Torrefaction

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What is it?

- It is the thermal degradation of organic biomass in an inert or nitrogen atmosphere, one atmosphere pressure and temperature in the range of 200–300°C, for several hours depending on the biomass
- It is an upgrading process of biomass for other energy generation processes like direct combustion on an industrial scale.
- Torrefaction is essentially a biomass cracking technique
- After torrefaction the biomass has become brittle, due to the disintegration of hemicelluloses and to a lesser extent lignin and cellulose, which are responsible for the tough fibre structure.
- In other words, the fibrous structure of the biomass is partially broken down. The weakened fibre structure improves the milling properties of the biomass and enables the biomass to be processed together with coal at the power plant.
- During the torrefaction process, the water contained in the biomass as well as superfluous volatiles are released, and the biopolymers (cellulose, hemicellulose and lignin) partly decompose, giving off various types of volatiles.
- The final product is the remaining solid, dry, blackened material that is referred to as *torrefied biomass* or *bio-coal*.

What are the advantages of Torrefaction?

- Torrefaction enhances the properties of feedstock in a number of ways to enable its use as a direct fuel: reduction in moisture, increase in energy density, increase in heating value, and improved ignitability and

reactivity of the processed fuel

- The features of torrefied biomass enable co-firing rates of more than 50% of generating output, while keeping the investments needed to a minimum.
- Torrefaction of biomass leads to improved grindability of biomass.This leads to more efficient co-firing in existing coal-fired power stations or entrained-flow gasification for the production of chemicals and transportation fuels.