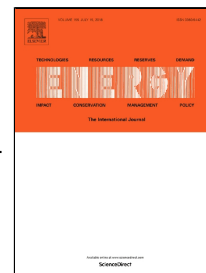


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Methane recovery in a combined amine absorption and gas steam boiler as a self-provided system for biogas upgrading

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1 **Methane recovery in a combined amine absorption and gas**  
2 **steam boiler as a self-provided system for biogas upgrading**

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9 **ABSTRACT**

10 Biogas, which primarily consists of methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>), is a  
11 renewable energy carrier, and can be upgraded to a natural gas substitute after removing  
12 trace impurities and CO<sub>2</sub>. Among the various CO<sub>2</sub> separation technologies, amine  
13 absorption is generally considered to be energy intensive as regenerating the rich  
14 solution need additional heat to strip CO<sub>2</sub>. However, it could hardly be found the related  
15 data concerning energy consumption of biogas upgrading projects adopting amine  
16 absorption. In this work, a pilot biogas upgrading project with combined amine  
17 absorption unit and gas steam boiler was established with treatment capacity of 300  
18 Nm<sup>3</sup>/h feed biogas. The major energy for operating this biogas upgrading project was  
19 self-provided through combustion a fraction of the biogas to generate steam for  
20 regenerating rich absorbent. Operation results showed that, besides much higher CO<sub>2</sub>

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