



PT PLN (Persero)



WIND POWER PLANT DEVELOPMENT IN INDONESIA

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System Planning, PLN
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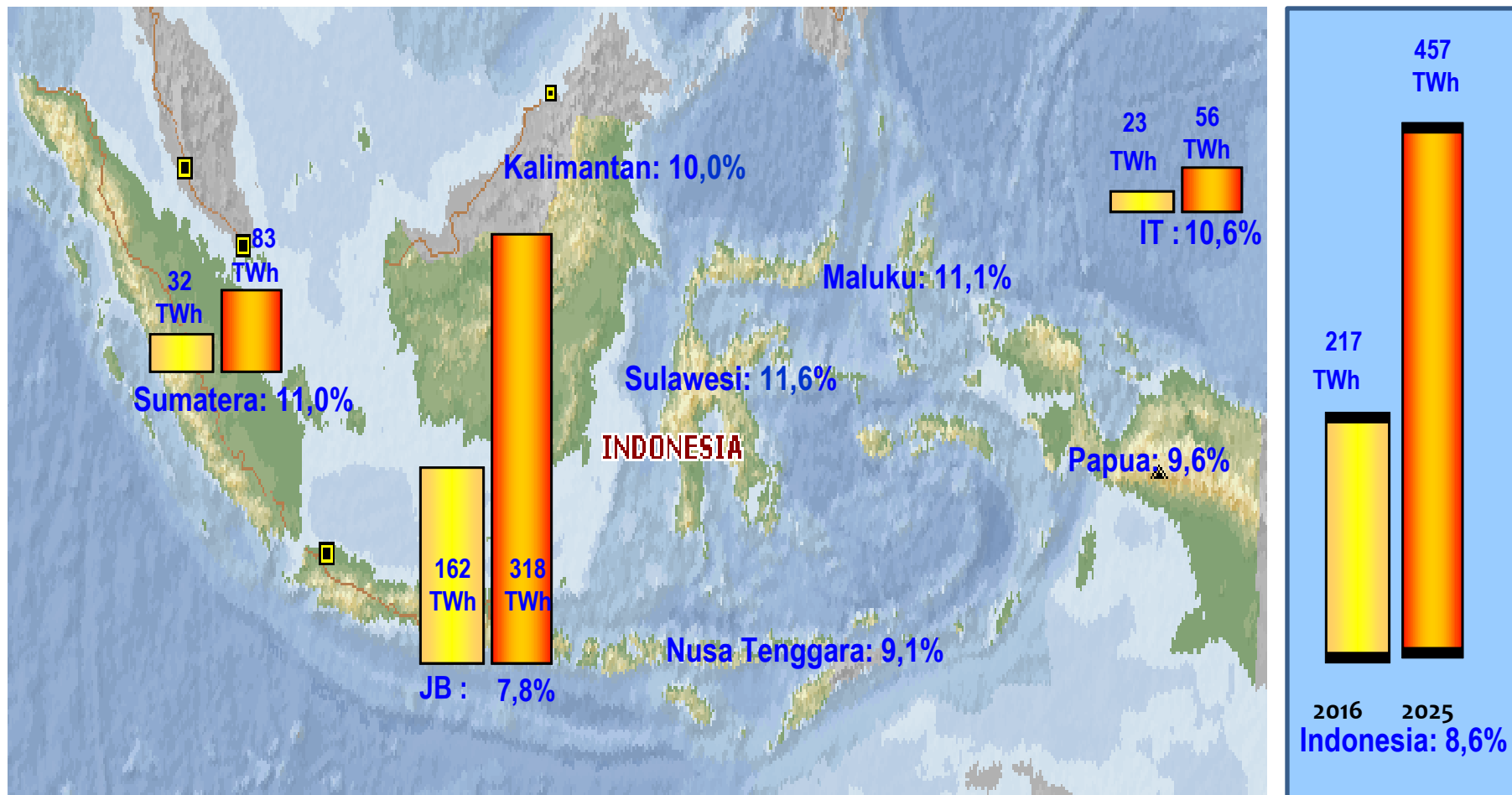




RUPTL 2016-2025 (DRAFT)

(PLN Electricity Supply Business Plan)

