

With the support of the PV Market Alliance

The PV Market Alliance



APVIA & GSC Q1 2018 Market Report



Introduction



- Launched in 2017, this 5th edition of APVIA's quarterly PV market report focus on "Indonesia", anticipated to witness solid growth in 2018 / 2019 and beyond
- This report focuses on "Indonesia" the importance of renewable energy in its energy mix in general as well highlights and trends regarding solar PV in particular
- This report has been prepared with information provided by the PV Market Alliance and especially Asia Europe Clean Energy (Solar) Advisory Co. Ltd. (AECEA)
- All information collected are valid at the time of publication. The data published do not engage the responsibility of APVIA or AECEA and should be considered with all due caution and are for informational purposes only

Indonesia – Country Snapshot

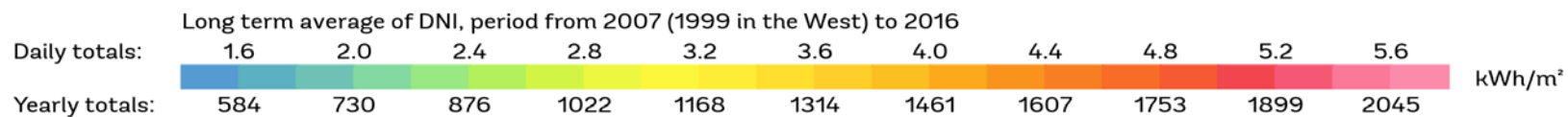
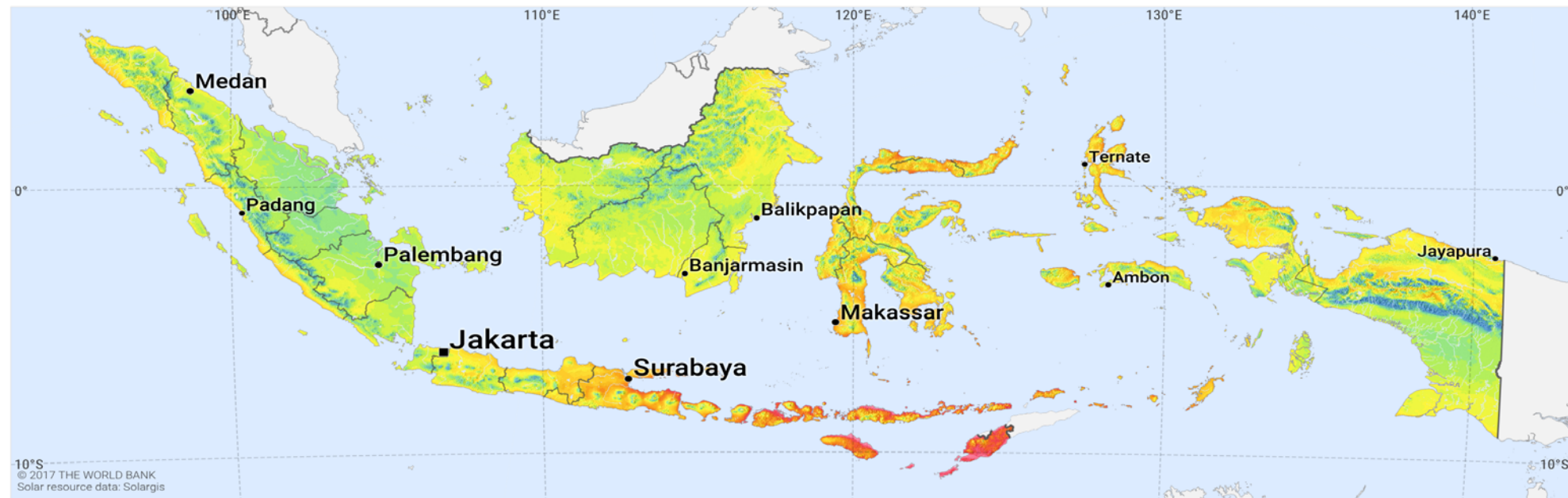
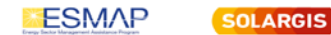
- approx. 17,500 Islands (approx. 6000 are inhabited) - the world's largest island country
- ≈ 2 Mio sqm; 14th largest country (land area); 7th largest (combined sea & land area)
- 2017: population ≈ 261 Mio; the world's 4th most populous country
- 2017: GDP growth rate 5.07%; Energy consumption increased by 5.9% (2016)
- By 2030 the country aims to reduce its CO₂ emissions by 29% compared to 2015
- Renewables in power (1% of primary energy consumption) increased by 7.1% in 2016, above the 10-year average of 4.7%
- 2016: Natl. Electrification rate approx. 92%
- Energy policy milestones includes e.g.
 - 2007 Law on Energy
 - 2009 Law on Electricity
 - 2009 Law on Mineral and Coal Mining
 - 2014 National Energy Policy



Indonesia - Direct Normal Irradiation Map

SOLAR RESOURCE MAP

DIRECT NORMAL IRRADIATION INDONESIA

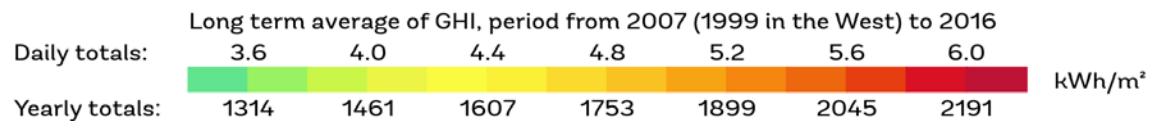
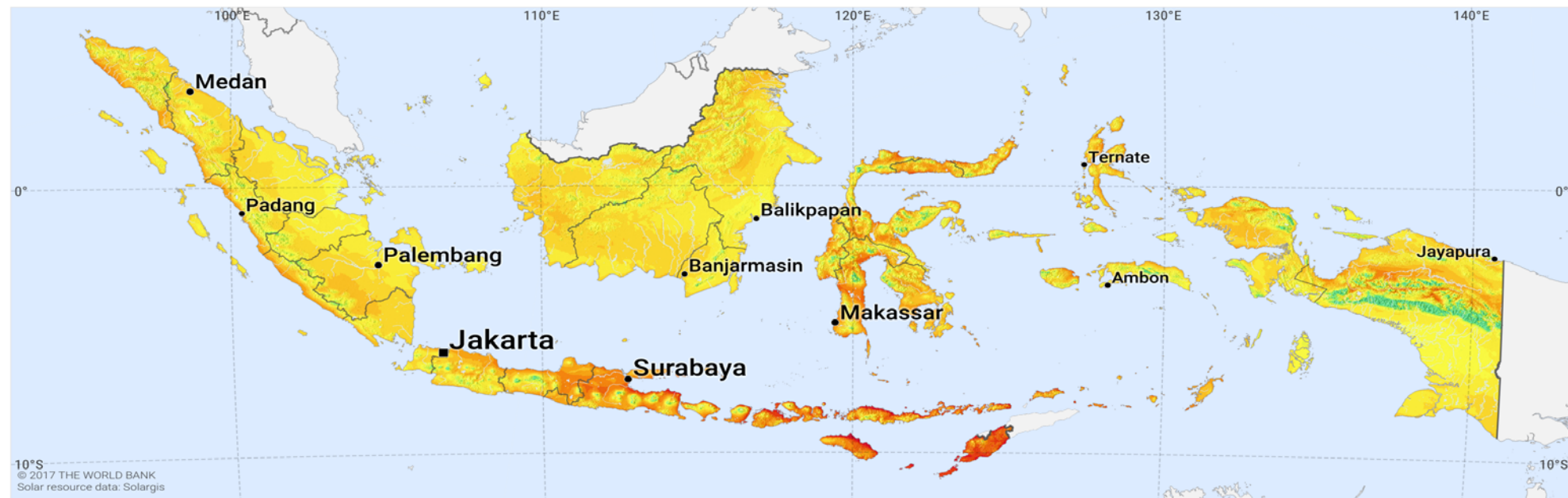


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Indonesia - Global Horizontal Irradiation Map

SOLAR RESOURCE MAP

GLOBAL HORIZONTAL IRRADIATION INDONESIA

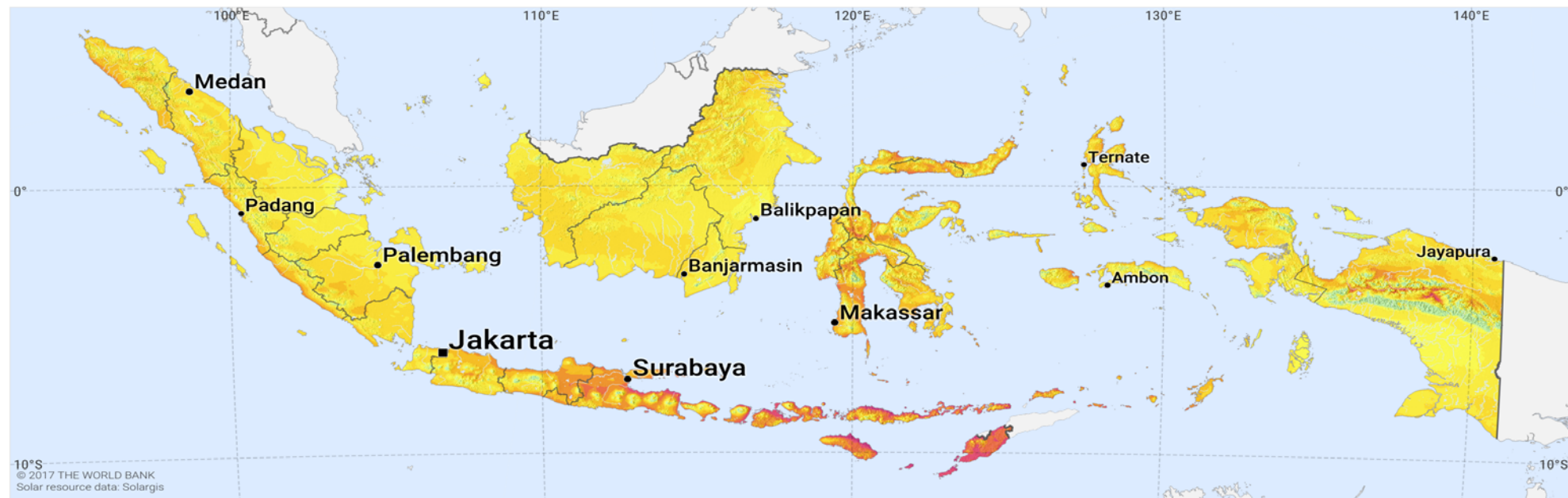


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Indonesia - Photovoltaic Power Potential Map

