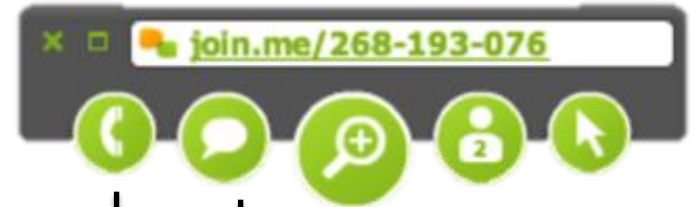


Webinar tools

Use the join.me toolbar →

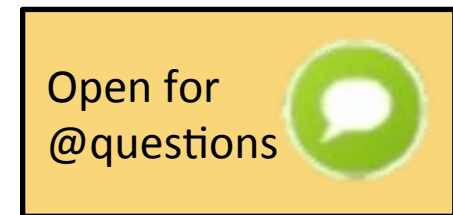


- 1) Make an audio connection.** The basic join.me connection only shows video of our screen. To hear us you need to connect via internet (by downloading the join.me desktop app – this will work like skype) or dial one of the access phone lines.
- 2) Use chat to engage during the webinar.** We will mute the participants during some parts of the webinar and you can use chat to get our attention or ask a question.

**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



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Based in the San Francisco Bay Area in
California, USA

Where we are now:

Draft document with proposed revisions available at
www.lightingafrica.org/qa-consultation-outcome

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

Open for
@questions



- **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)

1

QA framework including test methods actively in use
(and adopted by IEC)

4

active test labs (Kenya, California/US, New York/US,
Germany) + two more in development (Senegal, India)

100+

products tested under the program

50+

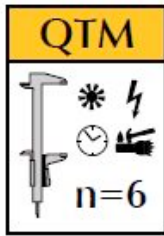
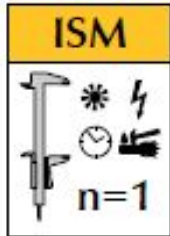
products have met quality standards according to tests

>1.4M

quality assured lights sold in Africa as of Dec. 2012
(sales in Asia also significant)



Lighting Global QA Program Elements



Standardized Testing Methodologies (multi-level)

QTM = quality test method; ISM = initial screening method



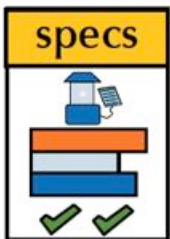
Minimum Quality and Durability Standards

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

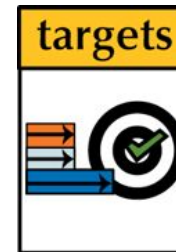
Standardized framework for reporting verified performance for products that meet minimum quality standards; available at www.lightingafrica.org/specs

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Standards vs. Targets

Complementary benchmarks with different roles:



Scope	Truth-in-advertising, quality, and durability	Product service levels and features
Role	Protect consumers from false advertising and early product failure.	A general guideline for the minimum performance consumers expect from basic, low cost products.
Lighting Africa and Lighting Asia Use	Baseline for qualification for any services. Critical importance.	Qualify for participation in consumer-facing campaigns.

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



Aspect	Baseline Standard (Unchanged)
Truth in Advertising	All specifications and claims that are subject to testing pass a test of accuracy.
AC-DC Charger Safety	Included chargers must carry approval from a consumer-electronics safety regulator.
Battery Protection	Batteries protected by appropriate controller to protect product and user.
Physical Ingress	IP 5x (fixed outdoor), IP 2x (others)
Range of durability tests	5 out of 6 pass with no dangerous failures.
Soldering and Electronics Quality	Pass a visual inspection.

Summary of Proposed Changes to Lighting Global Minimum Quality Standards



Aspect	Proposed Change
Lumen Maintenance	Increase requirement from L70 @ 2000 hrs to L85 @ 2000 hrs.
Battery Durability	(New) Batteries must pass storage test that simulates deep discharge in supply chain
Hazardous Materials (battery only)	(New) Ban batteries with cadmium or mercury
Ingress Protection	Water ingress requirements extended to PV module junction box (closes loophole)
Warranty	Warranty requirement is one year (was 6 months)



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.**



© Bruno Déméocq/Lighting Africa/2012.



