

Benefits of Harmonizing Test Methods and Quality Standards

This Technical Note explains the importance and benefits of an internationally harmonized quality assurance framework for small scale solar photovoltaic (pico-PV) products. Benefits are outlined for specific stakeholder groups, and a summary of the Lighting Global Quality Assurance (QA) Framework is provided for reference.

See also www.lightingglobal.org for additional Technical and Eco Design Notes

Introduction

The rapid growth of the pico-PV market has prompted development and relief organizations, incentive and financing programs, and standards bodies to put in place quality requirements for pico-PV products. Lighting Global encourages these stakeholders to coordinate their efforts to converge on a harmonized quality assurance framework. In so doing, the organizations will more effectively reduce the prevalence of sub-standard products while fostering innovation and maintaining consistency across international markets.

To facilitate adoption of a common set of test methods and standards, the World Bank Group's Lighting Global Quality Assurance (QA) Program has been committed to developing and maintaining a **QA framework** that is applicable for a wide range of stakeholders. These efforts have yielded the world's most widely recognized QA framework for pico-PV products, testing hundreds of off-grid solar products and supporting the sales of millions of quality-verified products. Lighting Global works closely with the International Electrotechnical Commission (IEC), the globe's leading standards organization for electrical appliances and equipment.

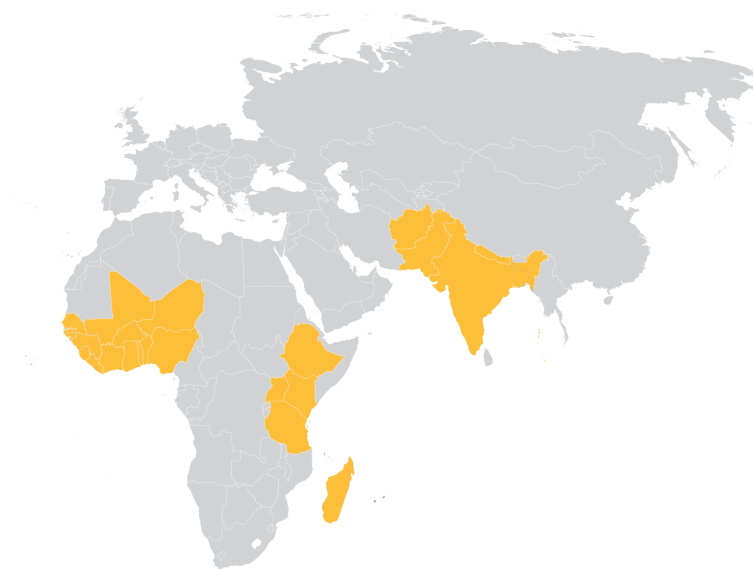
Lighting Global's QA framework was developed to serve a broad market audience and meet many diverse stakeholder needs. It is composed of four elements:

- **Test methods** to rigorously evaluate performance
- **Quality Standards** to set baseline requirements
- **A Test Lab Network** to maintain consistent test results
- **Market Surveillance Testing** to ensure long-term compliance

Growing Adoption of Harmonized Standards

A precedent is being set for adoption of harmonized quality standards by countries with large markets for pico-PV products. As of 2017, countries such as Kenya, Tanzania, Ethiopia, and Rwanda have harmonized their national standards for pico-PV products with the Lighting Global Quality Standards and the test methods specified in IEC TS 62257-9-5. In addition, countries such as Uganda, Pakistan, Afghanistan, and regional groups such as ECOWAS (consisting of 15 member states in West Africa) are exploring or are in the process of adopting national and regional standards for pico-PV products. Lighting Global strongly encourages adoption of fully harmonized standards and test methods.

Countries Adopting or Developing Quality Standards for Pico-PV Products



Benefits of Harmonization for Consumers

Consumer benefits are the ultimate goal

While there are many stakeholders that receive considerable benefits, consumers stand out as both the reason and the primary beneficiary of harmonization efforts. Improved product performance and decreased cost are the two pillars of technology evolution, and these are achieved in part through the growth of a vibrant, healthy market. Harmonization supports market growth by bringing key benefits and thus supports an environment that is conducive to a better consumer experience and subsequent increases in sales.

Consistent product quality reduces market spoilage

Consistent levels of quality and truth-in-advertising for performance reduce confusion and increase the chance that consumers will have a positive experience with pico-PV products. Increased product quality is facilitated in a robust, harmonized market.

Sub-standard products are at a disadvantage in areas where harmonized standards open up markets to higher quality choices. These products will either not qualify to be sold in these regions, or they may be less appealing to supply chain actors ranging from product distributors to financial institutions because they do not carry Lighting Global affiliation. Adoption of harmonized standards helps to provide an opportunity for better products to compete.

More product choices = happier consumers

Manufacturers are better able to focus their resources on product development when the technical requirements they are trying to meet are consistent and widely recognized. Designing to a single standard is much easier and leads to more successful results than trying to satisfy many competing standards. It also removes the need for manufacturers to choose in which

markets and countries they will compete, allowing their product investments to yield more dividends.

