Where to start:

Planning energy efficiency programmes

Appliances & Equipment: Session 1

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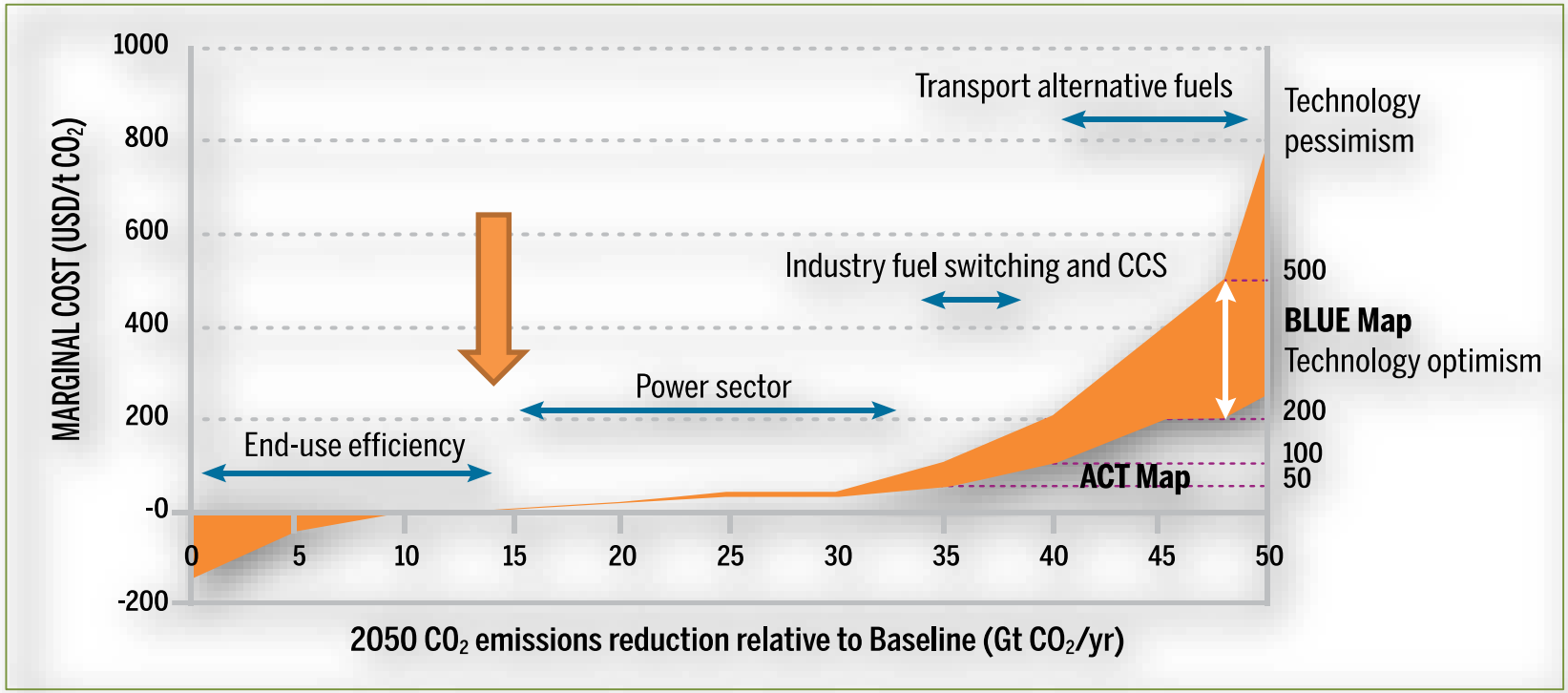
Scenario

There has been a change of government and the incoming government wants a range of options for interventions to rapidly increase **residential** energy efficiency for appliances, equipment and lighting.

How do you identify, prioritise and quantify these options?

