VeraSol

Conformity Assessment for Off-Grid Solar Products

Opportunities & Recommendations for Stakeholders

October 2021

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Executive Summary

Off-grid solar (OGS) products play a critical role in improving livelihoods and creating income-generating opportunities for off- and weak-grid communities. To meet the growing demand for basic energy services, OGS products of varying quality and durability are flooding markets, especially those serving the poorest and most vulnerable consumers for whom purchasing a solar product is a significant investment.

To keep low-quality products out of the market, some governments have adopted OGS quality standards. These national standards underpin quality assurance frameworks that protect consumers while improving the quality, availability and affordability of OGS products in the market. To ensure that products meet the quality standard, governments establish conformity assessment programs that determine whether products fulfil the requirements described in the quality standard. Effective conformity assessment programs prevent sub-standard products from entering regulated OGS markets while also facilitating the entry of high-quality products.

Many countries with significant OGS markets use Pre-Export Verification of Conformity (PVoC) to assess whether imported products meet the quality standard. PVoC has proven to be a well-suited conformity assessment strategy for governments with limited resources available for consumer protection.

"PVOC and VeraSol certification is a bulletproof system to protect markets from low-quality products" (manufacturer)

In 2020, the International Electrotechnical Commission (IEC) published IEC TS 62257-9-8, the quality standard for pico-solar products and Solar Home System kits with photovoltaic modules up to 350 watts, collectively referred to as OGS products. Together with the corresponding test methods (IEC TS62257-9-5), the IEC quality standard forms the foundation for quality assurance in the OGS sector. This development has opened the door to the widespread adoption of these standards. Numerous national governments have already adopted the IEC quality standard and test methods for OGS products, and several others are currently pursuing adoption.

With an increasing number of countries adopting the IEC quality standard for OGS products, actors throughout the value chain are benefiting from international harmonization. Governments can more effectively and efficiently keep low-quality products out of their markets. Suppliers can test their new products once and sell those products into multiple markets. This enables companies to get innovative new products to market more quickly and at a lower cost, resulting in considerable benefits to consumers.

VeraSol is leveraging international harmonization of the OGS quality standard to boost the effectiveness of national conformity assessment programs. We are bringing together government bodies, their partners and the private sector to cooperatively reinforce conformity assessment activities where national market monitoring efforts are limited. As part of this effort, we recently solicited feedback about PVoC conformity assessment programs from manufacturers of VeraSol-certified OGS products, seeking to:

- Better understand the PVoC process for off-grid solar products, its successes and its challenges
- Identify how the adoption of the IEC quality standard for OGS products (IEC TS 62257-9-8) may affect PVoC programs
- Assess the value of VeraSol product certification in the context of national conformity assessment programs
- Provide practical recommendations to key stakeholders for improving PVoC programs

This document provides insights and recommendations for stakeholders to better engage in and streamline the PVoC process for OGS products. The findings and guidance presented in this document are drawn from VeraSol's in-depth knowledge of the OGS sector, online survey responses and interviews with manufacturers of VeraSol-certified products.

Insights about Pre-Export Verification of Conformity (PVoC)

- **Overall, PVoC programs work well for VeraSol-certified OGS products, but opportunities for improvement exist.** During the interviews, manufacturers indicated that PVoC programs are largely successful at facilitating the importation of VeraSol-certified OGS products. The interviewed manufacturers generally experience little or no challenges. However, based on their feedback, we have identified some practical ways of making the PVoC process even better through increased awareness of applicable standards, improved communication, and harmonization of PVoC procedures.
- **VeraSol product certification facilitates conformity assessment.** The majority of manufacturers engaging with VeraSol have expressed that VeraSol product certification eases importation. PVoC programs for countries with relatively large off-grid solar markets accept VeraSol certificates as evidence that OGS products meet relevant quality standards.
- **New IEC quality standard is not expected to disrupt PVoC for OGS products.** With the relatively recent publication of the IEC quality standard for OGS products (IEC TS 62257-9-8), VeraSol is working to ease the transition from Lighting Global's Quality Standards, which served as the de facto international standard for OGS products for several years. Feedback from manufacturers indicates that they do not expect a shift towards the IEC standard to impede their access to key markets.
- **Additional research is needed to understand how well PVoC programs keep sub-standard OGS products out of markets.** To fully grasp the effectiveness of PVoC programs for OGS products, we need to understand their role in keeping non-compliant products out of markets. Information such as product data from PVoC programs and input from manufacturers of non-certified products would provide insights on how non-compliant OGS products enter markets.

