

高效率生質氣化共燒鍋爐系統之開發

執行單位

國立成功大學航空太空工程學系

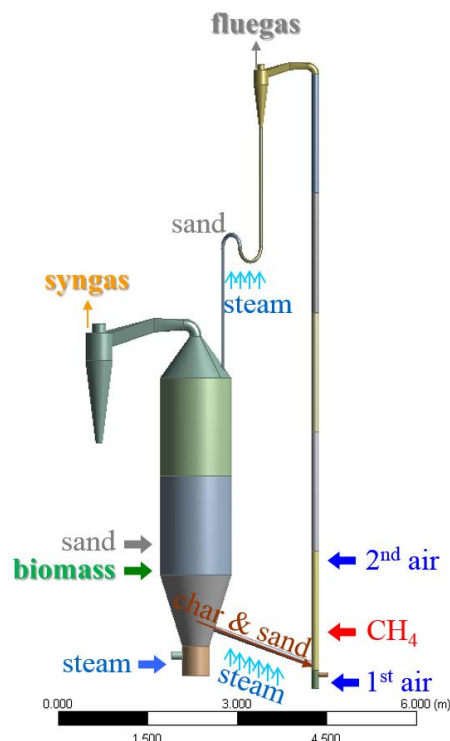
計畫主持人

趙怡欽

- 所開發之雙流體化床生質物氣化鍋爐系統，產生之合成氣可與傳統鍋爐結合進行共燒，亦可結合燃料電池提高效率與發電，未來擬應用於熱需求(加熱)或發電產業，同時達成生質/廢棄物減量與去汙化之目標。

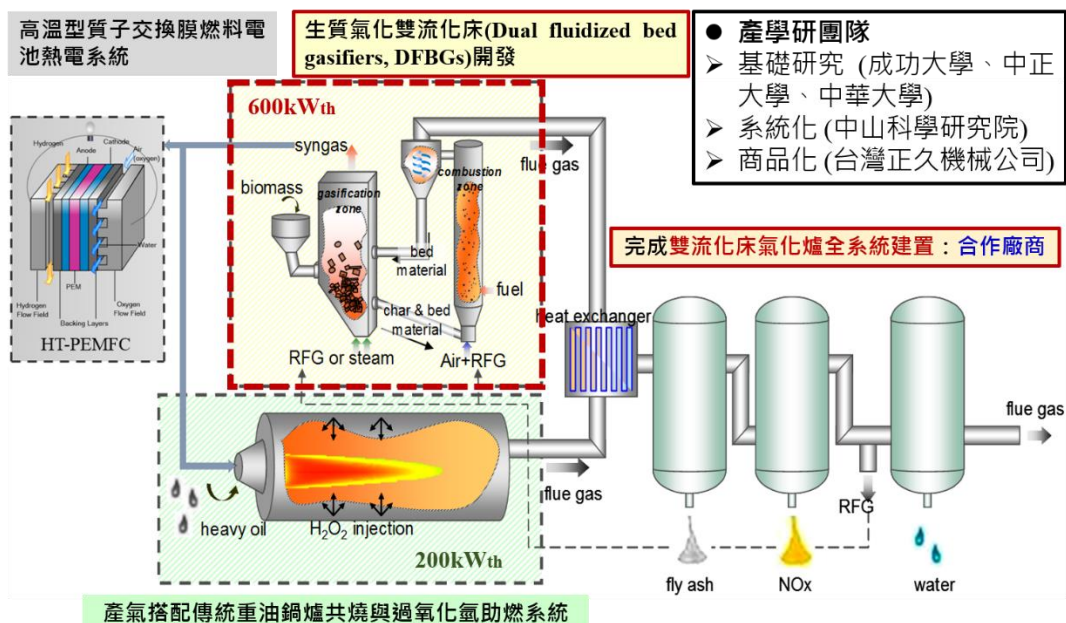
專利申請

1. 雙流化床生質氣化系統
2. 陽極循環式燃料電池之氣體管理方法及系統



- 本計畫結合產學研三方共同開發一套雙流體化床生質物氣化鍋爐系統，其中包含一個600 kW_{th}鼓泡流化床氣化爐與一個200 kW_{th}循環流化床燃燒爐。未來氣化爐所產生之潔淨高熱值合成氣除了可搭配傳統重油鍋爐與過氧化氫助燃系統共燒外，亦可將淨化與純化後之氫氣作為高溫型質子交換膜燃料電池模組之燃料，用以提高生質氣體的能源使用效率與應用範圍。目前掌握技術如下：

1. 生質氣化技術與600 kW_{th}雙流化床鍋爐自主設計開發與操作經驗。
2. 過氧化氫輔助重油與生質物燃燒技術。
3. 高溫質子交換膜燃料電池膜電極組製作技術。



Development of Highly Efficiency Cofired Furnace Incorporated with Biomass Gasification

Execution Unit

Department of Aeronautics and Astronautics, NCKU

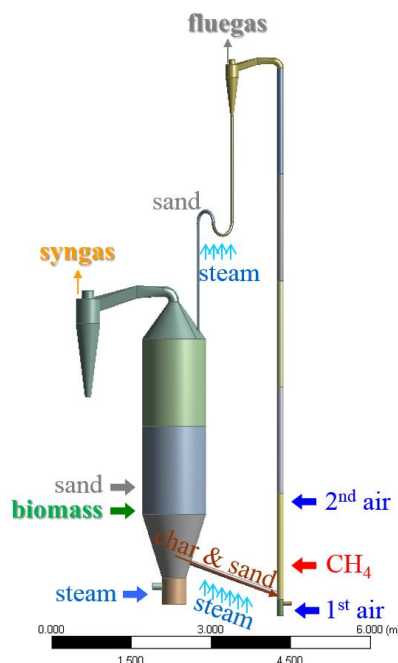
Project Investigator

Yei-Chin Chao

- The syngas which produced from Dual fluidized bed gasifiers can be co-fired with traditional furnaces or combined with high temperature proton exchange membrane fuel cells to enhance energy efficiency. In the future, it can apply to heat demand or power generation industries and achieve the goal of waste-to-energy and pollutant reduction.

Patent application:

1. Dual fluidized bed gasifiers for biomass
2. Gas management method for anode gas recirculation fuel cell and system thereof



- This project integrates the research group of several units (NCKU, NCCU, CHU, CSIST and Taiwan Masahisa Machinery CO., LTD.) and develops a set of highly efficient gasification co-fired furnace with the fuel of heavy oil and solid biomass. The dual fluidized bed gasifier includes a 600 kW_{th} BFB steam gasifier and a 200 kW_{th} CFB air burner. This project also develops a high temperature proton exchange membrane fuel cell (HT-PEMFC), and uses the produced biogas for the HT-PEMFC to extend its applications. The main technique is as follows:
 1. Biomass gasification and 600 kW_{th} Dual fluidized bed gasifiers development and operation.
 2. Enhancement of heavy fuel oil and biomass combustion efficiency by hydrogen peroxide addition.
 3. Development of a high temperature proton exchange membrane fuel cell.

