



# A Game Changer in the Fight Against Climate Change

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Elon Musk's Starship rocket is poised for liftoff. The billionaire inventor recently announced that the massive new rocket system developed by his SpaceX corporation is approaching technical readiness—and that many of the remaining hurdles are administrative in nature.

How extensive those might be, however, remains to be seen. The Federal Aviation Administration (FAA) is now conducting an environmental impact review of the Starship project, possibly resulting in years of delays. The bureaucratic attention is sorely misplaced; instead of focusing on the potential environmental and climatological impact of Starship, the FAA (and the Biden administration at large) should instead be weighing the opportunity costs of delaying the venture. That's because Starship has the potential to be a game changer in the fight against climate change.

In his recent Starship update, Musk trotted out some pretty mind-blowing numbers. To meet his goals of eventually building a city on Mars, the iconoclastic entrepreneur is building the largest and most powerful rocket ever constructed, with an ability to launch 100 metric tons to orbit in a single launch, for just \$10 million a launch. To understand what this means, it's necessary to grasp that it currently costs \$2,350 to put a kilogram of matter into orbit. Musk's project would drop that price to an astounding \$100 per kilogram.

This, moreover, is just the beginning. Musk has made clear that he is aiming for each Starship to be able to launch three times per day. He'll need to field a fleet of about 10 to meet his stated goal of 1 million metric tons per year.

All this matters a great deal, not least for environmentalists because it will make the concept of Space Solar Power both technically and economically feasible.

Designs for individual solar power satellite (such as NASA's SPS-ALPHA) weigh in at about 8,000 metric tons, and—once deployed—will deliver about 2 gigawatts of energy back to Earth. And unlike terrestrial solar generation, which is intermittent, Space Solar Power Satellites can deliver constant power appropriate to the 24 hour needs of cities and industry and will be able to compete directly with coal and nuclear.

Moreover, even after accounting for the carbon needed to manufacture a satellite, the entire launcher fleet and all the fuel necessary to launch it, these satellites represent a net positive. Over a 15-year lifecycle, each system will avoid creating more than 500 times the carbon it took to build and launch. And since Musk's plan to build a Starship fleet capable of launching a million metric tons a year could build not just one, but over 70 such systems every year, it would result in a net carbon avoidance of 1.2 gigatons per year.

That is no minor dent. The entire fossil fuel system puts out 34 gigatons of CO<sub>2</sub> annually. Having a system that can retire close to 4 percent of that in a single year would represent a game changer.

Given its potential, it is astounding that Space Solar Power is not yet part of the administration's strategy to tackle climate change, and was not even mentioned in its *Space Priorities Framework* or at the recent National Space Council meeting focused on climate change. This, despite the fact that America's "pacing challenger," China, has a robust space solar power program, and that our closest ally, the U.K., recently released its own positive study on the issue. Relevant, too, is the fact that action on Space Solar Power was recommended by the government's own internal think tank, the Aerospace Corporation, as well as by the Progressive Policy Institute and the Union of Aerospace Workers.

For an administration committed to climate change, 21st century jobs, energy justice and overseas partnerships, neglecting the issue appears to be a major oversight—especially when allies like the U.K., Australia, Japan and India have shown interest in collaborating.

To tackle the scourge of climate change, many activists and advocates have called for an Apollo Project for energy. What they fail to realize is that one is already here. What Space Solar Power needs to mature is for regulators and bureaucrats to stay out of the way. The Starship project can point the way to a clean, constant and scalable renewable energy solution.