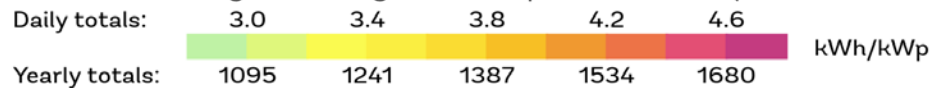
SOLAR RESOURCE MAP

PHOTOVOLTAIC POWER POTENTIAL INDONESIA



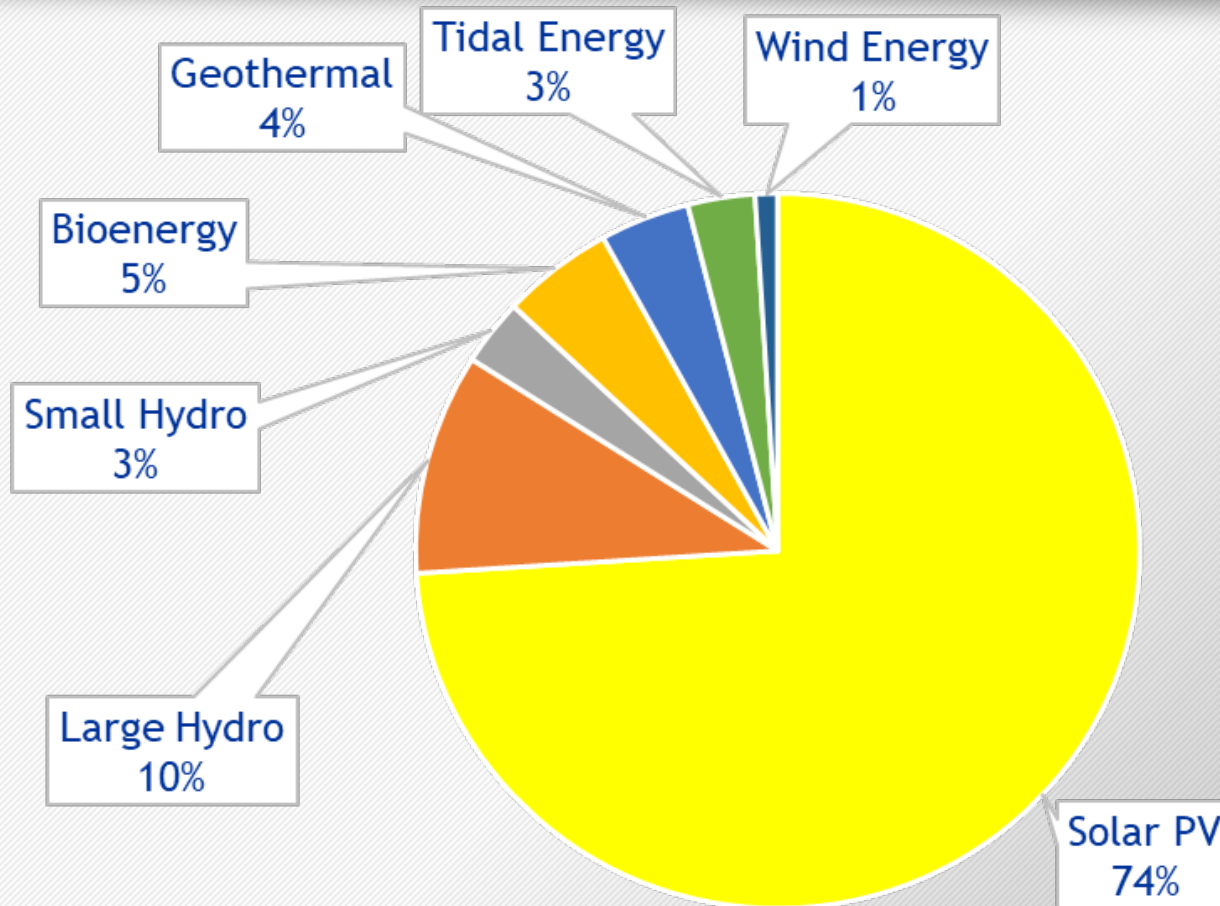
10°S
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Solar resource data: Solargis

Long term average of PVOUT, period from 2007 (1999 in the West) to 2016



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Indonesia - Home to Abundance RE Sources



- The estimated renewable energy potential of Indonesia amounts to approx. 717 GW
- Solar PV accounts for almost three quarter of the total or roughly 530 GW
- By the end of 2017 approx. 100 MW of solar PV power generation capacity were installed
- Installed solar PV capacity is largely off-grid

Indonesia - Status of Utilizing RE Sources



Geothermal 29,000 MW
Utilization 4.6 %



Hydro 75,000 MW
Utilization 9 %



Biomass 49,810 MW
Utilization 3.3 %



Solar 48 kwh/m2/day
Utilization < 1 %



Wind 3-6 m/s
Utilization < 1 %




Wave 49 GW
Utilization < 1 %

Indonesia – Sustainable Development Goals



7 AFFORDABLE AND CLEAN ENERGY

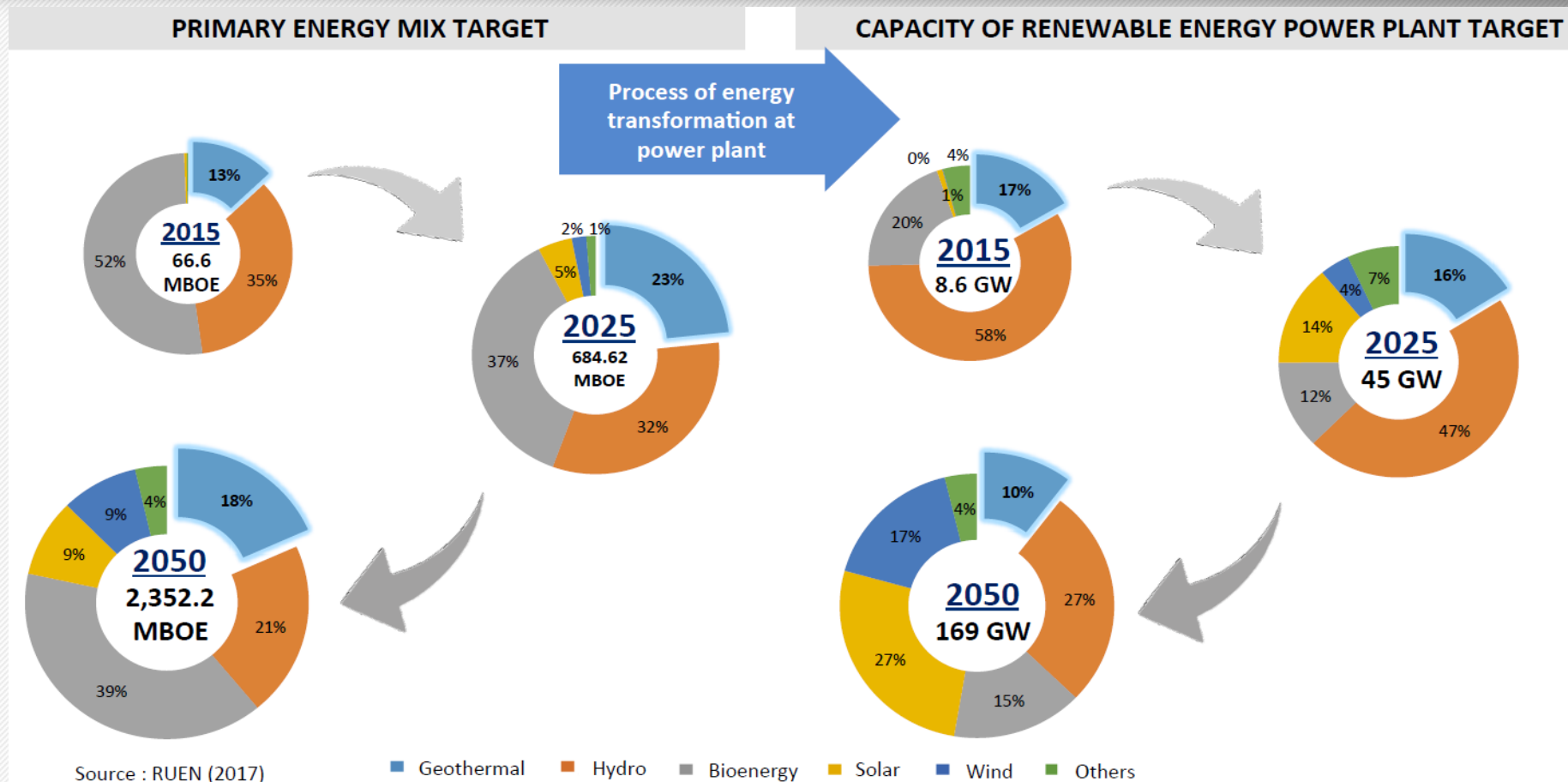


Ensure Access to Affordable, Reliable, Sustainable and Modern Energy for All

TARGETS

- 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix
- 7.3 By 2030, double the global rate of improvement in energy efficiency
- 7.A By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology
- 7.B By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support

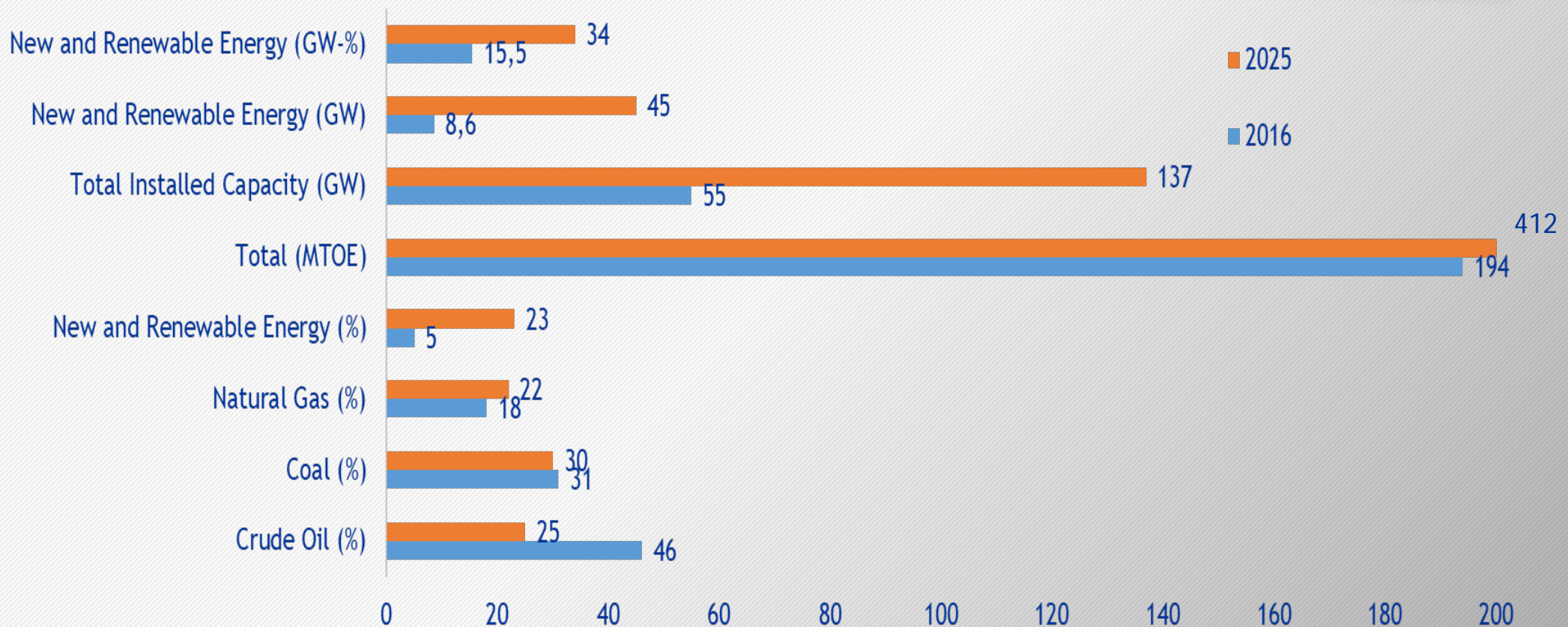
Indonesia - Primary Energy Mix Targets & RE Power Plant Targets (2015, 2025, 2050)



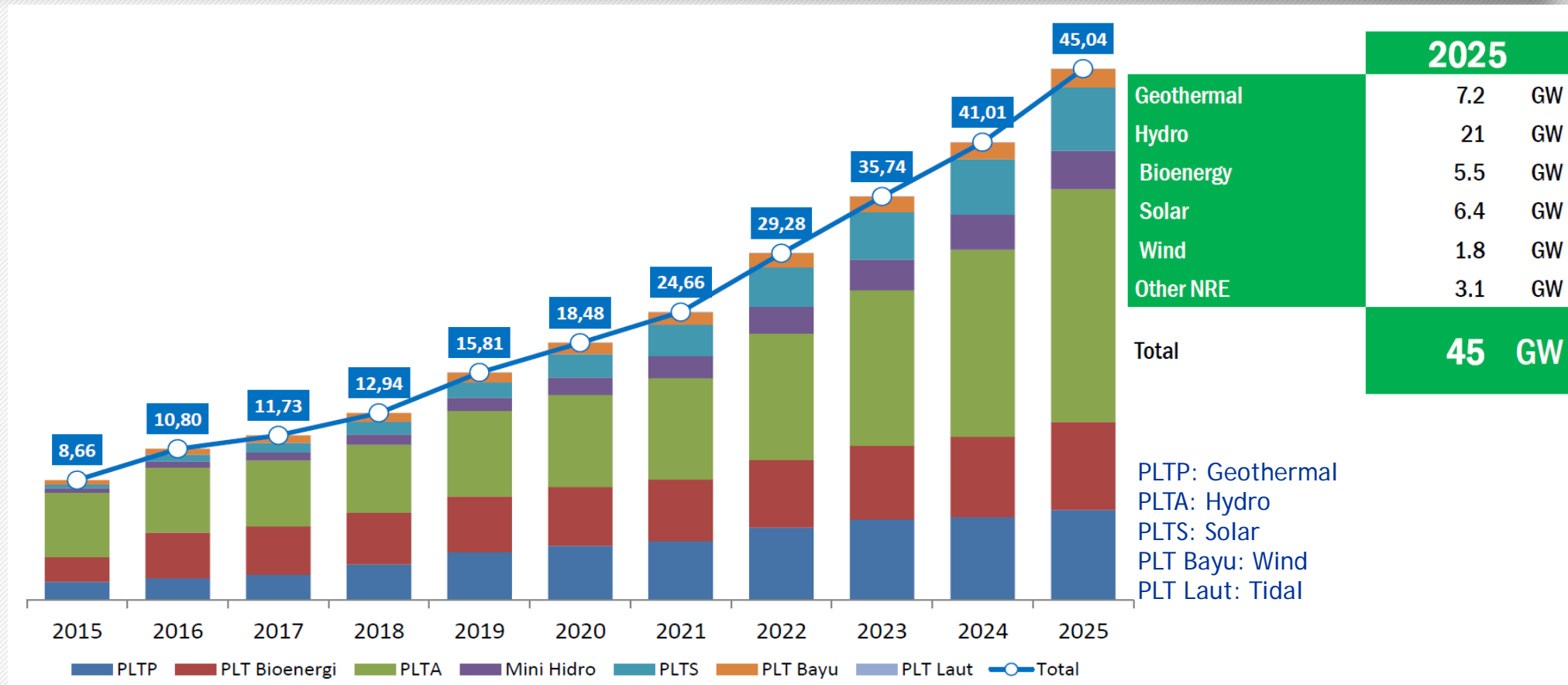
Source: BAPPENAS Sept 2017

- 2015 solar PV in the primary energy mix target was 1%
- 2025 target is 5% and the 2050 target is 9%
- By 2025 approx. 6.4 GW solar PV and 2050 approx. 45 GW are planned to be installed and operational

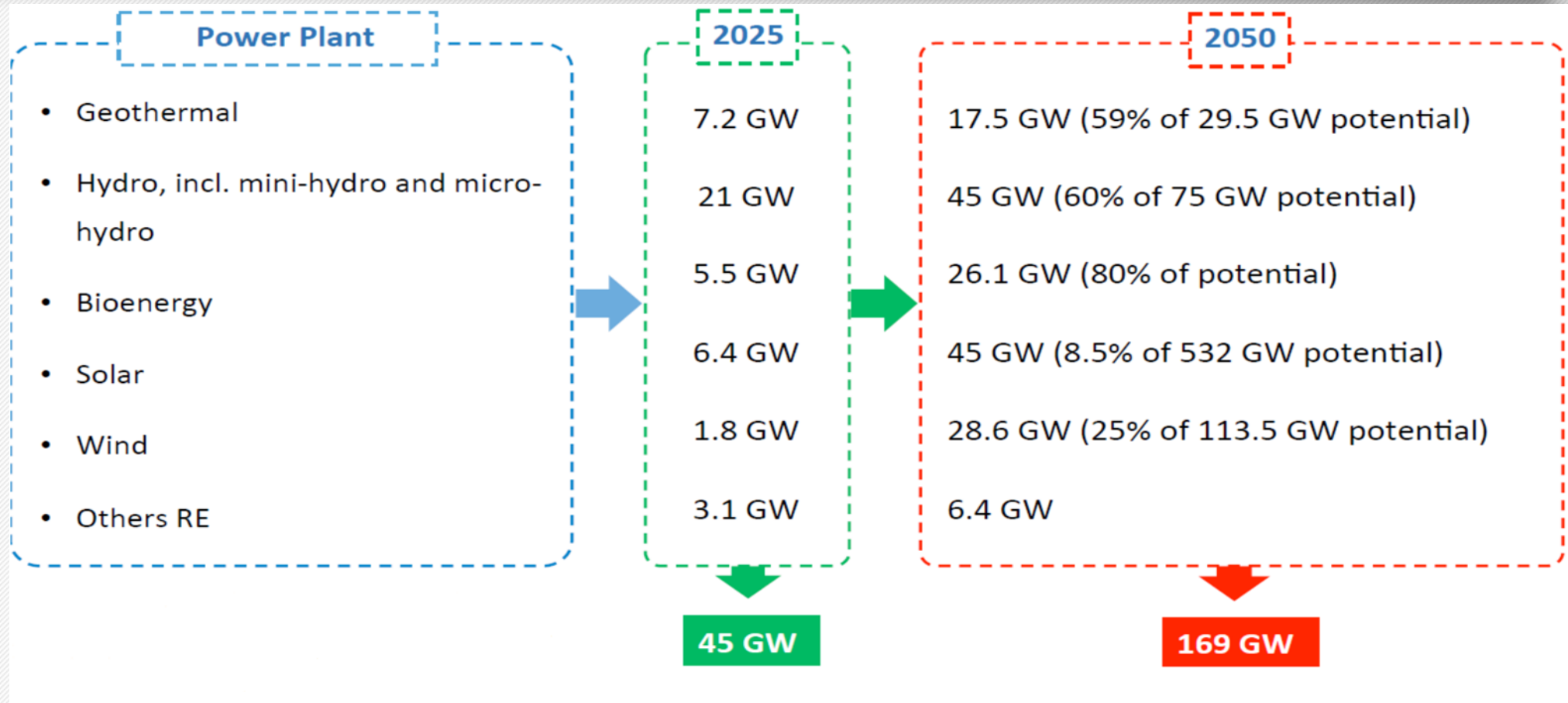
Indonesia's Commitment - 23% RE by 2025



Indonesia - New and Renewable Energy Targets by 2025 (GW)

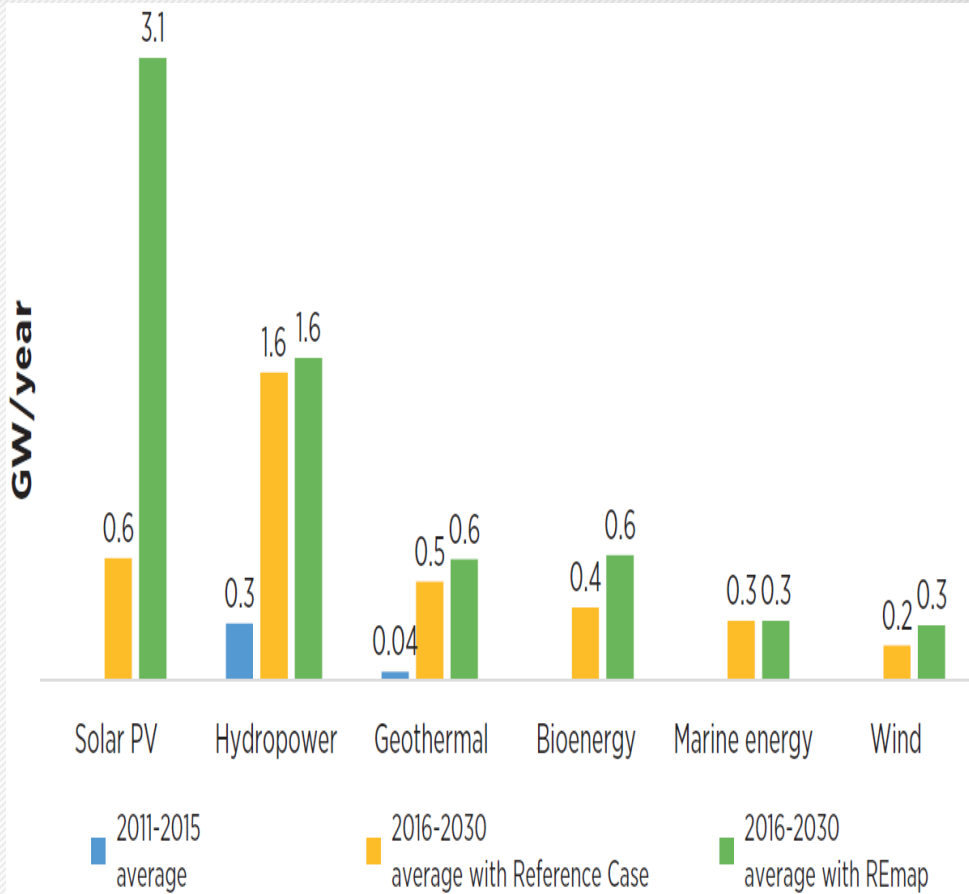


Indonesia - 2025/2050 Long-Term Renewable Energy Power Plant Scenario

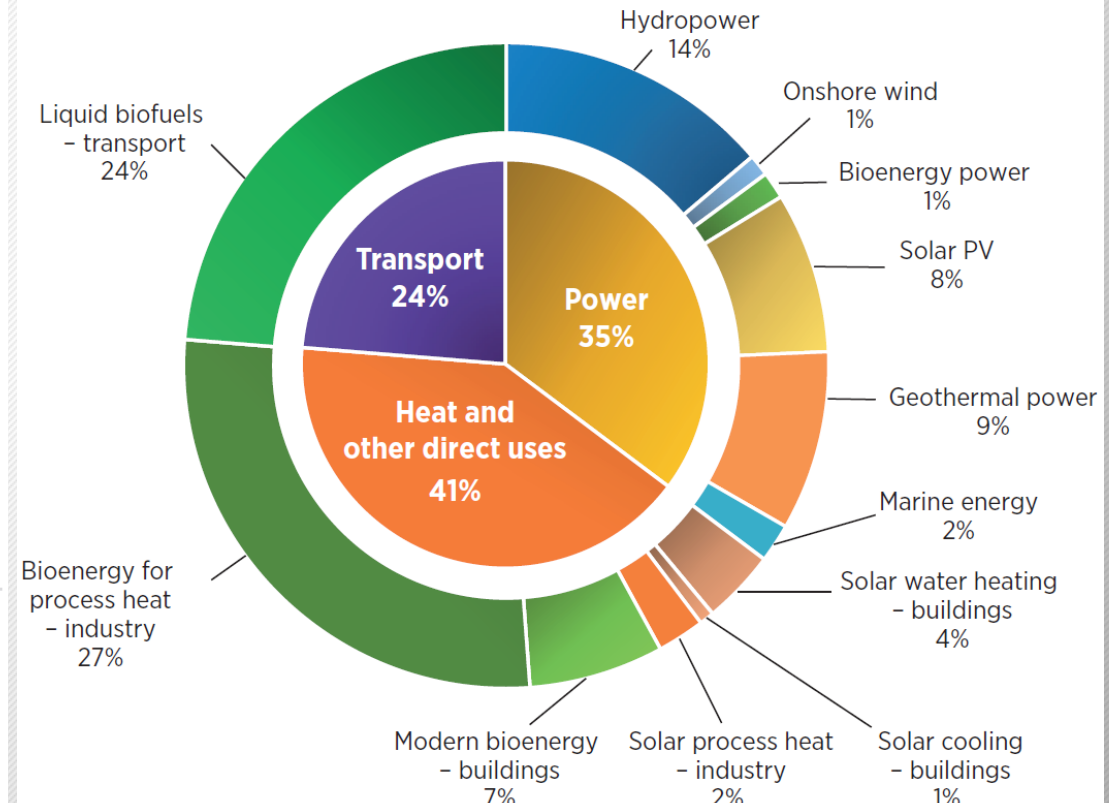


Indonesia - Annual Renewable Power Installations till 2030

Breakdown of Renewable Energy in total Final Energy Consumption in 2030



REmap total renewable energy use: 2 839 PJ/year



Indonesia - Near-Term RE & Energy Conservation Targets (RPJMN 2015-2019)

