

# SOLAR RESOURCE SOLUTIONS

NRG Systems' solar solutions provide the data you need to successfully plan and operate your utility-scale photovoltaic project.

## **Complete Package**

From purpose-built, configurable hardware and software to installation and maintenance support, we deliver consistent results around the world.

## **Unrivaled Ease-of-Use**

Integrated systems designed and tested to work together for predictable, repeatable performance.

## **Bankable Solutions**

Count on our products as well as our company to deliver dependable results, even in uncertain times.





# Our Systems Revolve Around You.

NRG Systems' solar solutions apply to pre-construction assessment through post-construction operational monitoring and are designed to transition seamlessly between the two.



# Solar Measurement Systems

## SYSTEM ANATOMY

**1**  
**Data Logging**  
 SymphoniePRO® 26-channel data logger

**2**  
**Solar Irradiance**  
 Industry-leading irradiance sensors

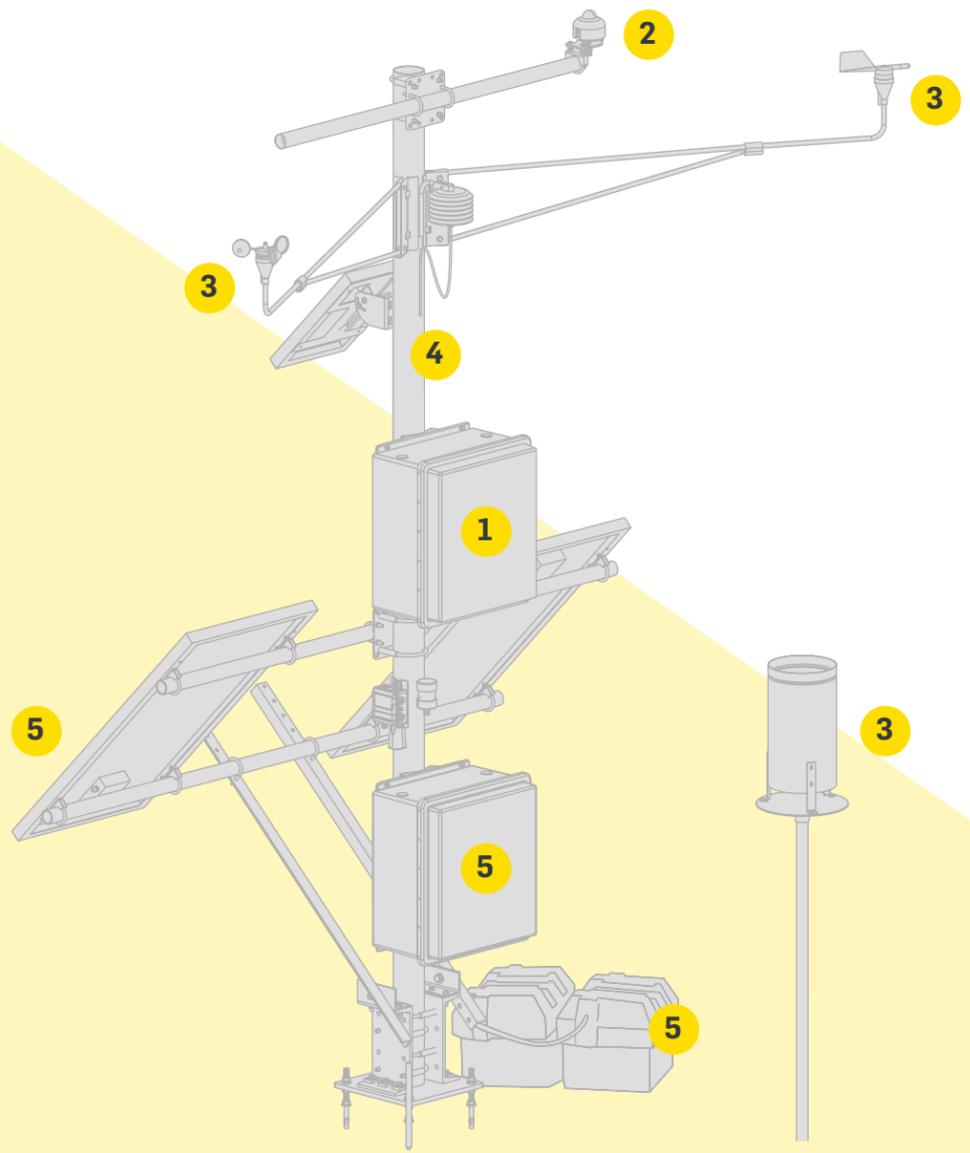
**3**  
**Meteorological Sensors**  
 Highly reliable, discrete sensors

