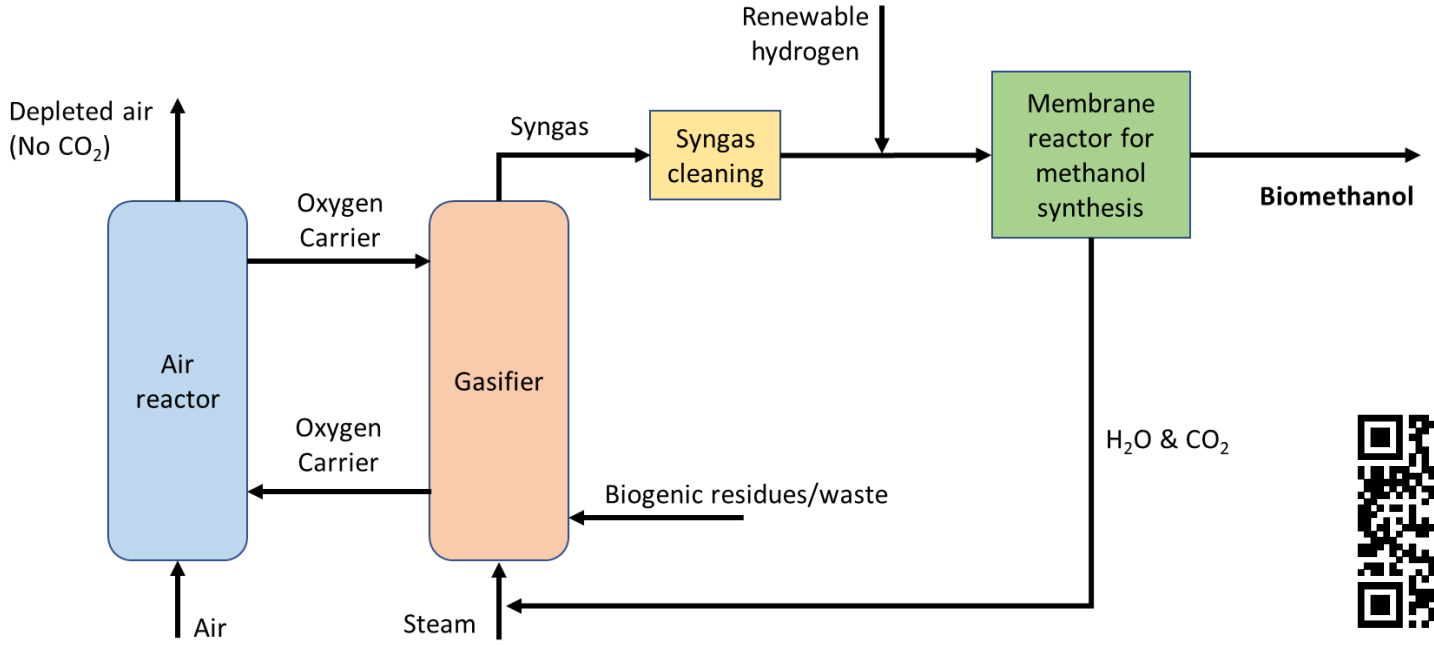
BioMeGaFuel

Funded by the European Union

Bio Methanol Production via Chemical Looping Gasification Coupled with Membrane Reactors

Advantages:

- Flexible toward feedstocks and can utilize various biogenic residues and wastes
- Higher conversion efficiency compared to conventional gasification and methanol synthesis methods, leading to lower production costs and maximum biogenic conversion to biomethanol.
- Reducing the number of downstream units, with the possibility of heat and power integration, provides significant potential for cost reduction.
- Produce biomethanol with near zero emissions (significant emission reduction).
- The process is less energy intensive and is self-sufficient in terms of heat.



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Website

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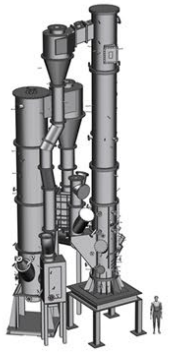
Key component Development

Chemical Looping Gasifier



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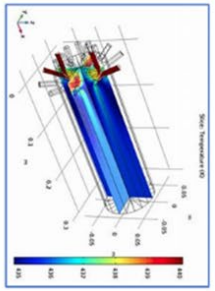
Methanol membrane reactor

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY
Blue World Technologies

Process model



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Products

Biomethanol

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Applications

Biofuel

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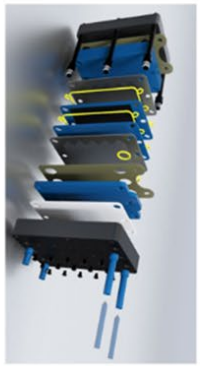
Fuel Cells



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Process evaluation and optimization

ivl Swedish Environmental Research Institute
RI. SE
Blue World Technologies
GIDARA ENERGY

