	New, 2 cct, SUTET	40,0	2026	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Jakarta (3/3)

No.	From	To	Voltage (kV)	Scope of work	Length (kms)	COD Target	Status
37	Tx Cawang Baru	Tx. Ragunan	150 kV	New, 2 cct, SKTT	3,6	2026	Plan
38	Duren Tiga II / Ragunan	Tx. Ragunan	150 kV	New, 2 cct, SUTT	2,6	2026	Construction
39	Cawang Baru	Tx. New Filigree	150 kV	New, 2 cct, SUTT	9,1	2026	Construction
40	Abadi Guna Papan II	Cawang Baru	150 kV	New, 2 cct, SKTT	20,6	2029	Construction
41	Bekasi	Tx. Marunda	150 kV	Rec, 2 cct, SUTT	29,6	2029	Plan
42	Tx. Marunda	Cowshed II	150 kV	New, 2 cct, SKTT	3,0	2029	Plan
43	Cowshed II	Marunda	150 kV	New, 2 cct, SKTT	3,0	2029	Plan
44	Kemayoran II / Pademangan	Inc. (Kemayoran - Gunung Sahari)	150 kV	New, 2 cct, SKTT	6,0	2029	Construction
45	Kemayoran II / Pademangan	Inc. (Kemayoran - Gunung Sahari)	150 kV	New, 2 cct, SKTT	6,0	2029	Construction
46	Priok	Muarakarang	500 kV	New, 2 cct, SUTET	20,0	2029	Plan
47	Angke	Ancol	150 kV	New, 2 cct, SKTT	11,8	2029	Plan
48	Ancol	Kemayoran	150 kV	New, 2 cct, SKTT	9,6	2029	Plan
49	Semanggi Barat II / Petamburan	Old Rubber	150 kV	New, 2 cct, SKTT	3,0	2029	Plan
50	Taman Rasuna II / Benhil	Old Rubber	150 kV	New, 2 cct, SKTT	10,0	2029	Plan
51	Ancol II / Pinangsia	Angke	150 kV	New, 2 cct, SKTT	10,0	2030	Plan
52	Gandul II / Pamulang	Inc. (Serpong – Petukangan | Bintaro)	150 kV	New, 4 cct, SUTT	1,0	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Banten (1/2)

No.	From	To	Voltage (kV)	Scope	Length (kms)	COD Target	Status
1	Bojanegara	Balaraja	500 kV	Rec , 2 cct, SUTET	99,2	2021	Procurement
2	Indonesia torray Synthetics (ITS)	Inc. (New Tangerang - Cengkareng II)	150 kV	New, 2 cct, SUTT	0,1	2021	Construction
3	Jatake II / Kelapa Dua	Inc. (Jatake - Old Tangerang)	150 kV	New, 4 cct, SUTT	0,4	2021	Energize
4	Tangerang Baru II / Sindang Jaya	Tangerang Baru III	150 kV	New, 2 cct, SUTT	14,9	2021	Construction
5	Lontar power plant	Tangerang Baru III	150 kV	New, 2 cct, SUTT	14,7	2021	Construction
6	Tangerang Baru II / Sindang Jaya	Inc. (Balaraja - Suvarna Sutra)	150 kV	New, 4 cct, SUTT	11,5	2021	Construction
7	Balaraja	Kembangan	500 kV	New, 2 cct, SUTET	89,0	2021	Construction
8	Terate/MNA	Inc_(Cilegon Baru - Cilegon Baru II)	150 kV	New, 2 cct, SUTT	3,6	2021	Construction
9	Tx. Single elephant	Inc. (Pasar kemis - Pasar kemis II)	150 kV	New, 2 cct, SUTT	2,7	2022	Construction
10	Single elephant	Tx. Single elephant	150 kV	New, 2 cct, SKTT	5,0	2022	Construction
11	Teluk Naga II / Dadap	Inc. (Teluk Naga - Lontar)	150 kV	New, 4 cct, SUTT	24,8	2022	Plan
12	Sepatan II	Sepatan	150 kV	New, 2 cct, SUTT	10,0	2023	Plan
13	Tigaraksa II / Citra Maja	Tigaraksa	150 kV	New, 2 cct, SUTT	20,0	2023	Plan
14	Bayah / Cemindo Gemilang	Malimping	150 kV	New, 2 cct, SUTT	70,0	2024	Construction
15	South Serang /Baros	Serang	150 kV	New, 2 cct, SUTT	26,0	2024	Plan
16	Banten Wind power Plant	Malimping	150 kV	New, 2 cct, SUTT	66,0	2024	Plan
17	Banten Wind Power Plant	Tanjung Lesung	150 kV	New, 2 cct, SUTT	66,0	2024	Plan
18	South Serang / Baros	Rangkas Baru	150 kV	New, 2 cct, SUTT	60,0	2024	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Banten (2/2)

No.	From	To	Voltage (kV)	Scope of work	Length (kms)	COD Target	Status
19	Sinar Sahabat	Inc, (Citra Habitat - Legok)	150 kV	New , 4 cct, SUTT	4,0	2024	Construction
20	Tanjung Lesung	Menes	150 kV	New, 2 cct, SUTT	90,0	2024	Construction
21	Cikande New	Inc. (Puncak Ardi Mulya - Cikande)	150 kV	New, 2 cct, SUTT	10,0	2025	Plan
22	Cikande	Inc. (Old Suralaya - Balaraja)	500 kV	New, 2 cct, SUTT	10,0	2025	Plan
23	Cikupa New	Inc. (Jatake - old Tangerang)	150 kV	New, 4 cct, SUTT	8,0	2025	Construction
24	Cikupa	Inc. (Balaraja – Kembangan)	500 kV	New, 4 cct, SUTET	4,0	2025	plan
25	Cilegon Baru II	Inc. (Cilegon - Attack)	150 kV	New, 2 cct, SUTT	1,0	2025	Construction
26	LBE	Bojanegara	500kV	Rec, 2 cct, SUTET	35,0	2025	Plan
27	PLTU Jawa-9 & Jawa-10	Inc. (Old Suralaya – Cilegon)	500 kV	New, 4 cct, SUTET	8,0	2025	Plan
28	Old Suralaya	Cilegon	500 kV	Rec, 2 cct, SUTET	26,0	2025	Plan
29	Tigaraksa II	Kopo	150 kV	New, 2 cct, SUTT	40,0	2025	Plan
30	Rawa Dano Power Plant	Inc. (Menes - Asahimas)	150 kV	New, 4 cct, SUTT	60,0	2025	Plan
31	Cilegon	Mitsui	150 kV	Rec, 1 cct, SUTT	4,4	2026	Plan
32	Peni	Suralaya	150 kV	Rec, 1 cct, SUTT	12,8	2026	Plan
33	Suralaya	Mitsubishi	150 kV	Rec, 1 cct, SUTT	9,5	2026	Plan
34	Mitsubishi	Cilegon	150 kV	Rec, 1 cct, SUTT	4,8	2026	Plan
35	Mitsui	Peni	150 kV	Rec, 1 cct, SUTT	0,3	2026	Plan
36	Balaraja New	Millennium	150 kV	New, 2 cct, SUTT	21,0	2027	Plan
37	Curug Switching	Inc. (Cikupa – Lippo Curug)	150 kV	New, 4 cct, SKTT	2,0	2030	Plan
38	Cikupa new	Curug Switching	150 kV	New, 2 cct, SKTT	6,0	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Java (1/7)

No.	Transmission From	Transmission To	Voltage (kV)	Job	Capacity (kms)	COD Target	Status
1	New East Bandung	Ujungberung	150 kV	New, 2 cct, SUTT	18,0	2021	Construction
2	New Bunar	Rangkasbitung II	150kV	New, 2 cct, SUTT	72,0	2021	Construction
3	Indramayu	Cibatu Baru/ Deltamas	500 kV	New, 2 cct, SUTET	260,0	2021	Construction
4	Mandirancan	Indramayu	500 kV	New, 2 cct, SUTET	180,0	2021	Construction
5	Cimanggis II/Middle	Inc. (Kedung Badak-Depok Rawadenok (Depok III))	150 kV	New, 4 cct, SUTT	15,2	2021	Construction
6	Indorama	Cikumpay	150kV	New, 1 cct, SUTT	1,3	2021	Procureme
7	Jatigede Hydroelectric power Plant / Parakan Kondang Baru	Inc, (Rancaekek - Sunyaragd)	150 kV	New, 4 cct, SUTT	20,0	2021	Construction
8	PLTGU Jawa-1	Cibatu Baru II / Sukatani	500 kV	New, 2 cct, SUTET	2,0	2021	Construction
9	South Bandung	Inc. (Tasik - Depok)	500 kV	New, 2 cct, SUTET	4,0	2021	Construction
10	Bekasi	Tx. Milling	150 kV	New, 2 cct, SKTT	8,3	2021	Construction
11	Cibatu Baru II / Sukatani	Inc. (Muara Tawar - Cibatu)	500 kV	New, 4 cct, SUTET	20,0	2021	Construction
12	Poncol Baru II	New Poncol	150 kV	New, 2 cct, SUTT	2,0	2021	Construction
13	Balongan	Inc. (Jatibarang - Arjawinangun)	150 kV	New, 4 cct, SUTT	48,8	2022	Procurement
14	Cianjur II / Mande	Inc. Cigereleng)	150 kV	New, 4 cct, SUTT	20,0	2022	Construction
15	Depok II	Inc. (Tx. Cimanggis Rawadenok (Depok III))	150 kV	New, 2 cct, SUTT	8,0	2022	Construction
16	PLTU Jawa-1	Mandirancan	500 kV	New, 2 cct, SUTET	20,0	2022	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Java (2/7)

No.	Transmission From	Transmission To	Voltage (kV)	Job	Capacity (kms)	COD Target	Status
17	Kanci	Inc. (PLTU CEP-Brebes)	150 kV	New, 2 cct, SUTT	4,0	2022	Construction
18	Karawang Traction	Jui Shin Indonesia	150 kV	New, 1 cct, SUTT	15,0	2022	Procurement
19	Karawang Traction	Hexa / AUA / AMI / Taman Mekar	150 kV	New, 1 cct, SUTT	10,0	2022	Construction
20	Outer regal Traction	Inc. (Ujungberung - Kiaracondong)	150 kV	New, 2 cct, SUTT	4,0	2022	Construction
21	New Brass	Mandirancan	150 kV	New, 2 cct, SUTT	24,0	2022	Procurement
22	Muara Tawar	Inc. (Bekasi - PIumpang | Cow Cage)	150 kV	New, 4 cct, SUTT	20,0	2022	Construction
23	Traction Padalarang Baru II / Ngamprah / Walini	Cirata	150 kV	New, 1 cct, SUTT	30,0	2022	Construction
24	Traction Padalarang Baru II / Ngamprah / Walini	Padalarang Baru	150 kV	New, 1 cct, SUTT	10,0	2022	Construction
25	PLTU Pelabuhan Ratu	Pelabuhan Ratu Baru	150 kV	New, 2 cct, SUTT	60,0	2022	Plan
26	Muara Tawar	Bekasi	500 kV	New, 2 cct, SUTET	18,0	2022	Procurement
27	Subang Baru	Inc. (Sukamandi - Haurgeulis)	150 kV	New, 4 cct, SUTT	20,0	2022	Procurement
28	Sukatani New	Inc. (Bekasi - Sukatani)	150kV	New, 4 cct, SUTT	8,0	2022	Construction
29	Cangkring Baru / Kapetakan	Sunyaragi	150 kV	New, 2 cct, SUTT	20,0	2023	Construction
30	South Bandung	Tx. Puppet Windu	150 kV	New, 2 cct, SUTT	64,0	2023	Plan
31	Data Center Summit	Inc. (Deltamas - THK)	150 kV	New, 4 cct, SUTT	16,0	2023	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Java (3/7)

