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**A 30-Megawatt Space Solar Power Plant Is Scheduled For 2030**

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[Tina Casey](https://cleantechnica.com/author/seawolf/) [9 Comments](https://cleantechnica.com/2024/11/09/a-30-megawatt-space-solar-power-plant-is-scheduled-for-2030/#disqus_thread)

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It wasn’t supposed to happen this fast, but here we are. The field of space solar power has leaped from the pages of science fiction to march right through the status of technological feasibility and enter the realm of economic attractiveness, with the aim of beaming many gigawatts’ worth of zero emission electricity to Earth on a 24/7 basis, regardless of the weather.

**Iceland To Get Space Solar By 2030**

The aptly named firm Space Solar is among the stakeholders racing to stake out a spot for their orbiting solar power plants.

“Space Solar has developed a cutting-edge solar power system that will orbit Earth, harnessing solar energy and transmitting it wirelessly via safe high frequency radio waves to ground-based stations,” the company explains.

They are not letting the grass grow under their feet. Last month, the UK startup announced a collaboration with the climate initiative Transition Labs to [build an orbiting solar power plant in space](https://www.spacesolar.co.uk/space-solar-and-transition-labs-to-deliver-space-based-solar-power-to-iceland-by-2030/) and beam solar energy down to a location in Iceland by 2030. The Icelandic energy firm Reykjavik Energy has signed up as an offtaker.

The initial goal is the delivery of 30 megawatts, with scaleup into the gigawatt range already on the table.

The arrangement with Reykjavik Energy is just for starters. The team is also scouting additional locations in Iceland, Canada, and the northern part of Japan for receiver locations.

**Finding Space For Space Solar**

If you caught that thing about ground-based stations, that’s where things could get sticky. The receiving station, called a rectenna, is not a single building. As described by Space Solar, it is an open, sprawling netlike structure several kilometers in diameter.

That sounds like two miles or more in US measurement. Finding a suitable site of that size on land and obtaining a construction permit would be formidable obstacles. Or not, as the case may be. As a workaround, the company proposes co-locating the rectennas with offshore wind farms.

The co-location idea is already in motion among other clean energy stakeholders. Offshore wind turbines are already being multi-tasked as platforms for offshore [green hydrogen](https://cleantechnica.com/2024/06/20/green-hydrogen-to-rescue-stranded-offshore-wind-resources/) production, [wave energy conversion](https://cleantechnica.com/2023/10/16/new-wave-energy-devices-to-suck-clean-kilowatts-from-the-seven-seas/), and [aquaculture](https://cleantechnica.com/2023/11/06/offshore-wind-developers-eye-new-alliances-with-aquaculture-industry/).

**Who’s Gonna Pay For All This?**

Cost is another hurdle tor climb. Sending a solar array up into orbit is an expensive endeavor. However, the [cost of rocket launches](https://cleantechnica.com/2024/04/07/space-solar-really-really-is-not-so-spacey-any-more/) has dropped precipitously in recent years. The consistent availability of solar energy in outer space is another cost cutter.

Here on Earth, wind and solar power vary according to daily and seasonal patterns of weather and daylight. Drought conditions can impact hydropower resources as well. In contrast, the output from a space solar array is constant and predictable.

There is also an opportunity to cut labor and site preparation costs. Space solar arrays are designed to unfold automatically in outer space, with robotic systems providing the finishing touches. The location requires no leveling, ground treatment, or mowing ([see more background here](https://cleantechnica.com/?s=space+solar)).

**The Space Solar Solution**

For the Iceland venture, Space Solar has selected the UK engineering firm IECL (the International Electric Company) to provide [the orbiting solar array](https://www.internationalelectric.com/space-solar).

IECL describes its areas of expertise as “innovative phased array technologies for communications, power transfer, radar and ultrasonic applications on earth and in space.”

“To date, one of the biggest engineering challenges in harnessing space based solar power has been designing a satellite capable of constantly facing the Sun while also beaming the power back to a fixed point on Earth,” the company notes.

