Docket #: S20-222

Nighttime Electrical Power Generation via Radiative Cooling

Stanford researchers have designed a power generation system capable of working at off-grid and at night when solar cells are not effective. By combining a thermoelectric generator with radiative cooling, this system can generate nighttime power density over 2 W/m2, outperforming wind and radio frequency energy harvesting. The thermoelectric generator component represents less than 1% of the system footprint area, making this an economically accessible platform.

Stage of Research

- Proof of concept

Applications

- **Off-grid, nighttime power generation**
- Modular energy source:
  - Agricultural, environmental or security sensors
  - Lighting
  - Digital communications

Advantages

- **Low cost, off-grid**
- Nighttime 2.2 W/m2 power density
  - Outperforms other ambient energy harvesting techniques like wind or radio frequency
  - Daytime performance estimated to be 3-4x higher than nighttime

Innovators

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