Webinar tools

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We are talking now... If you can’t hear audio see item 1 to the left.
Webinar Guidelines

1. **Presentation Mode:** Muted audio from participants during presentation times to prevent distractions.

2. **Moderated Chat:** Direct questions and comments to the @questions user in the chat window. *We will pause to address questions several times during the webinar—indicated by icon.*

3. **Expanded Voice Comments:** We may unmute audio in cases where a question is too long or complex for the chat window.
Quality Assurance for Off-Grid Lighting
Updating the Lighting Global Minimum Quality Standards and Performance Targets

Stakeholder Outreach Webinar
July 10th 2013 1 PM GMT
Presenting Today

Dr. Arne Jacobson
Lighting Global Quality Assurance Lead
Based at Schatz Energy Research Center at Humboldt State University in Arcata, California, USA

Peter Alstone
Lighting Global Quality Assurance Team
Based in the San Francisco Bay Area in California, USA
Where we are now:


Deadline for Comments extended from July 19th to Friday, August 2nd, 2013

Revisions go into effect January 1, 2014. Existing products maintain status until test results expire (2 years from receipt of results).
Agenda

• **Background** on Lighting Global QA
• **Summary of proposed changes to Standards and Targets**
• **How to engage** with the updates process
Lighting Global Quality Assurance Program

- Joint initiative of IFC and World Bank; supports Lighting Africa and Lighting Asia
- **Testing and verification program** for LED-based off-grid lighting products (including pico-PV systems)
- QA framework recently institutionalized through the International Electrotechnical Commission (IEC) (TS 62257-9-5, Ed. 2.0)
## Lighting Global QA Program Highlights (2009 to 2013)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>QA framework including test methods actively in use (and adopted by IEC)</td>
</tr>
<tr>
<td>4</td>
<td>active test labs (Kenya, California/US, New York/US, Germany) + two more in development (Senegal, India)</td>
</tr>
<tr>
<td>100+</td>
<td>products tested under the program</td>
</tr>
<tr>
<td>50+</td>
<td>products have met quality standards according to tests</td>
</tr>
<tr>
<td>&gt;1.4M</td>
<td>quality assured lights sold in Africa as of Dec. 2012 (sales in Asia also significant)</td>
</tr>
</tbody>
</table>
Lighting Global QA Program Elements

**Standardized Testing Methodologies (multi-level)**

QTM = quality test method; ISM = initial screening method

**Minimum Quality and Durability Standards**

Metrics and thresholds for ensuring truth-in-advertising and minimum product quality and durability

**Program Specific Performance Targets**

Program-specific performance levels that go beyond minimum standards; used to determine access to consumer-facing program services

**Standardized Specification Sheets**

Standardized framework for reporting verified performance for products that meet minimum quality standards; available at www.lightingafrica.org/specs
# Standards vs. Targets

Complementary benchmarks with different roles:

<table>
<thead>
<tr>
<th>Role</th>
<th>Protection</th>
<th>A general guideline for the minimum performance consumers expect from basic, low cost products.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope</td>
<td>Truth-in-advertising, quality, and durability</td>
<td>Product service levels and features</td>
</tr>
<tr>
<td>Lighting Africa and Lighting Asia Use</td>
<td>Baseline for qualification for any services. Critical importance.</td>
<td>Qualify for participation in consumer-facing campaigns.</td>
</tr>
</tbody>
</table>

**Standards** vs. **Targets**

- **Standards**: Truth-in-advertising, quality, and durability
- **Targets**: Product service levels and features

**Role**

- **Protect consumers** from false advertising and early product failure.
Key Principles for Setting Standards & Targets

1) Ensure that **end-user perspectives inform decisions**, along with input from other key stakeholders.

2) Seek an appropriate **balance between quality and affordability**.

3) Revise pass thresholds regularly to keep up with technology and market trends.

