

presentation abstract, session on gasification (if available)

Speaker: Stephan Renninger, Cyclize GmbH

Zero emission waste reforming to enable a circular carbon economy in Europe

Mixed waste streams present technological and environmental challenges for recycling: Even as sorting procedures improve, a large share of composites and non-sortable residues remains. Pyrolysis is a viable recycling approach for these fractions, but still lags expectations in terms of product usability; incineration and CCU are very energy intensive when considered together. Gasification can step up to the challenge of providing a CO₂ neutral non-fossil feedstock that is economically viable in Europe.

Traditionally, waste is gasified by partial oxidation, which leads to low grade syngas and considerable CO₂-emissions. The Cyclize approach instead provides energy by a non-thermal plasma, which is ignited directly in a stream of pyrolysis gas, reforming it to high quality syngas. Waste heat from this reforming step is used to drive the pyrolysis. The main challenge is building a low maintenance, large volume, high efficiency plasma reformer. Promising results could be achieved in Cyclize plasma reformers. An economic analysis hints the performance goals that plasma waste reforming needs to achieve, to be competitive to the traditional reforming of natural gas.