

# 混合式儲能系統與雲端分散式能源管理平台技術開發

執行單位

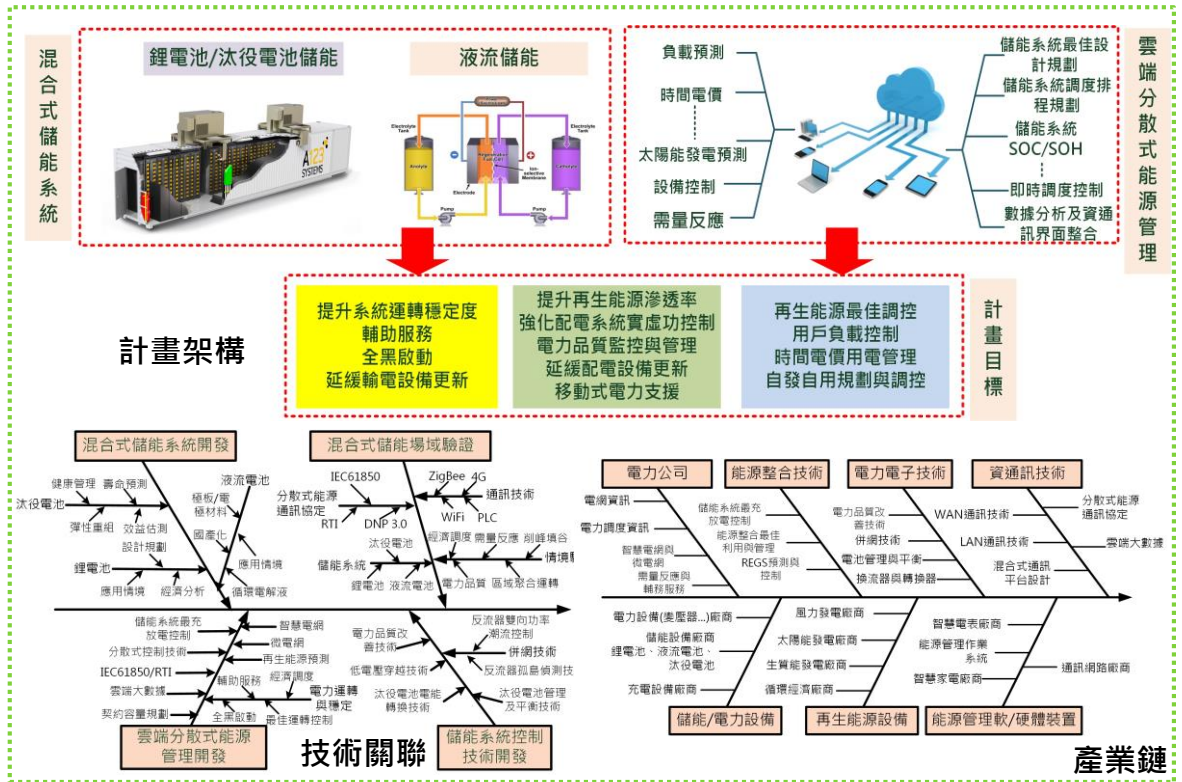
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- 混合式儲能系統為擴大再生能源裝置容量的重要技術之一，所開發之技術有助於提高再生能源併網量及運轉可靠/穩定度，並提高區域實虛功控制穩定電力品質。此外，建立汰役電池未來循環應用之關鍵技術，帶動儲能系統與能源管理產業。

本計畫針對鋰電池/汰役電池及液流電池等之混合式控制技術申請相關專利，其中「一種可擴充模組化電池容量估測系統」，已獲中華明國專利(證書號碼I613455)。



- 本計畫進行包括鋰電池/汰役電池及液流電池等之混合式控制技術開發，汰役電池SOC/SOH、換流器、轉換器及平衡與管理技術開發，具電池監控、充放電控制、及調度排程規劃等功能之雲端分散式能源管理平台開發，未來可用於削峰填谷、需量反應、再生能源調控、聚合調度、變電所整合調度等。
- 本計畫目前完成混合式儲能系統示範場域規劃與雲端分散式能源管理平台設計；鋰離子電池及SOC估測模型開發；串聯汰役電池SOC平衡之T型逆變器設計與驗證；返馳式電池電量平衡電路；建立以多重遲滯信號取消濾波器之三相強化鎖相迴路，提升儲能系統與電網同步運轉和控制；開發具IEC61850功能之IED，可整合至儲能系統與各項輸配電設備。
- 本計畫已獲中華民國專利一案，發表一篇IEEE工業應用期刊論文一篇。

