Finding the sweet spot: identifying affordable quality solar products for the last mile

Webinar – 10th September 2020
Agenda

- Introduction (5 minutes)
- Presentation of key findings (20 minutes)
- Panel discussion (20 minutes)
- Open Q&A (10 minutes)
Presentation of key findings
Last mile distributors (LMDs) struggle to identify high quality, affordable off-grid solar (OGS) products at the last mile

LMDs’ choice between QV vs non-QV products in terms of quality and affordability*

*Not representative of the market split of QV and non-QV products; merely intended as an illustration of one of LMDs’ procurement challenges
This report’s objective is to help LMDs tackle this challenge, specifically by providing insights on two key questions:

1. Are there products in the market today that are both quality* and affordable** at the last mile, i.e. products in the price-quality sweet spot?

2. How could these be identified?

*Meeting Lighting Global Quality Standards
**I.e. that can be sold on cash to end-users at 25-50 per cent cheaper price-points than leading QV products in the market with similar specifications (e.g. battery size, panel size, number of light points, etc.), and a valid two-year warranty.
To do this, we followed a funnelled process to identify and test best-selling non-QV products in the Kenyan market.

Funnelled product identification and testing process

Field survey & desk research | Quality/price filtering | ISM* pre-tests | ISM* full tests

100 products | 18 products | 8 products

* Scope of products limited to ‘pico products’ (<10Wp panels) sold on cash
**Initial Screening Method (ISM), conducted in partnership with VeraSol
3 key insights
1. There are 50 shades of grey in the non-QV OGS market: the non-QV OGS market includes products with all levels of performance.

*SL - solar lantern. MLS – multi-light system
2a. The cost of tweaking some of these products to meet the standards would add just 1-5% to the product’s FOB* price

Estimated cost of tweaks for MLS 2** to meet Lighting Global Quality Standards

Total cost of tweaks to reach standards: $0.2-0.51
(1-5% of product’s retail price)

* FOB – Free on Board, i.e. the price of the product before shipping expenses
** Multi-light system deemed close to meeting the Lighting Global Quality Standards
2b. The price-quality sweet spot exists: non-QV products are emerging with the potential to meet the standards at competitive prices

Comparison of cash-sales recommended retail price (RRP) for comparable QV and the tested non-QV multi-light systems (two-to-four light points, with mobile phone charging)

Products are compared based on their measured battery capacity, used as the best available proxy to compare similar products. Sample sizes: non-QV products = 11 (including 2 sweet spot products); QV products sample size = 4. Sources: GDC research and quality testing (for detailed sources please see the full report).
3. Customers and distributors may be taking a stab in the dark, as they seem unable to identify sweet spot products

Best-selling non-QV products ≠ Products meeting the Lighting Global Quality Standards

Is this due to
- Inability to identify quality?
- Low expectations of quality?
- Choosing price over quality?
- Other?
Panel discussion
Our panellists

Chris Carlsen, Technical and Policy Expert

Natalie Balck, Head of Projects and Partnerships

Ogwal Joseph, Founder and CEO

Drew Corbyn, Head of Performance and Investment
Thank you!

https://globaldistributorscollective.org/research-and-insights
GDC@practicalaction.org.uk
Appendix
# Specifications of products put through full ISM testing

<table>
<thead>
<tr>
<th>Product</th>
<th>Battery type</th>
<th>Measured battery capacity (Ah)</th>
<th>Panel size (Wp)</th>
<th>Number of light points</th>
<th>Mobile phone charging</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL 1</td>
<td>Li-ion</td>
<td>2,31</td>
<td>2</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>SL 2</td>
<td>SLA</td>
<td>3,46</td>
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<td>Yes</td>
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<tr>
<td>SL 3</td>
<td>SLA</td>
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<td>3</td>
<td>1</td>
<td>Yes</td>
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<tr>
<td>MLS 1</td>
<td>Li-ion</td>
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<td>5</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>MLS 2</td>
<td>Li-ion</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>Yes</td>
</tr>
<tr>
<td>MLS 3</td>
<td>SLA</td>
<td>2,39</td>
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<tr>
<td>MLS 4</td>
<td>SLA</td>
<td>2,68</td>
<td>3</td>
<td>4*</td>
<td>Yes</td>
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<tr>
<td>MLS 5</td>
<td>SLA</td>
<td>4,06</td>
<td>3</td>
<td>4*</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*one of these light points is an independent torch
Comparison of cash-sales recommended retail price (RRP) for comparable QV and the tested non-QV solar lanterns (one light point, with mobile phone charging)