Recommendations for Key Stakeholders

- **Manufacturers**
    - Ensure that OGS products meet the quality standard
    - Stay informed of country-specific requirements for importing OGS products
    - Provide timely and complete application materials for certificates of conformity
- **PVoC Providers**
    - Accept VeraSol certificates and IEC TS 62257-9-5 test reports from ISO 17025 accredited laboratories
    - Maintain ongoing communication with national standards bureaus and importers to facilitate effective conformity assessment
    - Educate employees about OGS products, the applicable IEC test methods and quality standard
- **Governments & Standards Bureaus**
    - Simplify regulatory requirements while maintaining robust quality assurance frameworks
    - Proactively inform and guide the private sector and PVoC providers of importation requirements and applicable fiscal policies
    - Consider international harmonization of HS classification and PVoC processes to promote trade and facilitate importation of high-quality OGS products
- **Industry Associations**
    - Organize educational forums addressing effective use of the IEC quality standard for OGS products
    - Liaise with standards bodies to advocate for regional harmonization of standards and PVoC processes
    - Engage with relevant government agencies to address and resolve issues linked to importation and conformity assessment
- **Donors and Development Partners**
    - Support governments and fund efforts to strengthen conformity assessment for OGS products, including capacity building and awareness creation
    - Engage with VeraSol to integrate best practices for quality assurance and conformity assessment into OGS interventions
- **VeraSol**
    - Continue stakeholder outreach to improve awareness of VeraSol product certification and its role in simplifying and strengthening conformity assessment of OGS products
    - Provide tailored support to governments, PVoC providers and the private sector to improve the effectiveness of conformity assessment programs
    - Explore potential adjustments to VeraSol product certification to address challenges linked to conformity assessment that manufacturers and importers of high-quality OGS products experience

Introduction

Off-grid solar (OGS) products play a critical role in improving livelihoods and creating income-generating opportunities for off- and weak-grid communities. To meet the growing demand for basic energy services, OGS products of varying quality and durability are flooding markets, especially those serving the poorest and most vulnerable consumers for whom purchasing a solar product is a significant investment.

To keep low-quality products out of the market, some governments have adopted OGS quality standards. These national standards underpin quality assurance frameworks that protect consumers while improving the quality, availability and affordability of OGS products in the market. To ensure that products meet the quality standard, governments establish conformity assessment programs that determine whether products fulfil the requirements described in the quality standard. Effective conformity assessment programs prevent low-quality products from entering the regulated OGS markets while also facilitating the entry of high-quality products.

IEC Standards for Off-Grid Solar Products

In 2020, the International Electrotechnical Commission (IEC) published IEC TS 62257-9-8[i], the quality standard for pico-solar products and Solar Home System (SHS) kits with photovoltaic (PV) modules up to 350 watts.[ii] This IEC standard is based on the Lighting Global Quality Standards for pico-solar products and SHS kits. We anticipate that products evaluated to the Lighting Global Quality Standards will be produced through 2022. Therefore, we strongly recommend that governments and other institutions continue to accept products that meet the Lighting Global Quality Standards at least until early 2023.[ii] Together with the corresponding test methods (IEC TS62257-9-5)[iii], the IEC quality standard forms the foundation for quality assurance for off-grid solar products. The standard is unique to the sector, as it describes a comprehensive set of requirements for the complete system, for individual components and consumer-facing information. While the comprehensive nature of the quality standard is ideal for consumer protection, governments may need to consider these differences when enforcing the standard.

Several countries with large off-grid solar markets – including Kenya, Ethiopia, Uganda and Nigeria – have adopted the IEC quality standard and test methods[iv] for OGS.[1] Numerous other national governments are also pursuing the adoption of these IEC standards. Widespread adoption of the OGS product standards will lead to regional and international harmonization and standard enforcement that can further reduce the prevalence of sub-standard products while fostering innovation and maintaining consistency across the markets.[v]

Conformity Assessment for Off-Grid Solar Products

Countries adopting the IEC quality standard on a mandatory basis are enacting measures to safeguard their markets from low-quality solar products. Conformity assessment – activities that determine whether

[1] In this document, the off-grid solar (OGS) products refer to pico-solar products and Solar Home System kits with photovoltaic modules up to 350 watts.

products fulfil the requirements described in a standard[vi] – is perhaps the most essential and effective tool available to governments that seek to protect consumers from sub-standard products, especially in countries without national market surveillance strategies. Among countries with mandatory quality standards for OGS products and primarily import markets, Pre-Export Verification of Conformity (PVoC) is the most prevalent means of assessing whether imported products meet the standards. National PVoC programs require that products imported into the country receive a certificate of conformity (CoC) before leaving the port of origin. A CoC is an official document showing that the goods comply with the relevant regulations and national standards. National governments typically designate independent, accredited third-party organizations to assess product compliance and issue CoCs before export.[vii] PVoC is a tried-and-true means of conformity assessment that has proven well-suited for governments with limited resources available for consumer protection.

