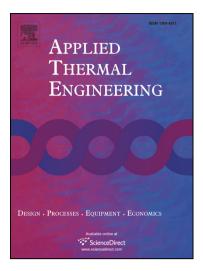
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Energy, exergy and sustainability assessments of a cogeneration system for ceramic industry

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15	Abstract
16	In this study, energy, exergy and sustainability analyses are applied in the ceramic sector to

ramic sector to simulate gas turbine based cogeneration plant model. The cogeneration system mainly 17 consists of a proposed gas turbine unit, a wall tile dryer and a ground tile dryer. The energy 18 analysis is performed, and then the exergy and sustainability analyses are applied for the five 19 different dead state (environment) temperatures varying from 10°C to 30°C (interval of 5°C). 20 It is found that the most energy efficient components are determined as the air compressor 21 and combustion chamber, while the minimum one is obtained to be wall tile dryer (7.98%). 22 The maximum sustainability and exergy efficiency (89.46%) are determined for the air 23 compressor as 89.46% at 10°C dead state temperature. The cogeneration (overall) system has 24 17.51% energy efficiency; while its maximum exergy efficiency is found to be 29.94% at 25 10°C environment temperature. The sustainabilities of the components are also directly 26 proportional to their exergy efficiencies. Furthermore, the utilization of the gas turbine unit 27 included cogeneration system can provide 0.1115 m³/s and 0.0732 m³/s natural gas saving for 28 29 the ground and wall tile dryers, respectively.

Keywords: Cogeneration; Efficiency; Energy; Exergy; Gas turbine; Spray dryer. 30

1. Introduction 31

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