



Drivers of Regulatory Reform in Energy Efficiency and Renewable Energy

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The energy sector is among the most dynamic and rapidly evolving sectors in the global economy. Policies suited to a particular set of economic and technological conditions may quickly become outdated as a new set of attributes come into play. The US shale gas boom and the Fukushima nuclear disaster in Japan are two recent examples that have transformed policymakers' conceptions of energy sector priorities and policy choices.

Regulatory regimes for promoting energy efficiency and renewable energy initiatives, if poorly conceived, can be costly and unintentionally cause large welfare losses. Energy, like transport and telecommunications, is a key intermediate input across all sectors of the economy, and distortions in its price or reliability can have large economic and social costs. It is thus critical to assess the efficacy of regulatory reform in the areas of energy efficiency and renewable energy. This policy brief is based on the findings from the APEC Policy Support Unit (PSU)'s commissioned study entitled *Regulatory Reform – Case Studies on Green Investments*.² It gives a summary of the motivations behind regulatory reforms in the energy sector, as well as the design and implementation of such reforms, based on the experience of APEC economies in implementing energy efficiency and renewable energy policies.

Motivation for regulatory reform in the energy sector

Energy security and environmental sustainability are underlying factors motivating regulatory reforms in energy efficiency and renewable energy sectors. Nevertheless, other factors such as the level of economic development also influence energy policymaking. The oil crises of the 1970s highlighted the energy security risks of over-reliance on imported oil. In the aftermath of the crisis, governments began implementing energy efficiency and conservation policies to reduce overall energy consumption and diversify their energy sources. Much of the initial push for renewable energy from governments was also underpinned by the desire to diversify away from imported oil, the clearest example being the promotion of biofuels in the US as an alternative fuel to gasoline in transportation.

More recently, environmental concerns related to global climate change have been given added impetus to government efforts at promoting energy efficiency improvements and renewable energy technologies. Climate change has persuaded governments to look for energy alternatives to coal and oil in particular. Regional and local pollution and safety concerns (e.g. with nuclear energy) have played a role in shaping policies on energy efficiency and renewable energy as well.

Domestic concerns to retain relative economic competitiveness among trading and investment partners have played a key role in energy policy dialogues in various forums.

APEC economies have been among the pioneers in the introduction of regulations to promote energy efficiency and renewable energy. In order to diversify sources of power generation, governments are trying to promote the use of non-conventional sources, including renewables such as solar, wind, biofuels and geothermal sources. The need to use energy resources more efficiently has also been the focus of governmental efforts in promoting energy efficiency over the past two decades. This is seen in efforts to encourage behavioral norms, such as Japan's Cool Biz program, which started in 2005 and discourages setting air conditioning devices below 28 degrees centigrade during the summer. Various APEC economies have also been active in the development of standards such as building codes and fuel efficiency requirements for automobile producers to reduce energy intensities in key sectors such as buildings and transport.

Private sector involvement in the reform process is often critical to successful outcomes. A good example is provided by the case study on energy efficiency in appliances. In 1998, Japan adopted the Top Runner program for improving energy efficiency in appliances after trying out energy performance standards for many years. The Top Runner program, by simply taking the existing best performing appliance as the target to be achieved in the next period, simplifies the regulatory process and allows manufacturers flexibility in how they wish to achieve the target.

Regulatory reform in the energy sector can also be extremely difficult to implement when significant constituencies exist in support of existing inefficient policy regimes, for example those which carry subsidies. There are a large number of developing economies that subsidize fossil fuel use in the transport and power generation sectors, causing wasteful inefficiencies and burdening the public budgets in those economies. The estimated size of fossil fuel subsidies in 2010 was USD 409 billion; the Asia-Pacific region constitutes a significant proportion of these subsidies, with 10 out of the 21 member economies of APEC accounting for USD 105 billion in fossil fuel subsidies in 2010.³

It is clear that for a significant number of economies, often including those that can least afford it, the single-most important example of market failure is fuel and power subsidies. To capture economic benefits from market-based pricing in the key infrastructure and energy sectors, countries need to wean off fuel and power subsidies in favor of programs that include well-targeted social safety nets. In the context of unsustainable public sector deficits, maintaining a stable investment climate for private sector investments while implementing needed energy sector reforms has become a careful balancing act for policymakers.

