Evaluating Policies for Energy Provider-Delivered Energy Efficiency

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Abstract

Energy providers have proven effective in delivering energy efficiency – if the right regulatory framework and enabling conditions can be established. In fact the past decade has seen a worldwide trend in mobilizing energy providers to invest in energy efficiency, with new obligations policies being implemented in the US, the EU, Australia, and China. This paper reviews emerging trends around the world for energy provider-delivered energy efficiency. The paper considers key policy design issues encountered by governments in developing energy efficiency policies for energy providers, drawing on the results of stakeholder workshops held in Australia, Europe and North America. The paper also suggests some evaluation priorities for ensuring that the experience gained in energy provider-delivered energy efficiency is reflected in future policies.

Introduction

The power sector will play a pivotal role in global efforts to manage primary energy demand growth and reduce greenhouse gas (GHG) emissions. According to the 2011 World Energy Outlook, The power sector is expected to account for 2/3 of cumulative emissions abatement to 2035, through switching to less carbon-intensive generation, more efficient plant operations, and lower electricity demand. Reducing electricity end-use demand alone accounts for one-third of reduced GHG emissions over the next 10-15 years.

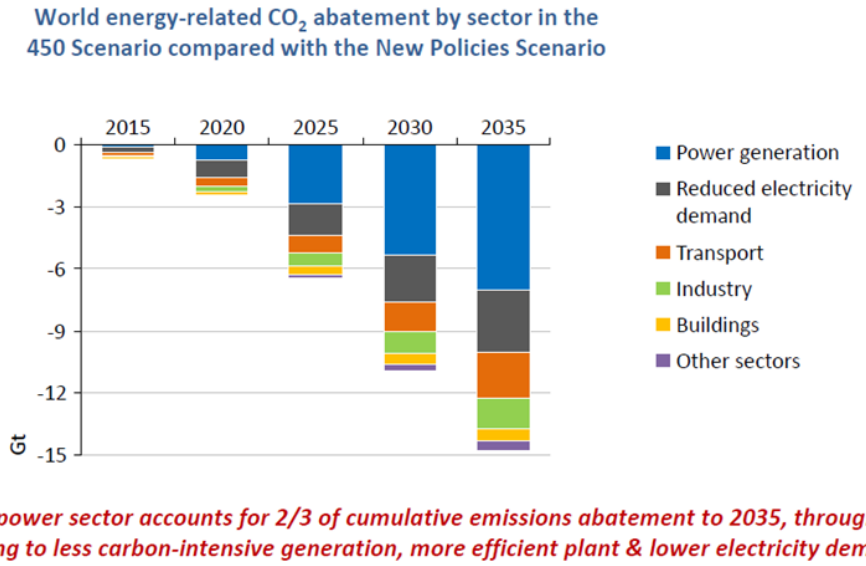

Figure 1: World energy-related CO2 abatement by sector in the 450 Scenario

The term "energy provider" refers to entities that either sell energy directly to end users (energy retailers) or transport energy to end users' dwellings or premises (energy network operators). In some jurisdictions these two functions are combined within vertically integrated energy utilities. In many countries energy providers play a central role in scaling-up end-use energy efficiency improvements. Ratepayer-funded spending on gas and electricity energy efficiency in the United States and Canada topped USD 6 billion in 2010, and in some jurisdictions energy providers spend over 3 percent of revenue on energy efficiency (Caracino and Nevius, 2010; Sciortino et al 2011). In the UK, annual spending by energy retailers under the Carbon Emissions Reduction Target (CERT) supplier obligation is now over USD 1.5 billion, while the Italian White Certificates scheme required energy distributers to spend USD 300 million in 2010 alone (Lees 2012). Other G20 countries including China and Brazil have introduced targets and energy efficiency spending requirements for energy providers (Cowart 2012).

