



Standardising solar skills for the terawatt era

Words: Sonia Dunlop, CEO of Global Solar Council and Jakob Lau Holst, CEO of GWO

As solar capacity surpasses two terawatts and deployment accelerates toward annual additions of more than one terawatt, the industry faces an urgent challenge: scaling the workforce to meet global demand. The Global Solar Training Standards, developed by the Global Solar Council and GWO, aim to provide a unified framework for technician training, ensuring consistent safety, skills and mobility across markets while supporting the rapid expansion of utility-scale solar projects worldwide.

Over the past decade, solar power has transformed from a fast growing clean technology into the backbone of the global energy transition. What was once considered a niche industry has become one of the world's most significant sources of new electricity generation.

In 2024, global installed solar capacity surpassed two terawatts, doubling the first terawatt reached only two years earlier and confirming solar as the fastest-growing power technology worldwide.

The pace of growth shows no sign of slowing and to meet the rising electricity demand, solar deployment will need to accelerate dramatically in the coming decade. From 2030 onwards, the industry is expected to add more than one terawatt of new solar capacity every year.

Achieving that scale of deployment will require an unprecedented expansion of the global workforce, with hundreds of thousands of additional technicians needed to build, install and maintain solar projects around the world.

Technology, manufacturing and investment are often discussed as the pillars of solar's success. Increasingly, however, the industry is recognising another critical factor: people.

The technicians constructing, installing, operating and maintaining solar infrastructure are the foundation of the industry's continued growth. Without a skilled and job-ready workforce, the industry risks slowing its own progress.

A fragmented training landscape

While a key component in the success of solar, training practices remain fragmented across many markets. Requirements vary widely between countries, regions, individual projects. Companies operating internationally often face the challenge of retraining technicians multiple times to meet different local standards.

This fragmentation creates inefficiencies that ripple across the industry. Inconsistent training quality can increase safety risks on site and contribute to uneven construction standards and quality-of-build challenges. Repeated training programmes add cost and complexity for companies operating across multiple markets. In some cases, workforce shortages or retraining delays can slow the pace of project delivery.

As solar farms become larger and more technologically sophisticated, the industry

can no longer rely on fragmented training systems. A global industry requires a global framework that ensures technicians possess consistent competencies wherever they work.

Introducing the global solar training standards

Recognising this challenge, the Global Solar Council (GSC) and GWO have partnered to develop the Global Solar Training Standards, the first internationally recognised training framework designed specifically for technicians working on utility-scale solar photovoltaic construction, installation, operations and maintenance projects.

The initiative brings together GSC's global industry leadership with GWO's proven training standards development model. Over the past decade, GWO has established widely adopted training standards in the wind industry, helping employers ensure that technicians arrive on site with verified safety and technical competencies. Today more than 300,000 technicians have completed GWO training delivered through over 600 independent training providers operating in 55 countries.

By adapting this model to the solar industry, the Global Solar Training Standards create a unified framework that addresses the specific needs and risks associated with solar projects. The standards focus on practical, site-relevant competencies that prepare technicians for real working conditions, ensuring they arrive on site ready to work safely and effectively, supporting the reliable operation of solar projects.

Built by the industry, for the industry

A defining feature of the Global Solar Training Standards is the way they were developed through collaboration with stakeholders from across the renewable energy ecosystem.

Subject matter experts across the solar industry, including Original Equipment Manufacturers (OEMs), developers and service companies contributed their expertise through a dedicated steering committee.

Organisations including Acciona, ACP, ARMSA Academy, Avangrid, BayWa.re, EDPR, Huawei, International Solar Energy Society, Malaysian Photovoltaic Industry Association, Ørsted, Solar Energy UK, Solar Power Europe and Sun Asia Energy helped shape the training modules to ensure they reflect real-world project requirements and operational challenges.

Before the standards were formally introduced to the market, pilots were conducted in major solar markets, including the United States and the United Kingdom. These pilots enabled technicians and trainers to test the training content in real-world conditions and provided valuable feedback that helped refine the final framework.

This collaborative process ensured that the standards were grounded in the practical realities of solar deployment, so they are fit-for-purpose to remove the administrative and financial burden from the industry and enable companies to focus on deployment.

The business case for standardised training

For many solar companies, workforce training has historically been viewed as a compliance requirement or an internal operational matter. As the industry scales to terawatt-level deployment, however, training is becoming a strategic issue that directly affects project performance, safety and cost management.

