Energy Efficiency Training Week
Indicators, evaluating and scaling up programmes

Industry Stream
Patrick Crittenden, Energy Efficiency in Emerging Economies, IEA
Paris, May 2019

IEA #energyefficientworld
Link between training content and objectives

- How to make the case for industrial energy efficiency policy
- How to select and design the best measures
- How to implement
- How to evaluate and scale-up

Develop your skills & knowledge to deliver industrial energy efficiency policies & programmes
Learning outcomes

This session will focus on developing your capabilities to:

• Understand energy efficiency indicators and how they can be used

• Plan, implement and supervise industrial energy efficiency programme evaluations

• Differentiate between different types of programme impacts

• Draw conclusions from evaluations and communicate the results

• Use evaluation to inform options to expand the scale and reach of successful programmes
Data and indicators underpin policy evaluation

- Establish metrics to track progress and evaluate effectiveness
- Allow for objective judgement of policy/programme
- Data required should be established at start of programme
- Structured collection process is necessary
  - Company reporting is essential
- Provides evidence of policy benefits for other countries
Indicators can be developed at different levels

GDP - Gross Domestic Product
GVA – Gross Value Added
What is an evaluation

- A systematic and **objective** assessment of an ongoing or completed project, programme or policy, its design, implementation and results

- The **aim** is to determine the relevance and fulfilment of **objectives**, **efficiency**, **effectiveness**, **impact** and **sustainability**
Why evaluate?

• Document and report results and benefits
  − Meet requirements
  − Gain support for programme continuation or expansion
  − Get more companies to participate in the programme

• Identify ways to improve current and future policies or programmes

• Support energy demand forecasting and resource planning
Types of evaluation

• Impact evaluation asks the question: “what happened?”
  - Includes direct and indirect benefits, energy and demand savings, multiple benefits

• Process evaluation asks the questions: “what was done and how did we do”
  - Includes operations and scope for improvements, satisfaction levels, participation

• Cost effectiveness evaluation asks: “what impact did we have relative to our investment?”

• Market evaluation asks the question” “what happened in the market?”
  - Including how supply of energy efficiency technologies and services has been affected)

Typically evaluations combine impact + process + cost effectiveness.
# Steps in an evaluation

Secure resources (should be done at the outset of the programme)

1. **Set the objective and review needs**
   - Which audience(s)
   - What are the evaluation questions
   - What do we know
   - What do we need to find out
   - How will we source data

2. **Terms of reference**

3. **Select who will carry out the evaluation**

4. **Manage the development of the evaluation design**
   - Methodologies
   - Scope, boundaries

5. **Manage the development of the evaluation work plan**

6. **Manage the implementation of the work plan, including the production of report(s)**
   - Data collection, analysis, synthesis, interpretation

7. **Use results, disseminate report and support use of the evaluation**
Evaluation examples – assessing net benefits

<table>
<thead>
<tr>
<th>Ireland SME programme 2007 - 2010</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>1470</td>
</tr>
<tr>
<td>Public budget</td>
<td>USD 1.3 million</td>
</tr>
<tr>
<td>Average energy reduction per company</td>
<td>10%</td>
</tr>
<tr>
<td>Cost per kWh saved to 2020</td>
<td>USD 0.020</td>
</tr>
<tr>
<td>Cost per kWh saved to 2030</td>
<td>USD 0.008</td>
</tr>
<tr>
<td>Value emission abatement to 2020</td>
<td>USD 44 million</td>
</tr>
<tr>
<td>Value of emission abatement to 2030</td>
<td>More than USD 88 million</td>
</tr>
<tr>
<td>Emissions abated to 2030</td>
<td>Almost 1800 ktCO₂</td>
</tr>
<tr>
<td>Net benefit to society in 2020</td>
<td>USD 178 million</td>
</tr>
<tr>
<td>Net benefit to society in 2030</td>
<td>USD 425 million</td>
</tr>
<tr>
<td>Net benefit per USD 1 spent by authority to 2020</td>
<td>USD 16.5</td>
</tr>
<tr>
<td>Net benefit per USD 1 spent by authority to 2030</td>
<td>USD 36</td>
</tr>
</tbody>
</table>
## Evaluation examples – Small incentives big results

