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Mar 18, 2017 @ 07:28 AM 11,389 aufgerufen 03.07.2018

**Trump Should Make Space-Based Solar Power A National Priority**



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* [collected by ground-based stations which would then add it to the existing electrical grid.](https://twitter.com/intent/tweet?url=http%3A%2F%2Fwww.forbes.com%2Fsites%2Fbrucedorminey%2F2017%2F03%2F18%2Ftrump-should-make-space-based-solar-power-a-national-priority%2F&text=collected%20by%20ground-based%20stations%20which%20would%20then%20add%20it%20to%20the%20existing%20electrical%20grid.)
* [generating several gigawatts of power in one fell swoop,](https://twitter.com/intent/tweet?url=http%3A%2F%2Fwww.forbes.com%2Fsites%2Fbrucedorminey%2F2017%2F03%2F18%2Ftrump-should-make-space-based-solar-power-a-national-priority%2F&text=generating%20several%20gigawatts%20of%20power%20in%20one%20fell%20swoop%2C)

If President Trump were to champion space-based solar energy as a means of delivering unlimited, renewable electricity from Earth orbit, it’s arguable that his administration could leave the U.S. and the world at large with a revolutionary new source of energy.

Space-based solar power (SBSP) --- in which satellites in Earth orbit capture the Sun’s radiation, convert it to electricity and then transmit it back to Earth in the form of either microwaves or lasers --- would arguably do more to positively impact the lives of everyday Americans and fellow citizens of the world than almost anything the new President could champion.

Some 30% of all incoming solar radiation never makes it to Earth’s surface, reports the U.S. Dept. of Energy (DOE). But, as the agency notes, in space, there’s no atmosphere, seasons or weather to diminish the collection of our star’s radiation.

The DOE notes that once such energy reaches Earth’s surface, it would then be [collected by ground-based stations which would then add it to the existing electrical grid.](https://twitter.com/intent/tweet?url=http%3A%2F%2Fwww.forbes.com%2Fsites%2Fbrucedorminey%2F2017%2F03%2F18%2Ftrump-should-make-space-based-solar-power-a-national-priority%2F&text=collected%20by%20ground-based%20stations%20which%20would%20then%20add%20it%20to%20the%20existing%20electrical%20grid.)

If SBSP is pursued using microwave beaming, the DOE says a high geostationary orbit would necessitate a collecting area spanning some 3 kilometers and weighing over 80,000 metric tons with costs ranging into the billions of dollars. To make such a satellite feasible, the agency says the satellites would need to be self-assemblying. The good news it says is that even one such satellite would be capable of [generating several gigawatts of power in one fell swoop,](https://twitter.com/intent/tweet?url=http%3A%2F%2Fwww.forbes.com%2Fsites%2Fbrucedorminey%2F2017%2F03%2F18%2Ftrump-should-make-space-based-solar-power-a-national-priority%2F&text=generating%20several%20gigawatts%20of%20power%20in%20one%20fell%20swoop%2C) or enough to power a city the size of Atlanta or Seattle.

Credit: John Mankins

"Visualization of a highly modular solar power satellite, harvesting sunlight efficiently in space and delivering it economically and safely to Earth; courtesy John Mankins"

But because microwaves inherently have very long wavelengths, they can easily penetrate Earth’s atmosphere, which the DOE reports would enable transmission of such space power back to Earth at safe, low intensity levels.

In contrast, the DOE notes that low-Earth orbiting space-based solar power laser transmitting satellites --- which could weigh less than 10 metric tons --- could be launched and operated at $500 million, or a fraction of the cost of larger microwave transmitting satellites.

Carbon nanotechnology could also help.

Rebeam Space Inc. CEO Gadhader Reddy won a 2015 International Space Solar Power competition for a concept that uses carbon nanotube technology to reduce the mass of an SBSP satellite to about 115 metric tons. At a cost of some $340 million, Geddy told me his Delaware-registered company could use such a system to reach profitability within two years of launch.

Meanwhile, California-based Solaren Corporation’s CEO Gary Spirnak told me his own company is still honing its patented SBSP technology while seeking investment partners. By 2018, Spirnak expects Solaren to negotiate a power purchase agreement with a major utility and to have a working 250 megawatt SBSP satellite in Earth orbit by 2025.

Once such electricity makes it to the ground, state of the art microwave beaming technology could, in theory, be used to allow the delivery of electricity via a Wi-Fi-like wireless system.

Retired University of Houston physicist David Criswell holds a patent on technology that applies to wireless transmission of power over a range of distances --- from meters to hundreds of kilometers.

The idea, Criswell told me, is that once the energy is beamed via microwave back to Earth, it can then be redirected to satellites that can send it anywhere on Earth (or even back to Earth orbit) as needed. Rectifying antenna (rectenna) receiving stations, says Criswell, would convert the power beam back into electricity and can upload it as needed to electrical grids --- or even to mobile devices equipped with small receiving rectennas.

[](https://www.forbes.com/pictures/54f4e70dda47a54de8244f16/top-10-largest-solar-proj/%22%20%5Ct%20%22_self)

[Gallery](https://www.forbes.com/pictures/54f4e70dda47a54de8244f16/top-10-largest-solar-proj/%22%20%5Ct%20%22_self)

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Even so, the first step is to prove that the technology works.

“There are no technological showstoppers preventing the development of space solar power,” John Mankins, NASA’s former chief technologist for human exploration and development of space, told me. However, Mankins, now President of Mankins Space Technology, Inc., says there is a real need to demonstrate solar power satellite systems here on Earth and in space.

Most of all, the fledgling space-based solar power initiative needs cohesive leadership to actively plot goals and transform it into a workable industry.

For argument’s sake, what would a $25 billion government-funded SBSP roadmap look like?

Year one --- 2018. $2 billion in design and technology development research to be meted out to academics, independent researchers and researchers in private industry, who initially would work on the problem separately. Then in 2019, researchers would begin work in a coordinated effort.

Year three --- 2020. Construction of a $3 billion proof of technology satellite to be launched into high-Earth orbit by early 2021.

Year six --- 2023. Construction of a full-scale $20 billion SBSP satellite system via a public/private partnership, with international participation. Launch would be in 2024.

How the Trump Administration might help.

“With a modest, focused [public-private partnership] over the coming three to four years,” said Mankins, “the U.S. might accomplish a meaningful demonstration of space solar power.”

A successful result, he says, would lead to a sea change equivalent to that of American electrification at the turn of the last century.

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