International alignment of nationally adopted IEC quality standards and PVoC programs can profoundly impact the sector's success and energy access for the world's most energy-poor populations. The benefits include streamlined product importation and empowered regulators to keep low-quality products out of the market effectively, and reduced cost for consumers with a more extensive selection of goods available.

VeraSol Quality Assurance Program

VeraSol[viii], formerly known as Lighting Global Quality Assurance, maintains the world's most widely recognized quality assurance framework for OGS products. The program provides reliable information about the performance, durability, and safety of OGS products and connects buyers with sellers of quality-verified products. VeraSol also engages with key stakeholders, provides technical assistance, and develops practical resources based on best practices and stakeholder feedback.

VeraSol certification provides confidence that products perform as advertised. Since its inception, VeraSol has certified over 200 OGS products from over 60 brands. To date, more than 42 million certified products have been sold, bringing power to the world's poorest and most vulnerable communities.

"PVoC and VeraSol certification is a bulletproof system to protect markets from low-quality products" (manufacturer)

VeraSol's trusted, rigorous and widely applicable quality assurance program supports a broad range of stakeholders:

- **Manufacturers** can easily assess their products, compare them against competitors', and make more innovative product development decisions. Certified products gain entry into important markets and are eligible for bulk procurements, results-based financing schemes, working capital facilities, and other initiatives.
- **Distributors** can quickly identify and source products that will meet their customers' needs and expectations. This reduces financial and reputational risks associated with guaranteeing products to end consumers and sales partners.

- **Governments** can use VeraSol's quality assurance framework as a basis for tax and duty policies, voluntary market stimulation programs, and product regulations to protect consumers.
- **Development & Humanitarian Aid Institutions** can increase impact and cost-effectiveness by limiting eligibility for program participation to products that meet minimum international quality standards.
- **Investors** can reduce risk by investing only in companies that trade in products designed to meet consumers' expectations for quality, performance, and durability.
- **Test Labs** can attract a broader client base by improving their capacity to reliably test a wide range of solar products to the applicable international standards.
- **Consumers** benefit from the greater availability of high-quality products at an affordable price.

Feedback from manufacturers demonstrates several common motivations for testing and certifying their OGS products[2]. Manufacturers have indicated that VeraSol product certification bolsters their businesses, helps access more markets and provides verifiable proof of their high-quality products. Over 70% of manufacturers pursuing product certification state that they are doing so to meet the eligibility requirements for market stimulation programs, meet consumer expectations, or advertise that their products meet quality standards. The majority (68%) of manufacturers engaging with VeraSol seek product certification to ease the import of products, and half want to ensure that product sampling and testing are done according to the IEC requirements.

Approach for Gathering Insights on Conformity Assessment

VeraSol seeks to improve the effectiveness of national conformity assessment programs by leveraging the international harmonization of the OGS quality standard and by bringing together governments, their partners and the private sector. We identified the need to understand better how conformity assessment is carried out for OGS products and have gathered important information about how VeraSol test reports and product certification are used in practice. By having a clear picture of manufacturers' experiences with PVoC programs – including successes, challenges and recommendations – VeraSol is much better positioned to improve conformity assessment for OGS products.

Main Objectives

- **Better understand the PVOC process for OGS products, its successes and its challenges**

A more in-depth understanding of PVoC allows VeraSol to provide more impactful and targeted technical assistance to governments and their partners seeking to establish conformity assessment programs or strengthen the existing ones.

[2] From the information submitted by product manufacturers as part of VeraSol's certification process.

- **Identify how the adoption of the IEC quality standard for OGS products (IEC TS 62257-9-8) may affect PVoC programs**

VeraSol seeks to prepare stakeholders – including governments and private sector actors – for potential changes in existing PVOC processes and requirements. Being better informed about the transition to the IEC quality standard prevents inconsistencies and interruptions to conformity assessment for OGS products.

- **Assess the value of VeraSol product certification in the context of national conformity assessment programs**

VeraSol can better understand how product certification is used in practice and make VeraSol certification more useful for conformity assessment by receiving direct feedback from product manufacturers.

Methodology

Between April and June 2021, we solicited feedback about conformity assessment processes in Africa from manufacturers of VeraSol-certified OGS products. This was conducted via an online survey and follow-up interviews with manufacturers. We invited 59 companies to participate in a short online survey, of which 22 responded. We held follow-up interviews with ten respondents to gather more detailed information about their experiences with PVoC and using VeraSol certificates for conformity assessment. The interviewed companies manufacture a broad range of OGS products, have diverse business models and are globally based (China, Hong Kong, Kenya, USA, and Europe). We did not gather feedback from manufacturers of non-certified OGS products during this effort, as we encountered challenges in obtaining their contact information. However, we will consider this in future endeavours.

