CEA
Clean Energy Associates

Investment Confidence

SUPPLIER BENCHMARKING PROGRAM | PV MODULE

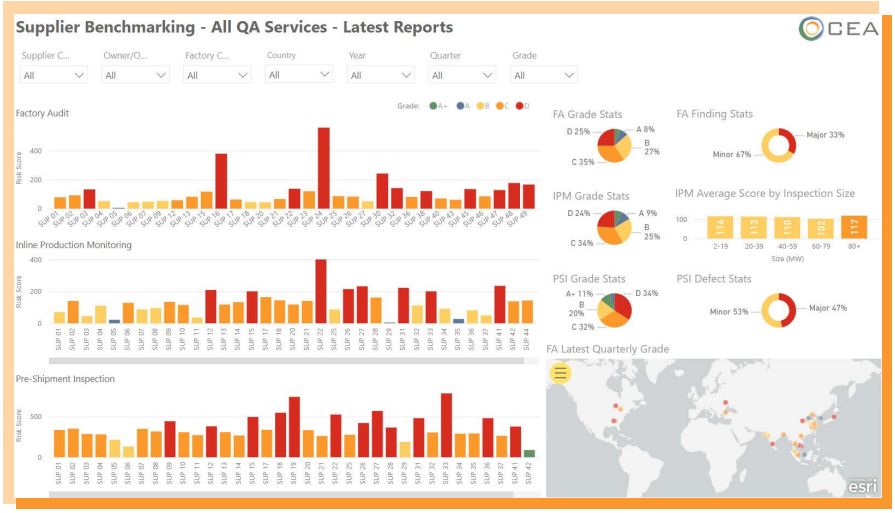
Mitigate Risk and Optimize Your Solar Energy and Storage Investment

The Clean Energy Associates' Supplier Benchmarking Program (SBP) delivers the PV industry's only quarterly independent, unbiased benchmarking of the top PV module manufacturers in the world.

The program provides an objective method for benchmarking the quality of PV module suppliers. It helps clients better assess the risks and opportunities associated with potential vendors and suppliers in today's nascent, highly dynamic solar energy industry.

The Supplier Benchmarking Program is based on a system that assigns quality risk-based scores to suppliers.

The scoring system was developed by analyzing thousands of data points acquired from CEA's factory audits, inline production monitoring, and product pre-shipment inspections at over one hundred and fifty supplier production facilities and over thirty five (GWs) of module quality assurance (QA) engagements.



The Problem: Selecting a PV module supplier presents risks.

The Solution: Employ quality assurance data to score quality- related risks.

The Logic: Benchmark suppliers against one another.

The Result: Mitigate risk and optimize your solar energy investment.

CEA has supported more than 35 GW of solar module projects worldwide. This vast volume of quality assurance work has accumulated a treasure trove of data and expertise.

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PROGRAM BENEFITS

Peace of Mind	This ranking enables clients to...
• The only unbiased quarterly benchmarking of the world's top PV module suppliers. • Enables developers, EPCs, IPPs, utilities, and financial institutions to maximize their solar energy investment • Scorecards provide a relative ranking of PV suppliers' production quality and risk.	• Make informed decisions. • Gain competitive advantage in project bidding through more accurate financial modeling. • Increase their leverage in negotiating financing, buying or selling assets, procuring equipment, and choosing whether to invest in projects.

PROGRAM FEATURES

Designed to Perform	This ranking enables clients to...
• Statistics of manufacturing data easily identify leading suppliers in an intuitive, visual format. • Risk score charts compare suppliers. • Objective grading system aggregates industry-wide quality levels. • Multiple chart views present data for suppliers by individual manufacturing location and globally. • Charts show evolution of location and supplier quality scores over time. • Supplier and time-filtered views enable targeted comparisons. • Quarterly releases keep clients up to date with latest manufacturing quality trends. • Unique visibility into manufacturing capabilities improves confidence in Approved Vendor Lists strategies.	• Factory audits with more than 1,000 QA check points providing great visibility into PV factories' quality level at a global scale. • Inline production monitoring of materials, storage and production processes with over 280 check points for unparalleled PV module manufacturing transparency. • Pre-shipment product inspection per ISO-2859 standards, ensuring module vendors meet acceptable quality levels. • Supplements world-class QA service that provides clients assurance of high quality PV module procurement. Exposure to over 50 percent of BNEF volume provides visibility into bankable suppliers. • Saves time and travel costs.

PROGRAM SCORECARDS: Collecting Reliable Data

The scorecard system evaluates suppliers with whom CEA has executed numerous projects, providing sufficient data for accurate risk scores. This list is continuously growing and contains the most important manufacturers in the utility scale market today.

Factory Audit	• A team of engineers audits a factory location using a 1,000+ point checklist. • Every finding is recorded and classified according to its risk potential.
Inline Production Monitoring	• A team of engineers continuously monitors all stations of a factory location during the production of an order, using a 260+ point checklist. • Every finding is recorded and classified according to its risk potential.
Pre-shipment Inspection	• A team of engineers perform visual, EL and IV inspections to a sampled lot of finished modules, according to a list of vetted quality criteria. • Every finding is recorded and classified according to its risk potential.

Clean Energy Associates (CEA), a solar and storage technical advisory firm, provides quality assurance and independent engineering solutions worldwide. We serve financial institutions, project developers, EPCs, IPPs, and power plant owners. From our base in China, CEA's quality control engineers travel worldwide to conduct upstream in-factory technical evaluations, including factory audits, production monitoring and pre-shipment product inspections. Our US-based product management and engineering (IE/OE) teams provide support throughout the project life cycle, from upstream supply chain management and supplier benchmarking, to downstream system design, construction, commissioning, performance assessment, re-power and optimization as well as warranty support. We serve the solar and storage industries through our expertise in PV modules, racking, inverters and energy storage systems. Since 2008, CEA has reduced buyers' risks and improved returns on investments via quality assurance, technical and financial due diligence, engineering services and supply Chain management globally.

Technical advisors, we provide procurement and investment confidence through risk mitigation to key stakeholders in solar and storage projects worldwide.

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