

WIND ENERGY INDONESIA

Overview
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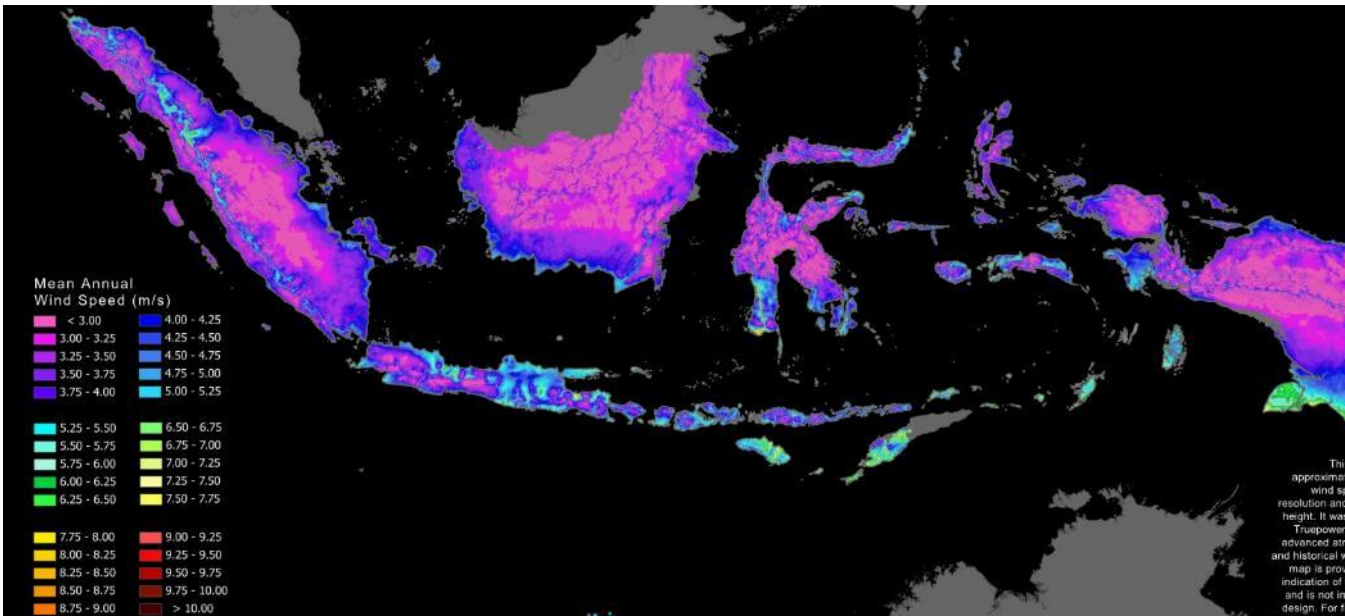
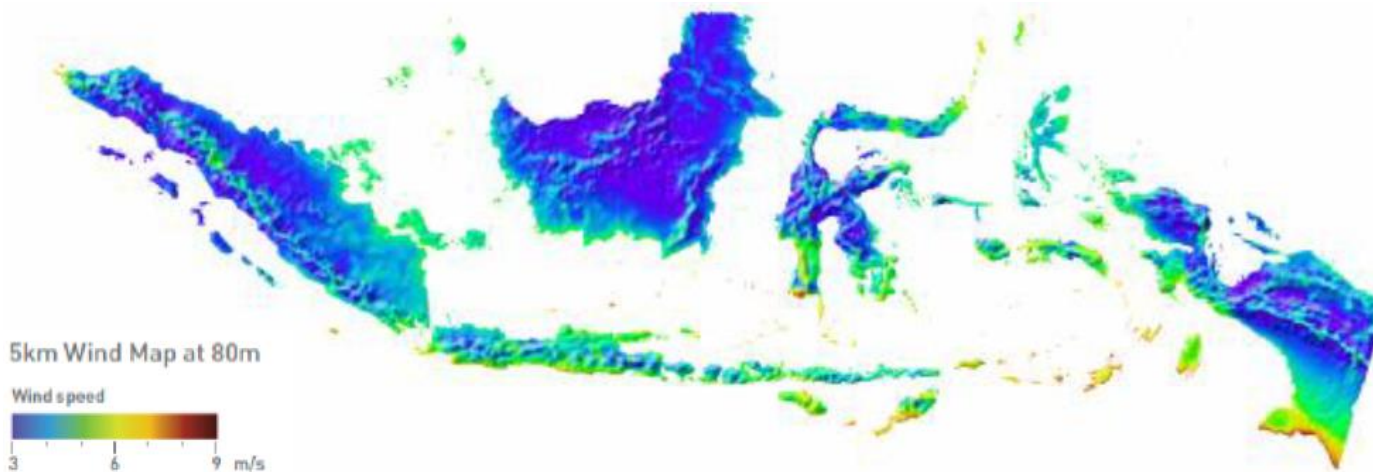




