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Solar-Power Satellites:
A Down-to-Earth Investment

A Sample Column for Review

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Science fact not fiction, solar-power satellites are the only practical means of our species' continued existence, let alone progress.

Milestones in the technological and consequent social advancement of civilization have been marked by the development of new and efficient sources of power. Making and controlling fire gave *Homo erectus* an evolutionary advantage over all other species. Harnessing beasts of burden allowed hunters and gatherers to settle into Neolithic villages. The backs of slaves bore the growth of ancient civilizations. The invention of waterwheels and windmills helped turn Medieval Europe out of the Dark Ages. Steam powered the Industrial Revolution. Petroleum fuels the Automobile Age, and electricity energizes the Information Age.

To maintain, let alone increase, our prosperity, we cannot quit developing new sources of energy. Fossil fuels are dinosaurs, sooner rather than later doomed to extinction; they are the biggest contributors to the Greenhouse Effect running amok and local air becoming a muck; and they are the ultimate source of war and terror in and from the Middle East. Nuclear fission and fusion have proven too expensive, complex, and dangerous to be practical, even in a world without terrorists. Wind-, tidal-, geothermal-, and ground-based solar-power are too limited by geography and technology to contribute significantly to existing, let alone, future energy needs.

The only dependable source of power for the advancement of civilization is space-based solar power. For decades, scientists and engineers—supported by both Democratic and Republican administrations at home and by other governments abroad—have developed the architecture of such a system. According to these plans, astronauts and astrorobots would construct massive satellites in high orbit around the Earth, where the sun shines continuously and intensely. The materials required—metals, silicon, and oxygen—are the most plentiful elements in the crust of the Moon, where they would be mined and, again using proven technologies, catapulted from the surface, far more efficiently and less expensively than if launched from the Earth, with over twenty times the gravity to overcome. Each satellite would bear fifty square kilometers of photovoltaic surfaces—the "leaves" for the "photosynthesis" of our green planet—safely and cleanly producing as much power as ten nuclear power plants. The enormous quantities of energy

generated would be sent down to Earth in the form of high-density radio waves, captured by antennas in secure areas, and converted into electricity fed into our power grids.

Of course, a project this ambitious would require an investment in capital, labor, and leadership as great as the mobilization for a world war. Cooperation between nations, in both the public and private sectors, as successfully employed in the Intelsat and Inmarsat satellite consortia, would be an essential component—as well as a welcome benefit—of this project, enhancing not only prosperity here on Earth but also security in this ultimate "high ground." Even petroleum-exporting countries could benefit from significantly increased supplies of energy, as could be used to affordably desalinate seawater and make deserts bloom; petrochemicals would continue to serve as valuable sources of carbon for plastics and other manufacture.

The only thing to dwarf this initial investment would be its ultimate profit: The sun sends our planet some 20,000 times as much power as the entire industrial world consumes; harvesting even a fraction of this supply would yield trillions of dollars' worth of energy (in today's dollars) every year, in perpetuity. Such a profitable program based in space could also represent the first step on a manned mission to Mars and beyond, only then technically and economically feasible.

And who can foretell what secondary benefits might arise? Our manned missions to the Moon produced profound advances, including computer technology that eventually transformed every aspect of modern life. Each dollar that has been invested in the space program has returned at least three dollars to the economy as a whole—a "multiplier effect" on par with education spending and twice as great as military spending.

The alternative—not meeting our world's ever growing needs for energy, or attempting to do so by means that would destroy the very environment in which we must live—comes at a cost in terms of lives, liberty, and property that cannot be calculated or borne.

Ironically, there is no issue more down-to-earth than the development of space-based solar power. With it, the economy and humanity of the world will flourish in ways we dare only imagine; without it, the economy and humanity of the world will perish in ways we dare not imagine.

The future is inevitable and largely in our hands.

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