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Theoretical Performance of a Sustainable Clean Energy On-Site Generation Device to Convert Consumers into Producers and Its Possible Impact on Electrical National Grids

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Abstract : In this paper, a theoretical evaluation is carried out of the performance of a forthcoming fuel-less clean energy generation device, the Air Motor. The underlying physical principles that support this technology are succinctly described. Examples of the machine and theoretical values of input and output powers are also given. In addition, its main features like portability, on-site energy generation and delivery, miniaturization of generation plants, efficiency, and scaling down of the whole electric infrastructure are discussed. The main component of the Air Motor, the Thermal Air Turbine, generates useful power by converting in mechanical energy part of the thermal energy contained in a fan-produced airflow while leaving intact its kinetic energy. Due to this fact an air motor can contain a long succession of identical air turbines and the total power generated out of a single airflow can be very large, as well as its mechanical efficiency. It is found using the corresponding formulae that the mechanical efficiency of this device can be much greater than 100%, while its thermal efficiency is always less than 100%. On account of its multiple advantages, the Air Motor seems to be the perfect device to convert energy consumers into energy producers worldwide. If so, it would appear that current national electrical grids would no longer be necessary, because it does not seem practical or economical to bring the energy from far-away distances while it can be generated and consumed locally at the consumer's premises using just the thermal energy contained in the ambient air.

Keywords : electrical grid, clean energy, renewable energy, in situ generation and delivery, generation efficiency
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