1 Indonesia Energy Situation

- ✓ Population: 267.7 million
- ✓ Country Area: 1,919,440 km²
- ✓ **World's fourth-largest producer of coal** and Southeast Asia's biggest gas supplier
- ✓ Total electrical capacity installed: 71 GW (Year 2020-ESDM)
- ✓ Total **electricity generation: 295.5 TWh** (Year 2019-IEA)
 - Electricity generation mix dominated by fossil fuels (85%) with renewables playing a smaller role (15%)
 - Major Sources of Electricity: Coal (60%), Oil (4%), Gas (21%), Hydro (7%), Geothermal (5%), Biofuels (3.6%), Wind/Solar/Waste (<1%)
- ✓ Electricity final consumption: 275.2 TWh (Year 2019-IEA)
- ✓ **Electrification ratio: 99.5%** (IEA 2019)
- ✓ **Wind Power Installed Capacity: ~ 148 MW** (Year 2020)
- ✓ **Wind generation: 484 GWh** (Year 2019-IEA)
- ✓ Indonesia's electricity needs predicted to grow by around 7% every year until 2027

2 Indonesia Wind Energy Potential



- ✓ In **2014**, the **first mesoscale wind map of Indonesia** was developed by EMD International (resolution 3 km)
- ✓ Indicative **annual average wind speed map at 80m hub height (200m resolution) created by AWS Truepower** using proprietary advanced atmospheric models and historical weather data.
- ✓ The **interesting potential areas concentrated in West Nusa Tenggara, East Nusa Tenggara, the south coast of Java and South Sulawesi. Maluku, Sumba and West Timor.**
- ✓ The approximate wind power potential in Indonesia was **estimated at around 9,300 MW** (ADB figures).
- ✓ The wind resource in Indonesia generally fits the design of **low speed wind turbines (larger rotor area) and higher towers** to maximize the wind energy capture.

3 Policies Relevant to Renewable Energy/Wind

2004	The Green Energy Policy (Ministerial Decree No. 2/2004) identifies Indonesia strategy to maximize the utilization of its renewable energy potential
2005	Blueprint of National Energy Management (2005-2025) identifies short and long-term development objectives in the electricity sector. It establishes targets for electricity production from various renewable energy sources.
2006	Medium-Scale Power Generation using Renewable Energy (Ministerial Regulation No. 2/2006) obliges electric utility PLN to purchase electricity generated from renewable energy facilities with capacity 1 MW up to 10 MW.
2007	Energy Law No. 30/2007 established a specific legal basis for national energy management
2009	Electricity Law (No.30/2009) : It secures sustainable energy supplies, promotes conservation and use of renewable energy resources. The regulation set by this law "Purchasing Price by PT PLN of Generated Electricity from Small and Medium Scale Renewable Energy Power Plant or Excess Power"
2011	(RAN-GRK) National Action Plan for GHG Emission Reduction by Presidential Regulation (No.61/2011)
2012	Ministerial Regulation No 04/2012 on Electricity Purchase from Small and Medium Scale Renewable Energy and Excess Power introduces new differentiated feed-in tariff levels in Indonesia.
2017	General Plan for National Energy (Presidential Regulation No.22 Year 2017) Regulation No. 10 of 2017 on Power Purchase Agreement Principles Regulation No. 12 of 2017 on Utilization of Renewable Energy Resources for Provision of Electricity, later replaced by MEMR Regulation No. 50 of 2017 , that regulates the tariff regimes for renewable electricity generation