4) Maintain a predictable, stable framework so that stakeholders know what to expect.
# Summary of Quality Standards Aspects that remain Unchanged

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Baseline Standard (Unchanged)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truth in Advertising</td>
<td>All specifications and claims that are subject to testing pass a test of accuracy.</td>
</tr>
<tr>
<td>AC-DC Charger Safety</td>
<td>Included chargers must carry approval from a consumer-electronics safety regulator.</td>
</tr>
<tr>
<td>Battery Protection</td>
<td>Batteries protected by appropriate controller to protect product and user.</td>
</tr>
<tr>
<td>Physical Ingress</td>
<td>IP 5x (fixed outdoor), IP 2x (others)</td>
</tr>
<tr>
<td>Range of durability tests</td>
<td>5 out of 6 pass with no dangerous failures.</td>
</tr>
<tr>
<td>Soldering and Electronics Quality</td>
<td>Pass a visual inspection.</td>
</tr>
<tr>
<td>Aspect</td>
<td>Proposed Change</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lumen Maintenance</td>
<td>Increase requirement from L70 @ 2000 hrs to L85 @ 2000 hrs.</td>
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<tr>
<td>Battery Durability</td>
<td>(New) Batteries must pass storage test that simulates deep discharge in supply chain</td>
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<tr>
<td>Hazardous Materials (battery only)</td>
<td>(New) Ban batteries with cadmium or mercury</td>
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<tr>
<td>Ingress Protection</td>
<td>Water ingress requirements extended to PV module junction box (closes loophole)</td>
</tr>
<tr>
<td>Warranty</td>
<td>Warranty requirement is one year (was 6 months)</td>
</tr>
</tbody>
</table>
Strengthen Lumen Maintenance

**Baseline:** L70 @ 2,000 Hours

**Update:** L85 @ 2,000 Hours (The “shortcut” of L95 at 1000 hrs remains in effect).

**Rationale:** Lumen Maintenance is better understood by the industry now and few good-quality products fall below this threshold. **Longer product lifetimes are important for sustainability.**

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[New] Battery Storage Durability Test

**Baseline:** No test of battery durability.

**Update:** 5 out of 6 samples pass a storage durability test.

**Rationale:** Some batteries fail quickly, leading to loss of service. These tests are designed to detect batteries that are defective from the time of manufacture or that are damaged due to deep discharge during time spent in the supply chain.

© Bruno Déméocq/Lighting Africa/2012.
[New] Hazardous Materials Ban

**Baseline:** No ban on particular materials.

**Update:** In batteries, Mercury and Cadmium should not be present at levels greater than trace amounts.

**Rationale:** Cadmium is a potent neurotoxin and the hazardous waste collection supply chain in much of the developing world is functionally non-existent. This ban is a precautionary measure.
External PV module Water Protection

**Baseline:** Loophole would allow external PV modules to only pass IP x1 (light rain)

**Update:** External PV module junction boxes and electrical connections must be resistant to permanent outdoor exposure.

**Rationale:** External PV modules are meant for permanent outdoor use and should be protected from early failure.

© Bruno Déméocq/Lighting Africa/2012.
Extended Warranty Requirement

**Baseline:** 6-month consumer-facing warranty required

**Update:** Extended to one year.

**Rationale:** This reflects market trends and extends protection to consumers from early failure.

The warranty requirement is a catch-all for durability and quality issues that fall outside the scope of testing. It reduces the complexity and cost of QA compliance.
## Open floor for questions on Standards

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## Summary of Revised Lighting & Run Time Performance Target Requirements

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<th>Performance Target Type</th>
<th>Existing Requirement</th>
<th>New Proposed Requirement (draft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light output (room lighting)</td>
<td>20 lumens</td>
<td>25 lumens</td>
</tr>
<tr>
<td>Light output (task)</td>
<td>≥ 25 lux over 0.1 m² area*</td>
<td>≥ 50 lux over 0.1 m² area*</td>
</tr>
<tr>
<td>Run time (solar charged)</td>
<td>4 hours per day</td>
<td>5 hours per day</td>
</tr>
<tr>
<td>Run time (grid AC charged)</td>
<td>8 hours per full charge</td>
<td>10 hours per full charge</td>
</tr>
</tbody>
</table>

*lamp positioned 0.75 meters from source or placed on task surface as per normal use*
## Considerations for Lighting and Run Time Performance Target Requirements

<table>
<thead>
<tr>
<th>End-user perspectives</th>
<th>We use consumer oriented <strong>focus groups</strong> to identify preferences.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tech &amp; market trends</td>
<td>We track how LED technology performance and cost trends influence <strong>ability to pass.</strong></td>
</tr>
<tr>
<td>Quality-Affordability Balance</td>
<td>We ensure that <strong>pass thresholds are achievable by affordable products</strong> for target population</td>
</tr>
<tr>
<td>Stable, predictable framework</td>
<td>We give manufacturers <strong>ample time to meet new requirements</strong></td>
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# Detailed Process

