

# 浮游式黑潮發電先導機組設計開發關鍵技術之研究

執行單位

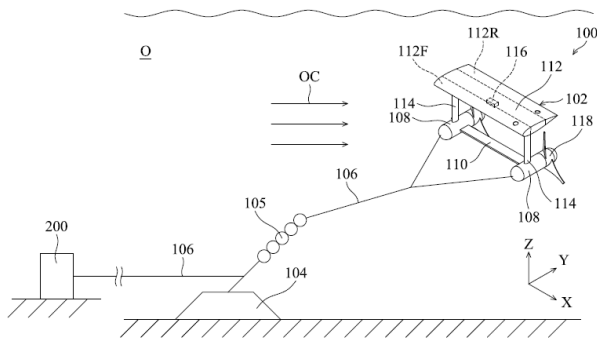
國立台灣大學

計畫主持人

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- 黑潮洋流發電渦輪機創新技術研發，達成20kW級浮游式黑潮發電先導機組整合設計與分析之自主技術，完成800W模型機組水槽發電測試驗證，並取得智財，作為後續導引產業投入20kW先導示範機組建置、推動0.5MW商用示範機組開發及實海域驗證計畫之基礎。

- 中華民國發明專利
- 名稱: 海流發電裝置
- 證書: I 608165
- 公告: 2017/12/11

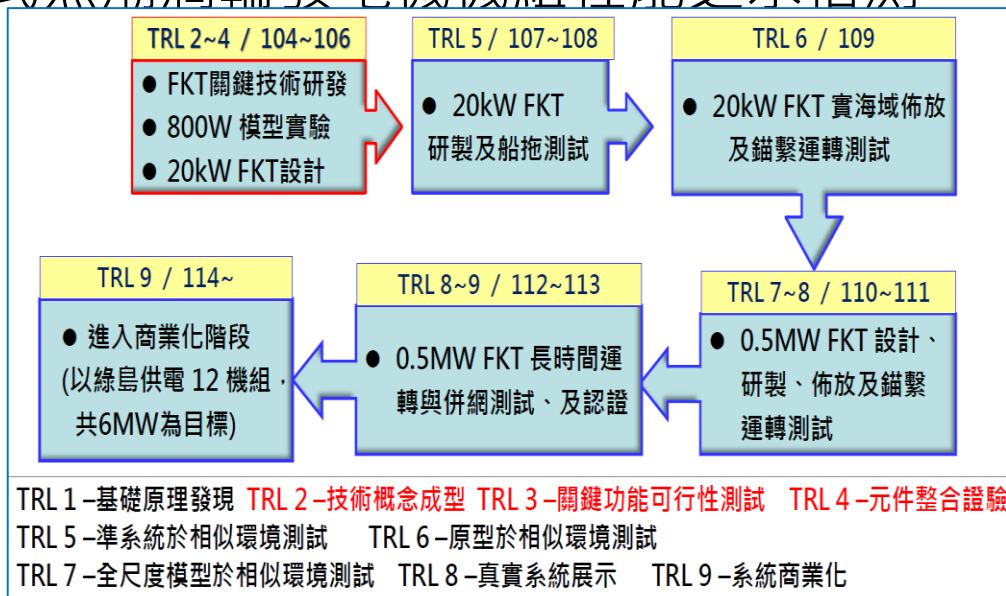


- 建立了包含翼形浮體作為浮力調節元件的浮游式黑潮渦輪發電機系統設計分析技術；建立了直趨式永磁同步發電機設計分析技術；建立了轉子葉片設計與性能分析技術；建立了耐高水壓的油壓補償水密軸封設計技術；建立了浮游式黑潮渦輪發電機機組性能之水槽測試系統與測試技術。

- 於2017年8月15日舉辦了「黑潮發電前瞻技術國際研討會」，邀請日本NEDO黑潮發電計畫團隊三位專家出席發表研發成果，併同本團隊成員，合計有8篇演講，國內100多位業界、學界及學生出席參與研討，

