



A Description of Current Regulatory Practices for the Promotion of Energy Efficiency

EXECUTIVE SUMMARY

21-June-2010



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Introduction

In the framework of the G8 of Energy Ministers, Rome, 24-25 May 2009, gas and electricity regulators from around the world committed to prepare a report on regulatory practices for energy efficiency¹ to be presented to the Muskoka G8 meeting of 25 and 26 June 2010.

This report is the first ever produced by the ICER, the recently founded International Confederation of Energy Regulators². ICER was founded in October 2009 to enable the world's gas and electricity regulators to co-operate on major global issues. The report presents information gathered from the world's energy markets on regulatory practices aimed at fostering energy efficiency.

In the preparation of this report we encountered a number of challenges:

- Energy efficiency is a relatively under-researched field in comparison with its importance as an area of great policy interest in tackling climate change;
- There is very limited systematic gathering of information on energy efficiency beyond national or regional boundaries;
- Comparative analysis of the different approaches used to promote energy efficiency worldwide is also very limited.

This report is the first step in seeking to address these challenges, and through our planned future work we expect to provide a significant contribution to the development of energy efficiency policy and the identification and spread of best regulatory practice.

Proposals for further work

This report is still “work in progress”. We aim to continue our work in this area. Specifically we intend to:

- identify case-studies that have proved particularly effective in order to facilitate the spread of good practice in a practical way;
- continue, on an ongoing basis, the gathering of information on regulatory approaches to fostering energy efficiency, particularly in those regions where information is currently less detailed;

¹ For the purposes of this report the following definition of energy efficiency has been used:

“Energy efficiency is the practice of reducing the amount of energy used without reducing the end-use benefits enabled by that energy. Energy efficiency can be categorized in a number of ways including end-use efficiency and end-to-end efficiency” - Electricity Power Research Institute – www.EPRI.com.

² ICER was founded on 19 October 2009. Additional information is available on: http://www.iern.net/portal/page/portal/IERN_HOME/ICER_HOME



- undertake further comparative analysis of the different approaches to fostering energy efficiency as an aid to policy makers in this area, and assess in particular the prerequisites (e.g. legal, economic and technical criteria) for introducing specific regulatory practices.

Summary of world regulatory approaches to energy efficiency

This section of the paper summarises at a high level the detailed information included in the report. A very wide range of approaches have been identified. The report groups the measures into the following categories:

- Legal and regulatory obligations
- Financial instruments
- Market based incentives (including tradable certificates, tenders and demand side management)
- Voluntary agreements
- Energy audits
- Consumer education and information provision (including billing regulation and smart metering)

Moreover the report highlights provisions on the role of the public sector. A brief definition of each measure has been provided.

Many of the energy efficiency initiatives described in this report have not been put in place by Energy Regulators, but rather by other government agencies. In some cases the energy regulator has a role in the administration or oversight of the programme. This report should therefore be seen as a compendium of energy efficiency measures.

A number of energy efficiency indicators, such as primary energy intensity, primary energy per capita and carbon intensity have been used to facilitate comparison between regions and countries. The analysis shows a general trend towards increased per capita primary energy consumption in most areas, including those which started from a low consumption base. However, most OECD countries, as well most emerging economies such as China, India, Brazil and South Africa show that remarkable gains in energy efficiency have been achieved since the early seventies as there is a marked decoupling between GDP growth and per capita primary energy consumption.

We collected extensive and accurate information for all major jurisdictions through our regional associations and through cooperation with organisations such as the International Energy Agency, the Renewable Energy, the Regulatory Assistance Project (RAP) and Energy Efficiency Partnership (REEP). We would like to thank them for their support in providing relevant data and reviewing parts of this report.



Data has been organised by continent and covers the following jurisdictions:

- **Africa and the Middle East:**
Algeria, Egypt, Israel, Jordan, Morocco, Saudi Arabia, South Africa, Togo, Tunisia.
- **North America:**
Canada (Alberta, British Columbia, Nova Scotia and Ontario).
Mexico.
USA (California, Maine, Massachusetts, Minnesota, New York, Oregon, Texas, Vermont, Washington and Wisconsin).
- **South America:**
Brazil and Uruguay.
- **Asia:**
China, India and Japan.
- **Australia**
- **Europe:**
Armenia, Croatia, European Union Member States, Macedonia, Norway, the Russian Federation and Ukraine.

