Evaluating the Multiple Benefits of Energy Efficiency

Project description

Project goals

To clarify and evaluate the multiple benefits of improvements in energy efficiency by:

(i) Understanding and quantifying the range of socioeconomic, sectoral and macroeconomic outcomes delivered by energy efficiency improvements;

(ii) Evaluating the link between positive outcomes of improved energy efficiency such as health and well-being, employment, competitiveness, affordability, economic development on the one hand and the reduction in energy savings and climate change mitigation attributed to some of these wider benefits (the rebound effect) on the other.

The outputs of this project should be useful to policy makers both in developing a more robust cost/benefit evaluation of energy efficiency policy and in rebutting critics of energy efficiency policy.

Rationale

The benefits of energy efficiency policies have generally been narrowly defined in terms of energy savings and GHG emissions reductions alone. However, it is apparent that improvements in energy efficiency also deliver a range of broader multiple benefits for society. The IEA has identified at least 8 of these: health and well-being, energy affordability for low-income households, increased asset values, energy security, avoided energy infrastructure investment, employment, industrial productivity benefits, and increased consumer surplus. These benefits have largely been left out of cost/benefit analyses to date because they are more difficult to quantify and monetise. It is important to be able to put a value on all costs and benefits of energy efficiency in policy evaluation. Evaluation methodologies and default ranges of estimates need to be developed for the range of non-market benefits, in order to make it possible for policy makers to include them in policy evaluation and generate an accurate policy impact assessment.

At the same time, the claim that energy efficiency improvements do not deliver energy savings because of the rebound effect has resurfaced recently, especially in the United States media (New Yorker 2010; Economist 2008; WSJ 2009; NYT 2011) and in a recent spate of discussion in the energy policy literature (UK ERC 2007, Breakthrough Institute 2011). Some of this commentary suggests that mainstream energy efficiency policies are undermined by the rebound effect and have created uncertainty amongst government energy officials and politicians as to whether energy efficiency policy is indeed an effective strategy to pursue.

An advantage of clarity on the broader outcomes of energy efficiency improvements is that it will provide a better understanding of the nature of the rebound effect and whether it is avoidable or not. The rebound effect describes the phenomenon seen when energy efficiency policies achieve lower energy savings than expected, due to increased utilisation of the energy-using device. As a result, energy security and GHG emission reduction outcomes are affected. However, there are cases where this rebound has a positive impact for other social concerns *e.g.* studies conducted in

US and New Zealand have shown a direct link between energy efficiency improvements and increased health and well-being, despite limited energy savings. Some outcomes, while positive, may result in increased energy consumption elsewhere (sometimes referred to as 'take back') *e.g.* increased consumer surplus can be spent on more or less energy-intensive activities. In this context the rebound effect could be viewed as the necessary manifestation of the achievement of wider societal goals. This is particularly so in developing countries, where the rebound effect reflects the benefits of energy efficiency measures in terms of delivering development goals at least cost.

The questions for governments are: how to design energy efficiency policies that maximise energy savings while also delivering other prioritised co-benefits; and how to communicate the rationale for energy efficiency policy sufficiently to respond to the critics. The IEA published a report in 1998 and a short summary in 2005 discussing the rebound effect. This new work responds to the need for a more robust policy evaluation framework and to "drill down" further in understanding the energy efficiency policy outcomes for different end-uses, end-users and policies, and to better distinguish rebound effects from a broader outcomes perspective.

Main project activities

(i) Desktop study on multiple benefits of energy efficiency improvements and link to rebound effect. This will:
   - define the multiple benefits and rebound effects in terms of energy efficiency;
   - provide a range of estimates where available from the literature on energy efficiency benefits for different sectors. Initial focus is on energy security, avoided energy infrastructure investment, health, employment, industrial productivity benefits.
   - clarify what are the types of rebound effect that need to be considered in policy design, implementation and evaluation.

(ii) Workshop on energy efficiency policy outcomes with sessions on each of the wider benefits of energy efficiency improvements; case studies; design of mitigation policies for patently undesirable rebound or take-back; how can outcomes be maximised in energy efficiency policy; and rebound effect in developing countries.

(iii) In-depth analysis including collection of data and analysis. This stage will require additional resources and will involve collection of data in the areas identified in the desktop study and workshop, *e.g.* sectoral level consumer data, industrial output and employment figures by subsector, health indicators, and energy security indicators. A full analysis with a report and guidelines for policymakers will be produced.

Ways to participate

A key objective of this work is to share information on documented outcomes of energy efficiency improvements between countries and experts. One important piece of this process will be a workshop on evaluation methodologies. The IEA encourages countries and experts to contact the IEA secretariat and share information with the team on approaches and evaluations already performed.

Contact partners

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