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Hybrid systems based SOFC turbine-fuel cell coupling for stationary power generation

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This paper reports a review of an environmentally clean and efficient source of energy such as   solid oxide fuel cell (SOFC) hybrid systems. Due to the climate concern most nations are seeking alternative means of generating energy from a clean, efficient and environmental-friendly method; however this has so far proven a big headache for both academics and the industry.

Micro turbines are one of the most hailed technologies for powering distributed generation systems. These devices produce a few watts with volumes of the order of a few cubic centimetres, which are sometimes better termed nano-turbines. Such devices incorporate micro-fabricated components and are being developed to provide power and even propulsion for micro vehicles. While a fuel cell is a device that converts the chemical energy from a fuel into electricity through an electro-chemical reaction with oxygen or another oxidizing agent.

Moreover, the conjunction of a micro turbine with a fuel cell is generally termed as a ''Hybrid''. Combining the two systems increases the efficiency of a micro turbine from 30 to 65%. Hence, this paper outlines the acute global population growth, the growing need, environmental concern, use of energy, its consequent environmental and hybrid systems layouts with the problems with proposed solutions. Furthermore, advantages of solid oxide fuel cells (SOFCs) turbine-fuel cell hybrid system with respect to the other technologies are identified. This paper also reviews the limitations and the benefits of solid oxide fuel cells (SOFCs) turbine-fuel cell hybrid system in relationship with energy, environment and sustainable development. Few potential applications, as long-term potential actions for sustainable development, and the future of such devices are discussed.

Keywords: