

Energy Input and Manufacturing Costs for Producing Torrefied Biomass Pellets

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Torrefaction is a slow heating of a biomass in a hermetically sealed container in the temperature range of 200-300°C. The biomass loses its volatiles resulting in a net increase in its energy content. One published literature (ECN Biomass 2006) shows that one unit of biomass loses 0.3 units of mass in volatiles yielding 0.7 carbonized (torrefied) solid material. Meanwhile one unit of energy loses 0.1 unit of energy through volatiles yielding 0.9 unit of energy content in the solid carbonized (torrefied) biomass. The net result is an increase of about 30% in the heat content of the biomass ($0.9/0.7=1.3$). The question is whether the increase in caloric value offsets the loss of weight of the biomass in terms of economics. This paper is a sensitivity analysis of the cost of making torrefied pellets from saw dust.