[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.



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.



© Bruno Déméocq/Lighting Africa/2012.

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Open floor for questions on Standards

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Summary of Revised Lighting & Run Time Performance Target Requirements

Performance Target Type	Existing Requirement	New Proposed Requirement (draft)
Light output (room lighting)	20 lumens	25 lumens
Light output (task)	≥ 25 lux over 0.1 m ² area*	≥ 50 lux over 0.1 m ² area*
Run time (solar charged)	4 hours per day	5 hours per day
Run time (grid AC charged)	8 hours per full charge	10 hours per full charge

*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

End-user perspectives

We use consumer oriented **focus groups** to identify preferences.

Tech & market trends

We track how LED technology **performance and cost trends** influence **ability to pass**.

Quality-Affordability Balance

We ensure that **pass thresholds are achievable by affordable products** for target population

Stable, predictable framework

We give manufacturers **ample time to meet new requirements**

Summary of Revised Lighting & Run Time Performance Target Requirements

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@questions



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Detailed Process

August 2nd

Deadline for Comments

www.lightingafrica.org/qa-consultation-outcome

Late August

Announcement of new framework and policy.
(Includes responses to comments and summary of anonymized comments on process).

Early Sept.

Webinar to discuss outcomes and logistics for implementing updated framework.

Jan 1st 2014

New requirements in effect.

Thank you for participating

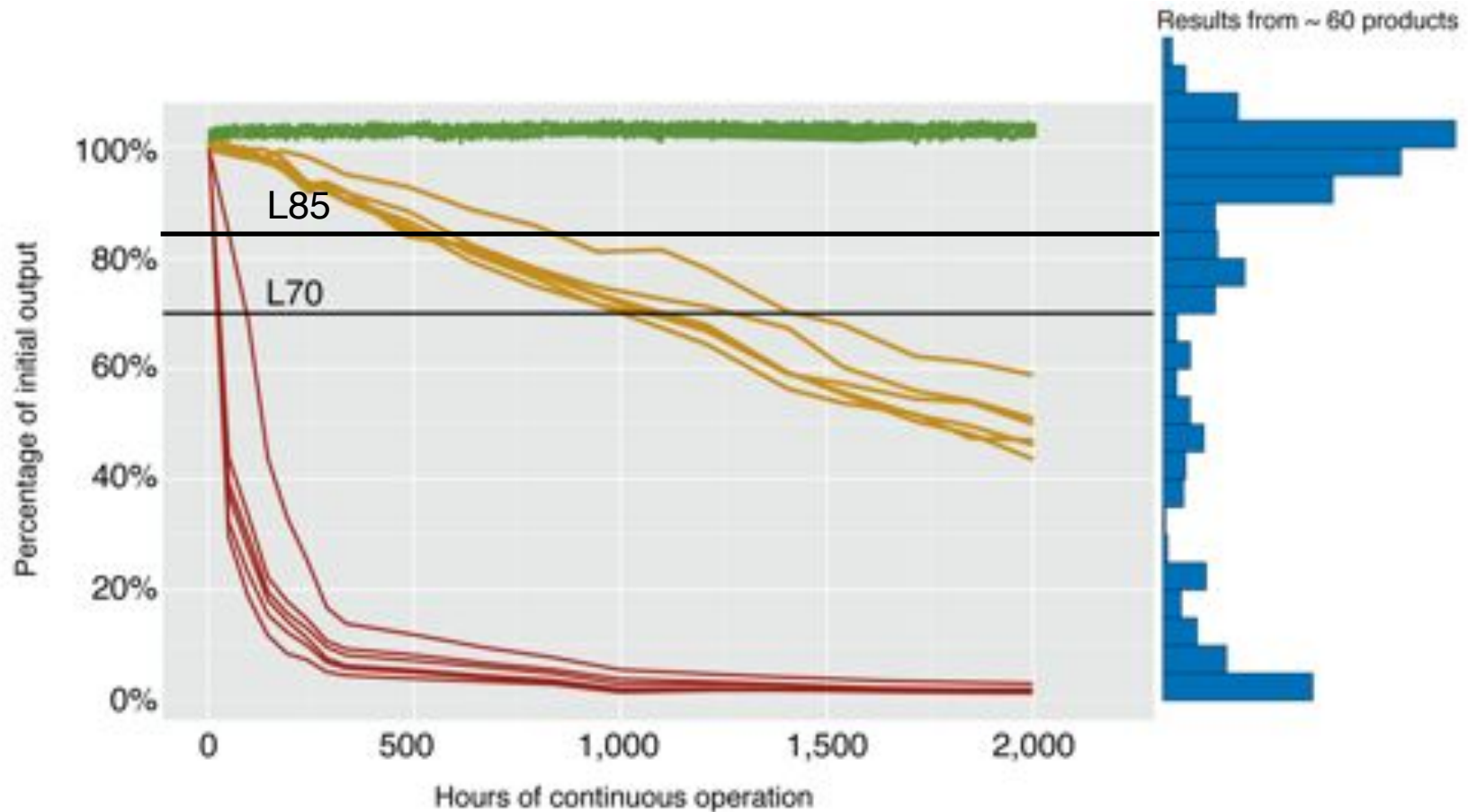
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Our donor partners