Governments and regulators turn to energy providers to deliver energy efficiency for several reasons. Energy providers have a strategic position in energy markets. With their extensive commercial relationships with even the smallest end-use customers, energy providers can help access energy savings in diffuse markets. Energy providers often have a ready-made delivery infrastructure by virtue of offices and facilities in their area of operations. Energy providers also enjoy name recognition by end-users, and are often viewed as an impartial or objective source of information. Energy providers also have extensive data on the consumption habits of energy consumers (International Energy Agency 2010). In short, energy providers are well positioned to overcome the key barriers - lack of awareness on the best energy efficiency measures, the "hassle factor" of procuring the measure, and perceived risk on performance and cost – that prevent consumers from investing in energy efficiency.

Increased involvement in energy efficiency by energy providers led the IEA to devote one of its twenty-five Energy Efficiency Policy Recommendations specifically to energy providers. The IEA recommends that Governments should:

- Ensure that verifiable energy efficiency options are allowed to compete directly with energy supply options in resource procurement and wholesale markets;
- Oblige energy providers to deliver cost-effective energy efficiency to end-use consumers;
- Require that energy customers be provided with cost-reflective pricing, supporting information and technology necessary for consumers to better understand and manage energy use; and
- Consider utilizing energy tariffs as a funding mechanism for energy efficiency.

In addition to promulgating these recommendations, the IEA and its working partner the Regulatory Assistance Project (RAP) have initiated a work program focused on energy efficiency and energy providers. Formulated under the auspices of the International Partnership on Energy Efficiency Cooperation (IPEEC) and led by the UK's Department of Energy and Climate Change, the Policies for Energy Provider Delivery of Energy Efficiency (PEPDEE) programme was established to promote cooperation and knowledge-sharing on how energy providers can improve the energy efficiency of their customers. Other governments supporting this work include the US, Australia, and the European Commission.

Key activities in this work program include:

- Review of regulatory and governmental policy mechanisms for mobilizing and obligating energy provider delivery of energy efficiency;
- Stock-taking of energy efficiency delivery schemes employed by energy providers;
- Regional policy dialogues in Australia, the European Union, and North America; and
- Identification of issues and recommendations for governments to consider in formulating policies for energy provider delivery of energy efficiency.

Review of Regulatory Mechanisms

The Regulatory Assistance Project (RAP) performed a global review of regulatory mechanisms used to mobilize energy providers to deliver end-use energy savings. (Swanson 2012). This review draws lessons from worldwide experience across diverse economic settings to describe regulatory mechanisms that energy market regulators and other government authorities have found useful in enabling and mobilizing energy providers to invest in energy efficiency. The review is selective, identifying twelve mechanisms that governments have used most often and most effectively. Eight of the mechanisms focus on using energy provider resources to achieve energy efficiency; another four underpin the success of the first eight. The review explains how each of those regulatory mechanisms functions in different market settings to mobilize resources or enable effective energy efficiency programs. The review also identifies issues that contribute to successful implementation, and provides examples of the policy development process in action.

The eight main regulatory mechanisms are:

- Energy efficiency obligations;
- Integrated resource planning;
- Securing stable funding for energy efficiency through energy provider revenues;
- Creating or adapting existing markets to mobilize energy efficiency investments;
- Disclosing opportunities for implementing demand-side resources in system resource plans
- Performance incentives for energy providers;
- Energy tariff design;
- Establishing independent energy efficiency providers;

The four additional policy mechanisms underpinning successful implementation of energy provider-delivered energy efficiency include:

- Decoupling throughput from energy provider profitability.
- Measurement and verification (M&V)
- Tradable white certificates
- An unambiguous policy commitment to energy efficiency

This paper will focus on energy efficiency obligations, as they are the most commonly found regulatory mechanism and the subject of new energy provider-energy efficiency policies in several parts of the world. Many of these obligations policies were born in the era of regulated electricity and gas utilities. However, in recent years obligations have been extended to not only

unbundled and competitive industries (e.g., retail gas and electricity suppliers), but an expanding circle of energy providers, including heating and district heating schemes and even road transport fuel providers (Leinekugel le Cocq 2012).

