UTILITY SOLAR INVERTERS AND SOLUTIONS
A global leader in power conversion since 1981, Advanced Energy provides the highest value power conversion and energy management solutions, backed by expertise and extraordinary service to customers throughout the world.

We put our 30-year heritage of shaping electricity and evolving technology leadership to work for our customers, providing products and services that meet next-generation needs. Customers can count on AE as a safe and bankable partner for their PV investment. We give customers a powerful advantage they can depend on.

Owners and developers of PV installations count on the high performance and reliability of our Solaron® and PV Powered™ inverters, as well as our dependable warranties and comprehensive SiteGuard® O&M services. To date, we have more than one million power conversion products and greater than 500 megawatts of PV inverters installed. Our extensive power conversion experience has earned the trust of some of the world’s most respected companies.

**The industry’s most intelligent, efficient, and reliable solar power solutions**

Over and over, AE has set records for conversion efficiency and has been on the forefront of inverter innovation. By delivering the industry’s most efficient PV inverters and power stations, coupled with our industry-leading utility controls and performance management services, we empower customers to position solar as a commercially viable energy source. AE offers the most dependable products for energy generation and solutions for intelligent, actionable site information.

**Driving adoption of solar**

We help customers maximize the lifetime value of their power plants by increasing total energy production, lowering levelized cost of energy (LCOE), and reliable grid operations. Our teams leverage expertise, proven techniques, and experiences from aerospace, semiconductors, and solar module production to drive innovation and improvements in total power plant economics and control.

**With Advanced Energy, you receive:**

- Highest rate of return on your PV investment and certainty on lifecycle performance via lowest LCOE
- Highest efficiency products, near 99% peak, that deliver the highest system performance
- Highest system uptime backed by revolutionary, industry-leading performance guarantees
- Cradle-to-grave system support and a single point of accountability – from applications engineering to whole site field services
- A bankable partner you can count on
**PowerStation™ 1 to 2 MW Integrated Base Station**
Pre-assembled solution for utility-scale, multi-megawatt PV projects

- Maximum power: 1, 1.5, and 2 MW options
- Configurations: Open, enclosed
- MV transformer: Parallel connect, single winding
- Customization for convenience, power, and security

**Solaron 1000/1000E**
Next-generation 1-MW technology for industry-leading LCOE and grid stability

- Maximum power: 1100 kVA
- Peak efficiency: Industry leading
- Double effective voltages using standard PV equipment
- Significant kVAR capabilities at full power

**Solaron 500/500 HE/500E/500 1kV**
Durable, robust, 500-kW building blocks for utility-scale PV installations

- Maximum power: 500 kW AC, plus headroom for VARs
- Peak CEC efficiency: 98.7% including all losses and controls
- Year-round efficiency, including all losses and controls: 97.5% to 98% CEC, 98.4% European
- Outdoor ready for cost-effective installation
Strong building blocks for utility-scale PV

As one of the world’s most installed solar inverter platforms, our Solaron PV inverters deliver record-breaking efficiency, increased energy harvests, reduced BoS costs, and lower O&M expenditures. Solaron inverters set the standard for efficient energy production, delivering:

• Highest peak efficiency: near 99%
• The highest CEC efficiencies – 97.5 to 98%, all-in – with no carve-outs or caveats
• Reliable conversion of raw solar DC power to quality AC grid electricity
• Direct parallel connections to single-winding medium voltage transformers
INDUSTRY-LEADING UTILITY SCALE SOLUTIONS – THE FULLY INTEGRATED AE POWERSTATION™

Achieve higher efficiency and reduced balance-of-system (BoS) costs with our outdoor-ready, pre-integrated PowerStations.

Factory assembled, pre-tested, and suitable for all climates – with or without an enclosure – the AE PowerStation affords easy, fast, and repeatable installations. Our all-on-one-skid design enables utility-scale providers to improve LCOE by reducing overall project costs resulting from one-time engineering, material, and field labor expenditures.

