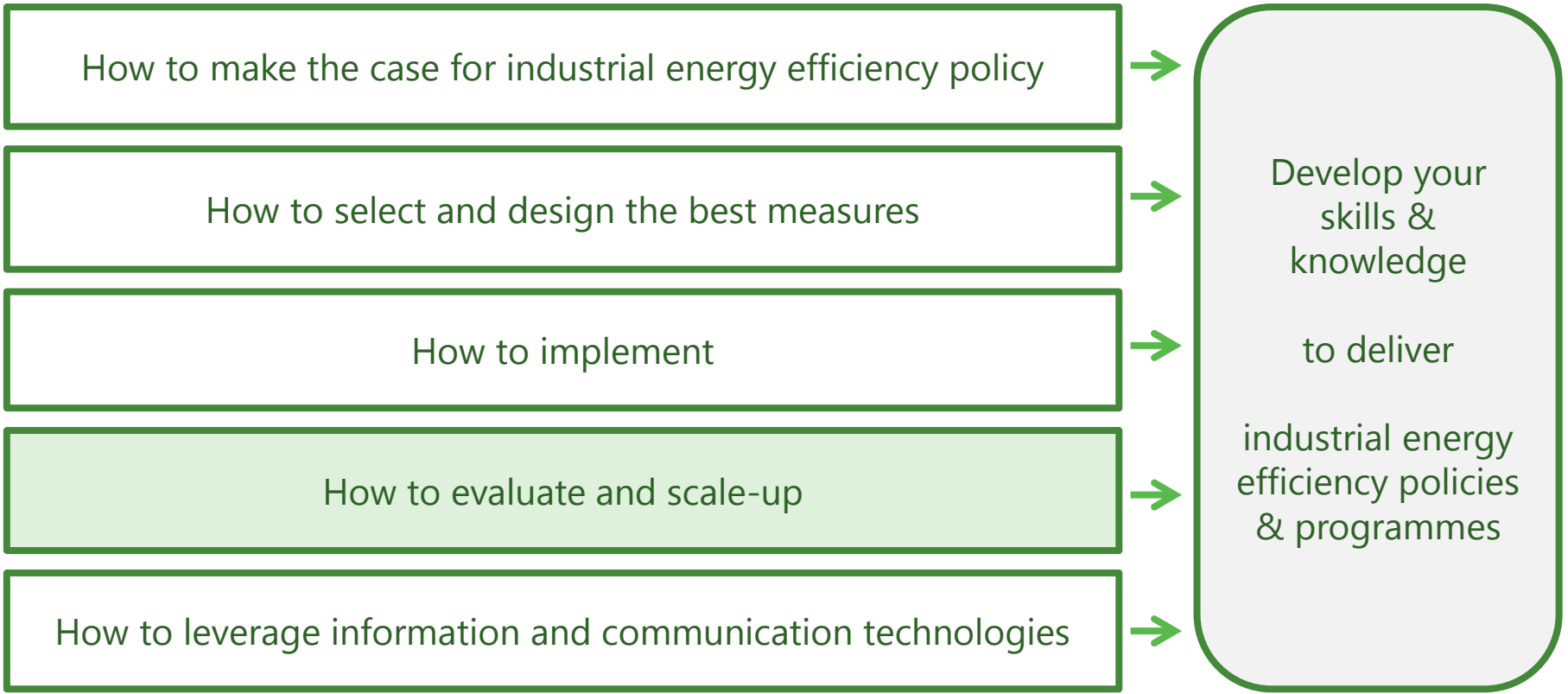
IEA Energy Efficiency In Emerging Economies Training Week

Industry Stream: Indicators, evaluation & scaling up

Vida Rozite & Patrick Crittenden, Paris, 15-17 May 2018

#EnergyEfficientWorld

Link between training content and objectives



Learning outcomes

This session will focus on developing your capabilities to:

