



energy

Department:
Energy
REPUBLIC OF SOUTH AFRICA

Energy Efficiency Training Week

Indicators and Evaluation

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IEA #energyefficientworld

Introduction

- Impact evaluation needs to demonstrate cause and effect
- Policy and programmes operate in a complex environment – multiple causes contribute to an effect
- Different methods of impact evaluation are suited to different policies and programmes and different types of questions
- Aim of this session is to introduce main impact evaluation approaches and their strengths and weaknesses
- And consider where data will come from to implement each approach

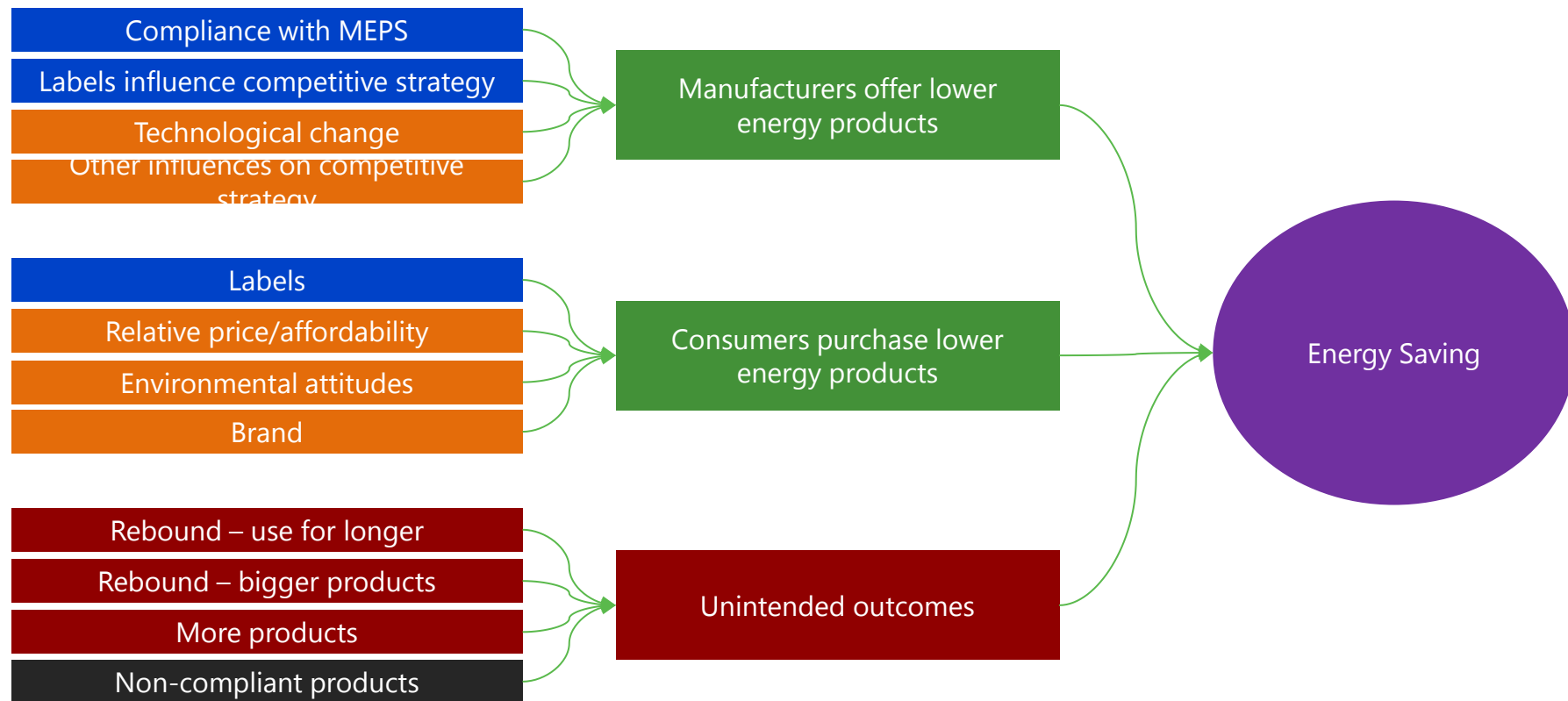
What is impact?