Competencies of Energy Regulators in terms of energy efficiency vary from country to country and States or Provinces in federal countries such as the US and Canada. Many regulators seem to have at least some competencies, especially with regards to end-use measures, roll out of smart meters, setting demand-side management and administration of energy efficiency programmes, although their elaboration of such programmes and of underpinning energy efficiency legislation usually rests with governments.

An outline of the main findings can be found below.

Africa and the Middle East

Energy efficiency policies has reached up to now very different levels of implementation in this area.

Financing tools to promote energy efficiency differ significantly among Africa and Middle East States: some countries have not established support schemes for energy efficiency yet while others have defined relatively more precise and focused mechanisms to financially promote the reduction in energy consumption (e.g. **Algeria, Egypt, Tunisia and Togo**). Support mechanisms are often in the form of funds, grants and subsidies given directly to the party implementing an energy efficiency project; in few cases soft loans are also provided to beneficiaries. Most of the time, all sectors are eligible for financial support although some countries have also established programs tailored to specific sectors or categories of beneficiaries.



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A relatively small number of countries has set legal requirements and technical standards to improve the energy efficiency of buildings, electrical appliances and vehicles. Moreover, the enforcement of existing rules represents a critical issue also in countries that have established energy efficiency standards.

With regard to regulation for buildings, existing standards often only apply to non-residential buildings. Labelling and efficiency standards for electrical appliances are often based on the experience of other countries where their effectiveness has been already proven: for example, the European label has been used as a model in **Tunisia**.

Energy audits exist in a mandatory or voluntary form in several North African and Middle East countries. They are more common for the building sector while in the transport sector they are at a very early stage and often limited to fleet owners (for example, **Tunisia** and **Algeria**).

A number of African and Middle East countries consider to gradually replace the old meters with electronic ones for energy efficiency purposes. In **Egypt**, for example, a feasibility study has been carried out for the introduction of smart meters on a large scale, and a pilot project has been implemented, involving the installation of about 20.000 electronic meters.

In most countries, no specific regulation of billing exists and no special information that enables customers to understand and reduce their own consumption is provided in bills (like, for example, the level of consumption articulated among different aggregations of hours, or the distributor's energy mix and the related environmental impact).

However, few initiatives have been taken in some countries in order to achieve energy efficiency goals through bills.

Public institutions, both national or international, energy utilities and other organisations carry out information campaigns and programmes to educate the public about what they can do to save energy in many countries.

Load Response programs to avoid shortcomings in the energy supply are not very common in African and Middle East countries.

North America

Canada

The Canadian Government offers financial incentives through initiatives like the EcoENERGY program, which is available throughout the country; some provinces also offer various programs and initiatives. These programs and initiatives can be targeted to the residential, commercial and industrial sectors. For instance, the Ontario and British Columbia Government's installation of smart meters is intended to reduce electricity consumption because, once a smart meter is activated, bills will be calculated based on real-time data, not estimated consumption, which will provide consumers with the necessary information to better manage their electricity costs. Other programs and initiatives are mentioned throughout this report.



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In order to achieve the objectives of conservation, some provinces have put in place legal and regulatory instruments which have led to an expanded role for Energy Regulators in assisting the provinces in achieving these objectives. As an example, in Ontario, the Green Energy and Green Economy Act, 2009, establishes important responsibilities for the Ontario Energy Board and other entities in achieving the Ontario Government's conservation objectives. In provinces like New Brunswick and Quebec, they have established energy efficiency agencies. The mandate of these agencies is to create, monitor and encourage energy efficiency programs/opportunities where necessary.

Mexico

In Mexico, a national program promotes the sustainable use of energy and focuses on increasing energy efficiency and reducing energy consumption in several targeted areas, including lighting, appliances, industrial motors, and buildings. There are several programs that provide low-interest loans to promote improvements in energy efficiency programs. In addition, Mexico is developing a program to promote process, products, and services certification, including the necessary auditing requirements needed for the certification system. Mexican law also requires that electric bills include information promoting the sustainable use of energy. Mexico is taking actions to promote research on the sustainable use of energy, and the development of experts in that field.

