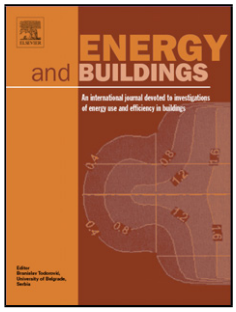

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Performance Analysis of a Liquid Absorption Dehumidifier Driven by Jacket-cooling Water of a Diesel Engine in a CCHP system

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Highlight

- A LiCl liquid absorption dehumidifier (LAD) was integrated into a combined cold, heat and power (CCHP) generation system. The LAD unit was driven by waste heat from jacket-cooling water (JCW) of the diesel engine, which was the prime mover of the CCHP.
- Experimental and modelling study was conducted to analyze the performance of LAD varying with the operating condition of the CCHP.
- The low grade waste heat recovered from JCW for dehumidification rounds up to near 30 kW when the engine works on its rated output of 50 kW, resulting the LAD dehumidification capacity of 0.76g·s^{-1} (2736g·h^{-1}) and the outlet air relative humidity (RH) of 41.91% at the flow rate of 300 m^{3}h^{-1}.

Abstract:

This article addresses the tough problem of effectively utilizing the low-grade residual heat of jacket-cooling water (JCW) from an internal combustion engine in combined cooling, heating, and power (CCHP) systems. An experimental platform was set up for this purpose, in which the JCW was used as a heat source to drive a LiCl liquid absorption dehumidifier (LAD). The thermodynamic model of the LAD in a CCHP system was established to correlate heat- and mass-transfer of the LAD with the output power of the engine, and the performance of the