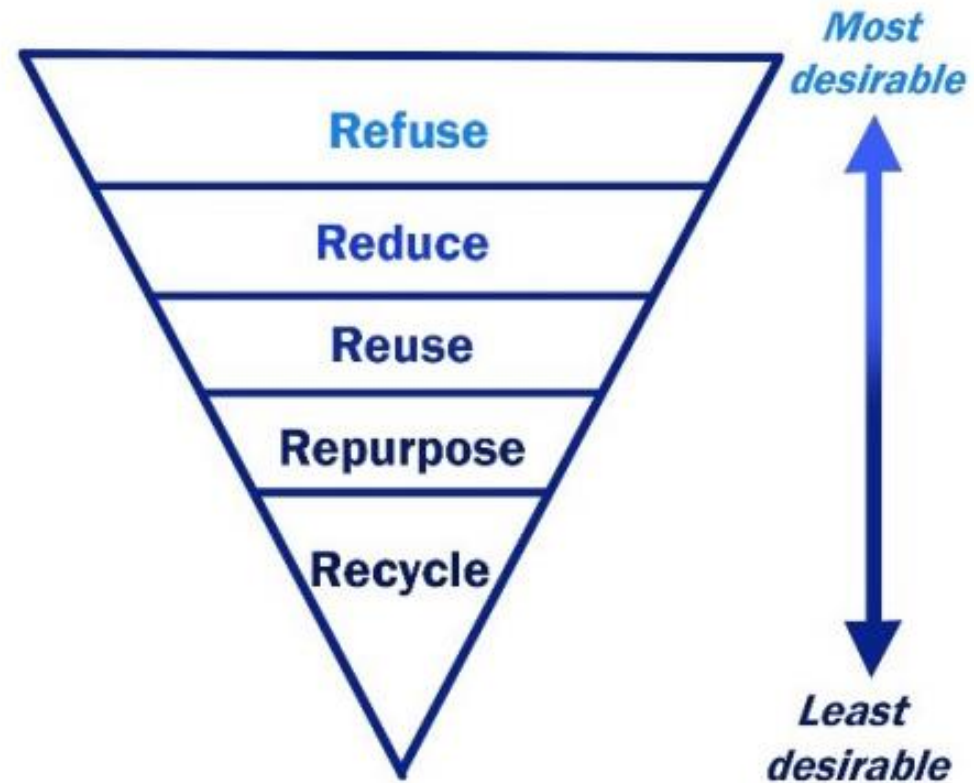


ENVIRONMENTAL ENGINEERING

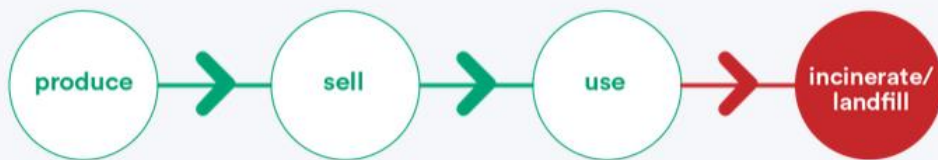
SOLID WASTE MANAGEMENT

5R PRINCIPLES

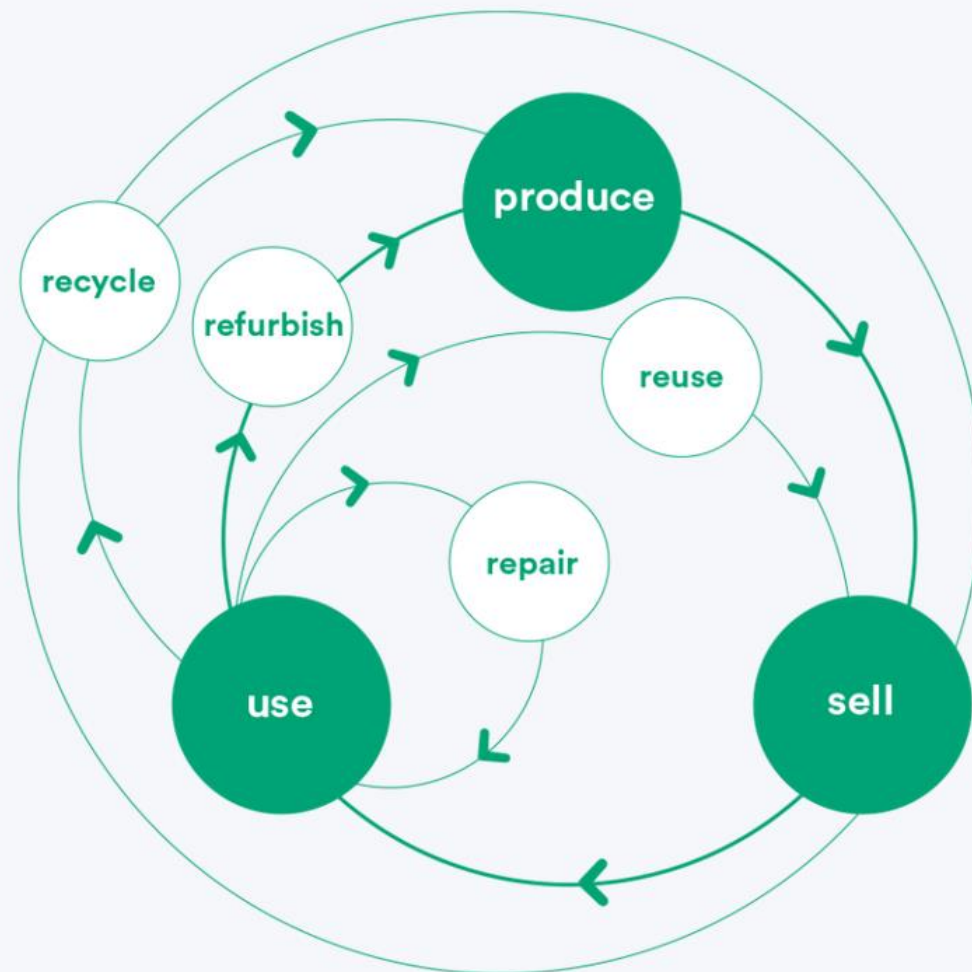


CIRCULAR ECONOMY

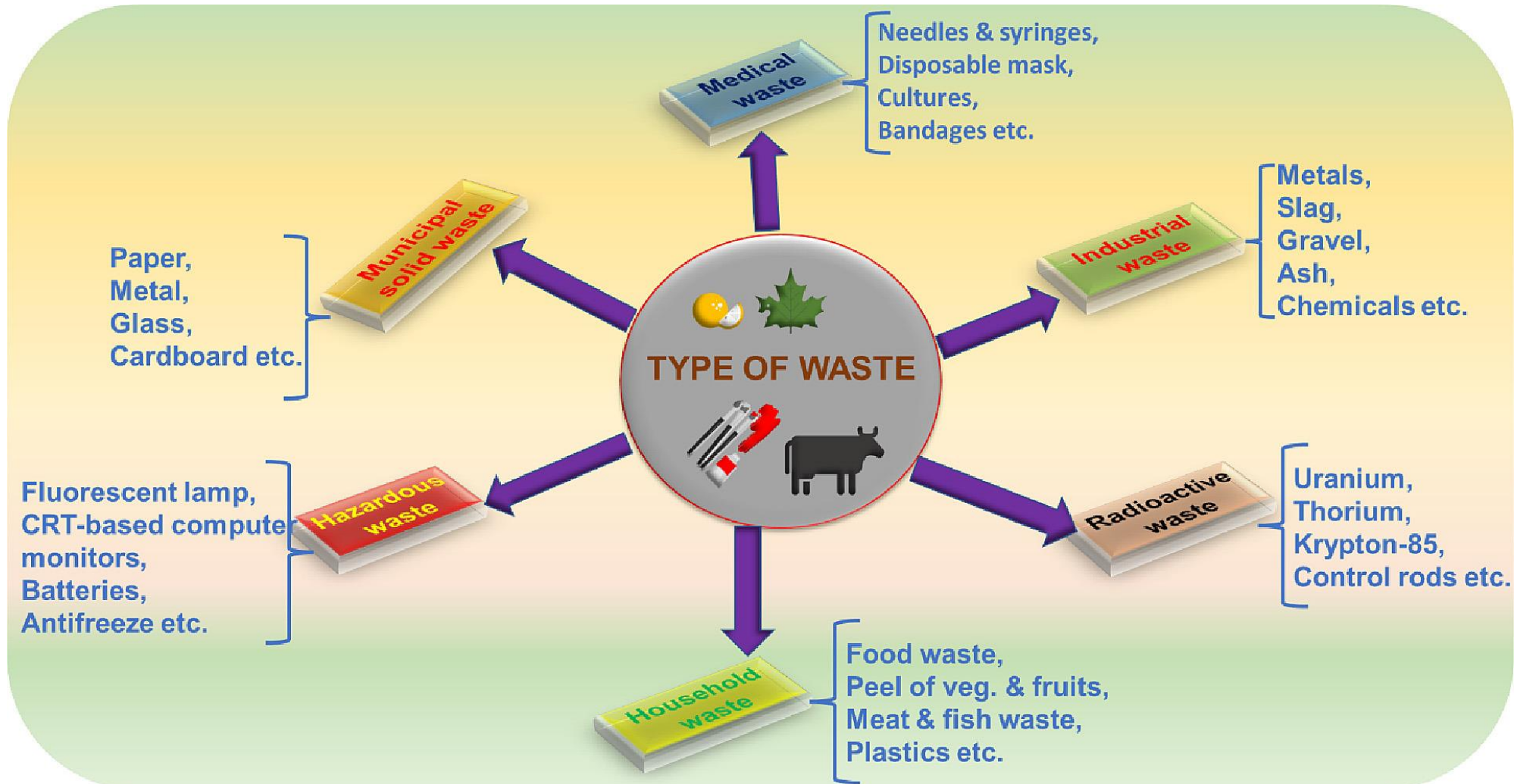
Linear Economy



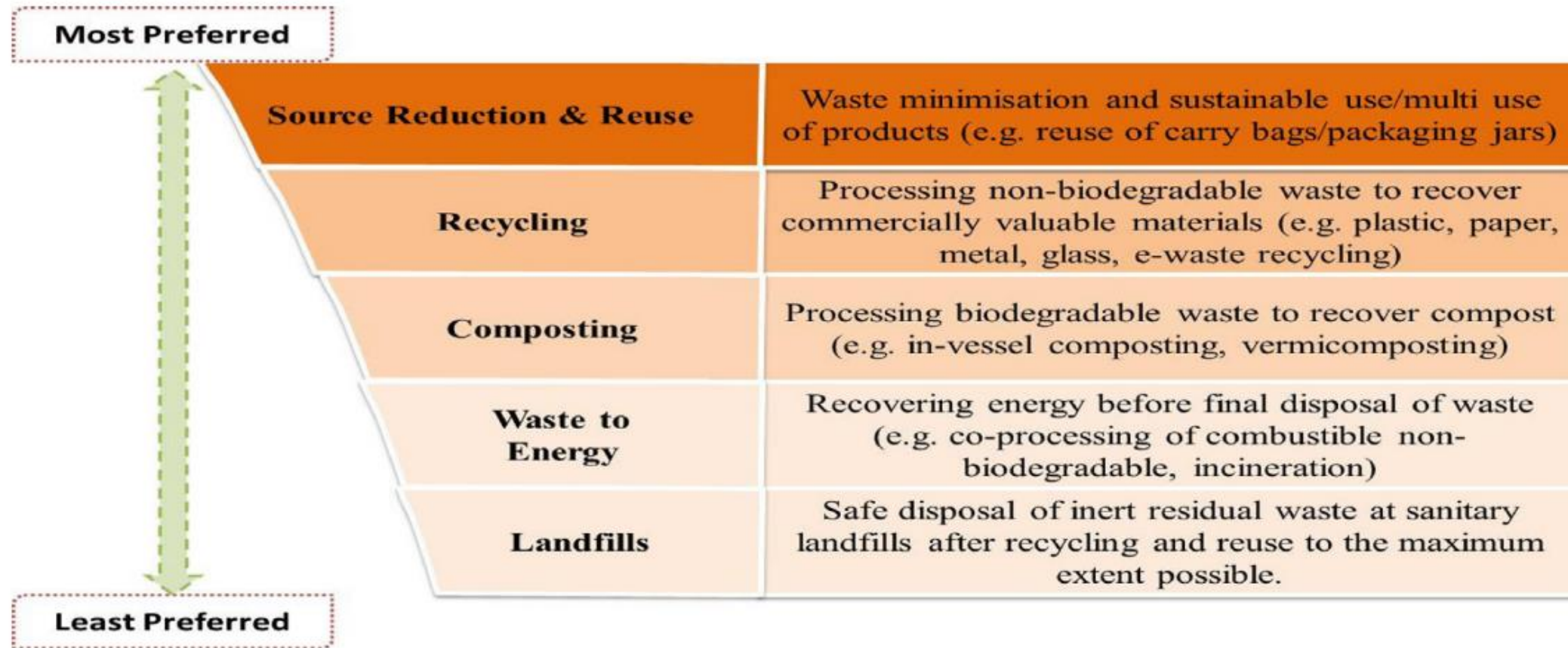
Circular Economy



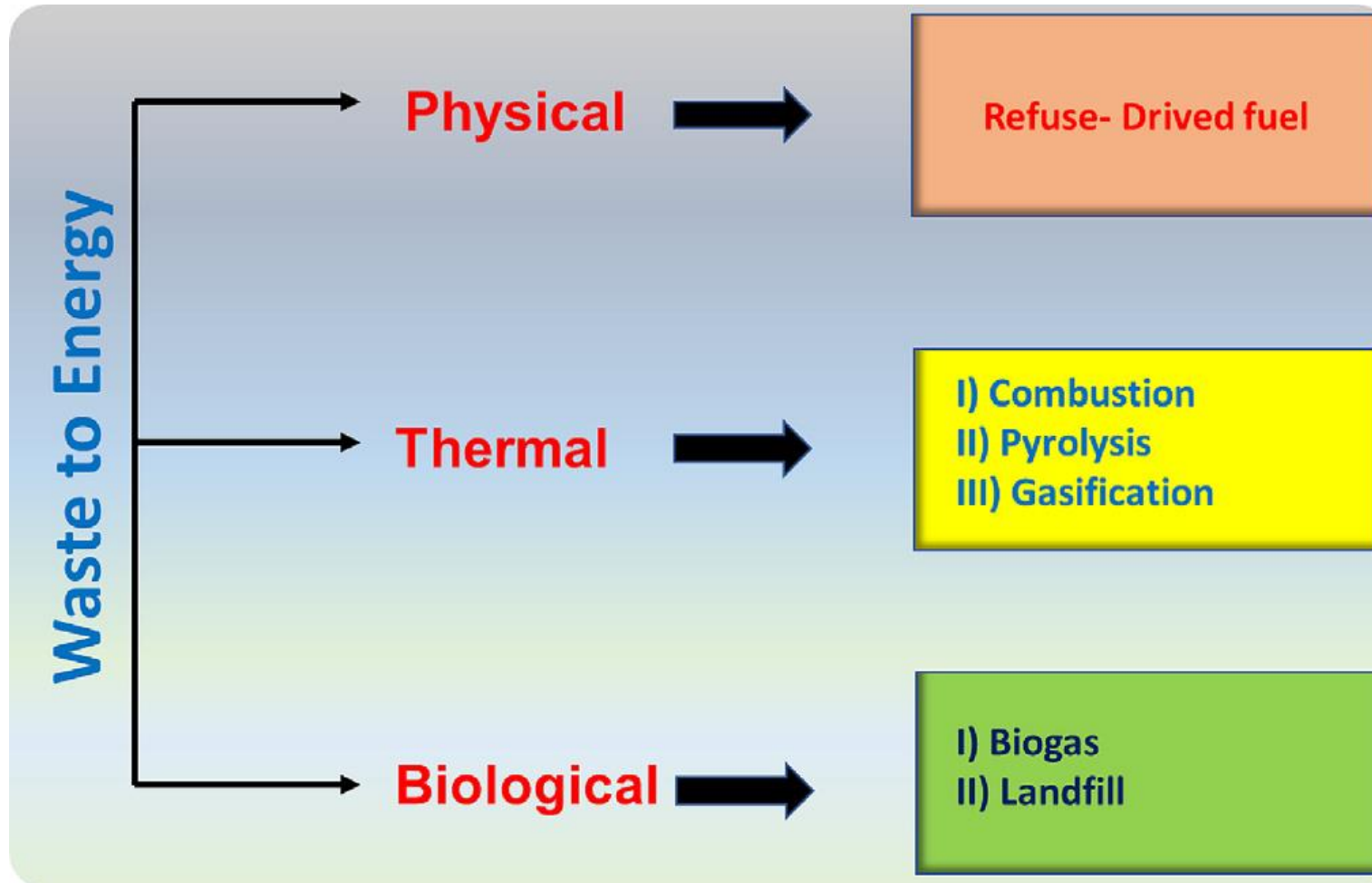
CLASSIFICATION OF WASTE



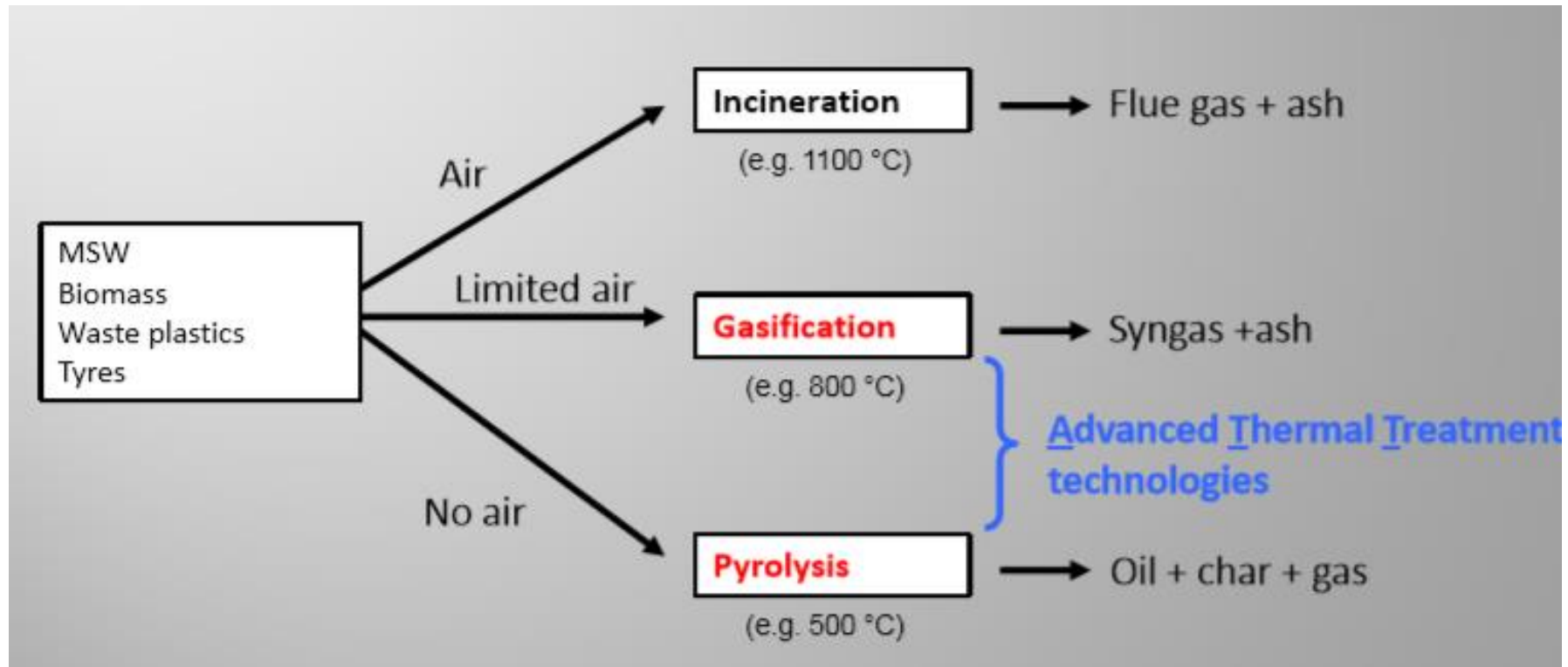
INTEGRATED SOLID WASTE MANAGEMENT HEIRARCHY



