



INDONESIA GEOTHERMAL DEVELOPMENT: Opportunities and Challenges

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Country Updates of Geothermal Development

- Current installed capacity is at 2,281 MW and we are expecting additional installed capacity of 50 MW before end of year to make total installed capacity becomes 2,331 MW
- Net zero emission is aimed in 2060 by phasing out coal power plant in 2035 and aggressive renewable development
- Under the scenario, Geothermal is targeted to share 7,2 GWH in 2025, 10 GWH in 2030 and 17 GWH in 2050. It is a very ambitious target
- Currently, Government is finalizing a Presidential decree in attempt to accelerating Geothermal development. It is hoped this decree provides strong support to accelerate Indonesia geothermal development
- Government drilling 'de risking' program has commenced. This is a program that is intended to reduce exploration risk in order to make Geothermal tariff more competitive
- The presence of Covid-19 pandemic delays the COD of some geothermal projects and holding up new investment decision. We hope pandemic will be gone soon to let us catch up what is left behind



Installed Capacity Geothermal Power Plant

No.	Geothermal Working Area/ Location	Geothermal Power Plant	Developer/ Operator	Total Capacity (MW)
1	Sibayak – Sinabung, NORT SUMATERA	Sibayak	PT. Pertamina Geothermal Energy	12
2	Cibeureum – Parabakti, WEST JAVA	Salak	Star Energy Geothermal Salak, Ltd	377
3	Pangalengan, WEST JAVA	Wayang Windu	Star Energy Geothermal Wayang Windu	227
		Patuha	PT Geo Dipa Energi	55
4	Kamojang – Darajat, WEST JAVA	Kamojang	PT. Pertamina Geothermal Energy	235
		Darajat	Star Energy Geothermal Darajat Indonesia, Ltd	270
5	Dataran Tinggi Dieng, CENTRAL JAVA	Dieng	PT. Geo Dipa Energi	70
6	Lahendong – Tompaso, NORTH SULAWESI	Lahendong	PT. Pertamina Geothermal Energy	120
7	Waypanas, LAMPUNG	Ulubelu	PT. Pertamina Geothermal Energy	220
8	Ulumbu, EAST NUSA TENGGARA	Ulumbu	PT. PLN (Persero)	10
9	Mataloko, EAST NUSA TENGGARA	Mataloko	PT. PLN (Persero)	2,5
10	Sibual-Buali, NORT SUMATERA	Sarulla	Sarulla Operation Ltd.	330
11	Karaha-Cakrabuana	Karaha	PT. Pertamina Geothermal Energy	30
12	Lumut Balai, South Sumatra	Lumut Balai	PT. Pertamina Geothermal Energy	55
13	Likipinangawan Muara Laboh	Muara Laboh	PT. Supreme Energy Muara Laboh	85
14	Sorik Marapi, North Sumatra	Sorik Marapi I & 2	PT. Sorik Marapi Geothermal Power	87
15	Rantau Dedap, South Sumatera	Rantau Dedap	PT. Supreme Energy Rantau Dedap	91.2
16	Sokoria, East Nusa Tenggara	Sokoria	PT. Sokoria Geothermal Indonesia	5
TOTAL				2281



Investment Opportunities

- Indonesia is blessed with abundance geothermal resources of 23,9 GWH with Government's ambitious development target
- Before pandemic, we made high growth energy consumption supported by high economic growth. Normally country's economic growth was in the range of 5-6% and electricity growth was at 7-8% annually
- Strong Government Political will to develop Renewable Energy Resources : Sustainability and Emission Reduction
- It requires a lot of investment to develop these resources. Most of these investments will come from private investors - presenting enormous investment opportunities.
- Great interest from Multi Lateral/Bilateral institutions and Commercial Banks for Project Financing
- Relatively conducive investment climate; Political stability. We already conducted 4 times of direct presidential election and all were peaceful



Challenges

- Challenge
 - Tariff gap between buyer's affordability and developer's expected return. Buyer's affordability is based on its average production cost while developer's expected return is based on economics of the projects
 - Government is still looking for best development scheme that results on frequent changes in regulation; frequent changes in regulation creates uncertainties and risks to the investors
 - Single Buyer - State Owned Utility Company and B to B negotiation. It requires patience, determination and uncertainty when conducting negotiation
 - Long lead development time. Average of project completion take around 10 years. Mostly due to negotiation time, land acquisition and procuring permits. Lots of efforts made by Government to accelerate the development time, especially for the permit approval process



Next to be Done

- Equitable Tariff Resolution:
 - Pricing policy that provide adequate return commensurate with the investment risk and affordability. The presence of Government to provide more incentives to improve the economics of project and
 - Technology breakthrough to reduce cost and risks. Combination of both will result in more competitive selling price from Geothermal energy
- Not to change regulations frequently to provide legal certainty to the investors.
- In order to succeed with your investment:
 - Good local knowledge and net working
 - Strong equity
 - Patience, commitment and determination