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Torrefaction - an easier, simpler, inexpensive immediately implementable option of reduction in greenhouse gas emission.

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Immediate reduction in carbon emission from thousands of coal/petcoke fired thermal power plants could bring significant reduction in the rise rate of GHG in the atmosphere. The problem of carbon emission has been further aggravated with current rise in use of petcoke, a high carbon intensity but less expensive fuel in power and cement industries. There is another important natural source of GHG emission. Trees and plants sequester around 60 gigatons of carbon per year, but most of it gets emitted back into the atmosphere when they die and decompose (Zhang, 2012).

The simple option of shutting down of fossil fuel power plants is difficult and not affordable for many countries. The much talked about back-end scrubbing of flue gas from fossil fuel fired plant is expensive, increases generation cost and most importantly it might take a decade or two for large scale implementation of CCS with amine scrubbing. Two torrefaction based options could potentially bring about immediate reduction in GHG emission in simple way and most important at cost which could be only a fraction of the cost of GHG reduction through conventional means.

Torrefaction is a low temperature thermal degradation of biomass in oxygen starved atmosphere. It can convert a wide range of biomass into coal-like fuels that would permit large scale (60-80%) substitution of fossil fuels with carbon neutral biomass in existing fossil fuel fired boilers.

Other effective means of reducing GHG emission from natural sources such as decay of agricultural or forest residues by torrefying them to produce biochar that could bury carbon for thousands of years underground in stable form. Controlled burning or burying plant wastes could retain as much as 10 giga tons per year of carbon as was practiced in Amazon basin in 450 BCE-950 CE. This practice retains significant part of carbon in biomass a very stable biochar instead of allowing them to be released to the atmosphere as CO₂ or CH₄. This paper gives a brief introduction to the torrefaction process and shows how it contribute to the reduction in carbon emission and technical, commercial and environmental barriers. It discusses current status of production of torrefied wood for cofiring in fossil fuel fired plants and production of biochar for soil remediation.