

- 1) **Li Sun**, Bin Xu, Robin Smith, Study of Tail Gas Treatment in Barley Straw Gasification Processes Integration with Utility Systems, The 7th International Conference on Applied Energy -ICAE2015, Abu Dhabi, United Arab Emirates, 28 - 31 March, 2015

The tail gas from the barley straw to transport liquid production processes contains light hydrocarbons, N₂, CO₂, H₂, and CO. It could combust as the fuel in the utility system for steam and power generation. Another tail gas treatment method is tail gas recovery to recycle H₂ and CO back to the production process for more liquids production. In this work, four tail gas treatment scenarios are investigated to address quantitative correlation among H₂ and CO recovery, product outputs, utility fuel selection, utility system performance, and CO₂ emission. The production processes and utility systems are optimized simultaneously to reach the optimal production and utility system operation. From the research results, tail gas recovery by reforming would lead to the optimal economic performance for the whole process site system. However, the tail gas combustion as fuel in the utility plant can achieve a similar economic profit, but reduce CO₂ emission about 20%.