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Windmill Efficiency Part 3: Testing the Magnetic Flux of Magnetostrictive Solenoids to Optimize Oscillatory Energy Production

Windmill efficiency: How can we harvest wind energy from more natural movement of oscillation instead of spinning turbines? How can we optimize energy production in an oscillatory generator? Applying different levels of magnetic flux on a copper solenoid surrounding magnetostrictive materials, it is possible to harvest energy by absorbing oscillatory movement. If the magnetic flux density is increased in an oscillatory magnetostrictive generator, then the more AC-current will be generated because more magnetomotive force is applied onto the solenoid and magnetostrictive conductor. The experiment involved measuring the current and voltage peak values when increasing magnetic flux -- by adding neo-dysprosium magnets -- to the solenoid. Peak performance increased when increasing magnetic flux, but only when adding two to four magnets. At four magnets, the galfenol and terfenol-d peak values spiked dramatically, producing energy almost three times more than level two. Steel, at this point, produced less than the magnetostrictive materials. Magnetic-saturation occurred with four magnets on the solenoid. After adding more than four magnets, the peak values continued decreasing dramatically. The magnetostrictive material electron mobility is extremely flexible, so when it came into contact with certain level of magnetic flux, the magnetic field resistances were able to efficiently bend the electron motions and vice versa. Magnet levels greater than four produced magnetic saturation because magnetic flux resisted with too much strength, forcing the electrons to float. The solution for this project would be to maximize magnetic flux on the solenoid surrounding the magnetostrictive material before reaching saturation for most efficient energy generation.