

Light Harvesting Special Interest Group

Space-based solar power
23 Feb 2022

Panel

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Challenges

- Beaming power over large distances is still in its early stages of development.
- Finding an optimal orbit and managing space debris concerns.
- Overcoming public perception of space-based solar as “science fiction” and demonstrating why it is a feasible power source.
- Ensuring that there are international standards and agreements for deployment and implementation.

Discussion Points

- Small-scale demonstrations of the technology required for space-based solar power are underway.
- Deciding on the optimal orbit for these solar farms is essential. Certain orbits will likely be too crowded and others have radiation levels that are too high. Highly elliptical orbits are predicted to be most advantageous.
- Economics are very important to the roadmap of this technology. [The Frazer-Nash study](#) on space-based solar includes a detailed techno-economic analysis.
- The key metrics for space-based solar power are different from those used to analyse standard satellite photovoltaics. Space-based solar is most affected by cost per unit of electricity produced. It is also heavily influenced by specific power of the solar cells.
- International standards and collaboration will be crucial to success, as this is an inherently international technology. The UK has a history of working internationally. A collaborative “moonshot” initiative approach could be effective.
- There is a five year plan in place to demonstrate beaming of power over a distance of 10 km. Once this milestone is reached, the technology can be scaled up to greater distances.
- Other recent technological advances such as autonomous robotics have made space-based solar more feasible.
- It is possible that space-based solar power could form a portion of the energy mix by 2050.
- Space-based solar is unaffected by weather and can provide baseload power. Along with hydroelectricity, it is one of the few green baseload power options.

Opportunities

- Engaging with the general public to dispel myths about this technology being “science fiction”
- Academics can help push this forward with both research and outreach to the public
- Expanding the international coalition of people and institutions supporting space-based solar power
- Using incremental technology demonstrations to build interest and investment from many different sectors
- Continued developments of radiation-hard thin film and lightweight PV technologies will boost realisation