*Positive and negative, primary and secondary long-term effects **produced** by an intervention, directly or indirectly, intended or unintended.*

From OECD DAC

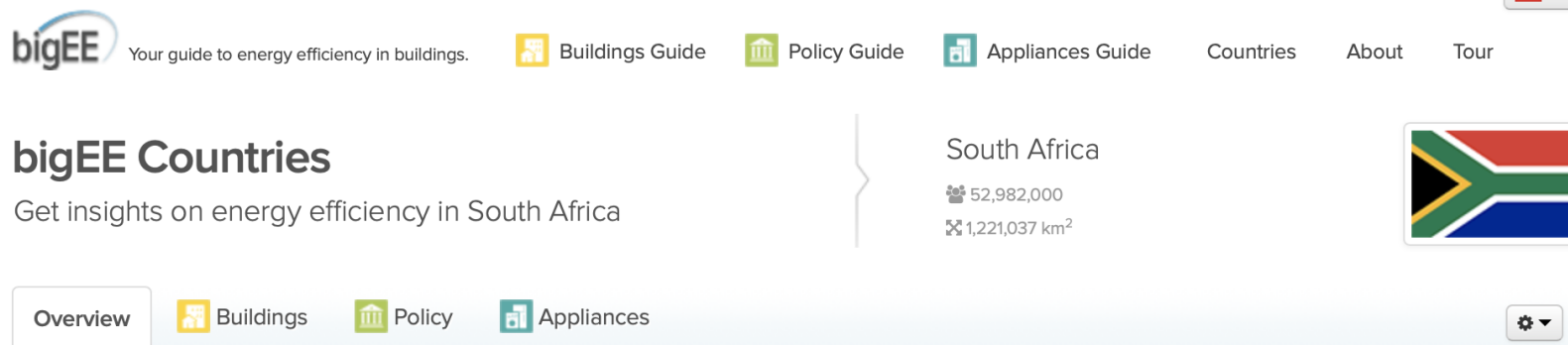
- What does impact mean for appliance and equipment policy – energy saving:
 - Compared to what (BAU, baseline)
 - By whom (rural, urban)
 - What energy (e.g. kerosene lamps to electricity)
 - Does it translate into \$\$\$ and CO2?
- What else might we be interested in?
 - Fairness
 - Prices
 - Jobs/economic development
 - Exports
 - Energy security

Did appliances and labelling policy make a difference?



Case study - modelling

- The bigEE programme looked at energy efficiency policies in South Africa, India and China
- Covered buildings, appliances and other key policies



The screenshot shows the bigEE website interface. At the top, the bigEE logo is followed by the tagline "Your guide to energy efficiency in buildings." and navigation links for "Buildings Guide", "Policy Guide", "Appliances Guide", "Countries", "About", and "Tour". The main section is titled "bigEE Countries" with the subtitle "Get insights on energy efficiency in South Africa". Below this, there are tabs for "Overview", "Buildings", "Policy", and "Appliances", with "Overview" currently selected. To the right of the tabs, the "South Africa" section displays the country's flag, population ("52,982,000"), and area ("1,221,037 km²"). A settings icon is visible in the bottom right corner of the page.

- <http://www.bigee.net/en/country/za/overview/>
- Co-ordinated by Wuppertal Institute for Climate, Environment and Energy.

Case study – fridge freezers

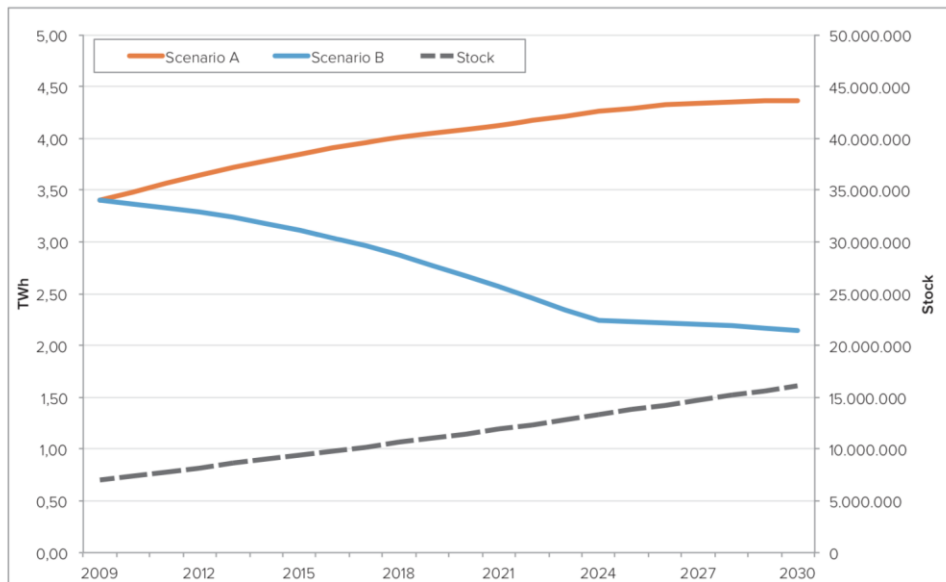


Figure 1: Total electricity consumption Fridge/freezers, Baseline Scenario (A) vs. Efficiency Scenario (B)

Source: Wuppertal Institute (2014)

Efficiency scenario assumes that all new appliances purchased are best available technology (BAT)

Savings:

- 44 TWh Electricity
- 29 Mt CO₂
- €1.9 billion saved by end users with additional costs of €1.7 billion

What can we learn from this? How could we use it? What doesn't it tell us?