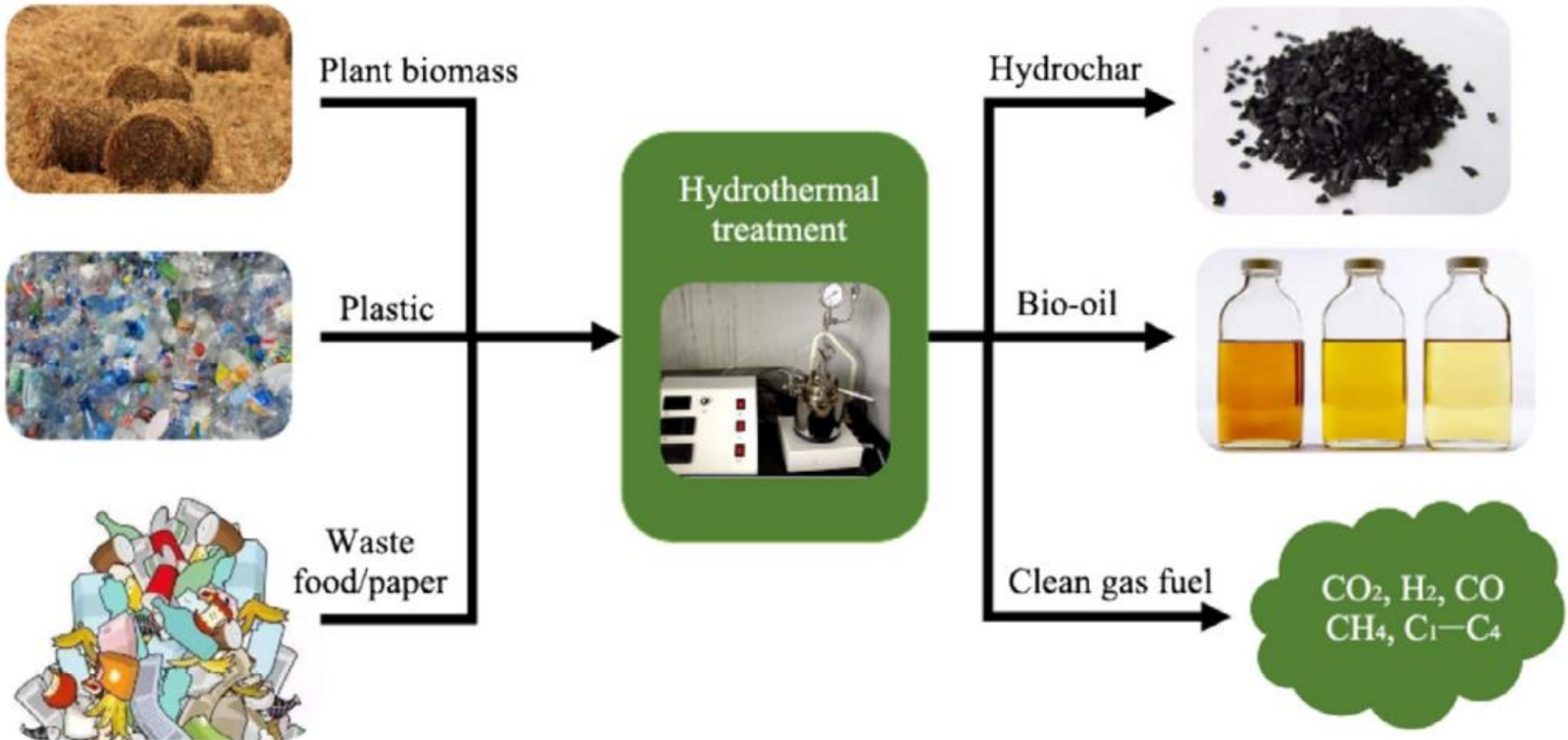
WASTE TO ENERGY



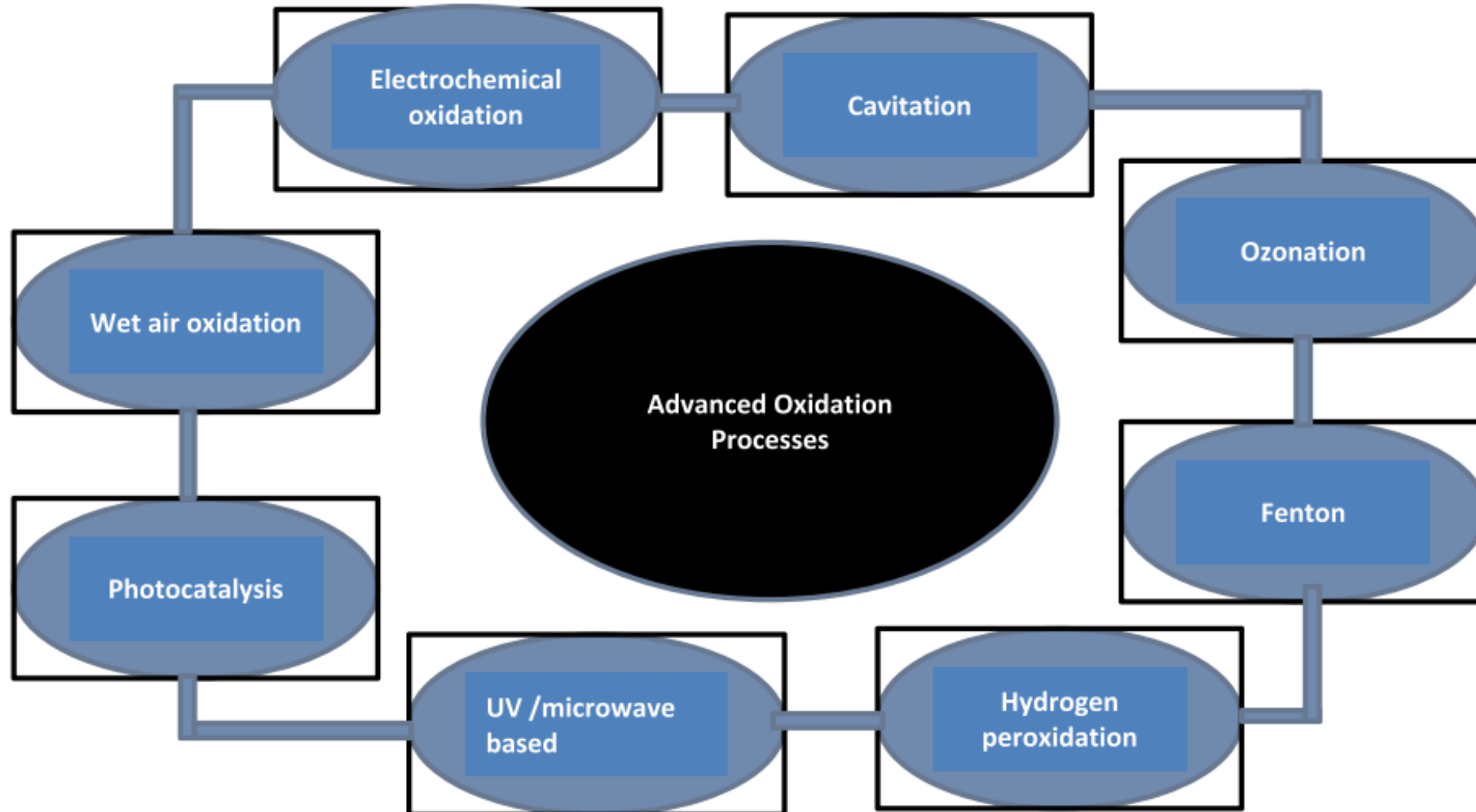
WASTE TO ENERGY – THERMAL



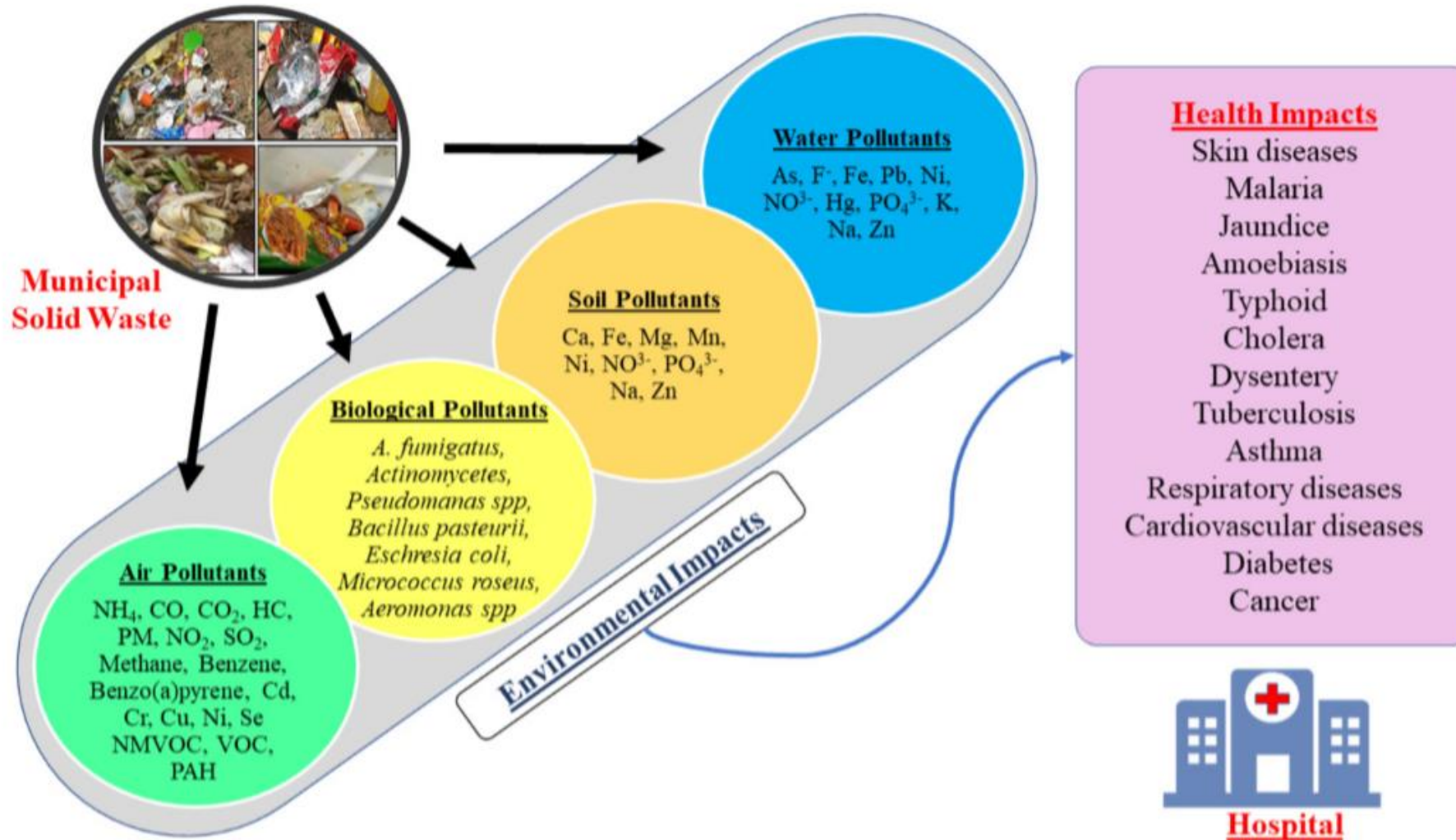
HYDROTHERMAL TREATMENT



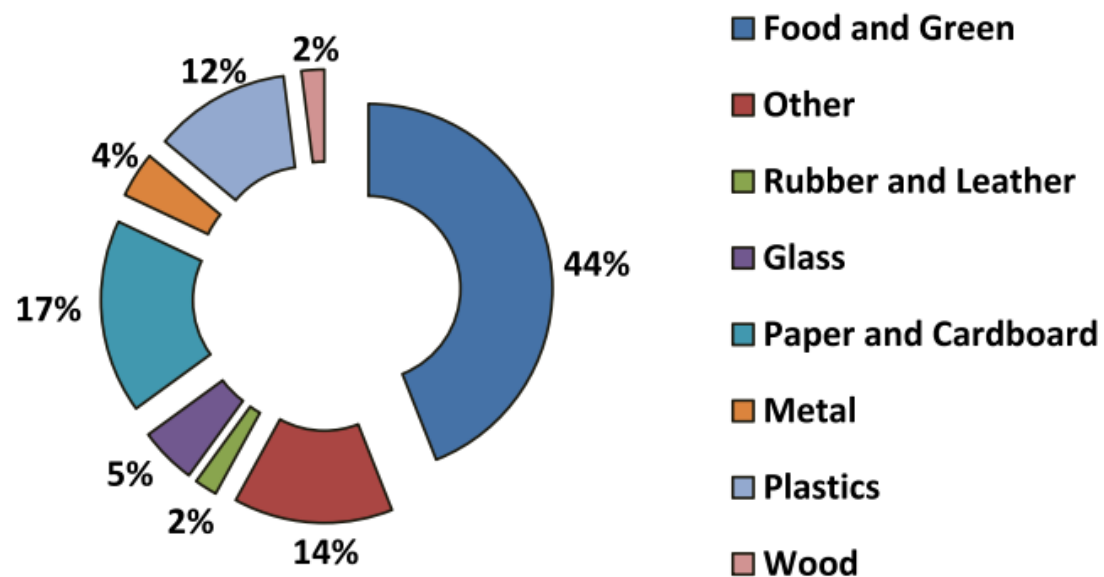
ADVANCED OXIDATION PROCESSES



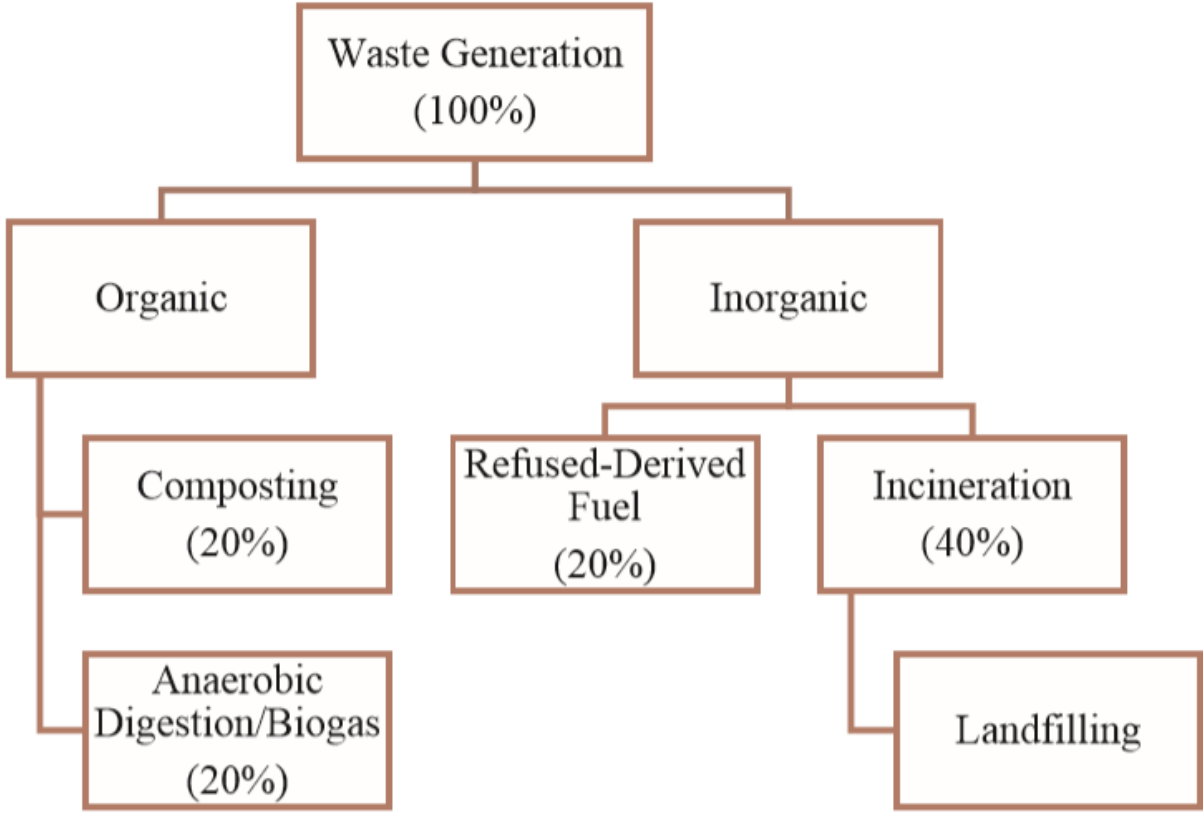
EXAMPLE – 1. MUNICIPAL SOLID WASTE



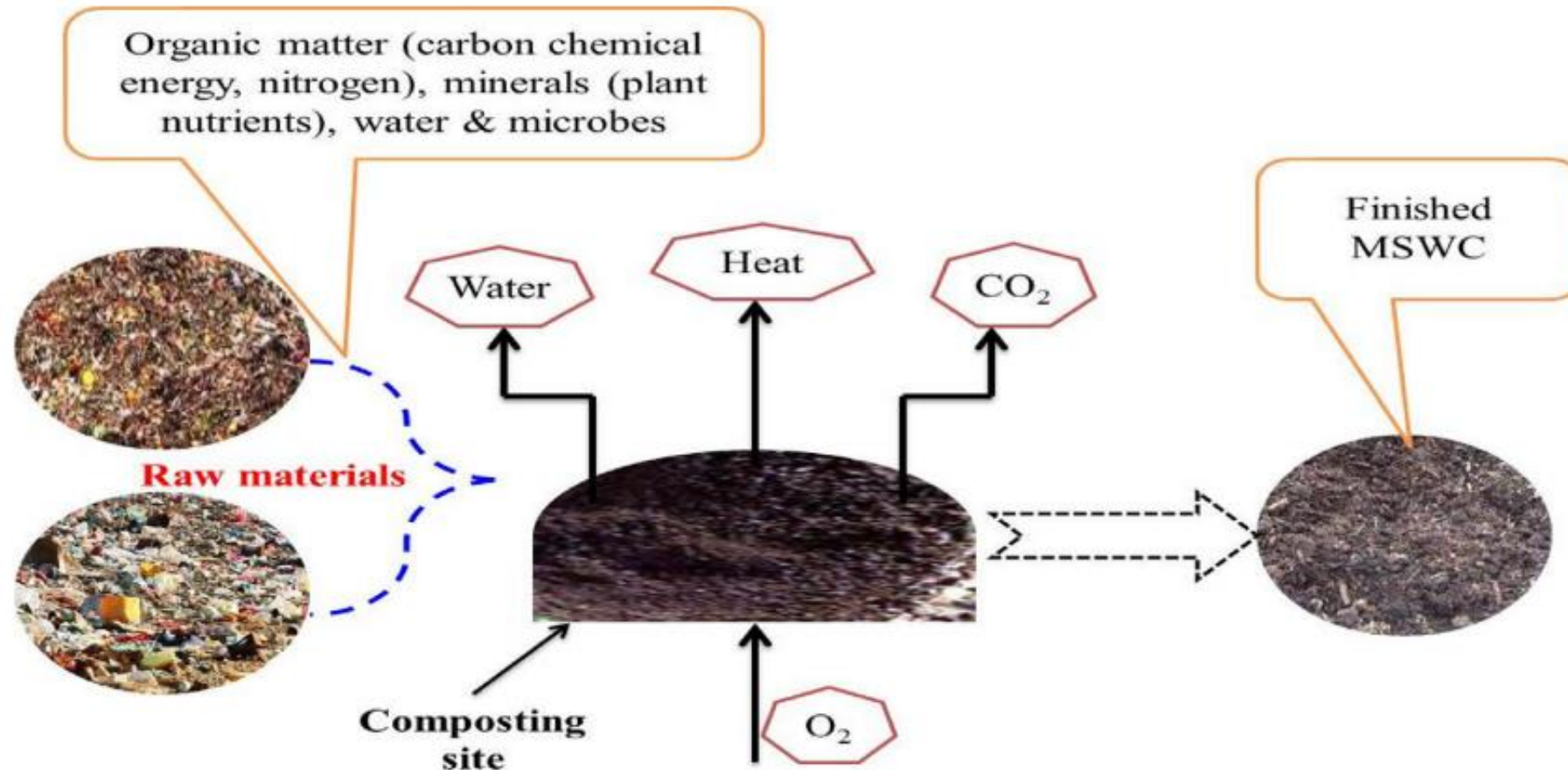
FRAMEWORK FOR INTEGRATED MSW MANAGEMENT



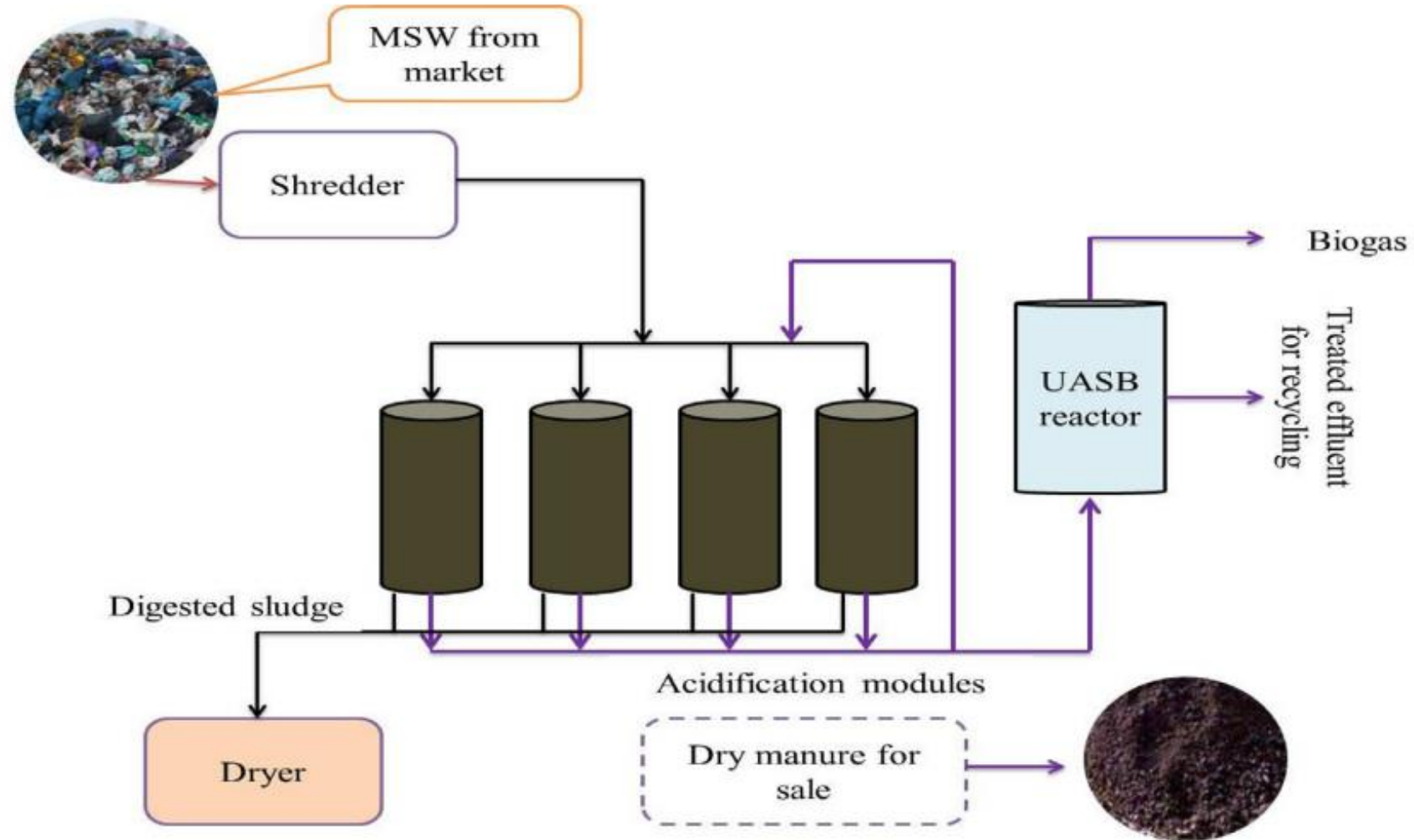
