宜蘭平原深層地熱探勘鑽井及地熱系統開發研究
-EGS儲集層現地取熱評估系統開發

執行單位	國立臺南大學	計畫主持人	林大偉

1. 計畫關鍵技術為開發出符合現地之水現地模型以預測現地產能測試之相似產能測試模型。本模型能降低實際產能測試次數，以有限之產能測試結果建立相似性模型，有效節省成本並結合電廠發電量關係式以預估電廠發電量。

發電潛能估計式

$$J(kW) = \dot{m}(kg) \times S_i \times P_{ij}\left(\frac{kW}{kg}\right) \times T_j$$

J: Electric power

P_{ij}: Power generation under the different type of generation system and exit temperature MW/kg

$$P_{ij} = \begin{bmatrix} p_{11} & \cdots & p_{1n} \\ \vdots & \ddots & \vdots \\ p_{m1} & \cdots & p_{mn} \end{bmatrix}_{m\times n}$$

i:exit temperature of production well; j:power generation type

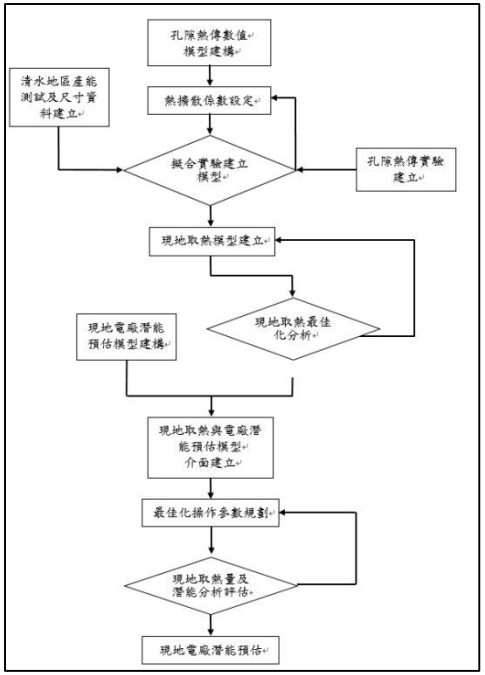
Type of generation system: $S_i = [s_1 \quad \cdots \quad s_m]_{1\times m}$

Range of Exit Temperature: $T_j = \begin{bmatrix} t_1 \\ \vdots \\ t_n \end{bmatrix}_{n\times 1}$

