

## HOW DOES THE IVANPAH SOLAR ELECTRIC GENERATING STATION WORK?

Ivanpah Solar's concentrated solar thermal tower technology produces electricity the same way as fossil fuel power plants: by creating high-temperature steam to turn a conventional turbine. However, instead of using fossil fuels to create steam, it uses the sun's thermal energy.

Central to the technology is a solar-field design that utilizes thousands of heliostats, each consisting of two mirrors. Optimization software and a control system allow individual heliostats to track the sun in two dimensions, thereby reflecting sunlight to a boiler positioned atop a tower. When concentrated sunlight strikes the solar receiver, it heats water to create superheated steam, which is piped down from the boiler to a conventional steam turbine that generates electricity. Transmission lines then carry the power to homes and businesses in Southern California.

## INFORMATION

- Located on 14.2 square kilometers (about 5.5 square miles) of public land, managed by the US Bureau of Land Management
- Three-unit power tower system capacity: 377 megawatts (Net) / 392 megawatts (Gross)
  - Unit 1: 126 megawatts
  - Unit 2: 133 megawatts
  - Unit 3: 133 megawatts
- Tower Height: 140 meters (459 feet)
- Number of Heliostats: 173,500 (2 mirrors per heliostat)
- Reflective Area per Heliostat: 15.2 square meters (a little over 163 square feet)
- Heliostat Solar-Field Aperture Area: 2,637,200 square meters (28,386,585 square feet; about 2.5 square kilometers or 1 square mile)
- Average Homes Served Annually: 140,000
- Average Heliostat Installation Rate: 1 per minute during construction period
- Heliostat Placement Accuracy: +/- 10 centimeters (4 inches) of depth; 15 centimeters (6 inches) of leeway in location
- Boiler Type: Solar Receiver Steam Generator (SRSG)
- Cooling Method: Dry (air-cooled condenser)
- Water Consumption: 123,000 cubic meters per year (100 acre feet per year), equivalent to 300 homes per year
- Avoided Emissions: More than 400,000 metric tons of carbon dioxide (CO<sub>2</sub>) each year
- Construction Jobs Created: More than 2,100 craft workers, a total of 2,636 workers at peak construction
- Owners: NRG Energy, Google, and BrightSource Energy
- EPC Contractor: Bechtel
- Customers: Pacific Gas & Electric; Southern California Edison
- Construction Commenced: October 2010
- Operational: December 2013