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# Development and assessment of a thermochemical cycle and SOFC-based hydrogen energy system as a potential energy solution for the peak demand in a sustainable community

Tarique, Altaf Hasan<sup>a</sup>; Khan, Sher Afghan<sup>a</sup>; Khalid, Farrukh<sup>b</sup> ; Bin Azami, Muhammad Hanafi<sup>a</sup> [Save all to author list](#)<sup>a</sup> Department of Mechanical Engineering, Faculty of Engineering, International Islamic University Malaysia, Kuala Lumpur, 53100, Malaysia<sup>b</sup> School of Energy Science and Engineering, Indian Institute of Technology, Guwahati, 781039, India[Full text options](#) [Export](#) **Abstract**

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**Abstract**

In this study, an integrated energy system is presented in which hydrogen is produced via the thermochemical cycle. The presented system would provide a potential solution for storing excess electric power in terms of hydrogen generation for a sustainable community. Principles of exergy and energy are utilized to analyze the presented system in terms of exergy and energy efficiencies. The simulation result shows that with the help of the developed system, 0.36 kg/h of hydrogen can be generated, which is utilized via SOFCs to produce and electrify the houses. Additionally, 1000 kW of

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