Energy Efficiency Training Week
Indicators, evaluating and scaling up programmes

Industry Stream
Patrick Crittenden, Energy Efficiency in Emerging Economies, IEA
Bangkok, 3 April 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

How to leverage information and communication technologies

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

**Swedish energy management programme 2004-2009**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</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 2nd cycle
  - More companies and sectors (621 corporations from 11 sectors)
  - Financial support to encourage greater implementation
## PAT programme results

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>3.8</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></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>
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</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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