Case study – fridge freezers

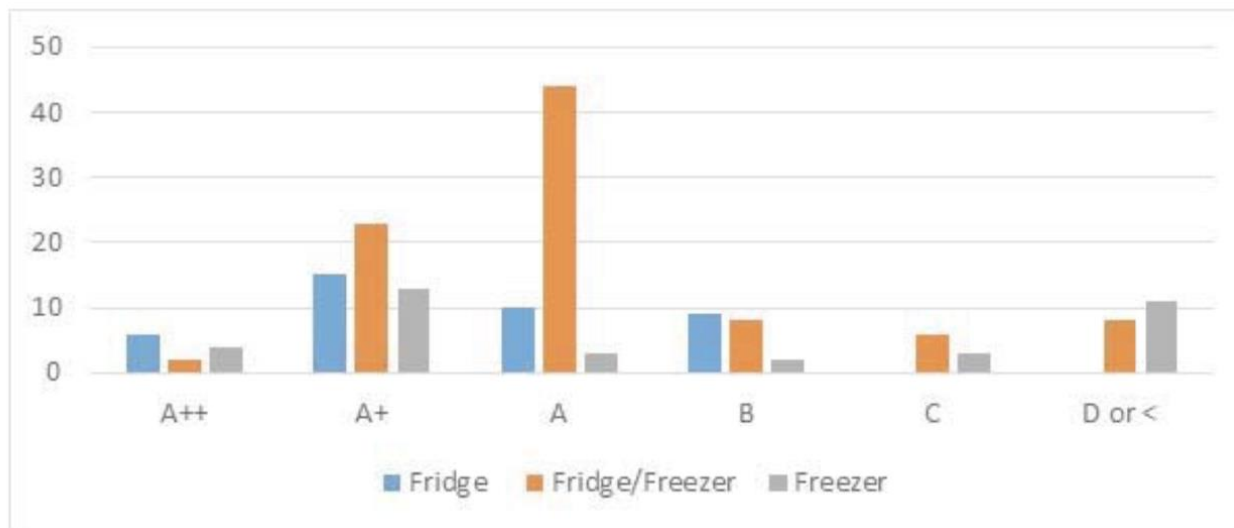


Figure 6: Distribution of models by energy rating (Category: Small)

Label ratings from market survey, number of models (2010)

Case study – fridge freezers

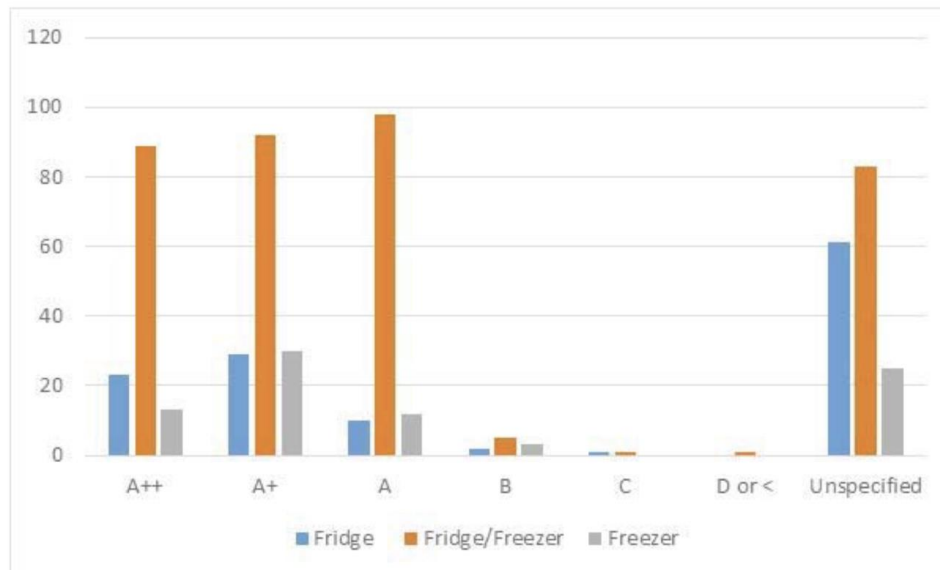


Figure 10: Distribution of models by energy rating (Category: Small)

Label ratings from market survey, number of models (2014)