GLOBAL MSW COMPOSITION



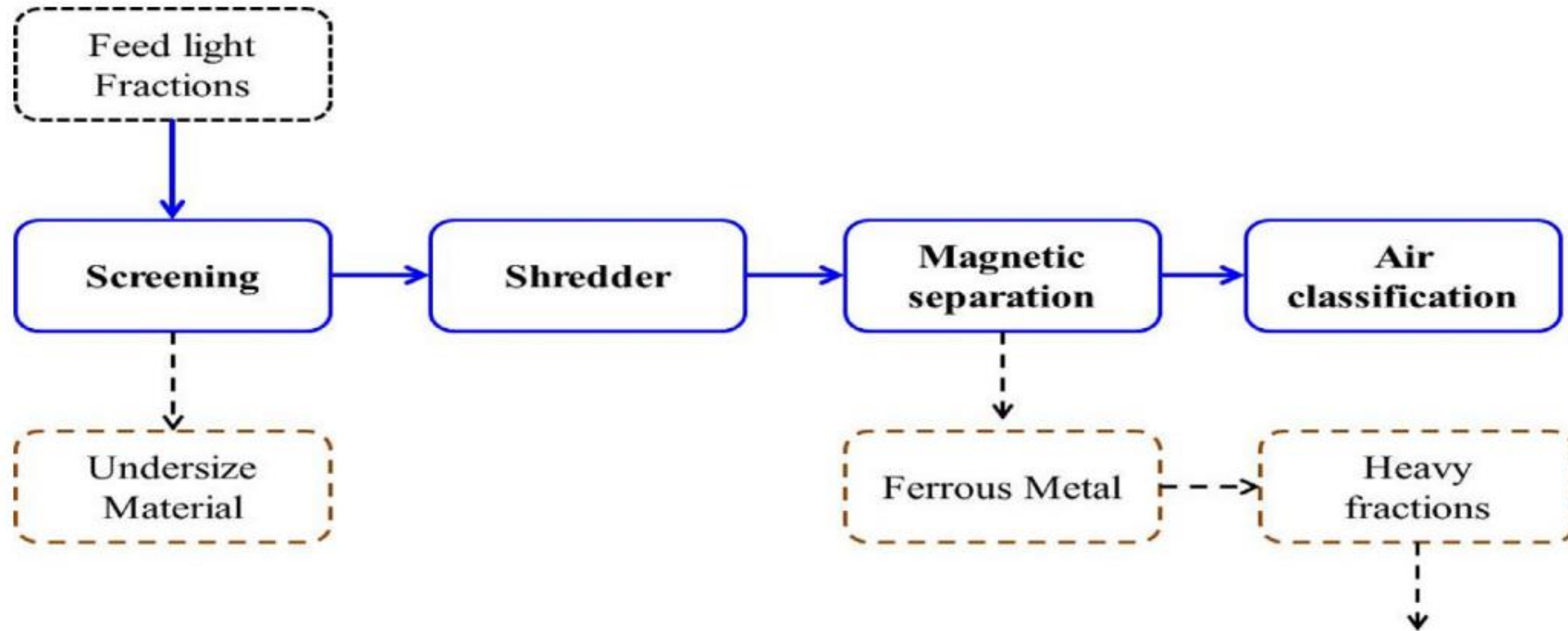
MUNICIPAL SOLID WASTE COMPOSTING

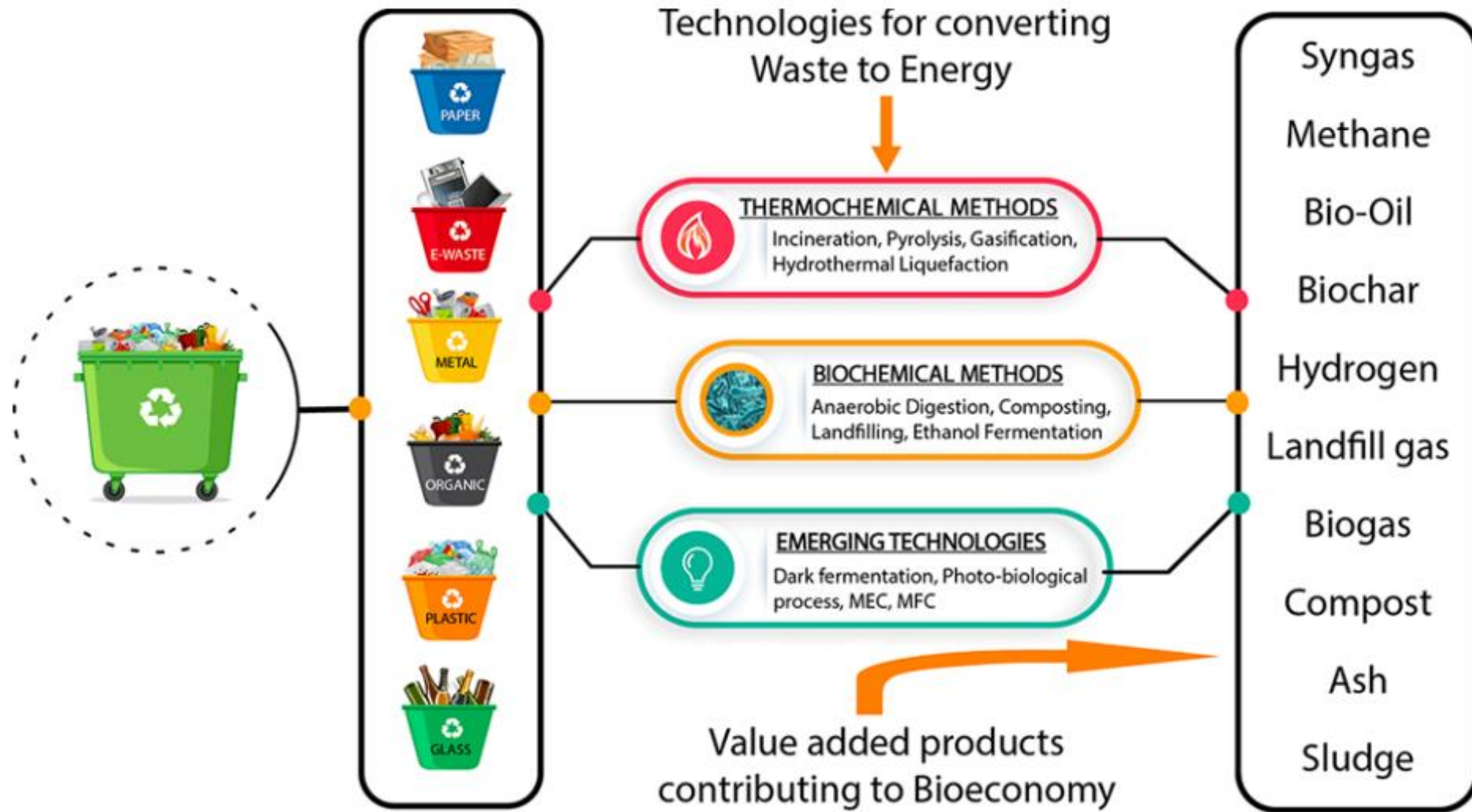


ANAEROBIC DIGESTION OF MSW

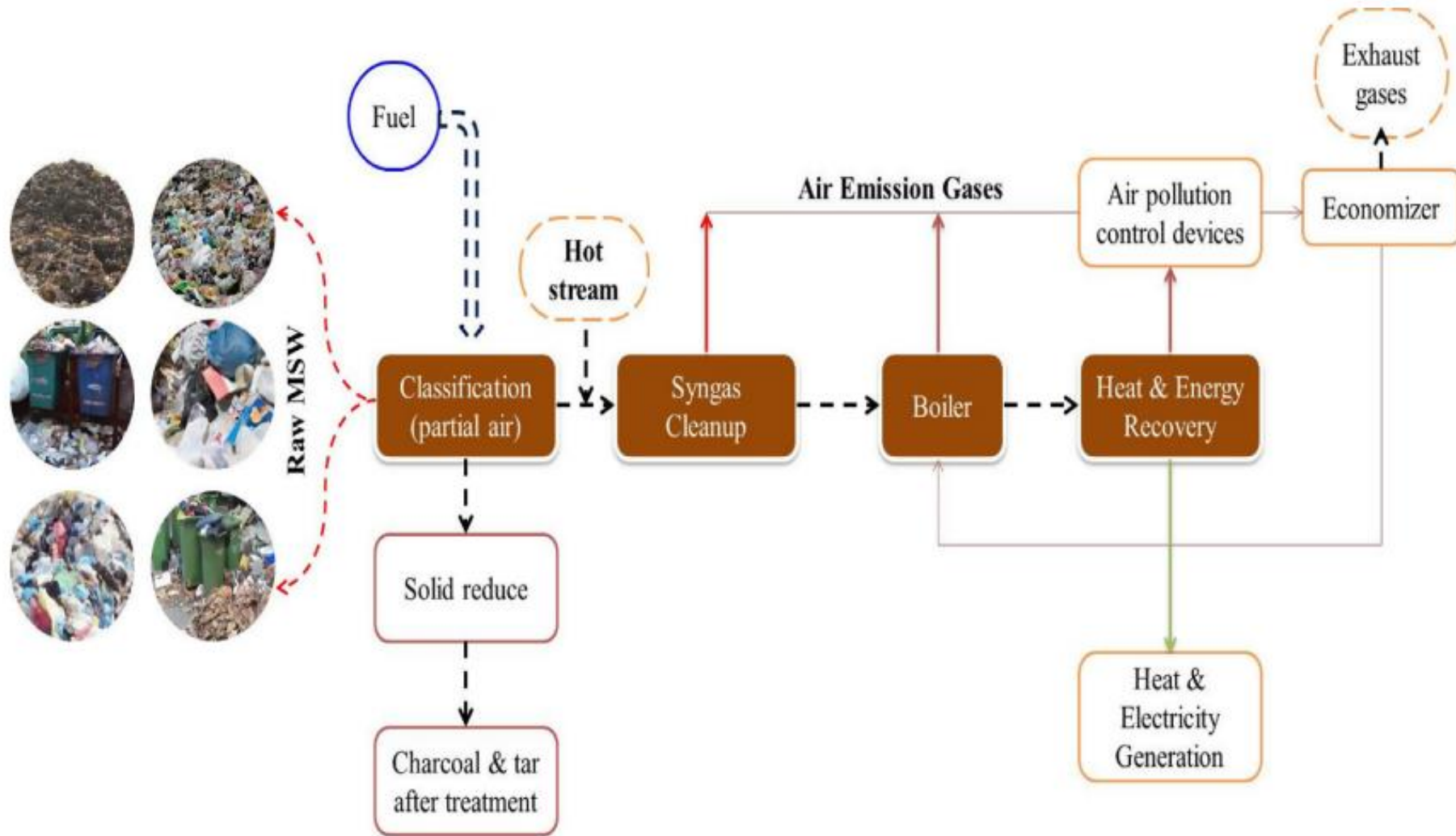


RESOURCE RECOVERY FROM MIXED SOLID WASTE

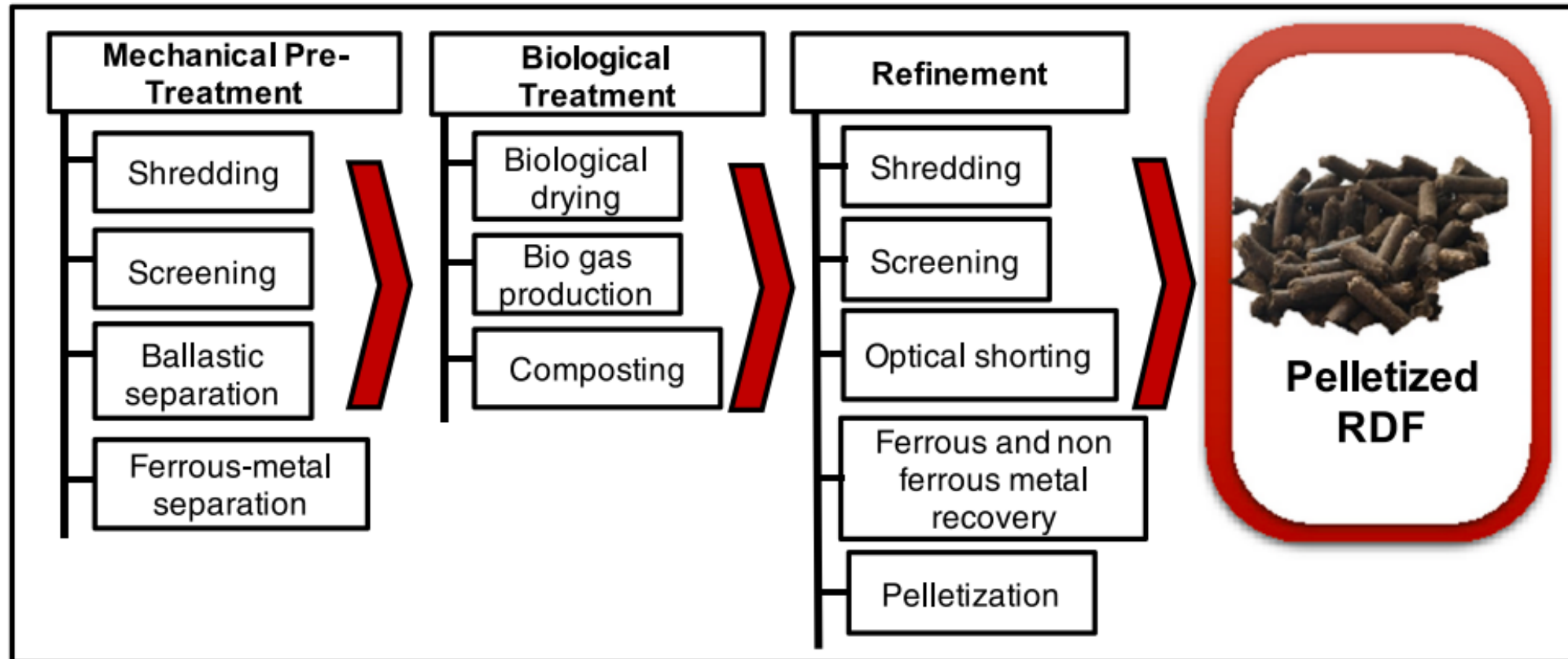




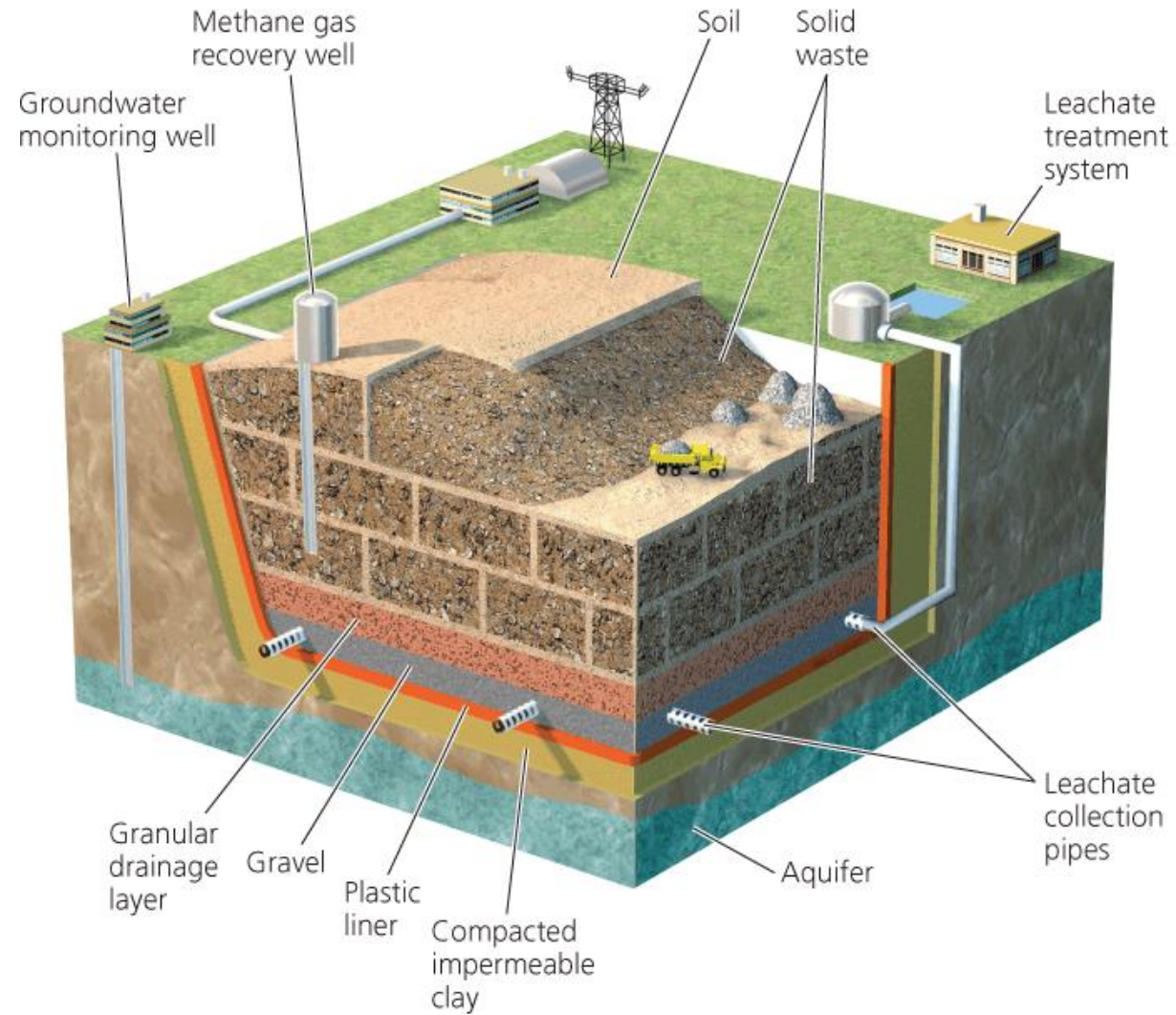
WASTE TO ENERGY FOR MSW DISPOSAL



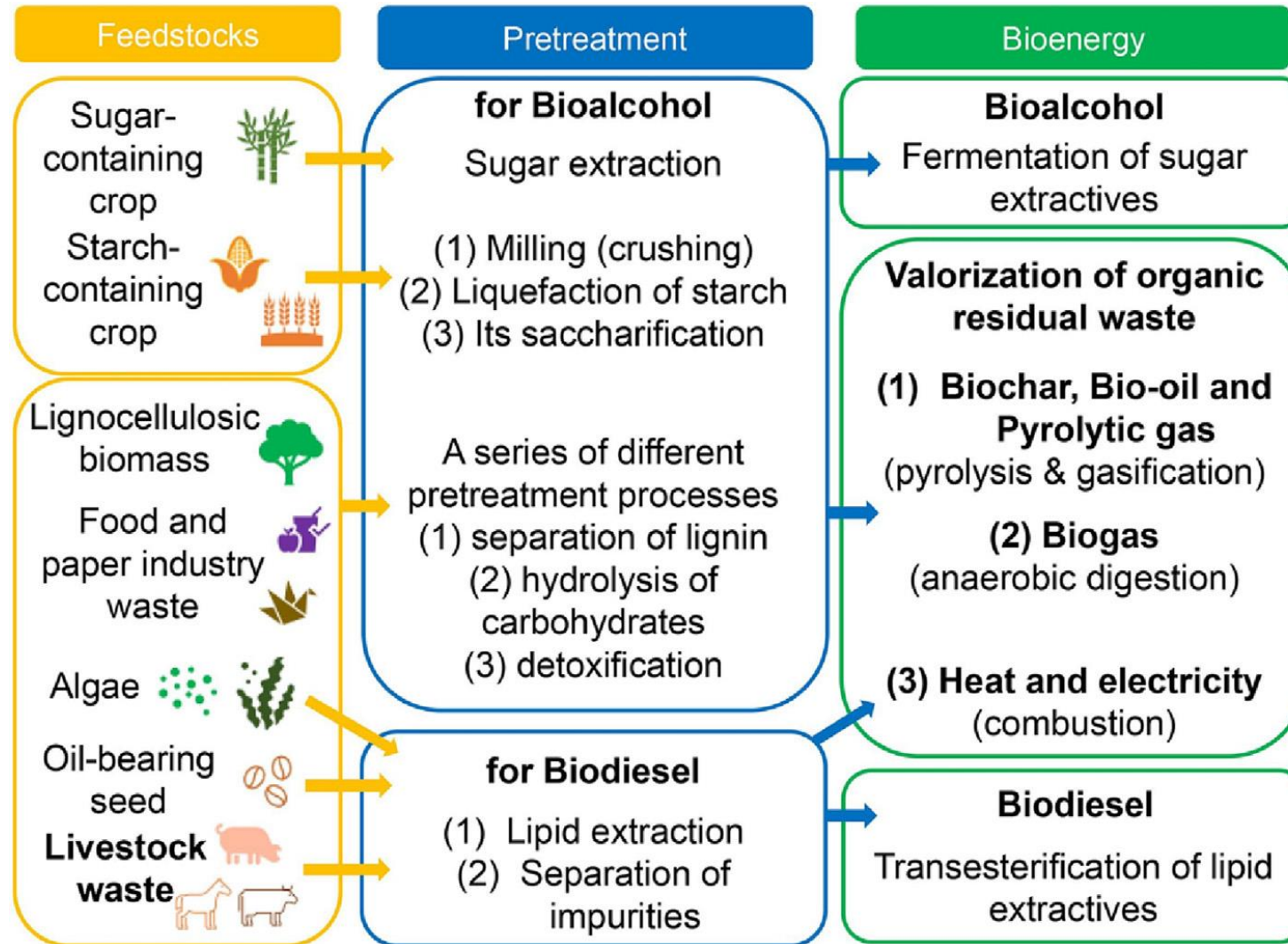
REFUSE-DERIVED FUEL OR SOLID-RECOVERED FUEL