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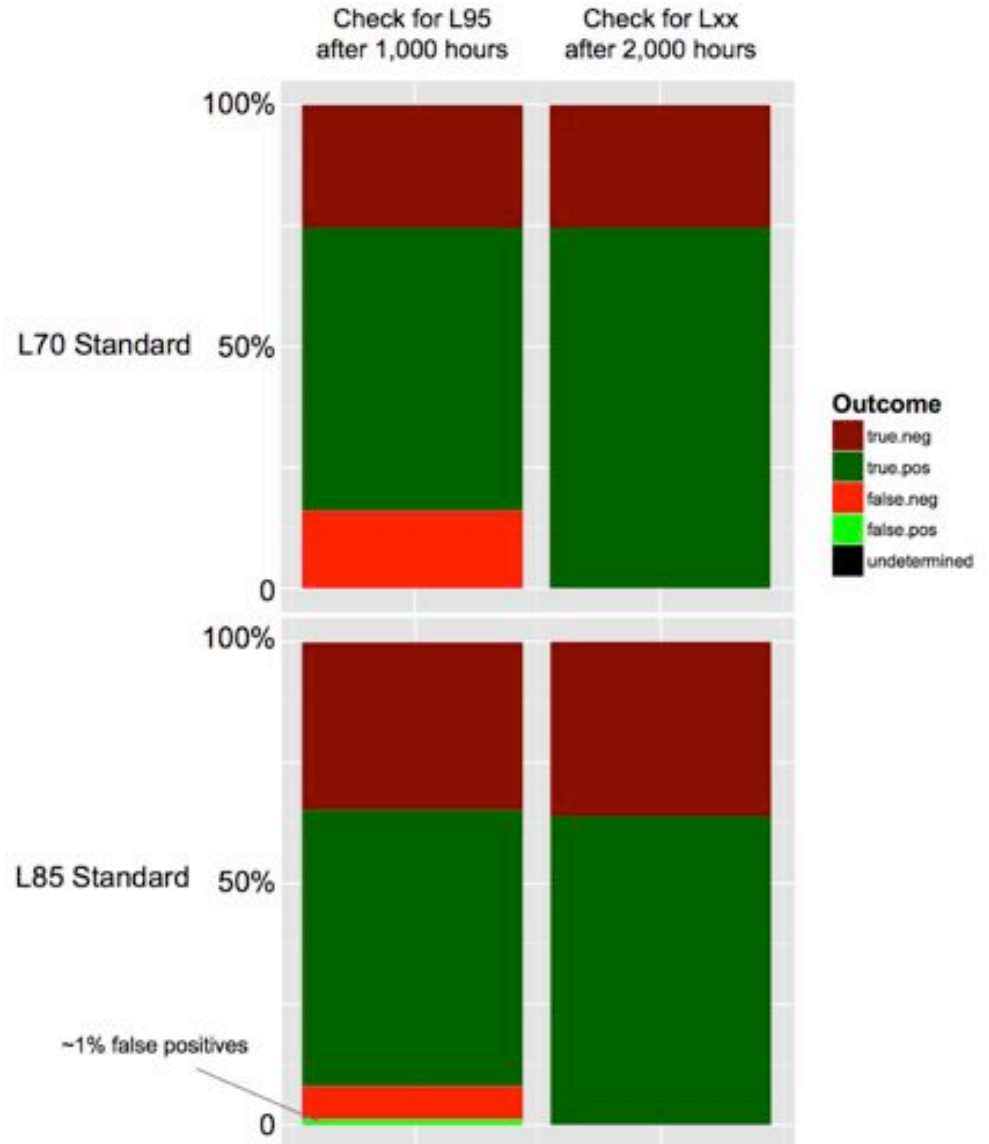
Lighting Global Experience: a range of lumen maintenance results