Willingness to buy increases with consumer confidence

Consumers have greater confidence in their investment with products that have been tested – and continue to be tested – to meet an adequate level of quality, durability, safety, and truth-in-advertising. Following is a summary of the minimum requirements of the Lighting Global Quality Standards.

Quality Standards quick summary

The Lighting Global Quality Standards have been developed to provide key benefits to consumers and end users:

- **Truth-in-advertising:** accurate product performance for key metrics (e.g., rated run time, light output, battery capacity, PV power)
- **Lumen maintenance:** after 2,000 hours, the product's light output must not drop below 85% of the initial value
- **Battery:** must be durable and adequately protected
- **Health and Safety:** batteries may not contain mercury or cadmium; products are safe
- **Durability and quality:** products are designed and manufactured to avoid early failure
- **Warranty:** products have a consumer-facing warranty with at least one year of coverage
- **Performance Information:** Product packaging reports run time and brightness with a note about the impact of mobile phone charging on run time.

Benefits for Non-consumers

The following page lists the benefits of harmonization for different stakeholder groups. While many of the benefits overlap between groups, the details in how these apply differ by category. This is reflected in each list provided for the different groups.

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Harmonization Benefits for non-consumer stakeholder groups:

Bureaus of standards, customs & conformity assessment programs

Increased confidence in standards

Standards organizations and regulators are given confidence in a QA framework that has proven to be effective and functional in other countries and regions.

Minimal investment required

Bureaus of standards are not required to invest in or manage local testing facilities. Quality verification is carried out at internationally accredited laboratories.

Increased ease of standards adoption

The standards adoption process is facilitated by a complimentary set of test methods and quality requirements.

Simplified regulations

Import requirements are simplified by implementing procedures that are uniform across multiple countries.

Bulk procurers & development agencies

Strengthened tenders

The product technical requirements for tenders and incentive programs can be easily and transparently developed based on widely accepted test methods and quality standards.

Increased product selection

A broader selection of qualifying products is available when the technical requirements are based on results from standardized testing at accredited laboratories.

Simplified bid evaluation

The burden of assessing baseline product quality is transferred to an independent third-party verification body. Procurement decisions are simplified by comparing product information in a uniform format. Test reports and standardized specifications sheets allow apples-to-apples comparison.

Manufacturers and importers

Increased regulatory consistency

No need to make costly modifications to products to meet the requirements of differing standards and regulatory environments.

Increased market consistency

The same quality verification scheme is applicable across multiple countries, thereby facilitating market entry and reducing the cost of importation.

Streamlined testing process

Product testing is facilitated by an international network of accredited laboratories.

Increased opportunities

Products that are evaluated according to an internationally accepted test method at accredited laboratories can qualify for more tenders, incentive programs, and financing.

Financial institutions, finance programs & investors

Mitigated technology risk

Lack of experience and familiarity with renewable energy technologies can result in a heightened perception of investment risk. By requiring that products meet internationally recognized quality standards, investors and lenders can assess technology risks with confidence.

Reduced exposure to regulatory risks

Widely harmonized testing and quality standards bring a level of stability and uniformity, thereby decreasing the risk of unforeseen policy changes that may negatively impact investment viability.

Reduced transaction costs

Transaction costs are reduced as the standardized documentation means rapid review is possible.

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Frequently Asked Questions (FAQs)

The following questions commonly asked by stakeholders considering Lighting Global's Quality Assurance program. Additional inquiries can be directed to QA@lightingglobal.org.

Are the Lighting Global Quality Standards appropriate for our country, institution or program?

Governments: Countries with medium or large pico-PV product markets should consider adopting mandatory national standards that are harmonized with the Lighting Global Quality Standards *if* they are in a position to allocate the necessary resources to effectively regulate and enforce the standards. The country should have an import system that allows rapid entry of quality-verified products while also preventing the entry of non-verified products.

Others (bulk procurers, development agencies, financial institutions): For these groups, a requirement that qualifying products meet the Quality Standards (at a minimum) is generally advisable. This is simple to implement as part of procurement documents and programmatic requirements.

Why are the Quality Standards not adopted by the IEC like the test methods?

Lighting Global anticipates that the Quality Standards will be submitted to the IEC in 2018. They have been evolving for the past eight years, and Lighting Global now believes they are ready to be adopted by the IEC.

What are the requirements for test labs to participate in the LG test lab network?

All laboratories that conduct qualification tests (i.e. Quality Test Method (QTM) and Renewal tests) must be ISO 17025 accredited to carry out tests according to IEC TS 62257-9-5. For market surveillance and initial screening (ISM) testing, labs are not required to have ISO 17025 accreditation but must demonstrate competency to perform the tests. All labs in the Lighting Global test

lab network must participate in inter-laboratory comparison (round robin) testing and sign an agreement with Lighting Global QA.

Does a requirement to meet the Quality Standards limit product choice?

Having standards in place for tender/program participation is a common way for organizations to maintain quality and prevent poorly designed products from spoiling the market or damaging program objectives. Many other certifications exist (CE, UL, Energy Star, etc.) that work to encourage positive outcomes, and Lighting Global standards are no different. While standards do limit access to substandard products, they protect consumers and help increase access to *better* products.

