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ORC TECHNOLOGY FOR WASTE-WOOD TO ENERGY CONVERSION IN THE FURNITURE MANUFACTURING INDUSTRY

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ABSTRACT

Exploitation of low and medium temperature thermal sources, in particular those based on biomass combustion and on industrial residual heat recovery, has been increasingly investigated in the last decades, accordingly to the growing interest towards reduction in primary energy consumption and environmental issues. Organic Rankine cycle technology allows designing power plants that are less demanding in terms of auxiliaries, safety systems, maintenance and operating costs when compared to conventional water steam power plants. To support the preliminary technical and economic design of this kind of plants in different contexts, a simulation code of part load and off-design operation of an organic Rankine cycle unit for combined heat and power has been developed. In the paper, taking the real situation of a furniture manufacturing factory as a starting point, it is shown how all energy flows occurring all year long inside the combined heat and power plant, can be estimated on the basis of the thermal user duty time profile, the available biomass flow rate and the adopted operation strategy. This information is the basis in order to correctly evaluate the energetic, economic and environmental advantages of the proposed technical solution, with respect to a particular context, as it is shown in the concluding part of the paper.

KEYWORDS

biomass, organic Rankine cycle, co-generation, waste-to-energy

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