United States of America

Individual states are primarily responsible for designing and implementing energy efficiency services in the United States, although the federal government has provided significant funding for existing efficiency programs in recent years. Generally, the provision of information to consumers coupled with financial incentives to implement cost-effective technologies or practices has been a key characteristic of the majority of successful efficiency programs in the U.S..

State public utilities commissions have adopted a wide range of strategies to promote energy efficiency that can include removing natural disincentives for utilities for efficiency, mandating efficiency and/or demand-side management programs.

In some states, the electric utilities implement efficiency programs, and the state public utilities commission develops regulatory mechanisms to ensure that the utilities have the proper incentives to implement efficiency programs without losing revenues from electricity sales. In other states, third parties, independent of the electric utilities, are selected to provide efficiency programs, sometimes in conjunction with electric utilities.

In addition to efficiency programs, certain states have adopted energy building codes, which provide the minimum energy efficiency standards that must be met to construct a building, and appliance standards. Some states create higher efficiency standards for public buildings, such as schools and governmental offices. In addition, the federal government is responsible for maintaining a system for labeling energy efficient appliances, so that consumers have additional information when making purchases of energy-intensive appliances such as refrigerators.



Many states have identified smart grid technologies as an additional mechanism for informing consumers of the amount of power consumed. To date, very few states have had much experience with advanced metering to determine whether smart grid technologies will provide the reductions anticipated. However, the ability to provide customers with information about real-time energy usage and the prices associated with that usage may influence customer behavior. The majority of utilities in the U.S. provide customers information on their monthly usage and compare the prior month's usage to a comparable time period the previous year; in this way consumers now have the ability to discern trends in energy usage and respond accordingly, albeit over the course of several weeks.

South America

Brazil and **Uruguay** have developed national energy efficiency programs affecting the industrial, public, residential, commercial, lighting, sanitation sectors as well as education and schools.

Brazil has two long-established programs, PROCEL and CONPET that aim to reduce electricity consumption in the above-mentioned sectors and the consumption of petroleum based products respectively, as well as a labeling scheme for appliances marketed or produced in Brazil (PBE).

Uruguay has set dual time tariffs for consumers (residential and general) and triple time tariffs (industrial), and is in the process of developing an energy efficiency certificates trading system. It has also launched a campaign aimed to exchange incandescent bulbs for efficient low consumption bulbs.

Asia

China has been implementing an ambitious energy policy in the framework of its 11th Five-year Plan for National Economic and Social Development (2006-2010), which sets a binding energy efficiency target whereby energy consumption per unit of GDP in 2010 should be 20% below 2005 levels.

Existing measures include energy intensity and emissions reduction targets, modernisation of the coal generation fleet, efficiency benchmarks for industries, differential pricing for energy intensive industries, industry-specific energy consumption standards including coal-fired power generation and demand-side management.

China has not implemented market-based instruments, but has developed several effective and innovative instruments, such as the efficiency benchmarks set by the Top 1000 Energy Consuming Enterprises Program, the demand side management in the framework of the Efficiency Power Plant (EPP) and pricing reforms.

The Top 1000 Energy Consuming Enterprises Program is a voluntary tool that sets out requirements and incentives to foster energy efficiency in 1008 participating enterprises responsible for around a third of China's energy consumption and a similar proportion of carbon dioxide emissions.



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According to the action plan of the program, the top-1000 enterprises shall establish an energy conservation organisation, formulate energy efficiency goals, establish an energy utilisation reporting system, conduct energy auditing, formulate an energy conservation plan, invest in energy efficiency improving, adopt energy conservation incentives, and conduct training. Because of the centralised nature of the Chinese economy, compliance to the Top 1000 Programme is mandatory in all but name, which ensures that the objectives of the programme are effectively complied with.

The Efficiency Power Plant is a programme currently being developed in five provinces. An EPP is a bundle of energy efficiency programs designed to yield electricity savings in amounts, timing, and durations that very closely resemble – and are as predictable and substantial as – the output of a conventional power plant. The EPP concept was developed partly to help convey the idea that energy efficiency is a resource comparable to supply-side resources, but also to simplify program design and implementation. By packaging energy efficiency program into large blocks, greater or equal to 300 MW, planners and policymakers more readily see the advantages of incorporating EPPs in power sector planning and investment.

