Evaluation Indicators for Energy Efficient Lighting MVE Policy

Kevin Lane, UNEP Consultant
Overview

- Background to efficient lighting and MVE
- What are indicators
- Evaluation & indicators in the policy cycle
- MVE and compliance
- Lighting-specific indicators
- Practical considerations
Background

- MEPS and supporting policy are highly effective for lighting products:
  - Large reduction in energy, carbon, consumer bills
  - Increased energy security, service
- MVE considered essential part to increase/ensure effectiveness of such policy
- Use of indicators important to track progress, and form part of any evaluation

http://www.enlighten-initiative.org
The policy cycle: Monitoring (including indicators)

Source: HMRC (2012)
What are indicators?

- Used to show progress of a program or intervention
- Can be subjective or objective

Features of a good indicator:
- Action focussed, or on an intervention outcome/aim
- Specific and measurable
- Reliable, simple

Timing:
- Indicators are collected on an ongoing basis, done in advance of an evaluation.
- Ideally measured prior to start of intervention for baseline
Types of indicators

Two main types:

- **Process indicators** monitor the implementation of the programme as well as programme inputs
- **Impact/outcome indicators** monitor the progress in achieving the programme’s objectives
What is monitoring, verification, enforcement (MVE)?

- **Monitoring** of MEPS/other programme is ongoing collection and analysis of data (also market surveillance).
- **Verification** is the process of determining, through testing, whether a product actually performs according to the energy performance value claimed by suppliers.
- **Enforcement** is how regulators respond to non-compliance.
- **Compliance** is the general term for programme participant’s actions in relation to programme requirements.
Compliance circle: virtuous or vicious

Source: Ellis et al 2010
## Simple logic model for MVE policy

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUTS Activities</th>
<th>OUTPUTS Participation</th>
<th>OUTCOMES/IMPACTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources</td>
<td>Analyse registration data</td>
<td>Staff</td>
<td>More compliant products</td>
</tr>
<tr>
<td>Regulators</td>
<td>Store surveys</td>
<td>Policy people</td>
<td>More efficient lamps</td>
</tr>
<tr>
<td>Laboratories</td>
<td>Sales data</td>
<td>Industry</td>
<td>Reduced GHG</td>
</tr>
<tr>
<td>Manufactures</td>
<td>Analysis of import/export</td>
<td>Lab staff</td>
<td>Lower running costs</td>
</tr>
<tr>
<td>Partners</td>
<td>Lamp performance tests</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enforcement activity</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Activities**

- Analyse registration data
- Store surveys
- Sales data
- Analysis of import/export
- Lamp performance tests
- Enforcement activity

**Participation**

- Staff
- Policy people
- Industry
- Lab staff
Process indicators

Programme *input* indicators relate to:
- Financial resources
- Equipment, staff available

Indicators related to *activity* on how well programme implemented, if it is reaching the intended target with acceptable quality, eg:
- Number of tests, surveys undertaken
- Proportion of the market covered
Process indicators for MVE intervention (inputs)

What were the inputs?

Indicators include:
- Number of (full time) staff each year
- Money invested in the programme each year (budget)
Process indicators for MVE intervention (activity)

how much activity occurred, coverage, etc.

- Number of lamp tests undertaken
- Proportion of the market covered
- Number of store surveys
MVE Impact and outcome indicators (monitoring)

Monitoring the progress of achieving the programme objectives, such as:

Product performance:
- Number of lamps sold by technology
- Average efficiency (efficacy) of products sold (or on market)
- Average features of lamps (eg power, lifetime)
- % compliant with regulations (MEPS, labelling)

Product price:
- Average price of lamps (retail, wholesale)

Data sources:
- Registration, import/export
- Store surveys, market research
Impact and outcome indicators (verifying)

Verifying the claims of products on the market:

- Number of non-compliant products
- The type of non-compliance (number, %) (e.g., administrative, performance)
- The extent of non-compliance

Data sources:
- Laboratory testing, store surveys
Impact and outcome indicators (enforcement)

Enforcement response:

- Number of products subject to action
- The level (extent) of response taken

Data sources:

- Enforcement body (based on monitoring and verification testing, and actions undertaken)

[Care needed - not always a good reflection of whether efficiency/compliance is improving]
Examples of MVE indicators

- China – analysis of registration data to provide annual average efficiency (monitoring)
- Australia – CFL labelling compliance

To follow…
Average energy efficiency level of lighting, 2010, China

<table>
<thead>
<tr>
<th>Products</th>
<th>Evaluation indicators</th>
<th>Unit of indicators</th>
<th>2010 average energy efficiency level</th>
<th>Increase compared to 2009 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>By Model</td>
<td>By Sales Volume</td>
</tr>
<tr>
<td>5-8W - RR series</td>
<td></td>
<td>Minimum initial lumen efficacy</td>
<td>46.80</td>
<td>47.10</td>
</tr>
<tr>
<td>5-8W - RB series</td>
<td></td>
<td></td>
<td>50.40</td>
<td>51.10</td>
</tr>
<tr>
<td>9-14W - RR series</td>
<td></td>
<td></td>
<td>53.8</td>
<td>55.1</td>
</tr>
<tr>
<td>9-14W - RB series</td>
<td></td>
<td></td>
<td>57.5</td>
<td>59.1</td>
</tr>
<tr>
<td>15-24W - RR series</td>
<td></td>
<td></td>
<td>58.7</td>
<td>62.1</td>
</tr>
<tr>
<td>15-24W - RB series</td>
<td></td>
<td></td>
<td>63</td>
<td>66.1</td>
</tr>
<tr>
<td>25-60W - RR series</td>
<td></td>
<td></td>
<td>60.6</td>
<td>68.1</td>
</tr>
<tr>
<td>25-60W - RB series</td>
<td></td>
<td></td>
<td>63</td>
<td>71.1</td>
</tr>
</tbody>
</table>

Source: CNIS (2012) White paper for the energy efficiency status of China energy-use products
Lamps in Australia, Unregistered, 2013

Source: E3 (2013)
CFL labelling compliance, Australia, 2013 & 2014

Source: MEA (2014)
Practical considerations

Issues of lamps:

- Different technologies (unlike appliances), different lifetimes, features. Usually, the focus should be on service, not technology. Though useful to monitor this, and can be easier to track.

Data collection:

- Use of product registration systems makes analysis much easier.
- Store surveys are relatively low cost market surveillance
- Laboratory tests are more expensive, time consuming

National energy consumption, impact evaluation:

- Need to either measure energy consumption, or (more usually) model impact
- Attribution and counterfactual are challenging, difficulty of no control group
- Need baselines or measurements at the start of MVE programme
Resources

- lites.asia reports, eg ‘Label display market surveillance’, available at: http://www.lites.asia/
- CLASP, eg MV&E Guidebook, available at: http://www.clasponline.org
Summary

- Evaluation is an integral part of good policy making
- Developing evaluation indicators is a key step towards tracking MVE progress and evaluating policy effectiveness
- Process indicators measure the inputs and working of the programme/intervention, eg:
  - Funding amounts, number of staff, number of tests, etc
- Impact/outcome indicators measures the impact of the programme, and tied to objectives, eg:
  - Compliance rates, average efficiency of products on the market
- Some evaluation impact indicators are key to evaluation of main policies (eg MEPS) not just MVE
Thank you!

Contact:
KevinLane.Oxford@gmail.com
Consultant to UNEP
Question and Answer Period

www.enlighten-initiative.org
www.lites.asia
The IEA energy efficiency indicators pyramid

Source: IEA (2014)
IEA disaggregation - sector, sub-sector, and end-uses

Source: IEA (2014)