

需量反應、分散式電源與儲能之整合應用

執行單位

國立成功大學

計畫主持人

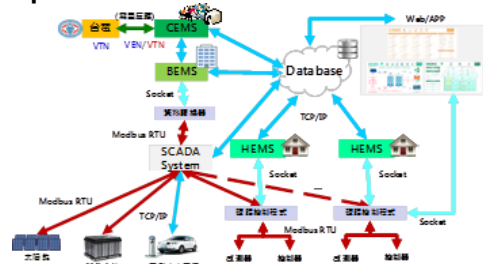
楊宏澤 教授

- 未來台灣電力供給將逐步邁向零核及高占比再生能源，為有效提升供電可靠度與電能使用效率，本計畫發展分散式電力資源與需求端管理整合技術，於北市興隆公宅與成大歸仁校區建研所完成技術驗證，可作為沙崙科學城技術規劃藍圖重要參考，以建構更大規模的能源聚合商模式。

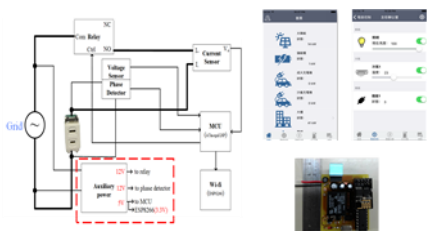
重要專利：

1. 可遙控複數電子裝置的遙控裝置
2. 智慧建築未來一天之短期負載預測方法

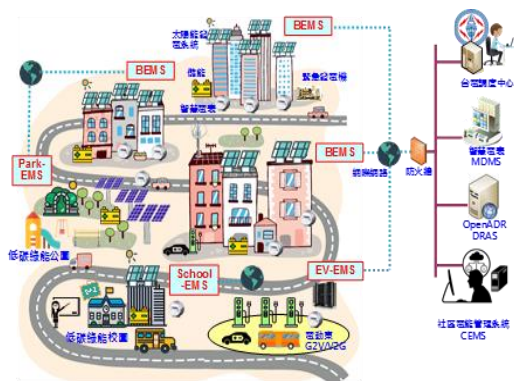
OpenADR 2.0b用戶端自動需量反應系統



智慧插座與人機管理介面



智慧城市架構之整合分散式電力資源能管理系統



臺北市智慧社區節能及示範實證計畫



沙崙建研所示範場域



● 技術介紹

- 本計畫開發分散式電源整合調度技術，透過電力系統模擬、電能管理演算法開發及預測技術達到分散式電源最佳實虛功率調度，以透過配電等級電能管理系統確保電網安全可靠，並提升電能使用效率，同時減輕因高再生能源滲透率所造成的系統衝擊。

● 目前發展情形

- 與國內廠商簽訂五年期共同開發與技轉合作，並於成大歸仁校區內政部建研所完成用戶端整合電能管理技術之示範系統。
- 完成興隆公宅1區之系統運維移交，並擴大衍生技術推廣計畫，協助北市府規劃及建置(1)士林北投園區低碳綠能公園、(2)低碳校園、(3)智慧能源商辦大樓及(4)寶橋消防分隊等系統。
- 未來興隆公宅二區將整合為單一虛擬電號，並參與台電低壓用戶需量競價方案測試，以完成實際用戶之虛擬電廠技術實證。

The Integrated Application of Demand Response, Distributed Generator, and Energy Storage System

Execution Unit

National Cheng Kung University

Project Director

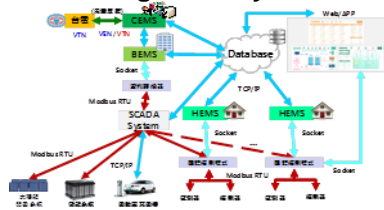
Prof. Hong-Tzer Yang

- The penetration of renewable energy will increase in Taiwan since the nuclear-free consciousness gains. To enhance the reliability of power supply and the efficiency of power usage, this project developed the energy management system (EMS) for distributed energy resources and load demands. The EMS has been successfully demonstrated at Taipei Xinglong Public Housing Section 1 and the Architecture and Building Research Institute (ABRI). The empirical fields mentioned above can be important references for planning Shalun Green Energy Science City to develop larger-scale commercial energy aggregation model.

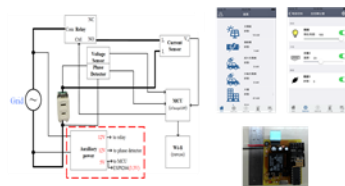
Patents

- A Remote control device controls the plurality of electronic devices.
- Method for forecasting a short-term load of the next day for smart buildings.

OpenADR 2.0b demand-side management system



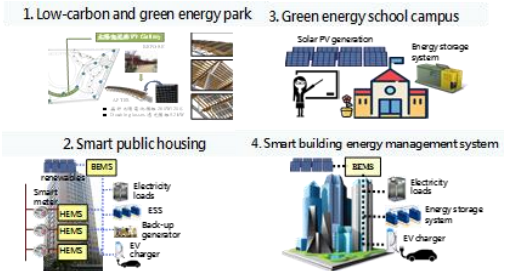
Smart socket and user interface



Integrated distributed energy resources energy management system



Taipei City demo site



Shalun demo site



● Technologies introduction

- This project aims to develop the DER-integrated dispatch technologies which integrate power system simulation, data analysis, and forecasting approaches, as well as energy management algorithms to perform optimal active/reactive power dispatch. The power supply security, reliability of distribution system levels and the energy usage efficiency can thus be improved. Also, the impact caused by high-penetration renewable generation can be mitigated.

● Current results

- This project has achieved a five-year R&D contract with DELTA, and has successfully demonstrated the EMS at the ABRI.
- After transferring the EMS of Xinglong Public Housing Section 1 to Taipei City Government (TCG), our team proceeds to promote the projects collaborated with TCG, including: low-carbon green energy parks, Low-carbon campus, smart energy business buildings and fire departments.
- The EMS we designed at Xinglong Public Housing Section 2 is expected to be effectively aggregated to a single virtual customer to participate in the low-voltage demand bidding program performed by Taiwan Power Company. Through this test, the technology of low-voltage level aggregator can be verified.