



PLN

Mercury Pollution Control of PLN's Coal Fired Power Plant (CFPP)

The COP-4 Minamata Convention on Mercury

11 March 2021

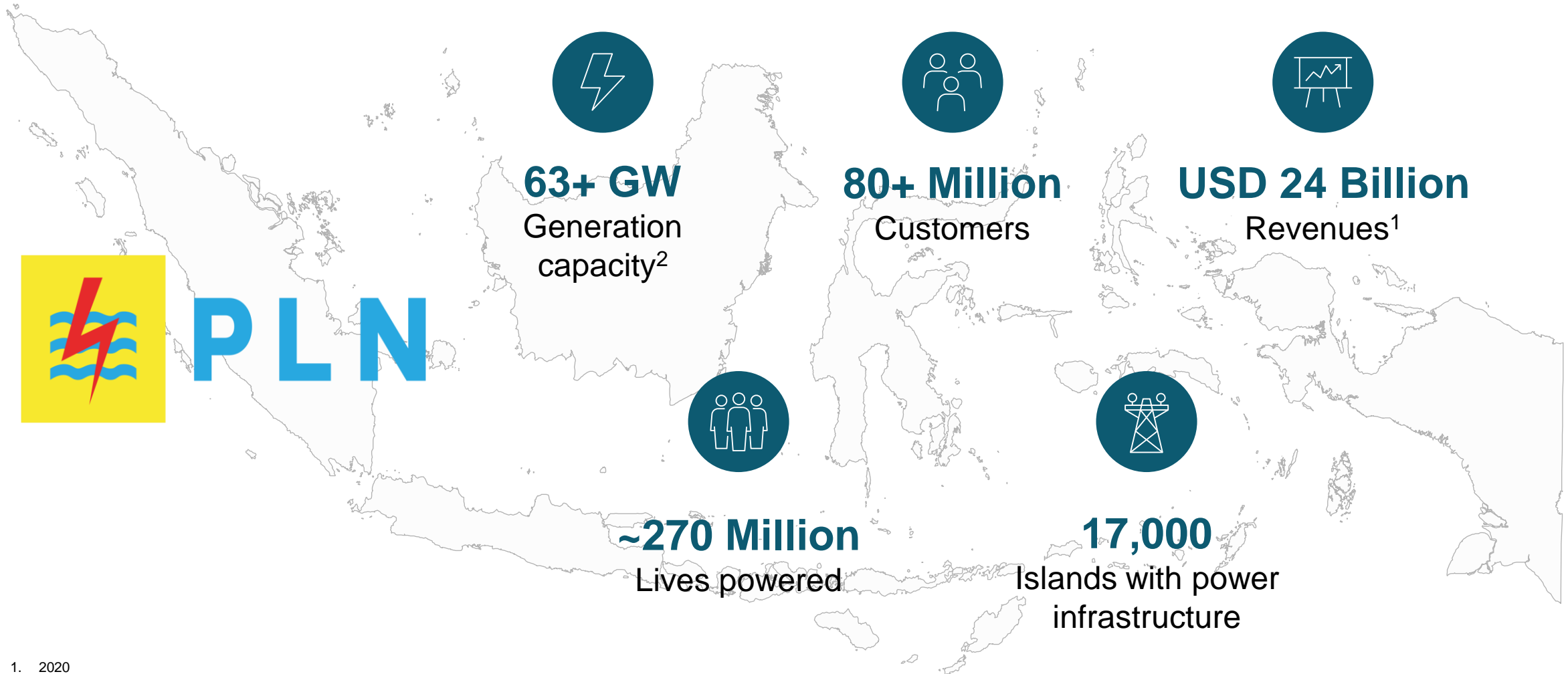


Sistem Manajemen
Anti Penyuapan (SMAP)

PLIS Pulau Messa, Nusa Tenggara Timur

www.pln.co.id

For 76 years, PLN has been powering millions of lives in Indonesia

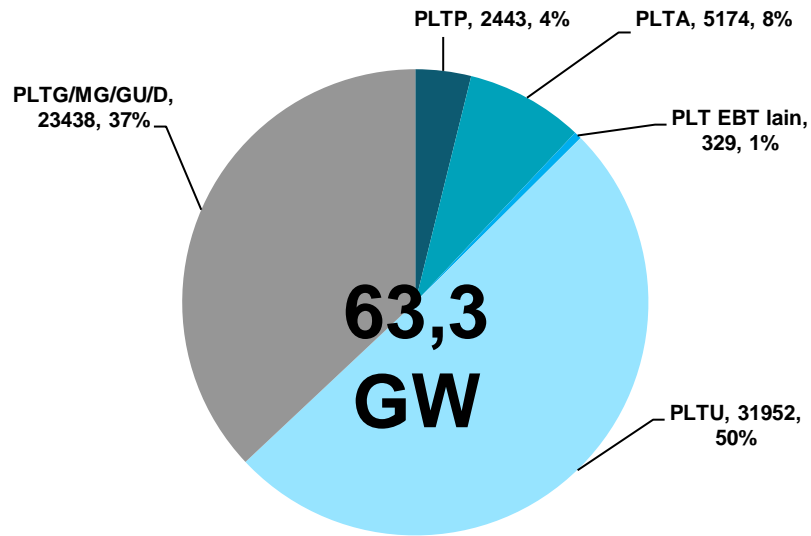


1. 2020
2. Including IPP

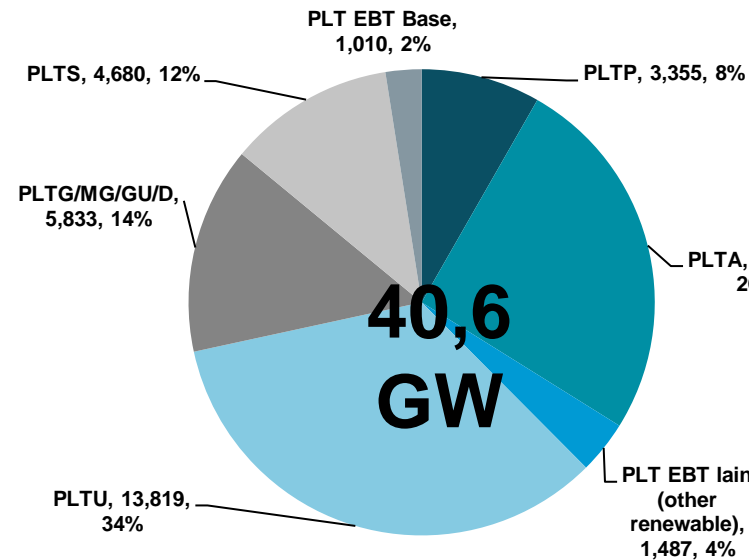
New Installation of Power Plant

(Electricity Supply Bussinnes Plan 2021-2030)

