



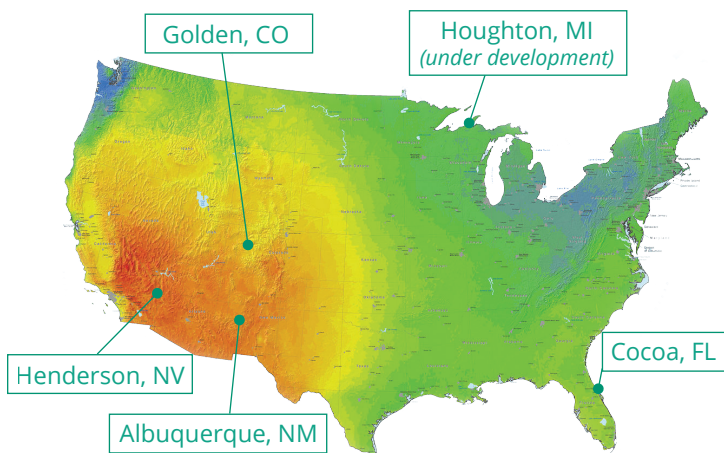
THE NEVADA REGIONAL TEST CENTER FOR SOLAR RESEARCH AND EDUCATION

The US Department of Energy has established multiple Regional Test Centers (RTCs) across the United States to support technical innovation in the solar sector. Currently funded by the Solar Energy Technologies Office, the RTCs are part of a broader national effort to lower the cost, increase the efficiency, and further the deployment of solar technologies.

Overview

Established in 2013, the Nevada Regional Test Center (RTC) is located at the Southern Nevada Water Authority's (SNWA) River Mountains Water Treatment Facility in Henderson, less than 20 miles from downtown Las Vegas.

The site brings a unique climate to the RTC portfolio, one defined by high irradiance, high heat and limited precipitation. These climatic characteristics provide a valuable test bed for emerging solar technologies, including heat-resistant solar cells, shade-resistant modules and anti-reflective and anti-soiling module coatings. The site also favors concentrated photovoltaic (CPV) systems, which benefit from high irradiance.



The Regional Test Centers span multiple climates, providing a valuable test bed for emerging solar technologies.

Site Management

The Nevada RTC reflects a three-way partnership between Sandia National Laboratories (Sandia), the SNWA, and the University of Nevada, Las Vegas (UNLV):

- Sandia provides technical and administrative leadership for the NV and other RTCs, ensuring technical consistency and accuracy across the multi-site program. Sandia also works closely with SNWA and UNLV on the design and execution of new partner studies at the NV RTC.
- SNWA manages new installations, providing on-site technical and electrical support.
- UNLV provides technical oversight for the Nevada site, ensuring data quality and reliability and overseeing on-site student research and education.



Roof-top view of the Nevada RTC, with fixed-tilt PV systems in the center; open-racking to accommodate new installations to the right; and CPV trackers to the rear.

Technical Capabilities

Like the other RTC sites, the Nevada RTC has:

- Grid-tied 480V, 3-phase electrical network that can support the installation of prototype technologies (non-UL-listed equipment can be accommodated).
- Grid-tied open racking to facilitate the rapid installation of new PV systems (plug and play approach)
- Mono-crystalline PV reference array against which the performance of new technologies can be compared
- Reference soiling station to measure surface contamination



- Meteorological station that collects the following data at a frequency of ≤ 5 secs, averaged per minute and synchronized with PV performance data:
 - Global horizontal irradiance (GHI)
 - Diffuse horizontal irradiance (DHI)
 - Direct normal irradiance (DNI)
 - Spectral irradiance composition
 - Precipitation
 - Ambient air temperature
 - Wind speed and direction
 - Relative humidity
 - Atmospheric pressure
 - Customized high-accuracy string-level DC voltage and current monitoring



UNLV students measure thermocouple cable in preparation for a new installation at the NV RTC.

The RTC Program

The RTC Program directly supports the DOE Solar Energy Technology Office's mission to further the affordability, reliability, and performance of PV technologies to meet US electric demand. This network of multi-climate field laboratories is accessible to US companies in the PV industry, allowing them to validate the performance and reliability of their products across the full range of harsh conditions in which they might operate. For more information see: energy.sandia.gov



GPS solar tracker and irradiance sensors at the Nevada RTC collect high-fidelity irradiance data, including GHI, DHI and DNI and spectral composition, at a frequency of every 5 seconds.

Special Features

- Isotype cell sensor for solar spectral measurements
- Technical support provided by the Center for Energy Research at UNLV
- Installation labor, and other technical assistance, provided by SNWA
- Onsite office for student education and research
- NV RTC "Operations Manual" serves as how-to guide for work-study students
- High-security site (guards on duty 24/7)
- Technologies represented to date at the RTC include: concentrated photovoltaics, mono-crystalline silicon (both n- and p-type), bifacial- and shingled-cell modules, anti-reflective coatings, and sensor adhesives, with more technological diversity on the way.
- Research site for concentrated photovoltaic (CPV) systems



Energy output and other performance data from multiple module technologies, such as the ones depicted above, are collected and analyzed by Sandia, and shared with the industry partners.

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