**Reductions in BoS beyond the inverter**

To help achieve the lowest LCOE for the lifecycle of a PV project, Solaron inverters are engineered with the goal of reducing BoS costs beyond the inverter. Double effective voltages with standard cabling and switchgear reduce upfront system expense and cut line losses. Robust, outdoor-ready construction and proven, liquid-cooled designs achieve superior energy production year-round. Parallel connections to MV transformers reduce transformer complexity and costs. The remote PV Tie options can deliver up to 40% savings in large-diameter copper cables and overall installation costs.

- Compact footprint allows standard freight which saves transportation costs
- Industry leading 2 MW configuration

**Reliability in all conditions**

We know there’s a difference between theory and reality, which is why we engineer Solaron inverters to be desert-ready for dependable performance in the most extreme conditions – without requiring any ancillary cooling systems and energy losses.
OPMIMAL UTILITY CONTROL AND PERFORMANCE MANAGEMENT

Solar power has evolved. So has the expectation that power conversion suppliers deliver convenient, yet dependable SCADA connectivity that optimizes system performance, provides remote site monitoring, and ensures increased energy production.

Whether utility-scale customers utilize our Integrated Data System (IDS™) or contract data management to a third-party supplier, we utilize prevalent standards and protocols like TCP/IP, Modbus, 128-bit security, and DNP3. This provides customers the system control they demand and state-of-the-art intelligent, actionable site performance that they can count on.

**Intelligent inverters**
Solaron inverters feature our advanced IDS and internal digital controls that allow operators to stream data to virtually any SCADA system. On-board storage can also record and archive years of data. Plus, built-in capabilities for utility commands significantly improve situational awareness by offering real-time views and remote access via network communication protocols to critical system information and performance data.

Solaron IDS automatically collects and stores a wide range of inverter-specific data for remote monitoring and advanced performance insight.

- Connects to third-party data services like SunEdison SEEDS®, Draker Labs Sentalis, and DECK Monitoring
- Provides Modbus mapping to utility-mandated or custom SCADA systems
- Enables an I/O interface to plant controller
Interactive controls for additional grid stability
• Remote disconnect/enable
• Active power (kW) percentage set point
• Reactive power (kVAR) set point
• Fixed ratio power factor (e.g., 0.95)
• Ramp Controls
• Over and under frequency trip
• High-voltage, low-voltage, and zero-voltage ride through
• Dynamic frequency support
• Dynamic voltage support
• More capabilities as codes and practices evolve

AE multi-site monitoring and management
Ensure maximum uptime and optimal energy production at PV sites with SEEDS, our jointly developed Solar Energy and Environmental Monitoring System. We put comprehensive information at our customers’ fingertips with access to environmental data, PV fleet performance, and energy output, while performing round-the-clock monitoring and performance verification from our global Renewables Operation Center (ROC). If underperformance or system failure is identified, we can immediately issue a service ticket and dispatch appropriate personnel to our customers’ site – so they can get back to maximizing production as quickly as possible.
SITE-WIDE SUPPORT

For 30 years, our service philosophy has remained unchanged; we are committed to providing customized service and support solutions that reduce performance risk from project concept to execution.

Before construction, AE provides industry-leading applications engineering and project management expertise. During construction, AE offers project management, installation services, and training. Post-construction, SiteGuard® ensures optimal whole-site performance year after year.

Complete O&M services
Whether a site is 5 MW or 500 MW, we provide a number of long-term system support solutions to ensure the PV system operates at peak efficiency. By serving as a single resource for PV site preventative and corrective maintenance, onsite response commitments, and inverter uptime performance guarantees, we save customers time and money and remove the inconveniences and inefficiencies of working with multiple service providers.

Available in most regions worldwide, our services are customized to match customer requirements and cover everything from inverters to PV modules, electrical systems, tracking systems, and regular reporting. SiteGuard contracts are available in single- and multi-year terms up to 20 years.

