A Solar Idea

Engineers will continue to make leaps and bounds in technological advances, but will be stopped by the most defining thing in the cosmos. Not friction, but energy. Many people say that solar energy is the way of the future. I agree. Current solar technologies have poor efficiency, because they are affected by Earth's weather. The solution to this is to bring the solar cell to the sun. I believe that the greatest challenge of the 21st century will be generating enough electricity to power our world. Satellites launched to the sun could collect an incredible amount of power by utilizing innovative propulsion and energy transmission methods.

One way that might be plausible is to launch satellites that orbit the sun and collect its incredible energy at close and effective range. The sun produces 100 billion hydrogen bombs worth of energy each second ("Amount of Energy Produced by Sun?", npa). This is about 360,000,000,000,000,000 (3.6×10^{17}) watts every second (npa). The Earth only receives 2 billionths of that energy, amounting to 720,000,000 W (npa). This is not nearly enough to meet the energy usage of the world. The Earth uses 13.5 TW a day or 156,250,000 (1.5635×10^{8}) watts a second ("New Power for the Planet", npa). That is 1/69,075,791th of what can in theory be collected. These satellites could collect as much energy in one second as the earth uses in about 2 years. In getting this energy to earth, they would still be able to satisfy the world's needs if the system was running at 0.000000000000000000000000177664073% ($1.77664073 \times 10^{-26}$) efficiency.

To transport a solar catcher satellite from Earth to the sun would not be anything new. The SOHO satellite already exists, as well as probes launched much deeper into space. A satellite traveling at 36,000 miles an hour could reach the sun in about 110 days ("How fast can conventional rockets go?", npa). The satellite could be accelerated and maneuvered by an ion

engine (“What is the difference between an ion engine and a conventional one?”, npa). An ion engine basically spits out a few charged particles at incredible speeds (npa). A chemically propelled rocket burns fuel which produces an incredible amount of particles at slow speeds (npa). Therefore an ion engine would require much more energy but less matter as fuel than a conventional rocket (npa). Since energy will not be a problem for the craft in question, an ion engine is perfectly suited for this purpose. An ion engine accelerates particles to 30 km/s as opposed to the conventional rocket exhaust speeds of 3-4.5 km/s (“Ion Thruster”, npa). The satellite could reach much greater speeds with less fuel using this method.

Probably one of the most difficult parts to this entire system would be getting the sun’s energy back to earth. The most plausible answer lies in your home—a microwave. Microwaves are thought to be much less dangerous than gamma or X-rays (“Microwave”, npa). They can also penetrate the Earth’s atmosphere, an invaluble trait (“Active Sensors”, npa). Microwaves also have relatively high energy levels (“Microwave”, npa). The collector satellite would send a microwave pulse to a smaller “relay” station. Making use of a rectenna, an antenna that uses a rectifier to convert AC (waves) to DC, the station could retrive almost 90% of the original energy (“Microwave Power Transmissions”, npa). By utilizing a series of relays, the energy could be transferred to a reciever and distribution center on Earth. Also, the stations could compensate for a block in the line-of-sight from the sun to Earth (a planet gets in the way). Another benefit of the system is safety. A closer station could receive messages and prevent accidents much faster. Even at the speed of light, it would take more than 5 minutes for a data stream to reach the sun. This could be disastrous if a microwave beam is misaimed. A close relay satellite could receive a message in a matter of seconds and correct the problem just as quickly.

In utilizing such innovative technologies, a solar system could be made to harness the amazing power of the sun if the satellite orbited it and transmitted energy back to Earth. These technologies are being tested today and could very well be a reality by the mid-to-end of the 21st century, leading to the most significant engineering breakthrough since the discovery of energy. As Thomas Edison once said "Hell, there are no rules here-- we're trying to accomplish something" (The Quotations Page npa).

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