Marginal emission reduction costs for the global energy system, 2050

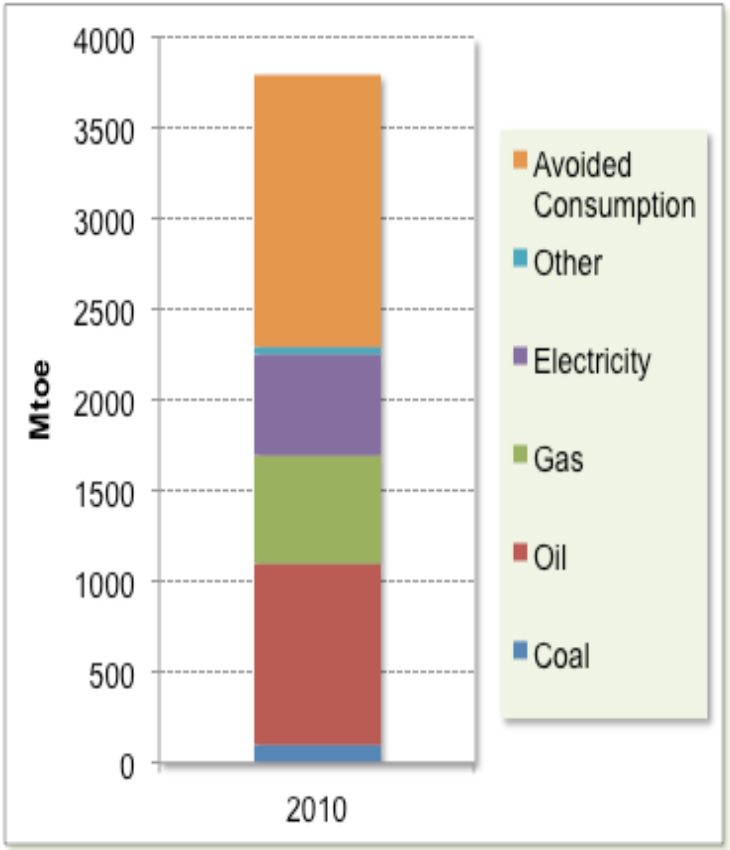


Source: IEA, Energy Technology Perspectives: Scenarios and Strategies to 2050, 2008, International Energy Agency/ OECD

End-use Energy Efficiency is the cheapest and often the quickest means to reduce CO_2

Why is your minister so keen on energy efficiency?

- In 11 IEA countries*, **energy savings** exceeded the output from any other single fuel source in 2010
- The result of cumulative investment in energy efficiency since 1974



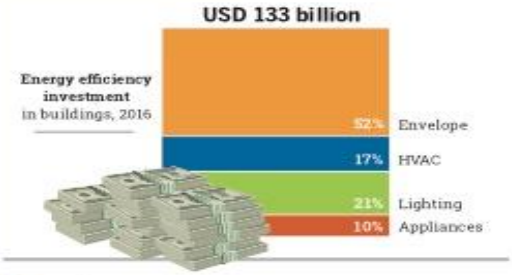
Source: IEA, Energy Efficiency Market Report 2013

*Australia, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Sweden, the United Kingdom and the United States

The world of Energy Efficient Equipment, Appliances and Lighting (EAL)

9%

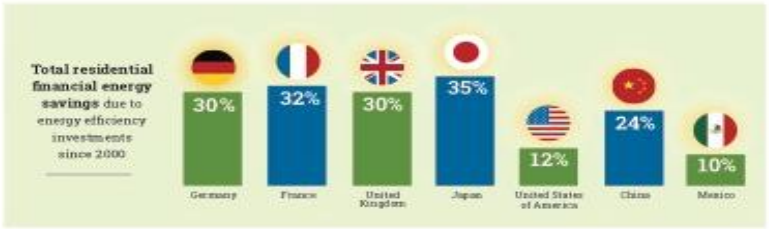
The increase in **global investment in energy efficiency** in 2016 vs 2015