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.

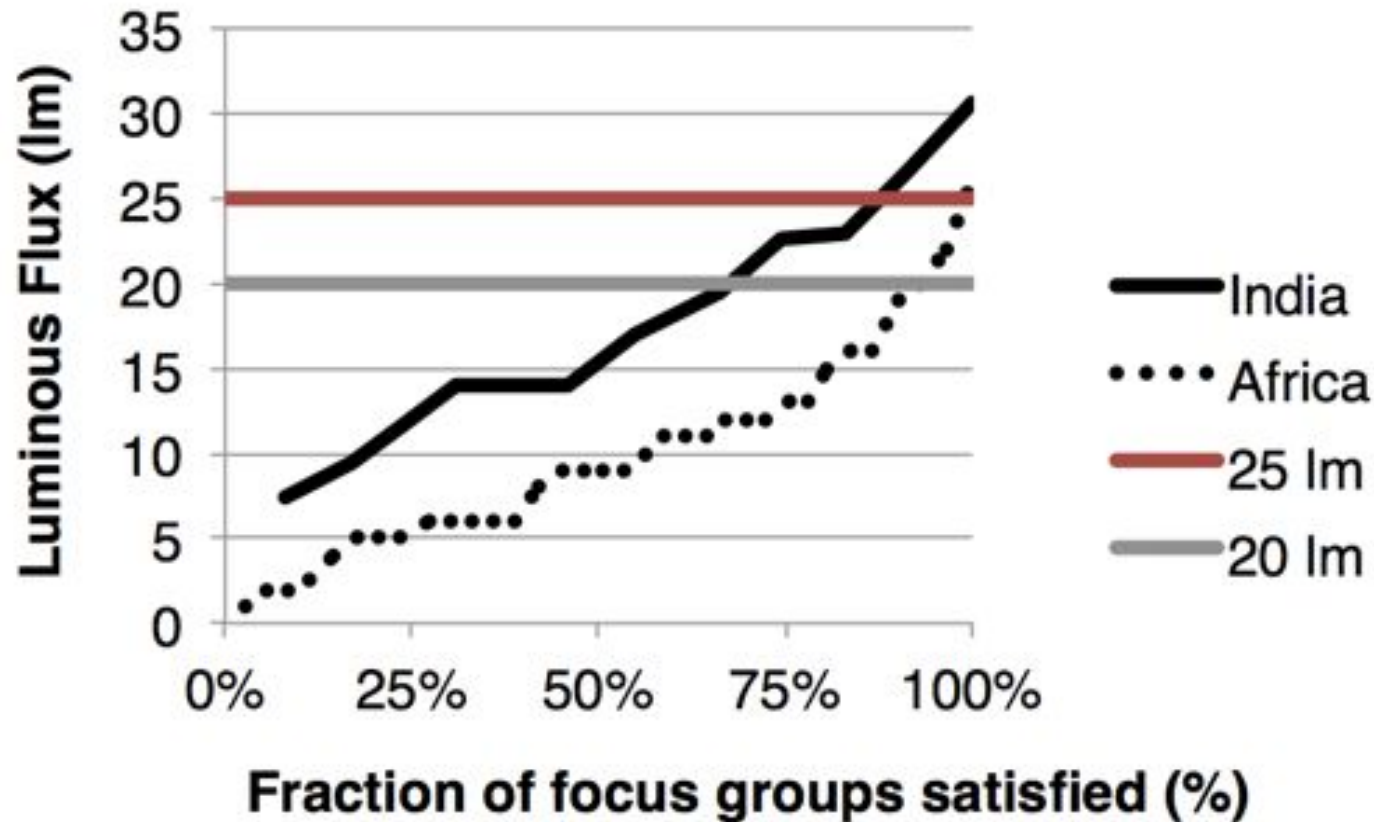


Lighting Global Used Focus Groups in Five Africa Countries and Two India States to Capture End-User Perspectives About Light Level Expectations

