

# Modelling the production of synthetic biodiesel via Fischer-Tropsch synthesis in eTransport

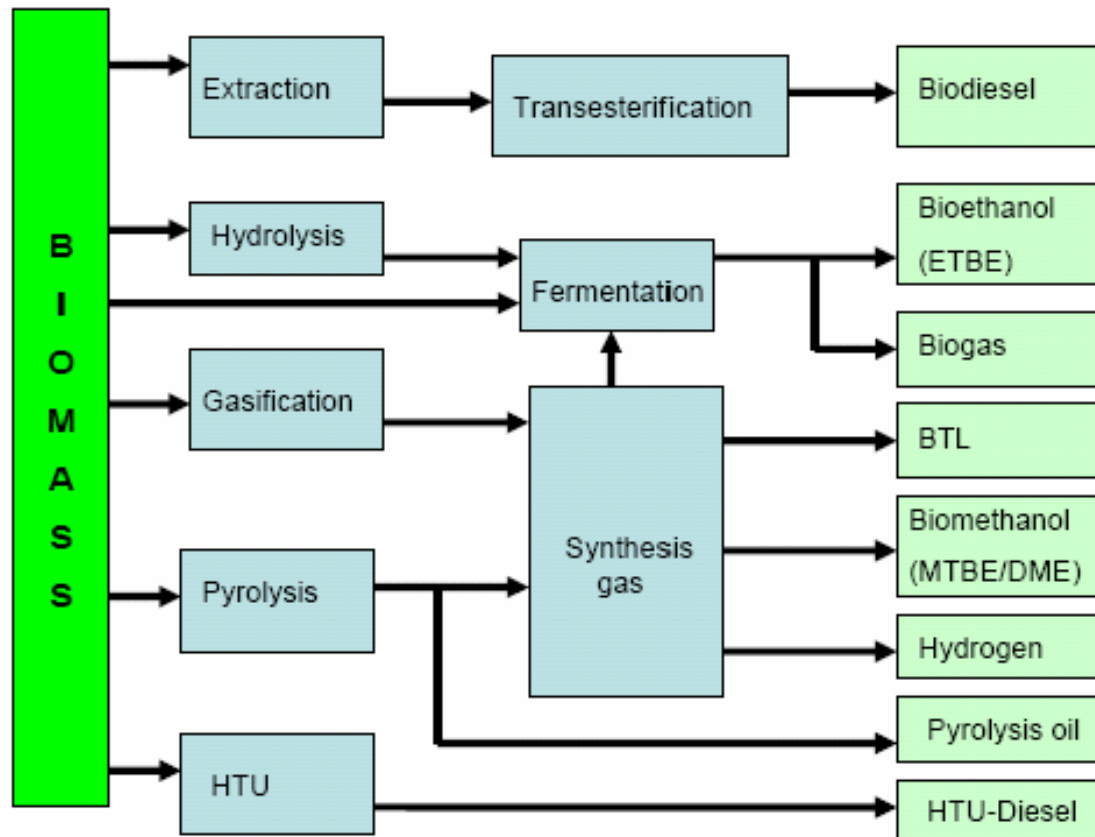
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Project work, Industrial Economy and Technology Management