China has also adopted innovative pricing reforms, which link the prices that large industrial consumers pay for electricity to the efficiency of their production. The program applies to the largest energy-consuming industries in the country, such as aluminium, cement and steel. It assigns different electricity prices based on the relative energy efficiency of each enterprise. The most efficient ones pay the standard regional prices for electricity without penalty, while the poorer performers pay surcharges which are being increased on a regular basis.

India launched an extensive energy conservation plan in 2001 which prescribes energy consumption norms and standards for the most energy intensive industries. In addition, the 11th Indian Five Year plan, which sets out key economic development objectives for the country for the period 2007-2012, sets a mandatory energy efficiency target of 5% by 2012 below business as usual levels. Within this framework India has launched several programs such as Bachat Lamp Yojana, which aims to replace incandescent light bulbs with energy efficient and high quality CFLs in households. One of the most innovative aspects of the scheme is that it is partially funded through the UNFCCC Clean Development Mechanism. Other programmes include a standards and labelling scheme, which lays down minimum energy performance standards for energy intensive equipment and appliances, the Energy Conservation Building Code (ECBC), a voluntary system setting minimum energy standards for new commercial buildings and Agricultural Demand Side Management measures that aim to replace inefficient pump sets, other agricultural equipment and street lighting. India is now developing new policy tools that mark a shift from the existing command-and-control measures towards a more market-based policy. The flagship tool of this new policy is Perform, Achieve and Trade, a tradable energy efficiency certificate system for large energy-intensive industries.

Japan has deployed an array of energy efficiency measures covering all sectors of its economy over the past three decades and is one of the most efficient countries in the industrialised world.

The centrepiece of Japan's efficiency policy is the Top Runner programme, which was established in 1998.



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It sets energy efficiency performance targets for categories of machinery and equipment, including imported and domestically manufactured vehicles on the basis the level of the most energy-efficient products on the market at the time of the value-setting process.

Other key policies include the energy efficiency requirements for large scale factories, a mandatory scheme for the reporting of energy efficiency measures for residential and non-residential buildings of over 2 000 square metres (m²), labelling of energy efficiency levels and the assessment of energy-efficient product retailers. Like many other industrialised countries, Japan has launched this year a pilot programme for the development of smart grids and the roll-out of smart meters.

Australia

In Australia a range of legal, regulatory and financial instruments for the promotion of energy efficiency have been introduced by State, Territory and Federal governments. A national framework for policy development by individual governments in respect of energy efficiency – the National Framework on Energy Efficiency (NFE) - has been in place since 2004 following agreement at the Ministerial Council on Energy (MCE)³. In 2008, the Council of Australian Governments (COAG)⁴ agreed to develop a National Strategy for Energy Efficiency, building on and providing \$88m in additional funding to support policy initiatives being progressed under the nine strands of the NFE. The 2008 COAG agreement was motivated in part by the perceived role of energy efficiency in supporting households and businesses in the context of the planned implementation of an emissions trading scheme (ETS). The measures anticipated in the national strategy include assistance to businesses and households, more consistent and stringent efficiency standards, reduction of barriers to demand response, and further assessment of vehicle efficiency. The National Strategy was endorsed and given further practical impetus by COAG in July 2009 through the National Partnership Agreement on Energy Efficiency. These national strategies provide an overarching direction for energy efficiency policy in Australia, and build on initiatives put in place by State and Territory governments, as well as policies previously implemented at the Federal level.

The Prime Minister's Task Group on Energy Efficiency was established in late 2009 to provide advice on options for improving Australia's energy efficiency by 2020. The Task Group is scheduled to provide recommendations to Ministers by mid 2010.

³ The MCE is the national policy and governance body for the Australian energy market, including for electricity and gas. The MCE was established by the Council of Australian Governments (COAG) in 2001.

⁴ COAG is the peak intergovernmental forum in Australia. COAG comprises the Prime Minister, State Premiers, Territory Chief Ministers and the President of the Australian Local Government Association. The MCE is therefore sub-ordinate to COAG.



Europe

European Union, Croatia and Norway

The European Union has established a legal and regulatory framework to promote energy efficiency and to create the conditions for the development of a market for energy services.