Energy Efficiency Obligation Design Parameters

Energy efficiency obligations are sometimes called "energy efficiency portfolio standards", "energy efficiency resource standards", "energy efficiency commitments" and "energy supplier obligations". This paper will use the term "energy efficiency obligation" (EEO). An EEO requires the obligated parties to meet a specific energy savings target by delivering or procuring approved end-use energy efficiency measures. All EEOs share three key features:

- a clearly delineated target for energy efficiency improvement, shared equitably between the obligated parties;
- penalties that accrue to obligated parties that do not meet their targets;
- a system that defines the energy savings activities that can be used to meet the target, measures, verifies and reports the energy saving values of these activities, and *post hoc* review to assure that claimed activities actually took place.

Typically, an EEO sets energy savings targets to be achieved over several years. Obligated parties must achieve the targets through reductions in energy consumption by end users. EEOs are often placed on providers of grid-bound energy (e.g., electricity and gas), but can also be placed on providers of other fuels (e.g., liquid petroleum gas or LPG, heating oil and transport fuels). Table 1 outlines the major design parameters for EEOs and suggests the extent to which an EEO can be customized to fit energy market conditions and country context.

There is an additional key requirement for effective EEOs irrespective of design choices - measurement and verification (M&V). M&V provides an essential guidance and oversight system that informs all stakeholders and maintains the credibility of energy efficiency programs. Establish an M&V methodology prior to program implementation is essential in order to provide an objective basis for assessing progress toward energy efficiency goals. M&V must be conducted by competent M&V professionals according to well established professional standards.

Table 1: Design Elements for EEO Mechanisms

Design parameter	Design choices			
Policy objectives	Acquire cost-effective energy efficiency as an energy resource	Reduce energy bills for all, or a subset of, end-use customers	Stimulate the development of an energy services industry	Mix of several different objectives
Legal authority	Enabling legislation	Regulation under existing legislation	Mix of enabling legislation and regulation	
Fuel Coverage	Networked fuels only (e.g., electricity and gas)	Include other fuels (e.g., LPG, heating oil, transport fuels)		
Sector and facility coverage	Residential, commercial, industrial sectors?	All energy end-users in a sector	Specified end-users selected by consumption level	Exclude certain end-users, e.g., energy-intensive trade-exposed industries

Energy savings target	Primary or end-use?	Annual or cumulative?	Denomination unit: energy or GHG emissions?	Time frame (e.g., 10 years, 20 years)
Sub-targets and portfolio requirements	Reduction in peak demand	Number of specified end-users reached (e.g. disadvantaged households)	Number of specified activities completed (e.g. whole of facility retrofits)	No sub-targets or portfolio requirements included.
Obligated parties	Omit the small energy providers?	Networked energy providers only or all energy providers?	Retailers and/or transmission and distribution system operators	
Performance incentives	Incentives for out-performance against scheme targets	Incentives for installation of specified energy efficiency measures	Incentives for specific customer classes	No performance incentives available
Cost recovery	None	Through regulated rates	Through a public benefits charge	Treated as a cost of energy providers doing business
Eligible energy efficiency measures	Only pre-approved measures with deemed energy saving values	Include pre-approved measures with ex post measurement of energy savings	Include any cost-effective measure with ex post measurement of energy savings	
Means of Procurement	Energy providers directly implement energy efficiency measures	Energy providers engage third parties to implement energy efficiency measures	Purchase of verified energy savings achieved by accredited third parties or other energy providers	Dedicated energy efficiency utility established to implement energy efficiency measures to meet the energy saving target

Global Examples of Energy Efficiency Obligation Policies

Currently, there are over 30 EEO schemes around the world which can be arrayed according to these design elements. Table 2 lists the predominant countries around the world. Note that in the US alone there are 24 states with some form of EEO in place (Nowack et al. 2011). Based on available data the total annual global spending on energy efficiency financed through networked energy bills and/or delivered by energy providers can be estimated at over €8 billion in 2011. Most of this spending stems from national and state/provincial efforts in Europe and North America.