- **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

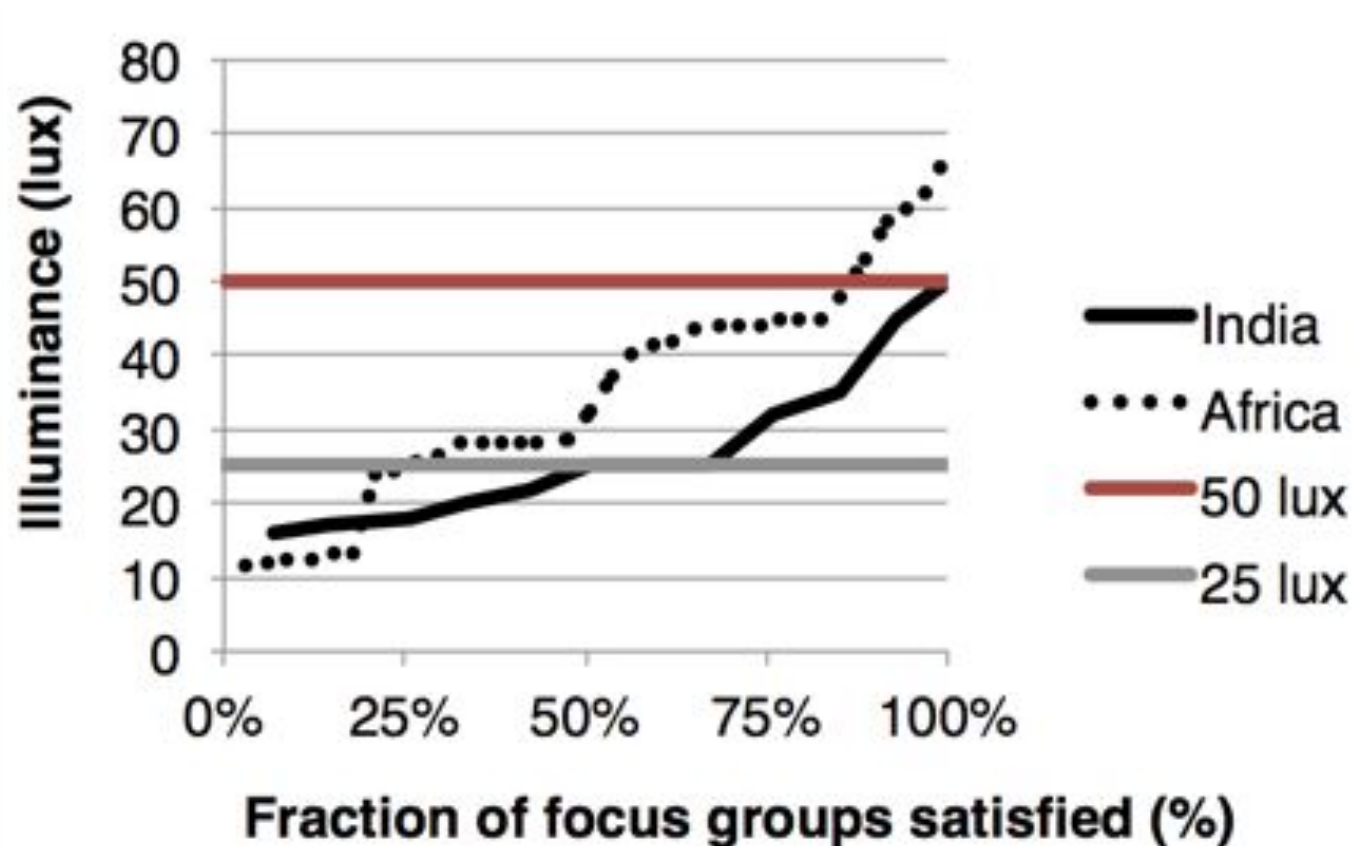


Summary of Focus Group Session Results for Luminous Flux (**lumen**) Expectations



