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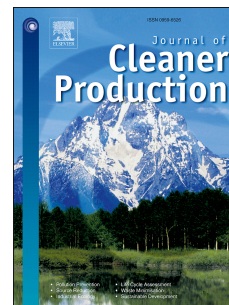
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Sustainable Utilization of Rice Husk Ash from Power Plants: A review

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Abstract

To move towards sustainability, finding sustainable ways of using rice husk ash for a large rice producing country like Thailand is essential. This review seeks to find sustainability characteristics of the uses of rice husk ash from power plants. It also reviews how rice husk ash is produced from different power generation technologies. Characteristics of rice husk ash are affected by different factors such as sources, preparation methods and combustion technologies. Different forms of rice husk ash, amorphous and crystalline, suit different applications. Ash from moving grate technology is suggested for use as adsorbent while that from fluidized bed is suggested for use as filler in polymeric composites and in the synthesis of innovative ceramic compounds. The ash from suspension fired technology is suggested for use in the construction industry and zeolite production. In addition to technical viability, using rice husk ash to substitute conventional products helps gain both environmental and economic benefits. Despite claiming sustainable applications of rice husk ash, many research papers report only technical performances of the products. This paper draws out sustainability characteristics of different rice husk ash applications using the “triple bottom line” framework. Potential reduction of greenhouse gas emissions, cost saving and employment generation of rice husk ash use options have been investigated. Results from the review suggest that using the ash to replace charcoal is the most sustainable option when comparing with other alternatives such as Portland cement, commercial silica and lime. This option could help to reduce GHG up to 1,005 kg CO_{2eq}/t product, to save cost up to 8,000 THB/t product, as well as to help generate employment for about 5 person-years/M THB spent in the sector. However, to make the sustainability assessment more comprehensive, other sustainability indicators such as fossil fuel depletion, human toxicity, ecotoxicity, particulate matter

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