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An Outer Space Perspective on Climate Change (Space Law and Policy) (5)

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LEGAL, POLICY, REGULATORY, AND LICENSING CONSIDERATIONS FOR SPACE SOLAR POWER

Abstract

The ultimate low-emissions energy solution is collecting power in space and beaming that power to terrestrial utilities. Called Space Solar Power (SSP), this technology tests the limits of space law, energy policy, international cooperation, and environmental assessment. Furthermore, there is a challenge in assigning orbital slots for power satellites (“powersats”) located at the favorable Geosynchronous Equatorial Orbit (GEO) because these are allocated by equatorial countries, and are already filled over populated longitudes on Earth. Frequency allocation is another challenge because these vary by nation, and for power beaming, must consider the issue of desensitization, in which communication signals can be jammed, even if at different frequencies, simply due to the vastly higher energy density of a power beam. Public perception of power beaming instantly raises the spectre of a “death ray”, such that laser or maser delivery of power from orbit may be considered unacceptable. Other, non-weaponizable impacts must be considered, such as aircraft flight paths and no-fly zones. There are safety concerns for ground-based passersby if the beam is not perfectly aligned with the receiving antenna (“rectenna”), having the risk of disrupting medical electronics such as pacemakers. In some cases, society must balance the current uses of orbital locations and frequency bandwidth against the expected benefits possible with SSP. Additional considerations must be factored into an overall strategy, such as orbital debris mitigation, which is certain to increase with large-scale deployment of powersats. The end-of-life treatment of powersats must be considered early in the process of developing policy recommendations and statutory language for consideration by legislative bodies. There should be international collaboration on developing licensing because the provisions of the Outer Space Treaty call for national sovereignty over commercial space exploitation, and there may be military implications should an asset such as a powersat come under attack. While much of existing space and maritime law may apply to SSP and power beaming, a holistic approach is needed early on so that legislators and regulators have a framework, guidance, and best practices to work from in crafting a globally-acceptable regime for energy production. While multi-governmental participation is likely required to retire risk in the early phases, there will be considerable pressure for a rapid shift to private, commercial enterprises. The legal regime for such operation is needed well in advance of actual deployment so that investors and insurers have clarity as to the potential hazards, risks, and legal exposure involved.