In the following sections, we summarize the feedback received from OGS manufacturers, present key takeaways and recommendations regarding conformity assessment, and describe the continued support that VeraSol intends to provide for conformity assessment of OGS products.

Findings and Insights

Online Manufacturer Survey

We received survey responses from 22 respondents out of 59, representing a response rate of 37%. Manufacturers were asked which African markets they import OGS products, who imports their products, which PVoC companies they use, and which documents are required by conformity assessment authorities.

The following are key takeaways from the online manufacturer survey.

Manufacturers mainly import products to Kenya, Nigeria, Ethiopia and Tanzania

Manufacturer feedback about importing into these specific countries, which represent a significant share of the global OGS market, is valuable. In addition, all of these countries have quality standards for OGS products and use PVoC programs for conformity assessment.

Most of the respondents are responsible for product importation

41% of the respondents take charge of importing products, while 32% have a mix of outsourcing and carrying out their importation. 27% of the manufacturers sell products to other companies that are responsible for importation. Since most manufacturers import their VeraSol-certified products at some capacity, VeraSol continues to support them on the PVoC process and market access.

The respondents show a preference for SGS as the most common conformity assessment provider

15 of the 22 respondents work with SGS to provide certificates of conformity for PVoC programs, yet several manufacturers are not exclusive. Eight respondents use two or three different PVoC providers, depending on the country of import.[3] While these findings suggest that engagement with SGS will be a crucial part of a PVoC outreach strategy, they also highlight the importance of aligning the process by which all PVoC providers assess conformity.

Most respondents are required to submit third-party test reports for conformity assessment

68% of respondents indicated that official test reports are required to receive certificates of conformity under PVoC programs. Some companies only submit third-party test reports, while others only provide VeraSol certificates or both. The next most commonly submitted documents are VeraSol certificates (45%), VeraSol Specification Sheets (41%), Quality Management System Certifications (32%), and safety certificates such as CE or UL (27%). These findings point to the need to engage with PVoC providers to increase the use of test reports for conformity assessment and inform them of the value of VeraSol certificates.

Manufacturer Interviews

Of the 22 survey respondents, VeraSol interviewed ten companies to dive deeper into three topics:

- Manufacturer experiences with PVoC for OGS products
- Product test reports and quality certificates
- Process of VeraSol product certification

[3] PVOC companies are selected and contracted by the governments based on competitive selection process. In line with international best practice, governments typically have agreements in place with multiple PVoC providers.

Experiences with the PVoC process

The manufacturers informed us that, in general, the PVoC process is working well. However, eight interviewed companies that import into multiple markets identified some difficulties that are addressed below. Two companies indicated that they are not experiencing any issues, yet it should be noted that they both have a limited scale of importation into a single country.

Overall, the interviewees have had varying and inconsistent experiences with the PVoC process. The manufacturers described a wide range of processing times for certificates of conformity. They reported CoC processing times anywhere between three days and two months, depending on the documentation requested by the PVoC providers and which documents the manufacturers already have available. The companies also have mixed experiences working with the PVoC providers, with some companies choosing the providers based on their quality of services and responsiveness. Other manufacturers choose PVoC providers based on whether they have local offices or according to the preference of importers.

While we heard many different and often contrasting stories from the interviewees, we did identify three common challenges that cut across most of the manufacturers' experiences with PVoC:

Bottlenecks and redundancy in the PVoC process cause losses for companies that use various import routes[4]

Small-scale and infrequent importers who use Route A experience delays and additional costs due to inspection requirements for all shipments. Manufacturers who hold Route C licenses are experiencing delays and complications due to redundancies in the process, which should be alleviated by meeting the stricter requirements.

Relationship building with PVoC companies improves process effectiveness

Some manufacturers reported communication issues with PVoC providers. In some cases, the regulatory requirements for countries are unclear or change from shipment to shipment. This takes additional time to understand and comply with the requirements fully. However, the interviewed companies indicated that they were able to facilitate the process over time due to strengthened relationships with PVoC providers. The conformity assessment process is streamlined as PVoC providers build confidence in the

[4] Countries with PVOC processes offer three certification routes. Route A (Consignment Inspection and Testing) – companies are required both to test and physically inspect imported products to demonstrate conformity to relevant standards. Route B (Product Registration) fast tracks certification process for goods with reasonable and consistent levels of quality (frequent shipments) through registration by the PVoC Provider for one year. The shipments of registered products are exempted from mandatory testing and certification may be based on physical inspection only. Route C (Product Licensing) - companies must demonstrate existence of a quality management system in their production/manufacturing process. Upon approval, manufacturer receives a License for the relevant products valid for one year. Licensed products are subject to random physical inspection by PVoC provider prior issuance of CoC and shipping.

manufacturers and product quality and better understand the product-specific requirements. Well-established and ongoing collaboration between manufacturers and PVoC providers ultimately speeds up the time to obtain CoCs.

