Appliances that Drive Economic Growth

A presentation to the Global Off-grid Solar Forum

Stephen Pantano
January 2018
Energy services are evolving...

- Appliances turn electrons into energy service
- Consumers moving beyond basic needs to higher tiers
- Growing demand for refrigeration, cooling, entertainment, and income-generating products
- Suppliers and technology rising to meet the demand
- More can always be done to improve efficiency, scale markets, and reduce costs!
... and demand for appliances is growing

Market growth by appliance product category (CAGR), 2015 potential to 2020 potential

- Refrigerators: $221M (15%)
- Fans: $245M (25%)
- Televisions: $1081M (37%)

2015 Current: $524 million
2015 Potential*: $1,490 million
2020 Potential*: $4,710 million
TOTAL (USD, millions): $3,126 million

Which appliances matter most?

Source: Global LEAP 2017 Off-Grid Appliance Market Survey
Efficient appliances drive consumer value…

Energy System Requirements

KEY
- Green: Energy system needed to support an appropriately-designed, super-efficient refrigerator
- Orange: Energy system needed to support a conventional on-grid refrigerator

- 80 Wp Solar Panel
- 700 Wp Solar Panel
- 35 Ah Lead Acid Battery
- 300 Ah Lead Acid Battery

Diagram shows the energy requirements for various household appliances, comparing efficient and conventional systems.
... by reducing overall energy access costs

Source: “A Home Energy System in just 25 Watts” (1.usa.gov/1K6yfyn)
Efficiency baselines are improving…

Solar Home System (SHS) Purchase Price (2016 data)

- **SHS with conventional appliances (2016)**
- **SHS with standard appliances (2016)**
- **SHS with efficient appliances (2016)**
- **SHS with super-efficient appliances (2016)**

Assumes 4 lights (5 hr/day), 22-inch color TV (4 hr/day), radio (6 hr/day), mobile phone charging (3 hrs/day)

Source: Schatz Energy Research Center & CLASP
… but there’s room for innovation (+ new products)!

Source: CLASP / Off-grid Appliance Data Platform
What can be done?

- Improve Market Intelligence
- Support Research & Development
- Strengthen Supply Chains
- Facilitate Effective Policy
- Coordinate Finance & Investment
Efficiency for Access Coalition
Actions follow technology & market maturity

- Innovation Prizes
- Awards, Incentives, and Procurement
- Market, Consumer, and Impacts Research
- Technology Roadmaps and R&D Support
- Test Methods & Technical Foundations
- Product Testing, Evaluation, and Data Sharing
- Quality Assurance & Policy Support
- Communications & Marketplace Education
## Low Energy Inclusive Appliances Programme

<table>
<thead>
<tr>
<th><strong>Scale Deployment of Near-to-Market Products</strong></th>
<th><strong>Targets</strong> include refrigerators, solar water pumps, televisions and fans.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stimulate Innovation &amp; Knowledge for Horizon Technology</strong></td>
<td><strong>Targets</strong> include brushless DC motors, advanced electric cooking, connectivity and compatibility/ interoperability</td>
</tr>
<tr>
<td><strong>Develop Market Intelligence &amp; Coordinate Partnerships</strong></td>
<td><strong>Address gaps in market data and improve market function through partnership coordination and knowledge-sharing</strong></td>
</tr>
</tbody>
</table>
Technology Working Groups will develop R&D Roadmaps for important products and enabling technologies

Goal is to focus R&D to accelerate innovation

Launching (now!) for refrigeration, solar water pumps, and compatibility / interoperability. We need your help and expertise!

Roadmaps will inform sponsored R&D grants, partnerships, and cooperation
LEIA research and knowledge sharing

- Market research, to identify trends and opportunities
- Consumer research, to understand use cases, preferences, and other factors important to R&D
- Impacts research, to define the economic, health, environmental benefits from improved appliances
- Research will inform – and be informed by – R&D roadmaps
- Information and insights shared with financiers, purchasers, policymakers, consumers, and others
Off-grid Cold Chain Challenge

- Off-grid cold storage containers have the potential to:
  - prevent food spoilage
  - raise incomes and increase food security

- The OGCCC is intended to bridge technology gaps and reward promising business models

- First round of awards will launch in March 2018
Global LEAP Awards Competitions

Global LEAP Awards
2017 Buyer’s Guide for Outstanding Off-Grid Refrigerators

2013-14 (33 nominations)

2015-16 (53 nominations)

2016-17 (128 nominations)

Appliances that Drive Economic Growth
Global LEAP+RBF Incentives

1. Incentive claim submission window opens
2. Off-grid solar companies and appliance manufacturers negotiate agreements
3. A 3-step process verifies the purchase, shipment, and sale of these products. Incentive payments are disbursed after completion of each step in the verification process

**2016**
- **5 companies**
- **12,000 televisions**
- Bangladesh

**2017**
- **27 companies**
- **60,405 televisions + 225,825 fans**
- Bangladesh, Kenya, Tanzania, Rwanda, Uganda
Global LEAP Off-Grid Appliance Data Platform

Product Sampling
Sample off-grid appliances from retail markets, distributors and manufacturers

Product Testing
Test products according to international best practice, using new Global LEAP test methods

Data Cataloguing
Organize product performance, quality and market data in interactive, user-friendly online platform

Data Sharing
Share data with policymakers, investors, DESCOS, and manufacturers to inform off-grid appliance design, business decisions, and policy
Promote and support good policy

Drive uptake of quality products

Develop market & product intelligence

Develop standards & administer certifications