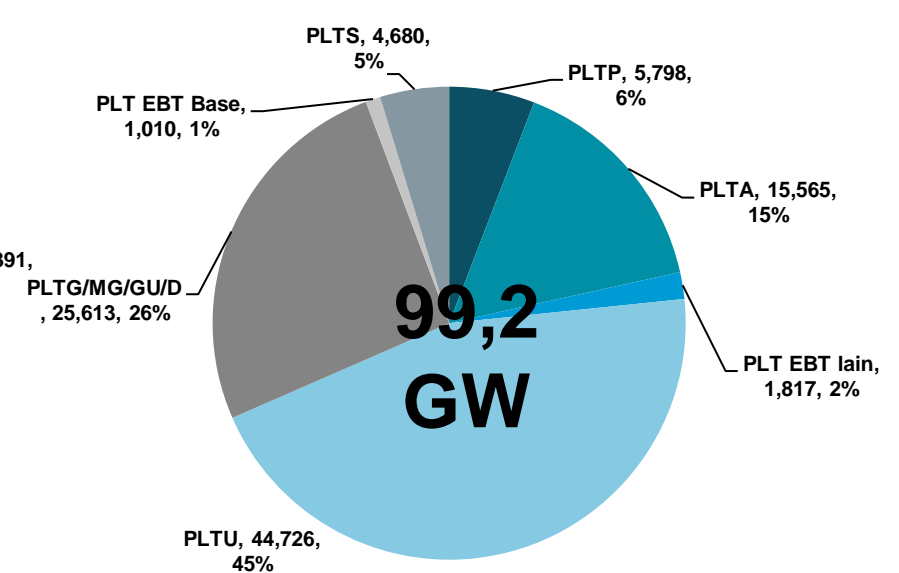
**Install Capacity
2020**



**RUPTL
2021-2030**

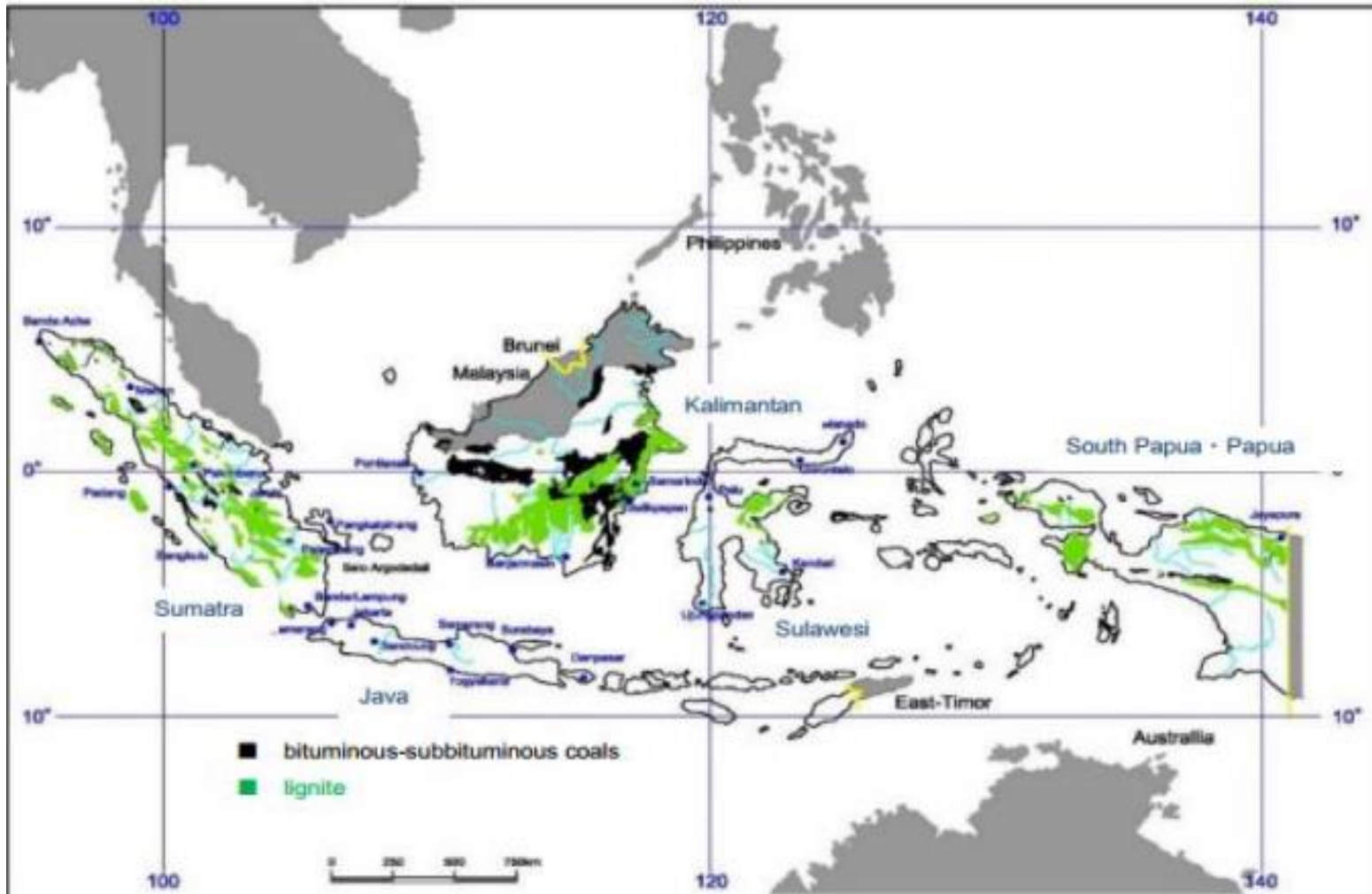


**Installed Capacity
2030**

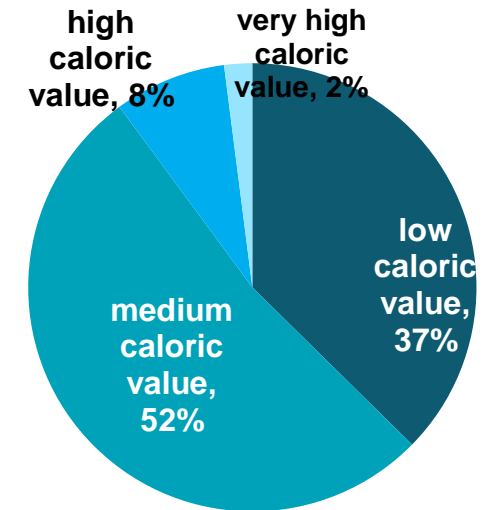


Power Plant Installed capacity in 2020 is 63,3 GW. New Installation planning is 40,6 GW for 10 years with Renewable reach to 20,9 GW (51,6%), Coal Fired Power plant retirement planning is 1,1 GW and De-dieselization around 3,6 GW. PLN's Power Plant Install Capacity in 2030 become 99,2 GW

Distribution of Indonesian Coal Based on The Characteristics



Source : Ministry Energy & Mineral Resources 2015



- ❑ Indonesian coal are characterized by bituminous, sub bituminous coal and lignite
