WHAT IS TORREFACTION?

Torrefaction is the roasting of biomass using temperature of 220-300ºC in a low-oxygen atmosphere so that combustion does not occur. Torrefied biomass has improved fuel properties:

- Higher heating value (10-20%)
- Partial hydrophobic (lower equilibrium moisture content)
- Improved grindability (less energy required)
- Higher carbon content (less volatiles)

Pellets made of torrefied biomass can have high energy density, similar to low-rank fossil coal; hence the name “bio-coal”.

TORREFIABLE WOOD VS. CHARCOAL

Torrefaction results in an improved heating value because more mass (M) is lost than energy (E) content during the process. According to results from literature, the increase is between 10 and 20 percent of the original heating value. In an industrial process, torrefaction gases can be recycled and utilised in drying of feedstock.

CONCLUSIONS

Torrefaction technology enables greater co-firing rates in existing pulverised coal power plants. Current biomass co-firing rates (i.e. conventional wood pellets) at coal plants can only be 5-10% of total fuel mix. Using torrefied biomass it is expected that this figure can be raised to 50% or possibly higher. This would result in a significant reduction of carbon dioxide emissions from the energy sector. Torrefied fuels can be processed using existing infrastructure at coal-fired power plants without extra investment.

REFERENCES


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