Demand Projection

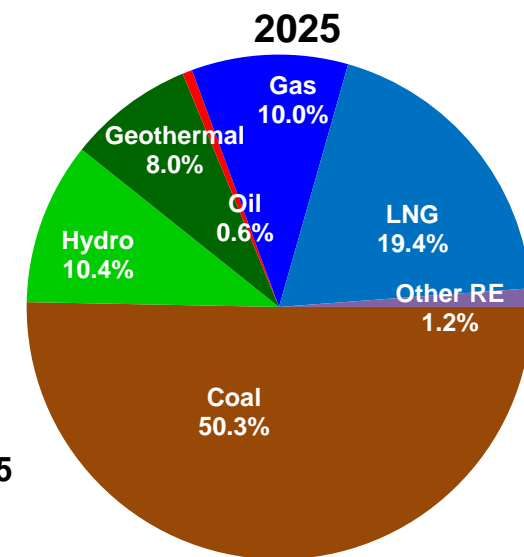
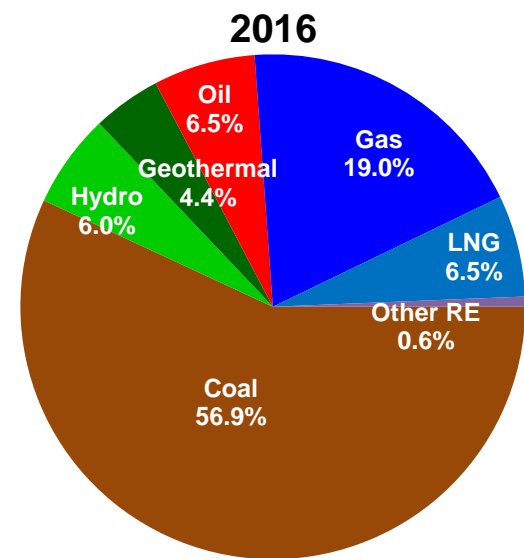
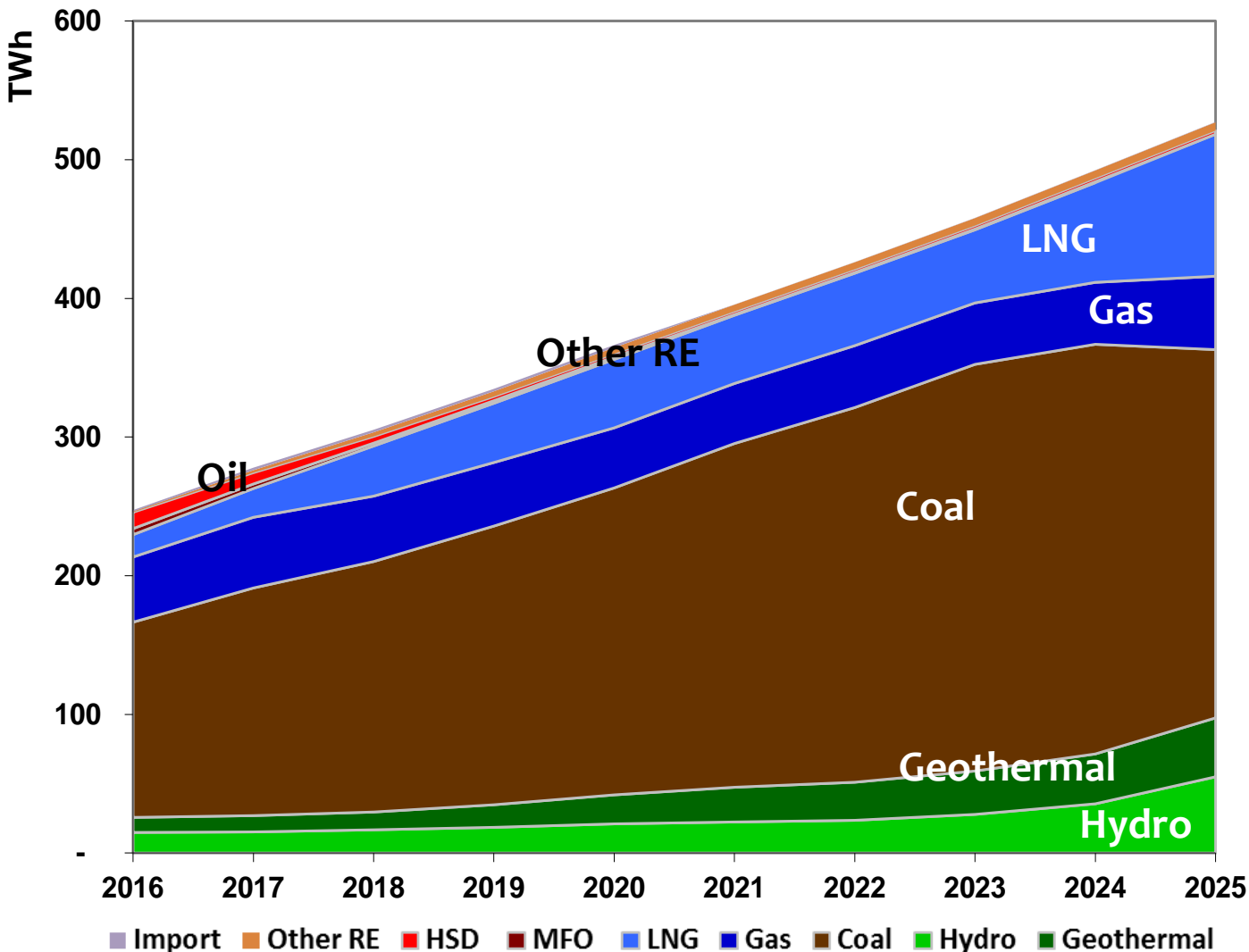