No.	Transmission From	Transmission To	Voltage (kV)	Job	Capacity (kms)	COD Target	Status
32	Data Center Summit	Inc. (Deltamas - KIIC II)	150kV	New, 4 cct, SKTT	16,0	2023	Plan
33	Telukjambe II	Indah Kiat Summit	150 kV	New, 2 cct, SUTT	3,0	2023	Plan
34	Malangbong Baru	New Brass	150kV	New, 2 cct, SUTT	84,0	2023	Plan
35	Patimban	Inc.Indramayu - Sukamandi)	150kV	New, 4 cct, SUTT	20,0	2023	Plan
36	Rengasdengklok Baru	Sukamandi	150kV	New, 2 cct, SUTT	40,0	2023	Plan
37	Sentul City/ Cijayanti	Inc. (Sentul - Bogor New)	150kV	New, 4 cct, SUTT	4,0	2023	Plan
38	Kosambi Baru	Tx. New Sukatani	150kV	Rec, 2 cct, SUTT	60,0	2023	Construction
39	Ujungberung Lama	Tx. (Rancaekek - Sunyaragi)	150kV	Rec, 2 cct, SUTT	12,8	2023	Procurement
40	Cibuni Power Plant	Patuha	150 kV	New, 2 cct, SUTT	11,0	2024	Plan
41	Dawuan II/ Megatama Putra Sejahtera Summit	Inc. (Kosambi Baru - PLTU Indramayu)	150kV	New, 4 cct, SUTT	10,0	2024	Plan
42	Kadipaten Baru II / Kertajati	Inc Tx (Rancaekek - Sunyaragi)	150 kV	New, 2 cct, SUTT	10,0	2024	Plan
43	Rancaekek	Sunyaragi	150 kV	New, 2 cct, SUTT	166,0	2024	Construction
44	Sawangan	Inc. (Gandul - Serpong)	150 kV	New, 4 cct, SUTT	4,0	2024	Construction
45	Bekasi	Tx. New Sukatani	150 kV	Rec, 2 cct, SUTT	58,0	2024	Construction
46	Telukjambe 11	Telukjambe	150 kV	New, 2 cct, SUTT	14,0	2024	Plan
47	Dayeuhkolot	Inc. (South Bandung - Cigereleng)	150kV	New, 4 cct, SUTT	6,0	2025	Construction
48	KIIC II / Margakaya	Kosambi Baru	150 kV	New, 4 cct, SUTT	40,0	2025	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Java (4/7)

No.	Transmission From	Transmission To	Voltage (kV)	Job	Capacity (kms)	COD Target	Status
49	New Jatiluhur	Inc. (Kosambi Baru - Padalarang)	150kV	New, 4 cct, SUTT	91,6	2025	Procurement
50	New Jatiluhur	Jatiluhur Hydroelectric Power Plant	150 kV	New, 2 cct, SUTT	20,0	2025	Procurement
51	Tx. Wayang Windu	Kamojang	150 kV	New, 2 cct, SUTT	60,0	2025	Plan
52	Java-3 Switchyard	Java-3 Switching	500 kV	New, 2 cct, SUTET	20,0	2025	Plan
53	Switching PLTU Jawa-3	Inc. (Batang -Indrama)	500 kV	New, 4 cct, SUTET	40,0	2025	Plan
54	Malangbong Baru	New Tasikmalaya	150 kV	New, 2 cct, SUTT	74,0	2025	Plan
55	Cigereleng	Lagadar	150 kV	Rec, 2 cct, SUTT	32,8	2025	Plan
56	Cianjur	Padalarang Baru	150 kV	New, 2 cct, SUTT	83,2	2025	Plan
57	Old Salak	New Ciawi	150 kV	New, 2 cct, SUTT	20,0	2025	Procurement
58	Parungmulya	Maligi	150 kV	Rec, 1 cct, SUTT	2,6	2025	Plan
59	Parungmulya	Kutamekar	150 kV	Rec, 1 cct, SUTT	5,1	2025	Plan
60	Kutamekar	Kosambi Baru	150 kV	Rec, 1 cct, SUTT	7,5	2025	Plan
61	Maligi	Kosambi Baru	150 kV	Rec, 1 cct, SUTT	6,7	2025	Plan
62	Sukarame	Wayang Windu	150 kV	New, 2 cct, SUTT	56,0	2025	Plan
63	Tx. Tambun	Tambun	150 kV	New, 2 cct, SUTT	10,2	2025	Plan
64	Poncol Baru II	Box Bojong Menteng	150 kV	Rec, 2 cct, SUTT	12,0	2025	Plan
65	Tambun II/ Tambun New/ Pasar Kalong	Tx. Tambun	150 kV	New, 2 cct, SKTT	2,2	2025	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Java (5/7)

No.	Transmission From	Transmission To	Voltage (kV)	Job	Capacity (kms)	COD Target	Status
66	Tambun II/ Tambun New/ Kalong Market	Box Bojong Menteng	150 kV	New, 2 cct, SUTT	2,0	2025	Plan
67	Tanggeung / South Cianjur	Pelabuhan Ratu Baru / Jampang Kulon	150 kV	New, 2 cct, SUTT	120,0	2025	Procurement
68	Upper Cisokan PS HYDROPOWER	Inc. (Cibinong - Saguling)	500 kV	New, 4 cct, SUTET	60,0	2025	Plan
69	New Tasikmalaya	Ciamis	150 kV	New, 2 cct, SUTT	20,0	2026	Plan
70	Pabuaran	MPS	150 kV	New, 2 cct, SUTT	24,0	2026	Plan
71	Cibinong	Cimanggis	150 kV	Rec, 2 cct, SUTT	13,2	2026	Plan
72	Sukatani	Dawn SW	150 kV	New, 2 cct, SUTT	30,0	2026	Construction
73	Sumedang Baru	Inc. (Sunyaragi Rancaekek)	150 kV	New, 4 cct, SUTT	5,0	2026	Construction
74	PLTP Tangkuban Perahu I	Padalarang Baru II	150 kV	New, 2 cct, SUTT	15,0	2026	Plan
75	Bogor Baru II/ Tajur	Inc. (Bogor Baru - Cianjur)	150 kV	New, 2 cct, SUTT	0,4	2027	Plan
76	New Bunar	Kracak Baru	150 kV	New, 2 cct, SUTT	30,0	2027	Plan
77	Cikijing	Inc. (Malangbong Baru - Kuningan Baru)	150kV	New, 4 cct, SUTT	80,0	2027	Plan
78	Gandamekar II / Cibuntu	Inc. (Tambun - Gandamekar)	150kV	New, 4 cct, SUTT	10,0	2027	Plan
79	Jababeka II / Pamahan	Tegal Herang	150kV	New, 2 cct, SUTT	18,0	2027	Plan
80	Mandirancan	South Bandung	500 kV	New, 1 cct, SUTET	150,0	2027	Plan
81	North Bandung	Padalarang	150kV	Rec, 2 cct, SUTT	25,6	2027	Plan
82	Bogor Baru	Katulampa	150 kV	Rec, 2 cct, SUTT	5,2	2027	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Java (6/7)

No.	Transmission From	Transmission To	Voltage (kV)	Job	Capacity (kms)	COD Target	Status
83	Katulampa	Cianjur	150kV	Rec, 2 cct, SUTT	39,5	2027	Plan
84	Cikalong	Inc. (Tasik - Depok)	500 kV	New, 4 cct, SUTET	4,0	2027	Procurement
85	Tegal Herang II	Tegal Herang	150kV	New, 2 cct, SUTT	40,0	2027	Plan
86	South Bandung II / Soreang	Inc. (Lagadar - Patuha)	150kV	New, 4 cct, SUTT	20,0	2028	Construction
87	Kamojang	Tx. South Bandung	150kV	Rec, 1 cct, SUTT	22,0	2028	Plan
88	Kamojang	Tx. Drajat	150 kV	Rec, 1 cct, SUTT	27,8	2028	Plan
89	Kedung Badak Baru II / Kencana	Inc. (Rawadenok - Kedung Badak)	150kV	New, 4 cct, SUTT	20,0	2028	Plan
90	Kracak Baru	Kedung Badak	150kV	New, 2 cct, SUTT	20,0	2028	Plan
91	Matenggeng PS Hydropower plant	Inc. (Tasikmalaya - Kesugihan / Rawalo)	500 kV	New, 4 cct, SUTET	120,0	2028	Plan
92	Pangandaran New / Cikatomas	Karangnunggal	150kV	New, 2 cct, SUTT	80,0	2028	Plan
93	Braga	East Bandung	150kV	New, 2 cct, SKTT	20,0	2028	Plan
94	Ubrug New	Inc. Pelabuhan Ratu - Lembursitu | Cement Java)	150kV	New, 4 cct, SUTT	8,0	2028	Plan
95	Ubrug New	Inc. Pelabuhan Ratu Cibadak Baru)	150kV	New, 4 cct, SUTT	8,0	2028	Plan
96	Ubrug	Inc. (Tasik - Depok)	500 kV	New, 4 cct, SUTET	8,0	2028	Plan
97	Babakan Baru	Inc. (CEP - Brebes)	150kV	New, 4 cct, SUTT	4,0	2029	Construction
98	Cikalong	South Bandung II / Soreang	150kV	New, 2 cct, SUTT	30,0	2029	Procurement

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Java (7/7)