- ❑ 80% having calories value <6.100 kcal/kg and about 41% having calories <5.100 kcal/kg
- ❑ A large part of Indonesian coal reserved are low caloric value and can be categorized as sub bituminous coal and or lignite

Indonesian Coal Specification use by PLN's CFPP

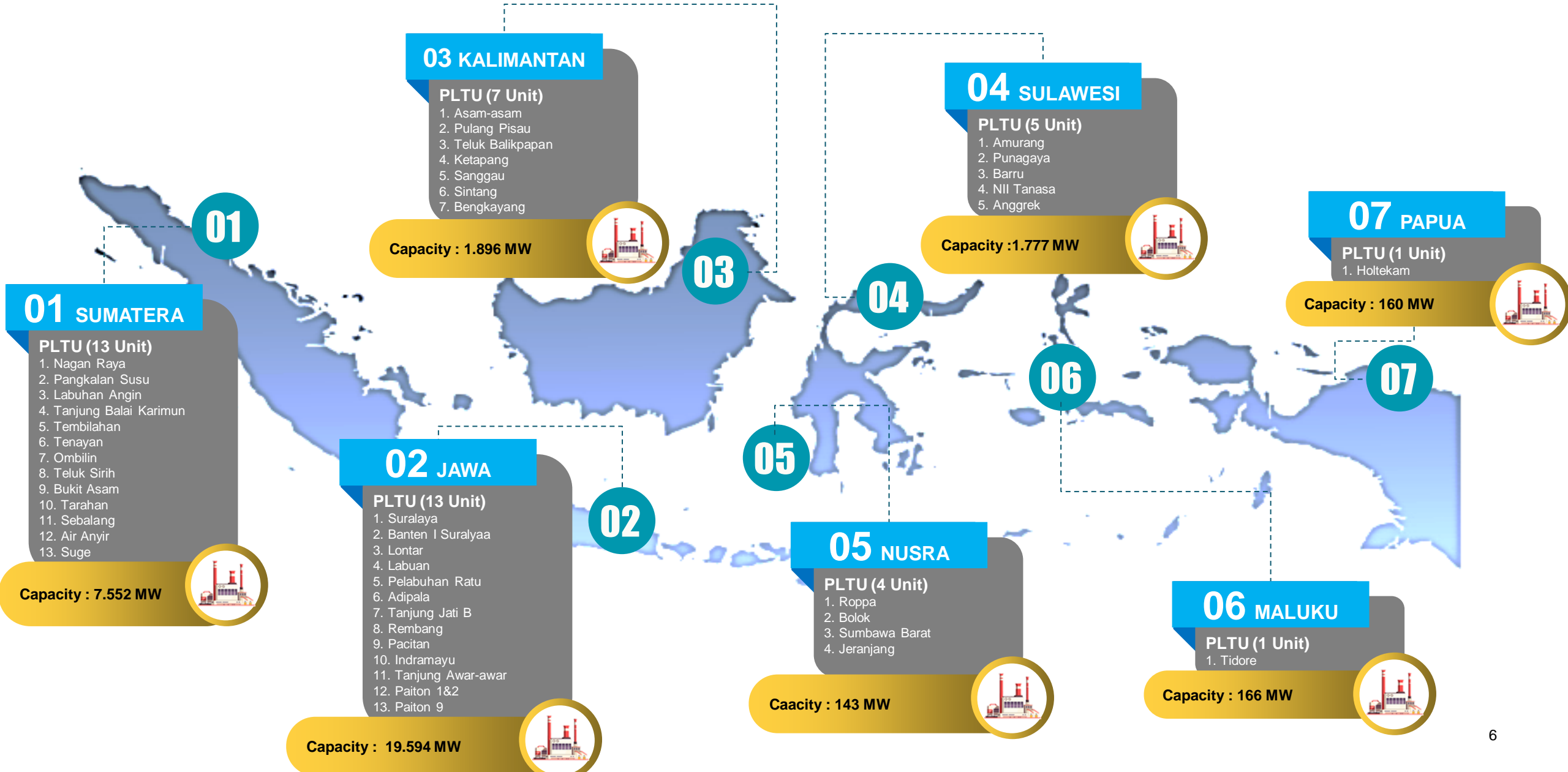
No	Location	Coal Supplier	Hg Content on Coal			Source
			µg/kg	ppb	mg/Nm3	
Coal Mining						
1	East Kalimantan	KPC		10 - 70	0,0895 - 0,6268	Puslitbang Tekmira Study Report (Coal specification which will be use by PLTU Sulut, PLTU Timor, PLTU Palu)
2	South Kalimantan	KPC		5 - 161	0,0448 - 1,4417	
3	South Sumatera	Bukit Asam	155,6			

