



ECOSYSTEM

Carbon Dioxide (CO₂) from the atmosphere is converted into Oxygen (O₂) and biomass through Chlorophylline photosynthesis by plants and vegetables.

BIOMASS

Woody and waste biomass is available for biofuel production.

BIOMASS PRETREATMENT

Biomass is pre-treated to reduce its size and moisture content.

FLEDGED GASIFICATION

GASIFIER

The gasifier requires **steam** and it produces mainly hydrogen (H₂) and carbon monoxide (CO), carbon dioxide (CO₂) and **char**. Solid calcium oxide (CaO) reacts with carbon dioxide (CO₂) producing calcium carbonate (CaCO₃) and allows adjusting syngas composition to specifications of the downstream process.

COMBUSTOR

Residual **char** from the gasifier is burned with air decomposing Calcium carbonate (CaCO₃) back to calcium oxide (CaO) and carbon dioxide (CO₂).

SYNGAS CLEANING

Pollutants (TAR, sulfur and Particulate Matter) are removed from the syngas to meet the specification of **DME** synthesis reactor.

DME SYNTHESIS

Clean syngas is converted into **DME** in a novel **FLEDGED** catalytic reactor. A porous sorbent is used to remove in-situ the produced steam, enhancing in this way the **DME** yield.

SUSTAINABLE HYDROGEN PRODUCTION

Additional Hydrogen (H₂) can be produced by water electrolysis using renewable electricity, boosting **DME** production and supporting a Power-to-Liquid conversion.

DME FINAL USE

DME can be used as **Biofuel** to increase the sustainability of the automotive sector, substituting conventional fossil fuels.