DEVICE FOR CONVERTING ENERGY FROM A FLUID IN MOVEMENT

Description:

Of all the types of renewable energies, one of the most widespread worldwide is wind energy. Its paradigmatic example for massive generation of electrical energy from wind movement is the three-bladed wind turbine. However, these devices have a number of drawbacks. The present invention is framed within the field of devices for energy conversion; more particularly, devices that convert wind energy into electricity. The invention provides an energy conversion device that takes advantage of the flutter instabilities generated by the wind in a very thin horizontal sheet elastically supported by a vertical shaft attached at its upper part to a NACA profile, attached by a moment connection to the sheet at its leading edge, and whose lower part is arranged to be able to move with respect to a fixed base anchored to the ground. The energy of the wind is transformed through the sheet oscillations into a vertical oscillatory movement of the shaft, which in turn is converted into electrical energy.

Keywords:
Wind Turbine, Flutter Instabilities, Structural Resonance, Fluid-Structure Interaction

Sectors:
Engineering, Environment and Energy

Areas:
Environmental and Forestry, Energies

Advantages:

The generation of electrical power would be possible in a range of wind speeds below 5 m/s, where most current wind turbines have problems for working. On the other hand, it solves the problems of visual impact, radar interference, shock waves at the tips of the blades or sound emission that current large two- and three-blade wind turbines have. Finally, it would be much more harmless to birds.

Uses and Applications:

Its use would be framed within wind energy, which is an abundant, renewable, and clean resource that helps to reduce greenhouse gas emissions by replacing energy sources based on fossil fuels. The environmental impact of this kind of energy is also less problematic than that of other energy sources. Some of the largest manufacturers of current wind turbines could be interested in this invention.

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