

低碳排流體化床技術之開發與應用計畫

執行單位

核能研究所

計畫主持人

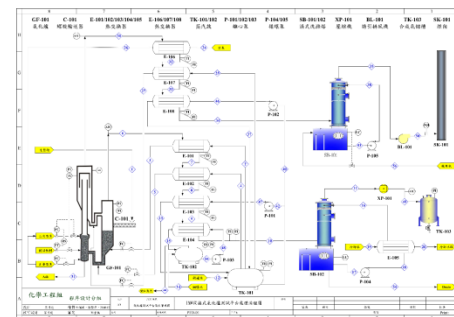
邱耀平

- 百瓩級流體化床間接式氣化先導系統建置，針對國內生質物料源與事業廢棄物經由氣化獲取可用能源技術之推廣，達成廢棄物資源化（提升再生能源發電量）與節能效益，並呼應「循環經濟」理念。

- ✓ 至106年底
- ✓ 申請：6案
 - 中華民國：3案
 - 美國：3案
- ✓ 獲得：5案
 - 中華民國：3案
 - 美國：2案
- ✓ 「內通式流體化床循環速率之控制方法」於2016台北國際發明展之競賽區獲銅牌獎



百kW_{th}級雙流體化床氣化爐冷模設施（左：整體、右：試驗過程）



間接式氣化程序
1MW_{th}系統之PFD

- 本計畫係研發促進能源多元化、提高能源效率之流體化床技術，推動國內產業導入潔淨低碳技術。目標係建立百瓩級雙流體化床間接式氣化系統並與產業合作推動 MW_{th} 級示範系統，該技術可應用至國內相關產業，如生質物發電、化工、造紙或廢棄物處置等，可提升合成氣品質，以達到減碳效益與發展帶動氢能經濟；並掌握永續社會發展條件，以向國際社會宣示我國欲達成溫室氣體減排的決心。
- 百瓩級流體化床間接式氣化先導系統建置，國內目前無此技術；團隊於2015年底完成先導設施概念設計之技術引進，接續進行工程規劃、及主體細部設計。本(2017)年度已完成 $100kW_{th}$ 級雙流體化床等比例冷模設施建置並進行流體動力參數測試，及生質物(木材)進料之 $1MW_{th}$ 級氣化系統設計。

Development and Applications of Fluidized-Bed Technology with Low-Carbon Emission

Execution Unit

Institute of Nuclear Energy Research

Project Director

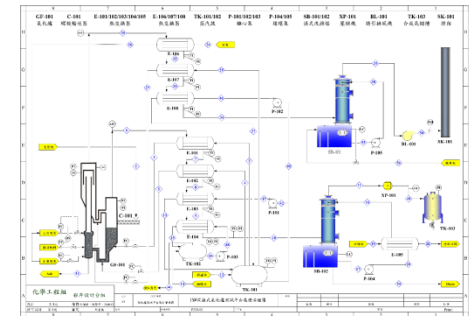
Yau-Pin Chyou

- To develop a 100kW_{th} -class pilot facility for indirect fluidized-bed gasification that utilizes indigenous feedstock to increase the contribution of renewable energy in the portfolio of electricity generation and convert waste to resources, complied with the “circular economy” concept.

- ✓ Patent (till 2017)
- ✓ Application #: 6
 - Taiwan : 3
 - US : 3
- ✓ Granted cases: 5
 - Taiwan : 3
 - US : 2
- ✓ Bronze medal award: 2016 Taipei Int'l Invention Show & Technomart



The Cold Mode of 100kW_{th} Indirect Fluidized-Bed Gasifier
(Left: Overall facility, Right: Experiment execution)



PFD of 1MW_{th} Indirect Fluidized-Bed Gasification

- It is essential to pursue follow-up efforts for energy utilization with lower carbon and pollutant emissions, as well as mitigate greenhouse gas emissions from sustainable development viewpoints.
- Clean utilization of biomass and waste via gasification technology are developed in this work. At present, local industry has shown interest in multi-production based on gasification and practiced a feasibility study plan. A cooperation project with a steel company was executed in 2017, to gasify the waste from the company and evaluate the composition and heating value of syngas.
- The project team aims to commission a 100 kW_{th}-class gasification pilot test facility, and cooperate with industry to promote the scale-up of capacity for a MW_{th}-class demo plant in the future.