

# Mechanical Power Generation Through Passive Radiative Cooling

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## ABSTRACT

Researchers at the University of California, Davis have developed an approach to generating mechanical power from the earth's ambient thermal radiation using a Stirling engine.

#### **FULL DESCRIPTION**

This technology introduces a novel method for power generation by exploiting the temperature difference between the earth's surface and the cold night sky through radiative cooling. Utilizing a modified low-temperature differential (LTD) Stirling Engine, it converts thermal energy into mechanical work, offering a sustainable solution to augment renewable energy sources, especially during nighttime.

#### **APPLICATIONS**

- ▶ Renewable energy generation complementing solar power.
- ▶ Passive cooling and air circulation in agricultural greenhouses and residential buildings.
- Space exploration and terraforming missions.

#### **FEATURES/BENEFITS**

- ▶ Cost-effective and scalable design suitable for widespread deployment.
- Optimized radiative surface area through infrared emissive paint coating.
- ▶ Efficient thermal coupling with the ground enhances performance.
- Achieves sufficient temperature differentials for operation under various sky conditions.
- ▶ Versatile applications, including air circulation in greenhouses.

Competitive power output at significantly lower manufacturing costs compared to solidstate devices.

Potential for future performance enhancements and global impact. Allows energy generation during nighttime or in regions with limited sunlight.

Decrease dependence on semiconductor devices or thermoelectric generators that are not easily scalable.

Lowers high manufacturing costs and scarcity of materials required for existing power generation methods.

### CONTACT

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#### **INVENTORS**

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#### OTHER INFORMATION

**KEYWORDS** radiative cooling, lowtemperature differential (LTD) Stirling Engine,

renewable energy,

energy generation

#### **CATEGORIZED AS**

#### Energy

- ▶ Other
- ► Solar
- Environment
  - Other
- **Engineering** 
  - Engineering
  - ► Other

RELATED CASES

2024-579-0

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

► Thin Film Thermophotovoltaic Cells

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