The pillars of this policy are the Directive on Energy End-use Efficiency and Energy Services, the Energy Performance of Buildings Directive and the Energy Labelling Directive and various implementing measures and the 2006 EU Energy Efficient Action Plan, now under revision⁵.

In 2007, the EU Council committed to deliver the 20% potential for cuts in primary energy consumption by 2020. EU Member States are required to put in place institutional and legal frameworks and measures needed to remove barriers to efficient end-use of energy.

In most countries traditional financial tools as well as regulatory instruments have been adopted to boost energy efficiency, in particular in the residential sector. Substantial savings in the building sector have been achieved in those countries requiring stricter provisions than those envisaged in the EU legislation. Moreover, gradual phasing out of incandescent light bulbs has been planned in many EU Member States.

Some countries have introduced innovative measures. For example, the Portuguese “efficiency cheque” reduces electricity costs to consumers with verified energy savings stemming from investments in energy efficiency and the British “pay-as-you-save scheme” uses saving on energy bills to pay for the upfront costs of smart meters roll-out. Moreover, some countries (e.g. Austria and the United Kingdom) established a link between energy efficiency support and social policy (programs for schools and low-income households).

Examples of market-based instruments are national tradable energy efficiency certificates systems (so called “White Certificates”) adopted by France and Italy (and in a near future by Poland) and the tender mechanism introduced in Portugal to select energy efficiency measures through a competitive procedure. Other countries, like Norway, rely on energy funds administered by flexible and market-oriented organisations.

In general the introduction and success of a measure depend also on national and local conditions. For example, voluntary agreements between state and local governments on the one hand and the business community on the other have been successfully adopted for years by Northern countries; these measures target particularly energy-intensive industries which contribute significantly to the overall economic activity of these countries. Moreover both the availability of efficient technologies and the availability of information for all the relevant actors (building professionals, end-users, energy managers, etc.) are important pre-conditions to achieve energy savings.

⁵ Information included in this report with regards to European countries is based on data collected by Energy Regulators through questionnaires and internal reports and other public sources (European Commission documents, IEA and Odyssee-Mure data-bases).



International Confederation of Energy Regulators

Five countries are proceeding to a roll-out of electricity smart meters and have adopted a legal framework for implementation of measures in this field. A roll-out is under discussion in another twelve countries. These policies will enable suppliers to develop new price models and end-users to be more active in the electricity supply market. Because of the accurate information smart meters can provide on actual time of use, customers should be encouraged to increase their efficiency in consumer energy and be part of demand-response plans. So far Demand-Side-Management Programs include mostly load interruptibility and time-of-use tariffs.

Most European Energy Regulators don't have any competences on main energy efficiency matters; these rest mainly with the government and ad hoc governmental agencies. Some Energy Regulators play a role in the management of market-based schemes (white certificates schemes and tenders) and/or roll-out of smart meters. In all European countries transmission and distribution tariffs, set or approved by Energy Regulators, are cost reflective and therefore don't include any incentives to increase the volume of transported energy. Some Energy Regulators regulate energy bills and therefore require that bills contain all the elements necessary to ensure that the customer has a complete and clear understanding of the bill. Moreover, in some cases they participate to information dissemination activities to raise public awareness on energy-saving practices.

Armenia, Macedonia, Russian Federation and Ukraine

Most of the Energy Regulators, who responded to our questionnaires, have very little competences and responsibilities in terms of energy efficiency, which are usually shared by several Ministries. Lack of information has been a major obstacle that has prevented us from providing an accurate picture of energy efficiency measures in these countries.

In general, billing is either not regulated or includes minimal information. In most respondent countries there haven't been introduced either certificates or tenders to promote energy efficiency. Energy Regulators from these countries do not support Demand-Side-Management programs and haven't yet adopted energy efficiency measures targeted to low income households. However, from the responses it was evident that smart metering is considered as a topical issue and projects are being initiated in this area. Despite these shortcomings, Energy Regulators rank energy efficiency as an issue of high priority both for their organisations and their countries.

There is a basic need to foster appropriate conditions and prepare a viable legal environment for regulators. It would be also useful to introduce financial measures (grants, subsidies, tax relief) to promote investments in the region.



Contact details of organisations involved in this project

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