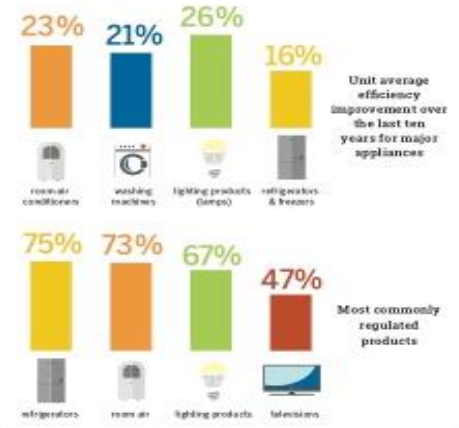


-12%

Additional energy needed globally without impact of efficiency improvements since 2000

22% Increase in **efficiency of residential buildings** between 2000-2016



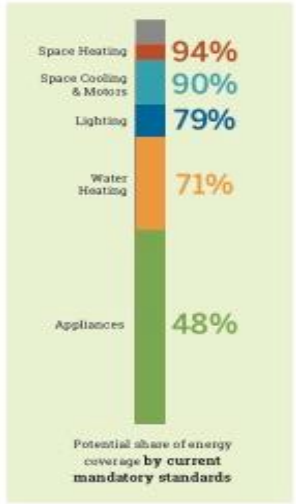


1 billion

New installation of **household connected devices** in 2017

300%

Growth in internet traffic 2012-2017



Potential share of energy coverage **by current mandatory standards**

570 million

Global stock of installed **smart meters**, 2016

*Produced by the **IEA Technology Collaboration on End-use Energy Efficient End-use Equipment (4E)***

List all the different kinds of government interventions we could consider?

Policy Measures [page 1/2]

- MEPS/Labels
  - MEPS
  - Comparative labels
  - Endorsements labels

- Mandatory obligations on utilities
  - Green certificates
  - White certificates

- Financial incentives
  - To consumers/retailers/suppliers/third parties (architects, plumbers, etc)
  - Grants and subsidies
  - Loans
  - Tax relief
  - Taxes

- Procurement by institutions/government

Policy Measures [page 2/2]

- Awareness raising campaigns
- Information
  - Appliances labels
  - Retail and/or trade staff training
  - Advice Centres, hotlines, publications, etc.
- Education
  - School programmes
  - Professional training and qualification/accreditation
- RD&D
  - Research
  - Demonstration
  - Commercialisation

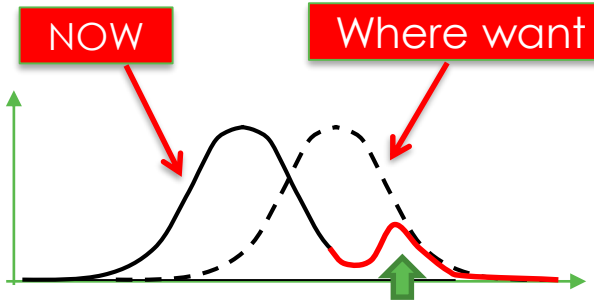
- What are the issues we need to consider when ranking these different types of programmes?

What to consider when ranking these different government options?

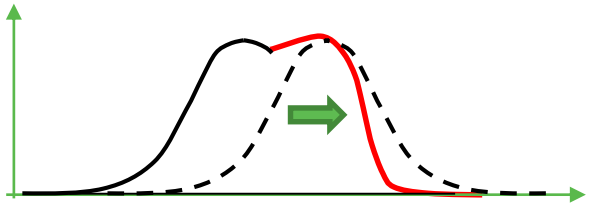
- Do they best help meet our programme objectives?
- How effective are they likely to be?
- Do they act on a small or large part of the relevant market?
- How certain are the outcomes?
- What resources will each require – costs, time, people, admin support, other?
- How fast acting are they?
- Are the outcomes sustainable in the long term?
- How difficult are each to organise? What partners could help?