No.	Transmission From	Transmission To	Voltage (kV)	Job	Capacity (kms)	COD Target	Status
99	Cikalong	Cigereleng	150 kV	New, 2 cct, SUTT	30,0	2029	Procurement
100	Tx. Kamojang	Tx. Drajat	150 kV	New, 2 cct, SUTT	2,0	2029	Plan
101	Tx. Drajat	Tasikmalaya	150 kV	New, 2 cct, SUTT	130,0	2029	Plan
102	Bekasi	Plumpang	150 kV	Rec, 2 cct, SUTT	13,9	2029	Plan
103	Gandul	Depok	500 kV	Rec, 2 cct, SUTET	15,0	2029	Plan
104	Banjar	Pangandaran Baru/ Cikatomas	150 kV	New, 2 cct, SUTT	20,0	2029	Plan
105	Rancaekek II	Inc. (Rancaekek Cikasungka)	150 kV	New, 4 cct, SUTT	8,0	2029	Plan
106	Bengkok Baru/ Dago II	Inc. (North Bandung - Dago Pakar)	150 kV	New, 4 cct, SUTT	40,0	2030	Construction
107	Cibabat III/ Stone Mountain	Padalarang Baru II	150 kV	New, 2 cct, SUTT	12,0	2030	Plan
108	Cibeureum II/ West Bandung	Cibeureum	150 kV	New, 2 cct, SUTT	10,0	2030	Plan
109	Cikumpay II/ Sadang	Inc. (Cikumpay - Purwakarta | Cirata)	150 kV	New, 4 cct, SUTT	20,0	2030	Plan
110	Lagadar II/ Bojong	Inc. (Lagadar Padalarang)	150 kV	New, 4 cct, SUTT	8,0	2030	Plan
111	Lembursitu Baru II / Sukalarang	Inc. (Lembursitu Baru - Cianjur)	150 kV	New, 4 cct, SUTT	2,0	2030	Plan
112	Majalaya Baru	Rancakasumba	150 kV	New, 2 cct, SUTT	30,0	2030	Plan
113	Sukatani New	Tegal Herang	150 kV	New, 2 cct, SUTT	24,0	2030	Plan
114	Cibatu Baru / Deltamas	Tx. THK	150 kV	New, 2 cct, SUTT	1,0	2022	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – C. Java (1/4)

No.	Transmission From	Transmission To	Voltage (kV)	Jobs	Length (kms)	COD	Status
1	Ampel	Inc. (Bawen - Klaten)	150 kV	New, 4 cct, SUTT	20,0	2021	Construction
2	Balapulang	Inc. (Bumiayu - Kebasen)	150 kV	New, 2 cct, SUTT	2,0	2021	Construction
3	Trunk	Weleri	150 kV	Rec, 2 cct, SUTT	62,0	2021	Construction
4	Tanjung Jati B	Tx. (Ungaran - Pedan)	500 kV	New, 2 cct, SUTET	260,0	2021	Construction
5	Tx. (Ungaran – Pedan)	Trunk	500 kV	New, 2 cct, SUTET	63,0	2021	Construction
6	Trunk	Mandirancan	500 kV	New, 2 cct, SUTET	334,0	2021	Construction
7	Central Java PLTU	Trunk	500 kV	New, 2 cct, SUTET	8,2	2021	Energize
8	Temanggung	Inc. (Wonosobo - Secang	150 kV	New, 2 cct, SUTT	11,0	2021	Construction
9	Purbalingga	Inc. (Mrica - Rawalo)	150 kV	New, 2 cct, SUTT	3,0	2021	Construction
10	Pedan	Wonosari	150 kV	Rec, 2 cct, SUTT	44,3	2021	Energize
11	Pekalongan II / Comal	Inc. (Pekalongan - Pemalang)	150 kV	New, 4 cct, SUTT	40,0	2021	Energize
12	Grobogan Cement	Inc. (Mranggen - Purwodadi)	150 kV	New, 4 cct, SUTT	20,0	2021	Energize
13	Semen Indonesia	Inc. (Rembang - Blora)	150 kV	New, 4 cct, SUTT	16,0	2021	Construction
14	Sayung	Tx (Tambak Lorok - Bawen)	150 kV	New, 2 cct, SUTT	20,0	2021	Construction
15	Ampel New / Tuntang New	Inc. (Bawen - Klaten)	150 kV	New, 4 cct, SUTT	2,0	2022	Procurement
16	Ampel New / Tuntang New	Inc. (Banyan - Mojosongo)	150 kV	New, 4 cct, SUTT	10,0	2022	Procurement
17	Ampel / Tuntang	Inc. (Ungaran - Pedan)	500 kV	New, 2 cct, SUTET	2,0	2022	Procurement
18	Banyan	Mojosongo	150 kV	Rec, 2 cct, SUTT	60,0	2022	Plan
19	Palur	Masaran	150 kV	Rec, 2 cct, SUTT	12,3	2022	Procurement

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – C. Java (2/4)

No.	Transmission From	Transmission To	Voltage (kV)	Jobs	Length (kms)	COD	Status
20	KIT Rod	Inc. (Batang - New Weleri)	150 kV	New, 2 cct, SUTT	14,0	2022	Plan
21	Tx. Kesugihan	Gombong	150 kV	Rec, 2 cct, SUTT	66,0	2022	Construction
22	Lomanis	Inc. (Semen Nusantara - Kesugihan / Rawalo)	150 kV	New, 2 cct, SUTT	2,0	2022	Plan
23	Banyan	Jelok	150 kV	Rec, 2 cct, SUTT	16,0	2023	Plan
24	Mojosongo	Banyudono	150 kV	Rec, 2 cct, SUTT	20,8	2023	Plan
25	Purwodadi	Blora	150 kV	New, 2 cct, SUTT	120,0	2023	Plan
26	Garung	Inc. (Dieng - Wonosobo)	150 Kv	New, 2 cct, SUTT	2,0	2023	Plan
27	Garung	Wonosobo	150 kV	Rec, 2 cct, SUTT	10,6	2023	Plan
28	Tambak Lorok II / Gajah	Inc. (Sayung - kudus)	150 kV	New, 4 cct, SUTT	40,0	2023	Procurement
29	Tawangsari (Sritex)	Inc. (Wonogiri - Wonosari)	150 kV	New, 4 cct, SUTT	2,0	2023	Plan
30	Ungaran	Ampel / Tuntang	500 kV	New, 1 cct, SUTET	22,0	2023	Procurement
31	Pedan	Ampel / Tuntang	500 kV	New, 1 cct, SUTET	56,0	2023	Procurement
32	Medari	Inc. (Sanggrahan - Kentungan)	150 kV	New, 2 cct, SUTT	1,0	2024	Plan
33	Jelok	Sanggrahan	150 kV	Rec, 2 cct, SUTT	86,0	2024	Plan
34	Weleri	Kaliwungu	150 kV	Rec, 2 cct, SUTT	43,9	2024	Plan
35	Purwodadi	Kedungombo	150 kV	Rec, 2 cct, SUTT	42,0	2024	Plan
36	Rawalo / Kesugihan	Inc. (Adipala - Cilacap PLTU)	500 kV	New, 2 cct, SUTET	28,0	2024	Plan
37	Kedungombo	Sragen	150 kV	New, 2 cct, SUTT	30,0	2024	Plan
38	Banyudono	Align	150 kV	Rec, 2 cct, SUTT	14,2	2025	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – C. Java (3/4)

No.	Transmission From	Transmission To	Voltage (kV)	Jobs	Length (kms)	COD	Status
39	Masaran	Sragen	150 kV	Rec, 2 cct, SUTT	12,3	2025	Procurement
40	Gondangrejo	Align	150 kV	Rec, 2 cct, SUTT	18,9	2025	Plan
41	Kalibakal	Bumiayu	150 kV	Rec, 2 cct, SUTT	70,1	2025	Plan
42	Kudus II / Nalumsari	Inc. (Kudus Jepara)	150 kV	New, 4 cct, SUTT	1,0	2025	Construction
43	Pati II / Trangkil	Starch	150 kV	New, 2 cct, SUTT	30,0	2025	Procurement
44	Pedan	Solo Baru	150 kV	New, 2 cct, SUTT	20,0	2025	Plan
45	Lomanis	Semen Nusantara	150 kV	Rec, 2 cct, SUTT	9,2	2025	Plan
46	Kesugihan/ Rawalo	Lomanis	150 kV	Rec, 2 cct, SUTT	54,4	2025	Plan
47	PLTP Candradimuka	Dieng	150 kV	New, 2 cct, SUTT	4,0	2025	Plan
48	Rawalo	Inc. (Cilacap - Kalibakal)	150 kV	New, 2 cct, SUTT	4,0	2025	Plan
49	Balapulang	Kebasen	150 kV	Rec, 2 cct, SUTT	42,0	2026	Plan
50	Palur	Gondangrejo	150 kV	Rec, 2 cct, SUTT	11,6	2026	Plan
51	Ungaran Power Plant	Bawen	150 kV	New, 2 cct, SUTT	60,0	2026	Plan
52	Ungaran	Jelok	150 kV	Rec, 2 cct, SUTT	40,0	2027	Plan
53	Bumiayu	Balapulang	150 kV	Rec, 2 cct, SUTT	44,0	2027	Plan
54	Medari	Kentungan	150 kV	Rec, 2 cct, SUTT	22,0	2028	Plan
55	Sanggrahan	Medari	150 kV	Rec, 2 cct, SUTT	56,0	2028	Plan
56	PLTP Baturaden / Slamet	Bumiayu	150 kV	New, 2 cct, SUTT	20,0	2028	Plan
57	Kesugihan	Purworejo	150 kV	New, 2 cct, SUTT	190,0	2028	Plan
58	Tambak Lorok III	Pandean Lamper	150 kV	Rec, 2 cct, SUTT	12,6	2028	Procurement

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – C. Java (4/4)

No.	Transmission From	Transmission To	Voltage (kV)	Jobs	Length (kms)	COD	Status
59	Tambak Lorok III	Ungaran	150 kV	Rec, 2 cct, SUTT	58,2	2028	Procurement
60	Kebasen II / Kemantran	Inc. (Pemalang - Kebasen)	150 kV	New, 4 cct, SUTT	4,0	2028	Construction
61	Pandean Lamper II / Banget Ayu	Inc. (Tambak Lorok - Bawen)	150 kV	New, 2 cct, SUTT	10,0	2028	Procurement
62	Simpang Lima	Kalisari	150 kV	New, 2 cct, SKTT	5,2	2028	Procurement
63	Pandean Lamper	Simpang Lima	150 kV	New, 2 cct, SKTT	8,4	2028	Procurement
64	Purwodadi II / Wirosari	Purwodadi	150 kV	New, 2 cct, SUTT	20,0	2028	Plan
65	Tanjung Jati	Jepara	150 kV	Rec, 2 cct, SUTT	48,2	2028	Construction
66	Holy	Jepara	150 kV	Rec, 2 cct, SUTT	53,4	2028	Construction
67	Brebes II / Ketanggungan	(Brebes - CEP)	150 kV	New, 4 cct, SUTT	8,0	2029	Plan
68	Majenang II / Sidareja	Majenang	150 kV	New, 2 cct, SUTT	10,0	2029	Plan
69	Palur II / Karanganyar	Inc. (Masaran - Palur)	150 kV	New, 2 cct, SUTT	2,0	2029	Plan
70	Purbalingga II / Belik	Balapulang	150 kV	New, 2 cct, SUTT	50,0	2029	Plan
71	Sanggrahan II / Rajeg	Inc. (Sanggrahan - Medari)	150 kV	New, 4 cct, SUTT	20,0	2029	Plan
72	Switching Kendal	Inc. Ungaran - Mandirancan	500 kV	New, 4 cct, SUTET	12,0	2029	Plan
73	Tambak Lorok	Switching Kendal	500 kV	New, 2 cct, SUTET	60,0	2029	Plan
74	Batang II / Limpung	New trunk	150 kV	New, 2 cct, SUTT	60,0	2030	Plan
75	Tanjung Jati	Rembang	500 kV	New, 2 cct, SUTET	340,0	2030	Plan
76	Pekalongan III / Kajen	Pekalongan II / Comal	150 kV	New, 2 cct, SUTT	40,0	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Yogyakarta