Years	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Demand (TWh)	200	217	244	268	292	315	340	366	394	425	457
Consumers Ratio	85,4	88,5	91,1	93,6	95,4	96,8	97,5	97,9	98,2	98,4	98,5



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Fuel Mix :





WPP DEVELOPMENT : STATUS

Number	System	System Peak Load (MW)	Plant Type	Location	Province	Capacity (MW)	Progress
1	Southern Sulawesi	900	WPP	Sidrap	South Sulawesi	70	Construction
			WPP	Takalar	South Sulawesi	62.5	FS and Interconnection Study
			WPP	Takalar	South Sulawesi	62.5	Proposal
			WPP	Jeneponto	South Sulawesi	20	Proposal
			WPP	Tolo	South Sulawesi	59.4	Proposal
			WPP	Takalar	South Sulawesi	52.8	Proposal
						327.2	
2	Northern Sulawesi	350	PV	Gorontalo	Gorontalo	27	FS and Interconnection Study
			PV	Gorontalo	Gorontalo	40	Proposal
			PV	Manado	North Sulawesi	40	Proposal
						107	
3	Lombok	250	PV	Pringgabaya	West Nusa Tenggara	41	FS and Interconnection Study
						41	
4	Timor	67	WPP	Nonohonis	East Nusa Tenggara	21	FS and Interconnection Study
						21	
5	Raha-Bau Bau	35.4	PV	Buton	South East Sulawesi	5	FS and Interconnection Study
						5	
6	West Kalimantan	285	PV	Pontianak	West Kalimantan	60	Proposal
						60	
7	Kalimantan Interconnection (exc. West Kalimantan)	957	PV	Banjarmasin	East Kalimantan	60	Proposal
			PV	Samarinda	East Kalimantan	120	Proposal
			PV	Bontang	East Kalimantan	30	Proposal
						210	
6	Java-Bali	24000	WPP	Sukabumi	West Java	250	Proposal
			PV	Bali	Bali	100	Proposal
			PV	Jatim	East Java	100	Proposal
						450	
8	Sumatera	5000	PV	Jambi	Jambi	200	Proposal
			PV	Bangka	Bangka-Belitung	24	Proposal
			PV	Sibolga	North Sumatera	30	Proposal
						254	



WPP DEVELOPMENT : CHALLENGES

Phase 1 :

- PLN Standard - Limitation
 - i. WPP Technology
 - ii. Interconnection requirement-grid code
- Government Regulation
 - i. Maximum penetration
 - ii. Subsidy Policy
 - iii. Local content

Phase 1

- PLN Standard
- Gov. Regulation

Phase 2

- Fit In Tariff Regulation
- Implementation

Phase 3

- COD

Phase 2 :

- Fit In Tariff
 - i. Ministry decree
 - ii. Subsidy policy
- Implementation
 - i. Tender Process
 - ii. Subsidy policy



WPP DEVELOPMENT : OPPORTUNITIES

Wind Energy Resources of Indonesia

About this map

This mesoscale wind resource map is developed by EMD International A/S, Denmark, in 2014-2015.

The development is supported by Embassy of Denmark through Environmental Support Programme 3 (ESP3) / Denik.

The project was implemented for The Ministry of Energy and Mineral Resources, Indonesia, and ESP3.

The mesoscale model used is the Weather and Research Forecast Model (WRF) with a spatial resolution of 3 km and driven by Era-Interim data from the period 2004-2014.

The map shows the annual average wind speed at 50m above terrain.

This average wind speed map is available at URL: indonesia.windprospecting.com (free access).