No	Location	Hg Content on Coal		Source
		µg/kg		
PLN's CFPP				
4	PLTU Suralaya 1-7	176		Final Report Mercury Emission From Coal Fired Power Plant in Indonesia, 2017
5	PLTU Paiton 1&2	66,8		
6	PLTU Asam-asam	62,4		
7	PLTU TJB 1&2	<0,070		
8	PLTU TJB 3&4	<0,070		
9	PLTU Tidore	57,5		
10	PLTU Jeranjang	77,6		
11	PLTU Ketapang	63,4		
12	PLTUTanjung Balai Karimun	59,1		
13	PLTU Air Anyir	134		

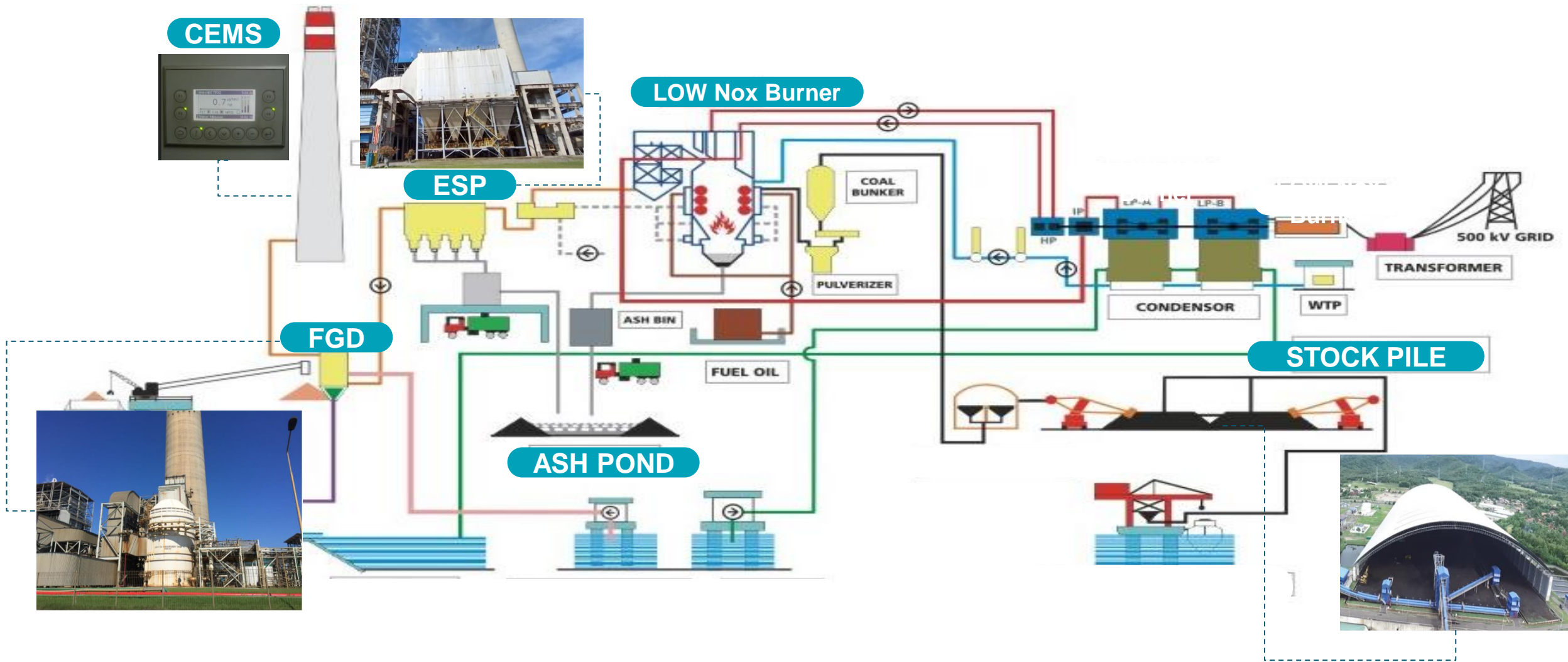
No	Location	Hg Content on Coal		Source
		µg/kg		
PLN's CFPP				
14	PLTU Teluk Balikpapan	86,71		Final Report Mercury Emission From Coal Fired Power Plant in Indonesia, 2017
15	PLTU Nagan Raya	81,54		
16	PLTU Labuhan Angin	57,91		
17	PLTU Bukit Asam	23,47		
18	PLTU Indramayu	58,72		
19	PLTU Pacitan	65,98		
20	PLTU Tanjung Awar-awar	43,11		
21	PLTU Ombilin	21,04		Final Report Mercury Emission From Coal Fired Power Plant in Indonesia, 2017
22	PLTU Tarahan	58,18		
23	PLTU Ropa	53,94		
24	PLTU Lontar	26,34		
25	PLTU Teluk Sirih	132,72		
26	PLTU Pangkalan Susu 1&2	<0,070		
27	PLTU Tenayan	25,19		
28	PLTU Rembang	52,5		
29	PLTU Barru	<0,070		
30	PLTU Bolok	50,75		

