

SESSION 8

TOP-DOWN POTENTIAL IN ENERGY EFFICIENCY POLICY ANALYSIS

Moderator: Walter Cariani - Anna Maria Sàlama, ENEA

PAPERS:

A Decomposition Approach to Evaluating the Progress of the New Green Economy

Luis Mundaca International Institute for Industrial Environmental Economics at Lund University, Sweden

Brian Cloughley, International Institute for Industrial Environmental Economics at Lund University, Sweden

The View from the Top: Application of Macro-Economic Models to Measure Energy-Efficiency Program Savings in California

Hossein Haeri, The Cadmus Group, Portland, Oregon

Jim Stewart, The Cadmus Group, Portland, Oregon

Ayat Osman, the Energy Division, California Public Utilities Commission, San Francisco, California

An Analysis of Eco-Efficiency in Energy Use and CO₂ Emissions in the Swedish Service Industries

Clara Inés Pardo Martínez, University of La Salle, Bogotá, Colombia

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Semida Silveira, Royal Institute of technology (KTH), Stockholm, Sweden

SESSION SUMMARY:

This session will focus on Top-Down methods (TD) applied to assess the effectiveness of energy efficiency and environment driven policies and measures under different circumstances/contexts.

A TD approach aims to overcome the weak points/shortcomings of the Bottom-Up methods (BU), that are generally time and resource intensive, because of extensive requirements for primary data collection and often leading to overestimations of energy savings since they fail to properly account for possible technical interactions among measures and programs. As well known, BUs refer to single measure/intervention, while TDs reflect an holistic approach that leads to results very useful in a policy-making process.

The three papers today presented are focused on the followings issues:

- To propose, utilize and assess a macro-decomposition ex-post policy evaluation framework to quantitatively measure progress towards a Green Energy Economy GEE. The scope of the research is limited to the topical aspects of CO₂ emissions, an important environmental component of a New Green Economy NGE. However, the original contribution relies on moving beyond an approach based on the ratio between expenditures on green initiatives and GDP, thus giving more emphasis to the impacts of packages of policy instruments, whose performances have to be well taken into account by policy makers. The estimation of the trends for the three intensity indicators (energy-carbon-emission intensities) over time in Sweden, UK and China, shows how CO₂ emissions, GDP variations and energy efficiency (energy intensity) are interrelated and whether resources or environmental impacts decline relative to economic growth (decoupling). As a result, criteria are given with reference to the importance of using

numerous evaluation criteria that can capture and characterize the multiple attributes of a policy instrument, when assessing the effectiveness of a policy measure. The core

- To assess and test the viability of using alternative TD approaches that use aggregate consumption and macro-economic data to measure reductions in energy use, resulting from energy-efficiency programs. So far, in the USA, energy savings and the cost-effectiveness of energy-efficiency have been evaluated using BU approach, a mix of techniques based on engineering, statistics, market research, or combinations of these. However, recently the California Public Utilities Commission (CPUC) has expressed interest in considering a full range of T-D evaluation methodologies, in order to obtain reasonably accurate and reliable means of meeting the three following key policy objectives: a) Estimation of energy savings attributable to programs operated by California's investor-owned utilities (IOUs); b) Assessment of the state's progress toward achieving its greenhouse gas reduction goals; c) Forecasting energy-efficiency programs, codes and standards, and naturally occurring savings for use in developing long-term forecasts of state electricity demand. The study results indicate that the TD approach is a viable method to estimate aggregate, system-wide effects of energy efficiency investments, particularly for estimation of market gross savings for measuring progress toward California's greenhouse gas reduction goals. The approach sounds relatively inexpensive to implement, particularly in comparison to the conventional BU method. However, too many uncertainties about measuring naturally occurring savings preclude reliance solely on these methods.
- To evaluate trends in energy efficiency and CO₂ emissions of the Swedish service sector over the period 1993-2008 based on the Data Development Analysis and the Data Panel Technique. The analysis demonstrate the importance of designing and applying adequate energy policies in order to foster the transition towards a low carbon economy. The service sector, hereby described as service industries, as one of the main drivers of every country's growth, has been investigated/observed to determine the potential to further improve energy efficiency and the decrease of CO₂ emissions, as well as to identify the most affecting variables (such as energy taxes, investments and productivity etc.) towards a low carbon economy.

A common inspiration source among the three papers is the need to overcome the weaknesses of the BU approach. A key finding is that even if TD methods are less expensive and more suitable as support to policy-making system, in comparison with the conventional BU methods, still uncertainties remain, that preclude reliance if applied in isolation while suggest a combined use of the two approaches to better assess the effectiveness of energy efficiency policies and measures.

An additional "fil-rouge" linking the three papers is that data collection and processing has proven to be a key element in TD analysis. In fact, although this is a relevant issue for the BU methods, due to their extensive level of data collection and process for each considered measure, also TD approach require significantly greater effort than expected. This is due to the fact that very often data are not homogeneous, since they are available from heterogeneous kind of organizations, at different geographical levels and have to be converted to minimize the potential for error.