

波浪發電系統研發與測試計畫

執行單位

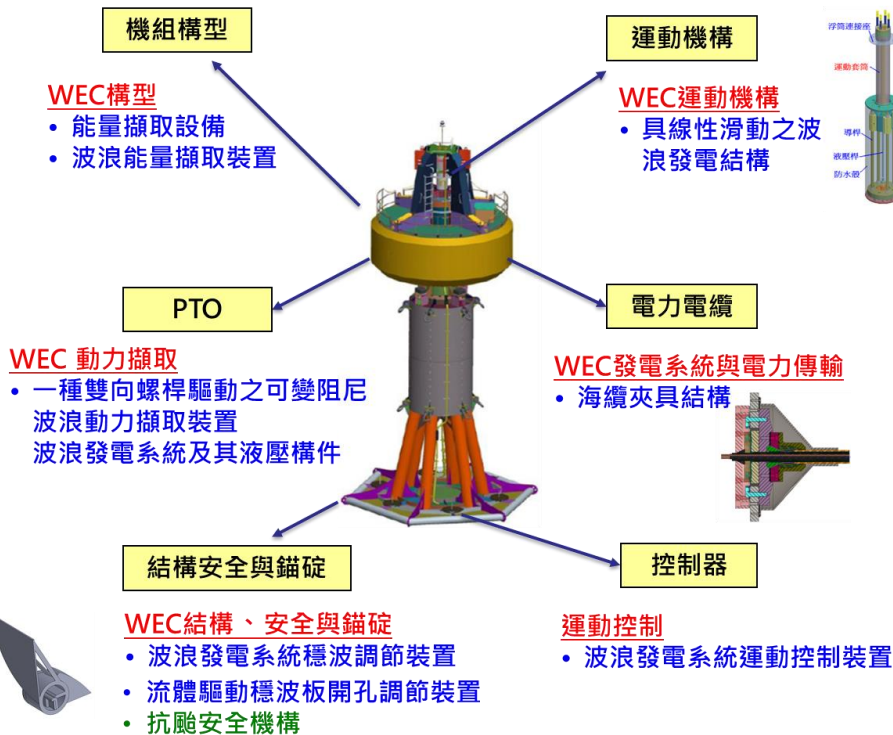
工研院

計畫主持人

顏志偉

- 為發展我國海洋能，研發高自製率波浪發電系統，逐步提昇機組性能與可靠度，並展開海上耐候測試來淬鍊機組性能。進行水下電力傳輸電纜技術本土化工作，尤其針對技術層次較高的動態電纜，將進行動態纜線開發與海上測試，加速達成輸電上岸之階段目標。

20kW點吸收式波浪發電機組



動態海纜設計開發

- 本計畫之點吸收式波浪發電系統，採用可雙向轉換波能之液壓動力系統，透過浮體的上下運動，利用低磨耗運動機構降低運動摩擦損失，將波浪能量傳遞給動力轉換系統，藉由液壓驅動發電機產生功率輸出；安裝方式則可因地制宜採離岸底碇式、懸浮式或岸基式。所發展之技術能力可依波浪發電機所需要之動能與現場海域的波浪條件，設計合適的機組外型與大小，進行波浪發機組整體外型與內部配置之細部設計。
- 2015年已完成20 kW波浪發電機組海上耐候測試，但面對極端天候可靠度仍不足，將優先考量颱風極端波浪下機組存活度，建立抗颱風關鍵技術。
- 水下電力傳輸技術本土化，動態纜線是懸浮式再生能源設備進行電力傳輸之重要關鍵技術，我國首次投入動態纜線開發，已完成3.3kV動態纜線與相關輔助元件(夾具與防彎曲保護裝置)設計開發，並歷經兩個月的海上嚴苛環境以及東北季風挑戰，通過各項測試與驗證。

Research and Test of Wave Energy Conversion Systems

Execution Unit

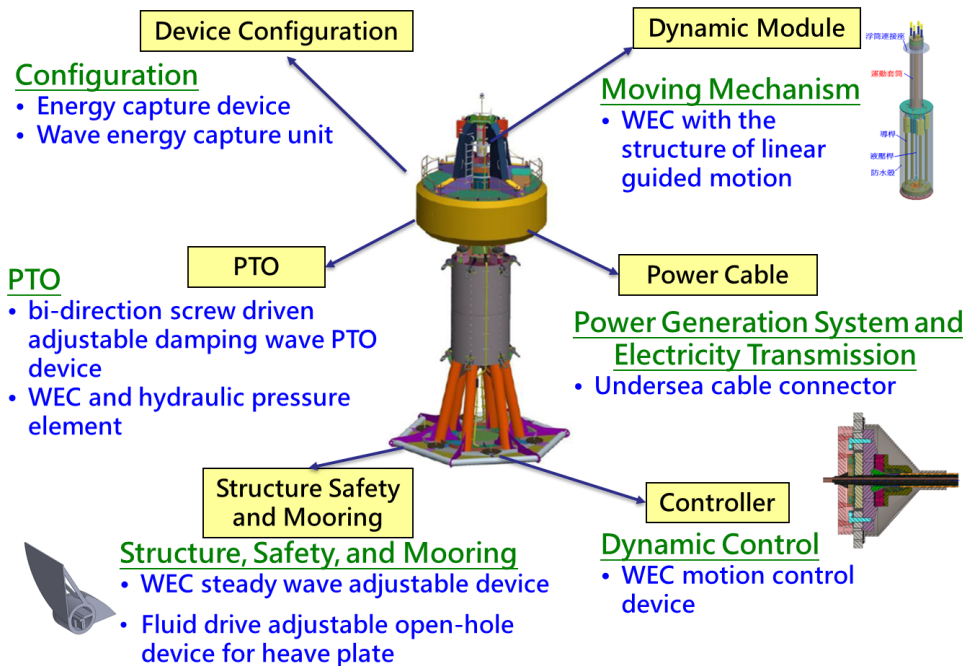
Industrial Technology Research Institute

Project Director

Chih-Wei Yen

- Research and development of high self-made rate of WEC, gradually improve the WEC performance and reliability, then expand the sea test to verify. Establishment of local underwater power transmission cable technology, to development of dynamic cable and sea test.

20kW WEC



dynamic cable

- The WEC devices developed at ITRI utilized a two-way energy conversion hydraulic power system. Wave energy is first absorbed with buoy and converted into mechanical energy. This is done through a low friction and high rigidity mechanism. The mechanical energy is further converted into electrical power through a hydraulic motor and a power generator. The WEC device is designed in such a way that it could be installed with different anchor type depending on site condition. The key technology is the capability to design and develop a WEC device with respect to required power and specific wave climate.
- The project has completed the sea test of a 20 kW WEC in 2015, but reliability is still not enough under extreme weather conditions. We need to first consider the survival, to establish security technology against typhoon.
- To establish underwater transmission technology, dynamic cable is an important key technology of transmission of floating renewable energy equipment. Taiwan first developed dynamic cable, has completed 3.3kV dynamic cable and related auxiliary components (fixture and anti-bending protection device) design and development. And after two months of harsh marine environment and the northeast monsoon challenge, passed the test and verification.