TARGET	2015		2016		2017	2018	2019	Estimation
	(target)	(realization)	(target)	(realization)				
Main Targets								
Primary Energy Intensity (1% decrease per year) (BOE/billion Rp)	482.2	501	477.3	440.3	472.6	467.8	463.2	
Renewable Energy Mix (%)	6	6.7	11	6.9	15	15	16	
Supporting Targets								
Installed Capacity of RE Power Plant (MW)	11,753.14	8,624.89	13,135.17		13,995.67	15,458.97	16,991.97	
Pilot Project of Nuclear Power Plant (MW)							10	
Pilot Project Ocean Current Power Plant (MW)							Min. 1	
CO ₂ Emission Reduction (million tons)	14.71	14.71	16.79	31.6	20.6	23.57	28.48	
Energy Audit Object (object)	10	10	10	10	10	10	10	



On track/on trend (>90%)



Needs extra effort (60-90%)



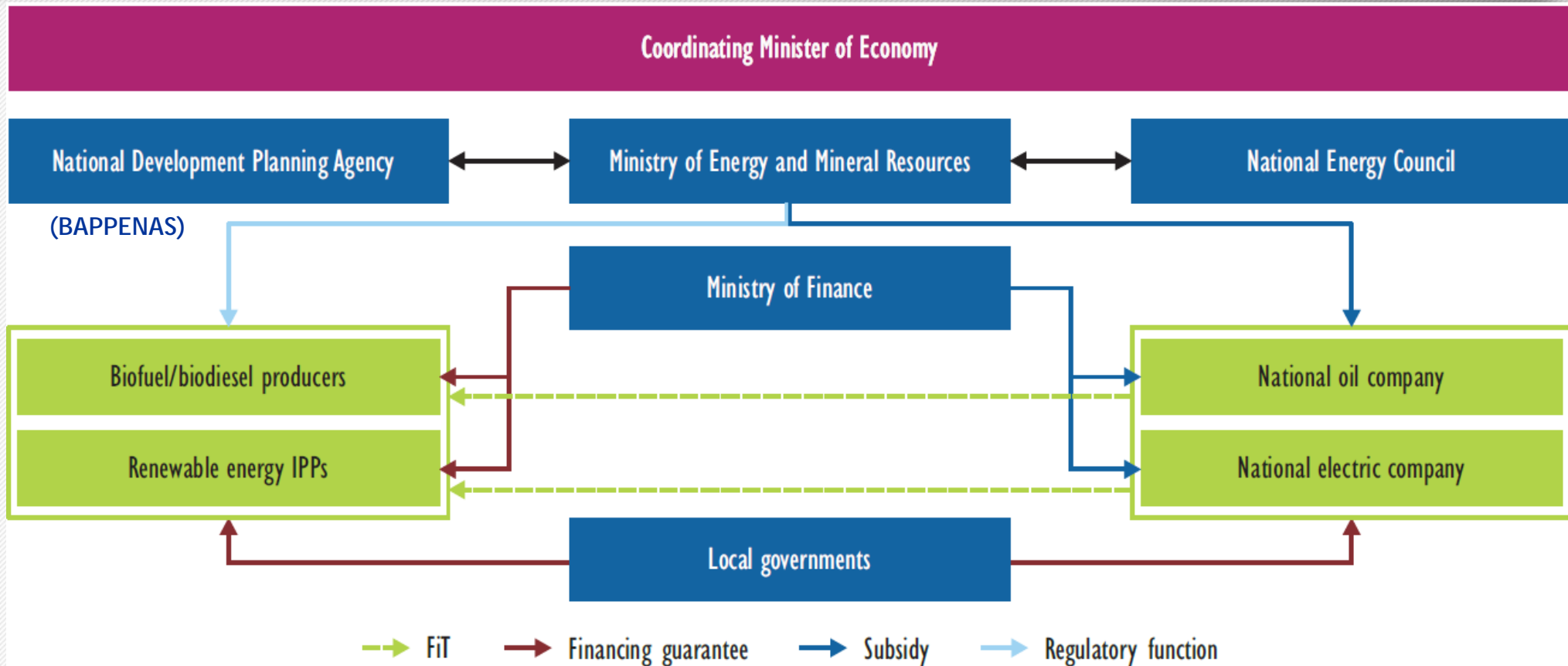
Very difficult to achieve (<60%)

Indonesia - Status Quo of RE Development

New and Renewable Energy Sources (Type)	Capacity Power Plants (MW)		
	Committed	2025 Target	Gap
Geothermal	7242	7242	-
Hydro Power	13987	17987	4000
Mini-Hydro & Micro-Hydro	1572	3000	1428
Bio-Energy	2006	5500	3494
Solar	540	6500	5960
Wind	913	1800	887
Other Energy	372	3125	2753
Total	26631	45153	18522

Source: MEMR 2017

Indonesia - Institutional Overview



Source: Damuri, Y.R. and R. Atje (2013), *Investment Incentives for Renewable Energy: Case Study of Indonesia*, International Institute for Sustainable Development, Winnipeg.

Indonesia - Institutional Overview

	Coal	Oil and Gas	New and Renewable Energy	Electricity
Policy Making	MEMR; DG Minerba	CMEA, BAPPENAS, MOF, MOEF, MOI, MOT, MSOE	CMEA, BAPPENAS, MOF, MOEF, MOI, Ministry of Public Works and Housing (MOPWH)	CMEA, BAPPENAS, MOF, MOEF, MOI, MOT, MSOE
	National Energy Council (DEN)			
	CMEA, BAPPENAS, MOF, MOEF, MOI, MOT, BKPM	CMEA, BAPPENAS, MOF, MOEF, MOI, MOT, MSOE	CMEA, BAPPENAS, MOF, MOEF, MOI, MOPWH	CMEA, BAPPENAS, MOF, MOEF, MOI, MOT, MSOE
Licensing	DG Minerba	SKK MIGAS, BPH MIGAS, DG MIGAS	NA	DG Electricity
	Local Government	Local Government	Local Government	Local Government
Contract Making	NA	SKK MIGAS (Upstream)	NA	NA
Regulator	DG Minerba	DG MIGAS (Upstream and Technical), BPH MIGAS (Downstream and Business)	DG EBTKE, DG Electricity, DG MIGAS	DG Electricity
Operation	SOEs, PSCs, Local Companies, Cooperatives, Communities	SOEs (PT Pertamina, PGN), PSCs (International and Local Companies)	Local Companies, Cooperatives, Communities	SOE (PT PLN), Captive Power, Cooperatives, Communities

BAPPENAS = State Ministry of National Development Planning, BKPM = Indonesia Investment Coordinating Board, BPH MIGAS = Regulatory Agency for Upstream Oil and Gas, CMEA = Coordinating Ministry of Economic Affairs, DG = directorate general, EBTKE = New and Renewable Energy and Energy Conservation, MIGAS = Oil and Gas, Minerba = Minerals and Coal, MEMR = Ministry of Energy and Mineral Resources, MOEF = Ministry of Environment and Forestry, MOF = Ministry of Finance, MOI = Ministry of Industry, MOPW = Ministry of Public Works and Housing, MOT = Ministry of Trade, NA = not applicable, PGN = State Gas Company, PT PLN = State Electricity Company, PSC = production sharing contract, SKK MIGAS = Special Task Force for Upstream Oil and Gas Business Activities, SOE = state-owned enterprise.

Indonesia – Complex Institutional and Stakeholder Landscape features the RE Sector




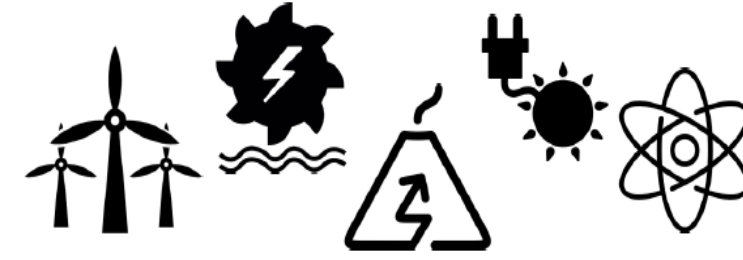

- In general, Indonesia has a rather complex institutional and stakeholder arrangements in the renewable energy sector. A number of government agencies are directly involved in formulating or implementing renewable energy policy at the national level, with local governments and a number of other government agencies also having influence over policy formulation and implementation
- The **Ministry of Energy and Mineral Resources (MEMR)** is the main institution that formulates policy and regulates the development of renewable energy under the supervision of the co-ordinating Ministry of Economic Affairs. In 2010, MEMR established a new Directorate-General of New, Renewable Energy and EnergyConservation (DGNREEC). DGNREEC serves as a focal point for renewable energy policy formulation in Indonesia
- The **co-ordinating Ministry of Economy** is responsible for the development of energy infrastructure through the “Masterplan for Acceleration and Expansion of Indonesia’s Economic Development” (MP3EI) and co-ordinates renewable energy policy formulation between the other actors
- The **National Energy Council (NEC)** was established in 2009 and is chaired by the President of Indonesia. The NEC works to co-ordinate national energy general planning and regional energy general planning, as well to define the authority of central and local governments

Indonesia - Complex Institutional and Stakeholder Landscape features the RE Sector



- The **Ministry of Finance (MoF)** contributes to renewable energy policy, and approves expenditure for the implementation of regulations concerning fiscal and tax incentives for renewable energy projects, such as the reduction of import taxes for technical components. The MoF established the Indonesia Clean Technology Fund, which provides USD 250 million for equity enhancement towards clean technology projects in Indonesia
- The **Ministry for National Planning (BAPPENAS)** influences the direction of policy on renewable energy, although is not directly involved in the implementation of renewable energy regulation. BAPPENAS established a roadmap for the promotion of renewable energy infrastructure
- The **Ministry of Research and Technology** and its “Agency for the Assessment and Application of Technology” (BPPT) are involved in formulating research and development and implementation of renewable energy technologies
- The **Ministry of Agriculture** is involved in the development of bioenergy via its responsibility for agricultural and plantation practices, including palm oil plantations
- The **Ministry of Forests and the Ministry of Environment** are involved in both bioenergy and geothermal-related issues

Indonesia - Policy Direction (2015-2019)

Approach	Policy Direction (RPJMN 2015-2019)
Intensification	<ul style="list-style-type: none">➤ Increasing primary energy production➤ Increasing energy reserves 
Diversification	<ul style="list-style-type: none">➤ Increasing the proportion of new and renewable in the energy mix➤ Increasing energy accessibility 
Conservation	<ul style="list-style-type: none">➤ Improve efficiency in energy use 

Indonesia – Near-Term RE Dev Strategy



- The development of RE power plants shall consider the balance between supply-demand and the readiness of the system as well as cost efficiency
- PLN will utilize all RE resources, i.e. hydro, geothermal, biofuel, wind energy, solar energy, biomass and waste, etc, and will support any effort to build up a domestic RE industry
- **Centralized PV** would be developed to electrify isolated areas (undeveloped areas, border areas and outermost islands) that are relatively far from existing grids
- **Hybrid system** (PV, other RE, and Diesel) would also be developed for areas that still have less than 12 hours electricity, commonly in the eastern part of Indonesia
- **Smart grid** system will be developed to increase penetration of intermittent RE and increase reliability of power system. Micro grid (usually using PV) will also be developed for the areas where distribution lines will not be developed in 2-3 years

Indonesia - RE Development Policy 12/2017 Utilization of Renewable Energy Source for Electricity Supply"