No.	Transmission From	Transmission To	Voltage (kV)	Jobs	Length (kms)	COD Target	Status
1	Kentungan II / Kalasan	Inc. (Bantul - Klaten)	150 kV	New, 4 cct, SUTT	4,0	2023	Construction
2	Kentungan II / Kalasan	Bantul	150 kV	New, 2 cct, SUTT	44,0	2025	Plan
3	Pedan	Kentungan II / Kalasan	150 kV	New, 2 cct, SUTT	44,0	2025	Plan
4	Bantul II / Tuksono	Inc. (Bantul – Wates | Purworejo)	150 kV	New, 4 cct, SUTT	4,0	2027	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Java (1/5)

No.	Transmission From	Transmission To	Voltage (kV)	Scope	Length (kms)	COD Target	Status
1	Gempol / New Porong	Tx. Sidoarjo	150 kV	New, 2 cct, SUTT	18,7	2021	Energize
2	Gempol / New Porong	Tx. Bangil (T. 1B)	150 kV	New, 2 cct, SUTT	4,0	2021	Construction
3	South Jember / Puger	Embankment	150 kV	New, 2 cct, SUTT	40,0	2021	Construction
4	KIS	Inc, (Bangil - New Porong) (T.1B)	150 kV	New, 2 cct, SUTT	14,4	2021	Procurement
5	Paiton	Kraksaan	150 kV	Rec, 2 cct, SUTT	39,6	2021	Procurement
6	Kraksaan	Probolinggo	150 kV	Rec, 2 cct, SUTT	58,8	2021	Procurement
7	Wingi II	Tulungagung II	150 kV	New, 2 cct, SUTT	68,0	2021	Construction
8	Krian	Karang Pilang	150 kV	New, 2 cct, SKTT	14,0	2021	Energize
9	Driyorejo II / Wringinanom	Ine, (Krian - Driyorejo)	150 kV	New, 4 cct, SUTT	20,0	2022	Procurement
10	Bangkalan	Tx Bangkalan	150 kV	New, 2 cct, SUTT	24,0	2022	Construction
11	Kedinding	Tx Bangkalan	150 kV	New, 2 cct, SUTT	22,0	2022	Plan
12	Ngimbang	Inc (Ungaran - Krian)	500 kV	New, 2 cct, SUTET	2,0	2022	Procurement
13	Tx. Silver	End	150 kV	Rec, 2 cct, SUTT	5,7	2022	Plan
14	Kediri	Tx. Mojoagung	150 kV	New, 2 cct, SUTT	2,0	2022	Plan
15	Buduran (AIS)	Buduran (GIS)	150 kV	New, 1 cct, SKTT	0,1	2022	Construction
16	Sedati	Buduran (GIS)	150 kV	New, 2 cct, SKTT	17,8	2022	Construction
17	Simogunung / Gunung Sari	Inc (Sawahan - Waru)	150 kV	New, 4 cct, SUTT	2,0	2022	Construction
18	South Surabaya	Kalisari	150 kV	New, 2 cct, SUTT	24,0	2022	Construction
19	Bangil New	Inc. (Bangil - Gempol / New Porong)	150 kV	New, 4 cct, SUTT	2,8	2023	Procurement
20	New Porong	Tx Bangil (T148A)	150 kV	New, 2 cct, SUTT	23,2	2023	Construction
21	Tx. New Bangil	Blimbing Baru	150 kV	New, 2 cct, SUTT	62,0	2023	Construction

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Java (2/5)

No.	Transmission From	Transmission To	Voltage (kV)	Scope	Length (kms)	COD Target	Status
22	Tx Bangil (T148A)	Tx. Bangil New	150 kV	New, 2 cct, SUTT	15,6	2023	Construction
23	Bangil	Inc. (Paiton Kediri)	500 kV	New, 4 cct, SUTET	8,0	2023	Procurement
24	Bangil	Inc. (Grati - Krian)	500 kV	New, 2 cct, SUTET	10,0	2023	Plan
25	Blimbing Baru	Tx.Kebon Agung	150kV	New, 2 cct, SUTT	2,0	2023	Procurement
26	Sengkaling	Tx. Lawang	150 kV	New, 2 cct, SUTT	18,0	2023	Procurement
27	Bungah	Manyar	150kV	New, 2 cct, SKTT	50,0	2023	Plan
28	Bungah	Paciran	150 kV	New, 2 cct, SUTT	50,0	202.3	Procurement
29	Tuban	Paciran	150 kV	New, 2 cct, SUTT	90,0	2023	Plan
30	East Java solar power plant	Probolinggo	150kV	New,2 cct, SUTT	10,0	2023	Plan
31	Kedinding	Kalisari	150 W	New, 2 cct, SKTT	2,4	2023	Procurement
32	Jatigedong	Ngimbang	150 W	New, 2 cct, SUTT	22,0	2023	Construction
33	Manyar	Cerme	150 kV	Rec, 2 cct, SUTT	15,3	2023	Procurement
34	Kedmding	Tx. End	150 W	New, 1 cct, SKTT	1,2	2023	Plan
35	Kedinding	Tx. Kenjeran	150 W	New, 1 cct, SKTT	1,2	2023	Plan
36	Kedinding	Tx. Bangkalan	150 kV	New, 2 cct, SKTT	2,4	2023	Plan
37	Bangkalan	T.22	150 kV	New, 2 cct, SUTT	12,0	2023	Plan
38	Bangkalan	Cable Head 1,2	150 kV	Rec, 2 cct, SUTT	22,0	2023	Procurement
39	Waru New	Waru	150 kV	New, 2 cct, SKTT	1,0	2023	Plan
40	Paiton	T. 11 Existing Grati	500 kV	New, 2 cct, SUTET	7,2	2023	Plan
41	Waru	Krian	500 kV	New, 2 cct, SUTET	44,8	2023	Procurement
42	Kalipuro New	Inc. (Situbondo - Banyuwangi)	150 kV	New, 4 cct, SUTT	20,0	2023	Plan
43	Paiton	Watudodol / Kalipuro	500 kV	New, 2 cct, SUTET	262,0	2023	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Java (3/5)

No.	Transmission From	Transmission To	Voltage (kV)	Scope	Length (kms)	COD Target	Status
44	Bangil New	Inc. (Lawang - Feather Cage)	150 kV	New, 2 cct, SUIT	1,6	2024	Procurement
45	Ijen Power Plant	Banyuwangi	150 kV	New, 2 cct, SUTT	60,0	2024	Plan
46	Kediri	Jayakertas / Kertosono	150 kV	Rec, 2 cct, SUTT	64,0	2024	Plan
47	Lamongan	Segoromadu	150 kV	Rec, 2 cct, SUTT	56,4	2024	Plan
48	Babat / Baureno	Lamongan	150 kV	Rec, 2 cct, SUTT	63,2	2024	Plan
49	Wlingi II	WIingi	150 W	New, 2 cct, SUTT	28,0	2024	Plan
50	Dolopo Baru	Inc. (Manisrejo - Ponorogo)	150 kV	New, 4 cct, SUTT	2,0	2025	Plan
51	Landing Point Bayuwangi	Gilimanuk	500 kV	New, 2 cct, SKLTET	13,0	2025	Plan
52	Watudodol / Kalipuro	Landing Point Banyuwangi	500 kV	New, 2 cct, SUTET	9,6	2025	Plan
53	Jember II / Arjasa	Inc. (Bondowoso - Jember)	150 kV	New, 4 cct, SUTT	20,0	2025	Procurement
54	Undaan	Intersection	150 kV	New, 2 cct, SKTT	10,0	2025	Plan
55	New Ngoro	Inc. (Sekarputih - Ngoro)	150 kV	New, 4 cct, SUTT	8,0	2025	Plan
56	New Ngoro	Ngoro	150 kV	Rec, 2 cct, SUTT	18,0	2025	Plan
57	New Ngoro	Sekarputih	150 kV	Rec, 2 cct, SUTT	21,8	2025	Plan
58	New Ngoro	Inc. (Paiton - Kediri)	500 kV	New, 4 cct, SUTET	4,0	2025	Plan
59	Wlingi	Sutami	150 kV	New, 2 cct, SUTT	48,0	2025	Plan
60	Kediri	Mojoagung	150 kV	Rec, 2 cct, SUTT	98,0	2025	Procurement
61	Perning	Kasih Jatim	150 kV	New, 2 cct, SUTT	40,0	2025	Procurement
62	Probolinggo	Gondangwetan	150 kV	Rec, 2 cct, SUTT	68,0	2025	Plan
63	New Caruban	Manisrejo	150 kV	New, 2 cct, SUTT	20,0	2025	Construction
64	Tx. Maspion	Tx. Buduran	150 kV	New, 2 cct, SUTT	10,0	2025	Procurement
65	Waru New	Tx. Maspion	150 kV	New, 2 cct, SUTT	10,0	2025	Procurement

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Java (4/5)

No.	Transmission From	Transmission To	Voltage (kV)	Scope	Length (kms)	COD Target	Status
66	Tx. Buduran	Sidoarjo	150 kv	New, 2 cct, SUTT	20,0	2025	Procurement
67	Waru New	Maspion	70 kV	New, 2 cct, SKTT	12,0	2025	Plan
68	Menganti	Inc. (Krian - Altaprima)	150 kV	New, 4 cct, SUTT	20,0	2025	Plan
69	Waru	Rungkut	150 kv	New, 2 cct, SKTT	12,0	2025	Plan
70	Rungkut	South Surabaya	150 kV	New, 2 cct, SKTT	20,0	2025	Plan
71	Tx. Kalang Anyar	Tx. Sidoarjo	500 kv	New, 2 cct, SUTET	26,0	2025	Plan
72	Tx. Sidoarjo	Waru	500 kV	New, 2 cct, SUTET	30,0	2025	Plan
73	Tx. Kalang Anyar	Grati	500 kV	New, 2 cct, SUTET	100,0	2025	Construction
74	Undaan	Kenjeran	150 kV	New, 2 cct, SKTT	10,0	2026	Plan
75	Wonokromo	Kupang	150 kV	New, 2 cct, SKTT	16,0	2026	Plan
76	Ngoro	New Porong	150 kV	New, 2 cct, SUTT	20,0	2026	Procurement
77	Mojoagung	Sekarputih	150 kV	Rec, 2 cct,SUTT	22,0	2026	Procurement
78	Tandes	Sawahan	150 kV	Rec, 2 cct, SUTT	6,0	2026	Plan
79	Tandes	Darmo Grande	150 kv	Rec,2 cct, SUTT	9,1	2026	Plan
80	Darmo Grande	Waru	150 kV	Rec, 2 cct, SUTT	21,3	2026	Plan
81	Kerek	Mliwang	150 kV	Rec, 2 cct, SUTT	18,0	2026	Plan
82	Tuban	Kerek	150 kV	Rec, 2 cct, SUTT	28,0	2026	Plan
83	Blitar	Inc. (tulungagung II - Wlingi II)	150 kV	New, 4 cct, SUTT	1,0	2026	Plan
84	Tanjung Awar-Awar	Ngimbang	500 kV	New, 2 cct, SUTET	150,0	2027	Plan
85	Ponorogo	New Trenggalek	150 kV	New, 2 cct, SUTT	70,0	2027	Plan
86	New Trenggalek	Pacitan power plant	150 kV	New, 2 cct, SUTT	84,0	2027	Plan
87	South Surabaya	Waru	500 kV	New, 2 cct, SUTET	17,0	2027	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. Java (5/5)