Table 2: Notable obligations schemes from around the world (Lees 2012; Crossley and Swanson 2011; Faruqui 2011; Heffner 2012)

Country	Obligated Entities	Eligible Sectors	Administrator	2011 Spending (€ millions)
Belgium - Flanders	Electricity distributors	Residential and non energy-intensive industry	Flemish Government	26
France	Energy retailers & importers of transport fuels	All except EU ETS	Government	300
Italy	Electricity & gas distributors	All including transport	Regulator (AEEG)	200

Great Britain	Electricity & gas retailers	Residential only	Regulator (Ofgem)	1,200
Denmark	Electricity, gas & heat distributors	All except transport	Danish Energy Authority	40
New South Wales (Australia)	Electricity retailers plus electricity generators with directly supplied customers	All except energy-intensive trade-exposed industries	State regulator and energy agency	30
Victoria (Australia)	Electricity and gas retailers	Residential (commercial to be added in July 2012)	State regulator and energy agency	50
South Australia	Electricity and gas retailers	Residential only, with disadvantaged group targets	State regulator and energy agency	TBD
US aggregate	Gas and electricity distributors and retailers	All	State regulators	5,230
Canada aggregate	Gas and electricity distributors and retailers	All	Provincial regulators and energy agencies	880
Brazil	Electricity distributors	Mainly households, businesses, public facilities, with new targets for disadvantaged groups	National regulator	200
TOTAL				8,130

Global policy discussions on energy provider-delivered energy efficiency

The Australian Context

Energy savings and greenhouse gas reduction targets have been placed on energy providers in three Australian states, commencing with New South Wales in2003 (Crossley 2008; Crossley 2009). Two of these schemes, in New South Wales and Victoria, include tradable energy efficiency certificates ("white certificates"). Accredited third parties can create certificates and this has enabled the development of a vibrant energy efficiency industry in these two states. Some trading of energy savings takes place in the South Australian scheme but without creating certificates. The individual state schemes vary considerably, but taken together approach €80 million in annual spending (Crossley and Swanson 2011). This spending level is likely to rise, as the targets which individual retailers are obliged to meet are scheduled to increase over the next few years.

Parallel to the growth in these state schemes is consideration at the Commonwealth Government level of a national Energy Savings Initiative (ESI) to replace existing state schemes. The Commonwealth Government is scheduled to take a decision this year on whether to pursue a national ESI. This decision will be based on economic modeling of alternative designs, including a regulatory impact analysis, together with consultation with community, industry and state and territory governments. Early expectations are that a national ESI would have broad coverage (e.g., residential, commercial and industrial sectors) and would create an incentive or a requirement to achieve energy savings in both low-income homes and in ways which reduce peak electricity demand (Harris 2011).

Most stakeholders acknowledge the potential benefits that could be realized by consolidating and streamlining the existing state-based schemes. A nationally consistent approach may reduce compliance costs for participating businesses (which are typically passed through to consumers) and would recognise that the market for many energy efficient products and services is a national one. A nationally consistent approach may also present advantages to regulators, obligated parties and third parties (for example energy service companies) through the operation of a single set of rules and regulations (Department of Climate Change and Energy Efficiency and Department of Resources, Energy and Tourism 2011).

Any national obligation scheme would also need to specify the other design parameters illustrated in Table 2 – setting annual targets, specifying sector and fuel coverage issues, determining energy saving activities to be considered eligible – plus establish the steps required for a smooth transition from state-based schemes to a national scheme.