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**.

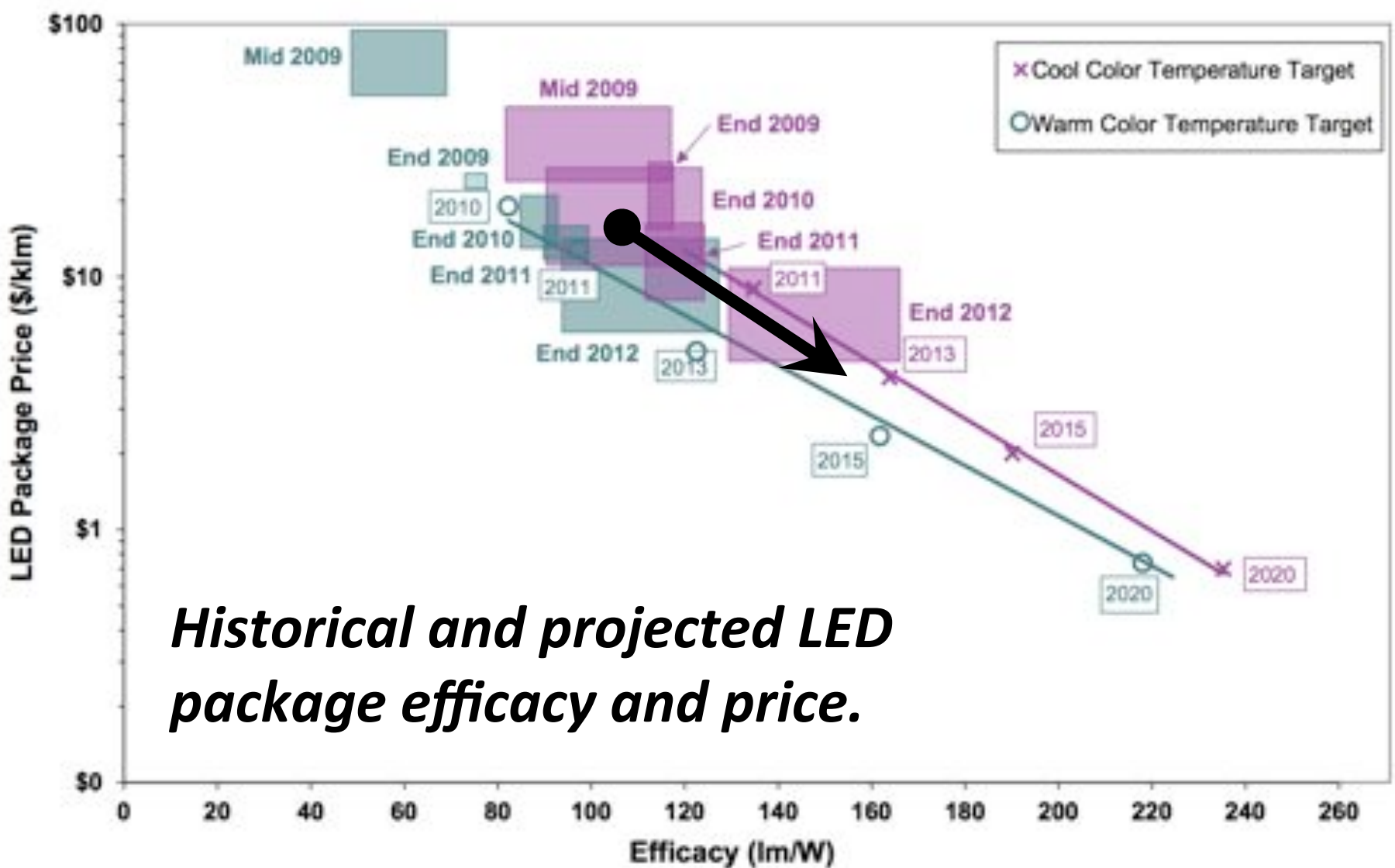
Summary of Focus Group Session Results for Task Lighting Illuminance (**lux**) Expectations