Market Transformation: impact of different policies

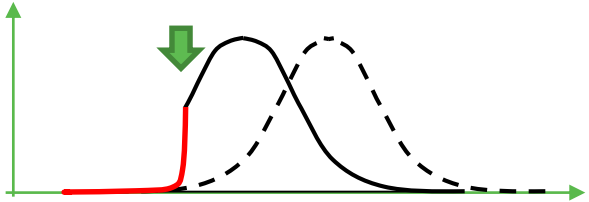
Leading Edge: establishing new technologies in the market



Mid Market: spreading good practice



Laggards: discouraging bad practice



Innovation
- R&D*
- Demonstration
- Technology transfer
- Endorsement labels

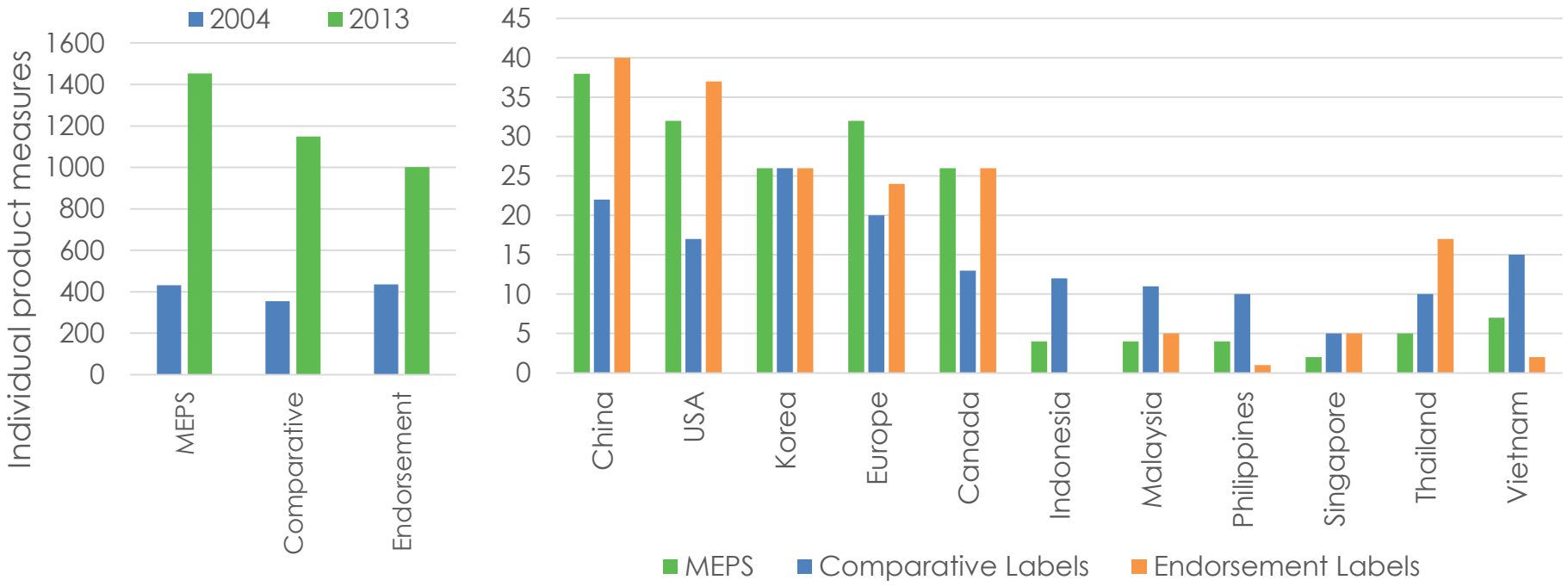
Reduce barriers
- Access to information / finance
- Endorsement labels
- Comparative labels

Remove worst
- Minimum Performance standards

Market mechanisms increase incentives for higher energy efficiency across the whole distribution

* Research and Development

Summary of policy measures, by measure type for selected countries, 2013



Source: Harrington, L., J. Brown, and M. Caithness, Energy standards and labelling programs throughout the world in 2013, 2014, Energy Efficient Strategies

Energy Efficiency Standards and Labelling – amongst the most widespread and significant programme types

Energy Efficiency Standards and Labelling (S&L)

- S&L programmes include:
  - Minimum energy performance standards (MEPS)
  - Mandatory comparison labels (usually stars or numbers)
  - Endorsement labels (the best in class)

- S&L programmes operate in >80 countries, covering >50 different types of equipment in all sectors.

