The Solar Resource Characterization Group conducts foundational solar radiation and power research that supports industry, government, and academia by providing solar measurements, models, maps, and support services. These resources are used to plan, develop, and integrate renewable energy technologies.

### National Solar Radiation Database (NSRDB)
- Three formats available:
  - Hourly, 10km gridded irradiance
  - Hourly, 10km gridded irradiance and meteorological fields
  - Hourly irradiance at 1,454 locations
- Recently updated to include 2005–2010 and additional locations

### Solar Variability
- Impacts of solar spectrum variability on measurement uncertainty
- Optimization of distributed solar system allocation within a geographic region to maximize generation and minimize variability
- Intra-plant and plant-to-plant variability

### Satellite-Derived Irradiance
- Global Solar Insolation Project (GSIP)
- Performance of physics-based versus empirically-based irradiance estimates from satellite

### Support Services
- Solar measurements and products

### Solar Characterization
- Solar irradiance and power modeling and analysis

### Solar Forecasting
- Forecast development, testing, and benchmarking

**Typical Meteorological Year (TMY)**
- Hourly meteorological data that represent the “typical” climate for a specific location.
- Applications: solar power system development, P50/P90 analysis, financing solar power systems, building efficiency performance, and others

**Figure 1. New map of NSRDB locations for 1991–2010 update.**

**Figure 2. Impact of solar spectrum variability on different instruments.**

**Figure 3. Probability distribution of ramp rates over the 99th percentile.**

**Figure 4. Scatter plot for cloudy and clear conditions in Hanford, CA.**

**Figure 5. Normalized HRRR-SURFRAD histogram of forecast error.**

**Figure 6. Total Sky Imager.**

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