- 1) Renewable based electricity price is set
- 2) Especially to meet the needs of electricity in certain areas (the eastern part of Indonesia ,rural and outer islands)
- 3) Incentives to boost the economy of renewable based power generation development
- 4) To ensure renewable based power generations (with capacity up to 10MW) must run-not to apply least cost policy
- 5) Open the opportunity for B2B co-operation
- 6) Simplified process

Indonesia - Energy Ministry Streamlines Regulatory Framework in 03/2018



- Indonesia has revoked 186 regulations in the energy and mineral resources sectors that were considered troubling, as the country seeks to improve the investment climate, while improving the ease of doing business
- In detail, 90 general regulations and another 96 related to permits, certification requirements and government recommendation prerequisites for certain projects in the energy and mineral resources sectors have been revoked
- Indonesia seeks to lure \$50 billion in investment in the energy and mineral sectors in 2018
- The regulations were applied by different directorate generals in the ministry, including oil and gas, minerals and coal, and new and renewable energy
- The Directorate General of Minerals and Coal alone saw the revocation of 32 general and 64 permit-related regulations

Indonesia - Rencana Umum Energi Nasional (RUEN) - Natl. Solar Strategies 2017



Strategy	Activities	Timeframe
Improve the quality of solar potential data	Detailed surveys by MEMR/local governments	2016-50
Increase utilisation of solar energy for electricity and for non-electrical purposes (such as heating/cooling)	Develop a solar utilisation roadmap	2016-19
	Refining pricing and purchasing policies for solar power	2016-19
	Facilitate establishment of upstream and downstream solar industry	2019-25
	Increase utilisation of solar thermal technology	2016-50
	Install solar panels at transportation facilities	2016-50
	Implement policy of using solar energy for modes of transportation	2025-50
	Facilitate transfer of solar cell technology through purchase of licenses and/or accessions	2016-19
	Facilitate R&D of solar cell technology	2016-50

Source: IRENA 2017

Indonesia - Rencana Umum Energi Nasional (RUEN) - Natl. Solar Strategies 2017



	Apply the results of R&D on solar cells into industrial products	2016-50
Increase utilisation of solar rooftop potential	Facilitate greater use of solar PV panels in industrial sectors	2019-25
	Amend Building Permit Rules to implement minimum solar cell utilisation obligation of 25 per cent of rooftop area of industrial and commercial buildings, for lighting public roads and for other public facilities and buildings	2019-50
	Amend Building Permit Rules to implement minimum solar cell utilisation obligation of 25 per cent of rooftop area of luxury housing, housing complexes, and apartments	2019-50
Promote domestic solar upstream to downstream industry	Compile a list of TKDN (Domestic Component Level) industrial products and components of solar cells	2016-19
	Compile and apply SN systems, technologies and solar cell products	2016-50

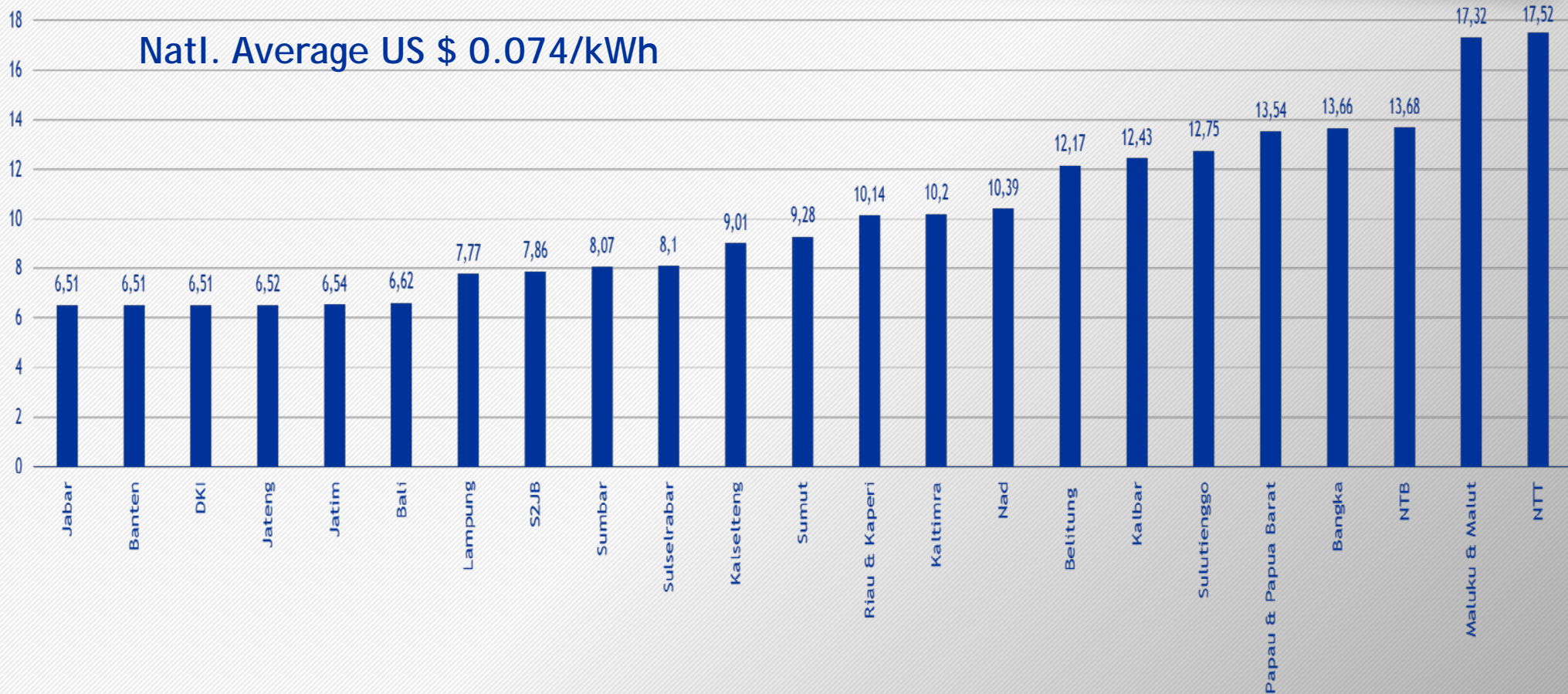
Source: IRENA 2017

Indonesia – Feed-in-Tariffs (New Design)



- February 2017, the government adopted an entirely new feed-in-tariff (FIT) mechanism for the renewable energy sector, including solar
- While the FITs were earlier fixed by the government, these are now to be determined based on negotiations between PLN and IPPs, subject to a cap determined by regional electricity supply costs
- The FIT for all renewable energy projects (other than geothermal and waste-to-energy) has been capped at 85 per cent of the regional electricity generation cost, if the regional cost is above the national average
- This cap is equal to the regional cost if it is lower than the national average
- The feed-in tariff model that PLN has designed seems to be a disincentive for new developers to install solar and wind, since the cap of 85 per cent would limit the tariff that the developers would receive

Indonesia - PLN's Regional Power Generation Costs in 2016 (USCents)



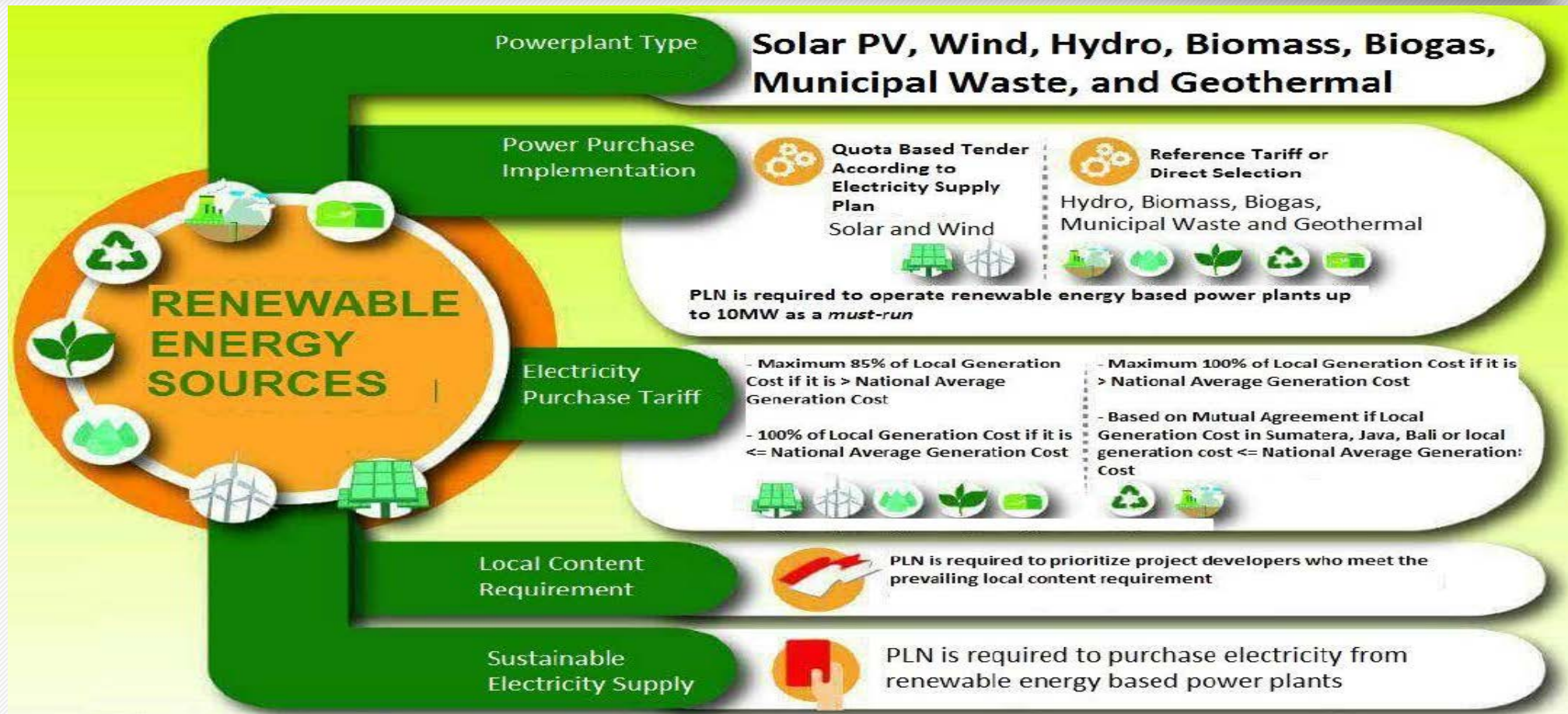
Indonesia - Renewable Energy Tariffs

No.	Renewable Energy Sources	Method of Appointment	Tariff	
			Regional Grid BPP > National BPP	Regional Grid BPP ≤ National BPP
1.	Solar PV	Auction in capacity quota with minimum 15 MW	Maximum 85% x Regional Grid BPP	100% x Regional Grid BPP
2.	Wind	Auction in capacity quota with minimum 15 MW	Maximum 85% x Regional Grid BPP	100% x Regional Grid BPP
3.	Hydro	Reference Price	Maximum 85% x Regional Grid BPP	100% x Regional Grid BPP
		Direct Selection	Price determined by direct selection process	
a. Capacity ≤ 10 MW: Capacity Factor minimum 65%				
b. Capacity > 10 MW: Capacity Factor depends on Regional Grid system requirements				
4.	Biomass	Reference Price (for 10 MW or less)	Maximum 85% x Regional Grid BPP	100% x Regional Grid BPP
		Direct Selection (for more than 10 MW)	Price determined by direct selection process	
5.	Biogas	Reference Price (for 10 MW or less)	Maximum 85% x Regional Grid BPP	100% x Regional Grid BPP
		Direct Selection (for more than 10 MW)	Price determined by direct selection process	
6.	Municipal Waste	Reference Price	Maximum 100% of Local Generation BPP	Mutual agreement between PLN and IPP
7.	Geothermal	Reference Price	Maximum 100% x Regional Grid BPP	Mutual agreement between PLN and IPP

BPP = Production Cost of Electricity

Regional Grid BPP and National BPP will be determined by the Minister based on the proposal of PT PLN (Persero)

Indonesia - Renewable Energy Tariffs



Indonesia - Investment Incentives

TAX ALLOWANCE

Gov't Regulation No.9/2016

30% of investment value
Reduction of corporate net income tax for 6 years, 5% each year.

