

Radiative cooling and electricity generation

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Why in news?

A scientist of Indian-origin has demonstrated a new way to generate electricity at night.

What is this method?

- The prototype device employs radiative cooling, in which a sky-facing surface passes its heat to the atmosphere as thermal radiation, losing some heat to space and reaching a cooler temperature than the surrounding air.
- This effect describes how frozen plants grow during freezing nights and the same theory may be used to generate renewable electricity by manipulating changes in temperature during the night when the need for illumination increases.
- This instrument releases the heat uniformly so that the cooling on the top is better than the cooling on the bottom and the difference between heat and electricity is then converted.
- The heart of the device is a generator that uses the temperature difference between the opposite sides to produce the current.
- The control could be controlled by a white LED when the system is connected to a voltage converter.
- Six thousand years ago, people in Iran and Afghanistan constructed enormous **beehive-shaped structures** called **Yakhchal**, which used this **passive cooling** effect to **create and store ice in the desert**.



Application-

This could be a broadly enabling approach to power generation suitable for remote locations and anywhere where power generation at night is needed. As of now, the amount of electricity it generates per unit area remains relatively small, but the researchers predict it can be made twenty times more powerful with improved engineering such as by suppressing heat gain in the radiative cooling component to increase heat-exchange efficiency.