Avarage Coal Hg Content use by PLN's CFPP : 66,73 µg/kg

PLN's CFPP



Air Pollution Control & Monitoring system at CFPP



Air Pollution Control & Monitoring System

Technology

Housekeeping



1
Flue Gas Desulphurization System



2
Limestone System Injection



3
Electrostatic Precipitator



4
CEMS (Multigas & Hg)



5
Low Nox Burner



6
Clean Coal Technology



7
Dust Spray System at Coal & Landfill



8
Compacting stock pile & Landfill



9
Closed conveyor

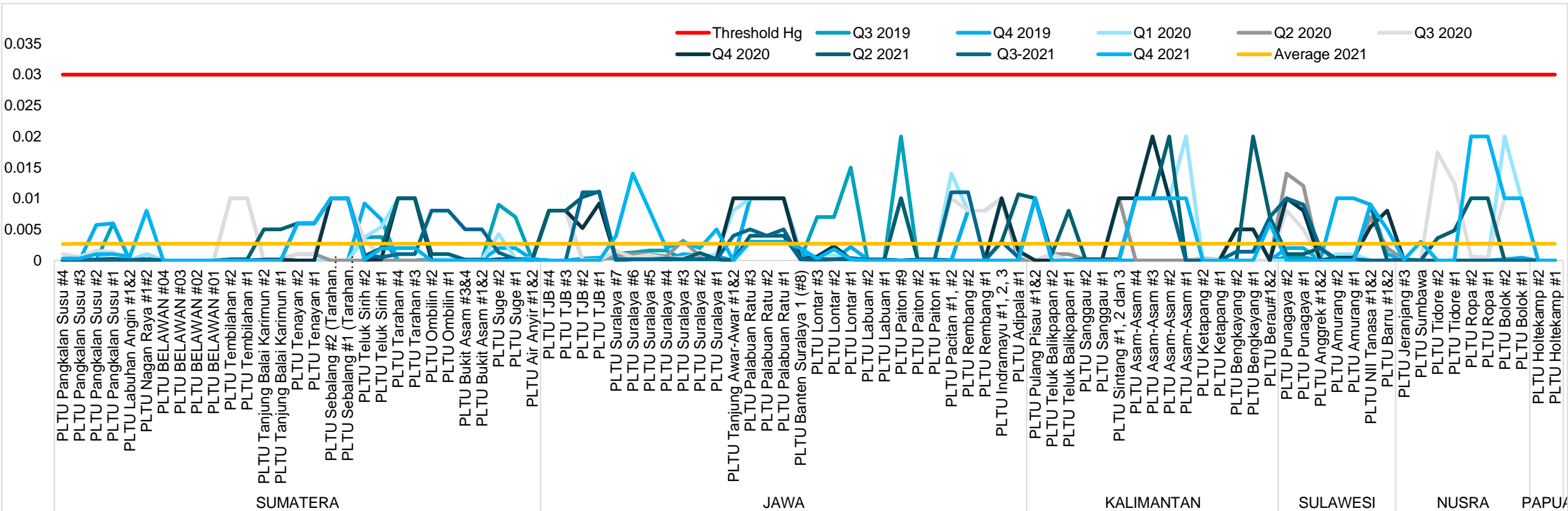
No	Boiler Type	Unit Name	Air Pollution Control Technology
1	CFB	PLTU Nagan Raya	ESP
2	CFB	PLTU Labuhan Angin	ESP
3	PC	PLTU Pangkalan Susu	ESP
4	Stocker	PLTU Tanjung Balai Karimun	Multicyclone
5	CFB	PLTU Tenayan	ESP
6	PC	PLTU Tembilahan	ESP
7	CFB	PLTU Air Anyir	ESP
8	CFB	PLTU Suge	ESP
9	CFB	PLTU Tarahan	ESP
10	PC	PLTU Ombilin	ESP
11	PC	PLTU Bukit Asam	ESP
12	CFB	PLTU Teluk Sirih	ESP
13	CFB	PLTU Sebalang	ESP
14	PC	PLTU TJB	Low NOx burner, ESP, FGD
15	PC	PLTU Suralaya 1-7	ESP & Low Nox Burner
16	PC	PLTU Banten I Suralaya	ESP
17	PC	PLTU Palabuan Ratu	ESP & Low Nox Burner
18	PC	PLTU Lontar	ESP & Low NOx Burner
19	PC	PLTU Labuan	ESP & Low NOx Burner
20	PC	PLTU Adipala	ESP & Low NOx Burner
21	PC	PLTU Paiton 1&2	ESP
22	PC	PLTU Paiton 9	ESP
23	PC	PLTU Tanjung Awar-Awar	ESP

No	Boiler Type	Unit Name	Air Pollution Control Technology
24	PC	PLTU Rembang	ESP dan Low NOx Burner
25	PC	PLTU Indramayu	ESP dan Low NOx Burner
26	PC	PLTU Pacitan	ESP
27	PC	PLTU Asam-Asam	ESP
28	CFB	PLTU Teluk Balikpapan	ESP dan Limestone System
29	CFB	PLTU Pulang Pisau	ESP
30	Stocker	PLTU Sanggau	ESP, Limestone
31	CFB	PLTU Ketapang	ESP, Limestone
32	CFB	PLTU Bengkayang	ESP
33	Stocker	PLTU Sintang	ESP, Limestone
34	Stocker	PLTU Berau	ESP
35	CFB	PLTU Amurang	ESP, Limestone
36	CFB	PLTU Barru	ESP, Cyclone dan limestone
37	CFB	PLTU Punagaya	ESP, Cyclone dan Limestone
38	CFB	PLTU Anggrek	ESP, Cyclone dan Limestone
39	Stocker	PLTU NII Tanasa	ESP
40	CFB	PLTU Bolok	ESP
41	Stocker	PLTU Ropa	ESP
42	CFB	PLTU Jeranjang	ESP
43	Stocker	PLTU Sumbawa	ESP
44	Stocker	PLTU Tidore	ESP
45	Stocker	PLTU Holtekamp	Dust Collector & Desulphurizer