145 business segments
Eligible for tax allowance, expanded from 129 segments in the previous regulation.

Under **certain requirements**

among others: investment value or export orientation, manpower absorption, local content.

IMPORT DUTY FACILITY

MoF Regulation No.176/PMK.011/2009 jo. MoF Regulation No. 76/PMK.011/2012 jo. MoF Regulation 188/PMK.010/2015

Import duty on Machineries and Equipments, goods, and raw materials for production

- Exemption of import duty on machineries and equipments
- **2 years** exemption of import duty on raw materials
- Additional 2 years import duty exemption for raw materials if company using locally-produced machineries and equipments (min 30%)

MoF Regulation No. 66/PMK.010/2015

Import duty on Capital Goods for Development and Expansion of Power Generation Industries for Public Purpose.

The Investment Coordinating Board of the Republic of Indonesia

TAX HOLIDAY

KEMENTERIAN ENERGI & SUMBER DAYA MINERAL

MoF Regulation No.159/PMK.010/2015

5-15 years
Tax relief facility, starting from the commencement of commercial production. Can be extended for Max. 20 years under certain consideration.

IDR 1 trillion
 Minimum investment plan (USD 80 million). Or Minimum IDR 500 Billion if introduce new technology

Max.100%
10-100% Reduction of corporate income tax for Pioneer Industry. Max. 50% for industry that implement high technology with investment plan IDR 500 M – less than 1 Trillion.

Pioneer Industry:

1. Upstream metal;
2. Oil refinery;
3. Basic organic-chemical from oil and gas;
4. Machinery industry that manufacture industrial machine;
5. Processing industry based on commodity from agriculture, forestry and fishery;
6. Telecommunication, information and communication;
7. Sea transport;
8. Processing industry as main industry located in Special Economic Zone (SEZ); and or
9. **Infrastructure** (economical, non-PPP scheme)

- Significant investment opportunities exist across the 13 priority areas identified by the government
- Solar PV dominates except the Papua region
- Loan interest are at below market rates
- Tax holiday, Tax allowance, Import duty and VAT exemption is being offered by the govt.

Indonesia - Investment Incentives

TAX ALLOWANCE

Based on Government Regulation No. 9/2016, MoF Regulation No. 89/PMK.010/2015 and Chairman of BKPM Regulation No. 18/2015, investment in new and renewable energy as Power Producer (KBLI 35101), with the product coverage: the conversion of new energy (hydrogen, CBM, liquefied coal or gasified coal) and renewable energy (hydro, solar, wind, or marine energy) into power, is eligible for income tax facilities of:

- A reduction in net income of up to 30% of the amount invested, pro-rated at 5% for six years of the commercial production, provided that the assets invested are not transferred out within six years.
- Acceleration of depreciation & amortization for building and non-building.
- A reduction of income tax on dividends paid to non-residents to 10% or lower rate according to double taxation avoidance agreement.
- Extension of tax losses carry forwards for 5 years and up to 10 years (if it meets certain criteria).for 5 years and up to 10 years (if meet certain criteria).

* Tax Allowance application is submitted to OSS-BKPM and will be processed in 25 days.

TAX HOLIDAY

Based on Government Regulation No. 94/2010, MoF Regulation No. 159/PMK.011/2015, and Chairman of BKPM Regulation No. 18/2015, corporate income tax exemption for the period of 5 to 15 years from the start of commercial production is granted for company with minimum investment project value of IDR 1 Trillion (approx. USD 69 Million) in 9 priority "pioneer industries" including infrastructure not under PPP scheme, for example renewable energy power plant.

* Tax Holiday application is submitted to OSS-BKPM and will be processed in 45 days.

IMPORT DUTY EXEMPTION

Based on Minister of Finance (MoF) Regulation No. 66/PMK.010/2015, all green-field or expansion investment of power plant for public usage (not including transmission, distribution and supporting services) are granted import duty exemption on imported machineries and equipment (for 2 years) for the company usage during construction period, provided that they are not or inadequately produced in Indonesia.

* Import Duty Exemption application is submitted to OSS-BKPM and will be processed in 5 days.

Indonesia – First Asian Sovereign Green Bonds



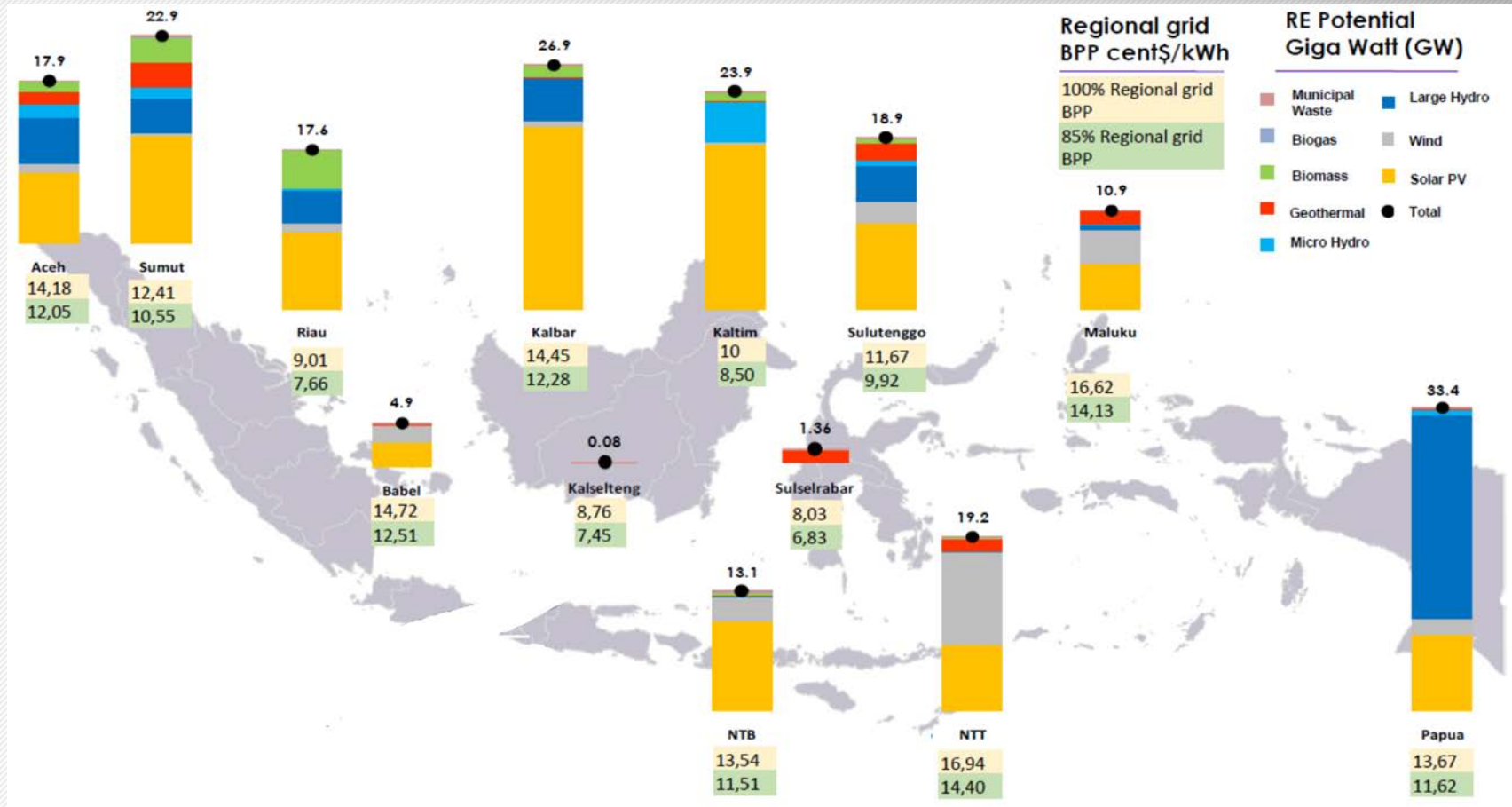
- Indonesia became the first Asian country to sell a green “Sukuk” bond on the intl. market
- Globally, US\$155.5 billion of so-called green bonds were sold during 2017, according to the London-based Climate Bonds Initiative. However, only a handful of governments have themselves sold such deals, where the proceeds are earmarked for investment in environmentally friendly projects
- Indonesia raised US\$1.25 billion in first Asian sovereign green bond sale in February 2018
- Proceeds from the green bonds will be used to finance projects such as **renewable energy**, green tourism and waste management
- The five-year green “Sukuk” bonds - which means it conforms with Islamic finance norms, carried a coupon of 3.75%
- “Sukuk” are investment certificates that comply with Islamic principles, usually through a contractual agreement that can incorporate several requirements, including environmental, social and governance (ESG) criteria
- Indonesia’s sukuk was based on an agency contract known as wakala and also incorporated a green framework assessed by the Centre for International Climate and Environmental Research (CICERO), a non-profit which specialises in green finance
- CIMB Group Holdings Bhd (KLSE:CIMB), Citigroup Inc (NYSE:C), Dubai Islamic Bank PJSC, HSBC (LON:HSBA) and Abu Dhabi Islamic Bank acted as bookrunners for the offering

Indonesia – Local PV Manufacturing



- Indonesia's solar panel producer Sky Energy will be looking to raise up to Rp 91.5 billion (\$6.8 million) through an initial public offering on the Indonesian Stock Exchange (IDX)
- The company disclosed that it will offer 203,256 or equivalent to around 20 per cent of its deposited capital
- The company confirmed that its shares will be priced at a range of Rp 375-Rp 450 apiece
- Based on the estimated price, the company will be expecting to raise between Rp 76.2 billion-Rp 91.5 billion from the public offering
- The offering is scheduled to be held from March 15 to March 21, 2018, and the company says it's shares will be listed on the IDX by March 28
- Proceeds from the IPO will be used as capital expenditure to increase the company's production capacity amid increasing demand for the company's product
- Established in 2008, initially as a solar panel distributor, Sky Energy teamed up with Hitachi High-Technologies Indonesia in 2009 to build manufacturing facilities and started producing solar panels in 2012. In 2016, it claimed to be the biggest solar panel producer in the country with a production capacity of 100 MW, as well as having 50 MW production capacity for solar cells

Indonesia - Current Renewable Energy Investment Opportunities



- Across Indonesia, except Papua, home to abundant hydro power resources, solar PV investment opportunities identified by the government dominates
- Significant potential for solar PV in Kalimantan (Borneo)

Indonesia – Recent Solar PV Developments

B-to-B Appointments

- 6 projects signed up
 - 1 x 15MWac North Sulawesi
 - 1 x 10MWac North Sulawesi
 - 4 x 5MWac Lombok

Tender Packages

- Sumatera package launched
 - Aceh (20MWp), North Sumatera (35MWp), Riau/Bangka Belitung (36.68MWp), West Sumatera (16MWp), South Sumatera/Jambi/Bengkulu (33MWp), Lampung (24.9MWp)
- PQ closed
- PLN still reviewing PQ submissions
- More tenders planned

