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Capstone project

Need Energy? Why not shoot for the Moon?: The Moon as a source for nuclear fusion and tidal generation.

Introduction

Energy: What is it, and why don't we have enough

Energy in its simplest definition is the ability to do work. What exactly is “work”? Work is the application of force over a distance. The resulting unit for energy is the joule, which is equal to kgm^2/s^2 . The more energy you have, the larger the force you can apply or a larger distance you can apply a smaller force. The Law of Conservation of Energy states that energy cannot be created or destroyed, but energy is changed from one form into another. The energy problem that the world faces is not that there is not enough energy, but that it is difficult to harness into useful energy for human consumption. Other than the chemical energy from food used to maintain homeostasis, the dominant forms of energy that humans use are electrical energy and chemical energy, in the form of fossil fuels in the combustion engine and combustion for heat. Electrical energy can also be used to generate heat and propel machines. Even though electrical energy is widely used, it is not a resource and must be converted from other sources of energy. The main source for electricity generation is fossil fuels, a nonrenewable resource.

We need to develop energy supplies that will meet the needs of an ever-growing world population. For the purposes of this paper the two forms of energy most relevant are mechanical energy and nuclear energy. (One of the most effective ways to harness these forms of energy into a usable form is through electricity generation.) The Moon may be an abundant source for both forms. The enormous amount of energy stored in the movement of the tides can be transformed into electrical energy with no greenhouse gas emissions, and the surface of the Moon may be the most promising source for mining helium-3, a nuclear fuel that may make nuclear fusion generators a reality.

How many gallons of water can an average person lift? The more gallons lifted, the more energy expended to lift them. Expand this idea to how much energy is involved in moving the oceans and one realizes the enormous energy potential of our oceans. The gravitational attraction between the Earth and the Moon is the engine that drives the tides, making them an extremely predictable source of energy. The question is how to transform the energy stored in the oceans into usable energy.