Support
Our technical support team has decades of experience servicing high-power products and has a PV plant knowledge base unmatched by our industry peers. We support more than 500,000 mission-critical equipment units worldwide – providing prompt service, ample parts inventory, and a well-managed supply chain – to help our customers maximize uptime and power generation. AE currently has over 300MW of PV under contract.

Design consultation
With more than one million power products installs, we offer the expertise to help customers design a stable PV system that will deliver clean power while maximizing efficiencies and profits. Leveraging our expertise and past successes, we anticipate potential issues and create designs that will prevent these issues from impacting production. Furthermore, we engineer our systems to optimize LCOE, reduce first costs, and provide intelligent tools for data monitoring and control.
As part of our goal to deliver high-quality, reliable, and innovative solutions, we look for new ways to apply our extensive knowledge to advance the industry.

Currently, through our Solar Electric Grid Integration System (SEGIS) stage-three contract, which is funded by the U.S. Department of Energy Solar Energy Technologies Program and administered by Sandia National Laboratories, we are developing and field-testing technologies focused on lowering the barriers to adopting solar energy on North American utility grids. Many AE engineers and leaders actively participate in industry groups like IEEE, solar power symposiums, publications, and international industry events.

**Certifications and awards**
- ISO 9001 certified since 1994
- ISO 14001
- NRTL/C
- UL 1741
- IEEE 1547 and 1547.1
- CSA C22.2 No. 107.1-01

**Corporate compliance**
We are committed to protecting the environment affected by our products, and to complying with applicable laws and regulations. In doing this, we will proceed with appropriate care to ensure we continue to meet our quality, reliability and cost-competitiveness goals.
AE Inverters and SiteGuard® O&M Services Can Reduce Cost per Kilowatt-hour over PV Plant lifecycle:

**Higher energy harvests**
- High peak efficiencies up to 98.7%
- Highest CEC-rated efficiencies (97.5 - 98%)
- High European efficiencies (98.4%)
- Fast, wide, proprietary maximum power point tracking
- 100% power on hot days (50°C/122°F)
- Industry-leading uptime

**Lower BoS costs**
- Lower site preparation and installation costs
- Standalone, outdoor-ready enclosures (high NEMA and IP ratings)
- Remote monitoring software included
- Reductions in large-diameter cabling
- Fewer medium-voltage transformers required
- Fewer or smaller inverter stations required

**Lower O&M costs**
- Standard warranty of 5 years
- Extended warranties up to 20 years
- High reliability
- Remote monitoring and diagnostics
- Customizable service plans with 99% uptime guarantee available
- Whole-site O&M services available
UNLOCK YOUR FULL LCOE POTENTIAL

When it comes to energy production, different sources of energy call for different financial models.

Even within the same category – PV solar, for example – ROI varies widely among system architectures, types of equipment, and locations. Analyzing the economics of a project is fundamental, and fortunately there’s a calculation that can help: LCOE.

LCOE analysis considers costs distributed over the project lifetime, providing a highly accurate financial picture that system operators prefer over older, simpler methods of calculating cost-per-watt. Cost-per-watt calculations ignore mission-critical factors like reliability, service, power quality, and efficiency. As a result, the true return on investment could be substantially different than otherwise anticipated. LCOE calculates the true cost of energy produced measured in cents per kilowatt hour, considering performance, system costs, and ongoing operations and maintenance.

Available in many regions worldwide, our services are customized to match customer requirements and cover everything from inverters to PV modules, electrical systems, tracking systems, and regular reporting. SiteGuard contracts are available in single- and multi-year terms up to 20 years.

The innovation, performance, and reliability of our power conversion products represent a fundamental shift to LCOE, ensuring our customers achieve the lowest costs of producing energy over the entire project lifecycles.

In an industry where ROI is often measured in fractions of a cent per kilowatt-hour, and responsiveness at both the equipment and service levels are critical, AE is the ideal partner for utility solar inverter solutions that maximize the financial value of your power plant.

Put our 30-year track record of success in delivering the most dependable, efficient, and innovative power conversion solutions to work to your advantage.