- Provide the foundation for many other programme types
  - Financial incentives
  - Procurement
  - Utility programmes

Findings: Global Impact of Energy Efficiency Standards & Labelling Programmes

- The energy efficiency of major appliances have increased at more than 3x the underlying rate of technology improvement in countries with S&L programs.

- One-off improvements of more than 30% have been observed.

- The most mature national S&L programs covering a broad range of products are estimated to save between **10% and 25%** of national or relevant sectoral energy consumption.

- In all programmes reviewed, the national benefits outweighed the additional costs by a ratio of at least **3 to 1.**

Findings: Global Impact of Energy Efficiency Standards & Labelling Programmes

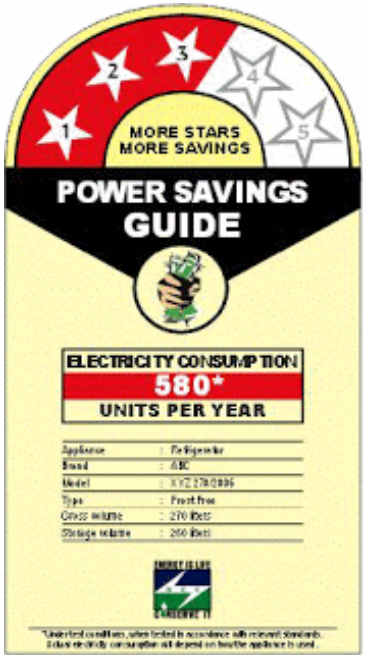
- S&L programmes have substantially reduced energy use and CO_2 emissions - very much cheaper than could have been achieved by other clean energy supply options.
- This conclusion takes into account any rebound effect.
- Improved health from higher thermal comfort and/or avoided air pollution; job creation and energy security - provide added justification for these programs.
- All S&L programs have the potential to expand in scope and ambition to deliver more energy and CO_2 savings.
- Governments should note these findings when determining investment options and priorities for meeting energy demand.

Linkages between policies

- Often more than one policy is required to create market transformation
- Some policies work well together
  - MEPS removes worst products; Labels incentivize best products
  - Procurement and financial incentives used to support highest labelled appliances

