

Colorado Regional Test Center at the National Renewable Energy Laboratory

The National Renewable Energy Laboratory (NREL) has two photovoltaic (PV) deployment areas available for RTC systems. The first is intended for larger sized systems (>50 kW) and the second for smaller systems (5-50 kW).

Large System Site: Solar TAC, Aurora, CO

Located at the SolarTAC facility in Aurora, Colorado near Denver International Airport, this eight-acre RTC site has >1 MW DC capacity. SolarTAC, which has a steppe (i.e., arid, high altitude) climate, is already home to multiple test sites and RTC systems.

The site plan is flexible, which allows the RTC team to combine or split lots to accommodate partner testing criteria.

Field deployments:

- Racks for latitude tilt (south-facing) for up to 5 kW systems
- Space for ground mounted systems for up to 500 kW systems
- Two-axis tracker

Existing meteorological measurements include:

- Global horizontal irradiance
- Direct normal irradiance
- Diffuse horizontal irradiance
- Precipitation
- Temperature



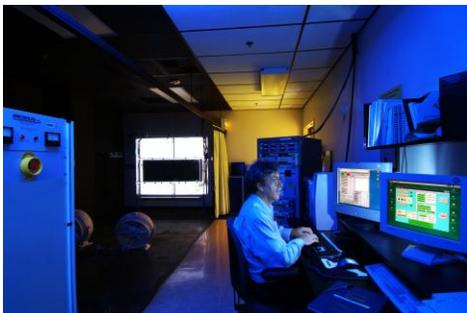
Maxim-Volterra System at the Colorado RTC.



Small System Site: NREL Campus, Golden, CO

Small systems can also be hosted on NREL's campus, either at the Outdoor Test Facility (see photo above) or integrated into NREL's campus, providing a variety of deployment environments, including rooftop. This site offers state-of-the-art characterization and modeling capabilities including:

- Module performance under a range of operating conditions including measurements both indoors and outdoors
- ISO accredited Indoor and Outdoor IV-curve measurement and analysis
- System performance modeling
- Light-induced transients in efficiency (reversible and irreversible)
- Potential-induced degradation screening
- Electroluminescence, infrared, acoustic and optical imaging for modules
- A wide range of materials characterization for failure analysis including UV/VIS spectroscopy, SIMS, Auger, PL, and many others
- Expertise in field degradation studies and degradation rate determination
- Module indoor accelerated testing capability
- Spectral response with outdoor spectro-radiometer



Field meteorological station including:

- Global horizontal, Direct Normal, Diffuse Horizontal irradiance
- Latitude-tilt thermopile and reference cell irradiance
- UV-A/UV-B, Net Infrared
- Precipitation
- Temperature
- Spectroradiometer

Both sites offer the potential to leverage ongoing research projects to better understand module, inverter, and system performance:

- PV performance model calibration and validation
- CPV power and performance rating
- NOCT / thermal characterization
- Microinverter efficiency measurements
- NREL Partial Shading performance test
- Potential-induced degradation
- Edge-seal durability
- Ribbon and other fatigue associated with thermal cycling
- Encapsulant discoloration
- Delamination

**For more information,
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