Compliance Issues Highlighted by Lighting Programs: CFLs in Asia

International Monitoring, Verification and Enforcement Conference

My Ton – USAID Contractor
Team Leader, Energy Efficient Lighting
ECO-Asia Clean Development and Climate Program
London, 14 September 2010
ECO-Asia CDCP Overview

ECO-Asia Clean Development and Climate Program Geographic Coverage

- China
- India
- Indonesia
- Philippines
- Thailand
- Vietnam

*These 6 countries account for 96% of the GDP of Asia’s developing countries*
Overview: CFLs in Asia

Asia’s CFL Market: Large production volume, many producers

There are at least 200 CFL manufacturers and 400 suppliers of specialized CFL materials and components in China alone (Chen, 2008).

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>750</td>
<td>800</td>
<td>1,040</td>
<td>1,380</td>
<td>1,760</td>
<td>2,400</td>
</tr>
<tr>
<td>India</td>
<td>NA</td>
<td>34</td>
<td>40</td>
<td>46</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>Indonesia</td>
<td>10</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>Philippines</td>
<td>4.5</td>
<td>NA</td>
<td>NA</td>
<td>18</td>
<td>25</td>
<td>NA</td>
</tr>
<tr>
<td>Thailand</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Vietnam</td>
<td>NA</td>
<td>NA</td>
<td>5.4</td>
<td>7</td>
<td>8.4</td>
<td>11</td>
</tr>
</tbody>
</table>

Overview: CFLs in Asia

Asia’s CFL standards: “so many standards, so little time”

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Safety</th>
<th>Efficacy</th>
<th>Color Rendering</th>
<th>Start-up Time</th>
<th>Lamp Lifetime</th>
<th>Lumen Maintenance</th>
<th>Warranty</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>India</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Indonesia</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Philippines</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Thailand</td>
<td>✓</td>
<td>U</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Vietnam</td>
<td>✓</td>
<td></td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
</tbody>
</table>

U = under consideration

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>Number of Wattage Bins</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>4</td>
</tr>
<tr>
<td>India</td>
<td>5</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4</td>
</tr>
<tr>
<td>Philippines</td>
<td>5</td>
</tr>
<tr>
<td>Thailand</td>
<td>4</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2*</td>
</tr>
</tbody>
</table>

*Note: Vietnam’s standard remains under consideration.

---

**Efficiency (lm/W):**

- China
- India
- Philippines
- Thailand
- Vietnam (Prop)
Overview: CFLs in Asia

Asia’s CFLs: current compliance rates

- **Average Efficacy at 100 hours**
- **Pass Rate - All Metrics**
  - Tier 1
  - Tier 2
  - Tier 3
- **Lumen Depreciation at 2000 hours**
- **Survival Rate at 2000 hours**
- **Pass Rate - CFL Test**
  - Tier 1
  - Tier 2
  - Tier 3

Mercury content for various CFL models (minimum, maximum and average shown)
Asia CFLs: Some Observations Regarding Compliance

Benchmarking Results Showed:

- At least **1/3 of the sample failed** to meet what may be considered as minimum performance standards (or the criteria for what may be considered a “quality” lamp) for the region.

- The overall **failure rate is likely to be significantly higher** than presented here due to limitations in laboratory testing, and that only a subset of all required metrics defining a quality CFL was evaluated.

- At least **90%** of tested products **do not meet** the requirements for ALC Tier 3, or European equivalent standards.

- **Name-brand models generally performed better** than low-priced models in most cases against most metrics. Exceptions to this rule were noted.
Asia CFLs: Some Steps Towards Compliance & Harmonization

Asia Lighting Compact (ALC):

- Was created to fulfill the ideals of the Manila Compact
- Is an independent, non-profit organization dedicated to improving product quality and adoption of energy-efficient lighting in Asia.
- Is impartial, not tied to any particular commercial organization or driven by political or corporate motivations.
- Is membership-based and open to all stakeholders.
- Membership includes: national lighting associations, lighting manufacturers, government agencies, institutions and independent organizations.
Asia CFLs: Some Steps Towards Compliance

ALC Registration & Quality Process

ALC
- Products & Registration
  - System Specifications & Build
- Data Receipt & Verification
- Cleaning & Registration
- Data Output to Frontend

Manufacturers
- Testing
- Data Submission
- Promotion
- Market Verification (Check Testing & Claim Verification)
Asia CFLs and Compliance – Not Done Yet

ALC is a good start, but:

• Lack of a regional agreement on compliance mechanisms is a major contributor to poor product quality in many Asian markets.
• Many data sources, no way to share or compare.
• Statistics are against us (lighting also take longer to test).
• Multi-sources and production locations not in our favor.
• Large-scale product procurement and/or location-specific requirements can be disruptive.
• Trade offs to consider:
  ♦ Compliance or high performance.
  ♦ Harmonization or comprehensive.
Possible Next Steps:
- Expand voluntary testing: industry adoption of US’ PEARL-model.
- Seek support for region-wide check testing regime.

[Diagram showing the process from Consensus Standards to Market Surveillance with steps such as Development of protocols, testing according to standard requirements, random audits, certification or mark issued, and random samples pulled from the market for further verification testing.]
Asia CFLs – Some Parting Thoughts

- lites.asia: Coordination and harmonization of IEC input
- Lighting Africa: qualification of regional testing facilities
- LEDs: Horses are out of the gates.

**Color Mixing**

<table>
<thead>
<tr>
<th>Luminaire</th>
<th>Line voltage input</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Driver</td>
<td>2008: 66%, Target: 90%</td>
</tr>
<tr>
<td>2. LED Device</td>
<td>2008: 30%, Target: 51%</td>
</tr>
<tr>
<td>3. Thermal Efficiency</td>
<td>2008: 90%, Target: 95%</td>
</tr>
<tr>
<td>4. Fixture &amp; Optics</td>
<td>2008: 60%, Target: 95%</td>
</tr>
</tbody>
</table>

**Phosphor Based**

- **Luminaire**
  - 1. Driver: 2008: 85%, Target: 90%
  - 2. LED Device: 2008: 51%, Target: 90%
  - 3. Thermal Efficiency: 2008: 95%, Target: 95%
  - 4. Fixture & Optics: 2008: 90%, Target: 95%

- **Optical Power**
  - Total Luminaire: 17% (2008), 60% (Target)

**OLEDs**

- **Luminaire**
  - 1. Driver: 2008: 90%, Target: 95%
  - 2. OLED Device: 2008: 60%, Target: 95%
  - 3. Extraction Efficiency: 2008: 96%, Target: 98%
  - 4. EQE: 2008: 36%, Target: 74%

- **Total OLED Device**
  - 21% (2008), 67% (Target)
Thank You!

myton@cleanenergyasia.net

www.cleanenergyasia.net

www.asialighting.org