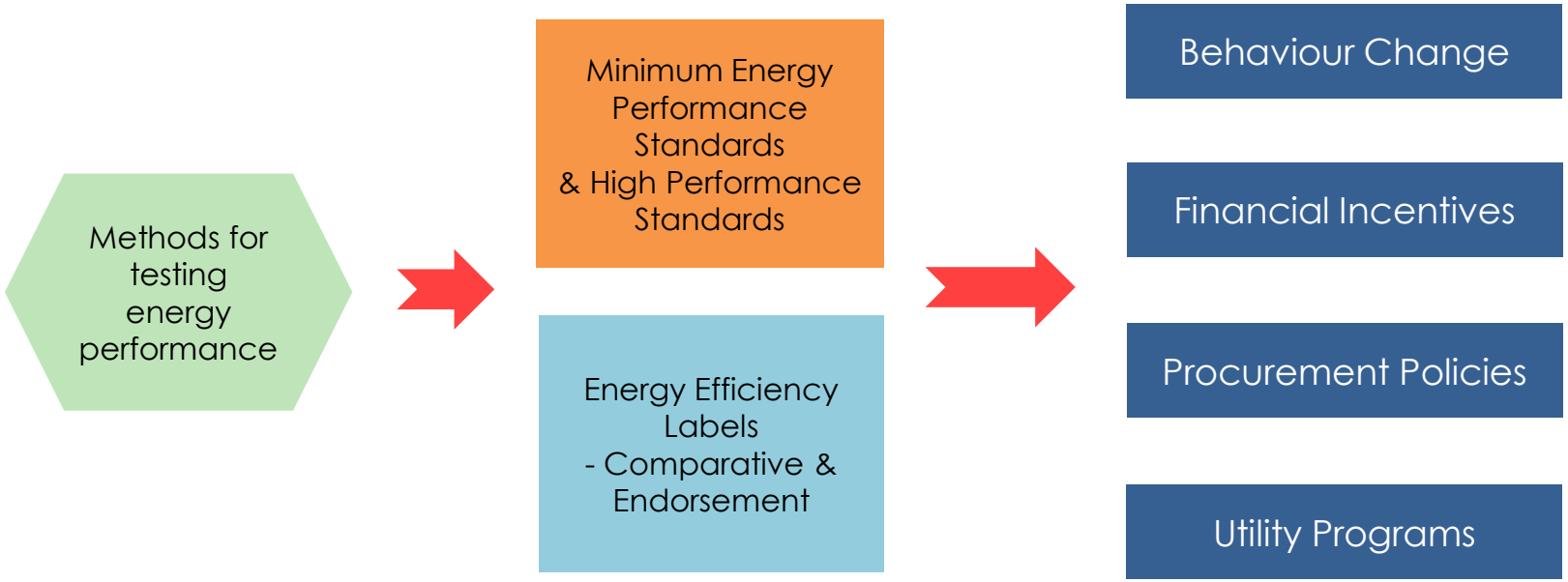
India's S&L programme

Mandatory Appliances	Voluntary Appliances
1.Room Air Conditioners	1. Induction Motors
2.Frost Free Refrigerators	2. Pump Sets
3.Tubular Florescent Lamp	3. Ceiling Fans
4. Distribution Transformer	4. LPG- Stoves
5. Room Air Conditioner (Casettes, Floor Standing)	5. Washing Machine
6. Direct Cool Refrigerator	6. Computer(Notebooks/ Laptops)
7. Color TV	7. Ballast (Electronic/ Magnetic)
8. Electric Geysers	8. Office equipment's (Printer, Copier, Scanner, MFD's)
9. Variable Capacity Inverter Air conditioners	9. Diesel Engine Driven Mono-set Pumps
10. LED Lamps	10. Solid State Inverter
	11. DG Sets