No.	Transmission From	Transmission To	Voltage (kV)	Scope	Length (kms)	COD Target	Status
88	Tunjungan	Undaan	150 kV	New, 2 cct, SKTT	20,0	2027	Plan
89	Tunjungan	Intersection	150 kv	New, 2 cct, SKTT	20,0	2027	Plan
90	Wilis / Ngebel geothermal power plant	Dolopo Baru	150 kV	New, 2 cct, SUTT	50,0	2027	Plan
91	Bangil	Lawang | Bulukandang	150 kV	Rec, 2 cct, SUTT	70,0	2028	Plan
92	New Gresik	Tx. Sawahan	150 kV	New, 2 cct, SUTT	20,0	2028	Procurement
93	Tx. Sawahan	Sawahan II	150 kV	New, 2 cct, SKTT	16,0	2028	Plan
94	Marmar Stone	Guluk Guluk	150 kV	New, 2 cct, SUTT	66,0	2028	Plan
95	Marmar Stone	Bangkalan	150 kV	New, 2 cct, SUTT	240,0	2028	Plan
96	Sidoarjo II	KIS	150 kv	New, 2 cct, SUTT	10,0	2028	Plan
97	Balong Panggang	Perning	150 kV	New, 2 cct, SUTT	30,0	2029	Plan
98	Pamekasan	Inc. (Sampang - Sumenep)	150 kV	New, 2 cct, SUTT	4,0	2029	Plan
99	Pamekasan	Sumenep	150 kV	Rec, 2 cct, SUTT	47,2	2029	Plan
100	Sampang	Pamekasan	150 kV	Rec, 2 cct, SUTT	47,2	2029	Plan
101	Bangkalan	Sampang	150 kV	Rec, 2 cct, SUTT	110,6	2029	Plan
102	New Caruban	Tx. Nganjuk	150 kV	New, 2 cct, SUTT	20,0	2029	Procurement
103	Tx. Nganjuk	Kertosono	150 kV	New, 2 cct, SUTT	20,0	2029	Procurement
104	Tanjung Bumi	Inc. (Bangkalan - Batu Marmar)	150 kV	New, 4 cct, SUTT	20,0	2029	Plan
105	Rembang	Tanjung Awar - Awar)	500 kV	New, 2 cct, SUTET	340,0	2030	Plan
106	Galis	Inc . (Bangkalan - Sampang)	150 kV	New, 4 cct, SUTT	32,0	2030	Plan
107	New Magetan	Dolopo Baru	150 kV	New, 2 cct, SUTT	50,0	2030	Plan
108	Wonoayu	Balongbendo	150 kV	New, 2 cct, SUTT	20,0	2030	Plan
109	Grindulu PS Hydropower Plant	Inc. (Pedan - Kediri)	500 kV	New, 4 cct, SUTET	40,0	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Bali (1/2)

No.	Transmission From	Transmission To	Voltage (kV)	Jobs	Length (kms)	COD	Status
1	Kubu	Amlapura	150 kV	New, 2 cct, SUTT	80,0	2022	Plan
2	Ship	Pemecutan Kelod	150 kV	Rec, 1 cct, SUTT	14,1	2022	Plan
3	Pemecutan Kelod	Airport	150kV	Rec, 2 cct, SUIT	33,6	2023	Plan
4	Antosari	Tanah Lot	150 kV	Rec, 2 cct, SUTT	26,5	2023	Plan
5	Tanah Lot	Ship	150 kV	Rec, 2 cct, SUTT	20,3	2023	Plan
6	Antosari (Extension)	Inc. (Celukan Bawang PLTU - Kapal)	150 kV	New, 4 cct, SUTT	64,0	2024	Procurement
7	Bedugul geothermal power plant	Baturiti	150 kv	New, 2 cct, SUTT	4,0	2025	Plan
8	Gilimanuk	Antosari (Extension)	500 kV	New, 2 cct, SUTET	151,2	2025	Plan
9	Payangan	Ship	150 kV	Rec, 1 cct, SUTT	21,5	2025	Plan
10	Baturiti	Payangan	150 kv	Rec, 1 cct, SUTT	28,0	2025	Plan
11	Pemaron	Baturiti	150 W	Rec, 2 cct, SUTT	40,9	2025	Plan
12	Ship	Baturiti	150 kV	Rec, 1 cct, SUTT	38,2	2025	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Bali (2/2)

No.	Transmission From	Transmission To	Voltage (kV)	Jobs	Length (kms)	COD	Status
13	Tx- Ship	Pemecutan Kelod	150 kV	New, 2 cct, SUTT	26,0	2025	Plan
14	Pesanggaran III / Bali Turtle	Inc. (Pesanggaran Sanur	150 W	New, 4 cct, SUTT	2,0	2025	Plan
15	Kubu	Pemaron	150 W	New, 2 cct, SUTT	40,0	2026	Plan
16	Antosari (Extension)	Inc. (Antosari - Kapal)	150 W	New, 4 cct, SUTT	16,0	2028	Plan
17	Gianyar II / Bangli	Gianyar	150 W	New, 2 cct, SUTT	10,0	2028	Plan
18	Padangsambian II / Canggu	Padangsambian	150 W	New, 2 cct, SKTT	17,6	2028	Plan
19	Tinga - Tinga	Inc. (PLTU Celukan Bawang - Gilimanuk|Pemaron)	150 W	New, 2 cct, SUTT	1,0	2030	Plan
20	Tinga - Tinga	Inc. (PLTU Celukan Onion - Ship)	150 k-v	New, 4 cct, SUTT	2,0	2030	Plan
21	New Sanur	Inc. (Gianyar - Sanur)	150 W	New, 2 cct, SUTT	2,0	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – N. Sulawasi

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD	Status
1	Otam	Molibagu	150	2 cct, ACSR 2xHawk	132	2021	Construction
2	Sario (GIS) / Manado City	Teling	150	2 cct, UGC, XLPE, 1000 mm	10	2021	Construction
3	Otam	Tutuyan	150	2 cct, ACSR 1xHawk	120	2021	Construction
4	Likupang	Paniki	150	2 cct, ACSR 2xHawk	42	2022	Construction
5	MHP Minahasa	Likupang	150	2 cct, ACSR 2xHawk	1	2022	Construction
6	Cape Red	Beetle	150	2 cct, ACSR 2xHawk	40	2022	Plan
7	Likupang	Pandu	150	2 cct, ACSR 1xHawk	24	2023	Construction
8	Likupang	Beetle	150	Uprating of 150 kV voltage	32	2023	Plan
9	PLTU Sulut 1	Incomer 2 phi (Lolak - Buroko)	150	4 cct, ACSR 1xHawk	10	2023	Plan
10	HYROPOWER Sawangan	Sawangan	70	2 cct, ACSR 1xHawk	1	2026	Plan
11	Molibagu	Gorontalo New / Botupingge	150	2 cct, ACSR 2xHawk	206	2027	Plan
12	Kema (PLTU Sulut 3)	Stripes	150	2 cct, ACSR 2xHawk	110	2027	Plan
13	Stripes	Tutuyan	150	2 cct, ACSR 2xHawk	80	2027	Plan
14	Tutuyan	Molibagu	150	2 cct, ACSR 2xHawk	160	2027	Plan
15	Ratahan	Incomer 1 Phi (Kema – Belang)	150	2 cct, ACSR 2xHawk	24	2027	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – C. Sulawasi

No.	From	To	TEG(KV)	Conductor	Length (kms)	COD	Status
1	Luwuk MHP	Luwuk	150	2 cct, ACSR 2xHawk	80	2021	Construction
2	Luwuk MHP	Toili	150	2 cct, ACSR 2xHawk	100	2021	Construction
3	Donggala	Incomer 2 phi (Silae - Pasangkayu)	150	2 cct, ACSR 2xHawk	3	2022	Plan
4	Moutong	Tolitoli	150	2 cct, ACSR 2xHawk	310	2023	Plan
5	Kolonedale	Tentena	150	2 cct, ACSR 2xHawk	130	2023	Procurement
6	Kolonedale	Furnace	150	2 cct, ACSR 2xHawk	180	2023	Procurement
7	Tawaeli	Talise 150 kV	150	2 cct, ACSR	70	2023	Construction
8	Poso	Ampana	150	2 cct, ACSR 2xHawk	248	2023	Procurement
9	Toili	Ampana	150	2 cct, ACSR 2xHawk	248	2023	Procurement
10	PLTU Palu 3	Incomer 2 phi (Tambu-Taweli)	150	2 cct, ACSR 2xHawk	10	2023	Plan
11	Ampana	Bunta	150	2 cct, ACSR 2xHawk	170	2023	Plan
12	Bunta	Luwuk	150	2 cct, ACSR 2xHawk	190	2023	Plan
13	Leok	Tolinggula	150	2 cct, ACSR 2xHawk	220	2024	Procurement
14	Tolitoli	Leok	150	2 cct, ACSR 2xHawk	216	2024	Procurement
15	Bangkir	Incomer 2 phi (Moutong –Toli-Toli)	150	2 cct, ACSR 2xHawk	90	2024	Plan
16	Tambu	Tawaeli	150	2 cct, ACSR 2xHawk	140	2024	Procurement
17	Petobo	Incomer 1 phi (Talise-Palu New)	150	2 cct, ACSR 2xHawk	10	2026	Procurement
18	Sigi	Incomer 1 phi (New Palu-Mauro/Parigi)	150	2 cct, ACSR 2xHawk	30	2026	Plan
19	Mauro/New Parigi	Incomer Single Phi (Poso-Palu Baru)	150	2 cct, ACSR 2xHawk	64	2026	Plan
20	Tambu	Bangkir	150	2 cct, ACSR 2xHawk	180	2024	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Gorontalo

No.	From	To	Voltage(kV)	Conductor	Length (KMS)	COD	Status
1	Tolinggula	Orchid Power Plant	150	2 cct, ACSR 2xHawk	158	2023	Construction
2	PT BJA Customer	Incomer 1 phi (Marisa - Moutong)	150	2 cct, ACSR 2xHawk	36	2022	Procurement
3	Marisa	Moutong	150	2 cct, ACSR 2xHawk	180	2022	Procurement

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – S. Sulawasi (1/2)