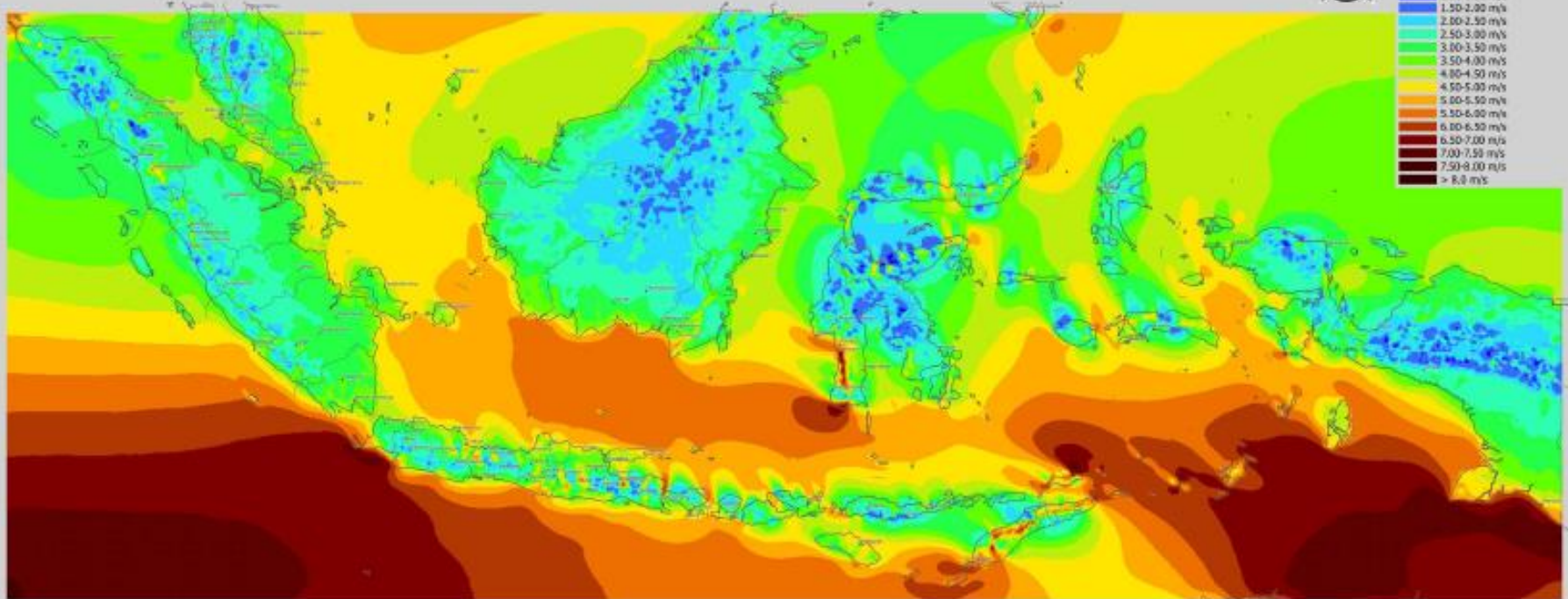
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Legend

Wind resources in 50 m height



250 0 250 500 750 1000 km



ESP3 DANIDA
ENVIRONMENTAL
SUPPORT
PROGRAMME

EMD International A/S
www.emd.dk

windPROSPECTING

windPRO



WPP DEVELOPMENT : TECHNICAL ASSISTANCE FROM USAID

- a. Wind and solar interconnection requirements for distribution network (grid code enhancement)
- b. Wind and solar interconnection requirements for transmission network. (under development)
- c. Wind and solar grid integration studies in Southern Sulawesi System, including technical workshop
- d. Variety of other clean energy areas



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Power Generation Development Plan

Pembangkit	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
CFPP	3,027	1,024	3,397	17,175	4,548	1,781	400	700	500	2,250	34,801
GeoPP	85	350	320	590	580	450	340	935	1,250	1,250	6,150
CCPP	-	1,315	6,850	1,500	-	-	1,050	260	4,340	3,600	18,915
GT/GE PP	759	1,384	1,235	170	208	254	145	26	10	80	4,271
MHPP	32	78	115	292	81	86	196	26	257	201	1,365
HPP	45	57	175	365	147	330	639	1,872	1,581	3,950	9,160
PS	-	-	-	1,040	-	-	-	450	450	2,000	3,940
RE++	192	279	346	266	309	64	46	129	30	276	1,937
Jumlah	4,139	4,487	12,437	21,398	5,873	2,965	2,816	4,398	8,418	13,607	80,538

Renewable Energy Development Plan

No	Plant Type	Capacity	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
1	Geothermal	MW	85	350	320	590	580	450	340	935	1,250	1,250	6,150
2	Hydro	MW	45	57	175	1,405	147	330	639	2,322	2,031	5,950	13,100
3	Minihydro	MW	32	78	115	292	81	86	196	26	257	201	1,365
4	Solar	MWp	26	122	70	50	118	11	10	17	10	10	444
5	Wind	MW	-	70	190	165	195	10	-	5	-	5	640
6	Biomass / Waste	MW	125	142	135	11	21	11	-	21	15	6	488
7	Bio-Fuel	10 ³ Kilo Liter	812	594	365	261	230	170	173	179	189	191	3,165
Jumlah		MW	312	819	1,005	2,513	1,142	898	1,185	3,326	3,563	7,422	22,186