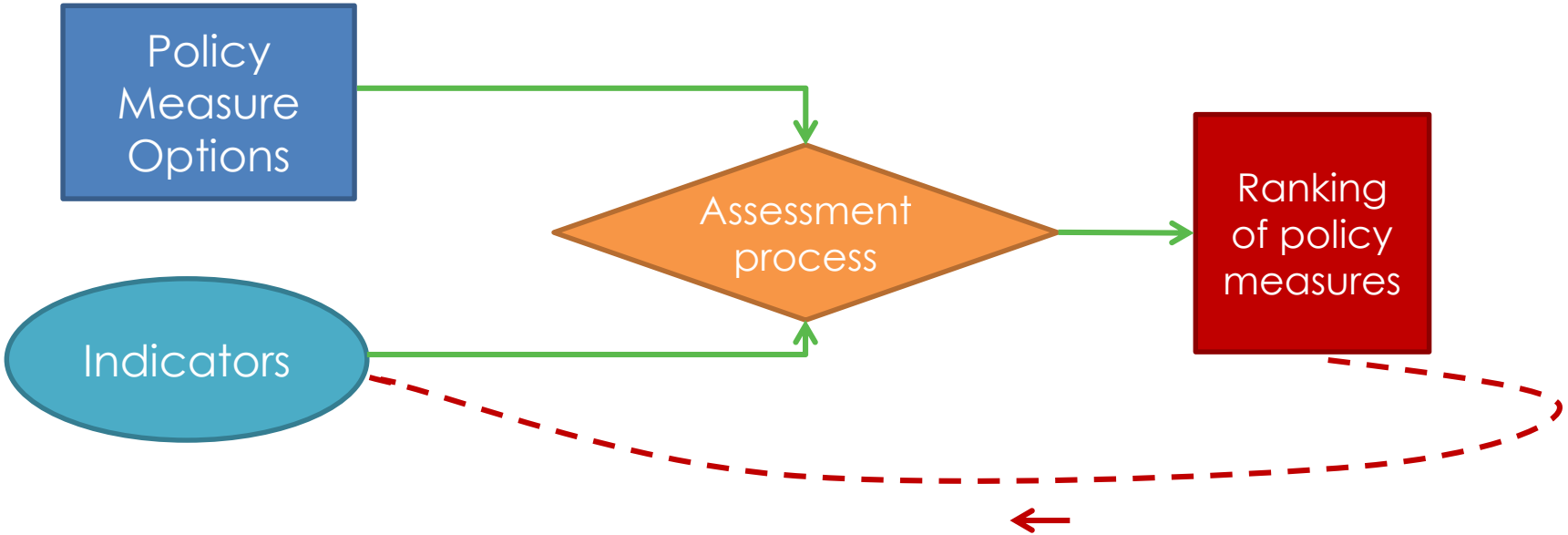
Linkages between policies

S&L Programmes can provide the technical foundation for a range of policy options
Other policies can leverage off the product definitions, metrics, test methods and performance levels established for better products



Initial assessment process

- Process to assess and rank best options
- Assess policy options against your important indicators



Data availability and accuracy

Indicators		Quantified assessment	Qualified assessment
Impact	Average appliance consumption		
	Overall energy reduction, peak load, ghg reduction, etc		
Resource Use	For government		
	For householders		
	For industry		
Employment	Overall employment impact		
Competition	Will competition increase?		
Speed & Ease of implementation	How fast will the impacts occur?		
	Support from key stakeholders		
Sustainability	Will the impacts be long lasting?		
Side-effects	Impact on appliance prices		
	Impact on local industry		

- Only very approximate data required to rank options
- Make use of overseas experience e.g impacts on prices and jobs
- Sometimes your 'best guess' may be sufficient
- Can add new data when available

Group Exercise

Complete a simple evaluation table for two different policies.

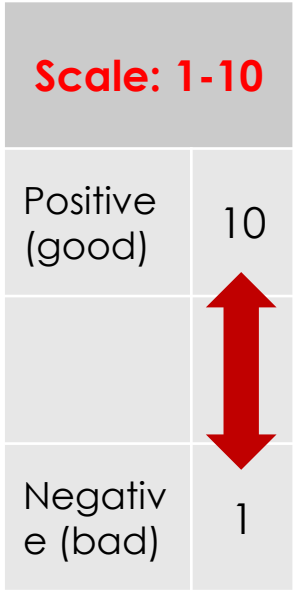
Objective: *Reduce Total Energy Consumption*

1. **Policy 1:** MEPS on residential water heaters

2. **Policy 2:** Rebate on super high residential efficiency water heaters (10% capital cost of equipment)

Evaluation Exercise

Indicators		Policy 1	Policy 2
1. Impact	Overall energy reduction		
2. Resource Use	For government		
3. Employment	Overall employment impact		
4. Competition	Will competition increase?		
5. Speed & Ease of implementation	How fast will the impacts occur?		
6. Sustainability	Will the impacts be long lasting?		
7. Side-effects	Impact on appliance prices		
	Impact on local industry		
TOTAL		**SUM-1**	**SUM-2**



Evaluation Exercise

Indicators		Policy 1	Policy 2
1. Impact	Overall energy reduction	**8**	
2. Resource Use	For government	**3**	
3. Employment	Overall employment impact	**5**	
4. Competition	Will competition increase?	**8**	
5. Speed & Ease of implementation	How fast will the impacts occur?	**5**	
6. Sustainability	Will the impacts be long lasting?	**7**	
7. Side-effects	Impact on appliance prices	**3**	
	Impact on local industry	**4**	
TOTAL		**43**	

Scale: 1-10	
Positive (good)	10
Negative (bad)	1

Evaluation process can be more detailed

- More indicators
- Add data where available
- Extend scale
- Add weighting to prioritize some factors

Summary

You will need to know about the attributes of different programme types:

- Industry /consumers often ask why government is doing more or focusing elsewhere
- Many regulatory impact processes require analysis of other policy options

An analytical approach is used throughout S&L programme planning

- Need to assess what level of information is sufficient
- How to deal with a lack of information
- Be aware of a range of concerns and particular sensitivities