A PEPDEE regional workshop held in Australia in December 2011 highlighted key lessons that have emerged from the experiences to date of the three state based schemes and tabled several suggestions regarding the design of a national Energy Savings Initiative:

- **Tradability** of energy savings is considered quite important for obligated parties, especially smaller ones. Many electricity retailers can't develop the large back-office systems needed to directly implement energy efficiency programmes.
- **Scheme harmonization** is important, as is appraising the pros and cons of existing state schemes and applying lessons learnt. Many electricity retailers, especially national retailers working across state boundaries, would prefer a single national energy efficiency obligation over the three existing schemes that are currently in place. Variability in key details like eligible customers, activities, target levels, compliance regimes add to the delivered costs of the energy savings.
- **Measurement and Verification** must strike the right balance between stringency, to ensure 'real' energy savings are achieved, and flexibility, to ensure new energy efficiency measures can be introduced. Stringent measurement and verification standards should be maintained for overall quality assurance and to encourage the adoption of new technologies. Deeming energy saving values for specified energy efficiency measures helps reduce the overhead costs associated with measure implementation.
- As regards **targets,** participants urged taking a gradual approach to stepping up targets. Inclusion of **sub-targets and portfolio requirements** for priority groups, such as low income households, is a difficult subject. Some electricity retailers are opposed to sub-targets, taking the view that energy efficiency and social welfare policy shouldn't be targeted with the same policy tool. Any sub-target adoption should consider that the extra steps required to identify priority households and deliver appropriate measures could increase administrative costs.
- Both electricity retailers and energy efficiency certificate creators support broad **sector coverage** in schemes. Households are a logical starting point for schemes, but there is huge untapped potential in business, services, and industry. However, to develop these markets there is a need for steady and stable market expectations that can only be created by multi-year targets, marginal abatement cost calculations, clear rules and regulations regarding risk abatement and project appraisals.

- Many electricity retailers are happy being the **Obligated Parties** and agree that they are well-placed to deliver energy efficiency to their customers.
- Small energy service companies are often very innovative, so schemes should encourage the participation of **accredited third parties** while maintaining clear rules and penalties to ensure the collective credibility of the scheme is not damaged by a few bad apples.

The European Context

Energy efficiency plays a central role in both the EU's 20/20/20 target and the 2050 carbon roadmap. Energy efficiency is expected to deliver 20 percent energy savings by 2020 and 30-40 percent energy savings by 2050. However, at the present rate of progress, only half of the anticipated 20 percent energy savings coming from energy efficiency will be achieved by 2020. Impact assessment for the Energy Efficiency Directive shows that energy efficiency obligations could not only close the 2020 energy savings gap but also produce most of the remaining GHG emissions reductions called for in the 2050 carbon energy roadmap. Exploiting this large energy saving potential requires the energy efficiency market to develop more quickly than it has up until today; accomplishing this will require new forms of regulatory/policy stimulus, such as energy efficiency obligations (Lowe 2012).

Regulatory mechanisms focused on energy provider-delivered energy efficiency are under discussion around the world, but the debate is especially intense within the European Union. The focus of the policy discussion is Article 6 of the Directive on Energy Efficiency proposed by the European Commission's Directorate-General of Energy (DG-Energy). The draft Article 6 states that all Member States should set up an Energy Efficiency Obligation program whose activities would deliver annual energy savings equal to 1.5% of recent energy sales volume expressed in primary energy terms (excluding the transport sector if the Member State so desires). There are opportunities for Member States to adapt alternative policies to EEOs provided that they deliver equivalent energy efficiency savings and use the same methodology to determine energy savings.

Discussions on the proposed Directive, including Article 6, will continue in the first half of 2012. A key practical issue is how the energy savings target is set and how the calculation of energy savings is done, especially considering differences in the current national schemes. Other important elements in the draft Directive include ensuring recognition of the importance of longer lived energy efficiency measures (e.g., insulation) compared to shorter lifetime measures (e.g., lighting and appliances); that programmes may include social aims; that third parties may realise savings. Some of these requirements may be especially difficult on energy companies with a smaller customer base.