Its solution is a system called CASSIOPeiA, short for Constant Aperture, Solid-State, Integrated, Orbital Phased Array. The system combines concentrating mirrors with a kilometer-scale array of lightweight solar panels.

Space Solar lists the following attributes:

1. ***Solar Reflectors*** *– The orientation of the satellites is sun pointing to constantly reflect sunlight onto the solar panel array below*
2. ***Solar Panels and Transmitters*** *– 60,000 layers of power modules collect the sunlight from the reflectors and convert this to high-frequency radio waves*
3. ***Power Transmission*** *– A coherent, collimated beam of radio waves is transmitted to a rectifying antenna on the ground*

CASSIOPeiA is a low-mass system that pushes down the expense of launching, along with a modular structure that helps to reduce manufacturing costs. The modularity, combined with the absence of moving parts, improves resiliency and helps to keep repair costs in check.

“A 2GW satellite weighs 2,000 tonnes, is 1.7km in diameter and its unique architecture allows it to operate in a range of orbits, including Geosynchronous, at 36,000 km, or Highly Elliptical Orbits. This gives good operational utility for a range of energy markets and regions on earth,” Space Solar adds.

Once the system is operational, the company anticipates that the cost per kilowatt will be competitive with wind or solar power on Earth.

**Meanwhile, Here In The USA**

That remains to be seen. However, cost is no object to defense agencies. Here in the US, the idea of [sending solar power plants up into orbit](https://cleantechnica.com/2024/10/10/the-crowded-field-of-space-solar-suddenly-got-more-crowded-er/) caught the attention of the US Naval Research Laboratory all the way back in 2009. A generous, $100 million donation to CalTech in 2013 kicked the US [space-based solar research](https://cleantechnica.com/2024/01/21/space-solar-perovskites-nasa-caltech/) field into high gear.

Since then, [the US Air Force](https://cleantechnica.com/2020/12/27/solar-power-beamed-down-to-earth-from-from-space-moves-forward/) has gotten involved, and the [US Space Force](https://cleantechnica.com/2024/02/04/us-space-force-space-solar-quantum-antenna/) may also have a contribution to make.

The US Department of Energy has yet to provide direct funding for space solar demonstration projects, but it does support [perovskite solar cell research](https://cleantechnica.com/2024/01/21/space-solar-perovskites-nasa-caltech/) and related fields.

NASA is also stirring into motion. Earlier this year the agency indicated that its funding priorities are on [space-to-space applications](https://cleantechnica.com/2024/04/25/space-solar-power-is-happening-sooner-rather-than-later/). However, its famous Jet Propulsion Laboratory is located at CalTech, suggesting the potential for some crossover reasearch.

In addition, some technologies could be applied on space-to-land operations.  On November 7, for example, the Arizona State University spinoff Solestial announced that it won a new NASA contract, for a project titled “Next Generation Silicon Based [Solar Arrays for Space Stations](https://cleantechnica.com/2023/11/10/self-repairing-solar-panels-are-heading-for-space/) and Other Permanent Space Infrastructure.”

The new contract is the latest in a series for Solestial, including the US Air Force along with [previous NASA contracts](https://cleantechnica.com/2023/11/10/self-repairing-solar-panels-are-heading-for-space/). The reference to space stations indicates that the focus continues to be on space-to-space applications. Still, Solestial has been collaborating with the Colorado startup Opterus Research and Development to develop a lightweight, rollout solar array similar those used in space-to-land designs, so keep an eye on that.

In another signal that activity is heating up, market researchers have been tracking growth in the emerging space solar industry, and the activity may be outrunning expectations. The firm Markets and Markets, for example, expects [governments and defense agencies](https://www.marketsandmarkets.com/Market-Reports/space-based-solar-power-market-117709727.html) to be among the first offtakers, but forward-looking utilities like Reykjavik Energy could beat them to the punch.

Data centers also provide a tempting target. If you have any thoughts about that, drop a note in the comment thread.

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