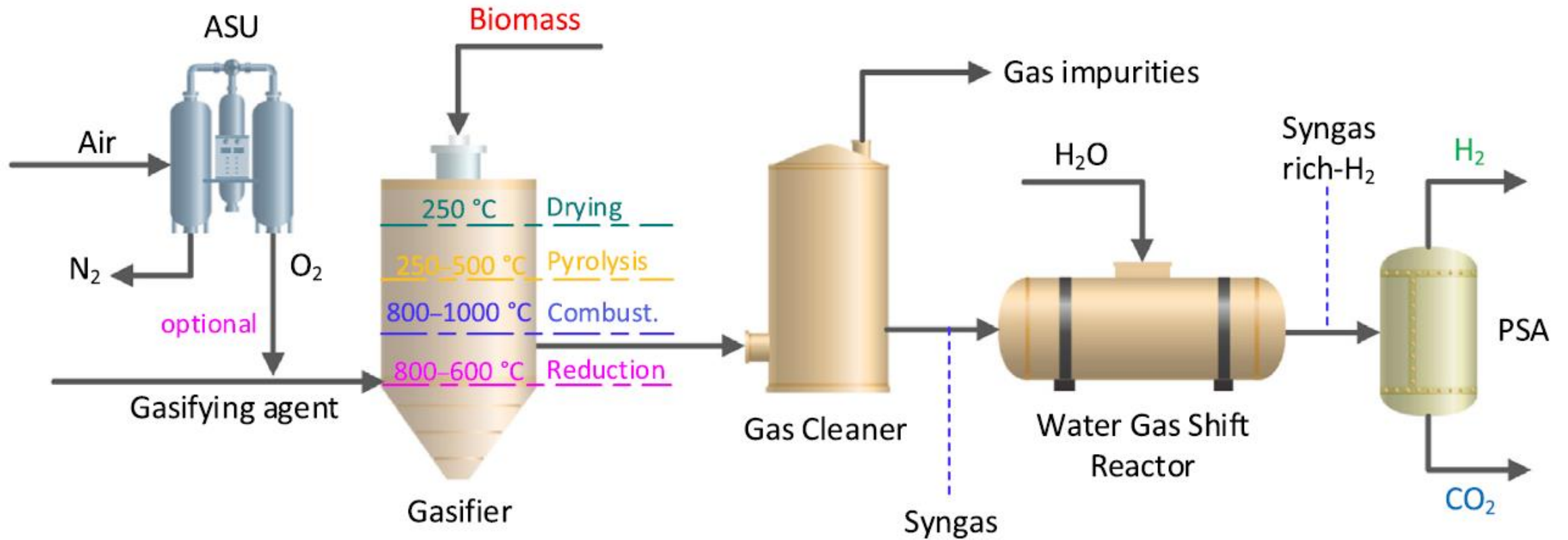
LANDFILLING



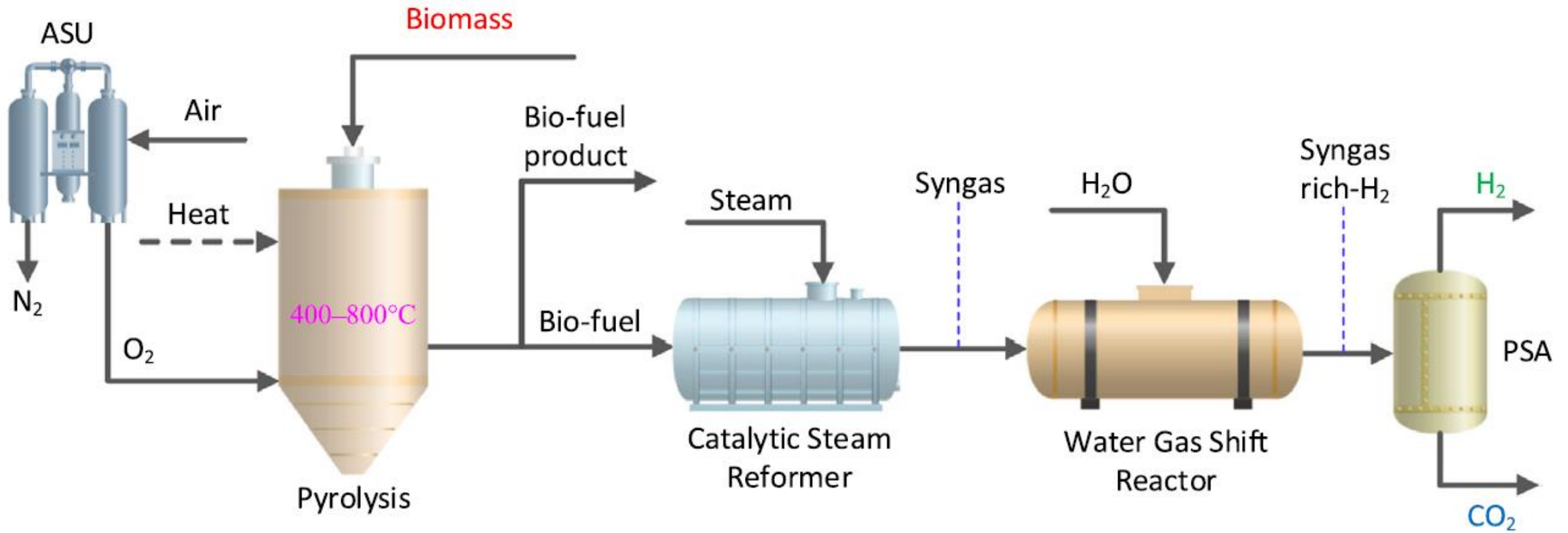
EXAMPLE – 2. BIOMASS



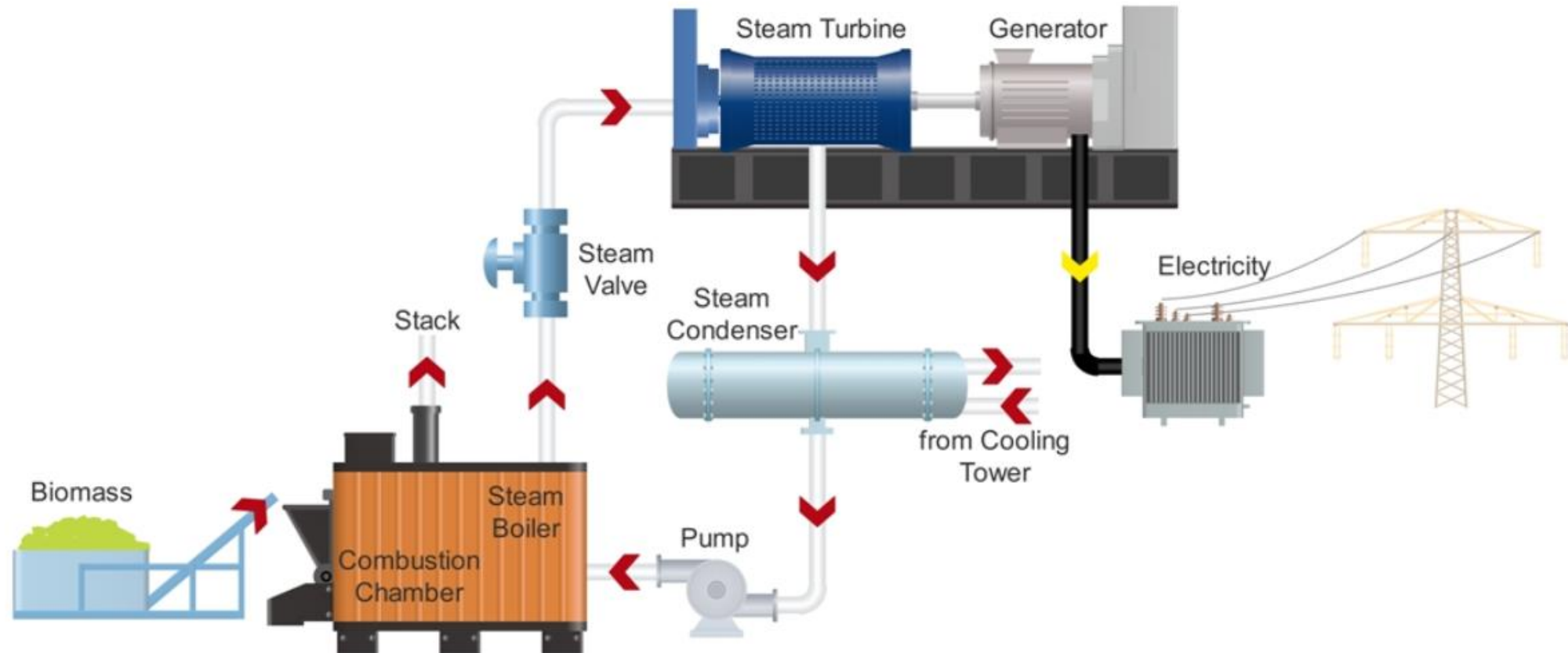
BIOMASS GASIFICATION



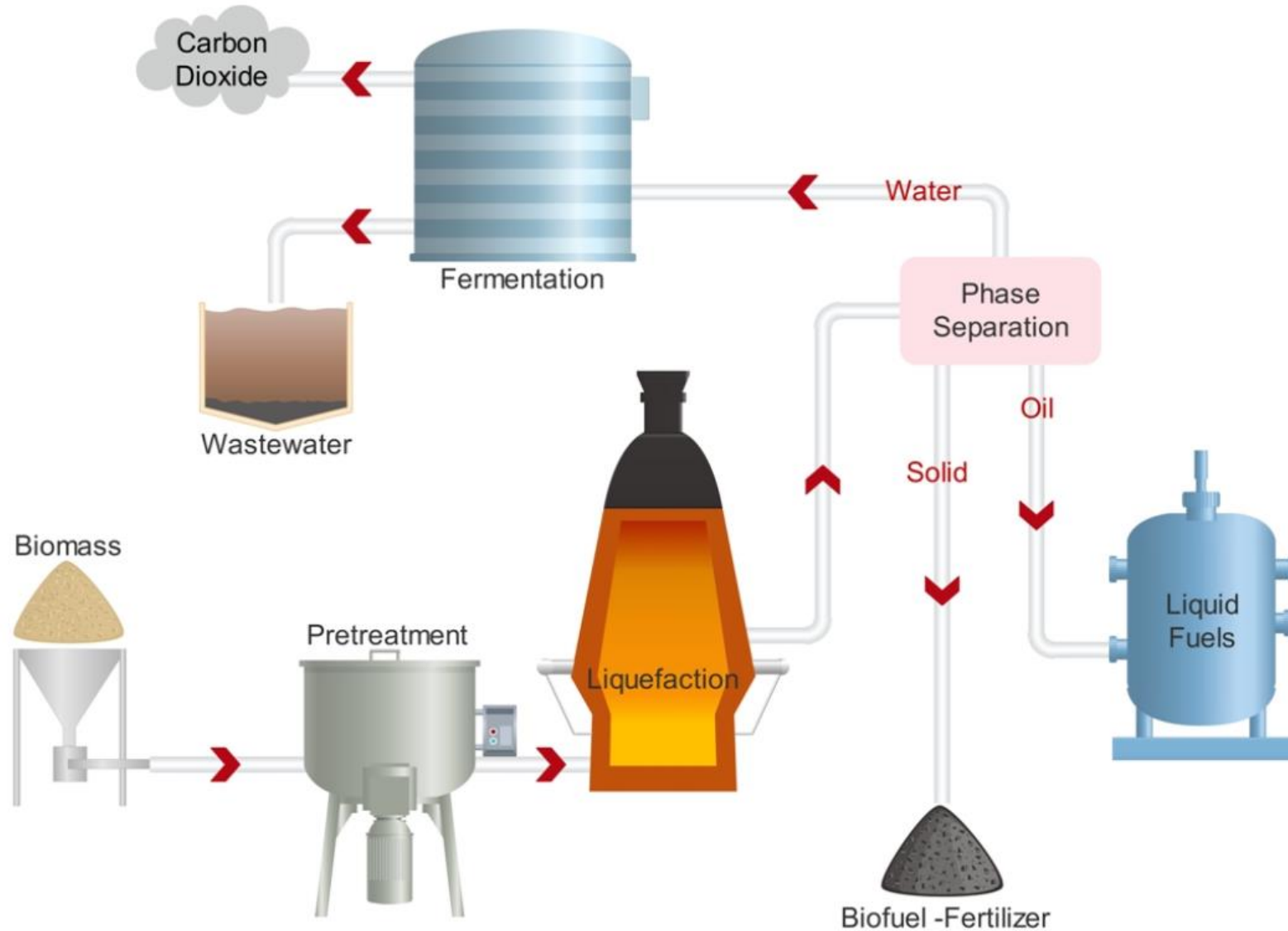
BIOMASS PYROLYSIS



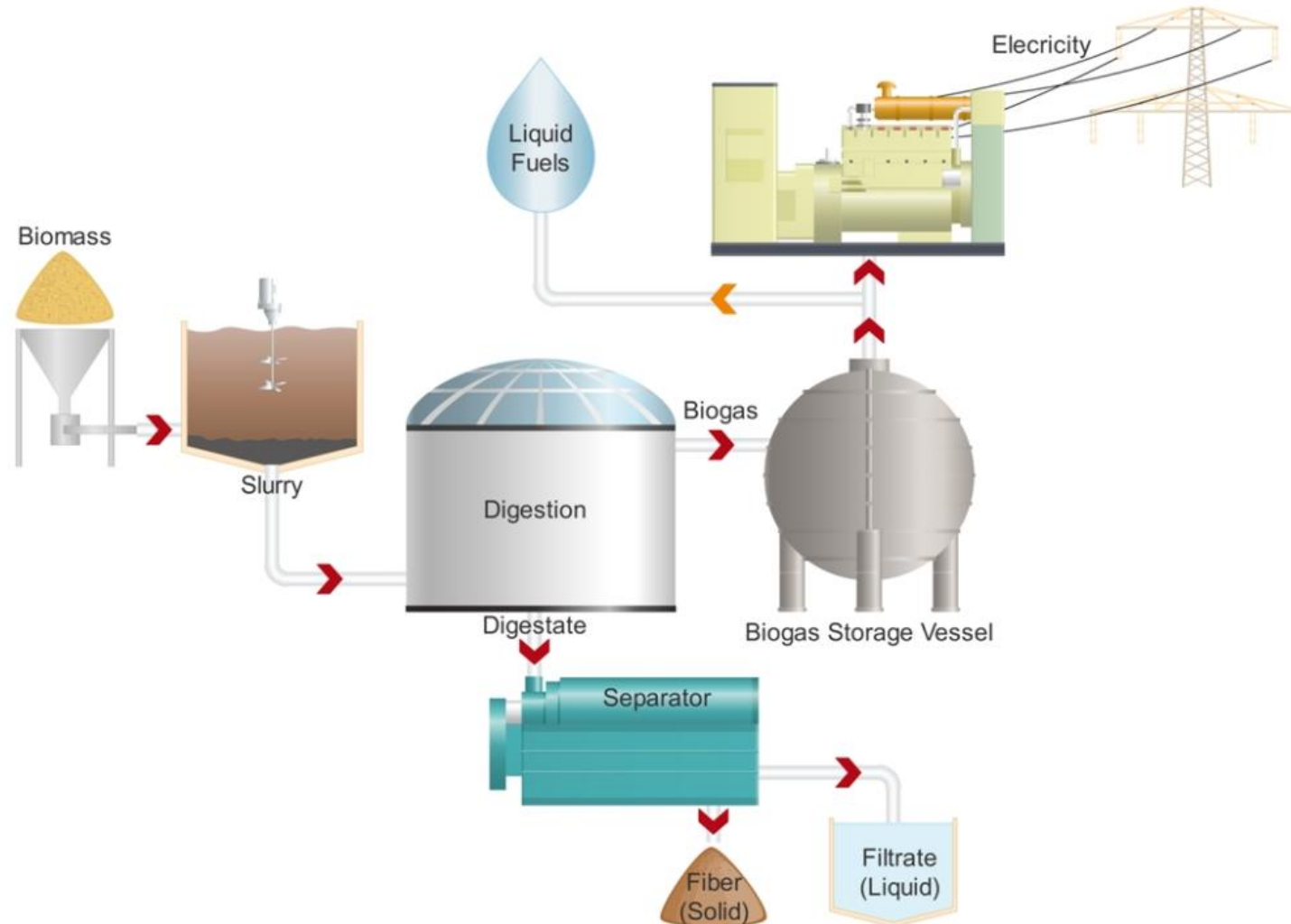
BIOMASS COMBUSTION



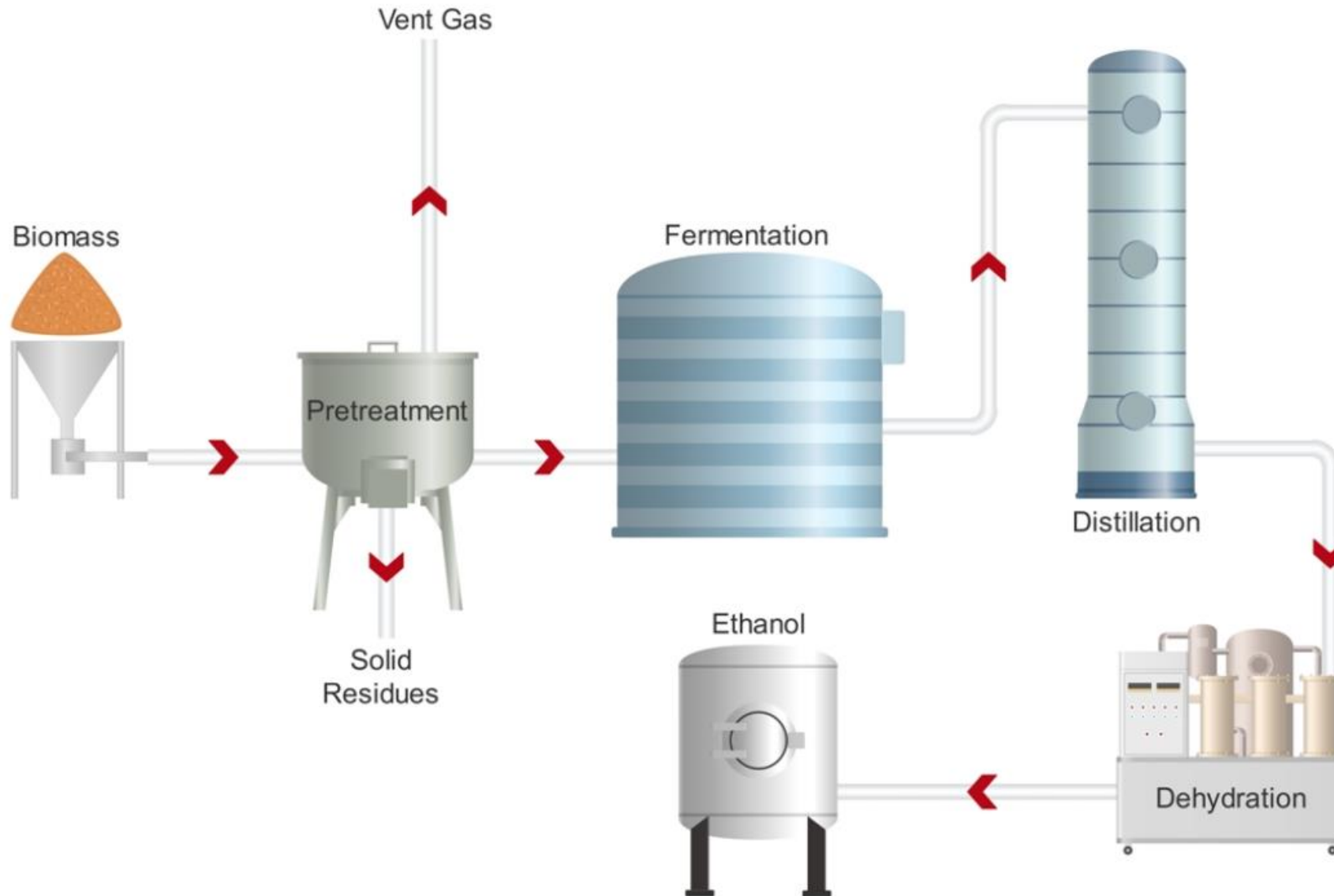
BIOMASS LIQUEFACTION



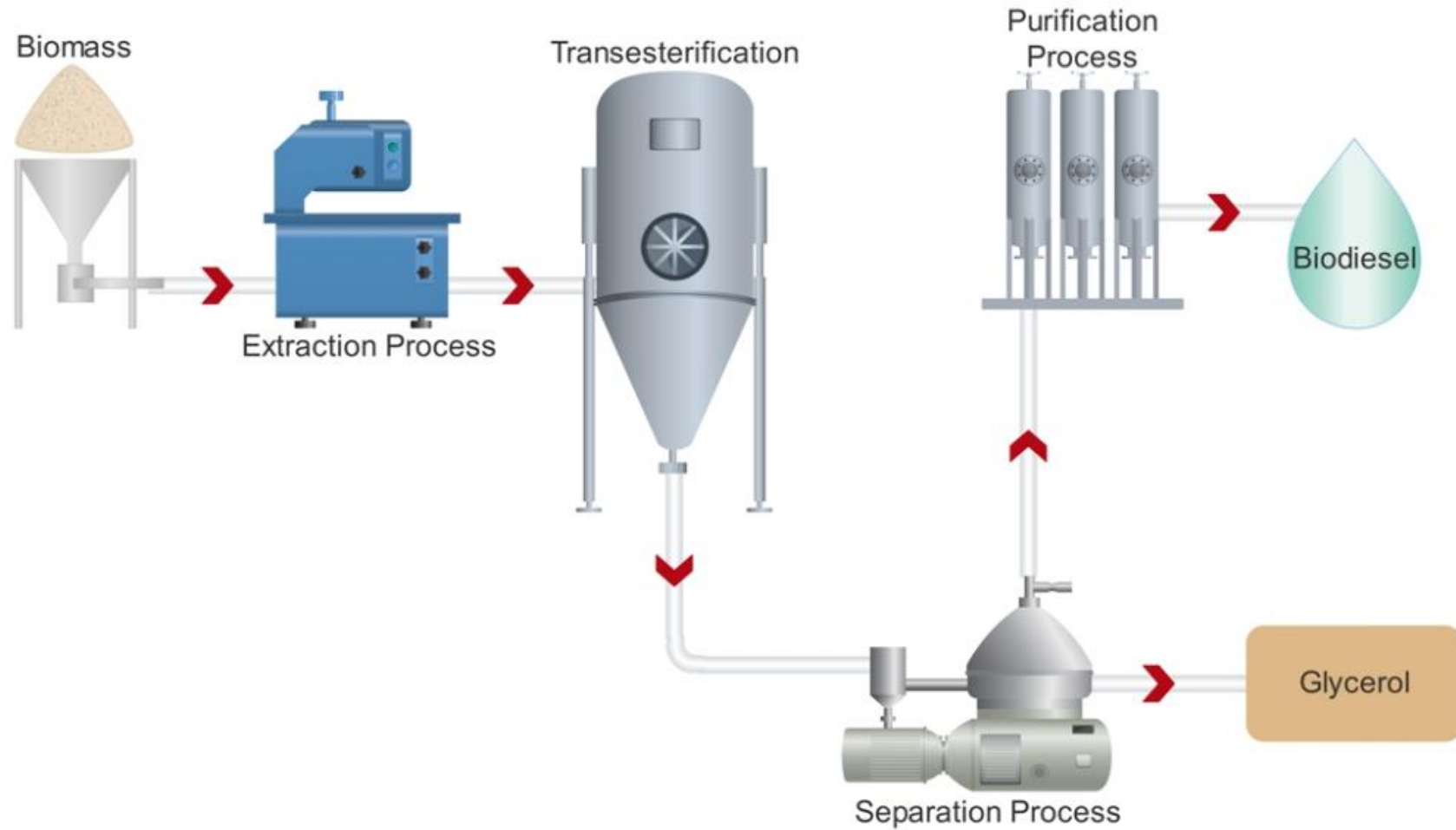