Mercury Emission Trend by PLN's CFPP



(taken by manual Sampling from 2019-2021)

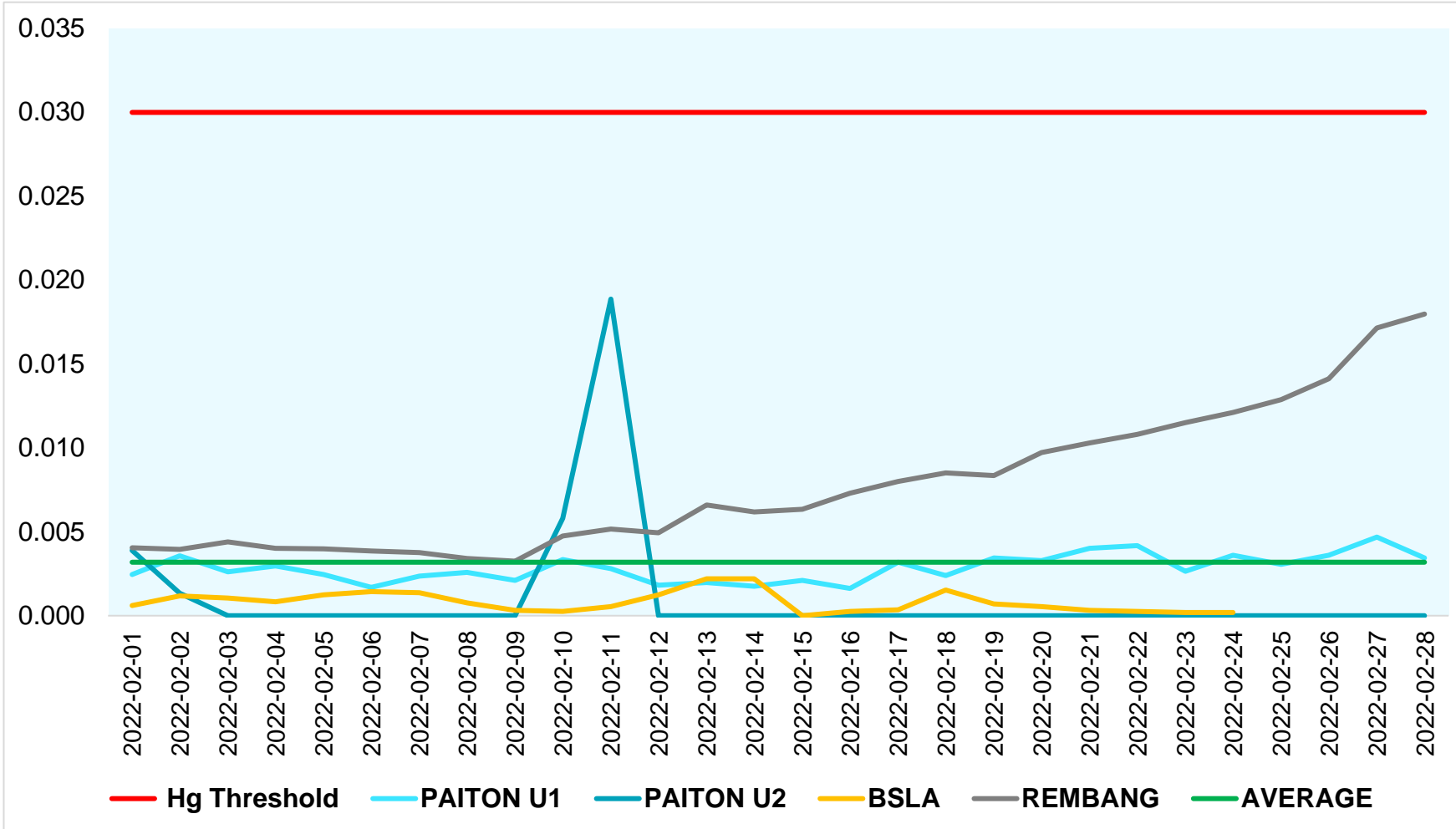


As above figure shown that all of Hg monitoring record are under threshold which stated in Ministry Of Environmental & Forestry (MOEF) Decree 15/2019

Parameter	Threshold for CFPP operated Before MOEF Decree Issued (mg/Nm ³)	Threshold for CFPP operated after MOEF Decree Issued (mg/Nm ³)
Sulfur Dioxide (SO ₂)	550	200
Nitrogen Oxide NO _x	550	200
Particulate (PM)	100	50
Mercury (Hg)	0,03	0,03

Hg Emission Trend by 3 CFPP (PLTU Paiton, PLTU BSLA, PLTU Rembang)

CEMS Report on February 2022



- All of CEMS (Multigas SOx, NOx Particulate) already installed at CFPP
- Hg CEMS currently installed at 3 CFPP (Paiton 1&2, BSLA and Rembang) for other CFPP is on procurement process
- As beside figure shown that all of Hg monitoring record are under threshold which stated in Ministry Of Environmental & Forestry (MOEF) Decree 15/2019

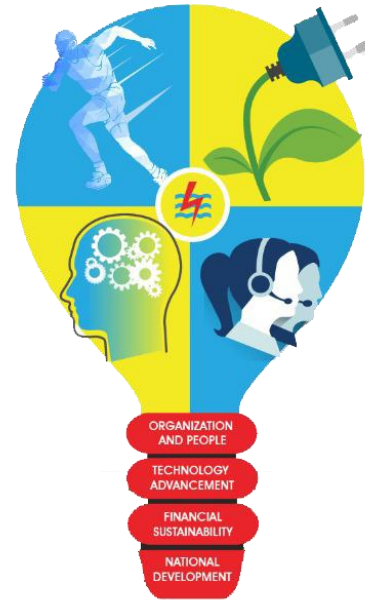
PLN aspires to build a sustainable energy future for Indonesia

LEAN

Generating and distributing energy with **zero waste** and **maximum efficiency**