Case study – fridge freezers

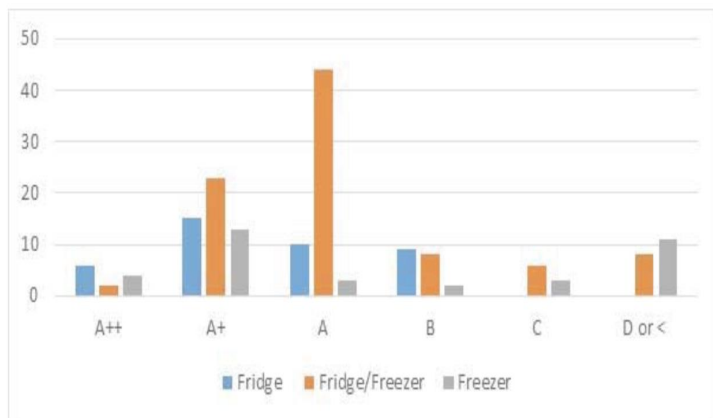


Figure 6: Distribution of models by energy rating (Category: Small)

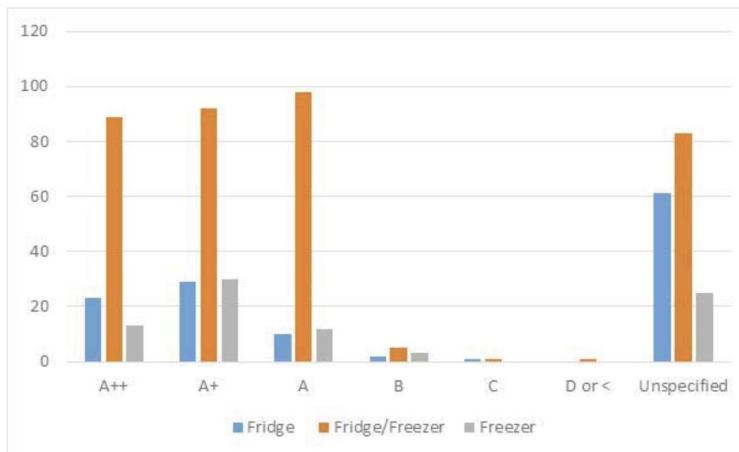


Figure 10: Distribution of models by energy rating (Category: Small)

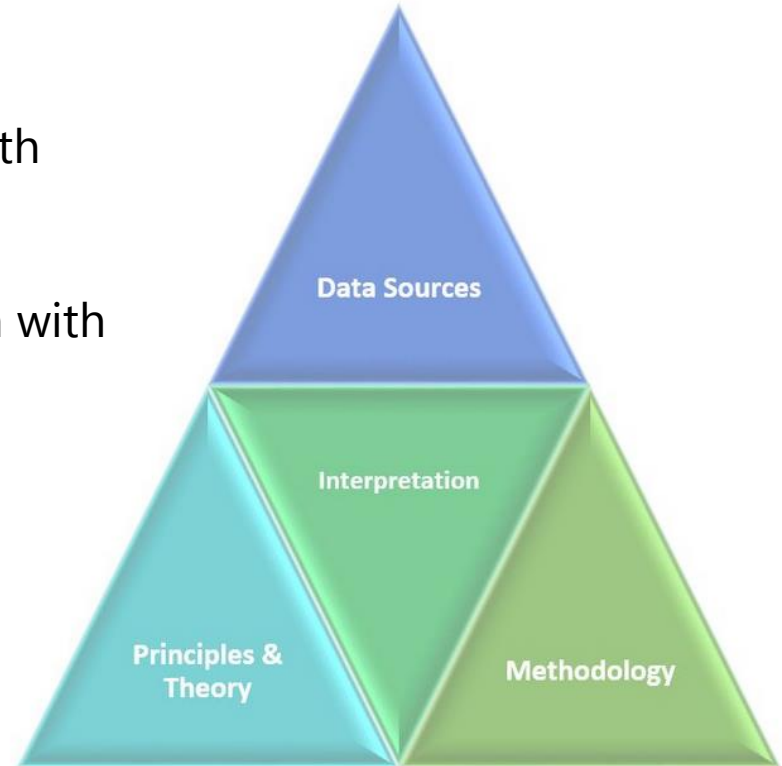
What can we learn from the comparison, what can't we learn?

What data do you need and where can you get it?