Governments in many developing countries face challenges in eliciting popular support for market-oriented

energy sector reforms when political viability and durability is a higher order criterion than economic efficiency. Similar constraints of political feasibility also operate in many developed economies. For example, the political constraints on imposing gasoline taxes as a means of improving fuel economy in the transport sector have shaped the U.S. federally mandated approach toward vehicle efficiency (CAFE) standards.

Design and implementation of regulatory reforms

The effectiveness of reforms has varied both across APEC economies and across different sectors. Based on the analysis presented in the PSU's commissioned study on *Regulatory Reform – Case Studies on Green Investments*, the following factors are especially pertinent to determining the success of the regulatory reform process.

Executive Leadership and Institutional Coherence to conduct reforms

The implementation of energy sector reforms involves cross-cutting efforts across various ministerial and agency jurisdictions within government at local, provincial and national levels. Multi-sectoral policies require clear coordination across government entities. It also requires that different divisions within institutions to coordinate properly. The clear delineation of responsibilities among all entities involved in the reform process facilitates the implementation of reforms. The greater the scope and implications of the proposed reforms, the greater is the need to have clear inter-ministerial task force structures with clear executive authority from Cabinet and Central governments. In particular, there needs to be coordination among key ministries across the trade, industry, energy and finance portfolios.

The complexity of reforms usually requires multi-sectoral teams comprised of experts in different areas of specialization. Also, it requires coordination at the political level among authorities to make high-level executive decisions when necessary and steer the process in the right direction.

Coordination among institutions is achieved in various ways. For example, Japan uses inter-ministerial committees to align positions among ministries and implement coherent policies. In addition, Japan's experience in energy efficiency in the buildings sector shows that new or amended laws can be implemented easier when it is clearly defined which government agency is in charge of each aspect concerning the reform process.

Similarly, the United States has delineated the roles between agencies and established jurisdictions between Federal and State governments over the implementation of policies. For example, the Federal government is in charge of fuel economy labeling, whilst fuel economy standards are established by State governments in some of the states.

In Australia, the policies between the Federal and the State governments are coordinated through the Council of Australian Governments (COAG), which includes the Prime Minister as its chair. COAG helps to align policies in energy policy. For example, COAG has been reviewing existing climate change programs to ensure complementarity with the carbon pricing scheme. However, this coordination mechanism has not been able to prevent policy overlaps in some cases, such as the solar photovoltaic (PV) sector, in

which the duplication of efforts to support solar PV systems across federal and state jurisdictions led to a large increase in scheme costs and the subsequent cancellation of many of these support schemes.

Stakeholder consultation and communication with constituencies

Within APEC, policymaking in general is becoming a more transparent process. In many developing economies of APEC, with a growing and educated middle class constituency and the increasing activity of non-governmental organizations concerned with social and environmental issues, there are increasing pressures for establishing transparent and equitable processes in introducing new regulations or in reforming existing regulatory regimes. This increasing demand for transparency can be a positive motivating factor in government initiatives to obtain the buy-in from affected constituencies required for efficient implementation of regulatory reforms.

Promoting awareness of the expected social and economic benefits of proposed reforms is important in effective implementation of energy sector reforms. For example, public campaigns and awareness programs in Japan have helped overcome barriers in the implementation of energy efficiency policies in the buildings and appliances sector. In the Philippines, there has been mass dissemination of information on the potential benefits of the National Residential Lighting Program, launched in 2009, through the use of compact fluorescent lights (CFLs), in order to improve energy efficiency. The program has generated broad social awareness and its implementation is in force.

Public-private partnerships have been important in introducing energy-related regulations. In cases where key industry stakeholders are actively engaged and consulted in the policymaking process, the process of implementing reforms is considerably eased. Cases in point include the setting of appliance standards in Japan and the Philippines, where manufacturer groups are actively involved in the policy formulation and revision processes.

Avoidance of regulatory capture

Stakeholder engagement is very important as it brings legitimacy to any regulatory reform process. While there are obvious benefits from engaging stakeholders in policymaking, it is important to recognize the dangers of stakeholders having too much influence on the policy outcome. When the regulatory reform process is dominated by interest groups looking to further narrow sectional agendas, it is usually at the cost of socially-optimal policies.

The case of biofuels in the United States is a clear example. Biofuels have not been profitable without the existence of subsidies for more than three decades. Numerous studies find that biofuels have not been cost effective and are not necessarily environmentally friendly either due to the consequences of the change of land use.⁴ Nevertheless, subsidies to biofuel farmers in the US still remain, in part because of the pressure by the agricultural lobby to keep them in place.