INNOVATIVE

Building new **clean energy businesses** (e.g. electric stoves, EVs, rooftop solar, EaaS, emissions trading, RECs)



GREEN

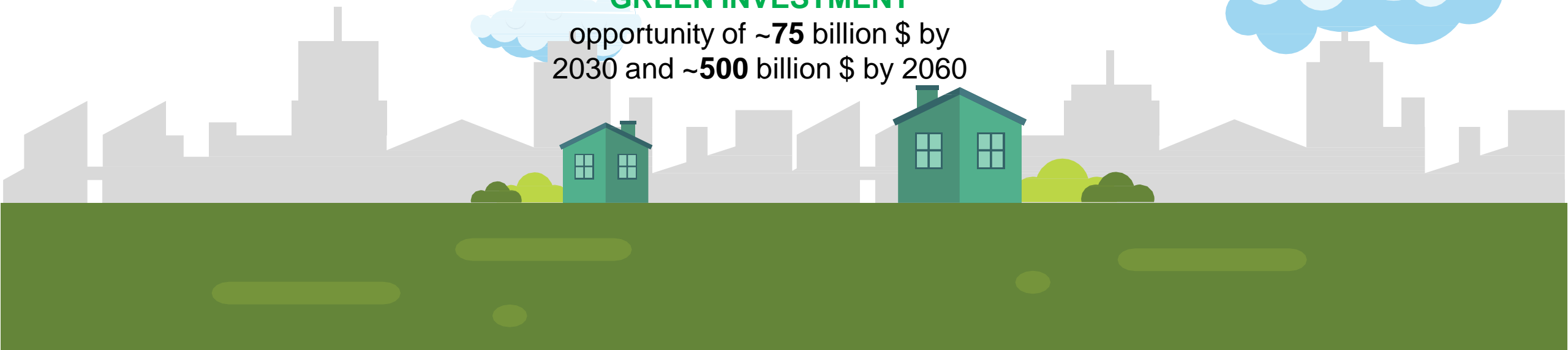
Accelerating **shift to green energy mix** for current and future generations

CUSTOMER FOCUSED

Providing **reliable electricity** and delighting customers through world-class services

GREEN INVESTMENT

opportunity of **~75 billion \$** by 2030 and **~500 billion \$** by 2060



PLN has planned a roadmap to retire coal power plants to support Carbon Neutrality by 2060

Planned replacement

Coal power plants with
1.1 GW renewable-based power plants

2025

Second phase of retirement

9 GW of sub-critical coal power plants

2035

First phase of retirement¹

24 GW of ultra super-critical coal plants

2045

2030

First phase of retirement

1 GW of sub-critical coal power plants

2040

Retirement

10 GW of super-critical coal power plants

2055

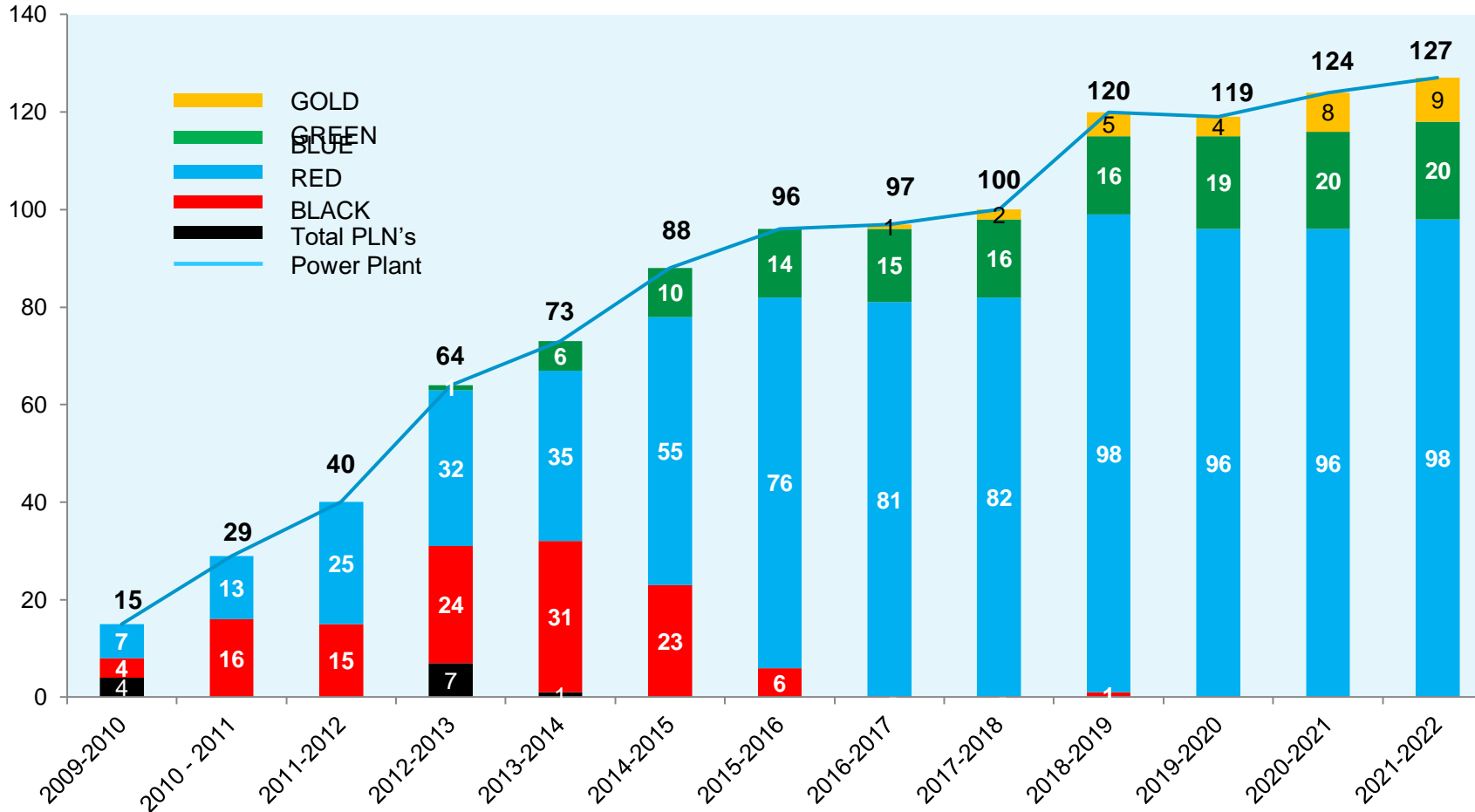
Final phase of retirement

5 GW of ultra super-critical coal plants

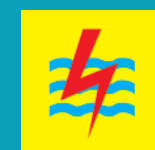
1. Gradual retirement of ultra supercritical coal plants from 2045 to 2056