Since LGQA does market surveillance, does that mean that my country doesn't need to include this as part of our enforcement strategy?

No. The market check testing from Lighting Global is intended to monitor product consistency over the course of that product's certification cycle. Samples are procured from different countries and may not be selected at all from any particular country. Lighting Global's market check testing is a key element of the Quality Assurance Framework but should not be considered a substitute/replacement for country-level market surveillance activities.

How can we be sure that a quality certification (type approval) and test report are authentic?

Lighting Global Standardized Specification Sheets (SSS) and Verification Letters (VL) for all quality-verified products can be viewed/downloaded from the Lighting Global website. Furthermore, each Verification Letter is accessed via a unique web address (URL) that is specified in the document. To confirm the validity of a product's quality verification, one can simply go to the unique URL shown on the SSS or VL to find the official version of the document.

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Conclusion

As the prevalence of pico-PV products increases, so too do the numbers of governments and organizations that seek to adopt and reference quality standards for these products. The need for harmonization of standards, therefore, becomes more critical since the risk of inconsistent and conflicting requirements increases with each new organization that adopts quality standards. All stakeholders, from consumers to manufacturers to regulators, receive benefits as a result of a consistently and broadly applied set of test methods and quality requirements for pico-PV products.

Expanded Adoption

The rapidly growing list of countries pursuing adoption of harmonized quality standards is giving credence to the value and validity of the QA framework for pico-PV products, which motivates more bureaus of standards to implement similar strategies.



Rising Worldwide Demand

As the worldwide demand for pico-PV products increases, internationally harmonized quality standards support sustainable market growth and ensure that consumers have access to reliable off-grid energy services. Lighting Global has established the most widely recognized and robust quality assurance framework for pico-PV products in the world, which is well positioned to serve as the foundation for a set of internationally harmonized standards.

Wide-Ranging Benefits of Harmonized Standards

Consumers are not the only stakeholders that benefit by converging on a common framework for quality assurance of pico-PV products. Many stakeholder groups, including manufacturers and distributors, bulk procurers and development agencies, and bureaus of standards and conformity assessment programs, will receive tangible benefits when they appropriately reference the Lighting Global QA framework in their policies and programs. A summary of the QA framework is provided in Appendix A.

For further information or assistance with using the Lighting Global QA framework, please contact the Lighting Global Quality Assurance Team: QA@lightingglobal.org

Appendix A: The Lighting Global Quality Assurance Framework

Lighting Global was initially established as Lighting Africa in 2007. In 2012, the reach of Lighting Africa was expanded, which gave rise to the Lighting Asia and Lighting Pacific programs. Lighting Global was created to house the program elements that span across all the programs in Africa, Asia and in the Pacific regions. One of Lighting Global's primary objectives is to counter market spoilage arising from poor quality products through a QA framework that involves setting standards and test methods, testing products within a network of accredited test laboratories, and carrying out market surveillance that is upheld by enforcement mechanisms.

Test Methods

The test methods used to evaluate pico-PV products focus on characterizing performance, durability, and safety. The test methods require that products be assessed on a system level as well as on a component level, including light sources, batteries, PV modules and control circuitry. In 2013, the Lighting Global test methods were incorporated into an Electrotechnical Commission (IEC) technical specification, IEC/TS 62257-9-5, establishing them as the most widely recognized and trusted test methods for off-grid lighting products by the world's leading standards organization for electrical and electronic technologies.

Lighting Global Quality Standards

When a product is tested according to the IEC/TS 62257-9-5 Quality Test Method (QTM), the test results are used to determine if the product meets the Lighting Global Quality Standards. The Quality Standards define the baseline level of quality, safety, durability, and truth-in-advertising that products must meet to ensure the protection of consumers. The test methods and Quality Standards are periodically refined through stakeholder engagement processes and consumer research to

ensure that they continue to meet the needs of consumers and the market.

Laboratory Network

Lighting Global maintains a network of accredited independent test laboratories located around the world. The network laboratories are ISO 17025 accredited to test products according to IEC TS 62257-9-5. The labs must also meet additional technical requirements and participate in regular inter-laboratory "round robin" comparison testing within the network to ensure they continue to produce consistently accurate results.

The list of accredited laboratories, as well as details on how to find or become an independent test laboratory capable of providing valid results for Lighting Global according to the IEC/TS 62257-9-5 is provided on Lighting Global's [lab network page](https://www.lightingglobal.org/quality-assurance-program/test-laboratory-network): <https://www.lightingglobal.org/quality-assurance-program/test-laboratory-network>

Market surveillance testing

Lighting Global ensures that quality verified products continue to meet the Quality Standards by conducting market surveillance testing. This involves sampling units of quality-verified products from the market without notifying the manufacturer, then testing the samples at a Lighting Global accredited laboratory. If the market surveillance test results confirm that the product continues to meet the Quality Standards, then the product maintains its quality-verified status. If the product is deficient, it may undergo further targeted testing and, if non-conformance is confirmed, have its quality verified status and Verification Letter revoked.

Additional information about Lighting Global's market surveillance is available for download from the website: <https://www.lightingglobal.org/resource/market-check-testing-policy/>