ANAEROBIC DIGESTION OF BIOMASS



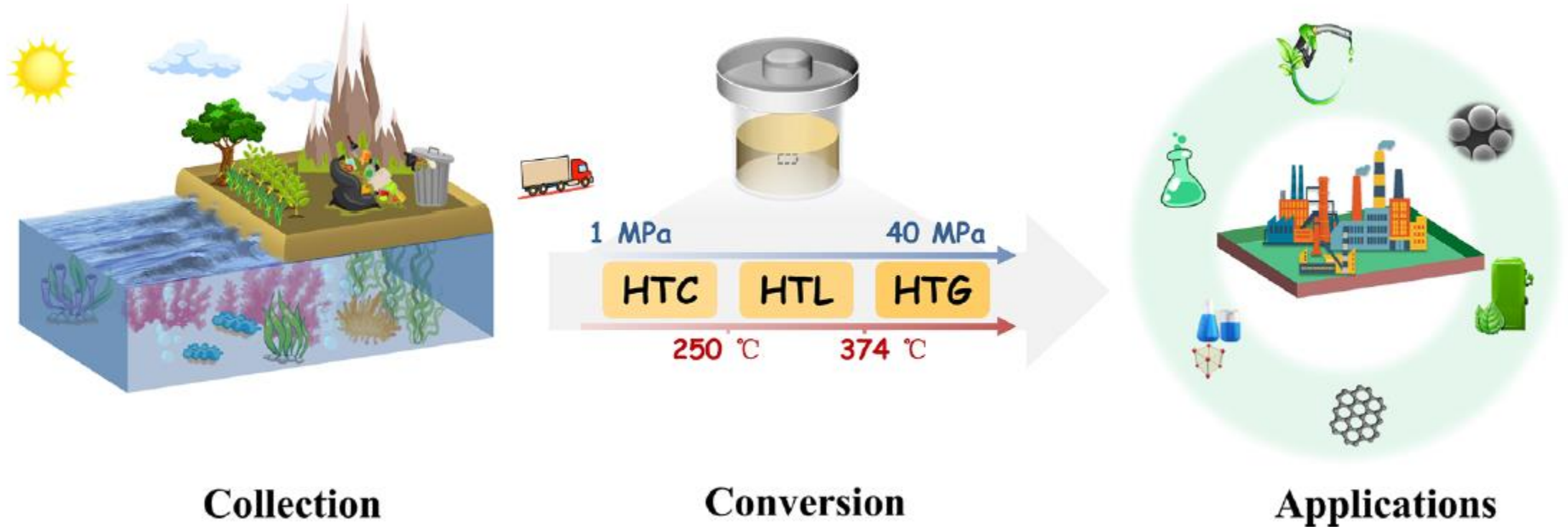
BIOMASS FERMENTATION



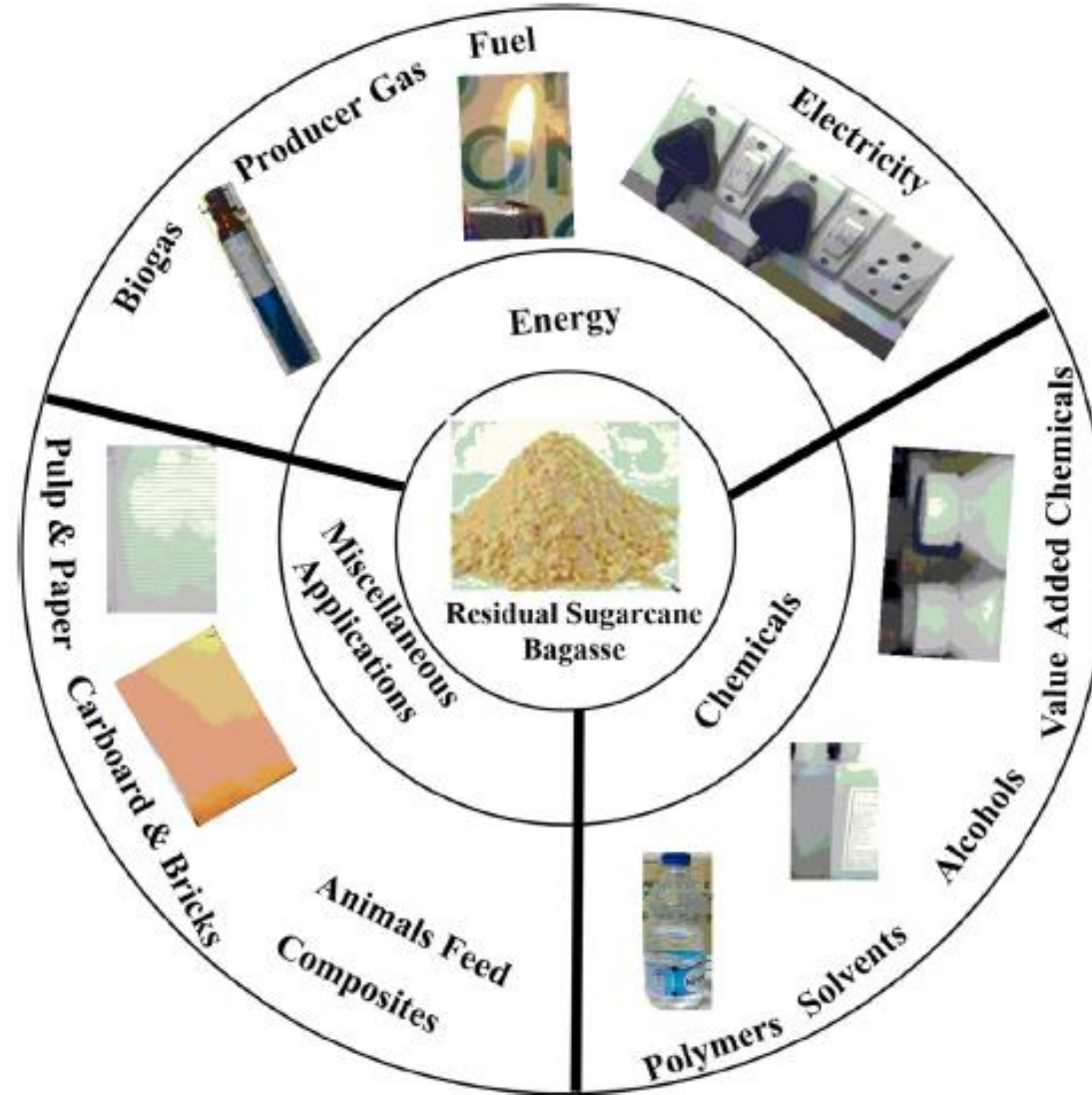
PHYSICO-CHEMICAL CONVERSION OF BIOMASS



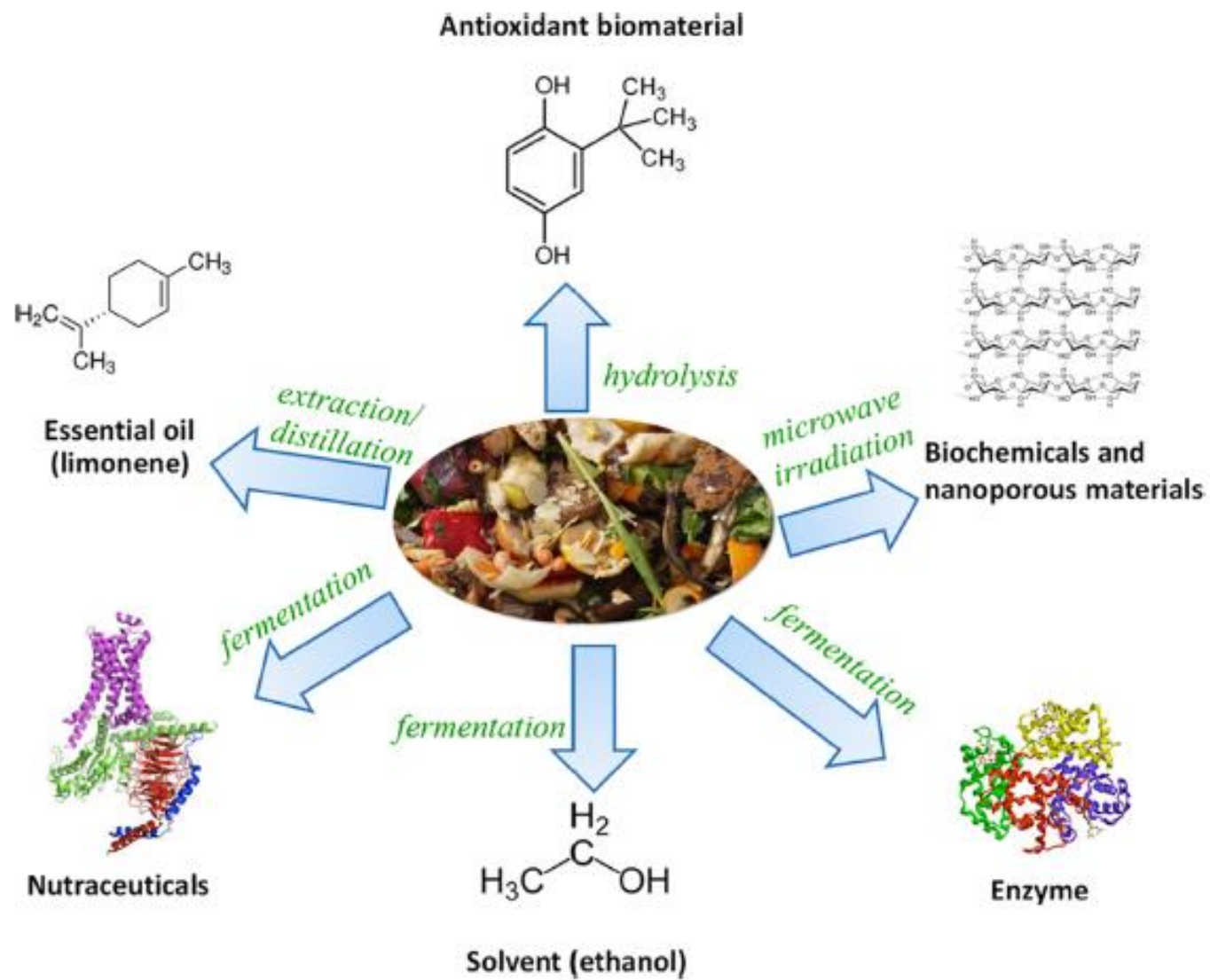
HYDROTHERMAL CONVERSION OF BIOMASS



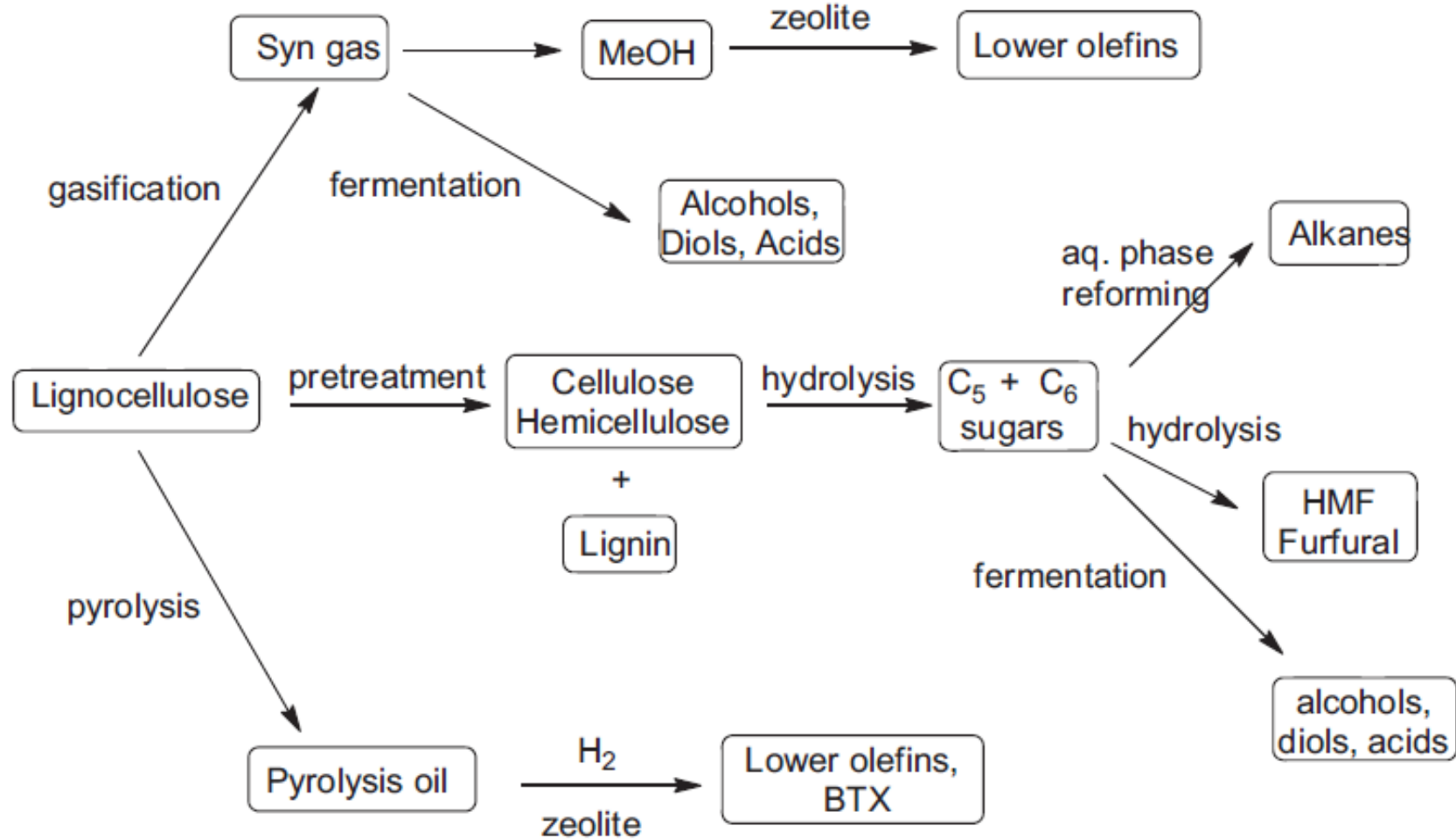
OPTIONS WITH SUGARCANE BAGASSE



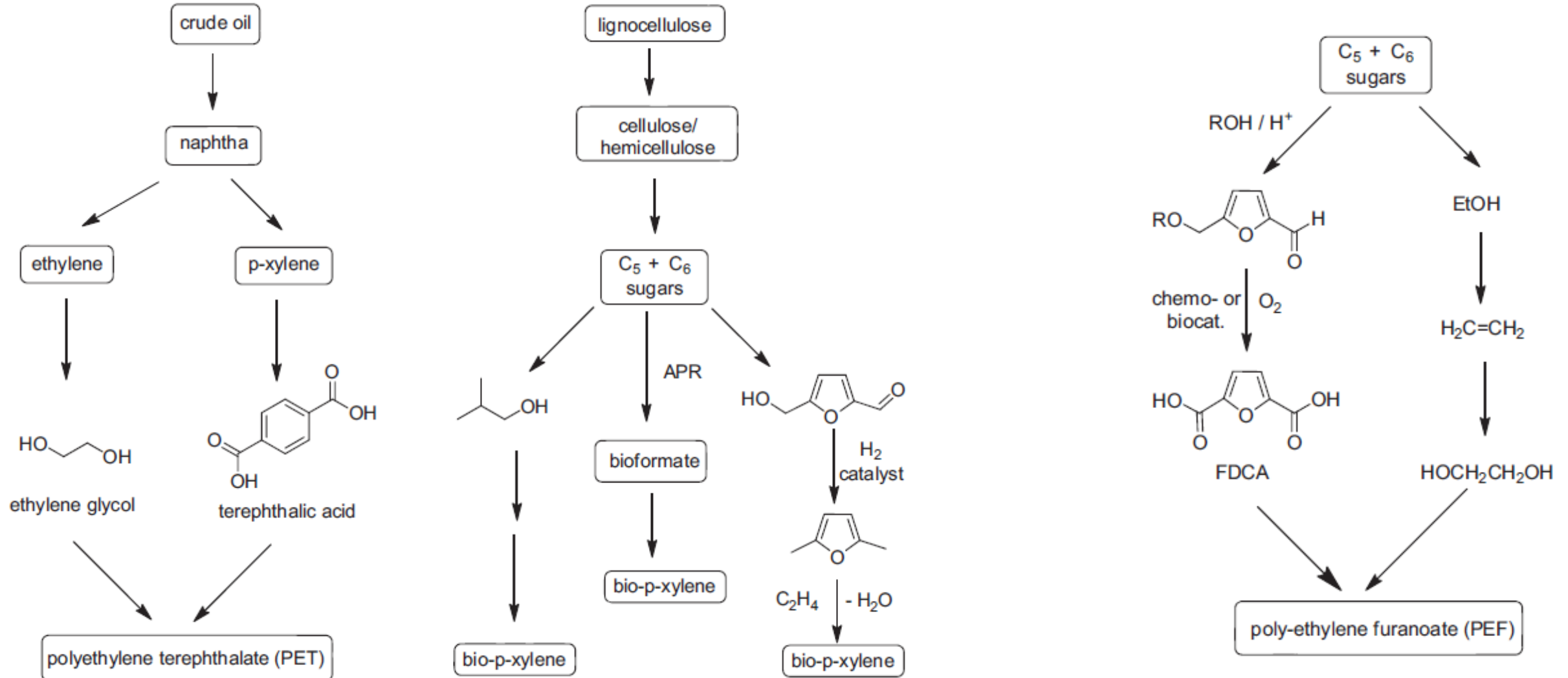
CHEMICALS FROM FOOD WASTE