Data	Source
Ownership levels	Household survey/national statistics
Historic sales	Manufacturers
Current sales	Registration system/market survey
Replacement rate	Household survey/international experience
Annual hours of use	Household survey
Average energy consumption before policy	Market survey/manufacturers/assumption/ past household surveys
Energy consumption of efficient products	Registration system
Compliance levels	Market survey/enforcement action

Triangulation

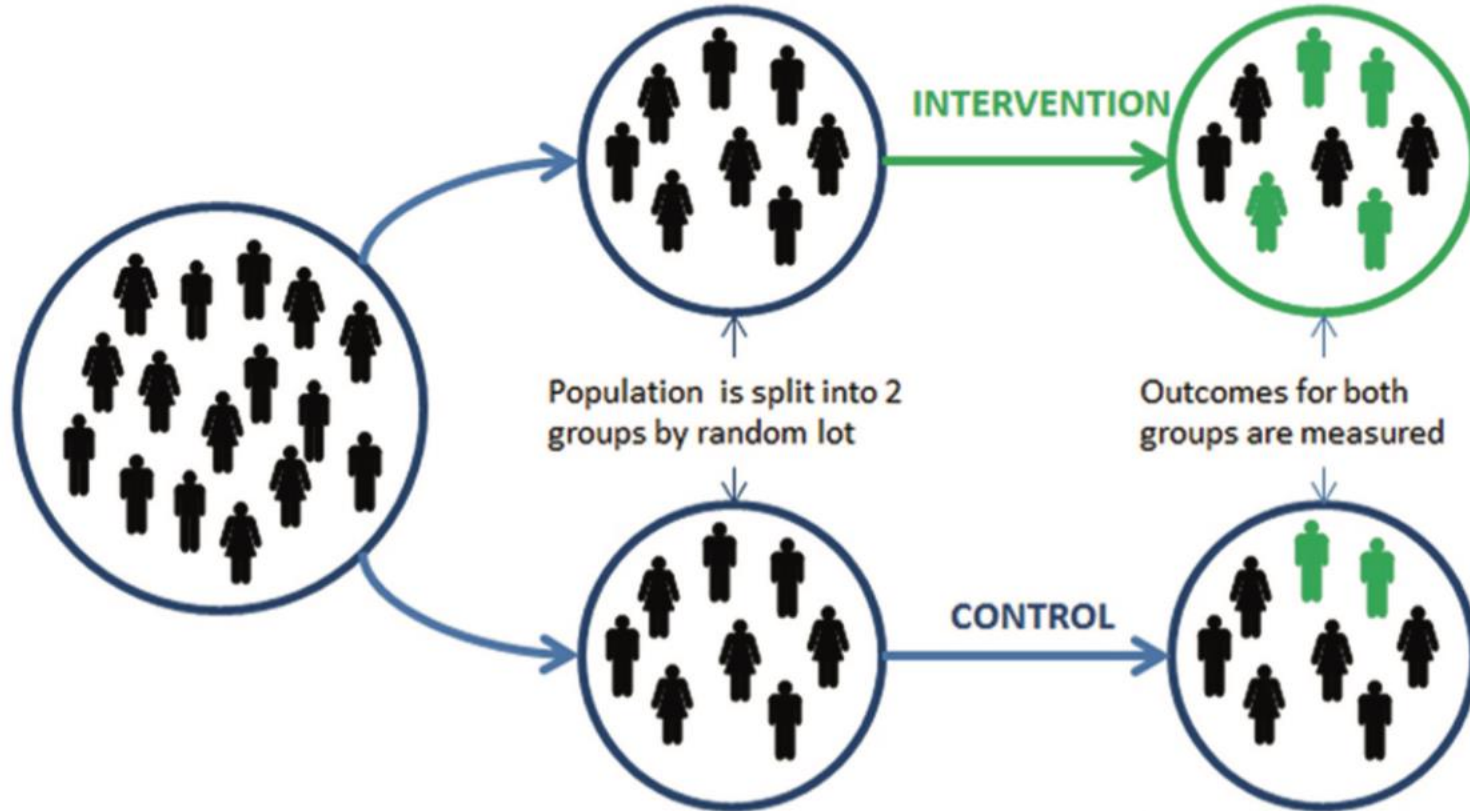
- Do data from different methods, sources and approaches align?
- Are the economy wide indicators consistent with the estimate of programme savings?
- Do data from manufacturers and retailers align with results of household surveys?



Did the policy make a difference?