No.	From	To	Voltage(kV)	Conductor	Length (kms)	COD	Status
1	New Power	Incomer 2 phi (Maros-Sungguminasa)	150	2 cct, ACSR 2xZebra	16	2021	Construction
2	GI Belopa	Incomer 2 Palopo - Shiva	150	2 cct, ACSR 2xHawk	2	2021	Construction
3	KIMA Makassar	New Power	150	2 cct, UGC, XLPE, 1000 mm	28	2021	Construction
4	Malea Hydroelectric Power Plant	Makale	150	2 cct, ACSR 1xZebra	30	2021	Construction
5	Sungguminasa	Lanna	150	2 cct, ACSR 2xHawk	20	2021	Construction
6	Wotu	Masamba	150	2 cct, ACSR 2xHawk	110	2021	Construction
7	South Sulawesi power plant Barru 2	Incomer 2 phi (Sidrap-Maros)	150	2 cct, ACSR 2xZebra	5	2021	Construction
8	Tanete	Inc 1 phi Bulukumba Sinjai	150	2 cct, ACSR 1xHawk	12	2021	Construction
9	Bulukumba	Bantaeng switching	150	Uprating 2 cct, ACCC 1xAmsterdam 360 mm2 (Existing 1xHawk)	15	2021	Plan
10	Jeneponto	Bantaeng switching	150	Uprating 2 cct, ACCC 1xAmsterdam 360 mm2 (Existing 1xHawk)	78	2021	Plan
11	Punagaya TIP 57	Jeneponto	150	ACCC 1xAmsterdam 360 mm2 (Existing 1xHawk)	60	2021	Plan
12	Bantaeng switching	Incomer 2 phi (Jeneponto -Bulukumba)	150	ACCC 1xAmsterdam 360 mm2 (Existing 1xHawk)	2	2021	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – S. Sulawasi (2/2)

No.	From	To	Voltage(kV)	Conductor	Length (kms)	COD	Status
13	Punagaya	Bantaeng Switching	150	2 cct, ACSR 4xZebra	132	2023	Plan
14	PLTG/GU/Makassar	Tallasa	150	2 cct, ACSR	10	2023	Plan
15	Bengo	Soppeng	150	2 cct, ACSR 2xHawk	74	2025	Construction
16	Makale	Rantepao	150	2 cct, ACSR 2xHawk	30	2025	Plan
17	KIMA Maros	Maros	150	2 cct, ACSR 2xHawk	12	2025	Plan
18	GITET Wotu	GITET Bungku	275	2 cct, ACSR 4xZebra	260	2023	Plan
19	Bakaru 2 GITET	GITET Sidrap	275	2 cct, ACSR 4xZebra	130	2027	Plan
20	GITET Palopo	Bakaru 2 GITET	275	2 cct, ACSR 4xZebra	210	2027	Plan
21	GITET Sidrap	New Power GITET	275	2 cct, ACSR 4xZebra	350	2027	Plan
22	New Power GITET	GITET Punagaya	275	2 cct, ACSR 4xZebra	140	2027	Plan
23	New Power GITET	Incomer 2 phi Maros-Sungguminasa	150	2 cct, ACSR 2xZebra	10	2027	Plan
24	GITET Sidrap	Incomer 2 phi Sidrap - Maros	150	2 cct, ACSR 2xZebra	6	2027	Plan
25	GITET Punagaya	150 kV GI Punagaya	150	2 cct, ACSR 2xZebra	10	2027	Plan
26	Bakaru 2 Hydropower Plan	Bakaru 150 kV GI	150	2 cct, ACSR 2xZebra	6	2025	Plan
27	Keera	Incomer 1 phi Sengkang-Siwa	150	2 cct, ACSR 2xHawk	13	2028	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – SE. Sulawasi

No.	From	To	Voltage(kV)	Conductor	Length (kms)	COD	Status
1	Kendari 150 kV	Andolo	150	2 cct, ACSR 2xZebra	180	2021	Construction
2	PLTG/MG MPP Sulselbar	Kolaka Smelter	150	2 cct, ACSR 2xHawk	4	2022	Construction
3	Kolaka Smelter	Incomer 2 phi (Lasusua-Kolaka)	150	2 cct, ACSR 2xHawk	8	2021	Construction
4	Andolo	Kasipute	150	2 cct, ACSR 2xZebra	84	2021	Construction
5	Tinanggea GI Switching	GI BSI Customer	150	2 cct, ACSR 2xZebra	6	2021	Plan
6	Raha	Bau-Bau	150	2 cct, ACSR 1xHawk	170	2022	Construction
7	Bau- MHP Smell	Incomer 2 phi Bau-bau Raha	150	2 cct, ACSR 1xHawk	6	2022	Construction
8	Tinanggea GI Switching	Tinanggea GI Smelter	150	2 cct, ACSR 2xZebra	40	2023	Plan
9	Mobile Generation GI	Incomer 1 phi GI Tinanggea Switching-GI Tinanggea Smelter	150	2 cct, ACSR 2xZebra	6	2023	Plan
10	HYDROPOWER Watunohu	Lasusua	150	2 cct, ACSR 1xHawk	80	2026	Plan
11	Kasipute GI	Kasipute Landing Point	150	2 cct, ACSR 2xHawk	16	2026	Plan
12	Kasipute Landing Point	Landing Point Raha	150	3cct, XLPE CU 1x400 mm2 (Under Sea)	60	2026	Plan
13	Landing Point Raha	GI Raha	150	2 cct, ACSR 2xHawk	80	2026	Plan
14	GITET Bungku	GITET Andowia	275	2 cct, ACSR 4xZebra	260	2023	Plan
15	GITET Andowia	GITET Kendari	275	2 cct, ACSR 4xZebra	135	2024	Plan
16	Konawe Hydropower Plant	Unaaha	150	2 cct, ACSR 1xHawk	80	2028	Plan
17	Andowia	PT Tiran’s customer	150	2 cct, ACSR 2xZebra	50	2023	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Sulawasi

No.	From	To	Voltage(kV)	Conductor	Length (kms)	COD	Status
1	Mamuju Baru	Incomer 1 phi PLTU Mamuju - Mamuju	150	2 cct, ACSR 2xHawk	2	2021	Construction
2	Polman	Mamasa	150	2 cct, ACSR 2xHawk	80	2023	Plan
3	HYDROPOWER Poko	Bakaru II GI	150	2 cct, ACSR 2xZebra	40	2026	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Maluku

No.	From	To	TEG (kV)	Conductor	kms	COD	Status
1	GI Piru	Kairatu GI	150	2 cct, ACSR 1xHawk	110	2022	Construction
2	GI Masohi	Kairatu GI	150	2 cct, ACSR 1xHawk	210	2022	Construction
3	GI Namrole	GI Namlea	70	2 cct, ACSR 1xHawk	161	2022	Construction
4	GI Mako	Income 1 phi (Namrole-Namlea)	70	2 cct, ACSR 1xHawk	2	2022	Plan
5	Seram 2 MHP	GI Masohi	150	2 cct, ACSR 1xHawk	20	2022	Plan
6	GI Piru	GI Taniwel	150	2 cct, ACSR 1xHawk	60	2026	Plan
7	Wai Tina Hydroelectric Power Plant	Inc. 1 Phi (Namrole-Namlea)	70	2 cct, ACSR 1xHawk	10	2027	Plan
8	Tala Hydroelectric Power Plant	Incomer 2 phi (Kairatu-Masohi)	150	4 cct, ACSR 1xHawk	30	2029	Plan
9	Ambon Base Renewable Power Plant	GI Wayame	150	2 cct, ACSR 2xHawk	60	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – N. Maluku

No.	From	To	TEG (kV)	Conductor	KMS	COD	Status
1	MPP Ternate	GI Ternate 1	150	2 cct, ACSR 2xHawk	10	2021	Construction
2	Jailolo	Sofifi	150	2 cct, ACSR 1xHawk	160	2022	Construction
3	Jailolo	Malifut	150	2 cct, ACSR 1xHawk	160	2022	Construction
4	Malifut	Tobelo	150	2 cct, ACSR 1xHawk	240	2022	Construction
5	Tobelo 2 MHP	GI Tobelo	150	2 cct, ACSR 1xHawk	22	2022	Plan
6	MHP Halmahera 1	Incomer 1 phi (GI Sofifi-GI Jailolo)	150	2 cct, ACSR 1xHawk	10	2025	Plan
7	GI Ternate 2	Incomer 1 phi (MPP Ternate - GI Ternate)1)	150	2 cct, ACSR 2xHawk	10	2026	Plan
8	Freshmen	Sofifi	150	2 cct, ACSR 1xHawk	300	2027	Plan
9	GI Ternate 1	GI Tidore	150	2 cct, ACSR 2xHawk	20	2029	Plan
				2 cct, Marine Cable	8	2029	Plan
10	Tidore MHP	Incomer 1 phi (Ternate 1 - Tidore)	150	2 cct, ACSR 2xHawk	20	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Papua (1/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD	Status
1	Timika MHP	GI Timika	150	2 cct, ACSR 1xHawk	60	2021	Construction
2	GI Sentani Baru	Incomer 2 phi (hydropower plant Genyem-Sentani)	70	4 cct, ACSR 1xHawk	4	2021	Plan
3	GI Jayapura (Skyland)	GI Space	150	2 cct, ACSR 2xHawk	20	2022	Procurement
4	Holtekamp power plant	GI Space	150	2 cct, SUTT/SKTT Sea Cable	60	2022	Plan
5	Holtekamp power lant	Keerom	150	2 cct, ACSR 1xHawk	40	2023	Plan
6	GI Space	GI Sentani New	150	2 cct, ACSR 2xHawk	72	2024	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – Papua (2/2)

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD	Status
7	Baliem Hydroelectric Power Plant	Gl Wamena	150	2 cct, ACSR 2xHawk	50	2029	Plan
8	Baliem Hydroelectric Power Plant	Sumohai GI	150	2 cct, ACSR 1xHawk	50	2029	Plan
9	GI Wamena	GI Elelim	150	2 cct, ACSR 1xHawk	122	2029	Plan
10	GI Wamena	GI Karubaga	150	2 cct, ACSR 1xHawk	140	2029	Plan
11	GI Karubaga	GI Mulia	150	2 cct, ACSR 1xHawk	120	2029	Plan
12	GI Mulia	GI Ilaga	150	2 cct, ACSR 1xHawk	80	2029	Plan
13	Jayapura/Skyland	Sentani Baru	150	Uprating of 150 kV voltage	56	2030	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Papua

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD	Status
1	Gl Sorong	Gl Rufey	150	2 cct, ACSR 2xZebra	20	2021	Construction
2	Manokwari MHP	Gl Manokwari	150	2 cct, ACSR 2xHawk	24	2022	Procurement
3	Manokwari MHP	Prafi	150	2 cct, ACSR 2xHawk	40	2025	Plan
4	Manokwari MHP	Gl Ransiki	150	2 cct, ACSR 2xHawk	150	2029	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – W. Nusa Tenggara