**7**  
**Services**  
 Industry leading customer service

**4**  
**Tubular Tower**  
 Quick to ship, easy to install

**5**  
**Auxiliary Power**  
 Autonomous power in any setting

**6**  
**Soiling Measurement**  
 35 W or full-size PV options

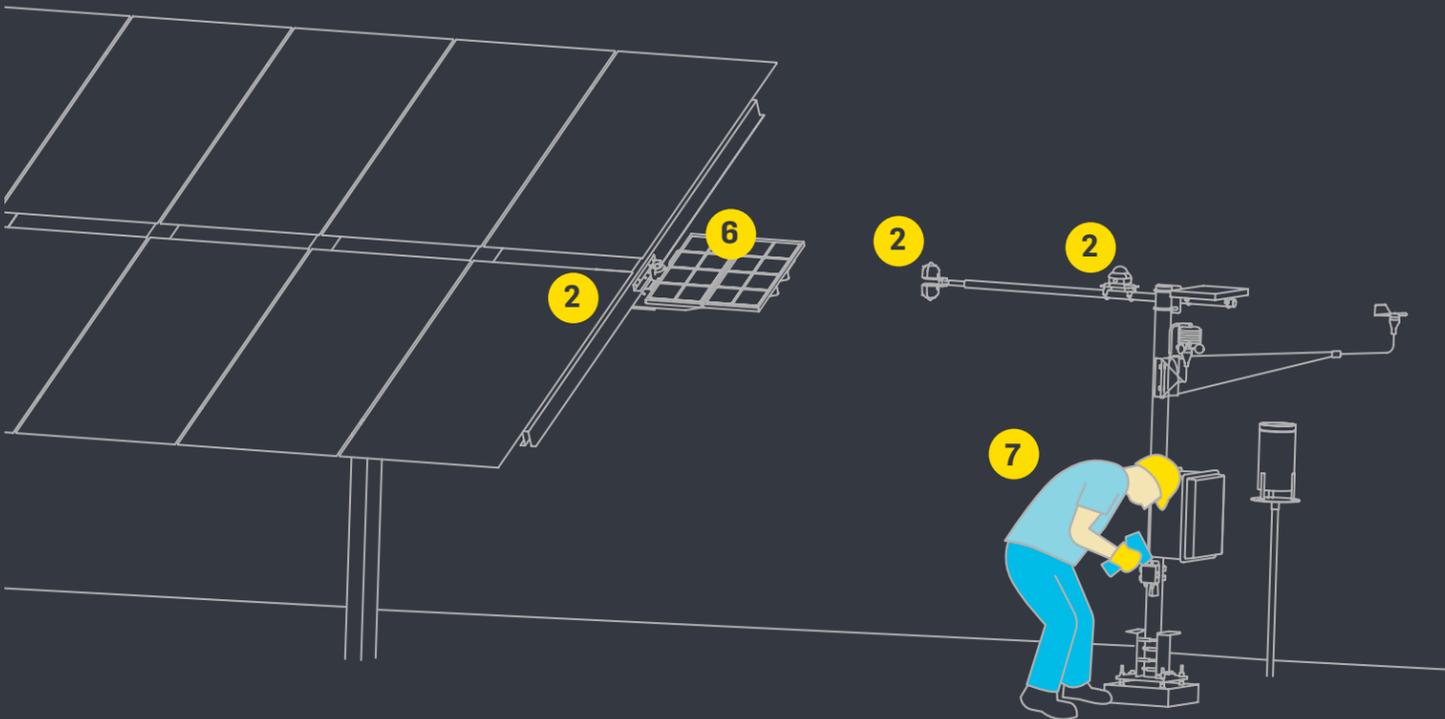


### Solar Resource Assessment

NRG Systems' Solar Resource Assessment (SRA) System systematically collects "ground truth" meteorological data at a prospective solar energy production site. Our complete and integrated measurement solution captures all relevant conditions so users can lower the uncertainty of AEP estimates associated with utility-scale photovoltaic projects.