有助於國內對於台日洋流發電技術進展有進一步的理解。本計畫目前達到TRL 4，日本NEDO計畫目前則已達到TRL 5。

- 已完成1/25縮尺(800W)模型機組的水槽試驗，在1.45m/s時發電量達850W以上，預計將於2018年1月9日在台大大型水槽公開舉行800W模型機組的水槽拖曳發電展示會。



# Key points for design and development of technology research for floating power generation pilot unit in the Kuroshio Current

Executive Unit

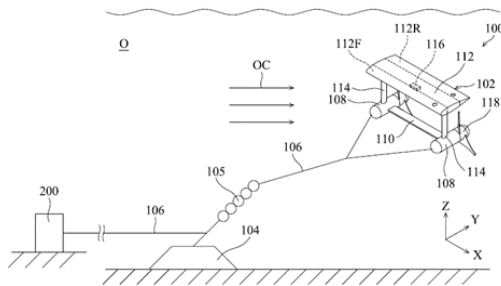
National Taiwan University

Project Director

Prof. Forng-Chen Chiu

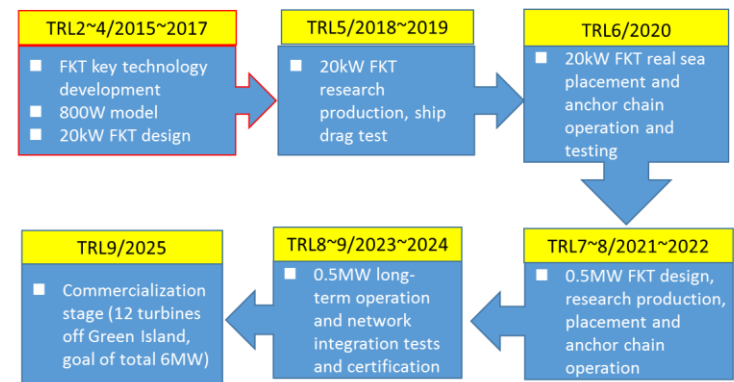
- Innovative research and technology for a floating turbine for the Kuroshio Current achieved independent technology for a 20kW level integrated turbine unit design and analysis. The completed 800W model unit power generation tank test obtained intellectual property registration, as a basis for future guidance for industry investment in a 20kW pilot demonstration unit to promote commercial demonstration of 0.5MW turbine development and a real-sea verification project.

- ROC Invention patents
- Name: Ocean current power generator
- Registration: I 60816
- Announced: 11 Dec. 2017



- Established design and analysis technology for adjustable floating wing buoy for the floating Kuroshio Current turbine generator system. Established design and analysis technology of direct-coupled permanent magnet synchronous generator. Established performance analysis technology for the rotor blade design. Established design technology for high hydraulic pressure compensated watertight shaft seal; established Kuroshio floating turbine unit performance sink test system and test technology.

- On Aug. 15, 2017, held International Seminar on Advanced Technology in Kuroshio Power Generation and invited 3 experts from Japan's Nedo Kuroshio power project research group to report on their results. Together with those of our own research group members, there were total of 8 lectures, and over 100 participants from domestic industry and academia attended the seminar to further understand domestic marine power generation. Currently this project is at TRL4, and Japan's NEDO project is at TRL 5.



TRL1: basic principles discovered  
 TRL2: formation of concept technology  
 TRL3: key function feasibility studies  
 TRL4: component integration certification  
 TRL5: preparatory system undergoes similar environment testing  
 TRL6: prototype in similar environment testing  
 TRL7: full scale model in similar environment testing  
 TRL8: actual system displayed  
 TRL9: commercialization of system

- Completed a 1/25 scale (800W) model generator sink test with power generation capacity of 850W or more at speeds of 1.45m/s. Open exhibition of the 800W model unit sink drag expected to be held on Jan. 9, 2018 at National Taiwan University's large sink.