<table>
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<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2nd</td>
<td><strong>Deadline for Comments</strong></td>
</tr>
<tr>
<td></td>
<td><a href="www.lightingafrica.org/qa-consultation-outcome">www.lightingafrica.org/qa-consultation-outcome</a></td>
</tr>
<tr>
<td>Late August</td>
<td>Announcement of new framework and policy. (Includes responses to comments and summary of anonymized comments on process).</td>
</tr>
<tr>
<td>Early Sept.</td>
<td>Webinar to discuss outcomes and logistics for implementing updated framework.</td>
</tr>
<tr>
<td>Jan 1st 2014</td>
<td>New requirements in effect.</td>
</tr>
</tbody>
</table>
Thank you for participating
Our donor partners

- The Africa Renewable Energy and Access Grants Program (AFREA)
- The Asia Sustainable and Alternative Energy Program (ASTAE)
- The Energy Sector Management Assistance Program (ESMAP)
- The Global Environment Facility (GEF)
- The Good Energies Inc.
- Italy
- Luxembourg
- The Netherlands
- Norway
- The Public-Private Infrastructure Advisory Facility (PPIAF)
- The Renewable Energy and Energy Efficiency Partnership (REEEP)
- The United States.
Lighting Global Experience: a range of lumen maintenance results

- L85
- L70

Percentage of initial output vs. Hours of continuous operation

Results from ~ 60 products
Lumen Maintenance “Shortcut”

Analysis of product test data for range of products.

Only ~1% of products that pass L95@1000 hours will fail L85@2000 hours – an acceptable “false positive” rate.
Lighting Global Used Focus Groups in Five Africa Countries and Two India States to Capture End-User Perspectives About Light Level Expectations

- **Africa focus groups**: 34 sessions involving 284 people from off-grid areas in Ghana, Kenya, Mali, Senegal, and Tanzania
- **India focus groups**: 12 sessions involving 116 people from off-grid areas in the states of Bihar and Odisha
- **Methods**: sessions at night in dark room; calibrated light source adjusted upward incrementally; participants asked to indicate when they would be satisfied with light from a low cost (~ $US 12), QA certified lamp
Result: Approximately **90% of India participants** and **>95% of Africa participants** would be satisfied with a low cost (~$12 US) lamp for ambient room lighting if it produced at least **25 lumens**.
Summary of Focus Group Session Results for Task Lighting Illuminance (lux) Expectations

Result: Approximately **90% of Africa participants** and **>95% of India participants** would be satisfied with a low cost (~$12 US) lamp for task lighting if it produced at least **50 lux over a 0.1 m² area**.
What is the cost implication of the proposed new Lighting Global Performance Target?

• The combined changes to the performance targets represent a significant increase in service (80% increase for room lighting and 250% increase for task lighting)

• This has cost implications, but LED technology and price trends should enable products to reach target without increasing prices

• Manufacturers have time to meet the new requirements, and LEDs will be even better and cheaper by then
Historical and projected LED package efficacy and price.

Total effect of higher lumen efficacy & lower prices since 2010 is 300+% gain

LED cost / performance trends translate to big cost savings

Cost components for a 120 lumen product that provides 4 hours of light a day

<table>
<thead>
<tr>
<th></th>
<th>Efficacy (lm/W)</th>
<th>Unit Cost ($/klm)</th>
<th>Power req. (W)</th>
<th>System cost by component ($US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CFL</td>
<td>40</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2009 LED</td>
<td>40</td>
<td>80</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2012 LED</td>
<td>100</td>
<td>10</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

LED performance gains and price declines should allow increased performance and/or lower prices.
Lamps that Cost $US 20 Should be Affordable to Most Rural Households in Africa and South Asia

Most rural households in Sub-Saharan Africa can purchase products in the $US 10 to $US 20 range for well under 20 days of income. This may be a reasonable target price range for lowest cost products that meet the Lighting Global Performance Targets. Data from India give a similar result.
Lighting Global Quality Assurance
Key Partners and Organizations

Off-Grid Lighting QA Partners

- Lighting Global
- U.S. Department of Energy
- IEC
- Navigant
- GIZ
- GLA
- Fraunhofer

Test Laboratory Network

- Fraunhofer ISE
- Lighting Research Center
- Rensselaer
- Schatz Energy Research Center
- CERER of Senegal
- UNIvERsity of Nairobi

We expect more labs to join now that IEC test methods have been adopted.