Sequencing and timing of policies

Linkages between related policies can enhance their overall effectiveness, but this requires policymakers to pay careful attention not just to policy design, but also to the appropriate sequencing and timing of policies.

Advancing Free Trade for Asia-Pacific Prosperity

APEC Member Economies: Australia; Brunei Darussalam; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; Philippines; Russia; Singapore; Chinese Taipei; Thailand; United States of America; and Viet Nam.

Energy efficiency policies in household appliances provide an example, since it is important to align new standards with labeling systems in a coordinated manner. Public education campaigns and mass media coverage can help in roll-out of policies, where affected constituencies are informed of sequence and timing of specific regulations. Otherwise, the lack of alignment and incorrect sequencing could limit potential gains of the measures, as take up rates and participation remain limited among poorly informed constituencies. In the Philippines, labels are implemented to complement standards and other incentive schemes, which help to increase the effectiveness of the policies aiming to improve energy efficiency in the use of household appliances.

Continuity of reforms and policy revisions

Regulatory reform is a continuous process. Economic, political and social conditions are not static and policies require adjustments as conditions change. In many cases, governments have been flexible in reviewing policies to respond to changes in existing conditions. For example, in the case of solar PV, Thailand has periodically revised solar PV targets, tariffs and other regulations in reaction to the changes in market conditions.

In certain cases, policies are updated by rule after a specific number of years. For example, the United States renews its fuel economy policies every five years taking into account stakeholder feedback and technology changes. Similarly, the Top Runner program for appliance standards in Japan involves regular and periodic updates and is even more flexible in that consultative deliberations for determining future standards can be re-opened even before the target year. However, such flexibility and continuity of reforms is not universal across APEC and this remains an area where regulatory reform practices can be improved.

Using cost-benefit analysis in the decision-making process

Cost-benefit analysis (CBA) has not been the norm in the case studies on energy efficiency and renewable energy presented in the PSU report.⁵ As a result, it is not entirely evident to policy makers as well as affected constituencies whether proposed regulations which are expected to yield the greatest net benefits to society are being selected during the policy formulation stage, nor whether existing policies are being adequately evaluated on an ex-post basis to see whether their actual implementation passed the social cost-benefit test.

A framework in place to conduct cost-benefit analysis could improve the regulatory reform decision-making processes. For example, in Australia, all regulatory proposals are required to undergo a preliminary assessment to establish whether they are likely to have an impact on businesses and individuals or the economy as a whole. If any proposal is likely to have a significant impact, more detailed analysis should be undertaken and documented in a Regulation Impact Statement.

Policy recommendations – Next steps for APEC member economies

What could APEC member economies do to improve the quality of the regulatory reform process in the fields of energy efficiency and renewable energy? We suggest focusing efforts in the following three recommendations:

Strengthening the collaboration between the APEC Economic Committee and other Working Groups and promoting the development of metrics to properly assess regulatory policies

The effective application of regulatory reforms involves an understanding of both the institutional process to implement policies and expert knowledge in various domains of society and economy affected by the proposed reforms. The APEC Economic Committee and the APEC Energy Working Group could collaborate closely to develop broad and transferable best-practice metrics and systems of assessment for proposed regulatory policies in energy efficiency and renewable energy.

Without reasonably measurable parameters and impact magnitudes that make up a robust cost-benefit analysis, it is not possible to determine whether policies are promoting the desired energy efficiency and environmental benefits at minimum cost.

Collaboration between APEC member economies will raise awareness among government officials about relevant economic and energy-related information (e.g. indicators, proxy measures, methodologies) that is already available. Best-practice guidance and capacity building would form key components in establishing rigorous norms in conducting robust analysis and regulatory impact statements.

Emphasis on more widespread use of cost-benefit analysis

Regulatory reform outcomes can be improved through more widespread use of cost-benefit analysis as a tool in the decision-making process. During the policy proposal stage, it is natural to focus on the potential benefits of the regulations and whether they meet important energy security and environmental objectives. This should then, however, be followed up by a robust ex-ante cost-benefit analysis that accounts for all the expected social benefits and costs of the regulatory reform. Furthermore, once the policies have been implemented, it is also important to undertake an ex-post cost-benefit analysis that takes into account the actual social benefits and costs, so that policymakers can evaluate if actual realized benefits outweigh the costs.

Indeed, promoting the results obtained in the CBAs, via proper communication channels, could help in the implementation of reforms. This can help enhance transparency in policy making and implementation.