Lack of information about importation requirements, including conformity assessment, duty and Value Added Tax (VAT) rates, and Harmonized System (HS) codes

Manufacturers cannot easily comply with product importation requirements if they are not fully aware of fundamental elements such as applicable standards, import duties and tax rates. The interviewees recommended that governments make relevant information readily available for PVoC companies and the private sector. Furthermore, stakeholders should be informed of any changes promptly. These findings further emphasize the importance of strengthening relationships and communication among importers, PVoC providers and governments, which can help fill information gaps and shorten conformity assessment processing times.

Test Reports and Quality Certificates

To receive CoCs, importers must submit test reports, certificates and other documents to the PVoC providers. Nearly half of the survey respondents submit VeraSol product certificates as part of their CoC applications. Providing VeraSol certificates facilitates conformity assessment since they are easily verifiable and backed by official test reports issued by ISO/IEC 17025[ix] accredited laboratories. While there is clear value in using VeraSol certificates for PVoC, several manufacturers expressed concern that they anticipate increased costs due to additional testing to certify OGS products to the IEC quality standard (IEC TS 62257-9-8). The interviewed manufacturers have not yet experienced issues with acceptance of test reports or VeraSol certification, yet they did share two common challenges.

Redundancy in requiring test report in addition to VeraSol/Lighting Global verification letter

Some PVoC providers incorrectly classify OGS products, requiring certificates and test reports other than (or in addition to) IEC TS 62257-9-5. One manufacturer shared that, in one instance, the PVoC provider incorrectly requested a test report for light fixtures (IEC 60598). The manufacturer lost valuable time and allocated a disproportionate effort to resolve the issue, ultimately costing the company more money to get their products to market.

Lack of standardization with regards to product and component identification leads to challenges for conformity assessment

In some cases, discrepancies between how products and components are identified lead to confusion and longer processing times for conformity assessment. When model and component names/numbers are not specified across submitted documentation, PVoC providers encounter difficulties. To address this, respondents recommend standardizing product naming across reports, certificates and consumer-facing information.

VeraSol Certification

VeraSol operates a rigorous certification scheme for OGS products that meet international quality standards. Companies seeking to certify their products with VeraSol follow a structured process to assure that testing and evaluation fully complies with the IEC and best practices. In the first step, manufacturers submit documents and information to VeraSol, which is needed to conduct a preliminary product assessment, develop a test plan and coordinate testing. Upon completion of this initial information gathering and evaluation stage, VeraSol helps arrange product sampling by a third-party agent. The manufacturer ships randomly sampled products to an ISO-accredited lab for testing. After receiving detailed test results, VeraSol's team of experts evaluates whether the product meets the quality standard. OGS products complying with the quality requirements are issued VeraSol certificates. Certified products are featured on VeraSol's Product Database[x]. When a product does not meet all of the quality requirements, VeraSol guides the manufacturer to bring the product into compliance.

Manufactures see value in obtaining VeraSol certification, as a rigorous process carefully vets and certifies only quality OGS products. However, the interviewees have encountered some challenges with the certification process and provided the following constructive criticism.

Excessive testing for compliance

Some respondents asserted that the scope of product testing described in IEC TS 62257-9-5 is overly exhaustive and complex, which subsequently requires too much time and money to complete. No clear solutions for this came out of our discussions with manufacturers. Yet, they encouraged VeraSol to pursue changes to the test methods that could accelerate and simplify product testing while maintaining a robust quality and performance assessment.

Certification lead time is disproportionately long

The average time required to complete laboratory testing of OGS products is 72-84 days[5], with additional time required for sampling, certification, and wait times between steps in the certification process. Some of the more complicated systems (such as larger SHS kits with multiple included appliances) can take six months or more to complete both testing and certification. Manufacturers typically need to begin preparing for certificate renewal three to six months before its expiration. Since VeraSol product certification is valid for two years, some manufacturers have indicated that the time required to certify their products and renew expiring certificates is excessive.

[5] The average time to complete QTM testing (as described in IEC TS 62257-9-5) for product certification varies based on the product category: 80 days for pico-solar products and 84 days for SHS kits. The average time to conduct testing for certification renewal is 72 days for both pico-solar products and SHS kits.