Over the course of the two-day EU workshop there was discussion on a number of key points related to energy efficiency obligations for energy providers, including:

- **Diversity but uniform success of EEO policies**. Despite wide variation in how EU Member States have designed and implemented EEOs, each scheme has been judged successful by their Governments and the obligations have expanded over the years.
- **Obligations on transport fuels**. Although France has placed obligations on companies that import transportation fuels, this remains new and unproven territory. Only Ireland and The Netherlands are considering similar policies at present;

- **Financial impact on energy retailers should be considered**, as they may find it difficult to finance their obligations. It was agreed that energy efficiency obligations have to work for energy providers - including the possibility to profit by doing it well.
- **Creating consumer demand including obligations targeted for social reasons.** The UK programme has successfully incorporated social and energy savings goals to date, but there are some problems with consumer demand. Consumers need to be engaged by providing business models which work for them. This combination has been difficult to find with some measures, notably insulation.
- I**nteractions** between obligations policies and other energy efficiency, climate change, and economic policies. There is a need to consider policy overlap and avoid unintended impacts on other policies, such as tax breaks being promoted in conjunction with EEOs
- Building **consumer trust and policy credibility** is important. This involves establishing trusted sources of advice, developing the credibility of delivery agencies, and ensuring effective coordination.
- The **sector focus** for obligations policies will continue to be smaller energy consumers such as households and non-energy intensive small and medium enterprises. This focus plays on the strengths of energy providers in helping overcome common consumer barriers including (i) lack of technical knowledge; (ii) aversion to the "hassle factor" of efficiency improvements; (iii) accessing financing; and (iv) overcoming transaction costs. Energy efficiency obligations also work well for larger users, although for industrial customers it is important to avoid duplication with other policies aimed at this sector (e.g. EU Emissions Trading Scheme or voluntary agreements)
- Some of the most-vexing **market failures**, such as the split incentives (landlord - tenant) problem, cannot be overcome through obligations policies alone.
- **Regulatory capacity building** for National Regulatory Authorities (NRAs) is needed, as they must develop new competencies related to energy efficiency program implementation. Regulators will need to consider issues such as effects on energy market competition, cost efficiency, and customer protection in order to make sure that the effort of achieving energy savings does not affect proper functioning of the liberalized market.
- Energy efficiency obligations must be **long-term** and accompanied by **complementary policies**. A multi-year approach is crucial to stimulating the industrial investment needed to scale-up the supply of energy efficiency products and material. Supplier obligations policies also need complementary financing and fiscal policy measures to support investments with long paybacks.
- **Ancillary policies such as tradability require careful consideration**. Tradability may confer an advantage on obligations polices by harnessing third parties and stimulating energy efficiency innovation, but also brings disadvantages such as added complexity and encouragement of speculative behaviour. The ability of an obligation scheme to encompass trading is dependent on national circumstances; there is no one size fits all. For this and other reasons it is difficult to envisage a pan-European trading scheme in the foreseeable future. If tradability is considered to have a benefit in the context of a particular national scheme, it makes sense to start with a simple scheme.
- **Incorporating social considerations into energy efficiency obligations policies** –there was agreement on including this element in the EU Directive as long as Member States had flexibility to accommodate local circumstances.

The North American Context

The US and Canada account for most of the global energy efficiency spending of energy providers. They also account for the greatest diversity of different regulatory mechanisms including not only 24 distinct EEO policies but a great diversity of other regulatory mechanisms including integrated resource planning, system benefit charges, performance incentives for energy providers, Energy efficiency tariff designs, and independent energy efficiency providers. A recent workshop held under the PEPDEE work programme focused attention on some of the key energy efficiency policy issues facing regulators and energy providers in North America.

The workshop underscored a continuing trend – more and more energy providers, including both distributors and regional network and system operators, have included energy efficiency in their system planning and analysis. This is a major step forward in "legitimizing" energy efficiency as a resource option. The practice has been spreading across the U.S. in recent years and has been assisted by several key states and regions (e.g. CA, NY, PNW, and NE) and by DOE and EPA supported activities such as the National Action Plan for Energy Efficiency and the SEE Action Network.

