U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Concentrating Solar Power (CSP) Parabolic Trough Systems B-Roll

Scene-by-Scene Description

Get the facts behind the footage available on the U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE) B-Roll Web site at **eere.energy.gov/news/b_roll.cfm**.

Video Title: Advanced Parabolic Trough Solar Collector Mirror
Video Only/No Audio
Location: National Renewable Energy Laboratory (NREL), Golden, Colorado
Shoot Dates: January 22, 2010 and February 16, 2010
Total Running Time: 5:20

Scene 1: 00:05: Solar collector mirror moving into place. The single-axis troughs track the sun from east to west during the day to ensure that the sun is continuously focused on the receiver pipes.

Scene 2: 00:32: Wide pan of solar collector mirrors. The mirrors are curved in the shape of a parabola, which allows them to concentrate the sun's direct beam radiation on the linear receiver.

Scene 3: 00:48: Close-up shots of receiver tubes. The selective coating on the steel tube has good solar absorbance and a low thermal emittance for reducing thermal radiation losses.

Scene 4: 01:32: Close-up shots of reflective mirror material.

Scene 5: 02:16: Solar collector mirror samples under accelerated weathering testing in simulation chambers at the NREL Advanced Optical Materials Lab. In 2009, NREL scientists collaborated with an industry partner to develop ReflecTech, a silver polymer film with the same performance as glass models, but at a much lower cost and weight.

Scene 6: 03:16: Small solar collector mirror samples in intense UV light weathering tests. To reduce the costs of solar collectors, NREL focuses on improving the stability of reflective CSP materials.

Scene 7: 03:45: The ReflecTech advanced, low-cost silver polymer mirror material.

Scene 8: 04:07: Preparing and laminating mirror sample for accelerated weatherizing test.

Scene 9: 04:39: Measuring the optical reflectance of advanced collector mirror material in spectrometer. ReflecTech material boasts a 94% reflectance.

Learn More about CSP Parabolic Trough Systems

Concentrating solar power (CSP) technologies use mirrors to reflect and concentrate sunlight onto receivers that collect solar energy and convert it into heat to produce electric power. Compared with fossil-fueled power plants, CSP plants generate significantly less greenhouse gas and other emissions, making them an optimal choice for large, utility-scale applications.

One type of CSP technology is the linear concentrator system, which collects the sun's energy using long, rectangular curved mirrors tilted toward the sun. These mirrors focus sunlight on tubes (or receivers) that run the length of the mirrors. The reflected sunlight heats a fluid flowing through the tubes, which is then used to boil water in a steam-turbine generator to produce electricity. Parabolic trough systems are a form of linear concentrator systems in which receiver tubes are positioned along the focal line of each parabolic mirror. Of all CSP systems, parabolic trough solar technology offers the lowest-cost solar electric option for large power plant applications.

Through the USA Trough Initiative, the National Renewable Energy Laboratory (NREL) supports DOE's efforts to expand U.S. industry participation and competitiveness in worldwide parabolic trough development activities. NREL's research focuses on advancing state-of-the-art parabolic trough technology, integration, analysis, and services. More information on parabolic troughs and other advanced CSP technologies can be found at **eere.energy.gov/solar**.