

利用再生能源之創新型空調系統技術研發與推廣示範

執行單位

國立臺灣大學機械工程學系暨研究所

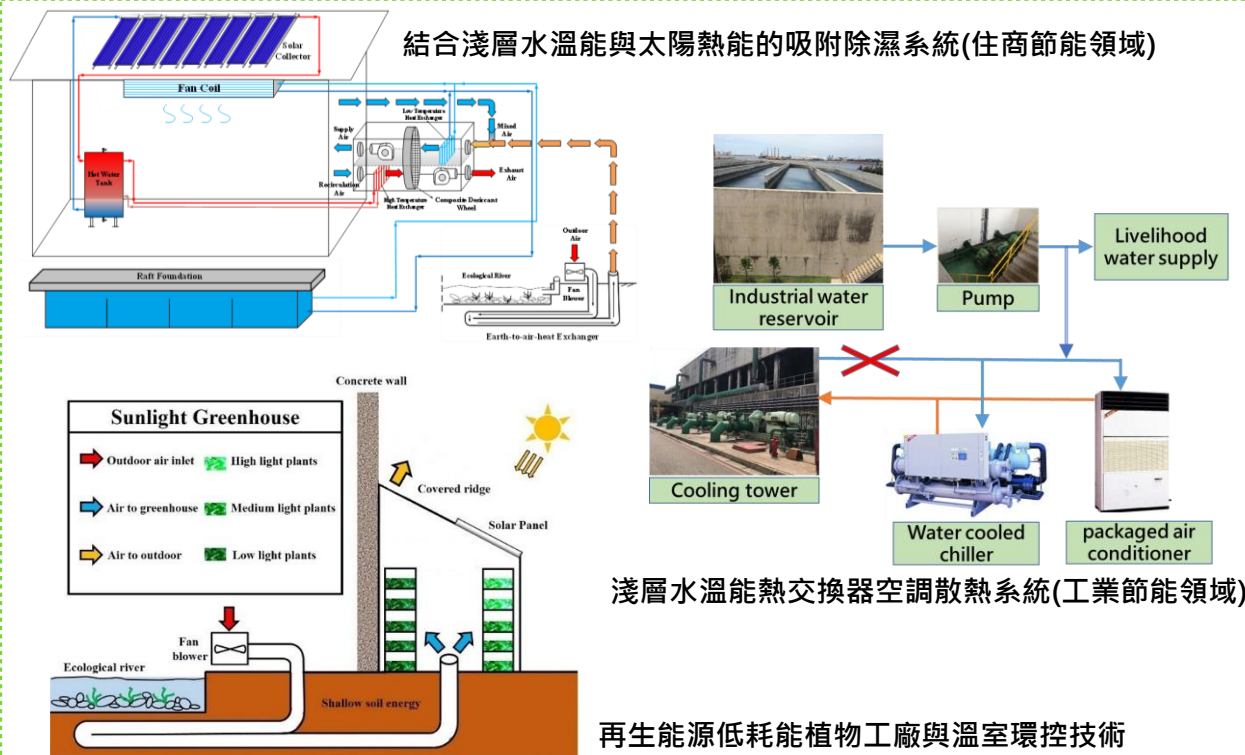
計畫主持人

陳希立

- 本計畫研發之空調系統技術，在工業節能領域預計應用於大型耗水工業廠區，取代空調冷卻水塔；在住商節能領域，預計應用於商辦大樓之外氣通風系統；在農業節能領域，預計應用於建置近零耗能的密閉型植物工廠及陽光溫室。

已取得之專利：中華民國專利M524927「地下水溫熱交換裝置」及M475320「管路清洗系統」，預計研究較成熟後，技術轉移給中國鋼鐵股份有限公司。

預定申請專利：子計畫二「低成本除濕轉輪」當應用於住商建築部門外氣空調時，可以節能方式的引進外氣改善室內空氣品質。此套技術先前並沒有出現在國際的文獻中，本團隊申請專利中。



本計畫利用淺層溫能與太陽熱能等再生能源開發創新型節能空調技術。子計畫一進行淺層溫能取代冷卻水塔技術研究，以降低冷卻水塔耗水與耗電之問題，並提升空調系統之性能係數。已完成淺層水溫能技術的設計研究與建置計畫，並建立廠區內之空調主機性能基準線；子計畫二結合再生能源與創新性除濕技術，開發低耗能空調冷卻加熱及除濕系統。已完成複合系統之規劃、建立淺層水冷卻系統和開發複合除濕材料並應用於除濕轉輪性能測試；子計畫三開發再生能源結合植物工廠與陽光型溫室低耗電環控技術，控制環境室內溫濕度及養液溫度。已完成太陽光電與淺層溫能之零耗能植物工廠建立與陽光型溫室應用示範。