These resource plans, studies, and analyses, consistently find energy efficiency to be both the lowest cost and lowest risk resource option. However, a countervailing trend which may affect the relative economics of energy efficiency is dramatic reductions in the price of natural gas. Since natural gas is increasingly used both as a direct source of energy and as a generation fuel, low gas prices affect the viability of energy efficiency both as an energy efficiency option and as a resource option. A key issue for regulators and policy makers is the planning time horizon and the expected price levels for natural gas over the coming decade. This situation needs to be monitored carefully by state and federal policy makers.

There is still a lot for energy providers and the energy efficiency industry to learn about best practices and lowest cost methods for delivering energy efficiency programs to consumers, including determining the most productive and cost-effective roles for energy providers in the delivery process. Overall, the industry needs simpler approaches for measurement and valuation of energy savings, and less complicated program designs to make them more attractive (and more affordable) to consumers. Programs targeted to specific market segments, and larger-sized customers in the commercial and industrial sectors, remain among the most cost effective energy efficiency strategies. Implementing simple and highly cost-effective energy provider-led programs for reaching mass markets remains elusive. Codes and standards and market transformation efforts remain the best ways for reaching mass markets.

The need to introduce new technologies continues to be a very important part of energy provider-led energy efficiency programs. For example, the transformation of business practices made possible by IT has not spread fully yet to the energy efficiency industry. There are promising smart grid products and services such as advanced metering infrastructure (for measurement and valuation of energy savings, and information feedback on energy consumption and costs) and distribution automation equipment (for accomplishing conservation voltage reductions) that are entering the marketplace and have potential for improving the efficacy of existing energy efficiency programs substantially. Energy providers are uniquely capable of leading the development of smart grid technologies, tools, and techniques and finding ways to provide them to enhance energy efficiency programs and implementation strategies.

While energy policy priorities change, energy efficiency remains an attractive resource option for federal and state policy makers under a wide variety of future conditions and

possibilities. For example, during those times when environmental protection is a major energy policy driver, energy efficiency is an attractive alternative because less energy consumption translates into lower environmental emissions. When economic growth is major energy policy driver, energy efficiency is an attractive option because it can mean lower energy bills for consumers and many energy efficiency programs are relatively labor intensive resulting in the potential for growth in employment. When energy security is a major energy policy driver, energy efficiency is an attractive option because less energy consumption translates into lower capacity requirements, reduced likelihood of outages, and where oil is involved, lower oil consumption and imports. Energy efficiency continues to be a "no regrets" energy resource and an effective alternative for managing risks in an uncertain, and often highly volatile, global energy marketplace.

Conclusions

Despite important differences in market design and regulatory frameworks, there is surprising commonality in the key design parameters which must be considered in developing energy efficiency obligations policies for energy providers. Each obligation has tended to address these issues and come up with solutions which reflect local circumstances such as the extent of energy market liberalization, the structure and number of the energy providers to be obligated, the local history of energy efficiency & energy providers, the national culture etc.

Basic policy design questions faced across the three jurisdictions described in this paper include:

- How do obligations policies affect electricity prices for consumers, in the short and the long run?
- Who should bear these extra costs?
- How do obligations policies interact with other energy efficiency policies, including other regulatory mechanisms and carbon pricing?
- Does trading improve the cost-effectiveness of obligations scheme?
- Are "distributional safeguards" needed? How should they be provided?
- How should the energy savings target be established?
- How can market distortions in liberalized markets brought on by obligations regulations be minimized?
- How do obligations policies affect wholesale and retail energy markets?

These issues will be further explored in a report to be issued later in 2012. The report will include specific suggestions for evaluation regimes to be considered by governments when reflected on the results of past energy efficiency obligations policies and developing new ones.

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