TEA, LCA, S-LCA

Diss, Communication & Exploitation

ivl Swedish Environmental Research Institute
CUBE
RI. SE

www.biomegafuelproject.eu

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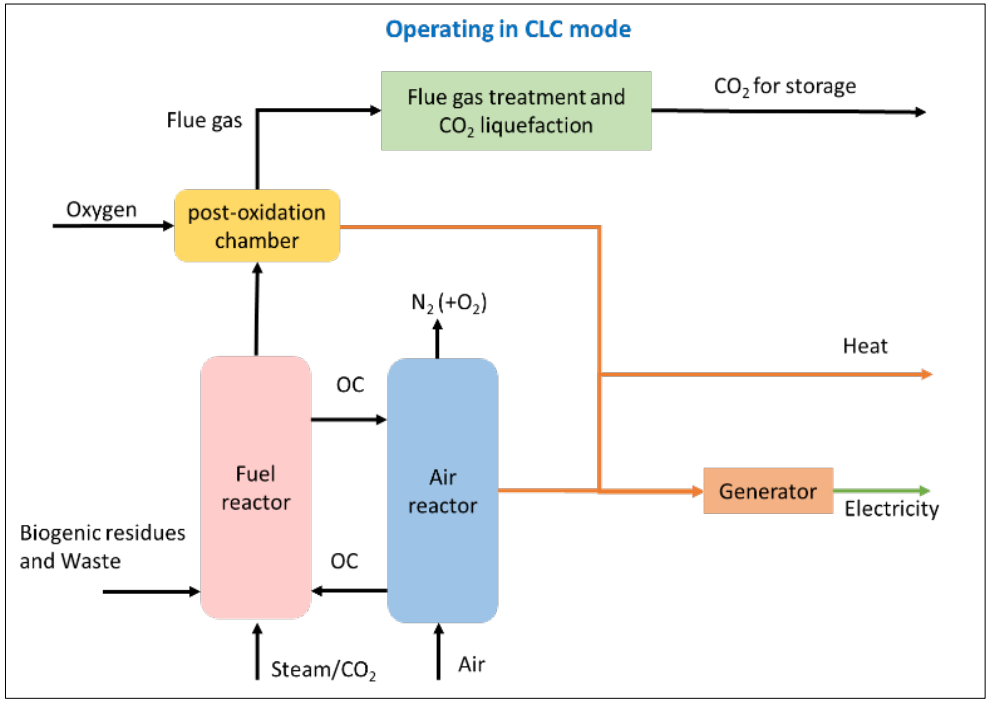
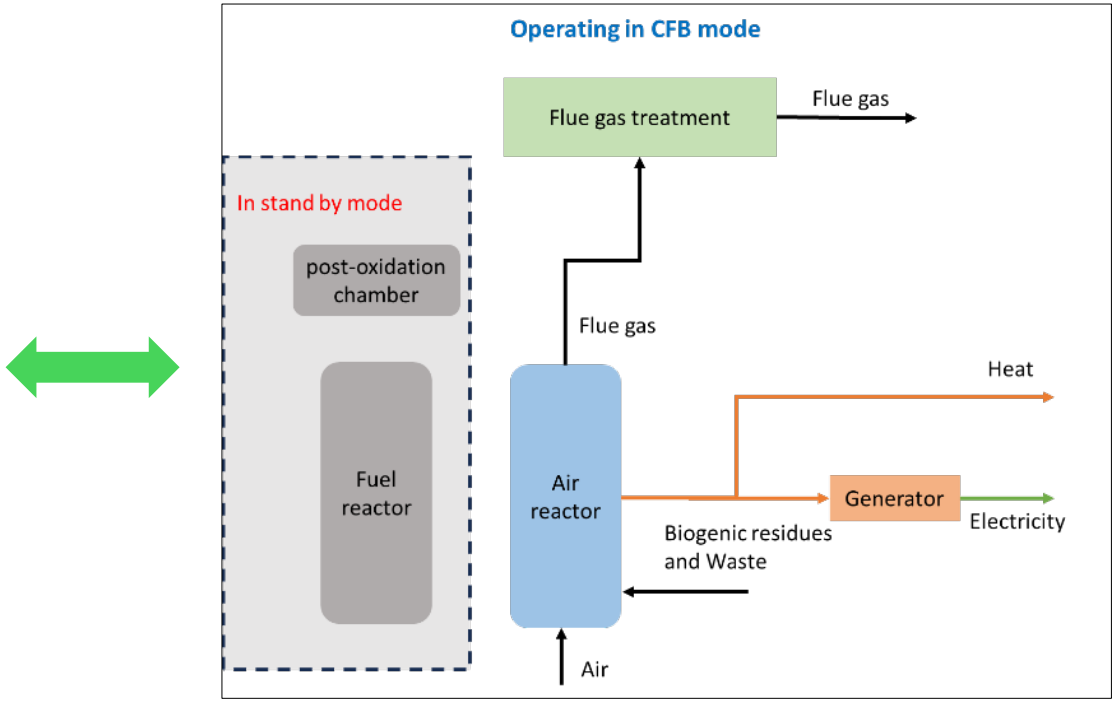
Flexible chemical looping combustion for combined heat and power production from biogenic residues with negative emission

Funded by the European Union

- The concept is based on dual circulating fluidized bed reactors which can operate in CLC mode while both reactors are in use or switch to conventional CFB operation when only one reactor is in use.
  - operating in CLC mode enables CHP production with negative emissions at low-cost while the concept is flexible to switch to CFB boiler mode to produce CHP with net-zero emissions





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Bio-FlexCLC Advantageous

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the European Union

1. Strong compatibility with existing infrastructure, as the technology is based on fluidized bed combustion, a common technology for heat and power production,
2. Have the flexibility to switch to conventional Circulating Fluidized Bed (CFB) combustion if market conditions are not amiable for carbon capture,
3. CLC model, have high efficiency and low cost and energy penalty and for CO_2 capture (roughly 20 €/ton$_{CO2}$),
    - Negative emission (CDR) at low cost
4. Since CLC offers inherent CO_2 capture, the CO_2 capture process automatically adapts to load variations, eliminating the cost penalties associated with significant capital investment costs for post-combustion capture or oxy-fuel infrastructure
5. In CLC mode, ash and emissions will be concentrated to the fuel reactor, where the gas flow is reduced to a quarter compared to conventional combustion,
6. CLC mode can generate supercritical steam for improved electrical efficiency,
7. The systems can utilize biogenic residues and wastes,
8. The system have high flexibility towards load fluctuations,
9. CLC mode results in lower SOx and NOx emissions.