

Indonesia's Geothermal Future

By Scott McInnis, Duncan Ritchie and Gene Sullivan



This year Indonesia hosted the World Geothermal Congress – as well it should. The country is home to 40% of the world's geothermal resource. What's more, much of the story has yet to be written. Over 95% of Indonesia's geothermal energy remains untapped. How can Indonesia realize its geothermal potential? It's a question that's been around for decades. This article explores what could be achieved over the next 10-15 years.

Opportunity in Indonesia

In the global effort to abate human effects on climate change, geothermal energy stands alongside forestry management as distinctive ways Indonesia can make a difference on the world stage. According to the Geological Agency of Indonesia, the world's largest archipelago has 27 GW of geothermal electricity generating potential – roughly equivalent to Indonesia's total current electricity supply. Bringing half of that potential on stream could reduce carbon dioxide emissions by as much as 80 million tonnes each year.

The appeal of geothermal energy extends beyond environmental considerations. From the government's perspective there are two other important considerations. Firstly, there is the issue of energy security. Whereas Indonesia has an abundance of hydrocarbons and coal, these resources are limited and valuable. Making full use of its geothermal energy

can give Indonesia greater scope to export its fossil based resources to other countries – which have fewer indigenous energy resources and are prepared to accept the higher economic costs and risks of fossil based energy consumption. It can also afford Indonesia greater flexibility to pace the extraction of its fossil based energy resources.

Secondly, consider job creation. Developing Indonesia's untapped geothermal resources could create as many as one million jobs - significantly more than other types of power generation.

The appeal of geothermal energy extends to the business sector as well. Indonesia's untapped geothermal energy translates into upwards of US\$65 billion of investment opportunities in sustainable long term assets.

Where business goes, financial markets follow. Listed geothermal energy companies are rare in the world. The Indonesian stock market could become an important vehicle for investors seeking exposure to this distinctive asset class.

The opportunity looks attractive from a number of angles. So, what's needed to turn this tremendous potential into reality?

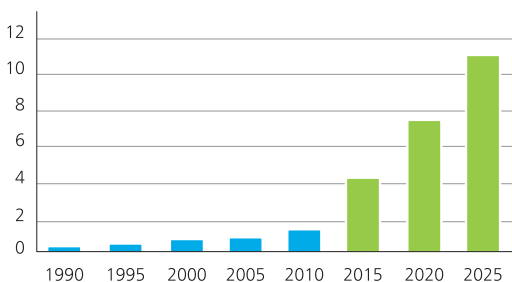
Making it Happen

The Indonesian government has established a goal of realizing 40% of Indonesia's geothermal potential by 2025. That's a tenfold leap from the current 4% and a laudable goal.

It's also an aggressive goal. To achieve it, the pace of geothermal capacity deployment in the next fifteen years will need to be about ten times faster than it was in the last fifteen years.

Accelerating the pace of development will be supported by past achievements. Indonesia's geothermal resource characteristics are now reasonably well understood, and a growing group of skilled technicians proudly operate some of the world's largest geothermal power stations. Yet much work lies ahead.

Indonesia's Geothermal Generating Capacity (GW)



Source: Indonesia Geothermal Association, Deloitte analysis

Realizing 40% of Indonesia's geothermal potential will require support from local communities, deep pools of technically skilled professionals and about US\$25 billion of investment.

To help it mobilize talent and funding, the Indonesian government sees a large role for the private sector, with 70% of new geothermal capacity slated to come from private developers. Much of the balance will be looked after by Pertamina Geothermal Energi, the country's most experienced geothermal energy company. What will it take for Indonesia to mobilize the investment for its geothermal program? Two central challenges must be overcome.

First: How to make projects commercially viable?

Geothermal developers need a clear and reliable path to a power purchase agreement or "PPA" that addresses the unique features of geothermal energy, is commercially viable and "bankable".

Geothermal projects are capital intensive and, compared to conventional power projects, more of the investment is required at the front end. In order for private sector developers to invest in geothermal resource development, they require reasonable assurance of the returns they will achieve for the risks they are taking. In addition, geothermal projects often require higher electricity selling tariffs than conventional power projects. These costs are often justified: geothermal energy creates positive economic benefits for society and helps insulate consumers from volatile energy prices. Indeed, a recent study sponsored by the Japan International Cooperation Agency found that the benefits of geothermal energy in Indonesia outweigh the costs.

A further point is foreign exchange. Much of the funding and equipment for geothermal energy comes from outside Indonesia. Overseas lenders, investors and equipment providers naturally will seek protection against foreign exchange risks.

In order to support suitable electricity selling prices and protect against foreign exchange risks, most developers will seek support from the Government of Indonesia – as has been provided for previous foreign invested power projects, both geothermal and conventional.

Yet the Government of Indonesia is keen to phase out government financial support for infrastructure projects.

In order for geothermal energy to succeed, the Government will need a clear framework for how, and to what extent, it will provide government support to geothermal projects. Whereas government support has been negotiated on a case-by-case basis for larger power projects, a different approach may be suitable for new geothermal projects because of their smaller size. Whereas conventional power projects can be as large as 1-2 GW or more, the average geothermal site in Indonesia has about 0.1 GW of potential. Protracted, case-by-case negotiations of government support could stifle growth.

The Government is currently developing a framework for government support for public-private partnerships (PPP) projects developed under Perpres 67/2005 and Perpres 13/2010. Successfully implemented, this framework may be adapted for application to geothermal projects.

As an important element in the path away from Government support, domestic Indonesian lenders and investors will need to increase their understanding of geothermal energy and gradually increase the amount of funding they are able to provide to the industry.

Second: How to create an efficient, effective process for project development that aligns with localization?

In line with Indonesia's decentralization of government, the right and responsibility for development and tendering of geothermal working areas is vested with local governments, in consultation with the Ministry of Energy and Mineral Resources. If Indonesia is to move towards a 'cookie cutter' approach to the development of its geothermal resources, how can this be reconciled with local government direction?

The answer may be local governments as decision makers and one national agency as standard setter and process manager. The national agency would work with its advisors to develop a standard form PPA, government support package and site permitting process (vital -- especially when 42% of the country's geothermal reserves are in protected forest areas), as well as a standard procurement process. This process would include key 'blanks' to be filled in by the local government agency -- such as the 'sunset dates' by

which drilling must occur or the PPA must be signed, at penalty of having the concession withdrawn. The local government agency would also decide which geothermal resources it wishes to open for private sector bidding. Outside of these clearly defined, and crucial, areas of local government discretion, the rest of the documents and process would follow a national standard, under direction of the national agency.

Several local governments such as West Java are moving proactively to attract private sector investment in their geothermal resources. Successful partnership between a national agency and one of the pioneering local governments could pave the way for a national framework.

Conclusion

A viable framework for private sector development of geothermal energy will create substantial benefits. Building the framework will require effective cooperation between local and national government agencies that are well advised on the requirements of a bankable geothermal project.

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