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.

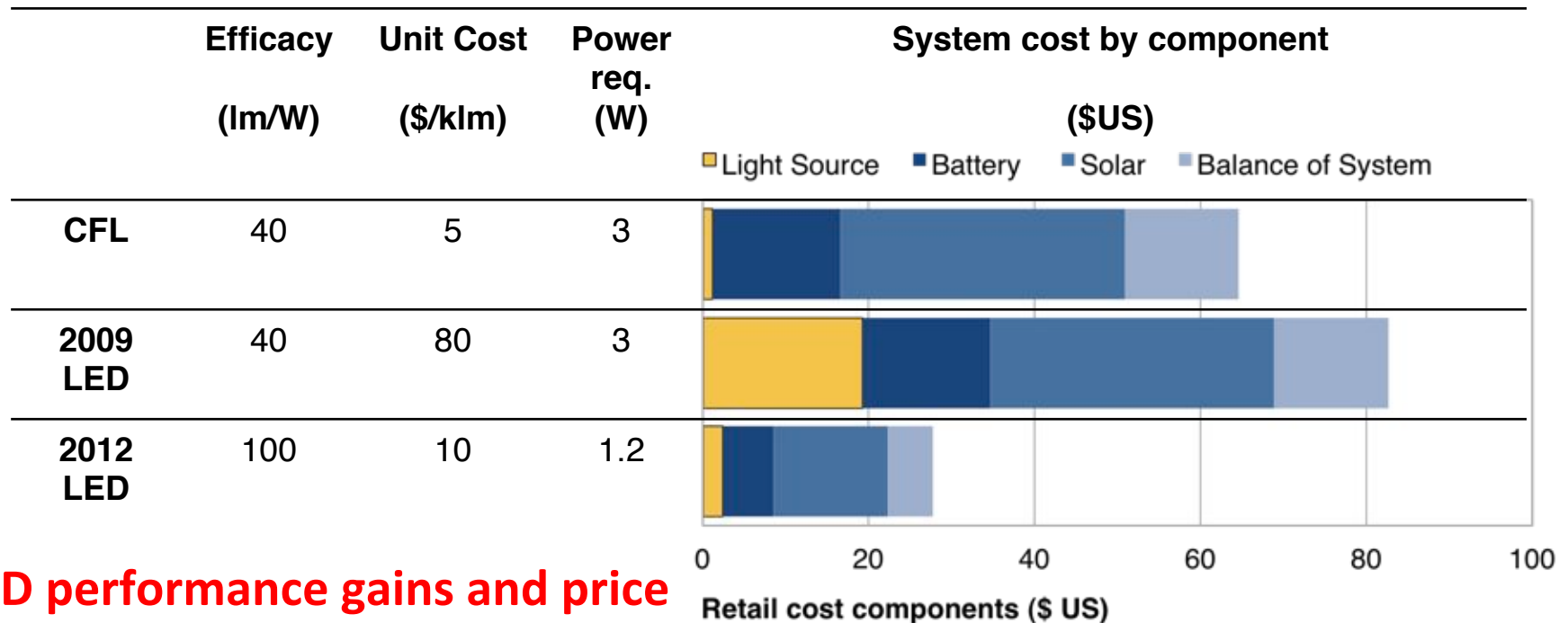
PRICE-EFFICACY TRADEOFF FOR LED PACKAGES AT 35 A/CM² AND 25 °C