### Solar Resource Monitoring

NRG Systems' Solar Resource Monitoring (SRM) System helps operators monitor and optimize the output from their utility-scale PV plant. Whether the project is tracking or fixed, mono- or bifacial, we help users detect inefficiencies at the module, string, and system-wide levels so they can launch real-time maintenance and build long-term, preventative maintenance and cleaning programs.

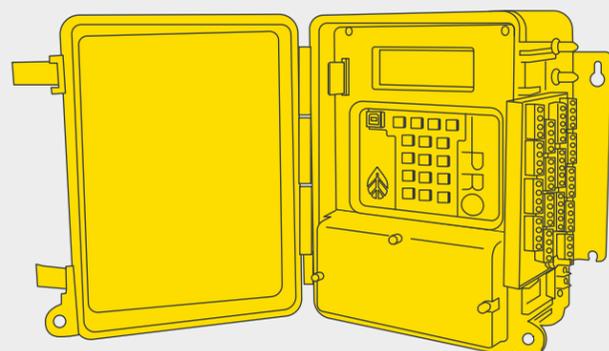


# Solar Solutions | Component Details

## Data Logging

### SYMPHONIEPRO 16- OR 26-CHANNEL DATA LOGGER

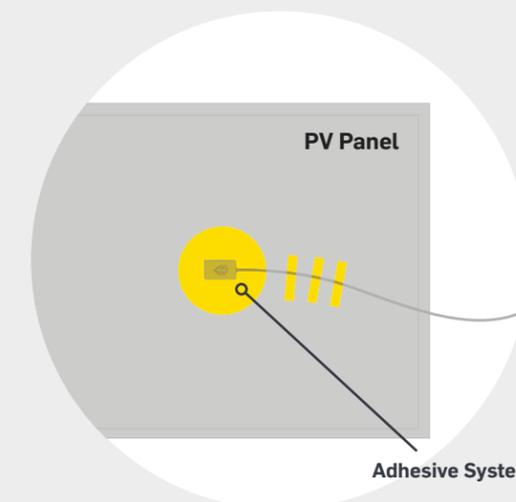
- High-resolution, high-accuracy measurements
- Long-term data storage
- Supports wide range of sensor types (analog, digital, serial)
- Calculated channels for additional solar information (solar position, direct normal irradiance (DNI), albedo)
- Easily configurable – no programming required
- Modular accessories for global communications & autonomous power support (Modbus TCP, Cellular, Satellite)



## PV Module Temperature

### ACHIEVE IEC CLASS A MEASUREMENTS USING OUR HIGH-ACCURACY 0.2 C INTERCHANGEABLE 10K NTC THERMISTOR SENSOR

- Our 0.2 C interchangeable 10K NTC Thermistor sensor ensures Class A measurements per IEC-61724-1:2017
- 4-wire configuration ensures accurate measurement regardless of cable length and enables flexible positioning on array
- Easy and repeatable installation and long-term performance via specially designed adhesive system



## Solar Irradiance

### ACCURATELY CAPTURE THE PRIMARY MEASUREMENT OF INTEREST IN A SOLAR RESOURCE CAMPAIGN

- All irradiance components (Global, Diffuse, & Direct) supported
- Class A, B, or C pyranometer options
- System compatibility with all industry-leading sensor brands
- Output options: analog vs. serial ("smart") sensors
- Thermopile pyranometer or PV reference cell
- Mounting flexibility for horizontal vs. plane-of-array irradiance capture
- Pyranometer heating & ventilation options

## FEATURED SENSORS

Economical class A sensor with various output options



Innovative class A "smart" sensor with internal heat & ventilation



Captures all three irradiance components (GHI, DHI, DNI (calculated)) with low power & no moving parts

## Meteorological Sensors

### COST-EFFECTIVE AND INDIVIDUALLY REPLACEABLE MET SENSORS CAPTURE:

- Wind Speed
- Barometric Pressure
- Wind Direction
- Precipitation
- Ambient Temperature
- Relative Humidity

