



WHITE PAPER

GASIFICATION TECHNOLOGY

THE PROCESS

Gasification is a process that converts biomass based on carbonaceous materials into gases including the largest fractions: nitrogen (N₂), carbon monoxide (CO), hydrogen (H₂), and carbon dioxide (CO₂).

The process is achieved by reacting the raw material at high temperatures (typically > 700C), without combusting controlling the amount of oxygen and/or steam present in the reaction.

The resulting gas mixture is called syngas.

Power can be derived from combusting of the syngas and is considered a renewable energy when biomass is used as raw material.

There are several types of gasifiers available for commercial use including: counter-current fixed bed, co-current fixed bed, fluidized bed, entrained flow, plasma and free radical.

THE ADVANTAGES



Syngas can be more efficient than direct combustion of biomass raw material because it can be combusted at higher temperatures.



Syngas can also be used as a hydrogen source in fuel cells, but it will require additional processing.



Gasification can generate lower amounts of some pollutants as Sox and NO_x



Gasification produces char as a by-product, which is increasing in demand and price



The technology is scalable, meaning that units can commercially be built from 50 kW and upwards making it an interesting alternative for industries and developing countries



Gasification offers several advantages compared to alternative sources of producing energy including the following:





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C.F. NIELSEN AND GASIFICATION

Over the years C.F. Nielsen has worked with several companies producing gasifiers, and we have tested many different types of raw material and sold several briquetting presses for gasifiers.

Gasifiers can be delicate systems and difficult to operate and generally operation efficiencies are increased when the raw material is homogenous in size, density, and moistures. A briquette offers these qualities.

Most gasifiers cannot operate with difficult waste and small particles. Some examples of this are raw material such as dust and smaller particles, like MDF, SRF and agricultural waste. All these raw materials can be briquetted and used as fuel in gasifiers.

Furthermore, some gasifiers require briquettes with high density, otherwise the fuel will disintegrate in the densifier. Our briquetting presses can produce high density briquettes out of most types of raw material due to our front-line technology.

C.F. Nielsen offers a wide range of briquetting presses able to produce briquettes from most raw materials with diameters from 30 mm and upwards with lengths from 20 mm up to 100 mm, densities between 1,1 and 1,2 making it ideal fuel for gasifiers. Capacities range from 200 kg/h to 2 ton per hour.