

# Project Financing Analysis Using Capital Budgeting and Multi Criteria Decision Making (MCDM) in Geothermal Projects in Indonesia

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## Abstract

Indonesia is located on the Ring of Fire and has a huge thermal potential of up to 29,000 MW, which is equivalent to 40% of the world's geothermal potential capacity. According to the latest records from the Geological Agency, Indonesia's geothermal potential in December 2019 was 23.9 gigawatts (GW). According to the Geothermal Authority (2019), this potential can only be used for a total potential of 8.9%, or 2,130.6. MW. Even though the government itself is targeting an increase in geothermal utilization to 7,241.5 MW or 16.8% of the total potential capacity in 2025, there is still much that has not been utilized. CNN Indonesia stated the expansion of geothermal energy as a source of renewable energies requires a long time and very high risk. Capital will return in the long term and investors will not explore much in this business. As a result, only a few investors are interested in developing geothermal energy in Indonesia. It is necessary to analyze the project financing to assess whether a geothermal project is feasible or not. In this study, data that were used are qualitative and quantitative data such as using a questionnaire given to experts, policy makers, and producers. This study identifies geothermal project feasibility and calculates the capital return estimation using Capital Budgeting method and determines the scheme using the Multi-Criteria Decision Making (MCDM).

## Keywords

Geothermal Project, Feasibility Study, Capital Budgeting and Multi-Criteria Decision Making (MCDM)

## Biographies

**Yafiazmi D.** is a Master of Engineering candidate in the Faculty of Engineering at Universitas Indonesia. He holds a Bachelor's degree in Industrial Engineering. He has several experiences working in different sectors such as in tobacco, construction, electricity and commodity futures companies. His research interests are in the areas of project management, supply chain management and HSE (health, safety, environment). He has a scientific research entitled "Studying the Procurement of Cement Raw Materials for Making Box Piles (Non Centrifugal) at PT. WIKA Beton PPB Bogor" and the title of his undergraduate research paper entitled "Analysis Occupational Health and Safety Hazards for Operators in the Mechanical Division by Using the Job Safety Analysis (JSA) Method".

**Farizal** is a senior lecturer in Management System in the Industrial Engineering Department, Faculty of Engineering Universitas Indonesia. He earned Bachelor of Engineering degree from Universitas Indonesia, Master degree from Oklahoma State University and Doctoral degree in from University of Toledo. His research interest in reliability design optimization, renewable energy, supply chain management and techno-economy.

**M. Dachyar** is a Professor and Head of Management Information System and Decision Support (MISDS) Laboratory at the Industrial Engineering Department, Universitas Indonesia (UI), Indonesia. He received Ph.D. from the Dept. of Industrial Engineering, Bogor Agricultural Institute, Indonesia. He received a master's degree from VUB Brussel, Belgium majoring in industrial location and development. He has taught Management Information System, Innovation Management, Project Management, Productivity, Decision Support System, Engineering Economics and Industrial Engineering Computation Laboratory. His main interest in research is Management

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