

Building Curiosity: Rover Power!

Hi I'm Ashwin Vasavada the Deputy Project Scientist for the Mars Science Laboratory mission and its Curiosity rover. So a lot of people wonder why Curiosity doesn't have solar panels like the Mars Exploration Rovers, Spirit and Opportunity. The Mars Exploration Rovers often found themselves short on power as dust settled on their solar panels. This was especially a problem in the short days of winter. We need a good strong and reliable source of power to keep Curiosity going for over two years on Mars.

Curiosity is two times bigger, five times heavier and has fifteen times the weight of scientific equipment relative to Spirit and Opportunity. Like those Rovers, Curiosity surveys the landscape and examines rocks up close.

Curiosity's scientific mission involves driving around this landing site, perhaps up to fifteen or twenty miles collecting samples of rocks and soils with a big jack hammer drill located on the end of a six foot robotic arm. Those samples are delivered to the rover and analyze with some very sophisticated and power hungry analytical laboratory instruments. That's where the MMRTG comes in. The Multi-Mission Radioisotope Thermoelectric Generator is a power source that we've used for years to power up spacecraft that have gone to the outer planets and even the Apollo missions used it on the moon.

Behind me you can see a full scale model of Curiosity, including the generator in the back. On this half scale model of the generator you can see what's inside. The generator contains a specially produced form of plutonium dioxide. The natural decay of this radio isotope gives off heat which these thermocouples can turn into electricity.

The generator provides both electrical power and heat to the rover. About 100 watts of electrical power is used to continuously charge the rover's battery. Also, heat can be pumped off of the generator using pipes to keep the rover's insides warm including the scientific instruments.

With Curiosity's generator, there's a guaranteed way of charging the battery year around in all sorts of conditions. Curiosity's generator was developed by the Department of Energy and will be installed on the rover just a few days before launch. But to make sure everything works together properly the engineers installed the actual generator on the rover for the first time. The blue light that you see was just additional lighting to help them make sure they could see what they were doing.

The Curiosity rover and the spacecraft that will take it to Mars are currently in Florida undergoing its final preparations for launch. Everything's going well and all of us on the science team can't wait for its launch later this year and its arrival to Mars next summer.

I'm Ashwin Vasavada and this has been your Building Curiosity update.