if power generation is i type, s_i is 1，others 0；

if the exit temperature is j range，t_j is 1，others are 0。

地熱電廠發電潛能與發電量關係式預估理論

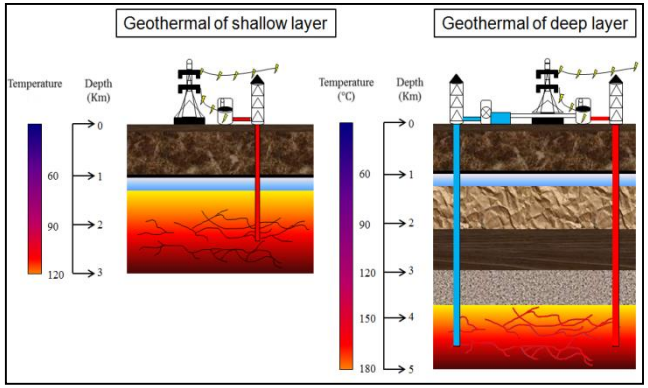


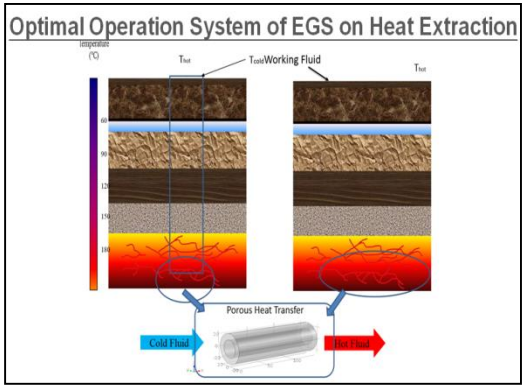
相似產能測試模型與電廠潛能預估流程圖

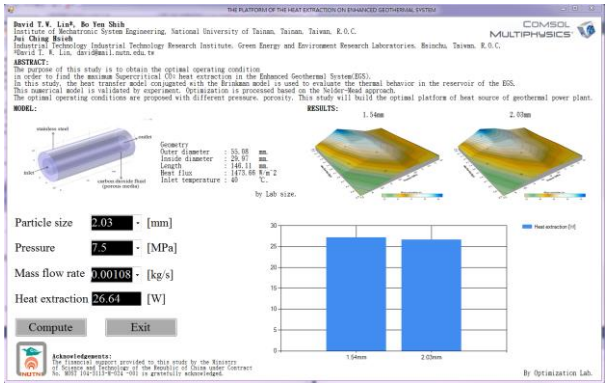
2.另於105年度計畫亦開發出CO_2-EGS取熱操作平台，輸入地層平均孔隙率和深度壓力，平台可計算出在獲得最大取熱量條件下所需之注入工作流體質量流率，作為日後地熱電廠操作之建議。

「增強型地熱系統之超臨界二氧化碳取熱最佳化操作參數平台」專利申請程序進行中。

- 發展策略：透過實驗修正模型，繼而以現地實際數據，使此平台之評估更加精確，提供地熱電廠較詳細的取熱規劃。







Geothermal Exploration, Drill and System Development in the Ilan Plain- The Development of Heat Extraction Evaluation System on the Reservoir of Enhanced Geothermal System

Execution Unit	National University of Tainan
Project Director	David T.W. Lin

1.The key technology of this project is to develop the Similar Capacity Testing Model to predict the well capacity. The power of geothermal power plant can be evaluated by using the correlation of power prior to the power plant setup. This model, which is carried out by the limitation of well yield for the ultimate power generation from its relationship, not only decreases the realistic testing numbers but also reduces the relative cost.

$$J(kW) = \dot{m}(kg) \times S_i \times P_{ij}\left(\frac{kW}{kg}\right) \times T_j$$

J: Electric power

P_{ij}: Power generation under the different type of generation system and exit temperature MW/kg

$$P_{ij} = \begin{bmatrix} p_{11} & \cdots & p_{1n} \\ \vdots & \ddots & \vdots \\ p_{m1} & \cdots & p_{mn} \end{bmatrix}_{m \times n}$$

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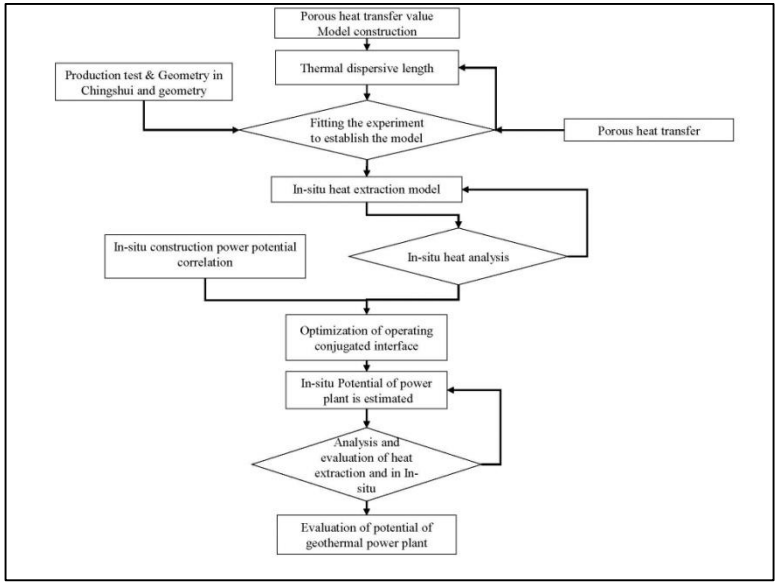
The Power Generation Correlation



The Scheme of Potential Power Evaluation for Power Plant

2.This project in 2016 also developed the Platform of the Heat Extraction on Enhanced Geothermal System to obtain the optimal injected condition of mass flow rate for maximum heat extraction based on the data of porosity and pressure. The application of patent has been under the procedure.

- **Strategy: Through experimental data to adjust the simulated model, the evaluation of this platform will be more precise in in-situ for the prediction of heat extraction of geothermal power plant**