Issues with certification acceptance for product families[6]

As described in IEC TS 62257-9-8, a product family is a range of product configurations comprised of different combinations of interchangeable components. VeraSol certifies product families by testing at least one fully configured "kit"[xi] in addition to testing a select number of individual components. This approach allows manufacturers to certify product families without thoroughly testing each unique configuration, reducing testing time and cost. With 49 product families currently certified by VeraSol, this design approach has become quite common.

Some of the interviewed manufacturers attested that they had encountered difficulties obtaining CoCs for kits and components included in VeraSol-certified product families. In some cases, government authorities and PVoC providers request separate test reports for each model being imported. Manufacturers have asked that VeraSol ensures that products certified as part of families can receive CoCs without undue complications. Two potential solutions proposed by the manufacturers are issuing one test report per component within each product family and specifying all kit configurations covered in the test report.

Request for additional, expedited VeraSol certification pathways

Manufacturers with a strong compliance history have expressed that the VeraSol certification process could be adapted to accommodate their needs better. Several top-tier manufacturers have been certifying their OGS products with VeraSol for many years. These companies have established a close relationship with the program and have a generally positive record of maintaining a high level of product quality. They have asserted that their compliance history should qualify them for a new, fast-track pathway to certification that further reduces time and cost.[7]

Allow manufacturers to address inaccuracies in consumer-facing product specifications before issuing final test reports

Inaccuracies in consumer-facing specifications are the most common reason that OGS products fail to meet the quality standard. A product is considered out of compliance if test results show that its performance (e.g. PV module power, battery capacity, luminous flux, daily solar run time) is more than 15% less than advertised[xii]. Under the current procedure, when a product does not meet the truth-in-

[6] A product family is a set of interchangeable components sold on a component-level basis or as "mix-and-match" kits. A benefit of selling products at the component-level is that users are able to tailor a complete system to their budget and lighting needs (https://verasol.org/publications/framework-for-testing-product-component-families).

[7] In accordance with the IEC test methods and quality standard, VeraSol currently offers an alternative product certification pathway for qualifying companies. The IEC test methods for OGS products (IEC TS 62257-9-5) define the Accelerated Verification Method (AVM), which is an optional testing pathway to enable expedited entry to markets or market support programs. The IEC quality standard for OGS products (IEC TS 62257-9-8) allows AVM testing as an alternative to Quality Test Method (QTM) testing for manufacturers that meet certain eligibility requirements. The AVM maintains the rigor of certification through a combination of eligibility screening and comprehensive follow-up QTM testing.

advertising requirement, the laboratory issues a final test report indicating where the consumer-facing specifications exceed the measured performance. In these cases, manufacturers can comply with VeraSol certification by adjusting inaccurate consumer-facing information. The original test report, however, is not revised. In some cases, this can lead to confusion.

To address this, some interviewed manufacturers requested that laboratories inform them of any truth-in-advertising failures before issuing a final test report. This approach would allow manufacturers to correct inaccurate consumer-facing materials and provide evidence that the specifications have been corrected, allowing the lab to amend the test report before being finalized.

Non-native English speakers encounter communication challenges

French and Chinese speaking manufacturers have indicated that they often encounter language barriers when communicating with VeraSol and test labs. A high degree of written and spoken information needs to be exchanged to complete product certification. VeraSol operates primarily in English, which can inhibit the ability of several companies to test and certify their products. Some manufacturers have requested that VeraSol translate more key documents and enlist additional team members who can communicate in Chinese and French to provide better support to the companies whose primary language is not English.

Recommendations to Improve PVoC for Off-Grid Solar Products

With several countries adopting and enforcing the IEC quality standard for OGS products, now is a critical time to address conformity assessment. VeraSol is leveraging international harmonization by bringing together governments, their partners and the private sector to improve the effectiveness of national PVoC programs and increase the market share of high-quality OGS products.

Insights gathered from manufacturers of VeraSol-certified products provide a clearer picture of their experiences with PVoC programs, including successes, challenges and recommendations. Manufacturer input also informed our guidance on actions that various stakeholder groups can play in improving national conformity assessment programs and ensuring high-quality OGS markets. Below, we provide recommendations for each key stakeholder group, including manufacturers, importers, governments, and PVoC companies. Our recommendations focus on how each stakeholder can support, improve and help streamline the PVoC process for OGS products. We also outline recommendations for stakeholders not directly involved in conformity assessment, such as industry associations and donor partners, who can help improve the effectiveness of PVoC programs.