## Tower & Mounting

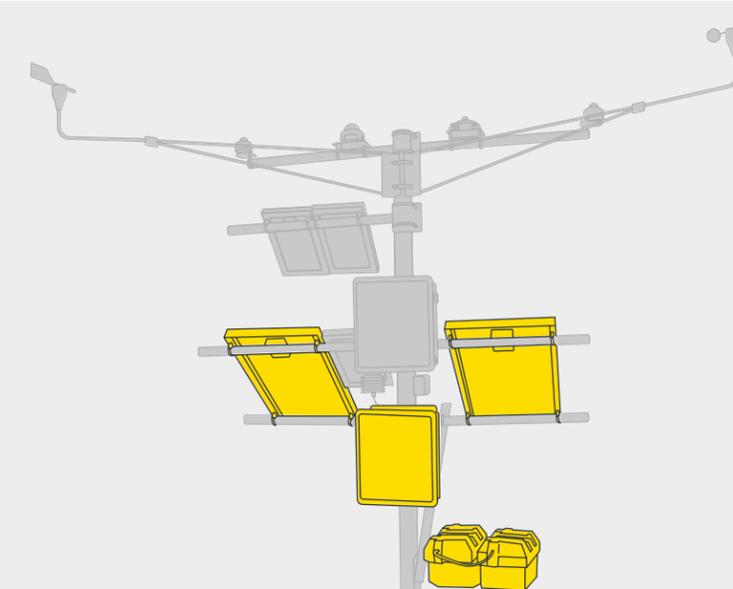
### FLEXIBLE SOLUTIONS FOR ALL SETTINGS

- Tubular Tower height options:
  - 2.2 m (7 ft)
  - 3 m (10 ft)
  - 10 m (33 ft)
- Temporary (guyed) or Permanent (pad-mount) base designs

## Auxiliary Remote/Uninterruptable Power Supplies

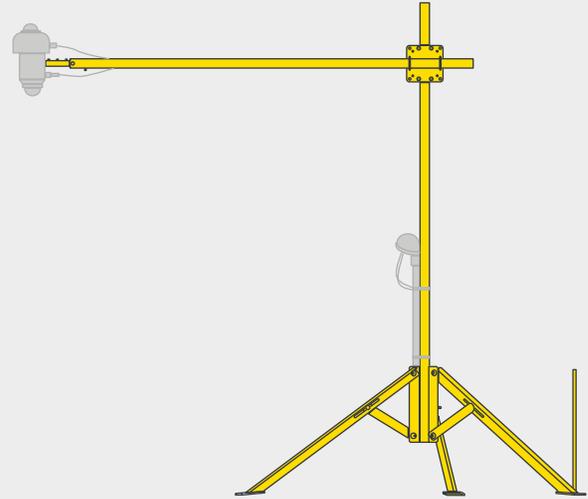
### SCALABLE, MODULAR POWER SUPPLY, SIZED BY PROJECT DEPENDING ON:

- Sensor configuration
- Project location
- Autonomy requirements



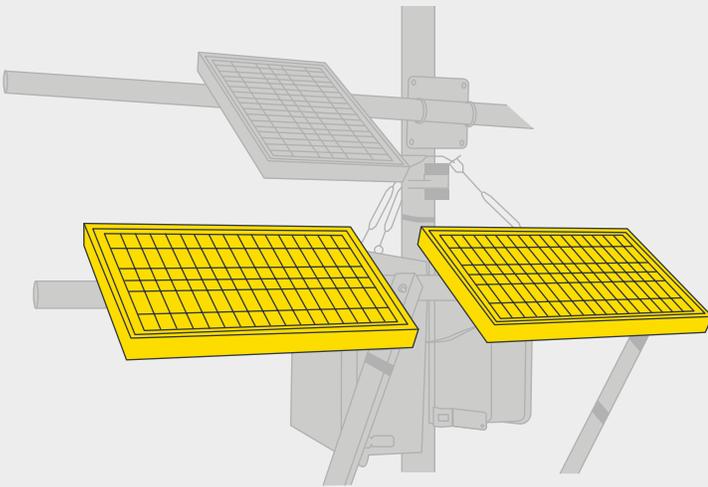
# Albedo Measurement Kit

- Unobstructed horizontal albedo measurements for bifacial PV modules
- Supports full range of pyranometers
- Matte black finish eliminates shading/reflections
- Special mounting fixture supports fixed or tracking installations



# Soiling Measurement Kit

- 35 W or full-size PV module options
- Fixed (tower) or tracking (array) mounting
- Clean and reference PV modules tested and paired at NRG
- $I_{sc}$  and PV (back-of-module) temperature measurements provided



## Services

### FOR TURNKEY MEASUREMENTS, OUR SERVICES INCLUDE:

- Pre-configuration and engineering documentation
- Equipment installation and maintenance
- Data services to streamline data delivery, processing, site monitoring, and data quality assurance



### For more information:

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ISO 9001: 2015 Certified

ISO 14001: 2015 Self-Certified

