分散式生質廢棄物能源關鍵技術研發計畫

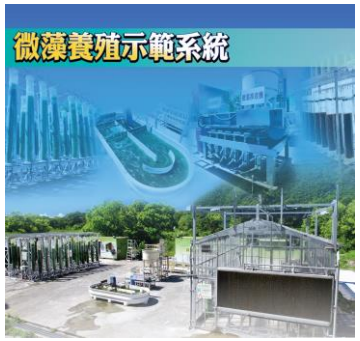
執行單位	工業技術研究院	計畫主持人	萬皓鵬博士

- 結合政策與關鍵技術，合理開發國內料源，建構生質廢棄物循環經濟應用模式，達再生能源目標。
- 應用國內生質利基料源，經熱化學及生物技術轉化為**分散式電能**、**生質燃料**及**中長碳鏈**/精密化學品，提昇**自主能源**，降低CO_2排放。

- A method for separating hydrolyzed product of biomass(中國大陸、馬來西亞)
- Method for separating hydrolysis product of biomass(美國)
- New mutant of Bacillus thuringiensis and application thereof(美國)
- 多孔材料與其製備方法、以及包含其之觸媒組成物(中華民國)
- 觸媒及其製造方法、以及合成燃氣之製造方法(中華民國)

工研院除焦油觸媒

5噸級裂解產油示範系統



微藻養殖示範系統

5噸級乾式厭氧醱酵發電系統

解聚噸級先導廠

項目		核心技術	成果與亮點
生質熱電技術	高效率觸媒氣化發電關鍵技術	• 流體化床觸媒氣化技術 • 新型床質觸媒合成技術 • 觸媒除焦油技術	• 業者合作污泥氣化技術 • **荷蘭ECN技術合作，簽署合作意向書**
	乾式厭氧醱酵技術	•共醱酵技術 •乾式厭氧醱酵設備設計 •多槽並聯模擬連續操作模式	• 台南市環保局合作示範運行 • 與工程公司合作商轉設備開發 • 與牧場合作驗證雞糞能源化
	裂解產油技術	• 流體化床裂解技術 • 除蠟技術	• 與永豐餘公司合作研究建立5噸/日準商業化裂解產油技術 • 5wt.%裂解油混燒，排放特性無差異
生質燃料與生物固碳技術	微藻固碳能源及加值化應用技術	• 高效率微藻生長技術 • 生物固碳合成技術	• **第5屆國家產業創新獎** • 微藻生長速率提升50%以上
	木質纖維素解聚技術	• 離子溶液解聚技術 • 有機酸回收技術 • 醣鹽薄膜分離技術	• **2013 R&D 100 Awards** • 完成噸級先導廠建置與驗證 • 自產纖維素酒精技術驗證(工研院、核研所及中油公司)

Research & Development of Decentralized Biomass/Waste to Energy Technologies

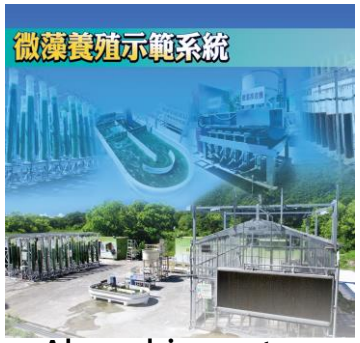
Execution Unit	Industrial Technology Research Institute
Project Director	Hou-Peng Wan

- Utilization of domestic biomass to provide distributed **electricity**, **biofuels** or medium-to-long carbon chains **bio-chemicals** by thermochemical or biological technologies for energy independence and CO_2 emissions reducing.

- A method for separating hydrolyzed product of biomass(China, Malaysia)
- Method for separating hydrolysis product of biomass(USA)
- New mutant of Bacillus thuringiensis and application thereof(USA)
- Porous material and method for preparing the same, and catalyst composition employing the same(ROC)
- The catalysts for increasing gasification efficiency and their modification(ROC)

ITRI-tar cracking catalysts

5 t/d paper-reject pyrolysis system



Algae bioreactors

Dry anaerobic fermentation system(5 ton)

Cellulosic sugar demonstration plant

Item		Core Technology	Achievements
Biomass for heat and power	High efficiency catalytic gasification tech.	• Catalytic fluidized-bed biomass gasification Tech. • Catalytic bed material synthesis • Tar cracking catalysts development	• **Cooperation with a company in development of sludge gasification** • **Cooperation with ECN in catalytic gasification development**
	Dry anaerobic fermentation tech.	• Co-culture fermentation tech. • Dry anaerobic fermentation device • Semi-continuous dry fermentation process	• Cooperation with Environmental Protection Bureau of Tainan City Government in food waste treatment • Cooperation with a manufacture company for development of commercial system • Chicken manure fermentation validation
	Fast pyrolysis tech. for paper-reject	• Fluidized-bed fast pyrolysis tech. • De-wax tech.	• 5 t/d paper-reject fast pyrolysis pilot plant(semi-commercial) • 5wt.% pyrolysis oil co-firing
Biofuels and carbon fixation	Carbon fixation by algae and algae' s value-added benefits tech.	• Bioactive substance on culturing microalgae • Carbon fixation by algae	• **2017 National Innovation Industrial Award** • Microalgae growth rate increased >50%
	Lignocellulose depolymerization tech.	• Ionic solution hydrolysis tech. • Organic acid recovery tech. • Membrane separation and purification tech.	• **2013 R&D 100 Awards** • Lignocellulose depolymerization pilot plant • Cellulosic bioethanol tech validation (ITRI, INER and CPC)