<table>
<thead>
<tr>
<th>Swedish energy management programme 2004-2009</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>100</td>
</tr>
<tr>
<td>Tax exemption value</td>
<td>EUR 15 million/year</td>
</tr>
<tr>
<td>Expected annual electricity savings</td>
<td>0.6 TWh</td>
</tr>
<tr>
<td>Achieved annual electricity savings</td>
<td>1.45 TWh</td>
</tr>
<tr>
<td>Measures implemented</td>
<td>1247</td>
</tr>
<tr>
<td>Private investment</td>
<td>EUR 70 million</td>
</tr>
<tr>
<td>Value of electricity saved per year</td>
<td>EUR 70 million</td>
</tr>
</tbody>
</table>
Communicating and using results

For whom?
- Government
- Funders
- Yourselves
- Partners
- General public
- Media
- Participating companies
- Companies not yet participating
- Others?

Think about
- What is your objective?
- What is the audience interested in?
- Level of technical expertise
- Using appropriate language
- What are the key messages?
After the evaluation – scaling up

Your evaluation shows that your pilot programme is successful and cost effective. You have covered 32 companies and 8% of national industrial energy use. What will you do next?
Scaling up

What does scaling up mean?

• Same sector more companies
• Same companies more implementation
• Same approach different sector
• Same approach more companies
• Using lessons learned to develop new approach to reach more companies and get more implementation
• New and innovative approaches for bigger coverage & greater efficiency

What is the end goal?

• Mainstreaming industrial energy efficiency - to business as usual – and no need for industrial energy efficiency programmes
Perform, Achieve, Trade (PAT) in India

• During first programme cycle, all sectors over-achieved their targets
  - 400 companies from 8 sectors
  - Energy use reduced by 5.3%, target was 4.1%

• Based on results PAT programme now being expanded for 2\textsuperscript{nd} cycle
  - More companies and sectors (621 corporations from 11 sectors)
  - Financial support to encourage greater implementation
### Targets and achievements in the first cycle of the PAT Programme, 2012-15
(BEE, 2017)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Target (million toe)</th>
<th>Achievements (million toe)</th>
<th>% above target</th>
<th>% over achievement</th>
<th>Number of ESCerts (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (thermal)</td>
<td>3.21</td>
<td>3.06</td>
<td>-5%</td>
<td>-5%</td>
<td></td>
</tr>
<tr>
<td>Iron and steel</td>
<td>1.49</td>
<td>2.10</td>
<td>29%</td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>Cement</td>
<td>0.82</td>
<td>1.44</td>
<td>43%</td>
<td>76%</td>
<td></td>
</tr>
<tr>
<td>Aluminium</td>
<td>0.46</td>
<td>0.73</td>
<td>38%</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Fertiliser</td>
<td>0.49</td>
<td>0.83</td>
<td>42%</td>
<td>73%</td>
<td>3.8</td>
</tr>
<tr>
<td>Paper and pulp</td>
<td>0.12</td>
<td>0.26</td>
<td>54%</td>
<td>117%</td>
<td></td>
</tr>
<tr>
<td>Textile</td>
<td>0.07</td>
<td>0.12</td>
<td>45%</td>
<td>71%</td>
<td></td>
</tr>
<tr>
<td>Chlor-alkali</td>
<td>0.05</td>
<td>0.13</td>
<td>58%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Total industry</td>
<td>6.68</td>
<td>8.67</td>
<td>23%</td>
<td>30%</td>
<td></td>
</tr>
</tbody>
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Upscaling or new approaches to scale up savings

- Standardised projects and solutions
- Integrated programmes
- Streamline admin.
- Energy management for SMEs
- Energy efficiency networks
- Build on successes and expand

- Regulatory approaches - limits, targets
- Remove regulatory barriers
- Make it mandatory

- Project portfolios for investors
- Risk sharing mechanisms
- Energy service companies
- Innovative finance mechanisms
- New business models
- Services instead of energy

- Long term industry technology roadmaps
- Industrial ecology, eco-industrial parks
- Information Communication Technologies
- Promote structural change

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