

2012 TECO Green Tech Contest

Works Introduce



No. : 19

Works : **Generation of Clean Energy using Ferro-Fluid**

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ITEM	DESCRIPTION
Introduction of Team	<p>The team includes five members, comprising four students and one assistant professor. Each student belongs to different Engineering streams of Amity University, Noida, India, such as Solar & Alternative Energy, Electronics & Computer, and Mechanical & Automation. The supervising assistant professor is from Renewable & Alternative Energy Institute, having specialization in various fields, like solar cells, nanomaterial characterization, quantum dots, organic LEDs, sensors, etc.</p>
Creative Motivation	<p>Today, fossil fuels provide about 85% of nation's total energy needs, while approximately 8% comes from nuclear and only 7% from renewable sources such as hydroelectric, wind and solar power. Since fossil fuel's supply is going to be depleted; thus, sustainable substitutes are needed, which will simultaneously reduce greenhouse gases as well as other pollutants and their impact on global climate change. To our knowledge, none of the currently available approaches has the potential to cause a transformational change in the current state-of-the-art to generate cleanest electrical energy. Power generator using ferro-fluid and rare-earth magnets can be a potential solution to remove all the barriers. In addition, it can be widely used as an efficient and cleanest form of electrical energy.</p>
Research Process	<p>The proposed work is to generate the cleanest electrical energy with the use of rare-earth magnets, ferro-magnetic fluids, based on the phenomena of electromagnetic induction. The rare-earth magnets are considered over here due to their very strong magnetic field. Thus, stronger will be the magnetic flux, larger will be the corresponding generated electrical power. Further, the most important part of this research work is the ferro-fluid. Ferro-fluid is a liquid which becomes strongly magnetized in the presence of a magnetic field. These ferro-fluids are specially used for self-levitating the rare-earth magnets. They make an O-ring on both sides (north and south poles) of the magnets. Therefore, these supported magnets are free to move or rotate along the axis. Using ferro-fluid, the friction between magnetic bars and closed circular tube walls will become extremely negligible. This enormously increases the motion of magnetic bars inside the tube with minimal losses. The novelty of this work lies on the role of rare-earth magnets and ferro-fluid bearing in the design of the portable device. This device has many useful applications viz. lighting, charging of cell phone or similar other devices/ instruments in remote areas/defense purpose where no other source of electricity is available. We believe that this technique is unique for the generation of clean electrical energy power by using mechanical energy, solar thermal energy, waste energy or wind energy, with slight more modifications.</p>

Introduction of Work

The main phenomenon behind this idea is the Electromagnetic induction. In this a temporary electric current is generated because the flux lines are cut by the moving coil or the flux lines linked with the coil are changed. The process of inducing an electro-motive force (emf) in a conductor whenever the magnetic flux linked with it changes, is known as electromagnetic induction. The emf developed is called induced emf and the current obtained is called induced current. In this innovative work, our objective is to generate the cleanest electrical energy with the use of rare-earth magnets, ferro-magnetic fluids. The proposed energy generation system uses the power of magnetic fields created from moving rare-earth magnets is constructed up to create electrical power. This ferro-magnetic power generator not only is clean, but also allows us to have the money-free electricity.