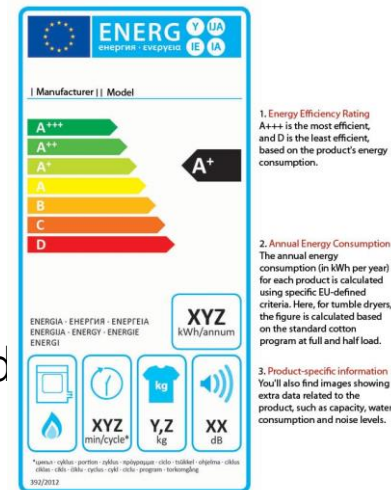
- Randomised control trial
- Statistical tests
- Contribution analysis

Approaches to causal attribution 1 – randomised control trial



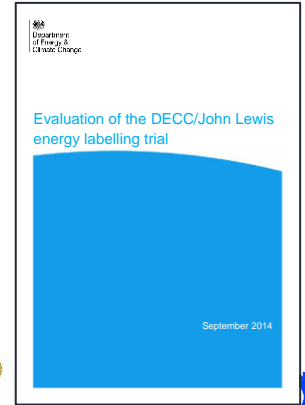
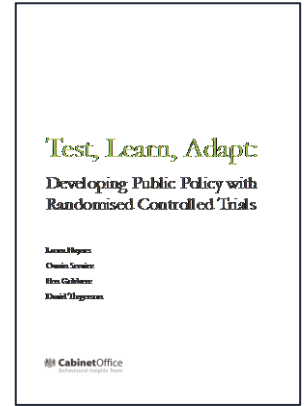
Approaches to causal attribution 1 – randomised control trial

- Test the inclusion of costs on energy label + staff training
- UK Government + John Lewis department store
- Trial group of stores compared to control group
- Small difference for washer dryers, no difference for other products



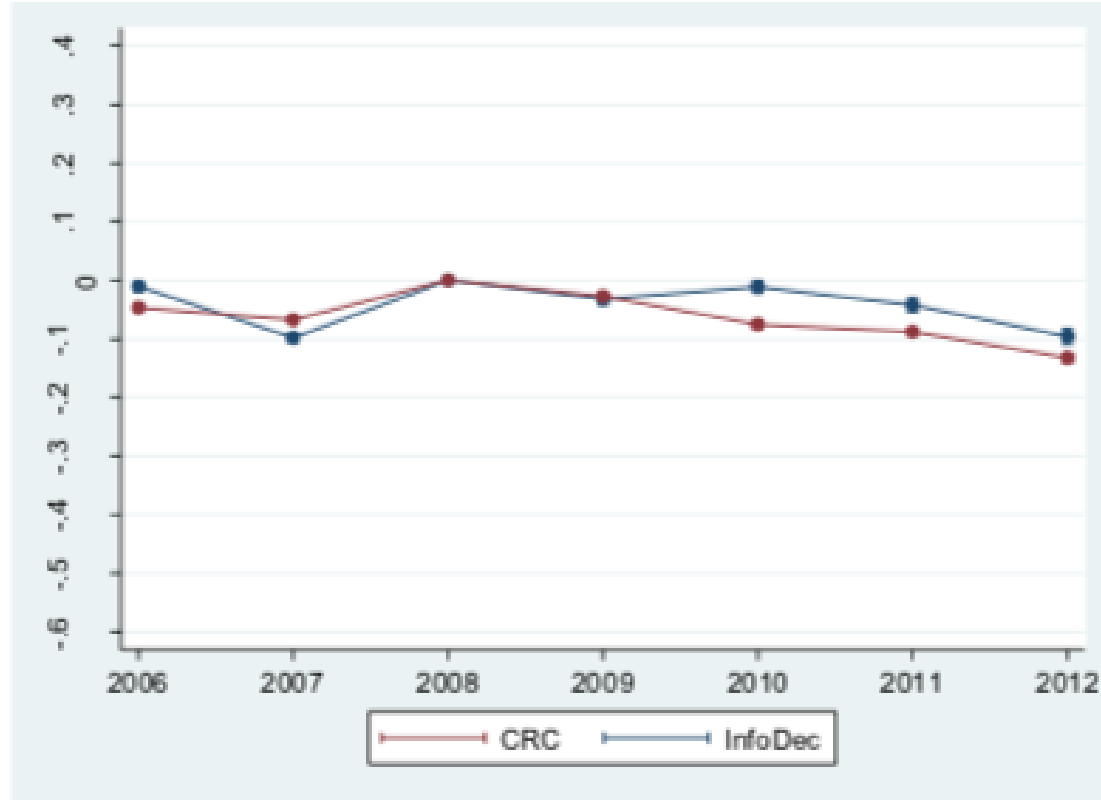
Approaches to causal attribution 1 – randomised control trial

- Strengths
 - “Prove” effect of policy
 - In the circumstances of the test (when, where)
 - For the indicator being measured
- Weaknesses
 - Doesn’t tell you why the policy worked/doesn’t work
 - Doesn’t tell you if the policy will work in other circumstances
 - Challenging to design and implement



Approaches to causal attribution 2 - statistical

- Difference in difference
- Using meter data can compare changes in energy consumption between the group subject to the policy and a comparison group (difference in difference) before and after the policy implementation.