Manufacturers & Importers

RESPONSIBILITIES	RECOMMENDATIONS
• Commit to producing/importing high-quality OGS products that meet regulatory requirements • Obtain all necessary documentation for PVoC • Follow PVoC procedures to obtain CoC	• Stay informed of country-specific requirements for the importation of OGS products • Include component ID numbers to product documentation, providing them to test laboratories and VeraSol when submitting a certification application • Expedite product certification and conformity assessment by providing requested materials in a timely manner • To further expedite product certification, consider testing products using the Accelerated Certification Method (AVM), if applicable • Make use of VeraSol's online resources to facilitate testing and certification • Ensure that the products adhere to the IEC quality standard

PVoC Providers

RESPONSIBILITIES	RECOMMENDATIONS
• Provide conformity assessment services to OGS importers as per country-specific regulatory requirements • Stay informed of each country's regulatory requirements	• Accept VeraSol certificates and IEC TS 62257-9-5 test reports from ISO 17025 accredited laboratories as evidence of meeting IEC TS 62257-9-8 • Maintain ongoing communication with national standards bureaus to ensure CoCs are issued according to current regulations • Cultivate relationships and foster close communication with importers to facilitate effective conformity assessment • Engage with VeraSol's team of technical specialists to be well-informed about OGS products and to efficiently assess conformity in a consistent manner

Governments & Standards Bureaus

RESPONSIBILITIES	RECOMMENDATIONS
• Adopt internationally harmonized standards for OGS products • Implement appropriate and enforceable regulatory requirements for OGS products • Communicate importation requirements – including compulsory standards, import duties and VAT – to all stakeholders, especially the private sector	• Proactively inform the private sector and PVoC providers of importation requirements and applicable fiscal policies • Simplify regulatory requirements and streamline processes for testing and certification of components in OGS product kits to avoid overburdening companies that supply quality products • Liaise with customs agencies and private sector to harmonize HS classification of OGS products • Guide PVoC providers on required documentation, classification of product families, VeraSol certificate acceptance and other relevant requirements • Provide ongoing support such as a hotline for the PVoC companies to respond to their inquiries promptly • Participate in workshops with PVoC providers, public and private sector stakeholders to discuss bottlenecks in the process and how best to address them • Consider harmonizing PVoC processes with other countries to promote international trade and facilitate the importation of high-quality OGS products

Industry Associations

RESPONSIBILITIES	RECOMMENDATIONS
Support manufacturers and importers on the regulatory requirements, opportunities and promoting innovations	• Organize educational forums on the implications of the IEC quality standard on the OGS market • Liaise with standards bodies to advocate for regional harmonization of standards and PVoC processes to support the smooth flow of products in the regions • Promote harmonization of HS codes as well as pragmatic assessment of products and components for standards conformity, value-added tax (VAT) and import duties • Advocate/lobby relevant government agencies to revise PVoC requirements to address the issues highlighted by manufacturers and importers

Donors & Development Partners

RESPONSIBILITIES	RECOMMENDATIONS
Provide financial resources and technical assistance to the OGS stakeholders to improve the conformity assessment processes for OGS products	• Fund efforts to strengthen conformity assessment processes for OGS products and awareness creation to streamline the PVoC process better • Support standards bodies to further bolster the quality of products in the market through market surveillance programs and establishing or upgrading OGS test facilities • Provide support to national and regional bodies to harmonize regional OGS standards and PVoC processes • Engage with VeraSol to integrate best practices for quality assurance and conformity assessment into OGS interventions

VeraSol

As the administrator of the world's most recognized and trusted certification program for OGS products and as a key partner to governments and industry, VeraSol is committed to strengthening and streamlining conformity assessment. The table below outlines our responses to the valuable input received from manufacturers and proposes actions that VeraSol can take to address challenges linked to conformity assessment.

CHALLENGES	VERASOL ACTIONS
Lack of information on OGS conformity assessment and acceptance of VeraSol certificates	• Continue supporting governments to ensure that importers and PVoC providers have up-to-date regulatory requirements • Develop and distribute guidance materials to facilitate the more effective and consistent evaluation of documents submitted for conformity assessment, including advice on categorizing OGS products and determining which test reports and certificates are required • Improve awareness of the value and utilization of VeraSol certification for conformity assessment; inform PVoC providers of the comprehensive nature of IEC TS 62257-9-5, and IEC TS 62257-9-8 and that additional reports/certificates are not typically required
Lack of component specifications, which are needed for conformity assessment	• Explore the possibility of adding all components of individual products and product families in VeraSol certificates[8] • Issue practical guidance to PVoC providers on how system components are tested and evaluated and how VeraSol certificates can be used as part of conformity assessment
Component naming discrepancies	• VeraSol guides labs on using component names from the manufacturer-provided user manual and packaging or model numbers printed on the components. • Explore adjusting the testing coordination process such that manufacturers specify how they want components identified in the test report. VeraSol welcomes companies to request revisions to a test report after receiving it if they want to change component names.