# Technology Developments for Hybrid Energy Storage Systems and Cloud Decentralized Energy Management System Platform

Execution Unit

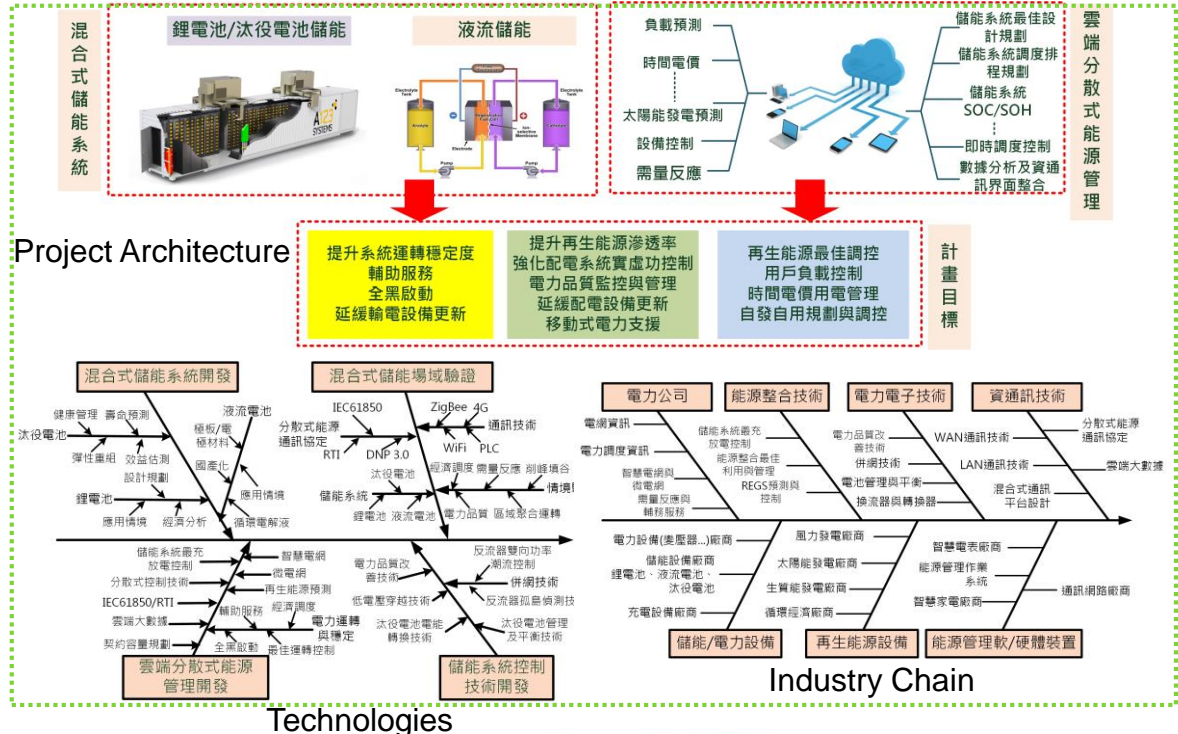
National Sun Yat-sen University

Project Director

Jen-Hao Teng

- The technologies developed for hybrid energy storage system will help increase the installed capacity of renewable energy and the reliability and stability of power system operation, as well as the improvement of regional real and reactive power control and power quality. In addition, key technologies for the future recycling of retired batteries will be established to drive energy storage systems and energy management industries.

This project applies for patents related to hybrid energy storage systems. A patent named "An expandable modular battery capacity estimation system" has been certificated by Taiwan IPO with No. 1613455.



- The main works of this project are the integration of hybrid energy storage systems, cloud decentralized energy management platform technology, health management and the applications of retired batteries and mutual scheduling of community and customer-side energy storage systems into investigating the power supply stability and energy flexibility in a demonstration field with high penetration of photovoltaic generation systems.
- The project currently completes the demonstration site planning of hybrid energy storage system and cloud-based decentralized energy management platform design; the models of lithium-ion battery and SOC estimation; the T-type inverter design and verification for SOC balance of tandem batteries; the design of fly-back battery balancing circuit; establishing a three-phase enhanced phase-locked loop to improve the synchronous operation of energy storage systems; and the development of an IED with IEC 61850 function, which can be integrated into energy storage systems and various power equipment.
- One patent has been certificated by Taiwan IPO and one journal paper has been published by IEEE Trans. on Industry Applications.