

Indonesia struggles to tap volcano power

September 25 2016, by Sam Reeves



Steam rises from the Wayang Windu geothermal power station on West Java

Columns of steam shoot from the ground at an Indonesian power plant sitting in the shadow of an active volcano, as energy is tapped from the red-hot underbelly of the archipelago.

Pipes zig-zag up rugged mountainsides covered in tea plantations, carrying steam from the Earth's core to power enormous, electricity-generating turbines at the Wayang Windu facility on Java island.

Indonesia, a seismically-active island chain studded with scores of volcanoes, holds an estimated 40 percent of the world's geothermal energy reserves, but has long lagged behind in its use of the renewable power source.

Now the government is pushing to expand the sector five-fold in the next decade, although the challenges are huge in a country where the burden of red tape remains onerous, big projects are often delayed and targets missed.

"The potential is tremendous," said Rully Wirawan, field manager at Wayang Windu. "The current government is trying to tackle the challenges so I believe the development of the sector will be better in future."

Geothermal, a clean energy source which releases negligible amounts of greenhouse gases, unlike burning dirty fossil fuels, is mostly found in seismically-active areas around tectonic plate boundaries.

Indonesia: volcano archipelago



Indonesia volcanoes

The Earth's heat emanating through the faultlines warms underground reservoirs, and the resulting steam can be channelled to geothermal energy plants.

Fossil fuel addiction

The majority of Indonesia's power is generated from its abundant reserves of coal and oil.

It currently has installed capacity to produce about 1,400 megawatts of electricity from geothermal, enough to provide power to just 1.4 million households in the country off 255 million.

That is less than five percent of geothermal's estimated potential and behind the world's two leading producers of the energy source, the United States and the Philippines.



A plant technician inspects the distribution lines at the Wayang Windu geothermal power station on West Java

But the government is aiming to increase Indonesia's generating capacity to around 7,200 megawatts by 2025, as part of a broader plan to boost the renewables sector, which would likely make it the world's top producer of the power source.

A major part of the drive is a law passed two years ago that means geothermal exploration is no longer considered mining activity, as it was previously.

The old definition had held up the industry as mining cannot be carried out in the country's vast tracts of protected forests, believed to contain about two-thirds of Indonesia's geothermal reserves.

The government is also seeking to sweeten local administrations—which had sometimes resisted the construction of the steam-belching facilities—by offering them up to one percent of revenue from any [geothermal plant](#) in their area.

Abadi Poernomo, chief of the Indonesian Geothermal Association, which represents companies involved in the sector, is upbeat about future prospects: "A lot of investors from abroad are coming to Indonesia with the intent to develop geothermal".



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High costs, red tape

Still, the challenges are enormous. While achieving the 2025 target may be possible, it will be extremely difficult, said Daniel Wicaksana, an

energy expert at consultancy Frost and Sullivan Indonesia.

One of the biggest problems is the high exploration costs needed at the outset, as checking for potential geothermal reserves is a complex, time-consuming business, that is not always successful.

Building a geothermal plant costs the equivalent of \$4 to \$5 million dollars per megawatt, compared to \$1.5 to \$2 million for a coal-fired power station, according to the association.

Investors have also complained about what they say is the relatively low price offered by the state-run power company to buy electricity from a geothermal facility, which they claim usually doesn't cover the large initial outlay.



Plant controllers working in the control room of the Wayang Windu geothermal power station on West Java

To top it all off, Indonesia's complicated bureaucracy puts many off—29 permits are required from different government agencies and ministries for a geothermal plant, and time-consuming negotiations with powerful local administrations can also hamper progress.

"The level of complexity to complete the necessary paperwork, at the local level especially, also adds to the slow development of geothermal," said Wicaksana.

Green groups have also questioned authorities' commitment to geothermal in the near term—a plan by the government to ramp up electricity-producing capacity dramatically by 2019 seems more focused on building coal-fired power stations than expanding the use of renewable energy sources.

Wayang Windu, which is jointly managed by independent company Star Energy and state-owned energy giant Pertamina and takes its names from the active volcano near the plant, illustrates some of the challenges.

Exploration first began at the site in 1985 but it was not until 15 years later that the plant began producing electricity commercially, while work on a new unit to boost power generation has been delayed due to negotiations over cost.



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Even officials admit achieving the government geothermal target will be tough.

Ego Syahrial, the head of the government's geology agency, which assesses geothermal energy reserves conceded: "The progress is not very encouraging to be honest."

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