Sharing experiences and exchanging views on how best to apply cost-benefit analysis would be useful, especially since some economies (such as the US) have more experience than others in using CBA prior to implementing reforms.

Accurately measuring the costs and benefits of the different efficiency and conservation programs is difficult for several reasons. Among the first challenges faced by any cost-benefit analysis of government energy-efficiency regulations is defining baselines in order to assess the improvements that would have occurred in the absence of regulations. We have also noted the problem of unobserved costs and benefits in standard ex-ante engineering analysis that make it difficult to measure the welfare impacts of various regulations. Yet another issue relates to the existence of free riders, that is, those who receive subsidies for appliances or equipment that they

would have bought anyway. The presence of rebound effects further complicates outcomes and often leads to an over-estimation of energy savings⁶. It should also be noted that CBA can also be subject to differing interpretations. For instance, the analyses of US CAFE standards carried out by the Environmental Protection Agency and the National Highway Traffic Safety Administration has been subject to critical debate among economists and there remains considerable uncertainty over welfare implications of such standards.

APEC should continue efforts in developing capacity-building events in CBA, such as training programs in Regulatory Impact Assessments. Evidence found out that most of the CBAs available in regulatory reform in energy efficiency and renewable energy in APEC are ex-ante, not ex-post. However, it is equally critical to close the cycle in terms of regulatory assessments, by conducting CBA after the implementation of the measure in order to examine how well the policies worked and whether the objectives were reached and are within reach in the first place. In the case of energy efficiency policies, in particular, many of the possible impacts of the policies (such as rebound effects) are difficult to predict during the policy formulation stage, but can be quantitatively measured once the policies have been implemented. These ex-post assessments should include an analysis of the compliance costs from the implementation of the initial reforms and check if these costs were larger than initially expected.

Promoting mechanisms to strengthen stakeholder consultation

One of the limitations found in some places is the lack of formal mechanisms to implement consultation processes with stakeholders to improve the regulatory reform process. APEC could promote capacity-building activities focusing on the institutional processes to guide successful regulatory reforms. Workshops on the implementation of transparency mechanisms and change management processes can provide government officials with new tools to strengthen stakeholder consultations to discuss reform proposals.

In designing mechanisms for stakeholder consultation, careful attention has to be paid to some of the issues that can arise. A wide range of stakeholders should be consulted, including not just industry associations but affected consumer groups and non-governmental organizations (NGOs) as well, in order to ensure that the consultation process reflects a broad spectrum of views; this will also help minimize the chances of the regulatory process being too strongly influenced by narrowly defined interest groups. At the same time, timelines for completing stakeholder consultations should be defined and adhered to so that regulatory reforms are implemented on time and without unnecessary delays.

Notes:

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2. This study is available in the following link: http://publications.apec.org/publication-detail.php?pub_id=1397
3. International Energy Agency, *World Energy Outlook 2011* (Paris: IEA/OECD, 2011).
4. For instance, the Congressional Budget Office estimated that the cost of mitigating one metric ton of CO₂e of greenhouse gases (GHG) using biofuel tax credits was as much as USD 750 for ethanol, about USD 300 for biodiesel, and USD 275 for cellulosic ethanol. See Congressional Budget Office. 2010. Using Biofuel Tax Credits to Achieve Energy and Environmental Policy Goals. Washington, DC: Congressional Budget Office. A detailed discussion of the economic and environmental implications of biofuel policies can be found in the chapter on biofuels in the *Regulatory Reform – Case Studies on Green Investments* study, which is available in the following link: http://publications.apec.org/file-download.php?filename=2013_psu_Regulatory_3.1-Biofuels_US_Indonesia.pdf&id=1397_toc
5. One of the exceptions found in the case studies was ex-ante CBAs concerning the Philippines' Energy Efficiency Component of the Clean Technology Fund Investment Plan, which seeks to implement projects aiming to achieve electricity savings. For instance, one of the projects replaced incandescent light bulbs with more energy-efficient technologies, such as fluorescent lights.
6. The rebound effect refers to the increasing consumption of energy services following an improvement in the technical efficiency of delivering these services. The increasing consumption of energy may offset the energy savings that may be achieved. For more information, see Dimitropoulos, John and Steve Sorrell, *The Rebound Effect: Microeconomic Definitions, Extensions and Limitations*, Working Paper, UK Energy Research Centre, April 2006.

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