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Indonesia Renewable Energy Targets

- Indonesia has ratified the legally-binding global climate change target, Paris Agreement, through Law No 16/2016.
- The country has targeted the achievement of a 29% (41% conditional on international support) GHG emission reduction by 2030 by means of the promotion of clean and renewable energy and energy conservation.
- The Indonesian government target of renewable energy (NRE) in the national energy mix is 23% by 2025 and 31% by 2050, from around 14% at present, as stipulated in Government Regulation (PP) No. 79/2014, which concerns the National Energy Policy (KEN)
- 23% NRE target composed of: 10% bioenergy, 7% geothermal, 3% hydropower and 3% other NRE (ex.solar/wind)
- The Directorate-General for Electricity and Energy Utilisation (DGEEU) has a sub-directorate New & Renewable Energy which has set a wind energy target of 255 MW by 2025
- The Indonesian Government targets 1.8 GW of installed wind capacity by 2025, with capacity factors estimated at 20-30 percent (IRENA)

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Indonesia Wind Farm Projects (PLTB)

Name/Location	Capacity MW	Status	Developer
Sidrap Wind Farm, South Sulawesi	75 (30 WTG G114/2500)	Operational 2018	UPC Renewables
Tolo 1, South Sulawesi (Jenepono)	72 (20 WTG SWT-3.6-130)	Operational 2019	Vena Energy
Tanah Laut, South Kalimantan	70	Re-tender	
Sukabumi, West Java	170	Assessment	
Lebak, Banten	150	Assessment	
Pandeglang, Banten	150	Assessment	
Tanah Laut, East Kalimantan	90	Assessment	
Sidrap Phase II and Phase III, S.Sulawesi	275	Assessment	
Buton, Southeast Sulawesi	15	Assessment	
Kupang, East Nusa Tenggara	2X10	Assessment	
Ambon, Maluku	15	Assessment	
Timor Tengah Selatan	20	Assessment	
Bantul, Central Java	50	Assessment	
Selayar, Sumba Timur, Kei Kecil, Garut, Saumlaki, Gunung Kidul, Belitung Timur	?	Assessment	

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Challenges

- The need of **reliable wind data measurement and assessment** for identification of wind potential sites.
- **Policy and regulatory issues**; Government initiative and political will, development of a more coordinated regulatory approach.
- **Local government and PLN capacity building**, lack of local technical and operational skills related to wind technology
- Need of **established competitive purchase tariff** and an established regulatory framework
- **Economic viability of facilities**: reach reasonable IRR or ROI, high Initial investment cost, investment support, more standardized process for PPAs and feed-in tariff pricing.
- **Grid connection**: feasibility, PLN support, costs, complexities related to grid integration of variable renewable energy (VRE)
- **Social dimensions**: Public Perception, Community acceptance and involvement
- Difficult for renewable energy to compete with fossil fuels. Indonesia's coal is not only plentiful but cheap. Still high subsidies for fossil fuels (coal).





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Opportunities

- **Technology transfer** from the tech-lead countries: integration of fluctuating renewables such as transmission and interconnectors, flexible generation, forecasting and operational planning tools.
- **Promote Public–Private Partnership**
- **Capacity building:** education and training opportunities for local government, PLN and stakeholders
- **Socio-economic benefits:** Local green jobs creation and enterprise development, local economy growth
- **Public awareness and education** for sustainable cities, climate change mitigation, adaptation and impact reduction.
- **Reduce Indonesia’s dependence on fossil fuels** for power generation, provide clean electricity to a nation in need of power
- **Reduce air pollution and GHG emissions** by replacing fossil fuels fired power plants with RE
- Promote Indonesia as a country committed to minimizing GHG emission through RE development

Annex

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