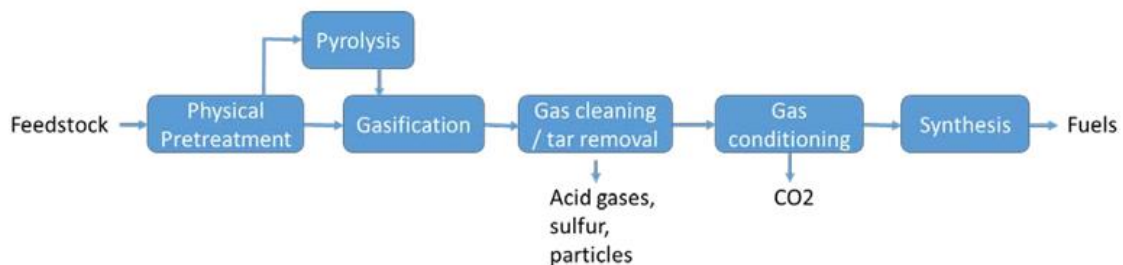




Biomass gasification for fuel production

Gasification is an efficient technology for the production of second generation biofuels from biogenic residues or waste, thus reducing land competition with food and feed production. The gasification process converts the feedstock into a gaseous chemical energy carrier, the synthesis gas, which, after purification and conditioning, can be converted to liquid long chain hydrocarbons like FT diesel, gasoline or kerosene, as well as oxygenates like methanol or ethanol.



Opportunities

- Gasification of biomass delivers a fossil free fuel with high energy density for hard to electrify transport, like aviation, shipping, long distance truck transport and the stock fleet of older vehicles with combustion engines.
- Carbon efficiency can be enhanced by adding green hydrogen produced by electrolysis, shifting the water-gas equilibrium to CO and H₂O.
- The CO₂ separated from the syngas can be captured and stored (CCS) or used in chemical processes to produce materials (CCU). This reduces the carbon footprint of the process.

Figure follows

Efficiency:

- Overall energy conversion efficiency is typically in the range of 40-65% (based on LHV)
- Utilisation of by-products like steam and heat can increase the overall efficiency by 5-10 %
- FT diesel, gasoline or kerosene have lowest yield from feedstock, but highest specific investment costs
- Biomethane (and hydrogen) have higher overall conversion efficiency and low investment costs.

A. Brown et al, 2020 Advanced Biofuels - Potential for Cost Reduction, IEA Bioenergy