[8] VeraSol certificates do not necessarily list all components that are part of a product or a family of products. We will look into the possibility of adding components to the VeraSol certificate if the test report for a product family also includes the components in the family. Under the current structure, listing all components on the test report will be a challenge, as these are not tested nor inspected by the laboratory technicians.

Kits that have been certified as part of a product family are not always accepted	• Engage with PVoC providers to help them understand how product families are tested and certified and how VeraSol Specifications Books can be used as part of the conformity assessment process
Time- and resource-intensive product certification	• Consider alternative certification pathways to reduce time and resources for test renewal to accommodate the sector's needs
Short duration of validity for VeraSol certification	• Carry out an updated assessment of certification and renewal test results. The pass rates and reasons for failure will be used to determine if an extension of the two-year validity of VeraSol product certification is justifiable[9] • Look into possible different options for renewing product certification
Language barriers	• VeraSol provides essential resources[xiii] in English, French and Chinese languages and will continue to expand our library of translated documents • VeraSol has developed Chinese language training materials for Shenzhen Technology University in China and will continue to seek opportunities to improve awareness and communication in other languages • Beginning in October 2021, VeraSol is distributing monthly newsletters in both English and Chinese
Inability to correct consumer-facing information before issuing final test reports	• Explore ways to empower laboratories to assess test reports for compliance with IEC TS 62257-9-8 • Consider potential mechanisms for allowing manufacturers to correct deficiencies in consumer-facing information before issuing final test reports

Conclusion

More and more countries are adopting IEC TS 62257-9-8 as a mandatory national standard to ensure consumers access high-quality off-grid solar (OGS) products. With several more countries expected to use Pre-export Verification of Conformity (PVoC) for imported OGS products, VeraSol's manufacturer survey and interviews

[9] In 2018, VeraSol (named Lighting Global Quality Assurance at that time), carried out an evaluation to determine if an increased certification validity period was warranted. Analysis of test results from 2010-2017 suggested that the two-year duration of product certification was still appropriate. The assessment showed that in 2016 and 2017 the majority of products met the Quality Standards only after correcting for non-compliance. The same was seen for testing to renew product certification. The reasons that products failed renewal testing included insufficiencies in truth-in-advertising, consumer-facing information, performance reporting, product quality and durability.

regarding PVoC provide timely and relevant guidance for the sector. This manufacturer feedback has been valuable in informing VeraSol's efforts to improve our certification program, better collaborate with the industry, and help stakeholders strengthen their roles and actions within the conformity assessment process. VeraSol is committed to engaging with governments, PVoC providers, the private sector and development partners to further improve PVoC processes in a way that better serves OGS markets, consumers and energy access objectives.

We encourage all stakeholders in the PVoC process to consider the recommendations provided in this document, take advantage of VeraSol's resources, and contact our team of experts for further guidance and support.

Endnotes

[i] IEC quality standards for pico-solar products and SHS kits (IEC TS 62257-9-8) available for purchase at IEC Webstore: https://webstore.iec.ch/publication/62431

[ii] A summary of the requirements in IEC TS 62257-9-8 is available on the VeraSol website: https://verasol.org/publications/summary-of-requirements-in-iec-ts-62257-9-82020

[iii] IEC test methods for pico-solar products and SHS kits (IEC TS 62257-9-5) available for purchase at IEC Webstore: https://webstore.iec.ch/publication/59747

[iv] Visit CLASP Policy Resource Center for policy information: https://cprc-clasp.ngo/policies

[v] The benefits of off-grid solar standards harmonization for governments and other stakeholder groups are summarized in VeraSol Technical Note 25: https://verasol.org/publications/benefits-of-harmonizing-test-quality-standards

[vi] Source: https://www.iec.ch/conformity-assessment/what-conformity-assessment

[vii] Additional information about PVoC for off-grid solar products is available from VeraSol: https://verasol.org/publications/pre-shipment-conformity-assessment-for-pico-pv-products

[viii] Find more information on VeraSol website here: https://verasol.org/

[ix] See ISO website for more information on the standard: https://www.iso.org/ISO-IEC-17025-testing-and-calibration-laboratories.html

[x] Visit VeraSol Product Database to explore Certified Products: https://data.verasol.org/

[xi] Refer VeraSol Framework for Testing Product Families for more information: https://verasol.org/publications/framework-for-testing-product-component-families

[xii] Refer VeraSol Consumer Information, Performance Reporting, and Component Labeling Requirements for more information: https://verasol.org/publications/information-requirements

[xiii] Visit VeraSol publication library: https://verasol.org/publications/&?

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VeraSol Quality Assurance

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