

COMPLETION REPORT

A comparative study of geothermal energy resources development and utilization in Japan-Indonesia and Malaysia

Dr. Sonny Irawan (+2)

Senior Lecturer

Faculty of Geoscience & Petroleum Engineering,

Universiti Teknologi Petronas<Malaysia>

This study explored the comparison of geothermal energy development and utilization in three countries namely Japan, Indonesia and Malaysia. In this research, leading countries in geothermal field which are Japan and Indonesia were picked to be compared to an inexperienced country, Malaysia with respect to their geothermal energy management and development. The aims of this study were to assist the government of Japan, Indonesia and Malaysia to get a better understanding on their geothermal energy resources development and utilization by comparison method to improve investment quality in the future as well as to improve the efficiency of geothermal resources usage. This study was conducted based on comparison concept, collecting information through previous researches conducted and paid a visit to the first geothermal site in Apas Kiri, Sabah.

From the study in Japan, as much as 2186.17MWt is used directly for the purpose of space heating and cooling, snow melting, and domestic hot water. Apart from direct use, geothermal heat energy is also used to produce electricity through non-conventional geothermal technology. To promote geothermal in Japan, the government has provided financial assistance to geothermal developers, lessen the land usage restrictions and introduced new Feed-in Tariff system. Based on reports, geothermal energy emit almost zero amount of dangerous gases into the air, thus it would significantly improve the air quality. Geothermal energy operations has proven to benefit the country's economy through various aspects mainly in providing jobs to the local community. In terms of education and trainings, Japan is actively offering workforce training in geothermal field to educate future geothermal experts. In Indonesia, a capacity of 23Mwt is directly used in mushroom cultivation, tea growing and pasteurization. Situated inside the Ring of Fire, Indonesia holds 40% of total world's geothermal potential. To promote geothermal development in Indonesia, New Geothermal Law has been introduced in to replace the Old Geothermal Law. Incorporating geothermal energy in Indonesia's power system would help the country to reduce the growing emission of CO₂, which has been the main environmental concern in Indonesia. Indonesia also provides workforce and industrial training in geothermal field. Malaysia has conducted its first geothermal project in Tawau, Sabah expected to supply 100MW of energy. Hot springs are popular in Malaysia as recreational site activities and the underground water is used as mineral or drinking water. The updated energy policy in Malaysia is under The National Renewable Energy Policy and Action Plan established in 2010 as outlined in 10th Malaysia Plan. Based on the data presented by Tawau Green Energy (TGE), the reading of CO₂ emission in geothermal plants is almost zero, it emits very little carbon dioxide and other dangerous gases into the air. The first geothermal energy power plant would help to boost career opportunities in the local community and contribute to variations of energy system in Malaysia.

Publication of the Results of Research Project:

Verbal Presentation (Date, Venue, Name of Conference, Title of Presentation, Presenter, etc.)

Date: TBA

Venue: TBA

Name of Conference: Iceland Geothermal Conference 2017

Title of Presentation: A comparative study of geothermal energy resources development and utilization in Japan, Indonesia and Malaysia.

Presenter: Dr Sonny Irawan

Thesis (Name of Journal and its Date, Title and Author of Thesis, etc.)

Not Applicable

Book (Publisher and Date of the Book, Title and Author of the Book, etc.) Not Applicable