Backcasting Analysis for Geothermal Development in Indonesia

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Indonesia has approximately 40% of world geothermal energy reserves, with 28,100 MW potential. Currently, it is ranked as the third in the world for geothermal energy consumption, following the US and the Philippines. It is also the third biggest emitter of greenhouse gases and aims to reduce GHG emissions by 16% by 2025. The Indonesian government recently established a goal to increase geothermal resources by 9,000 MW by 2025, becoming the world's largest producer of geothermal energy (Geothermal Energy Association, 2010).

It is, however, not certain how the Indonesian government is going to reach the target. The Indonesian geothermal road map, for example, does not specify what policies are required by when, and who would implement of the policy options. In order to make the geothermal target feasible, there is a need to clearly demonstrate the way to reach the target through various policy options, spanning political, economic, social and infrastructure issues.

This article identifies the policy options available to the Indonesian government to reach the target, and addresses the policy road map up to 2025. It also demonstrates the policy program administrative schedule that identifies and allocates responsibilities and time schedule for policy implementation. By both policy road map and policy program administration schedule, the reaching the target is expected to be more feasible.

Overview

Indonesia is also known for its oil and gas reseves, but these have decreased over the decades, because of over-exploration and reduced production from main oil fields. The Indonesian government has recognized the huge geothermal potentials, estimated up to 21GW additional capacity. The Indonesian government recently established a goal to increase geothermal resources by 9,000 MW by 2025, becoming the world's largest producer of geothermal energy.

As part of the implementation guidelines, the geothermal road map has been drawn to specify short, medium to long-term capacity increase targets. However, although the roadmap is a clear statement of the Indonesian government's intention for further capacity increases, there are few supporting policies and mechanisms to ensure its feasibility. The lack of the sufficient support has been evidenced by the marginal geothermal electricity capacity increase in recent years. Insufficiency of geothermal capacity increases is mainly due to lack of investment in the relevant projects. Behind this, there are some structural problems related to the energy industry framework and central/local government political imbalances.

Methods

Determining how to achieve the Indonesian geothermal target requires considerable thought. There is a need to clearly demonstrate a feasible path to deliver the goal. With this in mind, the research adopts a method to demonstrate scenarios for a normative and desirable future, which is called backcasting analysis. Backcasting involves working from a normative future, to identify how the future could be achieved, through a range of policy measures. The major difference between the forecasting and backcasting methods is that the latter concerns the "implications of different policy goals", while the former indicates "what the future will likely be" (Robinson, 1982). The fundamental philosophy behind the backcasting is a will for a discovery and understanding on human choices to retain freedom of action, rather than an assumed causality over the things that happen (Dreborg, 1996). Based on the backcasting framework and existing scenario analysis, together with expert survey, this is to identify political, institutional and administrative schedule to overcome barriers to achieve the Indonesian government geothermal target.

Results

There have been several scenarios develped for Indonesian geothermal production. The scenarios include BAU, 'no oil subsidy' scenario, in which the fossil fuel subsidy is eliminated in Indonesia, and the 'climate' scenario in which the international climate regime is considered (Jupesta, Suwa and Wicaksono, 2011). These scenarios discussed the impact of domestic and international energy policy on the Indonesian geothermal emergence. On the other hand, the feasibility of these scenarios depends on administrative and institutional arrangement and efficiency to deliver effective policies.

This article identifies the policy options available to the Indonesian government to reach the target, and addresses the policy road map up to 2025. It also demonstrates the policy program administrative schedule that identifies and allocates responsibilities and time schedule for policy implementation. By both policy road map and policy program administration schedule, the reaching the target is expected to be more feasible.

Conclusions

The introduction of geothermal energy in Indonesia will serve to supply indigenous energy to Indonesia. It also increases energy security and minimizes emissions as it partially replaces coal for electricity generation. The policy road map created, based on the backcasting philosophy, and addresses the managerial guidance as to what institutional barriers to be overcome, by when and by whom.

For geothermal development in Indonesia, foreign investment and national policy support plays significant role in diversifying energy development. Innovative energy systems could be developed in the future by better institutional and administrative arrangement that could work efficiently and effectively to produce required policy results that lead more investment into geothermal projects. The policy road map analysis addresses a multifaceted and chronological approach covering technology, the market and the environment, to give a comprehensible vision of the complexity of the geothermal system in Indonesia and supply practical tools to for better policy coordination.

References

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