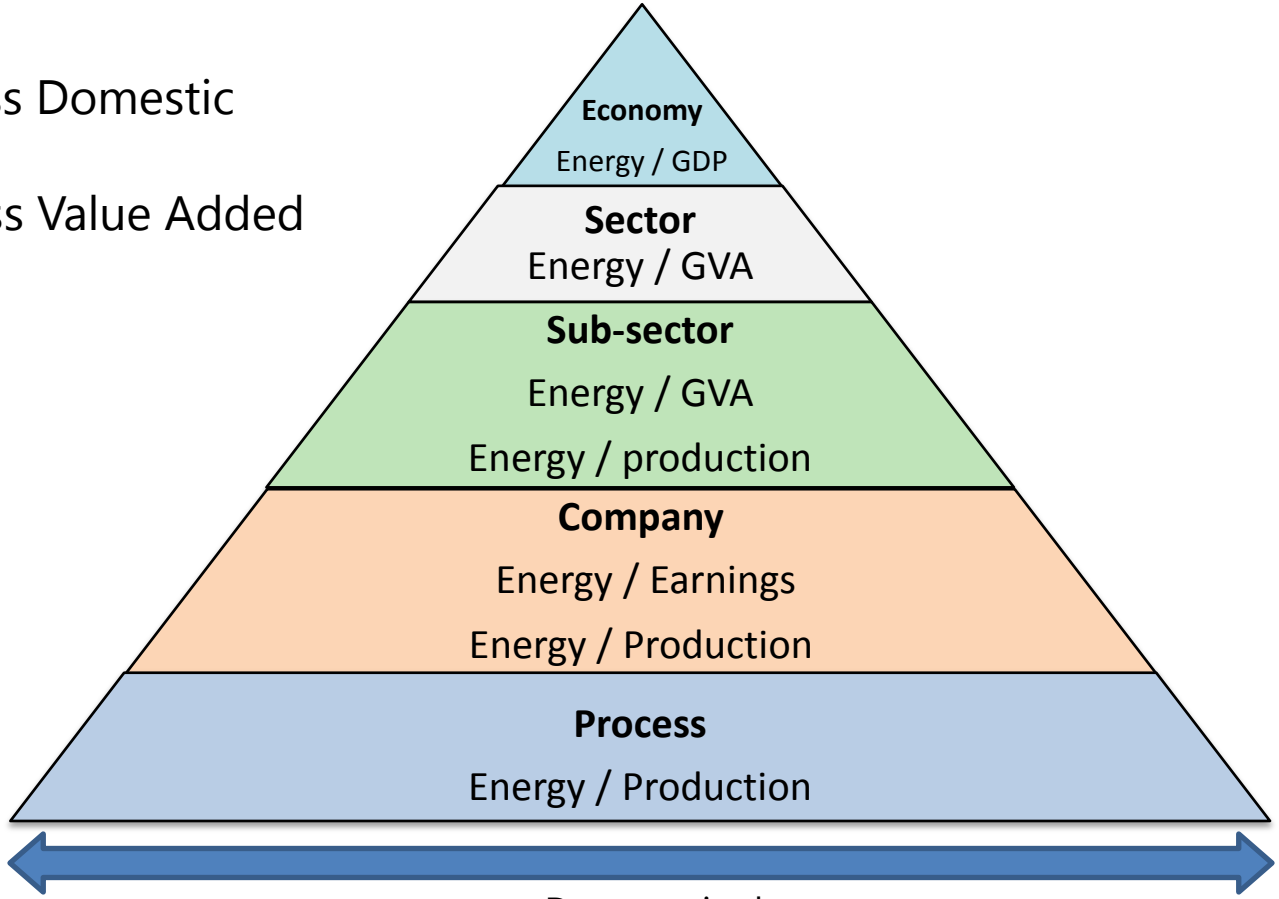
- Understand energy efficiency indicators and how they can be used
- Plan, implement and supervise industrial energy efficiency programme evaluations
- Differentiate between different types of programme impacts
- Draw conclusions from evaluations and communicate the results
- Use evaluation to inform 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



Indicators exercise

1. Form a group of 4-5 people

2. Review the data that is provided to you

3. Prepare a brief presentation to describe:
   - What 'level' these indicators are on the 'industry sector indicators pyramid'
   - Which stakeholders will be most interested in these indicators
   - What do the indicators tell you about changes in industrial energy efficiency performance
   - What are the limitations of the data set?

