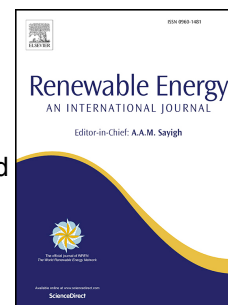


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Experimental investigation on air displacement and air excess effect on CO, CO₂ and NO_x emissions of a small size fixed bed biomass boiler

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Abstract

Biomass has a key role in the future of the energetic scenario, since it is a programmable renewable energy source which is suitable either to generate power and/or produce heat. This paper deals with biomass combustion processes in small size boilers, which is suited either for large residential buildings, or for small size industrial users. This kind of boilers is different from small pellet stoves and fireplaces and from large utility size boilers. In particular, those small size boilers have been seldom studied in the scientific literature about the combustion kinetics and pollutant formation mechanisms. Hence, the authors present the thermo-chemical data collected from a 140 kWth chipped wood boiler at the University of Pisa. The effect of the air excess and the ratio between secondary feeding air and primary feeding air mass flow rate, on CO, CO₂ and NO_x emissions was investigated. Results have shown that the air excess has the main influence on the pollutant produced. A comparison of the measured data with those presented in the literature and the discrepancies with other studies are also discussed.

Keywords:

Small Size Fixed Bed Boiler, Biomass Combustion, Air Displacement, Emission Management, Experimental Results

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