Standardised training improves safety by aligning technician preparation with the real hazards encountered on solar sites. Utility-scale projects involve complex electrical systems, heavy equipment and

demanding environmental conditions. Ensuring that technicians understand these risks and follow consistent safety protocols reduces incidents and protects both workers and project operations.

The benefits also extend to operational efficiency. In the absence of common standards, technicians moving between projects often need to repeat similar training courses to meet different requirements. A globally recognised framework reduces this duplication and enables companies to deploy workers more efficiently across markets.

Workforce mobility is another important advantage. As solar development expands into new regions, access to skilled technicians will become an increasingly significant constraint that will slow down growth. Standardised training allows competencies to be recognised across borders, enabling employers to draw on a larger and more flexible global talent pool to meet demand when and where required.

For investors and asset owners, training quality also has implications for long-term project performance. Installation and maintenance practices directly influence the reliability and efficiency of solar assets. A workforce trained to consistent standards contributes to higher-quality construction and more dependable project operations over time.

Building a global training infrastructure

The Global Solar Training Standards are delivered through a network of independent GWO-certified training providers, ensuring consistent training quality regardless of where courses are delivered. This global infrastructure provides employers with access to standardised training across multiple regions and markets.

Through this approach, the industry will move from a fragmented training landscape to a recognised global competence baseline which parallels GWO's suite of standards for the wind industry. This baseline ensures safety performance, supports workforce mobility across markets and provides customers, investors and regulators with greater confidence in how solar assets are built and operated.

Following pilot programmes and the launch of the standards in 2025, the first training providers have already begun offering courses aligned with the new framework. As awareness grows and more companies integrate the standards into their workforce strategies, the network of training providers is expected to expand significantly.

To date, more than 20 training providers have already made the choice to extend their scope to include the Global Solar Training Standards. And in 2026, this will exponentially increase as global developers, EPC contractors, investors, manufacturers and operators make it a requirement for technicians for their projects.





This growing ecosystem will help ensure that technicians everywhere have access to training that meets the same recognised global benchmark.

Scaling solar requires industry collaboration

Like any industry standard, the Global Solar Training Standards will achieve their full impact only through broad adoption. Developers, EPC contractors, manufacturers, operators, investors and training providers all have a role to play in building a workforce capable of supporting solar's continued expansion.

For companies responsible for building and delivering solar projects, the first step is integrating the standards into workforce strategies. Developers and EPC contractors can embed the framework into their in-house training, procurement requirements and project specifications, ensuring that technicians working on their sites have completed recognised training aligned with the standards.

Doing so provides greater assurance that work is carried out safely and consistently, while helping companies reduce delays associated with retraining or workforce shortages.

Training providers also have a critical role in expanding access to standardised training. By becoming certified to deliver courses aligned with the Global Solar Training Standards, training centres can offer programmes that meet a globally recognised benchmark while opening new opportunities to serve the rapidly growing solar workforce.

Manufacturers, asset owners and operations and maintenance providers can contribute by encouraging or requiring their partners and contractors to adopt standardised training. Aligning workforce expectations across the value chain helps ensure that technicians arrive on site with consistent competencies and safety awareness.

Investors and insurers also have an important role to play in scaling solar. By recognising workforce training standards as part of project risk management and due diligence, financial stakeholders can support stronger safety performance and operational reliability across solar assets.

A workforce ready for the terawatt era

The solar industry has already demonstrated that rapid transformation of the global energy system is possible. Yet the next phase of

growth will require the industry to scale human capability alongside physical infrastructure.

Solar is already the largest renewable energy employer in the world. Its workforce will continue to expand as deployment accelerates. Ensuring that this workforce is safe, skilled and globally recognised will be essential for sustaining the pace of the energy transition and the reputation of the solar industry as we become the backbone of the global energy system.

The Global Solar Training Standards provide a practical pathway for achieving this goal. By offering a shared framework for training and certification, they help transform workforce readiness from a risk into a strategic advantage for the entire industry.

Scaling solar to the terawatt era will require collaboration across the industry. By adopting common training standards and investing in the skills of the people building solar infrastructure, the industry can ensure it has the workforce needed to deliver clean energy at the scale the world now demands.

globalwindsafety.org/about/company

globalsolarcouncil.org/about