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

Steps in an evaluation

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

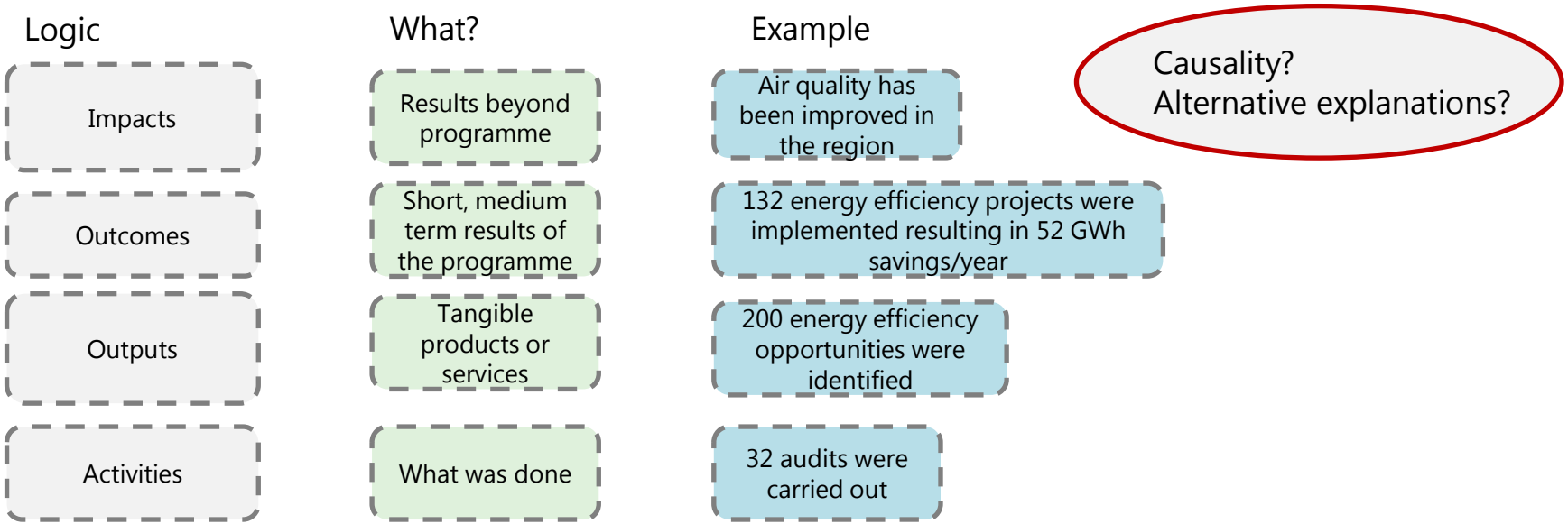
1. Set the objective and review needs
   - Which audience(s)
   - What are the evaluation questions
   - What do we know
   - What do we need to find out
   - How will we source data
2. Terms of reference
3. Select who will carry out the evaluation
4. Manage the development of the evaluation design
   - 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

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, participatio
- 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.

Programme logic, impacts, causality



Data collection for evaluation

- Data to gather - examples
  - Changes in energy use
  - Value of multiple benefits (quantified when possible)
  - Investments in energy efficiency projects
  - Profitability of projects (payback periods)
  - Number of energy efficiency opportunities identified
  - % of projects implemented
  - Case studies

Challenge: cannot directly measure savings and benefits need to compare with counterfactual (situation without the programme) or at least baseline

Estimates of gross energy (and/or demand) savings
Estimates of net energy (and/or demand) savings – separating out impacts resulting from other factors

Challenge: Production and other factors fluctuate

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Baseline or counterfactual

- **Counterfactual** - situation without programme
- Or changes compared to **baseline** (measurements or assessments at outset or before programme)

➢ but consider changes during the programme period

Normalisation for:

✓Weather

✓ Wider economy

✓**Production levels**

✓Product portfolio changes

✓Other key factors?

For net results consider:

Free riders: Companies that would have done energy efficiency irrespective of programme

Rebound: Savings from energy are invested in processes that increase energy demand

Rebound can be seen as a **positive effect (multiple benefits)**

Calculating cost effectiveness

Costs:
- Administration costs
- Costs for participating companies

Benefits:
- Benefits for companies
- Benefits for utilities/government
- Benefits for society
- Benefits for energy efficiency market

Issues to consider
- Discount rates - costs upfront, benefits later
- Lifetime of benefits

Think about:
Investment cost vs value of energy savings over lifetime

Calculating cost effectiveness

Method	+	-
Desktop review e.g. audit reports	Relatively cheap	Depends on quality of documents
Surveys	Relatively cheap	Low response rates
Interviews	Deeper insights	Resource intensive, not always representative
Focus group	More comprehensive discussion	Might be difficult to organise
Case studies	Deep insights into one company	Bias towards successful cases
Experimental approaches	Insights into impacts	Expensive, difficult in real world setting

- What combination will provide you with the information you need?
- What can you afford?