Products are compared based on their measured battery capacity, used as the best available proxy to compare similar products; other metrics of comparison, such as available daily electrical energy (Watt-hour/day), were not available. Non-QV products are selected from the 18 products that were put through ISM pre-tests and ISM full tests; sample size = 6 (including 1 sweet spot product). RRP for non-QV products are estimated based on field survey data; RRP for sweet spot products are estimated based on Hystra modelling; battery capacity is based on ISM testing results. QV products have been selected based on a) leading QV brands in Kenya, b) product specifications and c) available data; sample size = 8. RRP were estimated based on wholesalers’ data and consultations with manufacturer representatives; battery sizes are based on specification sheets on the Lighting Global website (soon to be integrated with the VeraSol website).
Comparison of cash-sales RRP for solar lanterns with 2-2.6 Ah batteries and 2-3 Wp PV-modules with one light point and mobile phone charging

<table>
<thead>
<tr>
<th>Product Specifications</th>
<th>SL1</th>
<th>NonQV1</th>
<th>QV1</th>
<th>QV2</th>
<th>QV3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery capacity (Ah)</td>
<td>2.31</td>
<td>2</td>
<td>2.2</td>
<td>2.4</td>
<td>2.6</td>
</tr>
<tr>
<td>Battery type</td>
<td>Li-ion</td>
<td>SLA</td>
<td>Li-ion</td>
<td>Li-ion</td>
<td>Li-ion</td>
</tr>
<tr>
<td># light points</td>
<td>1</td>
<td>“1 LED” &amp; “32 LEDs” options</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Panel size (Wp)</td>
<td>2</td>
<td>3</td>
<td>2.3</td>
<td>2</td>
<td>2.4</td>
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<tr>
<td>Mobile phone charging</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

- QV product
- Sweet spot product
- Removed after pre-tests
- Non-QV products that underwent full ISM testing
- Non-QV products that underwent ISM pre-tests only
Comparison of cash-sales RRP for multi-light systems with 3.3-6Ah batteries and 3-10W PV-modules with 3-4 light points and mobile phone charging

<table>
<thead>
<tr>
<th>Product specs</th>
<th>MLS 5</th>
<th>NonQV2</th>
<th>MLS 2</th>
<th>MLS 1</th>
<th>NonQV3</th>
<th>QV4</th>
<th>QV5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery capacity (Ah)</td>
<td>4,06</td>
<td>4,54</td>
<td>4</td>
<td>5,4</td>
<td>3,61</td>
<td>3,3</td>
<td>6</td>
</tr>
<tr>
<td>Battery type</td>
<td>SLA</td>
<td>SLA</td>
<td>Li-ion</td>
<td>Li-ion</td>
<td>SLA</td>
<td>Li-ion</td>
<td>Li-ion</td>
</tr>
<tr>
<td># light points</td>
<td>3 + torch</td>
<td>3 + side lamp</td>
<td>3</td>
<td>3</td>
<td>4 + torch</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Panel size (Wp)</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>6,5</td>
<td>6,3</td>
</tr>
<tr>
<td>Mobile phone charging</td>
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<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

- QV product
- Sweet spot product
- Low ease of compliance
- Removed after pre-tests

Non-QV products that underwent full ISM testing
Non-QV products that underwent ISM pre-tests only