

地熱發電機相關設備系統整合及開發1MW地熱發電系統

執行單位

國立臺灣大學機械工程系

計畫主持人

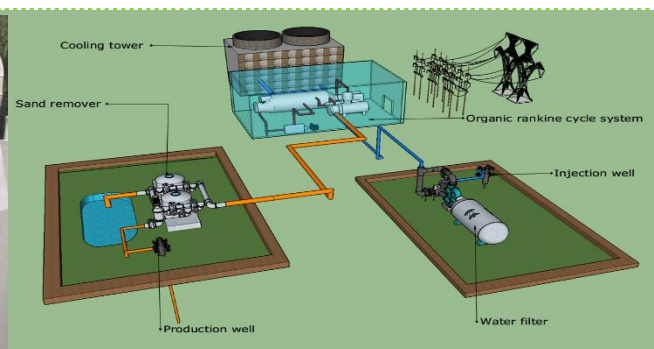
馬小康

本計畫藉由10kW小型實驗平台所研發之系統整合技術及建立的友善式地熱發電分析軟體，可應用於 **single-flash system and binary system** 深層地熱發電廠(5MW)的設置與效能評估，並可依地熱探勘、鑽井驗證和儲集層模擬的數據來規劃和建造地熱發電廠。

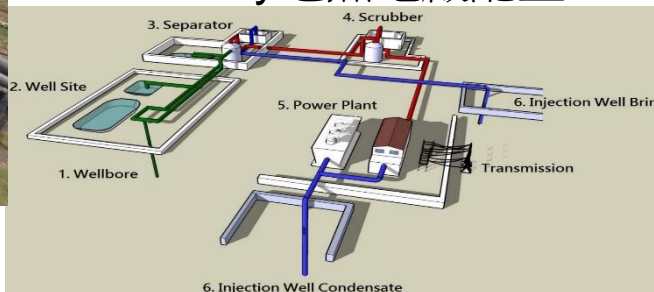
- 104/07/11獲得新型專利:多重U型排水裝置。
- 104/08/29獲得新型專利:使用熱電晶片的氣體警報器。
- 104/12/09申請新型專利:一種改良之有機朗肯循環系統。
- 105/12/14申請專利名稱：地熱井的內熱毛細交換系統。
- 105/12/16申請專利名稱：向心式渦輪機之轉子葉型結構。



10kW小型實驗平台



3D Binary地熱電廠配置



3D Single-Flash地熱電廠配置

- 藉由10kW小型實驗平台所研發之系統整合技術，可應用於未來深層地熱先導發電廠的設置，並可依據地熱探勘、鑽井驗證和儲集層模擬的數據來規劃和建造地熱發電廠。
- 建立的友善式地熱發電分析軟體，可應用於開發深層地熱先導發電廠的規模及效能評估。其中包括兩種操作模式 (1) 輸入生產井流量與溫度、氣液分離溫度及熱交換器冷凝溫度，可獲得發電廠的熱效率及電能產生量與T-s圖示; (2) 輸入需求電量、生產井溫度及熱交換器冷凝溫度，可獲得需要生產井流量與相關圖示。
- 出席美國2016 Baseload Renewable Energy Summit地熱會議。並參訪里諾市的Steamboat Complex廠區，它由七個ORC發電廠組成，產生的功率78兆瓦(MW)。
- 國際合作機制:
 - 洛杉磯市地熱能部門經理Mr. Barry B. Dong(董)
 - ORMAT Vice president, Mr Rahm Orenstein

The integration of geothermal generator-related equipment system and development 1MW geothermal power generation system

Execution Unit

Mechanical Eng. Dept., National Taiwan University

Project Director

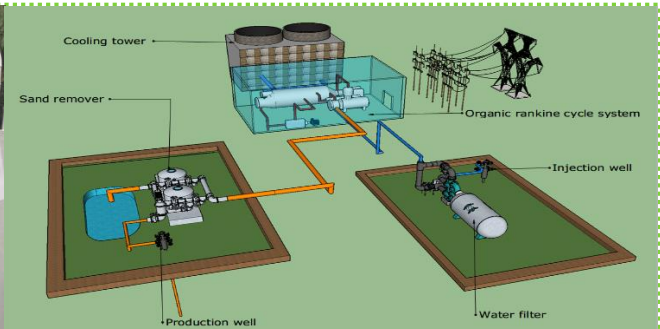
Hsiao Kang Ma

The integration of geothermal generator-related equipment system developed by the 10kW small experimental platform and a user friendly geothermal power generation software developed by the project, which can be used for the performance evaluation of the single-flash system and binary system geothermal power (up to 5MW).

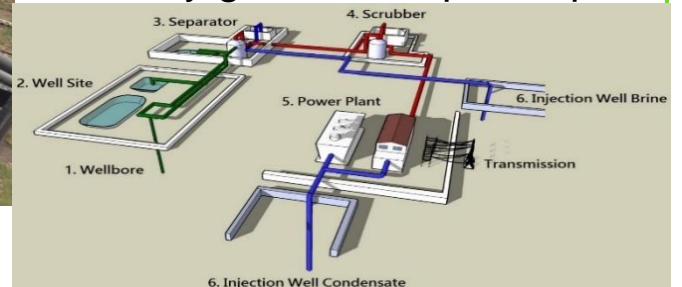
- 104/07/11 Patent Name: Multi-U drainage.
- 104/08/29 Patent Name: Gas alarm with thermoelectric chip.
- 104/12/09 Patent Name: A modified organic Rankine cycle system.
- 105/12/14 Patent Name: Geothermal wells capillary heat exchange system.
- 105/12/16 Patent Name: Radial turbine rotor blade structure.



10kW Small-scale experimental platform



3D Binary geothermal power plant



3D Single-flash geothermal power plant

- The integration technology developed by the 10kW small-scale experimental platform can be applied to future settings of geothermal pilot power plant and geothermal power plant can be constructed based on geothermal exploration, well verification and reservoir simulation data.
- The established user friendly geothermal power generation software can be used to evaluate the scale and thermal performance of deep geothermal pilot plants. There are two modes of operation: (1) Input the flow and temperature of the production well, the gas-liquid separation temperature and the condensation temperature of the heat exchanger to obtain the thermal efficiency of the power plant and the amount of generated electricity and the T-s diagram; (2) Input the demand power, production well temperature and heat exchanger condensing temperature to obtain the need to produce well flow and related.
- Attend 2016 Baseload Renewable Energy Summit Conference and visit “Steamboat Complex” geothermal power plant in Reno, USA. It consists of seven ORC power plants, generating 78MW of power.
- International cooperation mechanism:
 - Mr. Barry B. Dong, Manger of Geothermal Department, Los Angeles City
 - ORMAT Vice president, Mr Rahm Orenstein