PROPER (Public Disclosure Program for Environmental Compliance)

2010 - 2022



- PLN's Power Plant following PROPER Program by MOEF as a participant which is increasing every year
- From PROPER Result shown that Environmental Management is improve start from 2016
- PLN's commitment is trying to comply with all of Environmental Regulation and trying to achieve beyond compliance



PLN

Thank you!

Monitoring of Mercury Pollution from ASGM Sector in Indonesia



COP-4 Minamata Convention Side Event, 11 March 2022



CENTER FOR STANDARDIZATION OF ENVIRONMENTAL QUALITY INSTRUMENT
(PSIKLH), AGENCY FOR STANDARDIZATION OF ENVIRONMENT AND FORESTRY
INSTRUMENT (BSIKLH),
MINISTRY OF ENVIRONMENT AND FORESTRY (KLHK)



Mercury Monitoring by PSIKLH

Mercury laboratory and related regulation

01

02

Past activities and future collaboration

Demonstration of mercury measurement

03

Mercury Laboratory in Indonesia

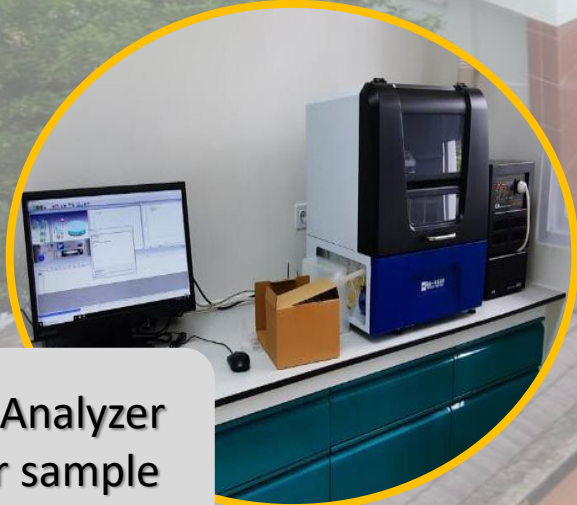




Mercury Analyzer for methyl mercury



Mercury Analyzer with fluorescent detector



Mercury Analyzer for water sample



Mercury Analyzer for solid sample

Indonesian Regulation on Mercury

Minamata
Convention on
Mercury

Law No. 11 Year 2017
Ratification of Minamata Convention
on Mercury

Presidential Decree No. 21 Year 2019
National Action Plan of Mercury
Reduction and Elimination (RAN PPM)

1. The implementation and the committee of RAN PPM
2. Mercury-containing medical waste management
3. Regional Action Plan of Mercury Reduction and Elimination (RAD PPM)

1. SOP for mercury waste management
2. SOP for mercury sampling and testing
3. The threshold of mercury exposure in targeted sectors.

Mercury-Related Standards in Indonesia

Media	SOP for Mercury Sampling and Testing	Threshold of Mercury Exposure	International References for Sampling and Testing
Emission source	SNI 7117.20:2009	✓	USEPA
Ambient air	Concepted	Under development	USEPA
Soil	X	✓	USEPA 7473
Solid waste	X	✓	USEPA 7473
Surface water	SNI 6989.78:2019	✓	APHA
Waste water	SNI 6989.78:2019	✓	APHA
Sediment	X	X	USEPA 7473
Biota and Biomarker	X	X	USEPA 7473

Past Activities

Mercury exposure to the agricultural soils and plants around the ASGM

2020



2021

Mercury exposure and socio-economic study of the ASGM

1997-2014



Annual monitoring of mercury pollution in ASGM areas



2018-2020



ASGM-sourced mercury pollution baseline estimation



Socio-economic study



Sludge, tailing and well water

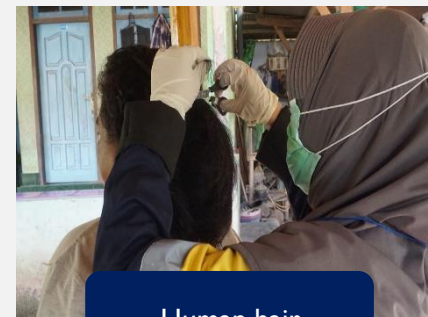


Soil and plant

Landak



North Minahasa

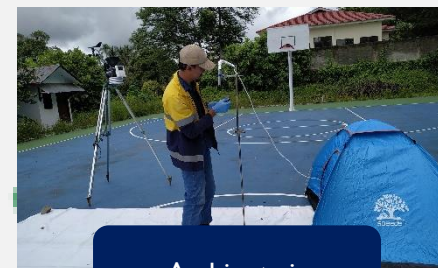


Human hair



Sediment, river water, and fish

West Lombok



Ambient air

Sample collection for mercury baseline estimation





Wet deposition sampler for mercury in rain water

Future Activities



1. Coordination with other stakeholders to compile data of mercury pollution in Indonesia;
2. Collaboration with others ministries / agencies to develop Indonesia's National Standar (SNI) methods related to mercury sampling and testing.
3. Cooperation with international institution for capacity building and knowledge/technology transfer in term of mercury monitoring.

Thank you!

