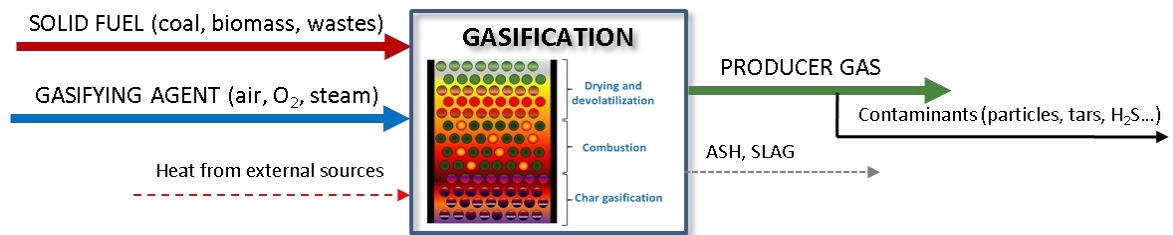


Gasification is an attractive technology for the production of energy, fuels and chemicals from biomass.

WHAT IS GASIFICATION?



Gasification is a high-temperature process in which a solid fuel (e.g. coal, biomass, wastes) is converted into a combustible gas, called **producer gas** or **syngas**. Gasification takes place at high temperatures (700-1500°C), and heat or small amounts of air or oxygen are added to supply the energy needed for the gasification process.

ADVANTAGES OF GASIFICATION

- **Versatility of applications** of syngas: fuel gas (power/heat production), synthesis of fuels and chemicals.
- **Higher electrical efficiencies** (gas engines at small-scale, combined cycles at large scale) than Rankine steam cycles (combustion).
- **CHP applications** allow parallel production of heat and power at maximum efficiency (whereas power efficiency is lower in combustion Rankine cycles).
- Easier removal of N-, S- and Cl compounds from producer gas.
- Possible integration with **CO₂ capture and storage** at large scale.

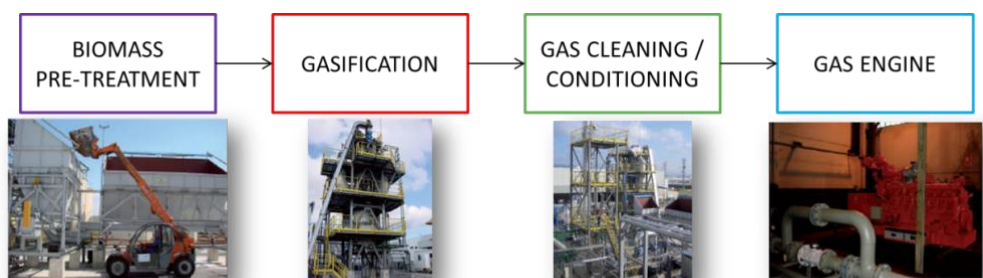
KEY OF GASIFICATION:

70-80%

of the energy contained in the initial solid fuel is transferred to the chemical energy of producer gas (remaining 20-30% accounts for heat and losses).

APPLICATIONS OF SYNGAS:

- Production of heat, power, mechanical energy, etc. (engines, turbines, fuel cells).
- Synthesis of biofuels: methanol, ethanol, synthetic natural gas, hydrocarbon fuels...



Configuration of a small-scale gasification plant

CLASSIFICATION OF GASIFICATION PROCESSES

- **Temperature:** High-T (fuel ash melts), low-T (below ash melting point).
- **Pressure:** Atmospheric, pressurized.
- **Heat supply:** Autothermal (heat provided by the combustion of part of the fuel), allothermal (heat added from external sources).
- **Technology:** Fixed/moving bed, fluidized bed, entrained-flow...