

NASA's Watts on the Moon Challenge

Objective

As NASA works to extend human exploration of the solar system, unprecedented capacity for **electrical and thermal energy distribution, management, and storage** will be needed to support sustained human presence and the beginning of industrial activity.

Solar energy is available on the surface of the Moon, but extended night hours (**350 consecutive hours**) and the extreme environmental temperature change from daylight to nighttime, create problems for solar power use. While sunlight is more available at the lunar poles, there are irregular periods of darkness and locations, like within craters, where the Sun never shines. Earth also addresses similar issues, where demand for additional renewable energy generation, including solar, is rising, but additional power management, distribution, and energy storage solutions are needed to address issues such as intermittency and resiliency.



NASA'S WATTS ON THE MOON CHALLENGE

NASA's Watts on the Moon Challenge seeks solutions for energy distribution, management, and/or storage that address NASA technology gaps and can be further developed for space flight and future operation on the lunar surface. Not only could novel solutions make a difference in lunar and space exploration, but technologies demonstrated during this competition could provide new options to distribute and manage sustainable power alternatives on Earth.

Prize Purse

The total available prize purse for all phases of this challenge is up to \$5 million dollars, provided by NASA. The agency is also exploring options for offering one or more teams an opportunity to fly their solution to the Moon.

Prize purses for Phase 1 will total up to \$500,000.

- Up to three 1st Place teams (one for each Mission Activity), will be awarded \$100,000 each.
- Up to four runner-up teams will receive up to \$50,000 each.



Prize purses for Phase 2 are expected to total up to \$4.5 million. Additional details about the number of winners and division of prize purses in Phase 2 (including milestone prizes, if offered) will be available when the second part of the competition opens.

NASAfacts

Description

The Watts on the Moon Challenge will be conducted in two phases totaling no more than 36 months, with Phase 1 lasting approximately eight months, and Phase 2 lasting approximately 28 months.

The challenge mission scenario is set in a polar region of the Moon where a NASA power plant has been deployed on the rim of a lunar crater. Teams must propose a solution for at least one of three Mission Activities that each require an energy distribution, management, and/or storage solution.

- **Mission Activity #1:**
Deliver power from the power plant to a mobility platform operating inside the crater. The mobility platform collects and delivers icy regolith to the water extraction plant.
- **Mission Activity #2:** Deliver power from the power plant to a water extraction plant operating inside the crater. The water extraction plant extracts and purifies water from the delivered material.
- **Mission Activity #3:** Deliver power from the power plant to an oxygen production pilot plant operating outside the crater. The oxygen production pilot plant extracts oxygen from the delivered material.

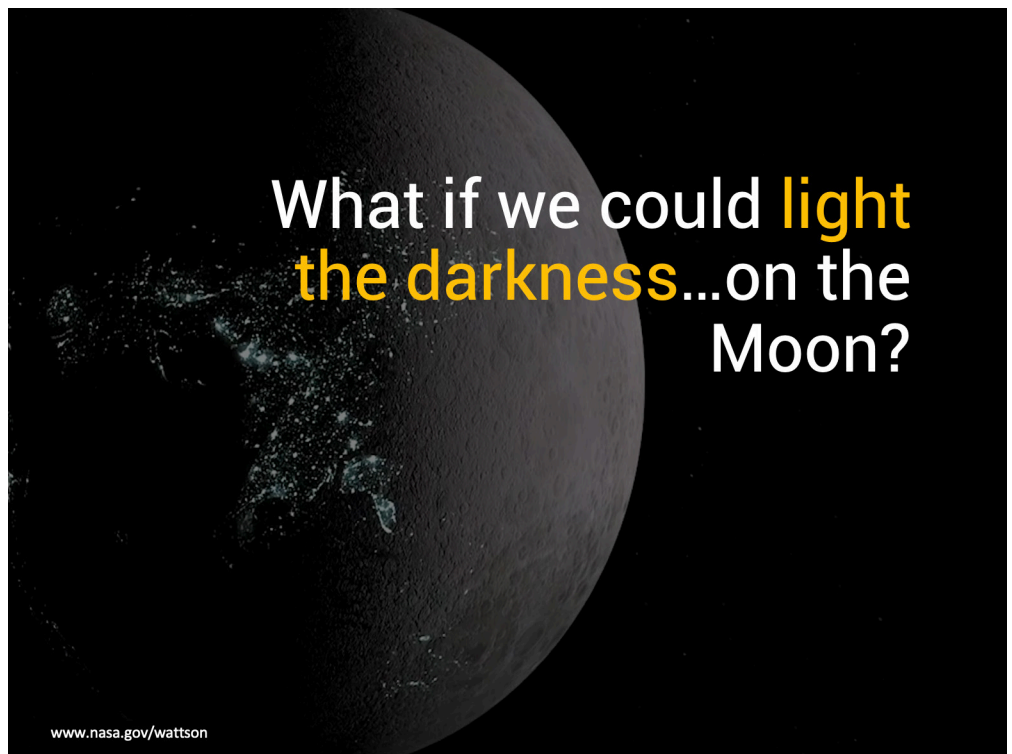
In Phase 1, teams will submit a concept design for their proposed solution. In Phase 2, teams will build and demonstrate their proposed solution. Teams may propose solutions to more than one Mission Activity.

The initiation of Phase 2 is contingent on the emergence of promising submissions in Phase 1 that demonstrate a viable approach to achieving the challenge goals. The rules for Phase 2 will be released prior to the opening of Phase 2.

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The Watts on the Moon Challenge is supported by NASA's Glenn Research Center in Cleveland, and is part of NASA's **Centennial Challenges, based** at NASA's **Marshall Space Flight Center**. Centennial Challenges is a part of the Prizes and Challenges program within NASA's **Space Technology Mission Directorate**. NASA Centennial Challenges has contracted **HeroX** to support the execution of this challenge.

For more information on NASA's Watts on the Moon Challenge, visit: www.nasa.gov/wattson.

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