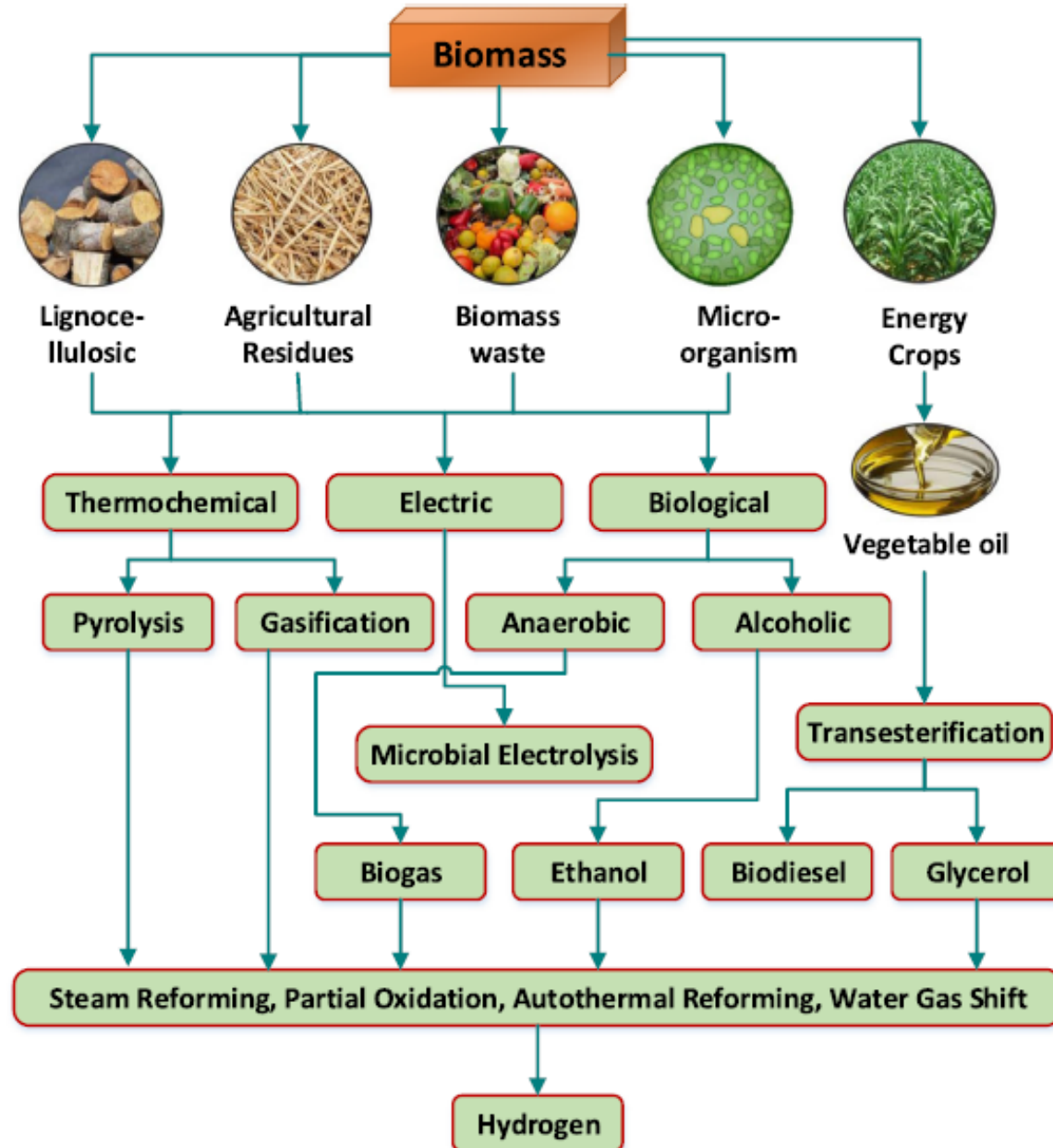
CONVERSION OF LIGNOCELLULOSIC BIOMASS



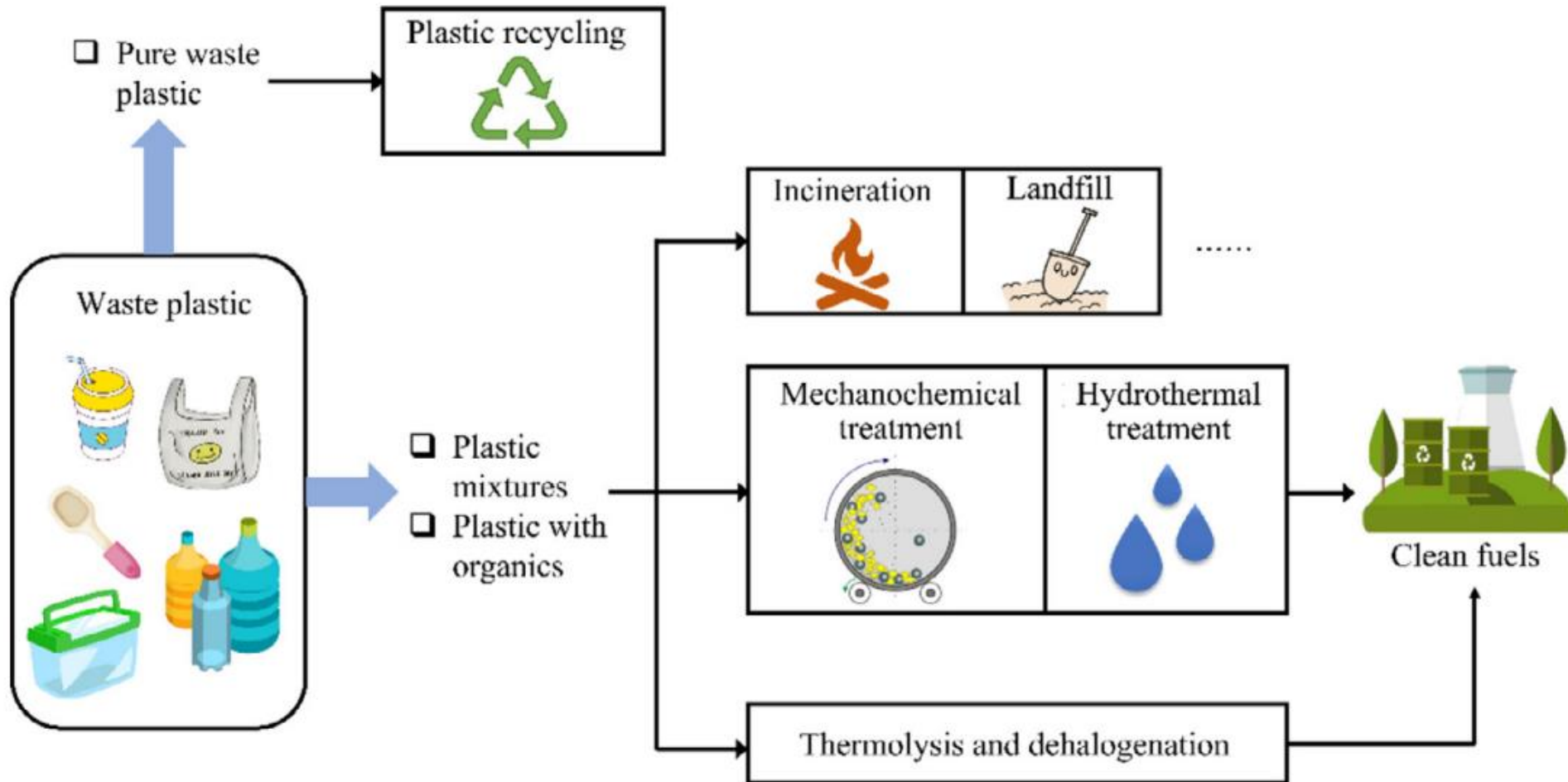
BIO-PET AND BIO-PEF



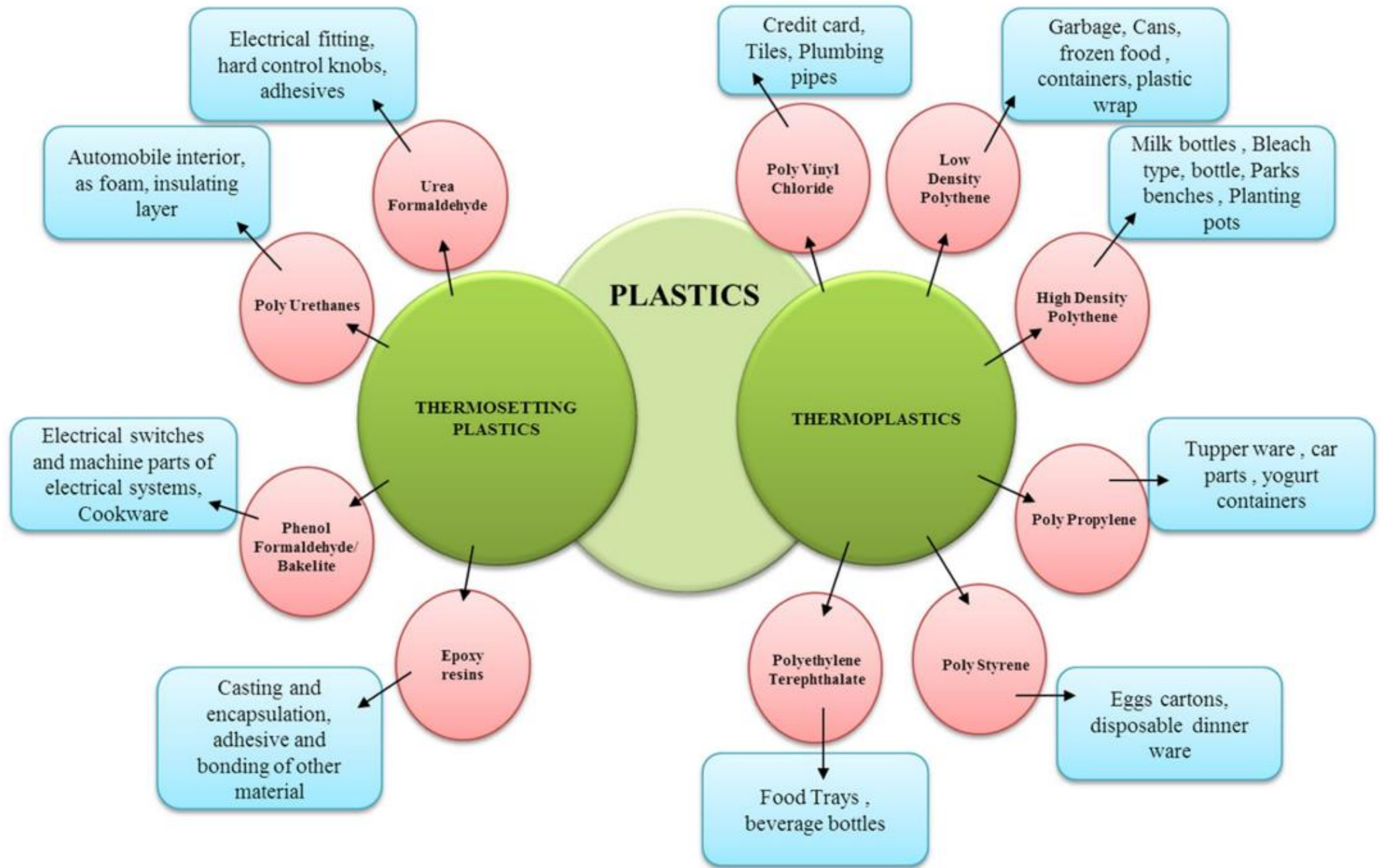
HYDROGEN AND FUELS FROM BIOMASS



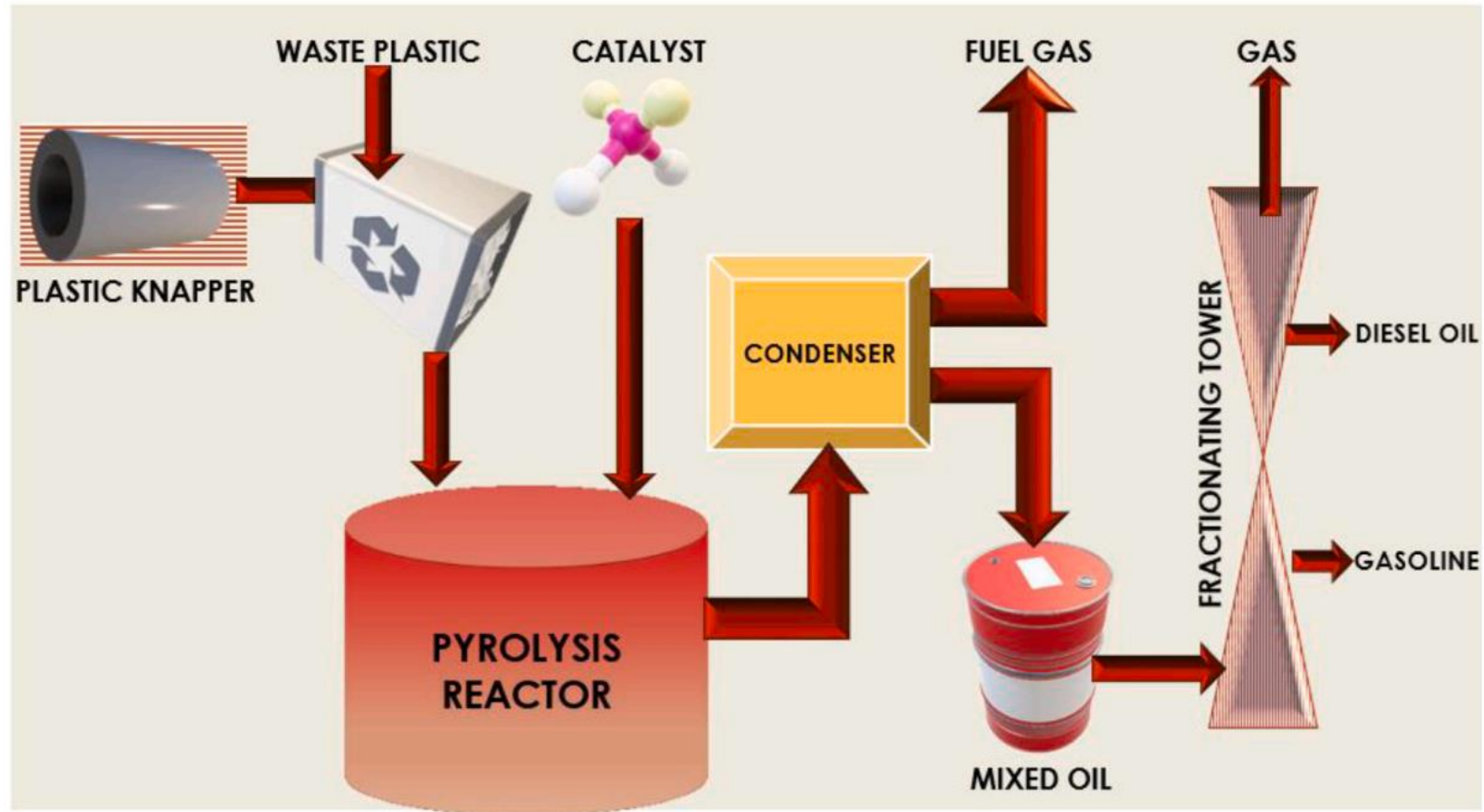
EXAMPLE – 3. PLASTIC WASTE



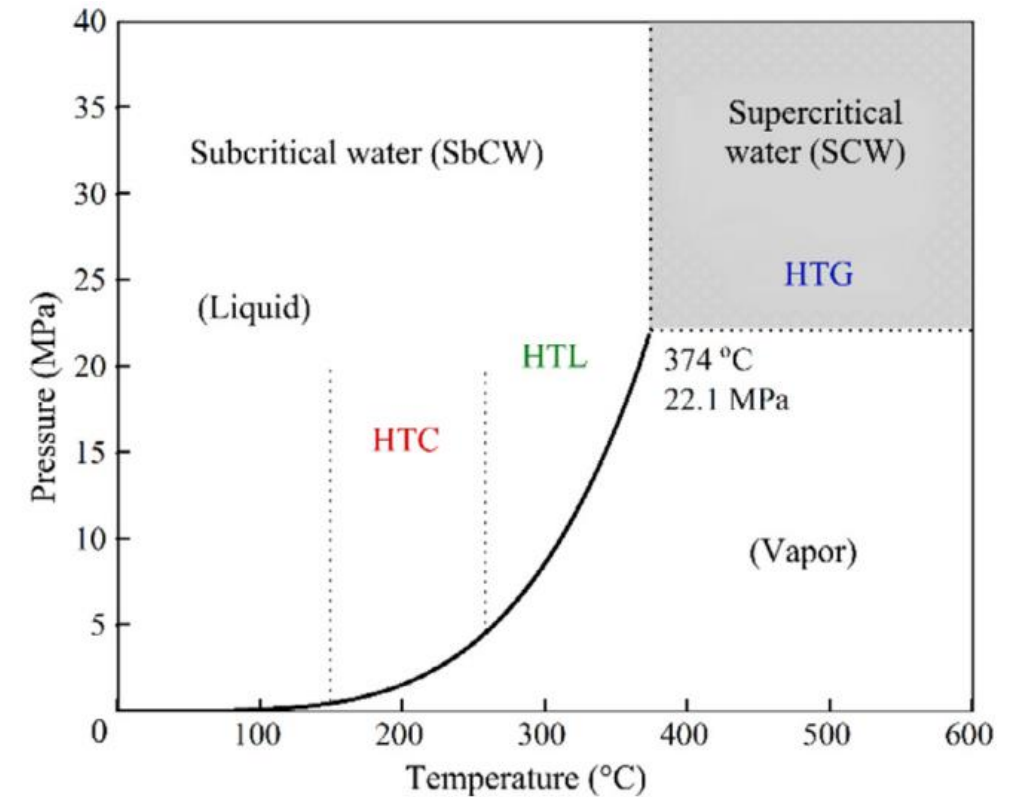
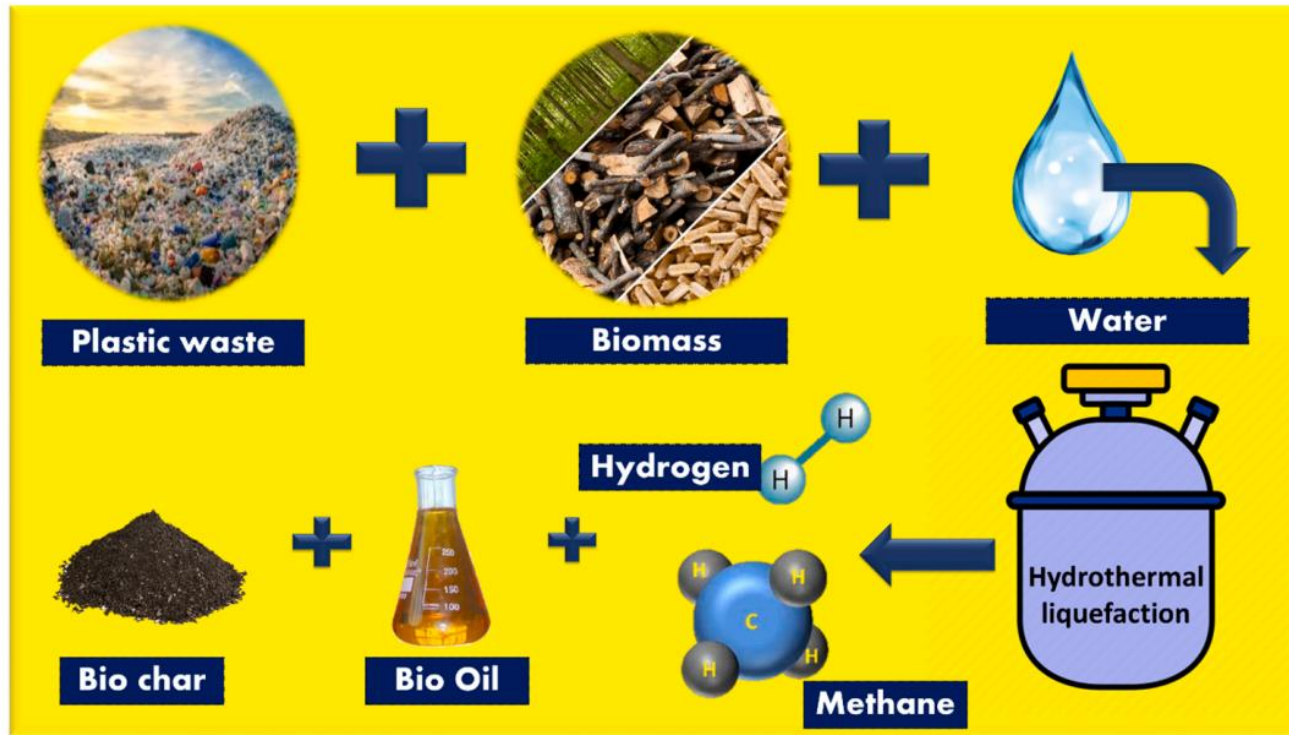
TYPES OF PLASTICS AND USES