Indonesia – Recent Solar PV Developments

350 kWp | Northern Sumatra | Aceh Province | Pulau Weh | Sabang



Source: AECEA Jan 2017

Indonesia - Floating PV Developments

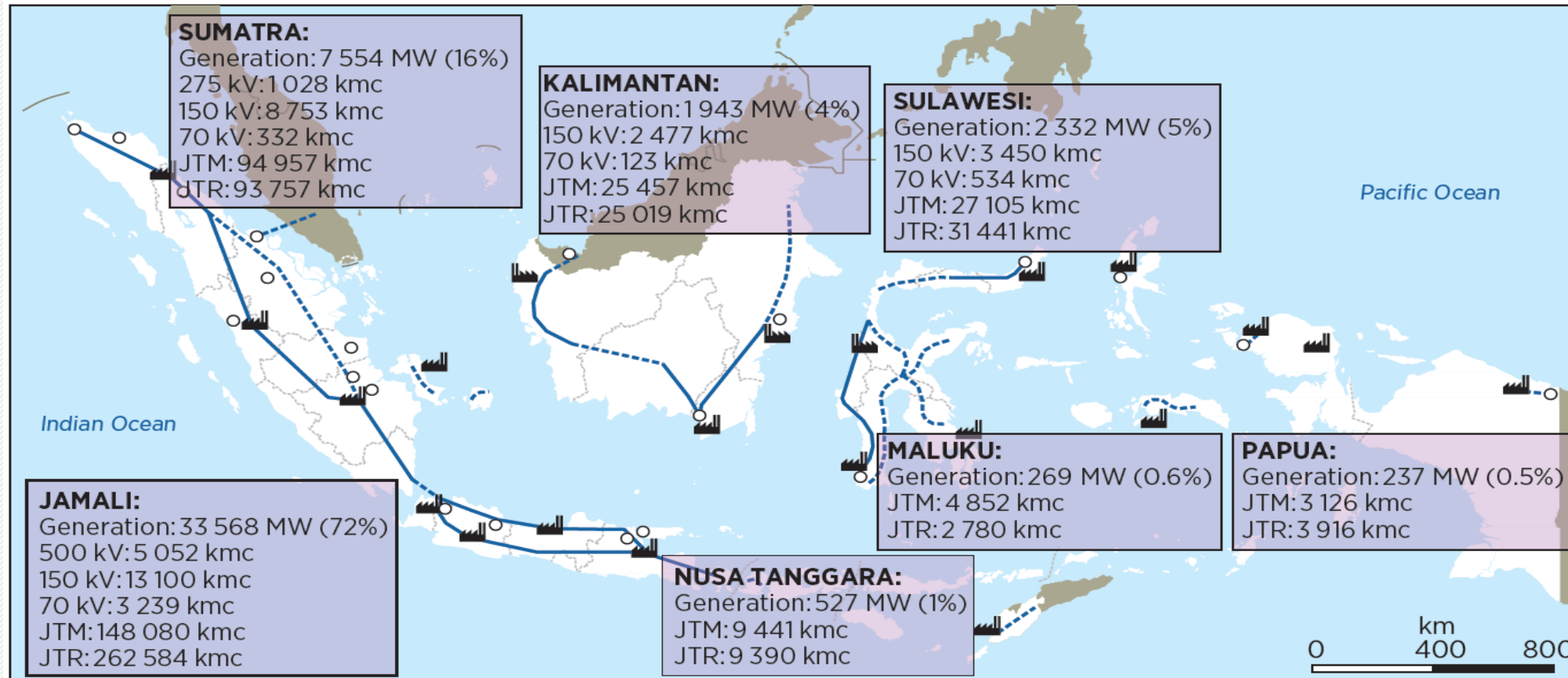


Indonesia – International Company Ambitions



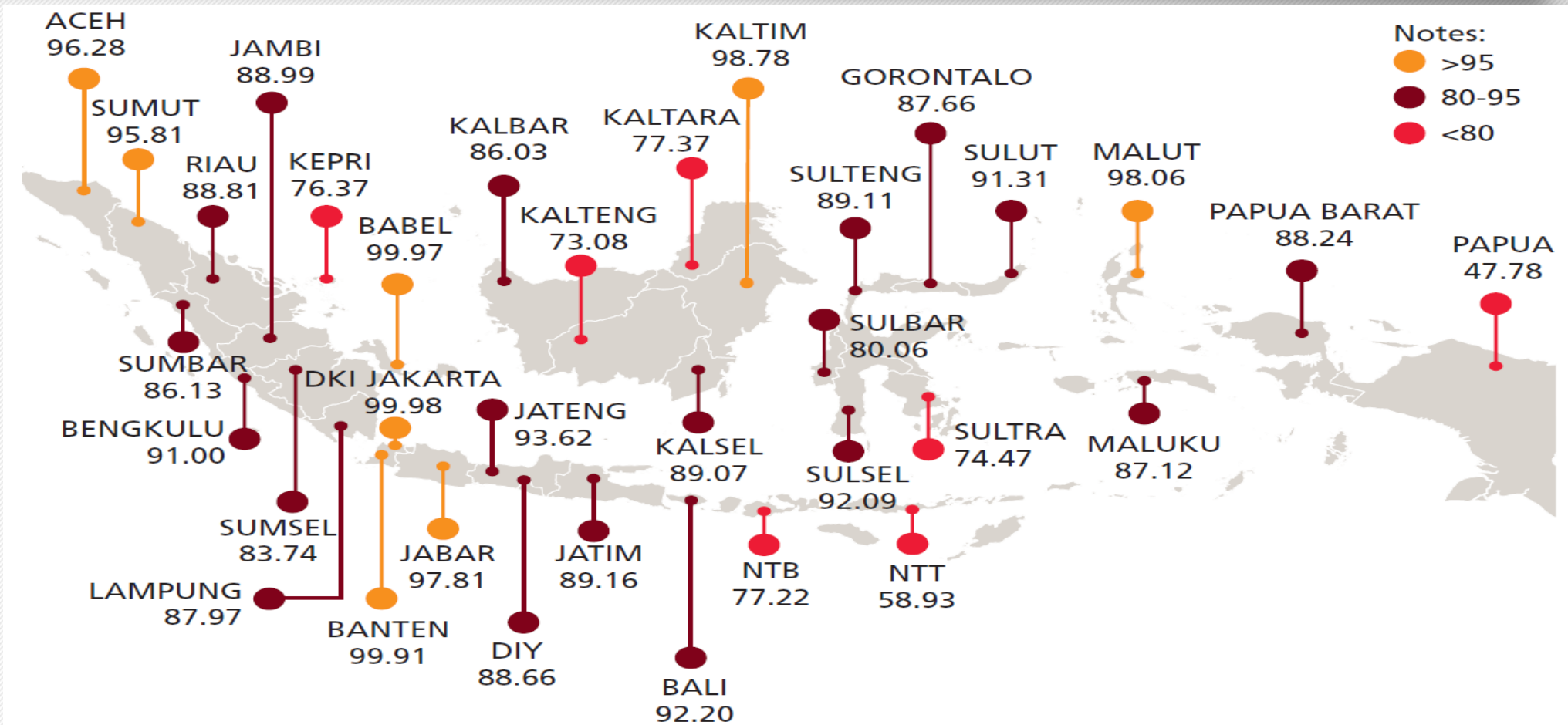
- March 2017, **ENGIE Group**, signed three partnership agreements in Jakarta to develop, co-finance, build, operate and maintain micro-grid and other renewable energy projects in various parts of Indonesia, for a total value of **USD 1.25 billion over the next five years**
- **ENGIE and Sugar Group** to jointly invest up to **USD 1 billion** over five years to develop renewable energy projects in Sumatera and Eastern Indonesia. The agreement is to develop photovoltaic power plants and biomass power plants, with a total power generation capacity of 500 megawatts in Sumatera and Eastern Indonesia. The solar parks in Sumatera and Eastern Indonesia will have a total power generation capacity of **300 MW** and will include a **140 MW solar park** in the province of Lampung, making it one of the largest solar power facilities in Southeast Asia
- **ENGIE and Electric Vine Industries** to jointly invest up to **USD 240 million** over five years in building **PV micro grids for 3,000 villages** in the Province of Papua. In this partnership agreement to jointly develop, finance, build, operate and maintain PV smart grids, providing sustainable 24-hour power for 3,000 villages in the Province of Papua over a 20-year period. Through this project, approx. 2.5 million people across Papua will be able to enjoy clean reliable energy without interruption
- **ENGIE and PT Arya Watala Capital** to jointly invest **USD 15 million** to develop solar power plants in East Nusa Tenggara. In this partnership are committed to jointly invest USD 15 million over the next three years to develop a total power generative capacity of up to **10 MWp** in East Nusa Tenggara, the southernmost province of Indonesia. The projects will be located in ten different areas in the province within the major islands such as West Timor, Flores and Sumba

Indonesia - Electricity Network (2014)