No.	From	To	Voltage (kV)	Conductor	Length (kms)	COD	Status
1	Mataram	Switching Mataram	150 kV	New, 2 cct, ACSR 2xHawk	20	2021	Construction
2	PLTGU Lombok Peaker	Switching Mataram	150 kV	New, 2 cct, XLPE CU 1x1000 mm2	2,5	2021	Construction
3	Sape	Bima	70 kV	New, 2 cct, ACSR 1xHawk	70	2021	Procurement
4	Cape	Switching Mataram	150 kV	New, 2 cct, ACSR 1xHawk	54	2021	Construction
5	Mataram	Mantang	150 kV	New, 2 cct, ACSR 1xHawk	40	2022	Plan
6	Jeranjang	Sekotong	150 kV	New, 2 cct, ACSR 1xHawk	57	2022	Plan
7	Maluk	Taliwang	70 kV	New, 2 cct, 1xHawk	40	2022	Plan
8	MHP Sumbawa 3	Incomer 2 phi (Labuhan-Empang)	150 kV	New, 4 cct, ACSR 1xHawk	9	2024	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. SE. Deer (1/2)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
1	Sokoria Power Plant	Incomer 1 phi (Ropa-Ende)	70 kV	New, 2 cct, ACSR 1xHawk	20	2021	Construction
2	Ropa	Bajawa	70 kV	New, 2 cct, ACSR 1xHawk	190	2021	Construction
3	Bolok	Tenau/ Kuanino	150 kV	New, 2 cct, ACSR 2xZebra	20	2021	Construction
4	Borong	Inc 1 phi (Ruteng-Bajawa)	70 kV	New, 2 cct, ACSR 1xHawk	0,1	2021	Construction
5	Aesesa	Inc 1 phi (Bajawa-Ropa)	70 kV	New, 2 cct, ACSR 1xHawk	0,1	2021	Plan
6	Kupang MHP Peaker/ Panaf	Naibonat	150 kV	New, 2 cct, ACSR 2xHawk	50	2022	Plan
7	Flores/ Rangko MHP	Labuan Bajo	70 kV	New, 2 cct, ACSR 2xHawk	20	2022	Plan
8	Kupang/ Maulafa Baru (Kupang City)	Naibonat	150 kV	New, 2 cct, ACSR 2xHawk	20	2022	Plan
9	Waingapu	MHP Waingapu	70 kV	New, 2 cct, ACSR 1xHawk	30	2022	Plan
10	Kefamenanu	Malacca	150 kV	New, 2 cct, ACSR 2xHawk	100	2022	Plan

Source: RUPTL 2021 - 2030

List of the planned transmission line projects, voltage, length and operation status – E. SE. Deer (2/2)

No.	From	To	Voltage	Conductor	Length (kms)	COD	Status
11	MHP Maumere Peaker	Larantuka	150 kV	New, 2 cct, ACSR 2xHawk	212	2023	Plan
12	Mantaloko Power Plant	Inc 2 phi (Bajawa-Ropa)	70 kV	New, 4 cct, ACSR 1xHawk	30	2025	Plan
13	Ulumbu Power Plant	Ulumbu geothermal power plant 5,6	70 kV	New, 2 cct, ACSR 1xHawk	20	2025	Plan
14	MHP Waingapu	Tambolaka	70 kV	New, 2 cct, ACSR 1xHawk	190	2026	Plan
15	Malacca	Atambua	150 kV	New, 2 cct, ACSR 2xHawk	96	2026	Plan
16	Wakaibubak	Tambolaka	70 kV	New, 2 cct, ACSR 1xHawk	50	2026	Plan
17	Amfoang	Kefamenanu	150 kV	New, 2 cct, ACSR 2xHawk	252	2024	Plan
18	Naibonat	Amfoang	150 kV	New, 2 cct, ACSR 2xHawk	108	2027	Plan
19	Oka Ile Ange Power Plant	Inc 1 phi (Maumere-Larantuka MHP)	150 kV	New, 2 cct, ACSR 2xHawk	5	2028	Plan

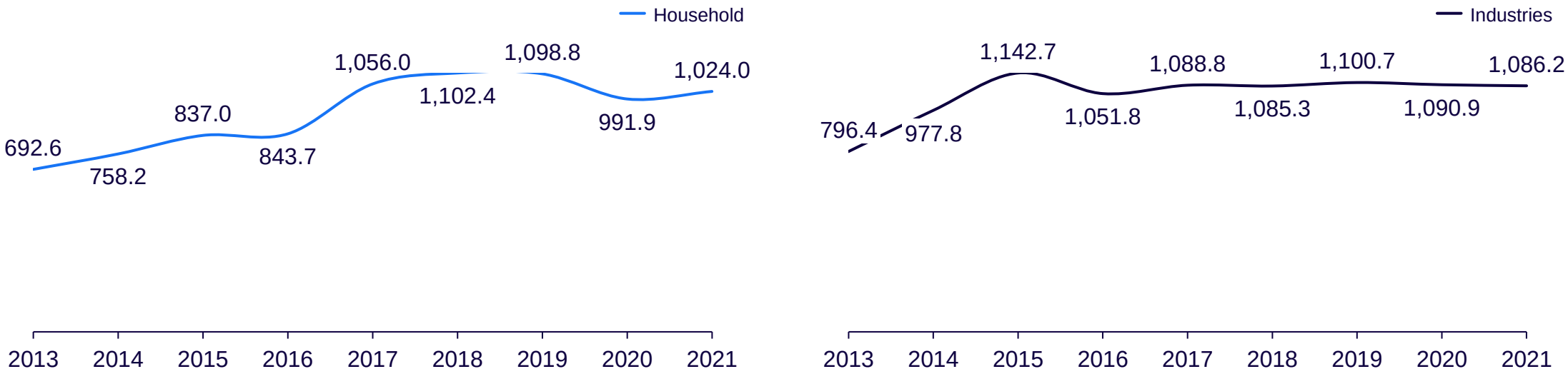
Source: RUPTL 2021 - 2030

9 電力料金

一般家庭と産業界の平均電力料金は、2017年以降、それぞれ平均1055 IDR/kWhと1090 IDR/kWhで概ね安定している。

Electricity prices for industry and households in Indonesia

2013-2021, IDR/kWh



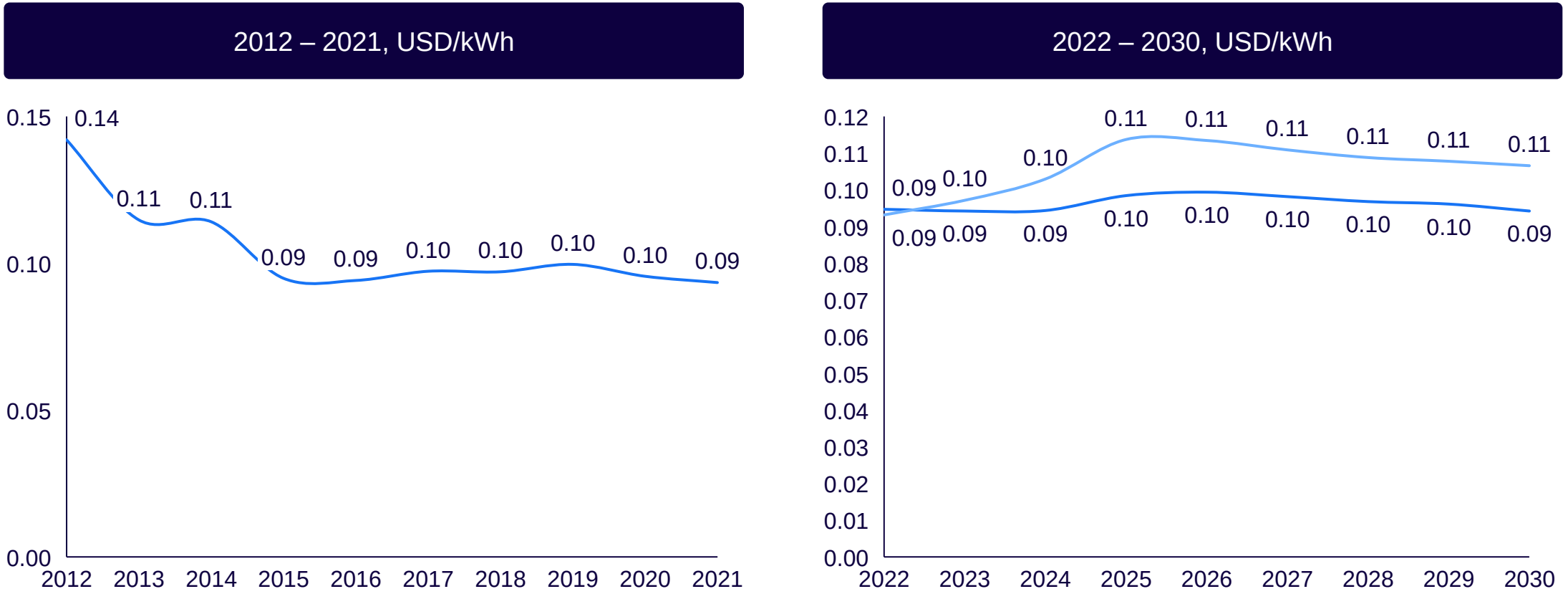
- As stipulated in Electricity Law No. 30, the government of Indonesia determines prices for electricity, which are given final approval by Parliament. Any differences between the cost of producing and transporting electricity and the price paid by consumers is subsidised by the government. Electricity subsidies continue to be a burden on the government and hinder efforts to improve energy efficiency and demand-side response mechanisms.
- Since 2013, electricity tariffs have been incrementally increased for certain consumer groups based on electricity consumption. While subsidies to larger industrial consumers of electricity were abolished in 2008, gradual price increases were announced in 2014 for medium-sized consumers and other industries, while prices stabilized since 2016