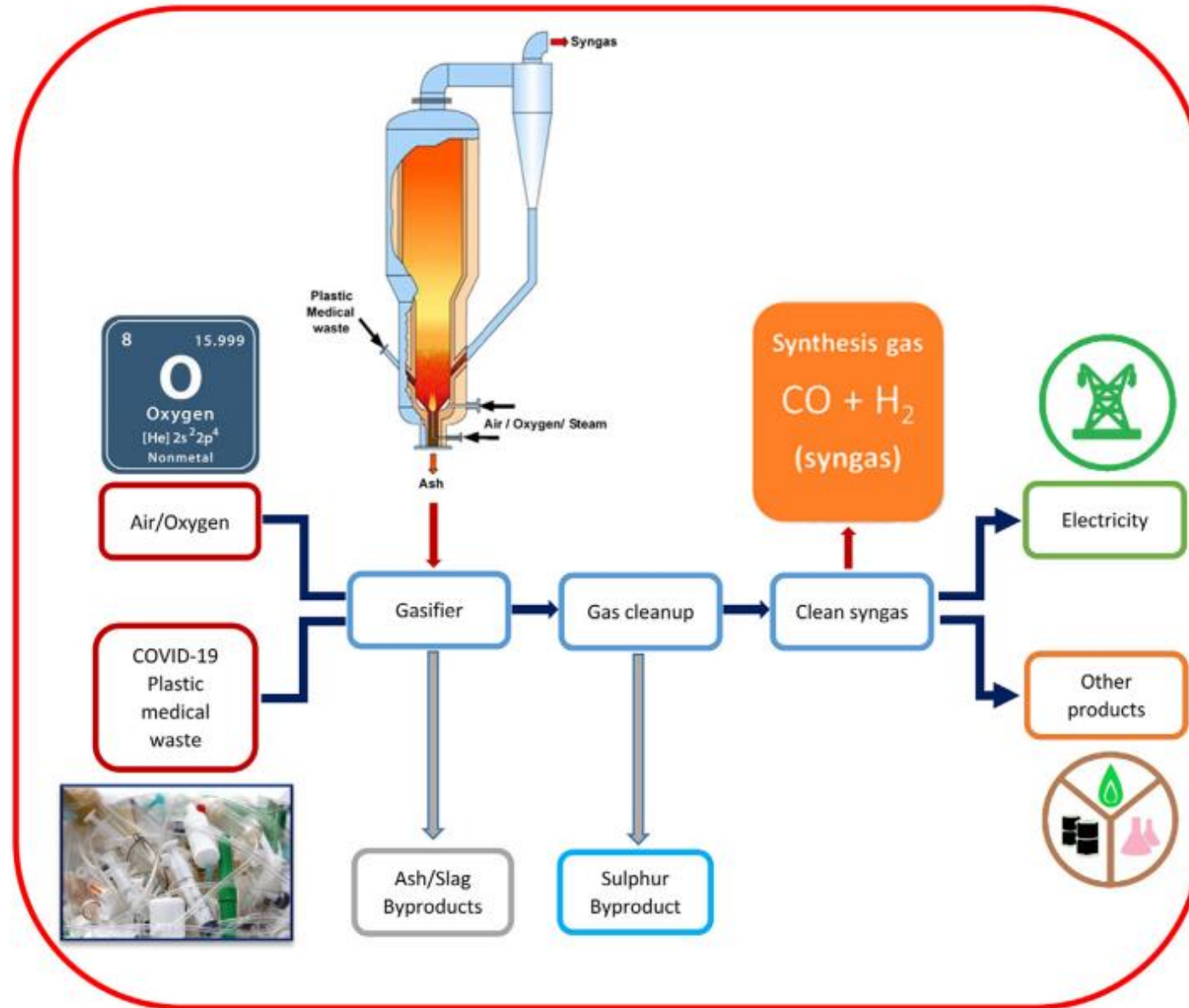
PYROLYSIS OF PLASTIC WASTE



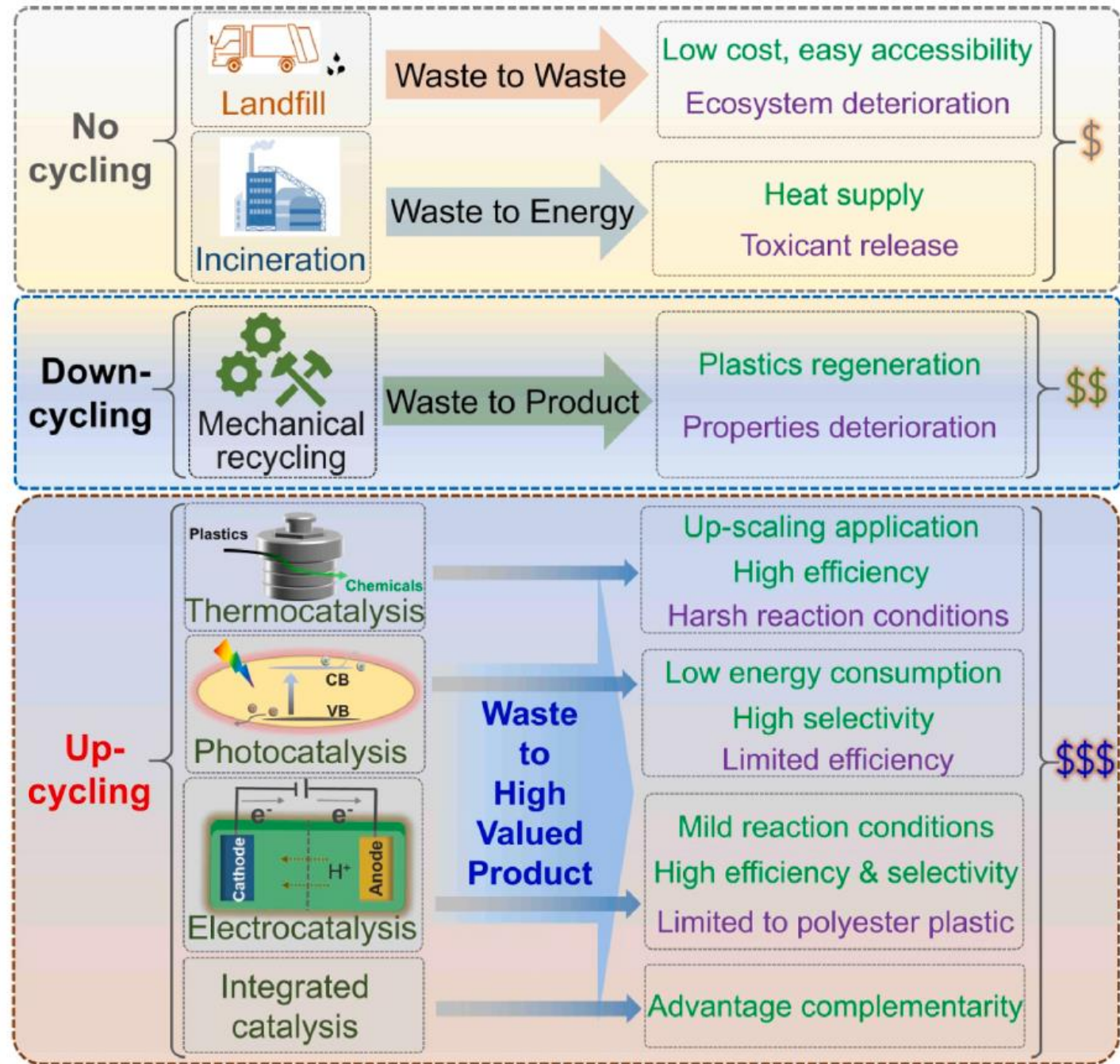
HYDROTHERMAL LIQUEFACTION OF PLASTIC WASTE



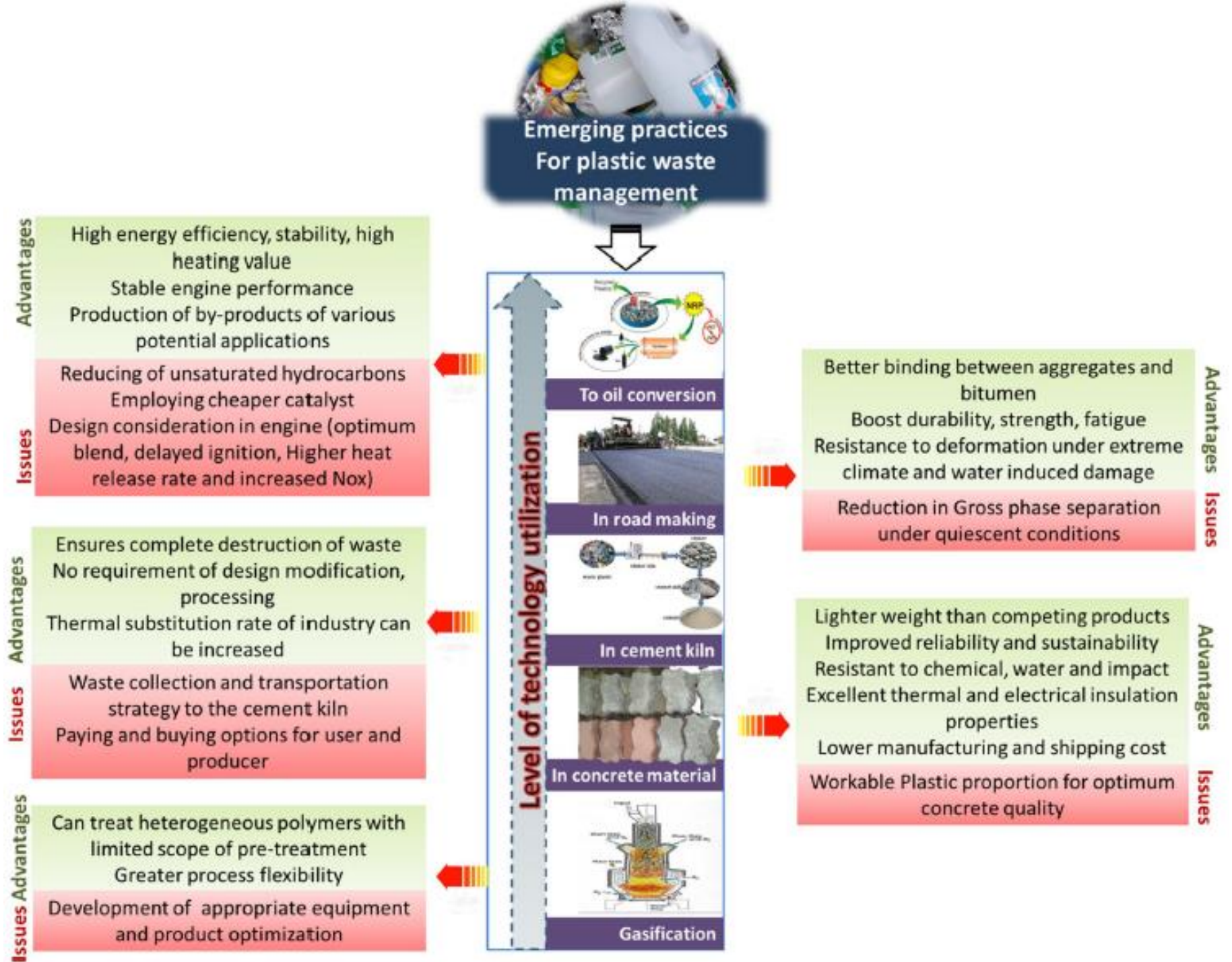
GASIFICATION OF COVID-19 PLASTIC WASTE



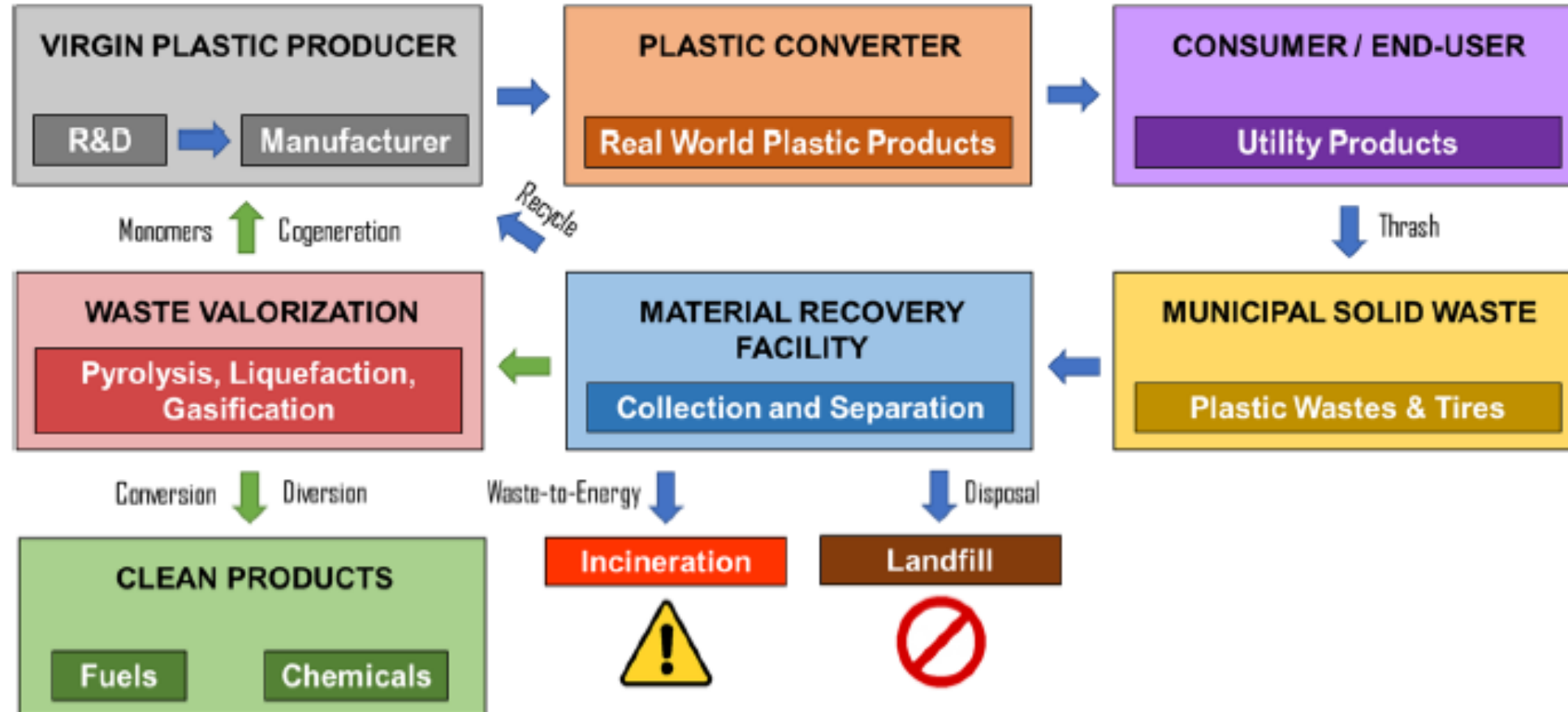
PLASTIC WASTE TREATMENT STRATEGIES



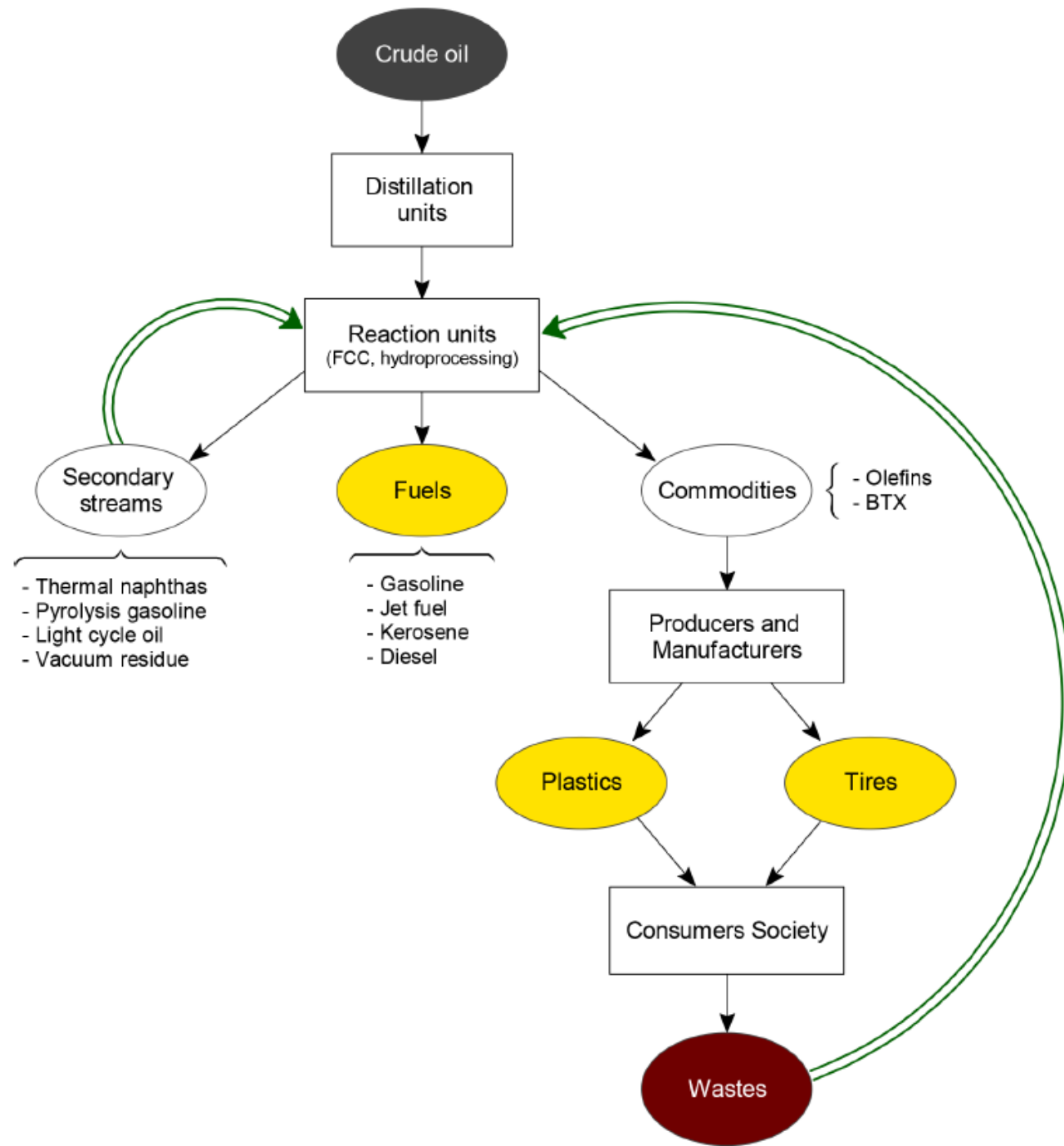
EMERGING PRACTICES FOR PLASTIC WASTE MANAGEMENT