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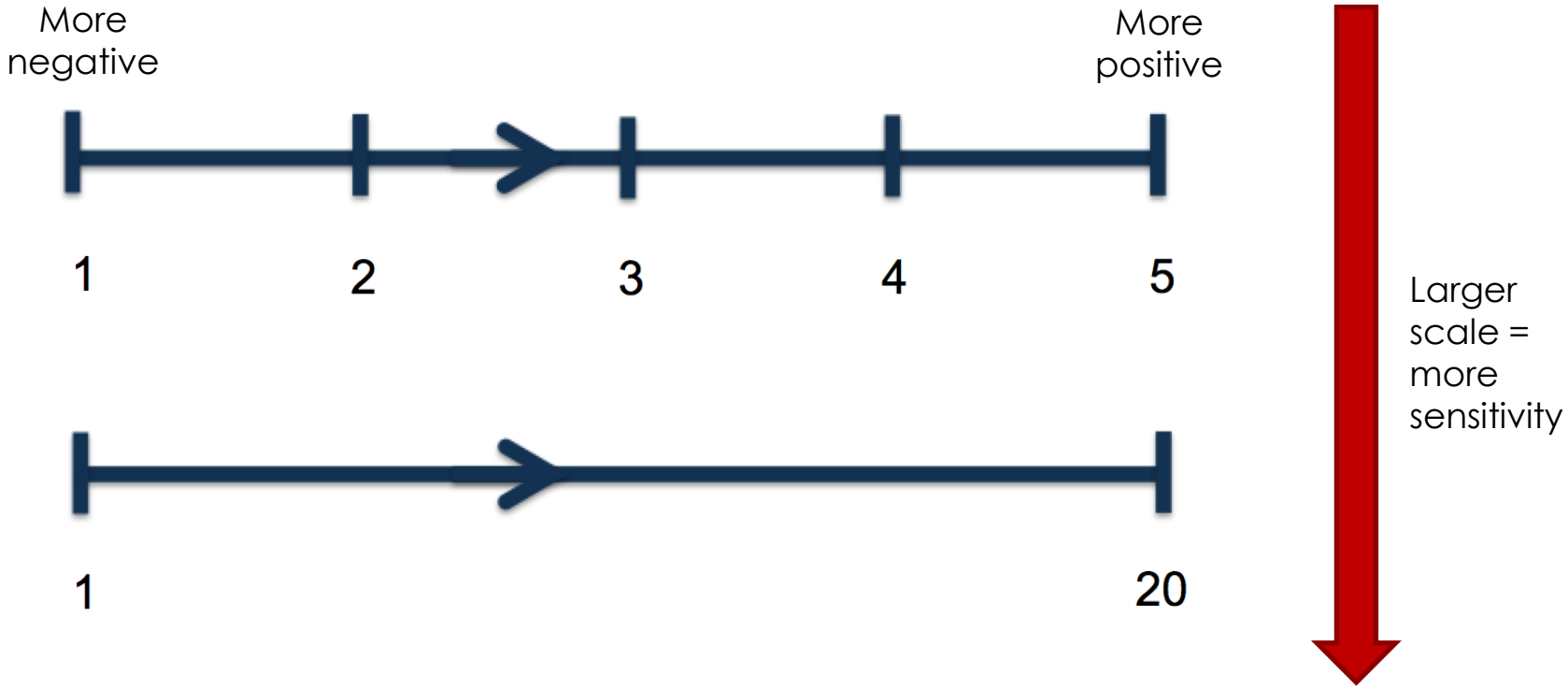
Ranking scales



Evaluation Table - weighted

Options	Indicator 1	Indicator 2	Indicator 3	Indicator 4	Total
	GHG savings	Lifecycle costs	Employment	Competition	
Option 1	4	2	2	3	**11**
Option 2	2	4	3	2	**11**
Weighting	**x1**	**x2**	**x2**	**x1**	
Option 1 (weighted)	4	4	4	3	**15**
Option 2 (weighted)	2	8	6	2	**18**

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