Approaches to causal attribution 2 – statistical

- Strengths
 - “Prove” effect of policy
 - In the circumstances of the test (when, where)
 - For the indicator being measured
- Weaknesses
 - Doesn't tell you why the policy worked/doesn't work
 - Doesn't tell you if the policy will work in other circumstances
 - Depends on ability to obtain data

Approaches to causal attribution 3 – contribution analysis

- Develop theory of change
- Consider alternative explanations, develop contribution story
- Gather evidence of the results, the causal links and other influencing factors
- Refine contribution story, repeat as necessary
- Validate with stakeholders

Estimating the effect of energy labels – contribution analysis

- Contribution story, labels reduce energy consumption because:
 - Consumers have a reliable way of choosing energy efficient products
 - Manufacturers are motivated to produce more energy efficient products
- Theory based evaluation tests:
 - Whether the policy was implemented as intended
 - Whether there is evidence to support the theory
 - What else might explain what has happened

Evidence

- Vietnam Energy Efficiency Labels
 - Implemented for a range of products in 2014
- Evidence from
 - Interviews with manufacturers
 - Consumer interviews and survey
 - Registration system
 - Label compliance survey

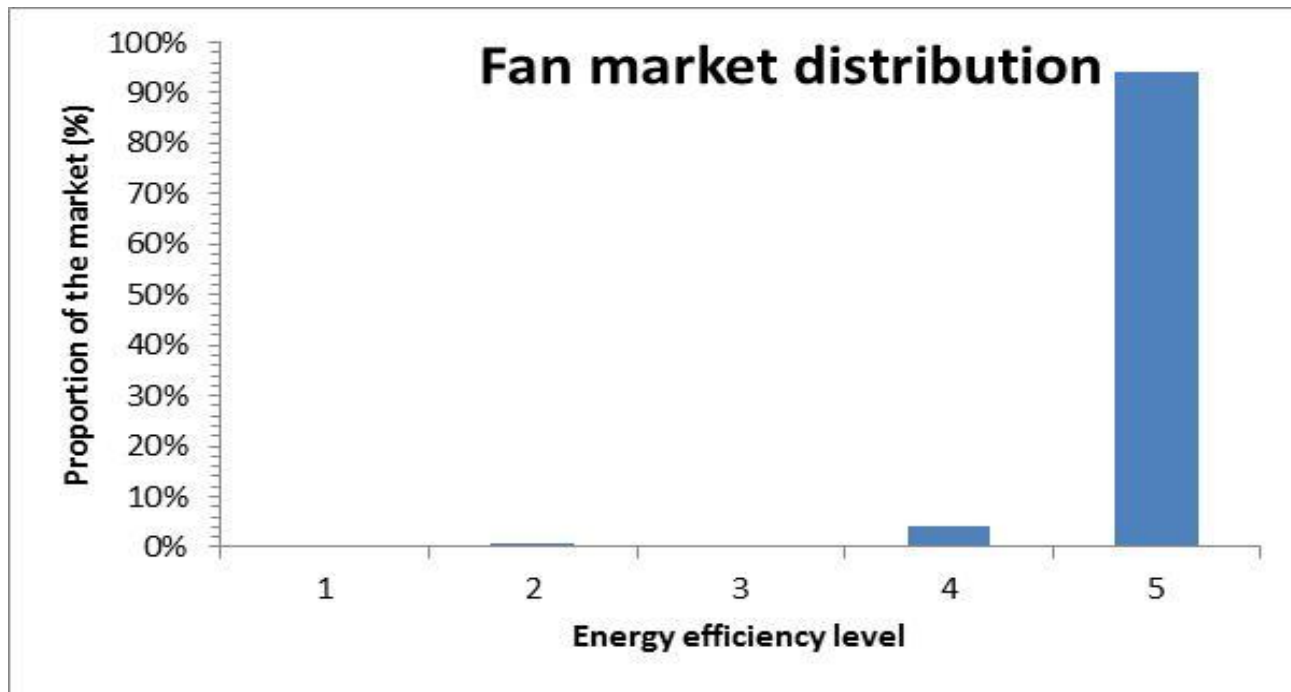


Results

- Interviews with manufacturers found that labels had a:
 - Significant influence on manufacturers of air conditioning and refrigerators
 - Moderate influence on manufacturers of fans, rice cookers and lighting
 - No influence on manufacturers of washing machines and televisions
- Survey of consumers found that labels influenced 85% of purchases to some extent
- Alternative explanations
 - Technological change
 - Spillover from other markets
 - Brands