Source: Statista 2023, Arthur D. Little analysis

電力コストのトレンドは以下

Electricity cost

2012 – 2030, USD/kWh



Source: RUPTL 2021 – 2030, Arthur D. Little analysis

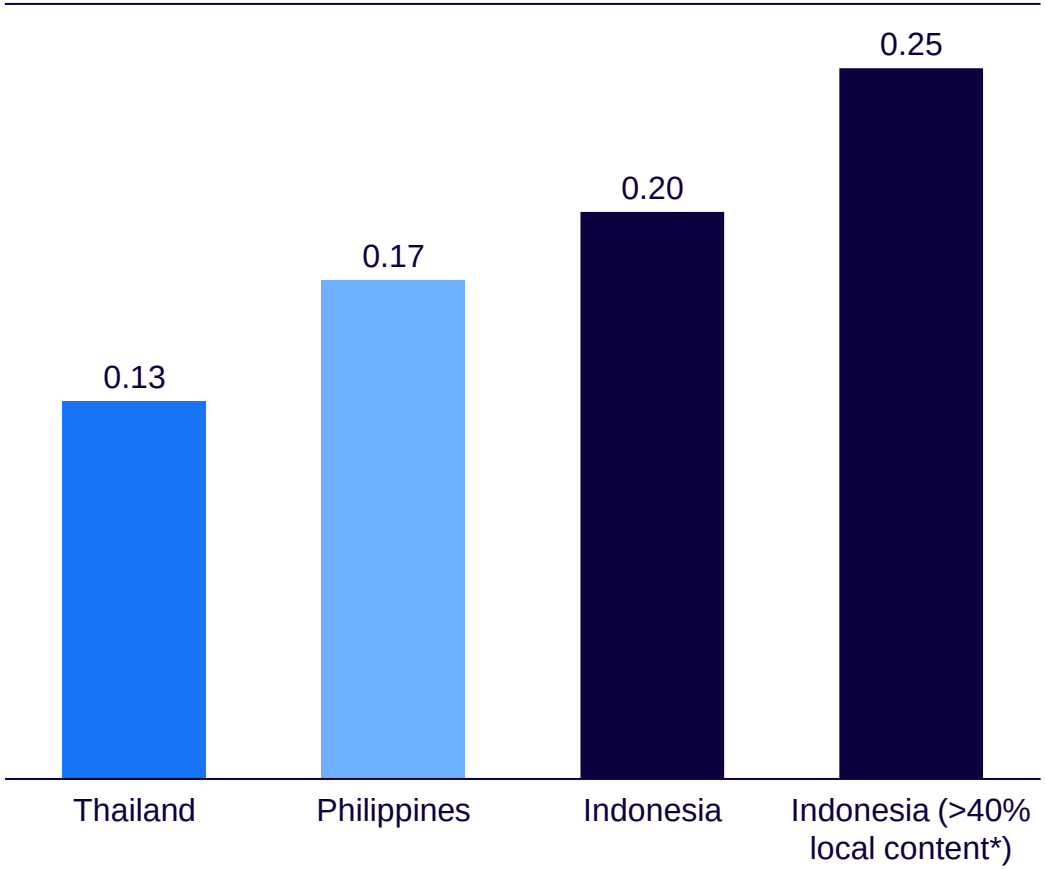
インドネシアの太陽光におけるFiT価格はタイやフィリピンと比較すると高い

FiT (Feed-in-Tariff)

Sector	Key developments
Solar	USD 0.145-0.25/kWh range depending on multiple capacity quotas, based on region and local content limit
Geothermal	Currently operating in a ‘ceiling price’ manner. Indonesia's geothermal association INAGA is proposing a FiT scheme which would imcrease geothermal PP development, currently hampered by tariffs set by PLN on a b2b basis. This is said to be addressed in the EB-ET Bill under purview as of 2022
Wind	No FiT currently in place. Large wind projects are unlikely due to wind speeds limitations. Currently 2 wind PPs are operating in Sulawesi, with 1 more under construction whilst Kalimantan has 1 under construction, both with start up date in 2023.
Biomass	FiTs only application to biomass plants with an installed capacity of 10 MW or less in size.

Solar FiT rates across SEA markets

2022, USD/kWh



Note: *Local content requirement is a policy that incentivizes local manufacturing, in this cause additional tariffs of USD 0.05 can be applied if the min. share of locally produced inputs in the solar projects is >40%
Sources: International Energy Agency 2023, Statistica 2023, Rystad Energy 2023, PV Magazine 2022, International Institute for Sustainable Development 2017

インドネシアでは地熱に対する買取価格も設定されている

Geothermal ceiling rates

2015 – 2025, USD¢/kWh

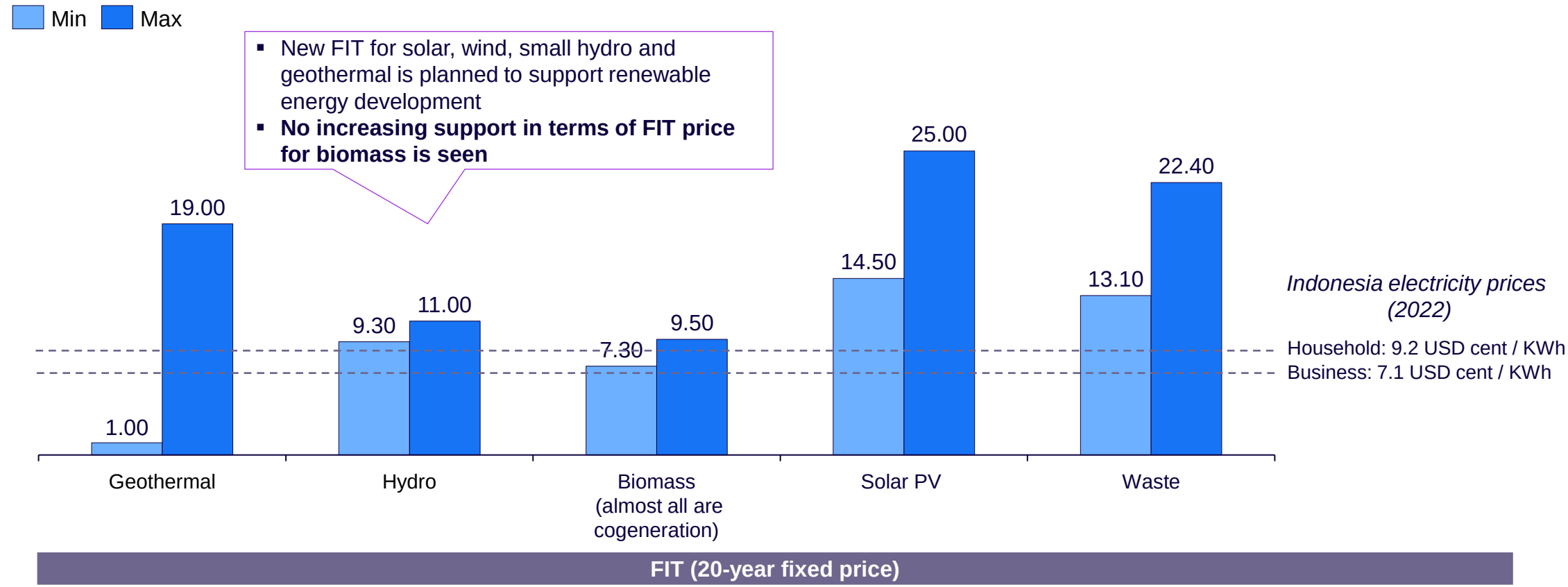
COD	Ceiling Price (USD¢/kWh)		
	Region I	Region II	Region III
2015	11.8	17.0	25.4
2016	12.2	17.6	25.8
2017	12.6	18.2	26.2
2018	13.0	18.8	26.6
2019	13.4	19.4	27.0
2020	13.8	20.0	27.4
2021	14.2	20.6	27.8
2022	14.6	21.3	28.3
2023	15.0	21.9	28.7
2024	15.5	22.6	29.2
2025	15.9	23.3	29.6

Note:
Region I: Sumatra, Jawa & Bali
Region II: Sulawesi, NTT, NTB, Halmahera, Maluku, Irian Jaya & Kalimantan
Region III: Remote areas within Region I and Region II where the majority of the electrical power is generated from fuel-oil plants

Note: *Medium and low voltage values are averages of zero waste and sanitary landfill technology FiT rates, **Indonesia's FiT rates are for MSW
Source: International Energy Agency 2023

FIT価格の一覧は以下。バイオマス発電のFIT価格を俯瞰すると、他再エネと比べ安い

Renewable energy purchasing price by power sources in Indonesia (US cent/kWh)

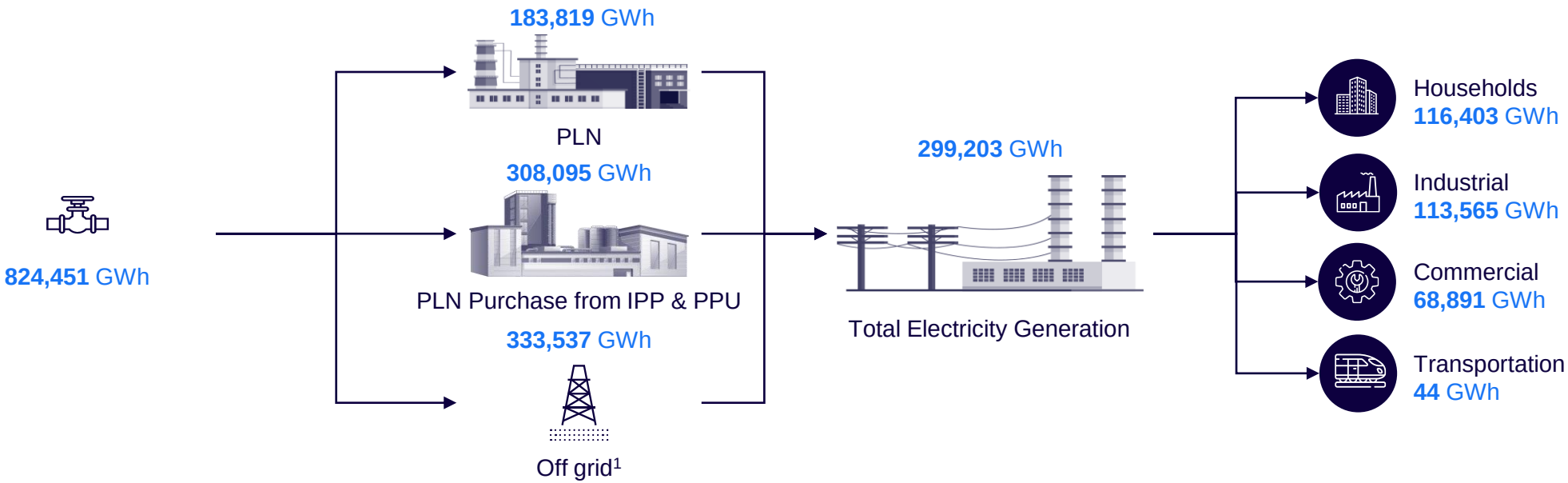


Source: MEMR Regulation No.19/2016, 2030 Indonesia Roadmap, Arthur D. Little

10 電力需給状況

総発電量の約60%がPLNで賄われ、エネルギー消費では家庭が最大のシェアを占めている

Electricity distribution



- In 2022, total electricity generation reached 824.5 TWh. PLN were responsible for 22.3% of this generation, amounting to 183.8 TWh, while PLN purchase from IPP & PPU contributed to 37.4% the remaining 40.1%, equivalent to 333.5 TWh are contributed by Off grid
- 'Households' had the largest share, at 38.9% (116.4 TWh).While 'Industrial' was second with 38% (113.6 TWh). 'Commercial' contributed 23% (68.9 TWh), and 'Transportation' had 0.014% (44 GWh) share of the total electricity consumption in 2022

Source: Ministry of Energy and Mineral Resource 2022, Arthur D. Little analysis
Note: 1) Off grid consist of captive power from IO & PPU, PP financed by State Budget and PP financed by Non-Governmental

Arthur D. Little has been at the forefront of innovation since 1886. We are an acknowledged thought leader in linking strategy, innovation and transformation in technology-intensive and converging industries. We navigate our clients through changing business ecosystems to uncover new growth opportunities. We enable our clients to build innovation capabilities and transform their organizations.

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