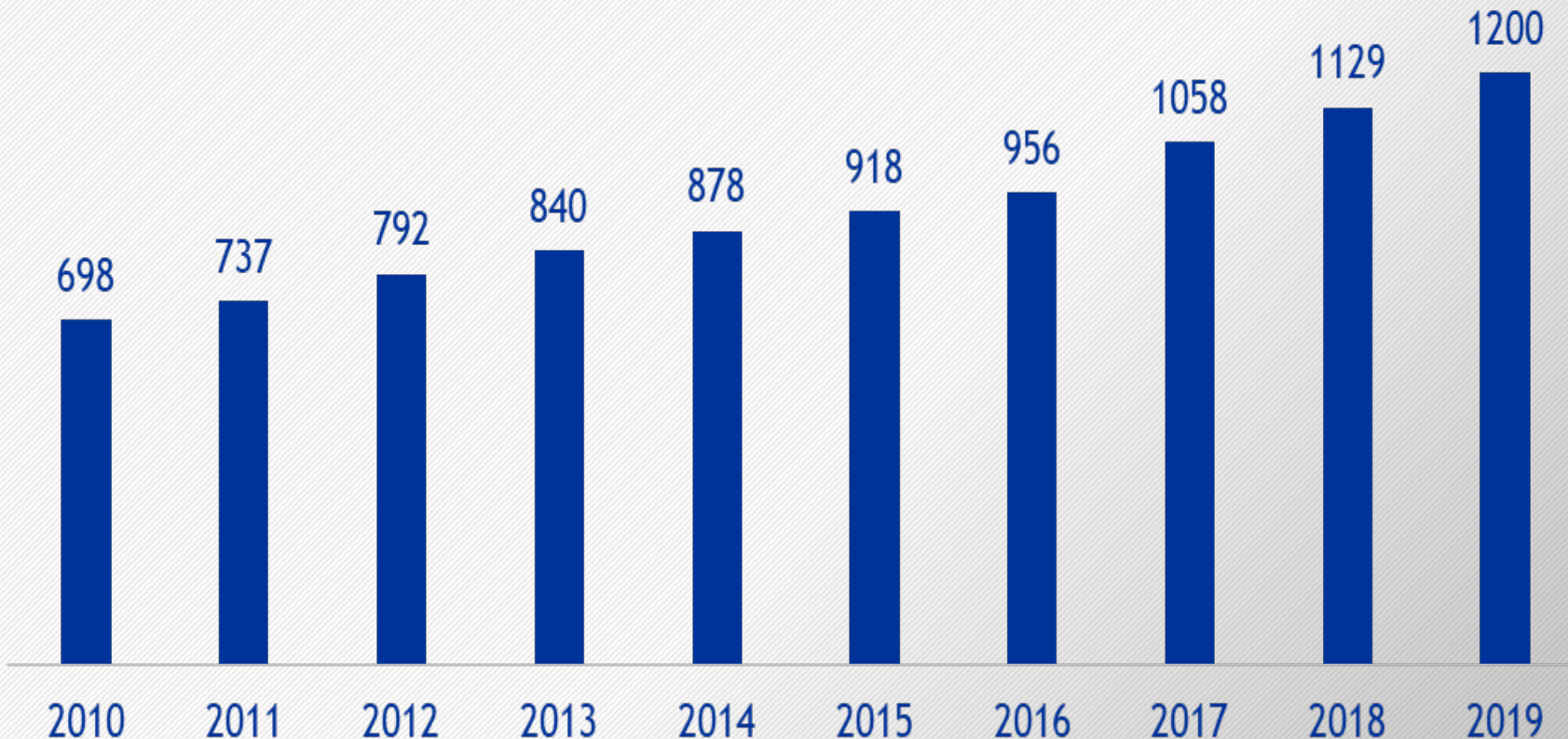


This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

Indonesia - National Electrification Rate (% of Population) in 2016

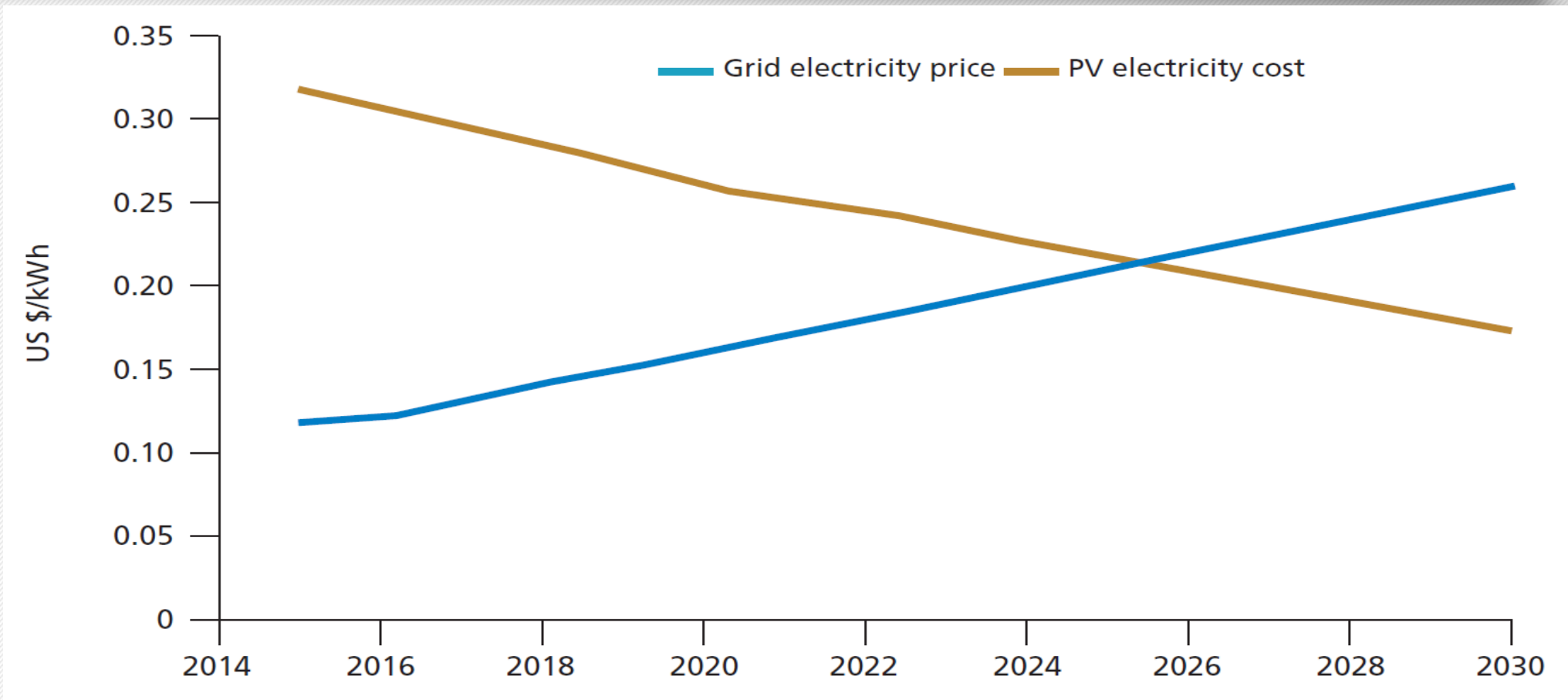


Indonesia - Per Capita kWh Consumption Development and Forecast



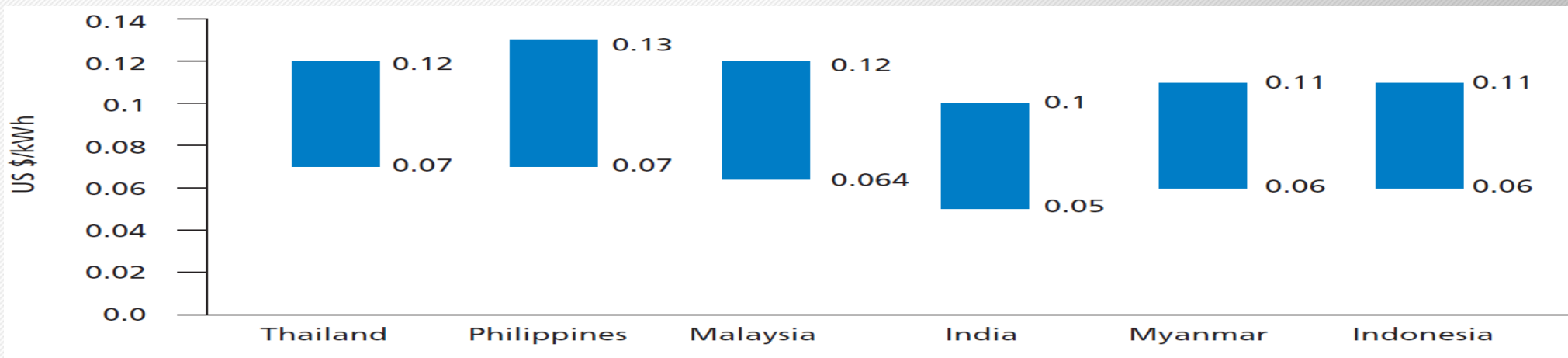
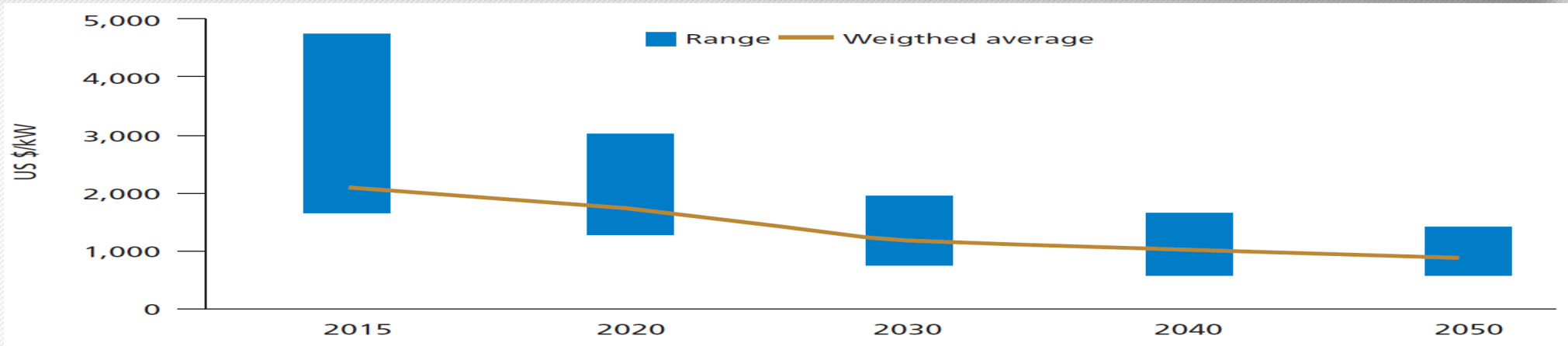
- Although per capita electricity consumption increases annually, however still relatively low
- 2019 Mid-Term Target is 1200 kWh / a
- 2030 longer-term target is 2764 kWh / a
- 2034 target is 3347 kWh / a

Indonesia - PV reaches Grid Parity in 2024



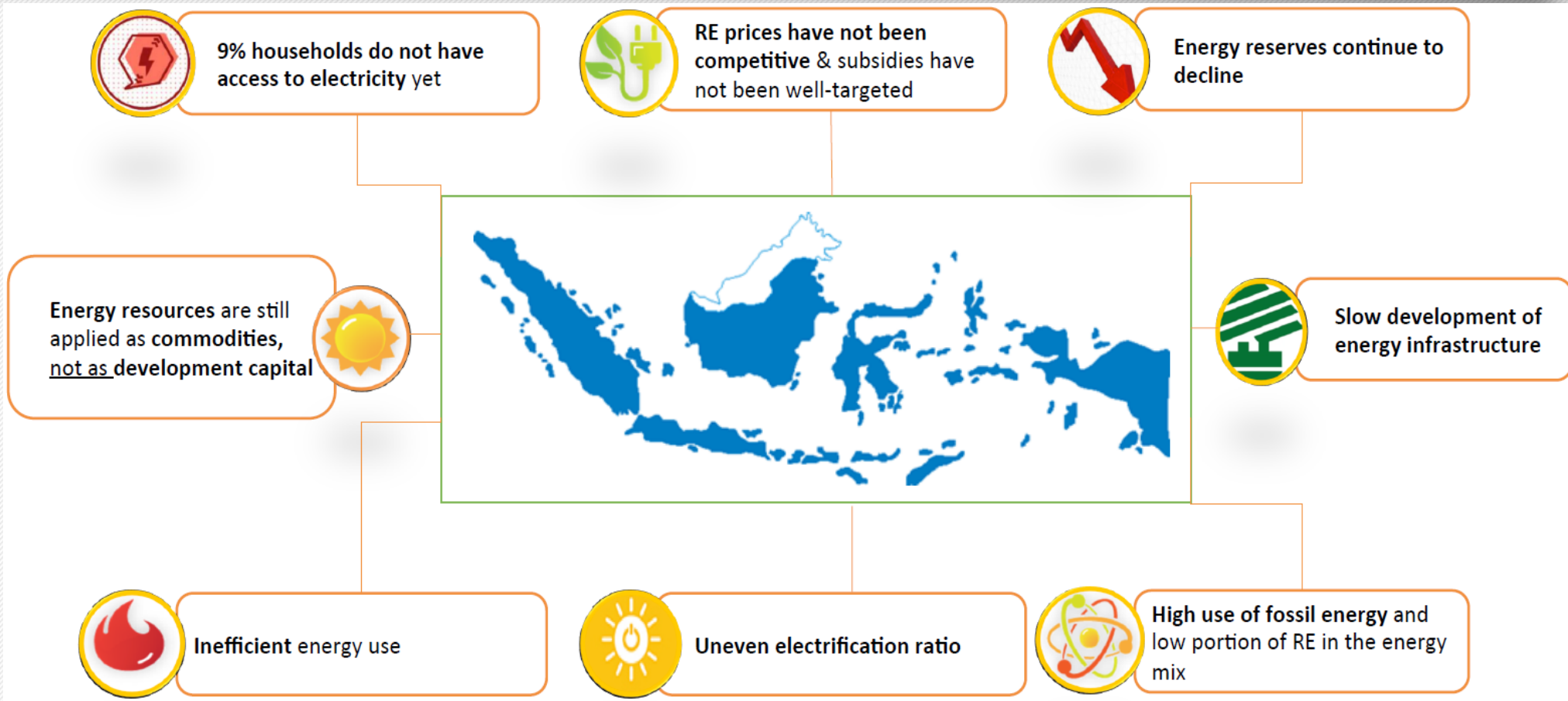
Source: PLN 2016

Indonesia - Cost of Solar PV Rooftop & LCOE compared with Asian Countries



Source: IEA 2014

Indonesia - Challenges



Indonesia – Issues & Opportunities



Debottlenecking

1. Procurement process
2. Land provision procedure
3. Coordination across sectors

Pricing Policy

1. Determination of more appropriate, transparent and sustainable electricity tariff
2. More appropriate electricity subsidy policy
3. More encouraging on RE feed-in tariff

Funding and Risks

1. Needs for government guarantee
2. Government equity participation to nurture the finance of SOEs
3. Equal risk sharing, especially for the upstream risks (e.g. for geothermal exploration)

Courtesy



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- Special thanks to Horst Kruse - Senior Advisor / Jakarta providing content guidance!
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