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

Copied with superficial edits from 2013 USDOE Multi-year program plan for Solid State Lighting (http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2013_web.pdf)

LED cost / performance trends translate to big cost savings

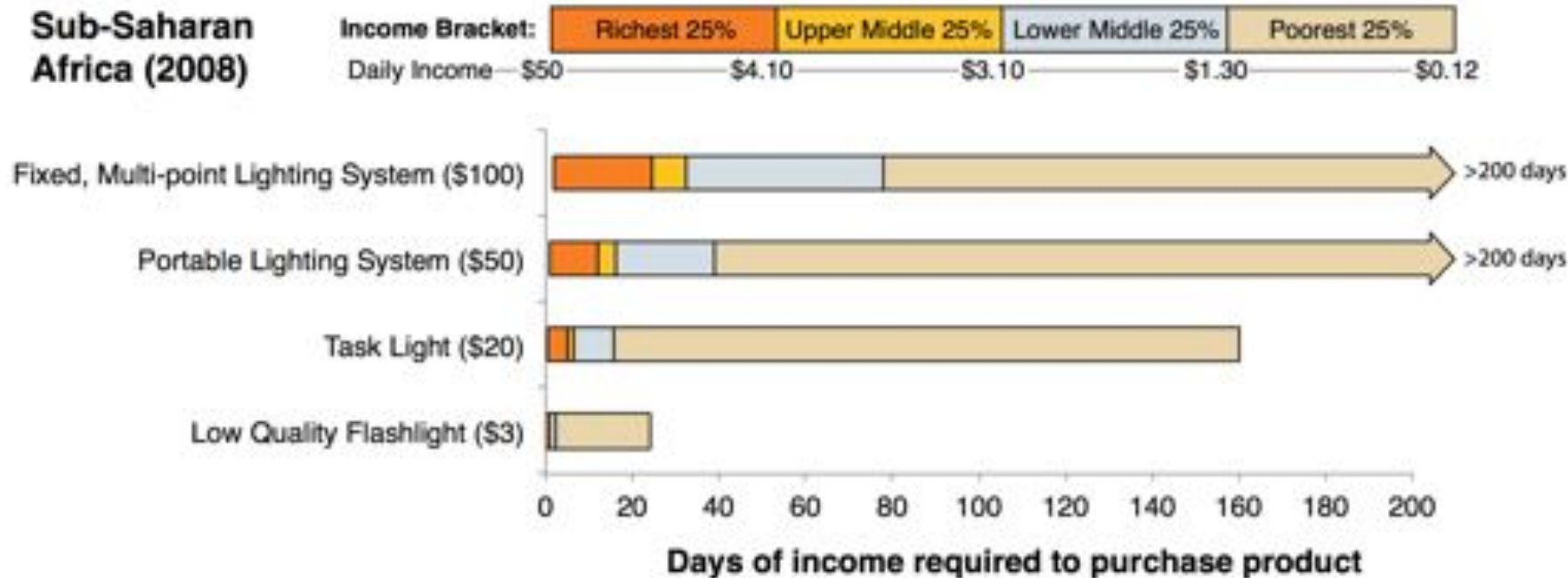
Cost components for a 120 lumen product that provides 4 hours of light a day



Assumptions: 120 lumens for 4 hours each day, solar cost \$5/W, solar resource 5 kWh/m², battery cost \$0.3/Wh, BOS cost \$2/W, 70% derating

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

Test Laboratory Network



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