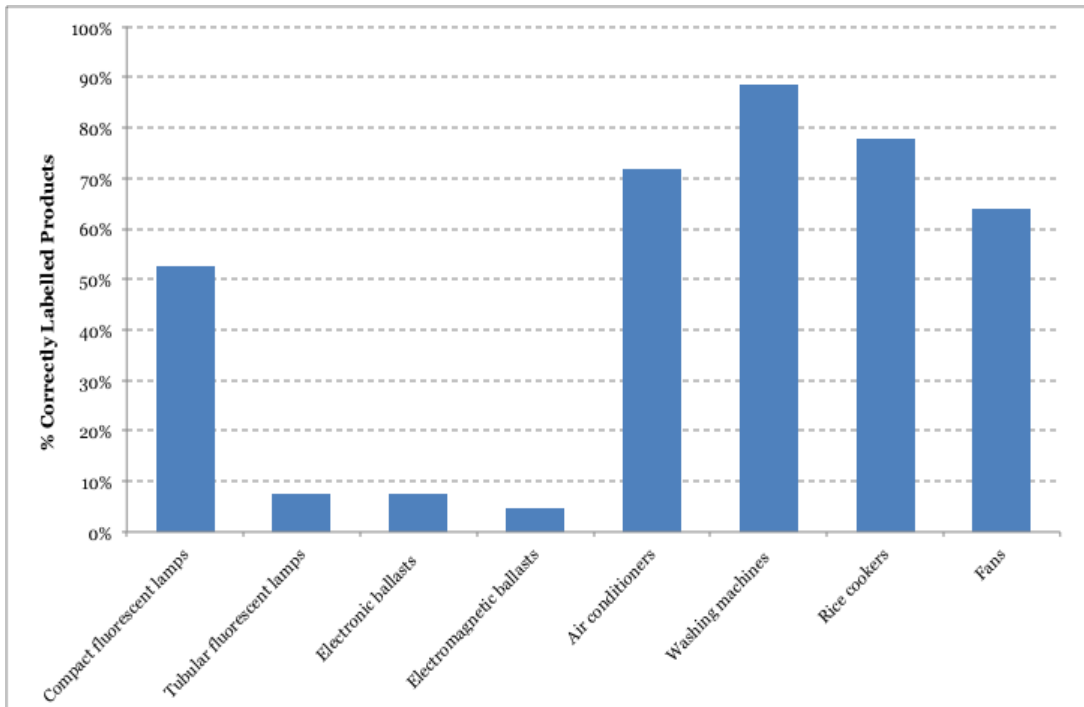
Example of theory based evaluation

- But in some cases policy not implemented as intended:



Example of theory based evaluation

- And there isn't full compliance with the policy



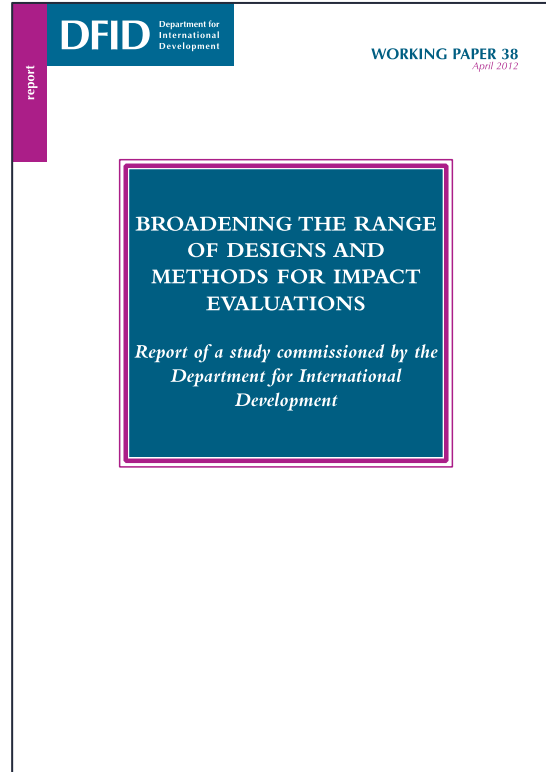
Effect of Vietnam Energy Efficiency Standards and Labels

Product	Manufacturers	Consumers	Compliance	Net effect
Air conditioning	Significant	85%	71%	60%
Refrigerator	Significant	85%	n/k	63%
Fans	Moderate	No	64%	32%
Rice cookers	Moderate	85%	78%	33%
Washing machines	None	No	88%	0
TVs	None	No	n/k	0

Approaches to causal attribution 3 – contribution analysis

- Strengths:
 - Reflects more of the influences on outcome
 - Explains why and how change happens
 - Utilises diverse evidence
- Weaknesses:
 - Approximate impact estimate
 - Doesn't provide proof of impact
 - Complexity can be challenging to communicate

Approaches to causal attribution – further reading





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