Evaluation examples – assessing net benefits

Ireland SME programme 2007 - 2010	
Participants	1470
Public budget	USD 1.3 million
Average energy reduction per company	10%
Cost per kWh saved to 2020	USD 0.020
Cost per kWh saved to 2030	USD 0.008
Value emission abatement to 2020	USD 44 million
Value of emission abatement to 2030	More than USD 88 million
Emissions abated to 2030	Almost 1800 $ktCO_2$
Net benefit to society in 2020	USD 178 million
Net benefit to society in 2030	USD 425 million
Net benefit per USD 1 spent by authority to 2020	USD 16.5
Net benefit per USD 1 spent by authority to 2030	USD 36

Evaluation examples – Small incentives big results

Swedish energy management programme 2004-2009	
Participants	100
Tax exemption value	EUR 15 million/year
Expected annual electricity savings	0.6 TWh
Achieved annual electricity savings	1.45 TWh
Measures implemented	1247
Private investment	EUR 70 million
Value of electricity saved per year	EUR 70 million

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

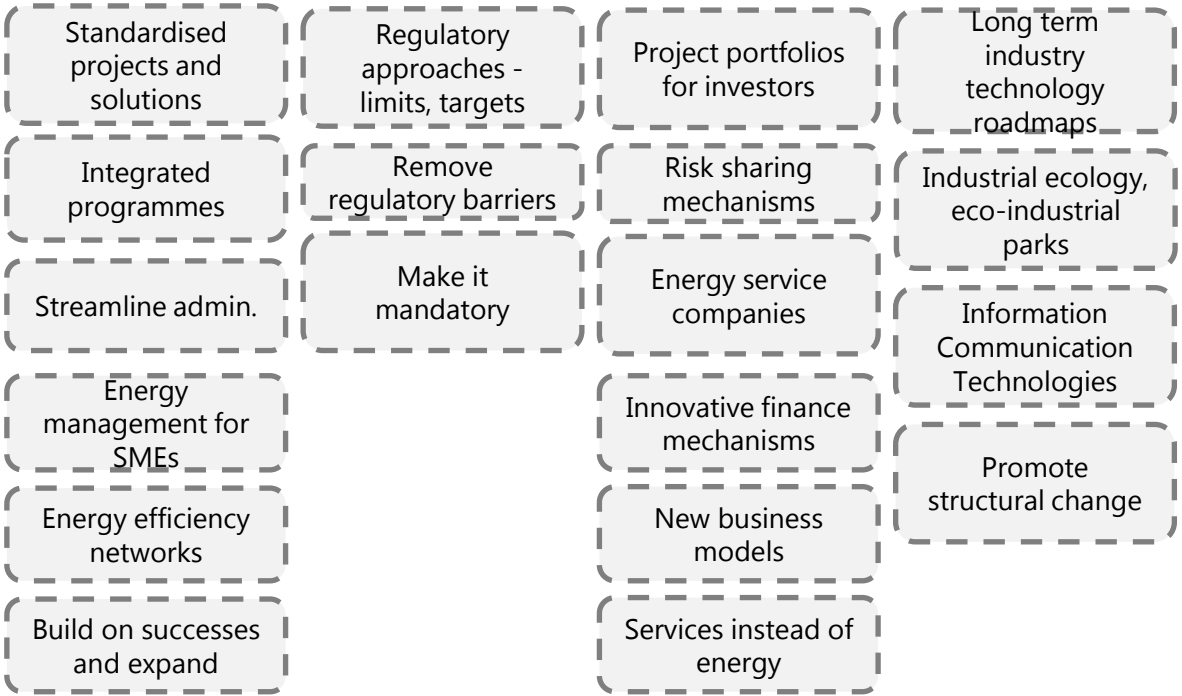
PAT programme results

Targets and achievements in the first cycle of the PAT Programme, 2012-15 (BEE, 2017)

Sector	Target (million toe)	Achievements (million toe)	% above target	% over achievement	Number of ESCerts (millions)
Power (thermal)	3.21	3.06	-5%	-5%	3.8
Iron and steel	1.49	2.10	29%	41%	
Cement	0.82	1.44	43%	76%	
Aluminium	0.46	0.73	38%	59%	
Fertiliser	0.49	0.83	42%	73%	
Paper and pulp	0.12	0.26	54%	117%	
Textile	0.07	0.12	45%	71%	
Chlor-alkali	0.05	0.13	58%	100%	
Total industry	6.68	8.67	23%	30%	

CASE STUDY

Upscaling or new approaches to scale up savings



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