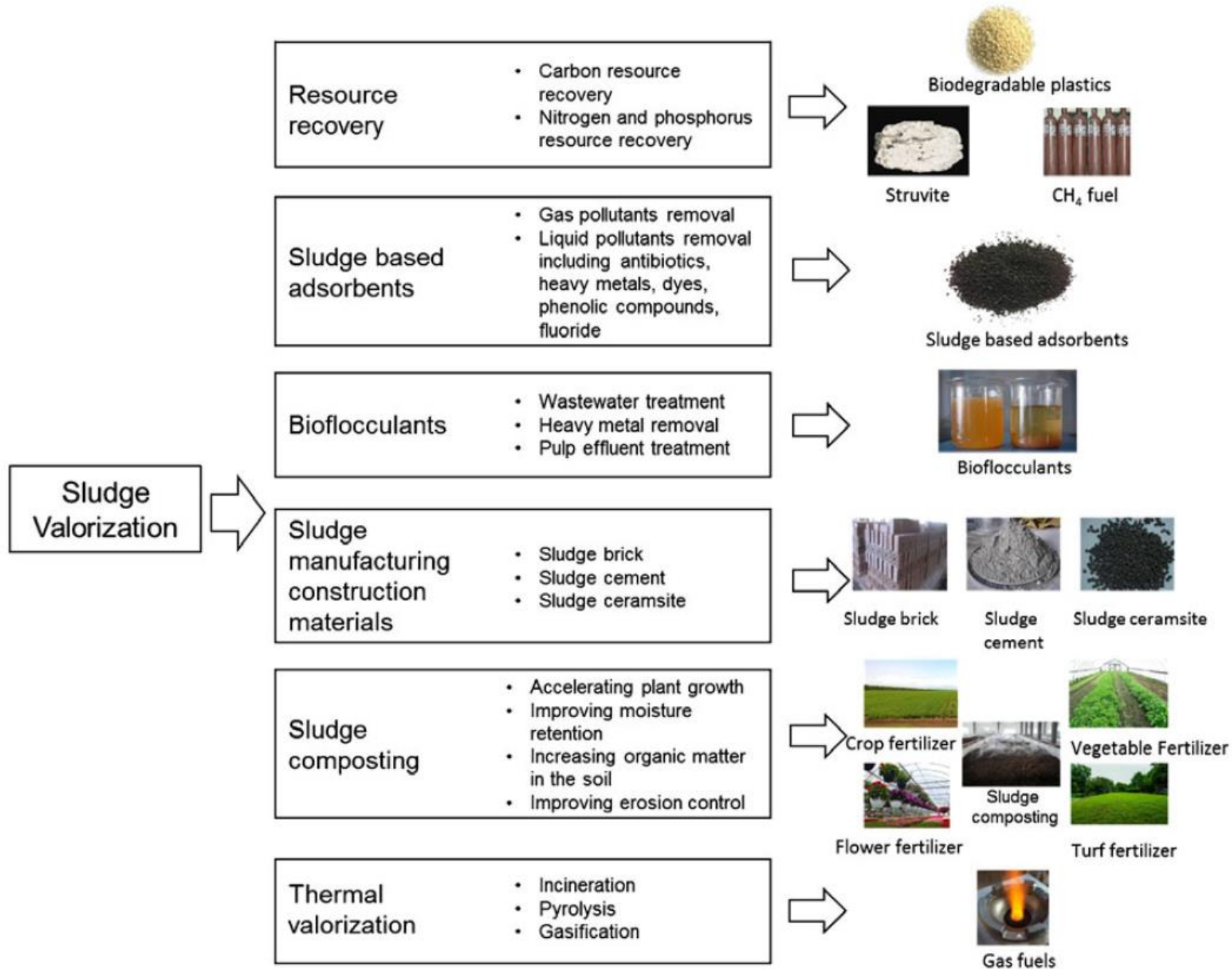
CIRCULAR ECONOMY FOR PLASTIC WASTE MANAGEMENT



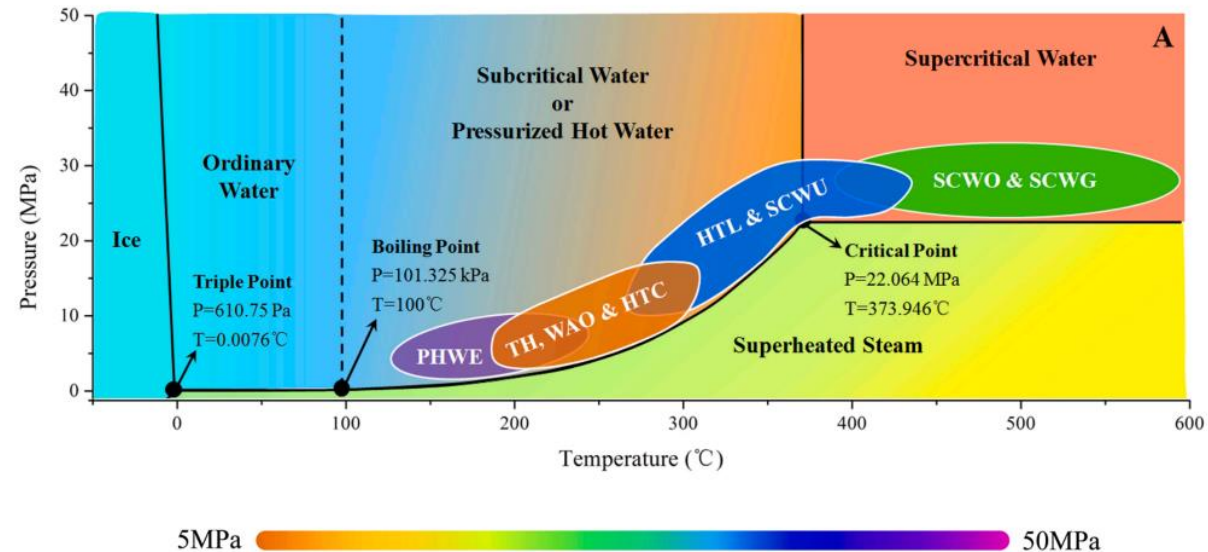
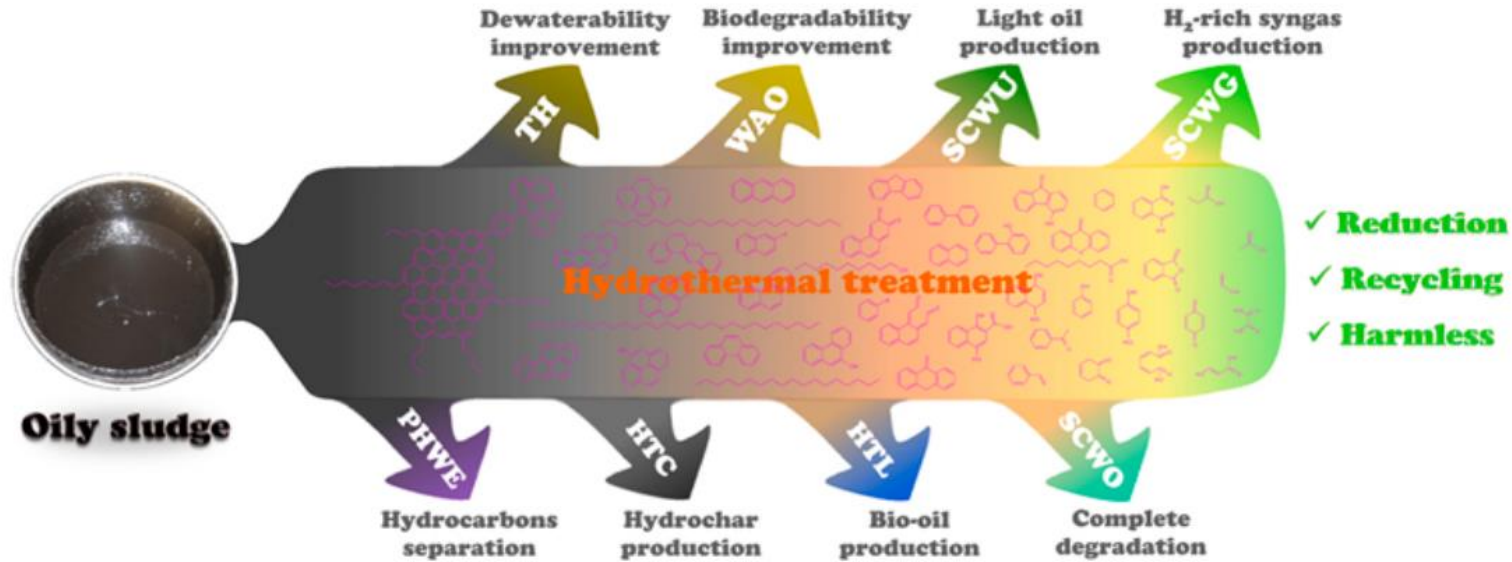
CONCEPT OF WASTE REFINERY



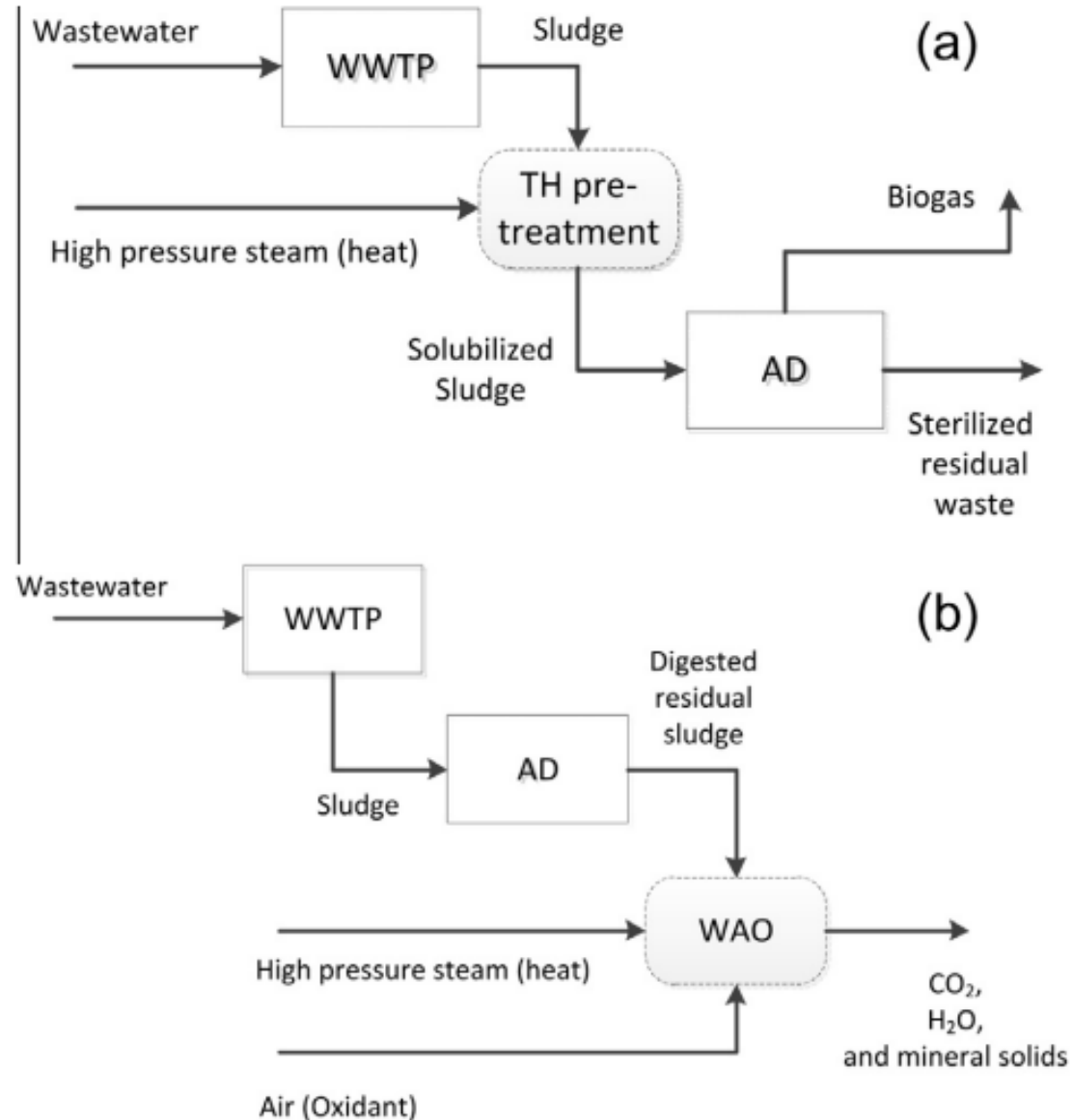
EXAMPLE – 4. WASTE SLUDGE



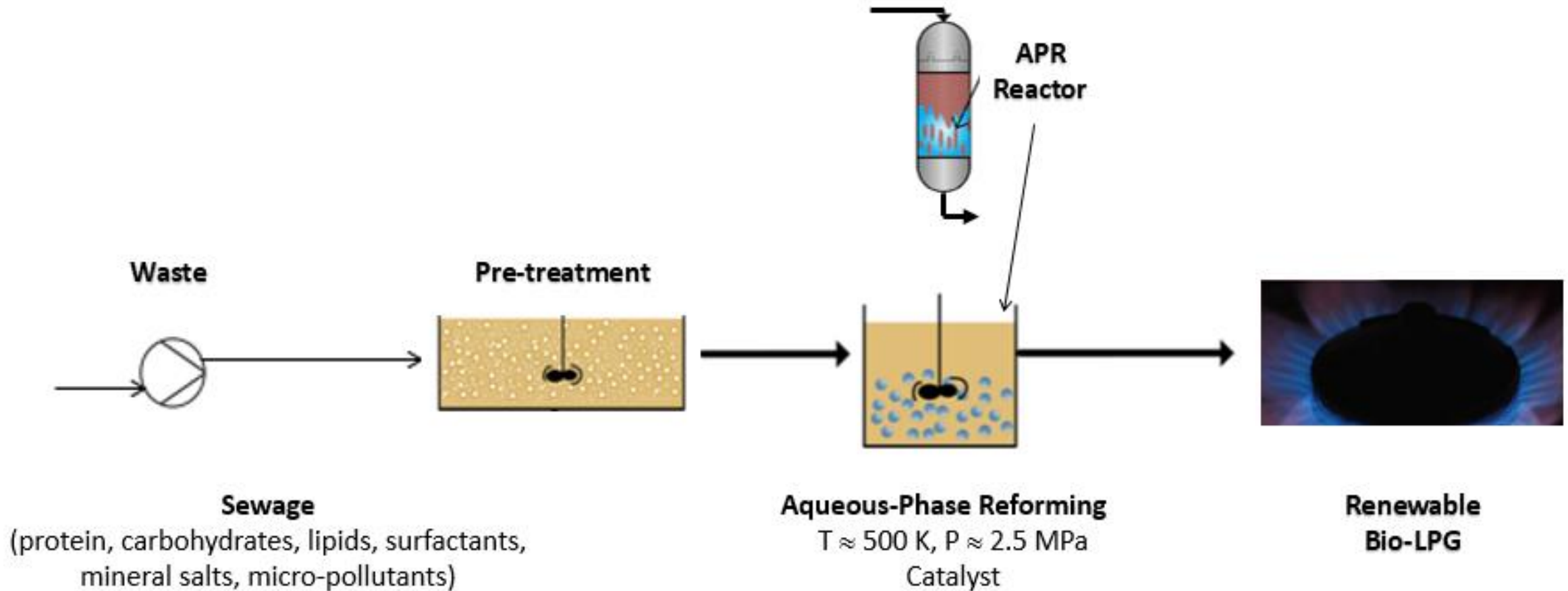
HYDROTHERMAL CONVERSION OF OILY SLUDGE



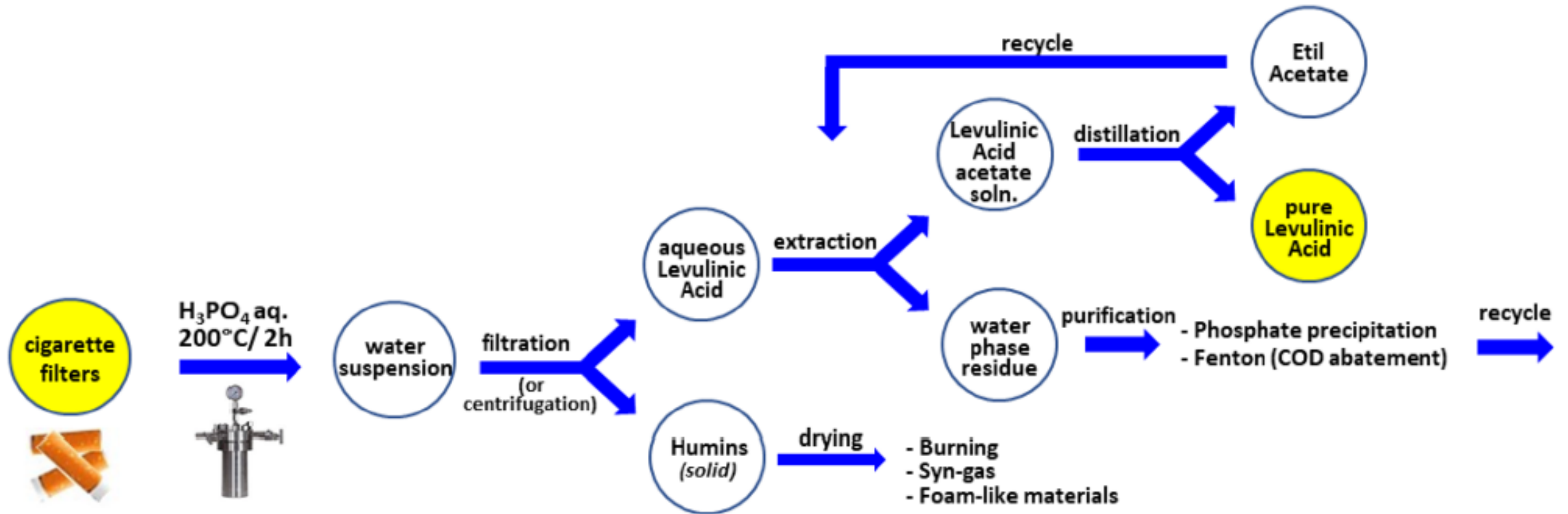
THERMAL HYDROLYSIS / WET OXIDATION OF SLUDGE IN WWTP



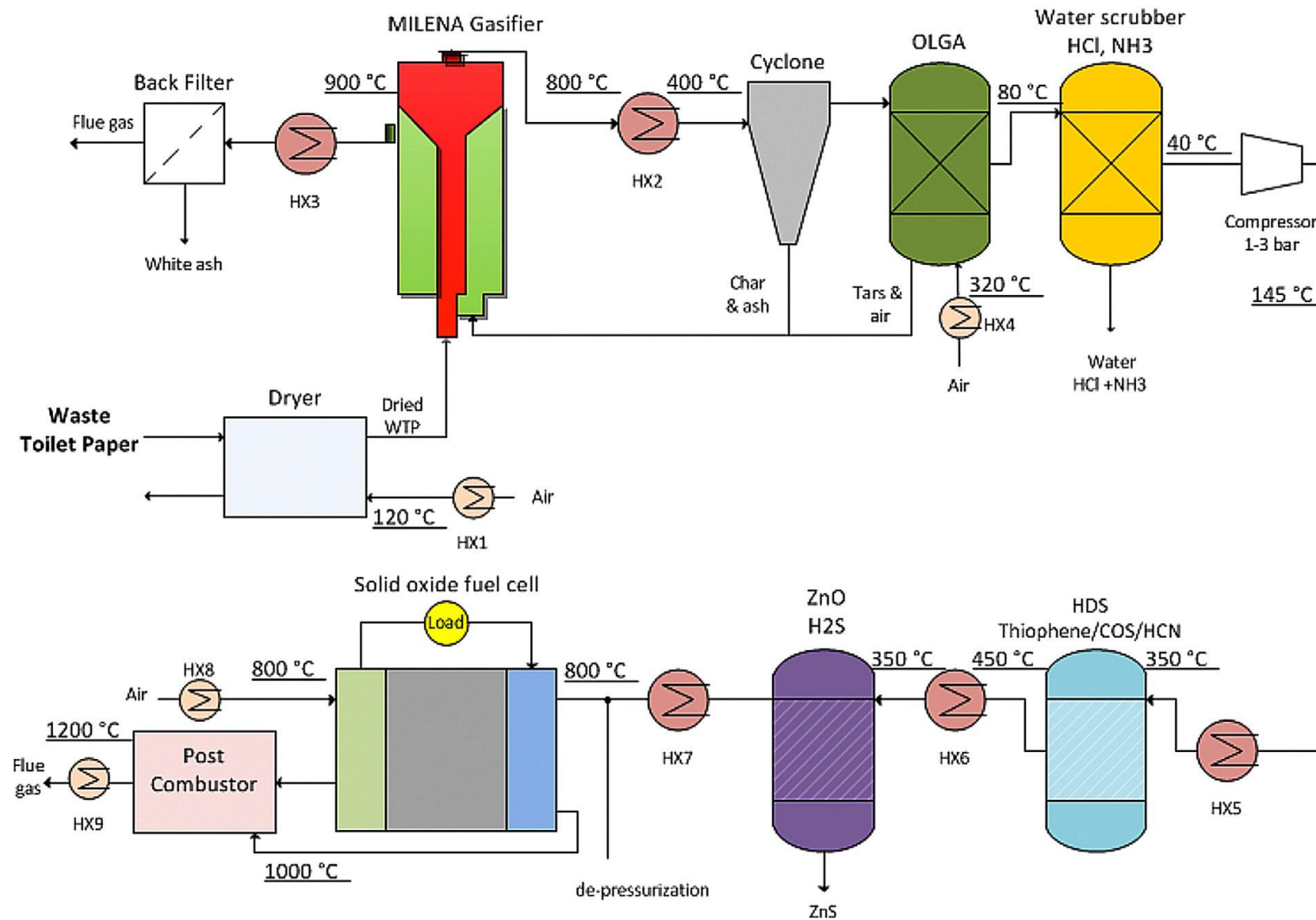
AQUEOUS-PHASE REFORMING OF SEWAGE SLUDGE



EXAMPLE – 5. MUNICIPAL PAPER WASTE



EXAMPLE – 6. WASTE TOILET PAPER



THANK YOU