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Energetic use of residues from rice parboiling industries in southern Brazil: biogas and hydrogen-syngas generation

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Brazil is one of the world's largest rice producers with trends for the growth of this sector. During the processing of the grain, high amounts of husk are generated, corresponding to 22% of its weight. On the other hand, in the process of parboiling, in turn, the final result is considerable volumes of effluent rich in organic matter. Thereby, this study demonstrates an energetic, economic and environmental way the possibilities of using these residues for power generation in the southern Brazilian rice parboiling industries. Two scenarios are presented: the first, with the use of biogas and the second, with the use of hydrogen-rich syngas. A case study was made in one of these industries, where it was discussed in detail the energy potential coming from systems operating with a CHP genset, using hydrogen-rich syngas from the rice husks and the biogas from the anaerobic treatment of the effluents. The results have shown that it is possible to produce more than $2,17E\uparrow 04$ MWh of electricity just considering the use of the biogas generated. On the other hand, the use of syngas generates enough thermal energy to operate the entire industrial process, with a surplus of 53,3% in MWh/year.

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