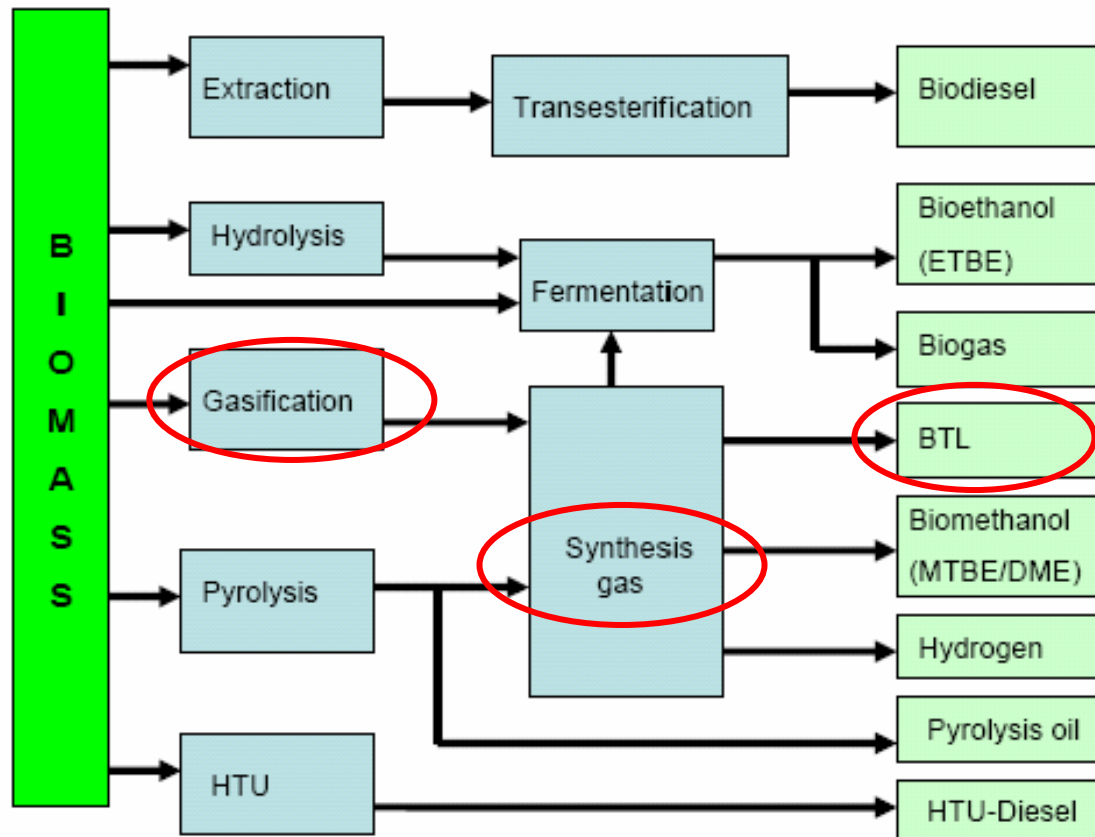
# Background

- Master 2007 - Yabai Li, Modelling of infrastructure for biomass collection
- I-SIP: Biofuels – Production of 2nd generation biodiesel  
"Through a case study, the most relevant biomass components are going to be implemented and tested in eTransport"

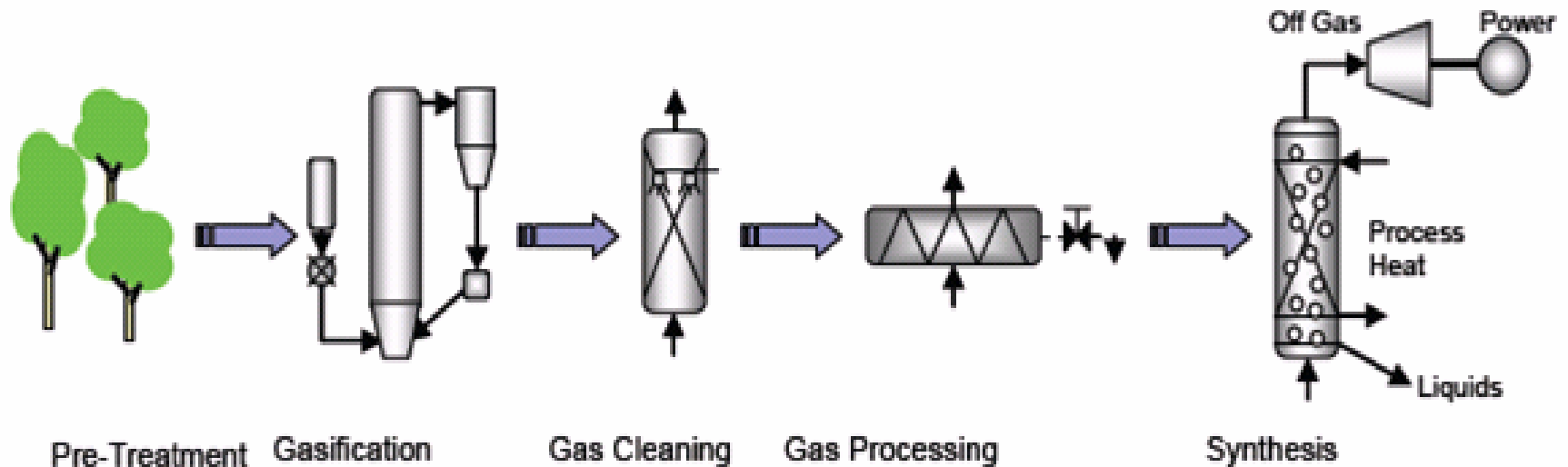
# Biofuels conversion routes



# Biofuels conversion routes



# Production of synthetic biodiesel via Fischer Tropsch synthesis



# Production of synthetic biodiesel via Fischer Tropsch synthesis

- Pre-treatment
  - Drying and grinding (master 2007)
- Gasification
  - Feedstock/ input: wood chips, pellets, residues
  - Process: feedstock undergo a partial oxidization and produces gaseous fuels called syngas
  - Many gasification methods available (types of gasifiers, other technical choices)

# Production of synthetic biodiesel via Fischer Tropsch synthesis

- Gas cleaning
  - FT catalysts are very sensitive to impurities in the syngas (particles, alkali, tar and nitrogen containing components)
  - No product gas from gasifiers meet the FT feed gas specifications
  - Extensive gas cleaning is necessary
  - Many choices
- Gas Processing
  - adjust the H<sub>2</sub>/CO ratio
  - reform the methane
  - reduce the fraction of CO<sub>2</sub>

# Production of synthetic biodiesel via Fischer Tropsch synthesis

- FT-synthesis
  - The synthesis gas undergoes a chemical reaction over a catalyst
    - synthesis gas is transformed into liquid hydrocarbons
  - Catalyst material is either iron or cobalt
  - Products: synthetic biodiesel, naphtha and gasoline products and wax
  - Hydrocracking of wax to synthetic biodiesel



# My project work

- Study the process
- Understand eTransport
- Make new AMPL models for eTransport
- Implement models in eTransport
- Go through a small case (?)

# New modules in eTransport

- Biomass supply (simple)
- Gasifier
- Gas cleaner
- Syngas Compressor
- FT reactor
- Demand, Market

# Challenges

- Understand the process and connections between parameters and variables
- Confidential data
- Discussions across fields of expertise
- Try to be a researcher