Investigation and demonstration of innovative air conditioning with renewable energy

Execution Unit

Department of Mechanical Engineering,
National Taiwan University

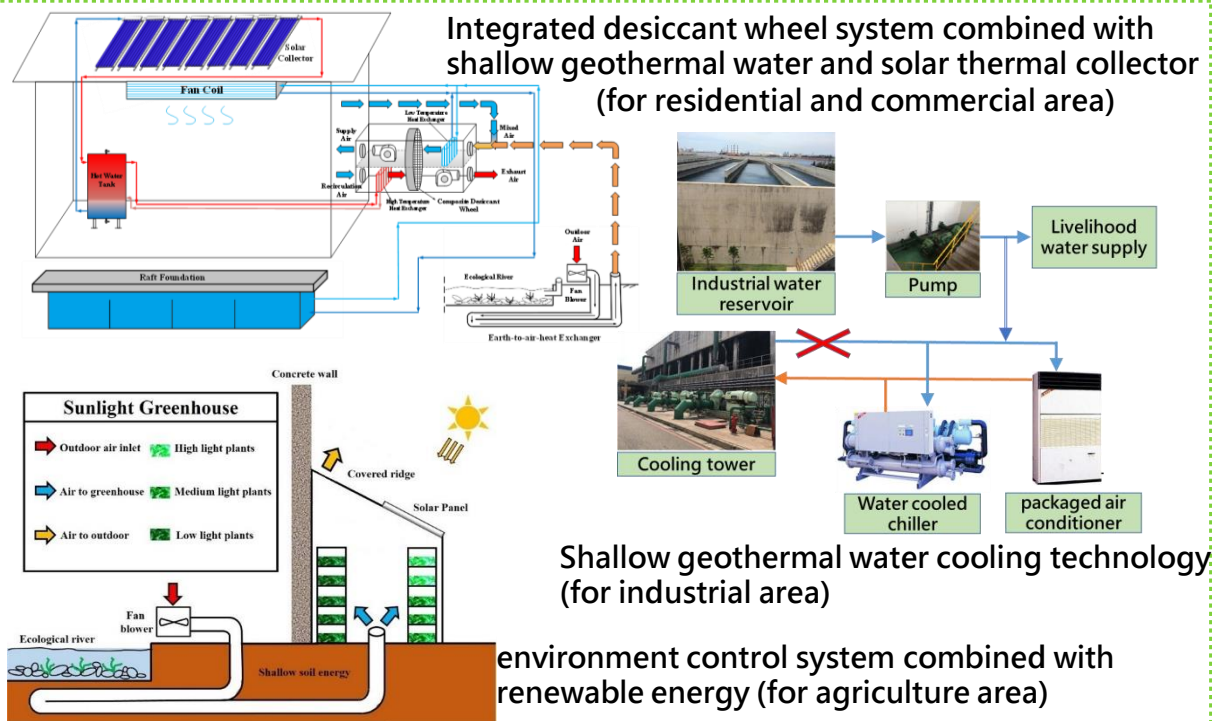
Project Director

Sih-Li Chen

- We are going to implement the air conditioning technologies developed by this project in water-intensive industries area to replacing the water-consumed cooling tower; in residential and commercial area to reduce energy consumption of ventilation system for business office building; in agriculture area to build near-zero-energy plant factory and solar green house.

Obtained patents: Two Taiwan Patents, M524927, Under-ground water temperature heat exchange device, and M475320, Pipe rinsing device, will be technology transferred to China Steel Co.,Ltd. when the technologies are well-studied.

Patents in preparation: The "low-cost composite desiccant wheel" developed in sub-project two has high potential in energy-saving. The patent for it is in preparation.



The aim of this project is to develop a variety of innovative low-energy-consuming air conditioning and ventilation systems, which consist of different kinds of renewable energy applications and dehumidification technologies with high energy-saving potential. The sub-project one developed shallow geothermal water cooling technology to replace water-consumed cooling tower in traditional air conditioning system and to enhance operating performance of air conditioner. This sub-project has accomplished the design and planning of shallow geothermal water energy technology, and established baseline measurement for air-conditioning equipment in industrial area; the sub-project two developed low-energy integrated dehumidification system combined with renewable energy. This sub-project has accomplished preliminary planning of integrated desiccant wheel system combined with shallow geothermal water and solar thermal collector, a shallow geothermal water cooling system, and composite desiccant materials to enhance dehumidification performance; the sub-project three developed environment control system combined with renewable energy for near-zero-energy plant factory and solar green house. This sub-project has established the application and demonstration of zero-energy plant factory and greenhouse with solar-photovoltaic and shallow-geothermal energy.